



SUMMARY REPORT
HSWE challenges
in the far north



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FOREWORD

The “HSWE challenges in the far north” initiative was launched by the Norwegian Oil and Gas Association in 2010. Employers, unions and government agencies were invited to participate in this work, and a programme committee was established with representatives from:

- interest and employer associations: Norwegian Oil and Gas, the Norwegian Shipowners Association and the Federation of Norwegian Industries
- unions: IndustryEnergy, the Norwegian Union of Energy Workers (Safe), the Norwegian Organisation of Managers and Executives and the Cooperating Organisations (DSO)
- regulators: the Petroleum Safety Authority Norway (PSA) and the Norwegian Petroleum Directorate (NPD).

This work has aimed to increase knowledge related to health, safety and working environment (HSWE) challenges which could be encountered in the far north of the Norwegian continental shelf (NCS), and to establish a common understanding of these issues.

Interest in and commitment to the work have been high. Active participation by and contributions from everyone involved have been important conditions for this tripartite collaboration.

Our thanks go to all those who have contributed to the extensive work involved.

This report from Norwegian Oil and Gas summarises a number of HSWE issues and recommendations related to petroleum operations in the far north. It provides a sound basis for further work on HSWE challenges in that region.

Stavanger, 25 June 2015

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1. SUMMARY

The Norwegian Oil and Gas Association has defined the far north of the NCS as a separate strategic priority area. There are several reasons for this. The far north will be crucial for proving new deposits of oil and gas, so that the Norwegian petroleum industry can continue to deliver in accordance with the demands made on it. The Barents Sea is the largest and most promising area for undiscovered remaining resources on the NCS. Increased commercial activity in the far north is significant for northern Norway, and Norwegian petroleum activity in this region is also important for the nation's overall interests above the Arctic Circle.

The level of safety on the NCS is high. Major improvements have been achieved over the past decade alone. The industry wants to conduct its operations in a safe manner because:

- avoiding harm to people, the environment and material assets has a value in itself
- safe and reliable activity provides its licence to operate on the NCS.

That also applies to petroleum operations in the far north.

However, these activities are not new. The petroleum industry has operated prudently in the far north for several decades. Norwegian Oil and Gas nevertheless wants to learn even more about new and special HSWE challenges which arise as activity moves northwards. The 23rd licensing round provides an example of this shift. The industry must always work to improve learning and experience transfer in order to reduce the risk of major accidents and other HSWE incidents on the NCS, including in the far north.

The "HSWE challenges in the far north" initiative was launched by Norwegian Oil and Gas in 2010. Employers, unions and government agencies were invited to participate in this work, and a programme committee was established with representatives from:

- interest and employer associations: Norwegian Oil and Gas, the Norwegian Shipowners Association and the Federation of Norwegian Industries
- unions: IndustryEnergy, the Norwegian Union of Energy Workers (Safe), the Norwegian Organisation of Managers and Executives and the Cooperating Organisations (DSO)

- regulators: the Petroleum Safety Authority Norway (PSA) and the Norwegian Petroleum Directorate (NPD).

This work has aimed to increase knowledge related to health, safety and working environment (HSWE) challenges which could be encountered in the far north of the Norwegian continental shelf (NCS), and to establish a common understanding of these issues.

A secretariat has searched for and collected literature on behalf of the programme committee. This process has helped to build a solid knowledge base for further work on HSWE challenges in the far north.

As a principal activity within this initiative, the secretariat also planned and executed six working seminars during 2014. Participation in these events was confined to invited delegates, and their programmes covered relevant subjects related to HSWE challenges in the far north.

1. Climatic conditions and communication (Gardermoen, 24-25 March)
2. Health and the working environment (Solstrand, 23-24 April)
3. Helicopter logistics and emergency preparedness (Utstein Kloster Hotel, 6-7 May)
4. Risk management and design (Selbusjøen, 20-21 May)
5. Emergency preparedness (Tromsø, 2-3 June)
6. Logistics and ice management (Stavanger, 17-18 June).

Detailed programmes for all six of these seminars, which were conducted in Norwegian, are provided in appendix 1 to the Norwegian version of this report.

Interest in and commitment to the six seminars were high. A total of 263 people attended from 62 companies, universities, research institutions, public authorities, unions and so forth.

A concluding conference was staged on 4 November 2014 at the Clarion Hotel Energy in Stavanger, where the most important results of the work were presented.

The initiative had the following parameters and boundaries.

- HSWE was defined in this work as health, safety and the working environment (this means that matters related to oil spill response and so forth were not considered).

- The work dealt primarily with issues which could be encountered in those parts of the far north already opened for petroleum activity – in other words, including the 23rd licensing round. Where certain subjects were concerned, it was also natural to refer to issues which could be faced outside the areas currently opened for oil and gas operations.
- All phases of petroleum activity in the far north were covered.
- Efforts were made to confine issues to HSWE-related challenges, but they extended in certain cases to operational matters.

However, a large number of the conditions identified at the seminars as possible problems have already been resolved or a solution will be found during and through the planning of activities in the far north. Operators must plan at all times, together with the vessel owners, for location-specific operations, taking account of geographical position, available forms of communication, area-specific climatic conditions and weather phenomena, helicopter transport and logistics, and location-specific emergency preparedness (including medical preparedness, evacuation and rescue).

All stakeholders have a single HSWE goal for petroleum activities in the far north – the level of risk must be satisfactory. In other words, it must be satisfactory and prudent regardless of where petroleum operations are conducted on the NCS.

Different players will have different roles with regard to:

- deciding that the issue has already been resolved/dealt with
- resolving the identified issues
- following up uncertainties
- filling knowledge gaps.

Players include (this list is not complete or comprehensive):

- operators
- vessel owners
- government agencies (PSA, Avinor, Norwegian Directorate of Health, etc)
- public authorities (Northern Norway Regional Health Authority, the joint rescue coordination centre, armed forces, etc)
- other important players, such as the Norwegian Meteorological Institute, the Norwegian Space Centre, various research institutions, and consultancies
- industry associations, primarily in this context Norwegian Oil and Gas and the Norwegian Shipowners Association.

Note that Norwegian Oil and Gas and the Norwegian Shipowners Association only initiate activities and projects at the request of their member companies.

Initiatives and proposals from the unions and government will be important for further work, and discussion of current issues in various tripartite arenas will also be relevant.

Some areas where follow-up could be appropriate are identified below.

BETTER WEATHER FORECASTING

A recurrent topic of discussion at the seminars was the need for better weather prediction in relevant parts of the Barents Sea. In this context, that involves improved forecasting of specific weather phenomena such as Polar lows, troughs (in other words, very intensive snowstorms), fog and icing forecasts for ships, rigs or fixed installations. Such improvements can be achieved relatively easily through better collaboration between the players – in other words, the industry provides more measuring points and the Met.no service provided by the Norwegian Meteorological Institute contributes through further development of forecasting models. If the industry is to contribute, however, Met.no must provide guidance on the frequency, format and quality of metocean data so that this information can be incorporated directly in the forecasting models.

One question which came up during the technical discussion was whether the available models for forecasting growlers (large lumps of ice in the open sea) are good enough. Assuming that its member companies require and wish this, Norwegian Oil and Gas will propose a study of the issue in close collaboration with Met.no.

EMERGENCY PREPAREDNESS IN THE FAR NORTH

Another subject which aroused great interest and discussions was emergency preparedness in the far north (including medical preparedness, evacuation and rescue). Responsibility for rescue operations on the NCS is divided between private and public players (including the joint rescue coordination centre (JRCC) and the resources available to it), with the former responsible for rescue in a zone 500 metres wide around the facility, and public resources coming into play between this zone and the mainland.

However, White Paper no 7 (2011-2012) on the high north says the following:

The individual commercial player and their industry associations are therefore duty-bound to work systematically to reduce the risk of accidents and to be in a position to handle crises themselves to a greater extent than is necessary in other waters. The government wants to contribute to openness over challenges, development of knowledge and experience transfer.

This can give the impression that the political authorities are thinking in terms of other arrangements for rescue responsibility in the far north. In any event, the White Paper creates some uncertainty over this matter. On behalf of the industry, Norwegian Oil and Gas can discuss these comments with the relevant government agencies so that possible uncertainty is eliminated. The association assumes that the principles for rescue operations will be the same across the whole NCS – in other words, that the government will remain responsible for rescue between land and the 500-metre zone around facilities in the far north.

TELEMEDICINE

Another subject discussed by most of the work groups involved the introduction of telemedicine as a standard tool for far northern operations. A number of operators

have already established this solution for all their activities. One condition for using telemedicine is the availability of communication channels or media which can transfer relevant data.

COMMUNICATIONS IN THE FAR NORTH

A very important topic discussed in the work groups was precisely communications in the far north. Communicating via satellite starts to become challenging and unstable above the 72nd parallel, and is very demanding north of 75° N. The Norwegian Space Centre occupies a key place for further development and improvement of satellite communication in these areas. If the centre is to be able to study the opportunities, develop solutions and assess financing possibilities for satellite communication in the far north, however, a close dialogue with the industry will be needed to specify the latter's long-term requirements. Mention can be made here of the petroleum sector's need for forecasting of space weather conditions which can affect communication and positioning, and of the important part played by access to broadband in emergencies and for telemedicine. If necessary, Norwegian Oil and Gas can help to coordinate contacts between the space centre and the industry.

HELICOPTER LOGISTICS AND EMERGENCY PREPAREDNESS

Helicopter logistics and emergency preparedness attracted great attention at the seminars. The Norwegian Oil and Gas network for aviation (LFE) ranks as the most important player in the sector for following up the issues identified through this work. In addition, the committee for helicopter safety on the NCS (SF) will play a key role.

PROPOSALS FOR GUIDELINES

A number of proposals were made during work on HSWE challenges in the far north for new or revised Norwegian Oil and Gas guidelines. The association will assess these suggestions, and will invite the parties to participate in this work if its member companies request that it takes such initiatives.

HEALTH AND THE WORKING ENVIRONMENT

Health and the working environment were a key topic at the seminars. Operators and vessel owners are responsible for ensuring good and acceptable organisation of work and restitution time. Similarly, appropriate work garments and personal protective equipment (PPE) tailored to the relevant climatic conditions must be available. However, some work clothes and PPE become unusable in certain climatic conditions. Much work is under way with the aim of developing suitable new garments and PPE for the far north, but more development and testing will be needed before these products become off-the-shelf items.

DESIGN AND WINTERISATION

Design and winterisation were frequently discussed in the work groups in relation to such aspects as safety-critical systems, structural integrity, the working environment and so forth. Very many of the issues raised can be addressed in the international standardisation processes being pursued through the ISO. A dedicated structure has been established in

the latter to continue work on the recommendations from the Barents 2020 study.

Norwegian Oil and Gas has already conveyed the various issues raised by the work in the seminars to the relevant standardisation processes in the ISO. It would also be natural for the various players to ensure that the subject of winterisation and design, including recommendations related to safety-critical equipment, is placed on the agenda for other current standardisation activities, such as the Polar Code, Norsok and relevant winterisation manuals.

PROPOSALS FOR RESEARCH

Together with the Norwegian Shipowners Association, Norwegian Oil and Gas will – at the initiative of its member companies – assess proposals to continue current research or begin work on new subjects related to both health and the working environment as well as to the other topics discussed during this work. The two associations will propose relevant research topics to such Norwegian programmes as Petromaks 2, OG21 and Maritim21.

FURTHER WORK

The six seminars generated no less than 383 proposals for further work. In addition to being structured and categorised, these have all been assessed to determine which of them need further follow-up. Possible action has been identified and proposals made about who might accept responsibility for following up these activities. See chapter 7 below. Which activities Norwegian Oil and Gas initiates will depend on the requests it receives from its member companies. All proposals for further activities under the auspices of Norwegian Oil and Gas will be considered and determined by the association's governing bodies.

2. BACKGROUND

Norwegian Oil and Gas has defined the far north as a separate strategic priority area. There are several reasons for this.

- First, the association believes that the NCS must be regarded as a whole. The sea areas off and around Lofoten, Vesterålen, Senja and Jan Mayen also form part of this unified region.
- Second, the far north is crucial for proving new deposits of oil and gas so that the Norwegian petroleum industry can continue to deliver in accordance with the demands made on it. The Barents Sea is the largest and most promising area for undiscovered remaining resources on the NCS.
- Increased commercial activity in the far north is moreover significant because it will create further employment in a region which needs additional jobs.
- Finally, the association would emphasise that Norwegian petroleum activity in the far north is also important for the nation's overall interests above the Arctic Circle.

The level of safety on the NCS is high. Major improvements have been achieved over the past decade alone. The industry wants to conduct its operations in a safe manner because:

- avoiding harm to people, the environment and material assets is the most important consideration of them all
- safe and reliable activity provides its licence to operate on the NCS.

That also applies to petroleum operations in the far north.

However, these activities are not new. The petroleum industry has operated prudently in the far north for several decades. It is familiar with most of the HSWE challenges faced in this region, including Polar lows, icing, winter darkness, atmospheric interference which can affect communication signals, issues related to emergency response, demanding personnel transport and so forth.

Norwegian Oil and Gas nevertheless wants to learn more about new and special HSWE challenges encountered as activity moves northwards. The 23rd licensing round provides an example of this shift. The industry must always work to improve learning and experience transfer in order to reduce the risk of major accidents and other HSWE incidents on the NCS, including in the far north.

This initiative, which began cautiously in 2010, has aimed to identify relevant HSWE challenges in the far north and to contribute to a shared understanding of these issues.

3. ORGANISATION OF THE WORK

3.1 PROGRAMME COMMITTEE

Norwegian Oil and Gas launched the initiative on HSWE challenges in the far north as early as 2010.

The objective was to increase knowledge of HSWE challenges related to petroleum activity on the far northern NCS. Through this work, the aim has been to establish a common understanding of these issues among companies, unions and government agencies involved in this industry.

Norwegian Oil and Gas invited these parties to participate in a programme committee on HSWE challenges in the far north, and the work has built on an active tripartite collaboration.

The following have participated.

Interest and employer associations

- Norwegian Oil and Gas
- Norwegian Shipowners Association
- Federation of Norwegian Industries

Unions

- IndustryEnergy
- Norwegian Union of Energy Workers (Safe)
- Norwegian Organisation of Managers and Executives
- The Cooperating Organisations (DSO)

Regulators

- Petroleum Safety Authority Norway (PSA)
- Norwegian Petroleum Directorate (NPD)

The programme committee had the following mandate:

The committee will prepare a programme for one or more seminars on HSWE challenges in the far north. These seminars will be staged under the auspices of Norwegian Oil and Gas.

HSWE challenges include issues and HSWE strategies for operations in the far north, hereunder conditions related to:

- distance
- inadequate infrastructure
- sea and air temperatures
- ocean currents
- winterisation
- communication
- emergency preparedness
- medical evacuation
- helicopter transport
- the working environment, etc.

The object of the seminars is to lay the basis for a shared knowledge of issues related to operations in the far north among players and stakeholders in the petroleum industry.

The members of the programme committee are presented in appendix 2.

3.2 SECRETARIAT

A secretariat was established to administer and support the programme committee's work. This was responsible for collating existing knowledge and for planning, executing and reporting on the six working seminars. See chapter 5.

The secretariat's members are presented in appendix 3.

4. COLLECTING LITERATURE AND FACTS

An extensive search was conducted for literature, reports, papers, studies and so forth dealing with HSWE challenges related to petroleum activities in the far north. These sources included research findings, internal company studies, and seminar and conference papers.

A number of relevant research programmes and activities were also identified at institutions in Norway and abroad. In addition, the secretariat attended and wrote summary reports on a number of conferences where the far north was a topic.

WHERE CAN I FIND THE REPORTS?

The literature review is documented in Norwegian in:

[HMS-utfordringer i nordområdene - litteraturgjennomgang](#)

This report presents résumés of a large number of relevant reports. Links to the most important individual documents are provided below.

Norwegian Oil and Gas has established a website (in Norwegian only) for the initiative on HSWE challenges in the far north:

<http://www.norskoljeoggass.no/no/HMS-utfordringer-i-nordomradene/>

Presentations from the seminars and summaries of these, as well as the assembled literature and fact bases, have been published on this site. Readers of the paper version of this report are referred to the site to access this material.

4.1 GENERAL/CROSS-DISCIPLINARY

Literature, studies, reports and so forth which relate to general or cross-disciplinary issues are listed below:

[Barents2020 Phase 3 report](#)

[Barents2020 Phase 4 report](#)

[Impact assessment Barents Sea SE13 Tekniske forutsetninger for petroleumsvirksomhet \(OD 2012\)](#)

[Impact assessment Jan Mayen 12 Tekniske forutsetninger for petroleumsvirksomhet \(OD 2012\)](#)

[Arctic Offshore Oil and Gas Guidelines: Systems Safety Management and Safety Culture \(Arctic Council/PAME, 2014\)](#)

[Memo on the Arctic Council \(Juli 2013\)](#)

[Nordområdeutvalgets sluttrapport \(2013\)](#)

[Nordområdene - Visjon og virkemidler \(Meld. St. 7 - 2011/12\)](#)

[Nordområdene - Visjon og virkemidler - en kortversjon](#)

[MarSafe North - Summary \(2011\)](#)

[Barents2020 virkemiddel for fremtidsrettet nordpolitikk \(UD, 2006\)](#)

[The Arctic Islands Adventure and Panarctic Oils Ltd](#)

[AMAP Arctic Oil and Gas \(2007\)](#)

[Moe Arctic Review \(FNI, 2010\)](#)

[Aronson Achieving International Standards in the Arctic \(SPE 2012\) - Abstract](#)

[Exxon Arctic leadership \(brosjyre\)](#)

4.2 CLIMATIC CONDITIONS AND COMMUNICATION

Literature, studies, reports and so forth on issues related to climatic conditions and communication are listed below:

[Impact assessment Barents Sea SE Vær, is og andre fysiske utfordringer \(Met.no 2012\)](#)

[Impact assessment Jan Mayen Vær, is og andre fysiske utfordringer \(Met.no 2012\)](#)

[Norwegian Space Centre: Romværsrapport 2012](#)

4.3 HEALTH AND THE WORKING ENVIRONMENT

Literature, studies, reports and so forth on issues related to health and the working environment are listed below:

[SINTEF 2013 report no F24656 Statoil Arctic protection](#)

[Norwegian Oil and Gas: Arbeid i kaldt klima \(2012\)](#)

[Norwegian Oil and Gas: Arbeid i kaldt klima - faktagrunnlag](#)

[Kalde utfordringer - helse og arbeidsmiljø på innretninger i Nordsjøområdene \(Thelma 2010\)](#)

4.4 HELICOPTER LOGISTICS AND EMERGENCY PREPAREDNESS

Literature, studies, reports and so forth on issues related to helicopter logistics and emergency preparedness are listed below:

[Impact assessment Barents Sea SE 2014 Konsekvenser for luftfart \(Avinor\)](#)

[Impact assessment Jan Mayen 2013 Konsekvenser for luftfart \(Avinor\)](#)

4.5 RISK MANAGEMENT AND DESIGN

Literature, studies, reports and so forth on issues related to risk management and design are listed below:

[Ptil/Iris: Technology and operational challenges high north \(2011\)](#)

[Lubbard: Some Aspects of Arctic offshore floating structures \(PhD, NTNU 2011\)](#)

[Gordeeva: Identification of Criteria for Selection of Arctic Offshore Field Development Concept \(Master, UiS 2013\)](#)

4.6 EMERGENCY PREPAREDNESS

Literature, studies, reports and so forth on issues related to emergency preparedness are listed below:

[Ett hav -SAR-ressursene i oljenæringen og fiskerinæringen \(2013\)](#)

[Sigurd R. Jakobsen: Evacuation and Rescue in the Barents Sea \(Master, UiS 2012\)](#)

[Evacuation from Petroleum Facilities Operating in the Barents Sea \(OMAE2012-83329\)](#)

[Basharat: Proactive emergency preparedness in the Barents Sea \(Master, NTNU 2012\)](#)

4.7 INFRASTRUCTURE, MARITIME LOGISTICS AND ICE MANAGEMENT

Literature, studies, reports and so forth on issues related to infrastructure and logistics are listed below:

[Impact assessment Barents Sea SE 2009 Infrastruktur og logistikk \(DNV 2012\)](#)

[Impact assessment Jan Mayen 2010 Infrastruktur \(DNV 2012\)](#)

[Maritim strategi - Stø kurs 2020 \(Ministry of Trade and Industry 2013\)](#)

[Maritim 21: Maritim transport og operasjon i arktiske områder \(2010\)](#)

[Comen: Coastal and marine engineering and management \(NTNU 2013\)](#)

[Johannessen Eik: Ice mangement in Arctic Offshore \(NTNU 2010\)](#)

[Noble Denton: Pack Ice Management \(2005\)](#)

5. WORKING SEMINARS

The programme committee organised six working seminars during the spring of 2014 on selected HSWE challenges in the far north. The purpose was to bring representatives from the companies, unions and government agencies together with experts on the selected topics in order to collate knowledge about HSWE issues of relevance for petroleum operations in the far north. This was also intended to help establish a shared understanding of relevant HSWE challenges as well as to identify knowledge gaps and unresolved problems.

The seminar subjects were:

1. Climatic conditions and communication
2. Health and the working environment
3. Helicopter logistics and emergency preparedness
4. Risk management and design
5. Emergency preparedness
6. Logistics and ice management.

5.1 LIMITATIONS AND ASSUMPTIONS

The programme committee for the initiative on HSWE challenges in the far north discussed on several occasions whether oil spill recovery should be included in the work. However, it opted to concentrate attention on health, safety and the working environment.

Oil spill recovery is a key topic for petroleum operations in the far north. A working seminar on challenges for oil spill recovery in the region was held under the auspices of Norwegian Oil and Gas in parallel with the work on HSWE challenges there.

The committee also discussed the geographical scope of the initiative. It concluded that work would be confined primarily to areas of the northern NCS already opened for oil and gas operations – in other words, including the 23rd licensing round in Barents Sea South-East. Where certain subjects are concerned, however, it was natural to recognise issues which could be encountered in areas still to be opened for petroleum activities.

Another discussion concerned which conditions could be classified as related to health, safety and the working environment, and which related to operations. The committee opted to define the HSWE concept in a way which extends relatively far into the operational arena.

In addition, the committee debated whether consideration should be confined to challenges faced by drilling and development or to fields on stream respectively, or whether the work should cover all phases of oil and gas activities in the far north. The conclusion was that the work should embrace every phase of far northern petroleum operations.

5.2 PARAMETERS FOR THE SEMINARS

A number of parameters were defined for the seminars, as listed below.

- They should be only open to invited participants.
- Each should be limited to a total of 50 participants.
- Companies, government agencies and organisations represented on the programme committee were invited to nominate one-two participants each.
- Companies with experience from operations in the far north were given priority.
- Companies with operatorships in the Barents Sea were given priority.
- Nominated participants had to be permanent company employees.
- Nominated participants should have a relevant background so that they could contribute actively to the discussions.
- Participants were expected to prepare for the seminars by studying the information pack with background material sent to them in advance.
- Two members of the programme committee were elected as “sponsors” for each seminar in order to ensure that the guidelines established by the committee were observed,

The programmes for the seminars are provided in appendix 1 to the Norwegian version of this report.

5.3 SPEAKERS AND PRESENTATIONS

Speakers at each seminar were identified on the basis of relevant experience from and leading-edge expertise with current issues related to the far north.

A preparatory meeting was held with the speakers before each seminar to ensure that their presentations were aligned with the objective.

All speakers were asked to prepare both a presentation and a summary of this.

5.4 RESULTS FROM THE SEMINARS

A summing-up has been prepared for each seminar. This includes the presentation summaries and a summation of group work. The material has only been distributed to the participants at the relevant seminar, and is intended to serve as a “receipt”/minutes for them.

5.5 PARTICIPANTS AT THE SEMINARS

Table 1 below provides an overview of participation at the seminars.

Speakers, participants and group leaders all took part in the seminars – in other words, all speakers and group leaders played an active role in the group work.

A total of 263 people attended the six seminars, of whom 188 were “unique” participants – in other words, some took part in more than one seminar.

In all, 62 companies/organisations were represented.

Company	Total attending	Company	Total attending
330 Squadron	1	Norwegian Oil and Gas Association	20
Acona	2	Norwegian Org of Managers and Executives	3
American Bureau of Shipping	2	Norwegian Petroleum Directorate	1
Apply Sørco	1	Norwegian Shipowners Association	8
Bayerngas Norge	3	Norwegian Space Centre	6
BG Group	1	Odfjell Drilling	4
Bristow	1	OMV	2
ConocoPhillips	3	Petroleum Safety Authority Norway	14
The Cooperating Organisations	1	PGNIG	5
COSL Drilling	6	Proactima	18
Det norske	4	Prosafe Offshore	1
DNV GL	9	Repsol	2
Dolphin Drilling	3	RWE Dea	3
Dong Energy	5	Safe	4
E.ON E&P Norge AS	5	Safetec	6
Edison Int	2	SARiNor	1
Eni Norge	7	Shell	12
Federation of Norwegian Industries	1	Sintef	2
GDF Suez	5	Space Norway AS	1
Haukeland Hospital	3	Stami	1
IndustryEnergy	11	Statoil	22
Inocean Engineering	1	Storm-Geo	1
Lloyd's Register Consulting	6	Suncor Energy	2
Lundin Norway	2	Telenor Satellite Broadcasting	4
Maersk Guardian	5	Total E&P	2
Met.no – northern Norway	6	Transocean	3
Met.no – western Norway	1	Tullow Oil	1
Moss Maritime	1	University Centre in Svalbard	2
North Energy	2	University Hospital of North Norway	1
Nofo	3	Viking Supply Ships	3
Former head, Norwegian Coastguard	1	Wintershall	4
		TOTAL	263

TABLE 1: PARTICIPANTS AT THE WORKING SEMINARS

5.6 GROUP WORK AND ITS PROCESSING

A detailed description of the way group work was conducted and how materials from the seminars were collated is provided in appendix 4.

5.7 EVALUATION OF THE SEMINARS

All the seminars were evaluated by the participants for their technical content, organisation and mode of work.

As figure 1 below shows, the technical content secured an average rating of 4.78 on a scale of one to six, with six as the top score. Organisation and mode of work were rated at 4.85. The whole series of seminars achieved a rating equal to 4.82.

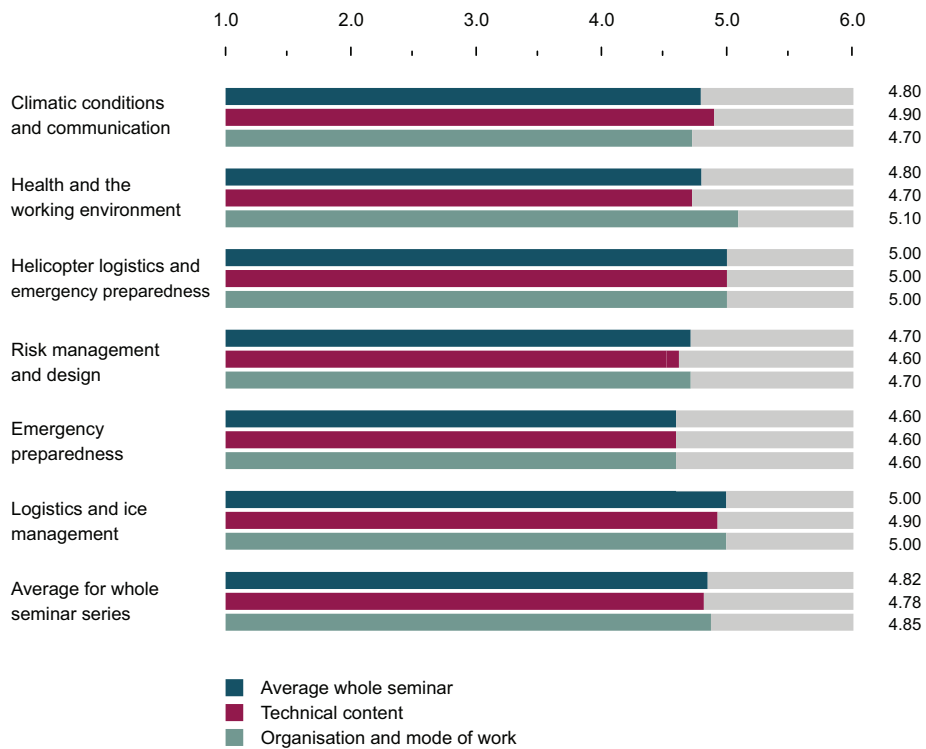


FIGURE 1: PARTICIPANTS' EVALUATION OF EACH SEMINAR AND THE OVERALL ASSESSMENT

6. COLLATING IDENTIFIED ISSUES AND RECOMMENDATIONS

Based on the group work described in chapter 5, issues have been grouped as follows:

- resolved
- easy to resolve
- recommended for further action.

All issues and recommendations/measures have been collated to systematise the information. An issue discussed at several seminars, for example, is merged into a single HSWE challenge. Topics, sub-topics, issues and recommendations have been summarised as briefly and as concisely as possible.

Figure 2 presents an overview of the distribution of identified issues by seminar and overall.

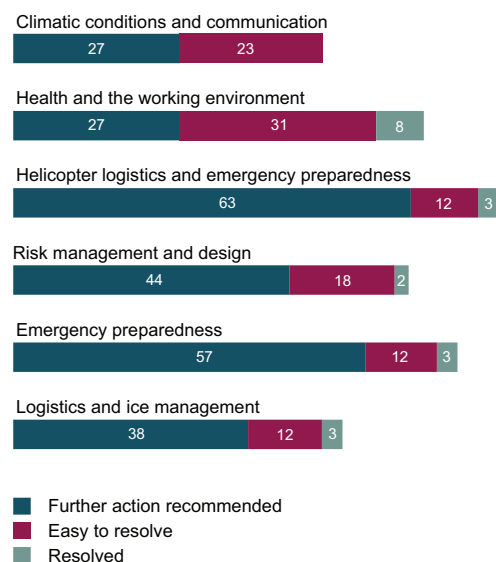


FIGURE 2: DISTRIBUTION OF ISSUES IDENTIFIED BY SEMINAR

Attention concentrated on the issues which the participants considered to require further action. Figure 2 accordingly shows that the work groups regarded only a small number of issues as resolved.

A total of 383 issues were identified during the six seminars. These base data have been aggregated/summarised to produce 54 issues/recommendations split between 10 different subjects. See chapter 7.

1. Climatic conditions
2. Communications
3. Helicopter logistics and emergency preparedness
4. Emergency preparedness
5. Health and the working environment
6. Design
7. Maritime logistics and ice management
8. Operational aspects and infrastructure
9. Regulations, standards and guidelines
10. Risk management

7. ISSUES AND RECOMMENDATIONS

The following summation has been prepared by Norwegian Oil and Gas on the basis of the material from the working seminars and its subsequent collation and aggregation. Starting from the issues identified at the seminars, it provides comments and a status report at 1 April 2015, indicates who is responsible for following up the matter, and identifies possible actions.

During collation of the identified HSWE issues, it has become clear that certain of them have already been resolved. These are nevertheless included in this overview in order to provide a complete picture of subjects discussed at the seminars.

NB! The summaries below are not in any order of priority.

7.1 CLIMATIC CONDITIONS

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
<p>KLI-1</p>	<p>Presentation of the issue More reliable weather forecasting systems in the far north, particularly for Polar lows, troughs (in other words, very intensive snowstorms), fog and icing forecasts for ships, rigs or fixed installations.</p> <p>Operator companies and vessel owners must follow up the requirements in the official consent concerning weather observations and collaboration with Met.no. This will help to improve the quality of forecasting in these areas by providing more measurement points and ensuring that such data are incorporated directly in ongoing predictions.</p> <p>Status and comments at 1 April 2015 Improvements can be achieved here relatively easily through better collaboration between the players. This means that</p> <ul style="list-style-type: none"> • the industry provides more measuring points on rigs, fixed installations and data buoys, as well as assessing opportunities for including supply ships on long-term charters • Met.no contributes through further development of forecasting models • and provides guidelines on delivering metocean data (frequency, format and quality) so that this information can be incorporated directly in the weather forecasting models. 	<p>Operator companies, vessel owners, committee for helicopter safety on the NCS (SF) and Met.no.</p>	<p>The operator companies will seek to install automated weather observing systems (Awos) on the rigs they use for exploration drilling, as well as reporting weather conditions with the aid of trained observers. As the only fixed installation in the area at present, Goliat will also provide this. Furthermore, efforts will be made to ensure that Met.no Tromsø is given access to these data in addition to other desired information (such as sea state and so forth) from the rigs.</p> <p>The SF, chaired by the Norwegian Civil Aviation Authority, will also assess the recommendation as a separate matter and its incorporation in the Norwegian civil aviation regulations (BSL G 7-1).</p> <p>OMV is now working with the weather forecasting service for northern Norway to establish automated data transmission from rigs in the Wisting area (currently <i>Leiv Eiriksson</i>).</p> <p>A joint industry project (JIP) currently being established under Statoil's leadership will involve interested companies (more than 10) in a three-year programme. This will deploy around seven data buoys to improve metocean measurement information.</p>
<p>KLI-2</p>	<p>Presentation of the issue Implementation of a new computer model for the Barents Sea, incorporating sea states, sea ice and atmospheric conditions.</p> <p>Status and comments at 1 April 2015 The Norwegian Meteorological Institute has submitted a project proposal to the Arctic 2030 programme being run by the Ministry of Foreign Affairs for implementing a completely new computer model of the Barents Sea. This will incorporate sea states, sea ice and atmospheric conditions. The model will have a higher resolution than any earlier work in the area. Seeking collaboration with the oil and gas industry could be relevant in order to ensure that the model established becomes even better at providing a picture of weather, sea states and ice warnings in the far north.</p>	<p>Operator companies, vessel owners, Norwegian Meteorological Institute.</p>	<p>Providing that a need and a wish exist among its members, Norwegian Oil and Gas will establish a collaboration with the Norwegian Meteorological Institute.</p>

CLIMATIC CONDITIONS, CONT

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
KLI-3	<p>Presentation of the issue Better aviation weather forecasting needed in the far north.</p> <p>Status and comments at 1 April 2015 As a result of the project, contact was established between relevant players and Met.no instituted terminal aerodrome forecasting (TAF) between Hammerfest and Bear Island in 2014.</p>	Avinor, operator companies, vessel owners, committee for helicopter safety on the NCS (SF), and the TAF service in Tromsø.	Regarded as resolved for the time being (2014). Incorporated in KLI-1.
KLI-4	<p>Presentation of the issue Need for better iceberg warnings.</p> <p>Status and comments at 1 April 2015 The operator companies can currently request iceberg warnings from the Norwegian Meteorological Institute, but the latter has been urged to develop more robust models for this service.</p>	Norwegian Meteorological Institute, Norwegian Polar Institute, operator companies, vessel owners.	Incorporated in KLI-2.
KLI-5	<p>Presentation of the issue Need for growler warnings. These large lumps of ice in the open sea may represent a potential risk, particularly for drill strings and the like.</p> <p>Status and comments at 1 April 2015 This is a demanding job, and no dedicated warning service has so far been put in place.</p> <p>The operator companies/vessel owners must ensure monitoring and adaptation to the actual climatic conditions in the relevant area.</p>	Operator companies, vessel owners, Norwegian Meteorological Institute.	Providing that a need and a wish exist among its members, Norwegian Oil and Gas will propose a study of this issue in close collaboration with Met. no.
KLI-6	<p>Presentation of the issue Need for better icing forecasts – both atmospheric and from sea spray.</p> <p>Status and comments at 1 April 2015 Operator companies can currently request regular icing forecasts from the Norwegian Meteorological Institute.</p> <p>The institute has been urged to initiate relevant studies/modelling work on icing conditions in cooperation with operator companies/vessel owners. Must also be viewed in relation to the Polar Code.</p>	Norwegian Meteorological Institute, Marintek and other relevant research institutions, operator companies, vessel owners.	A meteorologist is currently working on a PhD at the University of Tromsø (UiT) which deals with freezing spray in the Barents Sea. He is testing models for better forecasting. Due to be completed in 2017.

CLIMATIC CONDITIONS, CONT

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
<p>KLI-7</p>	<p>Presentation of the issue Improve local weather forecasting/observations by installing X-band radar on rigs and fixed installations.</p> <p>Status and comments at 1 April 2015 Reference has been made to experience with this in Canada. Goliat will have X-band radars with a range of about 45 kilometres (while the land-based weather radars have a range of about 250 kilometres).</p>	<p>Operator companies, vessel owners.</p>	<p>Included in ENI's plans for Goliat as part of an extensive programme for weather observations.</p>
<p>KLI-8</p>	<p>Presentation of the issue Better coverage by weather radar.</p> <p>Status and comments at 1 April 2015 A weather radar station on Bear Island has been proposed as a good way to improve weather forecasting in the Barents Sea, particularly for Polar lows and troughs.</p> <p>Topographical conditions mean that the siting of the existing meteorological station limits its usefulness. A good solution would be a mountaintop position in the south of the island, but that would call for the installation of power cables and a location in a nature reserve, and would be expensive (more than NOK 50 million). The Norwegian Meteorological Institute is instead considering positioning several mobile weather radars, which would provide a good improvement at lower cost.</p> <p>The institute has now acquired a mobile radar unit for testing at 30 per cent of the cost of a "large" facility. Transportable on a trailer, such a device could also be installed on a rig/production platform.</p>	<p>Norwegian Meteorological Institute.</p>	<p>Weather radar systems on Bear Island could be assessed if further development or increased activity occurs in the western Barents Sea.</p> <p>Using mobile weather radar will be assessed when experience from the test period is available.</p>

7.2 COMMUNICATIONS

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
KOM-1	<p>Presentation of the issue</p> <p>Satellite-based broadband communication is important for operations, emergency response and telemedicine. Communication via geostationary satellites begins to become challenging and unstable above 72° N, and geostationary satellite communication is very challenging above the 74th-75th parallels.</p> <p>Status and comments at 1 April 2015</p> <p>Operations pursued so far have resolved this issue in various ways and with somewhat varying quality.</p> <p>Broadband requirements in the Arctic and the far north (particularly the Norwegian and European sectors) are now being identified by the Norwegian Space Centre in cooperation with Telenor Satellite Broadcasting. This work forms part of a study on whether the basis exists for a Norwegian satellite communication system to provide broadband in the Arctic and the far north.</p> <p>Such a solution has a long time frame, given that it takes five years from the decision point to launch a satellite and that such devices then have an operating life of about 15 years.</p> <p>An important contribution will be for the oil and gas industry to provide information about its (long-term) requirements. Operator companies should study their need for data communication and the advantages/drawbacks of various solutions available (fibreoptic cable and local coverage via mobile broadband versus satellite-based systems).</p>	<p>Operator companies, vessel owners, Norwegian Space Centre.</p>	<p>Norwegian Oil and Gas can contribute by coordinating contacts between the industry and the Norwegian Space Centre.</p>

COMMUNICATIONS, CONT

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
<p>KOM-2</p>	<p>Presentation of the issue Space weather phenomena can affect communication and positioning, and their effect increases the higher the latitude. Forecasts are available today from several sources.</p> <p>Status and comments at 1 April 2015 Operators/vessel owners must ensure that they adopt forecasting of space weather phenomena, and provide the necessary training with such conditions as well as alternative solutions as required.</p> <p>Space weather forecasting is available today from at least three sources:</p> <p>SeSolstorm (Norwegian Mapping Authority): http://sesolstorm.kartverket.no/contact.xhtml?_ga=1.106020426.891284205.1426162726</p> <p>Solar Influences Data Analysis Center (SIDC) (Belgium): http://sidc.oma.be/registration/registration_main.php</p> <p>Space Weather Prediction Center (USA): http://www.swpc.noaa.gov/products/alerts-watches-and-warnings</p>	<p>Operator companies and vessel owners.</p>	<p>Followed up by relevant players.</p>

7.3 HELICOPTER LOGISTICS AND EMERGENCY PREPAREDNESS

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
HEL-1	<p>Presentation of the issue Need for more search and rescue (SAR) helicopters (national SAR helicopter in Tromsø?).</p> <p>Status and comments at 1 April 2015 Norwegian Oil and Gas does not consider it to be the industry's responsibility and role to demand or influence the decision on a new base of this kind in Tromsø to serve activity currently under way or expected in the western Barents Sea. The SAR helicopter in Hammerfest (Statoil/ENI) is the main resource, and is regarded as sufficient for this area – with support from the national SAR resources at Banak and in Svalbard as well as from the Norwegian Coastguard.</p>	Ministry of Justice and Public Security (JBD).	At the request of its member companies, Norwegian Oil and Gas will write to or meet with the JBD to discuss the ministry's plans.
HEL-2	<p>Presentation of the issue Ensure that all helicopters are equipped with satellite communication, de-icing systems and so forth. The SAR helicopters must be equipped for all-weather search and rescue (Awsar) with the latest safety/location systems, such as automatic identification system (AIS) tracking.</p> <p>Status and comments at 1 April 2015</p> <ul style="list-style-type: none"> • The helicopters used today are equipped with Iridium satcom equipment as well as de-icing. • The SAR helicopter is also equipped for AIS tracking in order to locate ships and people in the sea. • Where transport helicopters are concerned, this is already incorporated in Norwegian Oil and Gas recommended guideline 066 on flights to petroleum installations. 	Operator companies, committee for helicopter safety on the NCS (SF).	Further rules are not considered necessary in this area today, but the SF has the subject on its agenda for ongoing work.
HEL-3	<p>Presentation of the issue Establish controlled air space (automatic dependent surveillance – broadcast or ADS-B).</p> <p>Status and comments at 1 April 2015 Avinor is responsible for establishing ADS-B coverage of new areas on the basis of commercial criteria.</p>	Avinor, committee for helicopter safety on the NCS (SF) and the operator companies (where the operator companies are concerned, also with regard to equipment in the helicopters and transmitters on relevant facilities).	<p>The SF will contribute to progress and regulatory entrenchment in collaboration with Avinor as the responsible developer. Implementation could tentatively be completed by 2017, following the other areas of the NCS.</p> <p>A requirement for helicopters to be fitted with ADS-B equipment has been proposed for inclusion when updating Norwegian Oil and Gas recommended guideline 066 on flights to petroleum installations.</p>

HELICOPTER LOGISTICS AND EMERGENCY PREPAREDNESS, CONT

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
<p>HEL-4</p>	<p>Presentation of the issue Develop and phase in opportunities for a fully coupled approach to rigs and airports.</p> <p>Status and comments at 1 April 2015 Active efforts are being made in various fora to prepare solutions for landing approach procedures.</p>	<p>Operator companies, Avinor and committee for helicopter safety on the NCS (SF).</p>	<p>Norwegian Oil and Gas: Requirements for helicopter outfitting as well as training and certification form part of the current updating of Norwegian Oil and Gas recommended guideline 066 on flights to petroleum installations.</p> <p>Avinor: Customising landing procedures for the relevant airports in Finnmark county. A number of meetings have been held to ensure good coordination and progress.</p> <p>SF will also work on this issue to come up with a solution which improves regularity for and reduces the risk of helicopter operations.</p>
<p>HEL-5</p>	<p>Presentation of the issue Improved communication between helicopter, facility/air traffic control (ATC) services and airports.</p> <p>Status and comments at 1 April 2015 Iridium satcom with good coverage is currently available for helicopter tracking. This is already incorporated in Norwegian Oil and Gas recommended guideline 066 on flights to petroleum installations.</p>	<p>Operator companies, Avinor and committee for helicopter safety on the NCS (SF).</p>	<p>Activity is under way to establish satisfactory communication in all phases of air travel to and from rigs in the area. The SF has this on its agenda, and the issue will be followed up in an integrated manner. That includes assessing the need for regulations.</p> <p>It was decided at an SF meeting on 19 March 2015 that the committee would write to Avinor and ask it to look at the opportunities for using Iridium tracking in its alarm service, and to clarify methods for good communication with the ATC service.</p>

HELICOPTER LOGISTICS AND EMERGENCY PREPAREDNESS, CONT

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
HEL-6	<p>Presentation of the issue Simulator training for crews which reflects the special challenges posed by the area.</p> <p>Status and comments at 1 April 2015 Norwegian Oil and Gas recommended guideline 066 on flights to petroleum installations requires extra training in addition to the current official requirements. A proposal to increase SAR training by a total of four hours per crew per annum has been made by the Norwegian Oil and Gas aviation network (LFE) as part of updating guideline 066.</p> <p>This increased training time, combined with the existing robust training regime, can be used to focus attention on special conditions related to the area as well as on the longer flight times.</p> <p>The SF will also contribute by paying special attention to this area, where one result could be regulatory changes.</p>	Operator companies and committee for helicopter safety on the NCS (SF).	<p>A proposal to increase SAR training by a total of four hours per crew per annum has been made by the LFE in connection with updating guideline 066.</p> <p>Statoil plans to hold a training seminar with the helicopter companies during the second quarter of 2015, where this will be one of the topics discussed.</p>
HEL-7	<p>Presentation of the issue Reduce the number of long flights for a crew, viewed in relation to the rotation scheme at the base.</p> <p>Status and comments at 1 April 2015 Each operator company, in cooperation with the helicopter companies, will find solutions which reduce the burden of longer transport flights.</p>	Operator companies and committee for helicopter safety on the NCS (SF).	<p>As and when required, the Norwegian Oil and Gas aviation network (LFE) will take the initiative on a collaboration with the helicopter companies on this issue.</p> <p>The SF will also look at how far regulatory restrictions on flight/work times for pilots are required.</p>
HEL-8	<p>Presentation of the issue Helicopter range in Barents Sea South-East. Intermediate landing?</p> <p>Status and comments at 1 April 2015 Intermediate landing is not required for the southern Barents Sea since two helicopter types (S-92/H225) are available which have the range to make return flights without needing to refuel. An extra landing would only increase the risk, and efforts should be made to avoid it.</p> <p>However, this issue will be assessed in the event of a possible opening of Barents Sea North.</p>	Operator companies.	Not relevant for the southern Barents Sea.

HELICOPTER LOGISTICS AND EMERGENCY PREPAREDNESS, CONT

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
HEL-9	<p>Presentation of the issue Assess restrictions on weight (passenger numbers) in relation to distance.</p> <p>Status and comments at 1 April 2015 This is dealt with automatically in order to comply with applicable regulations. These mean that long-distance flights will reduce the ability to fill all the seats in the helicopter. Forthcoming upgrades to the S-92/H225 machines will extend their range and increase capacity.</p>	Operator companies.	Regarded as resolved.
HEL-10	<p>Presentation of the issue Secure the AWSAR helicopter in a hangar on an installation in a fixed location.</p> <p>Status and comments at 1 April 2015 A hangar would be required if it were considered necessary to position an SAR helicopter offshore in connection with a production facility in a fixed location. No plans exist for this today, since the Hammerfest base covers the area in a satisfactory manner.</p>	Operator companies.	Since this is not a relevant issue today, measures do not need to be adopted now.
HEL-11	<p>Presentation of the issue One or more helicopter bases could be required.</p> <p>Status and comments at 1 April 2015 Capacity is restricted at airports in northern Norway (runway, scheduled flights, hotels) and at the Hammerfest base. The need for and location of a helicopter base in eastern Finnmark will depend entirely on plans for exploration drilling in Barents Sea South-East.</p> <p>A meeting has been held between Norwegian Oil and Gas, certain operator companies and relevant local authorities, as well as Finnmark county council.</p>	Operator companies.	This is under consideration now because of requirements related to new awards in the area through such processes as the 23rd round. Which base or bases are needed depends on safety, regularity, facilities, distance, the duration of drilling operations and logistical costs.
HEL-12	<p>Presentation of the issue Study opportunities for transmitting medical data/images during flights – telemedicine.</p> <p>Status and comments at 1 April 2015 The operator companies (represented by Statoil) have addressed the need for inflight telemedicine with transmission directly to hospitals, including with the helicopter manufacturers.</p>	Operator companies, helicopter companies, helicopter manufacturers.	Work is under way on this. Progress depends on technological advances.

HELICOPTER LOGISTICS AND EMERGENCY PREPAREDNESS, CONT

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
HEL-13	<p>Presentation of the issue Assess whether helidecks are, or can be, tailored to the new AW101 national rescue helicopters.</p> <p>Status and comments at 1 April 2015 On behalf of the Norwegian Oil and Gas aviation network (LFE), Statoil has had a meeting with the team for the national rescue helicopter project and asked it to make sure that the necessary analyses are conducted and approvals secured.</p>	<p>Operator companies, Ministry of Justice and Public Security.</p>	<p>Awaiting a response from the team for the national rescue helicopter project concerning the necessary analyses and approval of the helidecks</p>
HEL-14	<p>Presentation of the issue Consider upgrading existing helicopter types, and look at possible tilt-rotor aircraft/helicopters adapted for long distances.</p> <p>Status and comments at 1 April 2015 This process is under way, with the S-92 expected to be upgraded in the second quarter of 2015 and the H225 a year later. That will provide opportunities to cover all planned distances in Barents Sea South.</p> <p>No other helicopters/tilt-rotor aircraft on the market today or at the planning stage (available in 2024 at the earliest) will increase capacity over long distances in this area.</p>	<p>Operator companies.</p>	<p>Being followed up continuously by the Norwegian Oil and Gas aviation network (LFE).</p>
HEL-15	<p>Presentation of the issue Assess the use of night vision goggles (NVG) for SAR crew during rescue operations.</p> <p>Status and comments at 1 April 2015 Work has been under way on this issue for a number of years. Agreement exists that the introduction of NVGs for SAR crew and as back-up for crew on transport flights will enhance their vision in an SAR context and reduce the risk of landing at and taking off from locations such as Bear Island and Hammerfest.</p> <p>Because of long processing time (more than two years) at the manufacturer and European civil aviation authorities, implementing the use of NVGs in the remaining contract period would be impractical.</p>	<p>Operator companies in cooperation with the helicopter companies.</p>	<p>Work will be pursued to get this requirement implemented for the next contract round in Hammerfest and for possible new contracts covering this area.</p>

7.4 EMERGENCY PREPAREDNESS

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
<p>BER-1</p>	<p>Presentation of the issue A good collaboration with the Northern Norway Regional Health Authority is essential for both telemedicine and general medical preparedness in the far north.</p> <p>During the work, the RHA stated:</p> <p style="padding-left: 40px;">The Northern Norway Regional Health Authority has a large and well-functioning emergency response organisation. In collaborating with the offshore industry, the challenges will lie in coordinating routines and communication channels, [ensuring] compatible medical monitoring and communication systems, and a common understanding of the problems based on the circumstances. [It] welcomes a joint initiative by the offshore industry to establish a collaboration over these challenges.</p> <p>Status and comments at 1 April 2015 An invitation of this kind to collaborate from the public sector is very positive. Experience from cooperation with the Western Norway RHA is a good reference here.</p>	<p>Operator companies/Norwegian Oil and Gas, Northern Norway Regional Health Authority.</p>	<p>Norwegian Oil and Gas can contribute in establishing dialogue as well as in creating arenas for experience transfer between the various players in this area.</p>
<p>BER-2</p>	<p>Presentation of the issue White Paper no 7 (2011-2012) on the high north indicates that the government believes the petroleum industry must accept a widened rescue responsibility – in other words, an expectation exists that private players will have a rescue responsibility beyond the 500-metre zone around an installation.</p> <p>Status and comments at 1 April 2015 Norwegian Oil and Gas recommended guideline no 064 on establishing area emergency preparedness assumes that the division of rescue responsibility will be the same in all parts of the NCS – in other words, that the private players have rescue responsibility in a 500-metre zone around offshore installations, while the public rescue resources are responsible for responses from land out to the 500-metre zone.</p> <p>The new national AW101 rescue helicopters, with substantially increased range and capacity, will be phased in during 2018-19. Through their SAR helicopters, however, the operators will always ensure a satisfactory emergency response for the whole flight phase to and from their installations.</p>	<p>Ministry of Justice and Public Security (JBD).</p>	<p>At the request of its member companies, Norwegian Oil and Gas will take the initiative to contact the JBD in order to clarify this issue.</p>

EMERGENCY PREPAREDNESS, CONT

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
BER-3	<p>Presentation of the issue Assess area emergency preparedness in the Barents Sea</p> <p>Status and comments at 1 April 2015 Uncertainty prevails so far about whether and where fixed facilities might be installed in the area on a scale which could form the basis for a formal area emergency preparedness scheme. Action must await this clarification as a result of developments.</p>	Operator companies	Area emergency response is assessed when several permanent operations/fixed facilities are to be established in an area, so that collaboration over preparedness can be considered.
BER-4	<p>Presentation of the issue Are special performance requirements for emergency preparedness required in the far north?</p> <p>Status and comments at 1 April 2015 The operator companies must ensure that their emergency preparedness analyses take account of conditions in the far north. Since it covers area emergency preparedness, Norwegian Oil and Gas recommended guideline no 064 on establishing area emergency preparedness will not be relevant in the far north for a very long time (the requirement is several fixed facilities in geographical proximity).</p> <p>All stakeholders share one HSWE goal for petroleum activities in the far north – these operations will have a satisfactory level of risk. In other words, the level must be satisfactory and prudent regardless of where petroleum activities take place on the NCS.</p>	Operator companies.	The level of risk must be satisfactory and prudent regardless of where petroleum activities take place on the NCS.
BER-5	<p>Presentation of the issue Need to identify alternative evacuation sites, including methods and transport for personnel in emergencies.</p> <p>Status and comments at 1 April 2015 Bear Island and Hopen can be used today as evacuation sites, since they have facilities, helicopter landing sites and fuel.</p>	Operator companies.	<p>The operator companies must plan for alternative evacuation sites based on location-specific conditions.</p> <p>Bear Island and Hopen can be used today as evacuation sites, since they have facilities, helicopter landing sites and fuel. Facilitating safe helicopter operations as well as necessary equipment must be taken into account when developing emergency preparedness plans.</p>

EMERGENCY PREPAREDNESS, CONT

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
BER-6	<p>Presentation of the issue The Norwegian air force's Orion planes are on stand-by with a 24-hour mobilisation time. This presents a challenge outside normal daytime hours because these aircraft can support the coordination of rescue work in the event of big accidents/emergencies.</p> <p>Status and comments at 1 April 2015 The Orion planes are operated solely by the air force, but can be made available at the request of the joint rescue coordination centre (JRCC).</p>	Ministry of Defence, Ministry of Justice and Public Security.	Information on available public rescue resources has been noted.
BER-7	<p>Presentation of the issue Safety and emergency response training. Assess opportunities for updating/extending the existing Norwegian Oil and Gas guideline 002 on safety and emergency preparedness training by adding an extra module/course for special conditions related to the far north.</p> <p>Status and comments at 1 April 2015 Should special conditions (such as new rescue equipment) related to safety and emergency response training be identified which differ from the regular programme in this area, consideration should be given to updating/extending the existing Norwegian Oil and Gas guideline 002 on safety and emergency preparedness training by adding an extra module/course for special conditions related to the far north.</p>	Operator companies.	At the request of its member companies, Norwegian Oil and Gas will launch an updating/extension process for the existing Norwegian Oil and Gas guideline 002 on safety and emergency preparedness training.
BER-8	<p>Presentation of the issue The Norwegian Coastguard has long operated in the Barents Sea and other northern waters on an all-year basis, and might be able to provide interested parties with knowledge, expertise and experience which could be useful for operations in the far north.</p> <p>Status and comments at 1 April 2015 The Coastguard has shared its operational experience from the far north through the working seminars.</p>	Ministry of Defence.	Further contact will be kept under continuous assessment by the operator companies and vessel owners.

EMERGENCY PREPAREDNESS, CONT

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
BER-9	<p>Presentation of the issue A beacon on survival suits could represent an important aid in SAR operations.</p> <p>Status and comments at 1 April 2015 Several operating companies have incorporated a beacon in their survival suits. The industry should consider working for common solutions.</p>	Operator companies, vessel owners.	At the request of the operator companies/vessel owners, Norwegian Oil and Gas and the Norwegian Shipowners Association can consider including this requirement in a future update of Norwegian Oil and Gas recommended guideline 094 on requirement specifications for survival suits on the NCS.
BER-10	<p>Presentation of the issue Given certain location-specific weather phenomena, conditions could arise during emergencies which make it difficult to use ordinary rescue facilities, such as helicopters and lifeboats.</p> <p>Status and comments at 1 April 2015 Alternative evacuation facilities, such as the Frog, bridges and vessels with heave-compensating systems, could be relevant in the far north.</p>	Operator companies, vessel owners.	At the request of the operator companies/vessel owners, Norwegian Oil and Gas and the Norwegian Shipowners Association can develop descriptions of available solutions for operations in the far north.
BER-11	<p>Presentation of the issue Establish location-specific emergency response solutions, including good medical preparedness, which take account of the relevant conditions.</p> <p>Status and comments at 1 April 2015 This also includes ensuring satisfactory communication during emergencies.</p>	Operator companies.	The operator companies must plan their operations on the basis of location-specific conditions.

7.5 HEALTH AND THE WORKING ENVIRONMENT

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
HAM-1	<p>Presentation of the issue Are special requirements related to medical services/duty doctors and medical resources needed offshore in the far north?</p> <p>Status and comments at 1 April 2015 Possible requirements in this area are set by the government, which must assess the issue.</p>	Directorate of Health, Petroleum Safety Authority Norway.	Possible measures must be taken by the government.
HAM-2	<p>Presentation of the issue Are special health requirements needed for personnel who are to work in particularly exposed areas?</p> <p>Status and comments at 1 April 2015 Possible requirements in this area are set by the government, which must assess the issue.</p>	Directorate of Health.	Possible measures must be taken by the government.
HAM-3	<p>Presentation of the issue Personal protective equipment (PPE) and tools can become unusable in certain climatic conditions in the far north. Low temperatures, for example, could cause problems in keeping fingers warm when doing jobs which require fine motor movements, while icing may block respiratory protection equipment.</p> <p>Status and comments at 1 April 2015 Responsibility for ensuring that work clothes and PPE are acceptable and appropriate for the relevant climatic conditions rests with the operator/vessel owner. See the Norwegian Oil and Gas brochure on <i>Work in a cold climate</i>. Much work is under way with the aim of developing suitable new garments and PPE for the far north, but more development and testing will be needed before these products become off-the-shelf items.</p>	Operator/vessel owner.	A number of development/research projects are under way in this area with industry involvement. Examples include Sintef's ColdWear.

HEALTH AND THE WORKING ENVIRONMENT, CONT

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
<p>HAM-4</p>	<p>Presentation of the issue Encourage continued research on such issues as</p> <ul style="list-style-type: none"> the relationship between cognitive performance and exposure to cold, including fatigue (here in relation to cold exposure associated with petroleum activities in the Barents Sea) psychosocial effects related to petroleum activities in the far north. <p>Status and comments at 1 April 2015 The operator and vessel owner are responsible for ensuring good and acceptable organisation of work and restitution time.</p>	<p>Research institutions, operator companies, vessel owners.</p>	<p>At the request of its member companies, Norwegian Oil and Gas will help to ensure that the issues are communicated to the relevant institutions/research programmes.</p>
<p>HAM-5</p>	<p>Presentation of the issue Follow up work on testing and further development of survival suits for use in the far north.</p> <p>Status and comments at 1 April 2015 The operator companies are following up work on testing and further development of survival suits in line with their requirements. They are pursuing dialogue with the suit developers on this.</p>	<p>Operator companies.</p>	<p>At the request of the operator companies/vessel owners, Norwegian Oil and Gas and the Norwegian Shipowners Association can assess updating Norwegian Oil and Gas recommended guideline 094 on requirement specifications for survival suits on the NCS.</p>
<p>HAM-6</p>	<p>Presentation of the issue Are specific provisions related to tour systems, work organisation and travel time required for the far north?</p> <p>Status and comments at 1 April 2015 The operator companies are responsible for planning and ensuring reliable and efficient personnel transport. New issues could arise when great distances are involved, and consideration must be given to whether alternative forms of travel (ship rather than helicopter, for example) should be adopted.</p>	<p>Operator companies, vessel owners.</p>	<p>The operator companies must plan for location-specific operations. Possible specific provisions for these areas would need to be discussed as part of negotiations on pay and conditions.</p>

HEALTH AND THE WORKING ENVIRONMENT, CONT

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
<p>HAM-7</p>	<p>Presentation of the issue Telemedicine ought to be considered as a standard solution for operations in the far north, depending on the availability and capacity of communication (broadband) on the installations.</p> <p>Status and comments at 1 April 2015 Several operators have already adopted telemedicine for all their activities. This does not solve every problem related to medical emergency preparedness, but provides a very useful diagnostic tool which allows diagnoses to be made with much greater certainty. However, good telemedicine requires that health personnel on the offshore facility are connected to the specialist health service on land. Good collaboration with the Northern Norway Regional Health Authority is accordingly essential (see HAM-1 and BER-1).</p>	<p>Operator companies, vessel owners.</p>	<p>Regarded as satisfactorily resolved.</p>

7.6 DESIGN

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
<p>DES-1</p>	<p>Presentation of the issue It is important that design is tailored for low-temperature areas.</p> <p>Design and winterisation have been frequently discussed in the work groups in relation to such aspects as safety critical systems, plant integrity and the working environment.</p> <p>Status and comments at 1 April 2015 A great many of the issues raised can be addressed in the ongoing international standardisation work being pursued by ISO technical committee 67/sub-committee 8 – Arctic operations.</p> <p>Sub-committee 8 has the following scope:</p> <p style="padding-left: 40px;">Standardisation of operations associated with exploration, production and processing of hydrocarbons in onshore and offshore Arctic regions, and other locations with similar climatic challenges.</p> <p>The sub-committee comprises</p> <ul style="list-style-type: none"> • working group 1: working environment • working group 2: escape, evacuation and rescue • working group 3: environmental monitoring • working group 4: ice management • working group 5: Arctic materials • working group 6: physical environment for Arctic operations. <p>In addition, it would be natural for the various players to ensure that such issues as winterisation and design – including recommendations related to safety-critical equipment – are on the agenda in other current standardisation activities, such as the Polar Code, Norsok standards and relevant winterisation manuals.</p> <p>Where the Polar Code is concerned, this will (hopefully) be approved by the Marine Environment Protection Committee (MEPC) in May. The whole code will then be approved. Work is still under way on some operational guidelines for inclusion in the information section of the code (where the approval process is not as strict as it is with the normative part), and the code is as good as ready.</p>	<p>ISO TC67/SC8, Standards Norway, Norwegian Shipowners Association, DNV GL.</p>	<p>Norwegian Oil and Gas submitted proposals for further work (which have emerged from the seminars) to Standards Norway, which represents Norway in the ISO.</p> <p>These were included in the underlying documentation for the ISO TC67/SC8 meetings in February 2015.</p> <p>The proposals have been sent to the Norwegian Shipowners Association representative for work related to the Polar Code and ISO Arctic operations (the association participates in the working group on escape, evacuation and rescue).</p> <p>Norwegian Oil and Gas will also take the initiative on communicating these proposal to DNV GL (winterisation manual).</p>

DESIGN, CONT

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
DES-2	<p>Presentation of the issue Consideration should be given to whether the Norwegian Oil and Gas recommended guideline 075 for water-based fire extinguishing systems is adequate for the special conditions in the far north. Large volumes of water are discharged from extinguishing systems, and rapid drainage before these can freeze is important. Heat tracing of the drain system will normally be required.</p> <p>Status and comments at 1 April 2015 Statoil and ENI are pursuing studies of and tests with freezing of water in empty cold pipes and deluge nozzles. In addition, trials will be conducted to see how much firewater could freeze to the deck before it drains away. Specific results are required from this work before changes to guideline 075 can be assessed.</p>	Operator companies.	Norwegian Oil and Gas will take the initiative on a revision of guideline 075 when the results of current trials and studies are available.

7.7 MARITIME LOGISTICS AND ICE MANAGEMENT

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
MAR-1	<p>Presentation of the issue Identify the need for tonnage and vessel types to ensure that the right capacity is available at the right time.</p> <p>Status and comments at 1 April 2015 Tonnage requirements for various types of supply and support vessels are regarded as a market issue which will be resolved as and when the need arises.</p>	Operator companies/vessel owners.	Followed up by relevant players.
MAR-2	<p>Presentation of the issue Extend Guidelines for Offshore Marine Operations (G-OMO) in the North West European area (NWEA) to cover new circumstances which could arise in far northern waters.</p> <p>Status and comments at 1 April 2015 G-OMO replaced the NWEA guidelines for safe management of offshore supply and rig move operations on 1 July 2014.</p>		Norwegian Oil and Gas will follow this up at the next revision of the guidelines.
MAR-3	<p>Presentation of the issue Ice management systems must be established for operations in ice-covered waters.</p> <p>Status and comments at 1 April 2015 Extensive experience has been acquired on this issue outside the NCS and by international companies which undertake such assignments. The issue is regarded as resolved for the areas currently opened. Ice management plans were prepared, for example, in connection with Hoop. These primarily involved satellite monitoring and, if the ice comes close, plugging the well and moving the rig from the location. The need for possible improved warnings of ice, icebergs and so forth is dealt with in recommendations KLI-4 and KLI-5.</p>	Operator companies.	Considered for operations in locations where ice can occur, primarily in the north/east.

7.8 OPERATIONAL CONDITIONS/INFRASTRUCTURE

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
<p>OP-1</p>	<p>Presentation of the issue Need for operational collaboration where relevant, including in connection with infrastructure for logistics and emergency response functions.</p> <p>Status and comments at 1 April 2015 A joint seismic survey was conducted in Barents Sea South-East during 2014 with 33 participants.</p> <p>The Barents Sea Exploration Collaboration (Basec) established between operator companies will look at these waters, but with special emphasis on the 23rd round.</p> <p>Five work groups have been established:</p> <ul style="list-style-type: none"> • metocean and ice • the environment and oil spill response • logistics and emergency preparedness • mobile drilling units • health and the working environment. 	<p>Operator companies.</p>	<p>Collaboration has been established in several areas:</p> <ul style="list-style-type: none"> • cooperation on seismic data acquisition in Barents Sea South-East • Basec <p>Further cooperation will be initiated when required.</p>
<p>OP-2</p>	<p>Presentation of the issue Is there a need for alternative personnel transport (instead of helicopters)? Assess methods, systems and infrastructure for alternative personnel logistics/transport.</p> <p>Status and comments at 1 April 2015 Reliable and efficient personnel transport can be a challenge because fog may be very extensive at times, long distances are involved and so forth. Using various types of ships could then be relevant. See also recommendation BER-10.</p>	<p>Operator companies, vessel owners.</p>	<p>At the request of the operator companies/vessel owners, Norwegian Oil and Gas and the Norwegian Shipowners Association can develop descriptions of available solutions for operations in the far north.</p>
<p>OP-3</p>	<p>Presentation of the issue Assess the choice of methods for development solutions in various parts of the far north.</p> <p>Status and comments at 1 April 2015 The choice of development solutions lies so far off that it would not be appropriate to make such assessments on a general basis now.</p>	<p>Operator companies.</p>	<p>Will be assessed on the basis of location-specific conditions when the time comes.</p>

7.9 REGULATIONS, STANDARDS AND GUIDELINES

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
REG-1	<p>Presentation of the issue Through the work on HSWE challenges in the far north, a number of proposals have been made to establish new or revised Norwegian Oil and Gas guidelines.</p> <p>Status and comments at 1 April 2015 Norwegian Oil and Gas will assess the proposals for new best-practice documents which describe recommended solutions for operations in the Barents Sea and, providing the member companies request the association to launch such new initiatives, will invite the companies, unions and government to participate in this work.</p> <p>Similarly, Norwegian Oil and Gas will assess proposals received for revisions when existing guidelines are to be updated.</p>	Operator companies.	Norwegian Oil and Gas will follow up.

7.10 RISK MANAGEMENT

RECOMMENDATION NO	NORWEGIAN OIL AND GAS ISSUES/RECOMMENDATIONS	ADDRESSED TO/RESPONSIBLE BODY	ACTION
RIS-1	<p>Presentation of the issue Risk analyses can only be as good as the information and knowledge they are based on. The most specific possible information and knowledge will always be desirable as input for risk analysis and management.</p> <p>Status and comments at 1 April 2015 For natural reasons, little specific experience exists in Norway from oil and gas operations in cold regions. A good deal of experience data (time series) related to oil and gas activities in the USA and Canada are available from the 1980s, but this material is fairly difficult to access.</p> <p>Where ignition sources are concerned, care must be taken in dealing with particular problems in the far north such as static electricity, thermite reactions and the like.</p>	Operator companies.	The operator companies must assess whether a joint initiative would be appropriate for obtaining and systematising this information from the USA and Canada.
RIS-2	<p>Presentation of the issue Unified approach to icebergs as input for analyses of defined situations of hazards and accidents (DSHA).</p> <p>Status and comments at 1 April 2015 Regarded as dealt with by the existing DSHA on drifting objects. See moreover MAR-3 on ice management systems.</p>	Operator companies.	Considered for operations in locations where ice can occur, primarily in the north/east.

APPENDIX 1: SEMINAR PROGRAMMES

See the Norwegian version of this report for a full overview.

APPENDIX 2: MEMBERS OF THE PROGRAMME COMMITTEE

Aud Nistov	Norwegian Oil and Gas
Eva Fagernes	Norwegian Oil and Gas/GDF Suez
Erik Hamremoens	Norwegian Oil and Gas/Statoil
Arne Haugan	Norwegian Oil and Gas/Statoil
Lill Harriet Brusdal	Norwegian Oil and Gas/Statoil
Atle Houg Ringheim	Norwegian Oil and Gas/Statoil
Rolf Håkon Holmboe	Norwegian Oil and Gas/VNG
Kristin Greig King	Norwegian Oil and Gas/Edison
Ralph Grønning	Norwegian Oil and Gas/Lundin Norway
Pieter Swart	Norwegian Oil and Gas/Norske Shell
Morten A Torgersen	Norwegian Oil and Gas/Dong Energy
Liv Nielsen	Norwegian Oil and Gas/Eni Norge
Øyvind Jonassen	Norwegian Shipowners Association
Erik Dahl-Hansen	Federation of Norwegian Industries
Fredrik Glenjen	IndustryEnergy
Henrik Solvorn Fjeldsbø	IndustryEnergy
Wilhelm Magne Austevoll	Norwegian Organisation of Managers and Executives
Jan Vidar Gausel	Norwegian Organisation of Managers and Executives
Roy Erling Furre	Norwegian Union of Energy Workers (Safe)
Halvor Erikstein	Norwegian Union of Energy Workers (Safe)
Morten Kveim	The Cooperating Organisations (DSO)
Benny E Solheim	The Cooperating Organisations (DSO)
Sigurd Robert Jacobsen	Petroleum Safety Authority Norway (PSA)
Kjell-Gunnar Dørum	Petroleum Safety Authority Norway (PSA)
Odd Raustein	Norwegian Petroleum Directorate (NPD – observer)

APPENDIX 3: MEMBERS OF THE SECRETARIAT

Aud Nistov	Norwegian Oil and Gas	Chair, programme committee
Reidulf Klovning	Norwegian Oil and Gas	Project manager
Espen Hoell	Hired from Proactima to Norwegian Oil and Gas	Consultant
Hans Jacob Beck	Hired from Proactima to Norwegian Oil and Gas	Consultant
Maiken Ree	Norwegian Oil and Gas	Information manager
Kristin Ringsby	Norwegian Oil and Gas	Administrative coordinator

APPENDIX 4: GROUP WORK

Participants in each seminar were divided into work groups comprising people from different disciplines and organisations. That ensured opportunities for effective discussion of the various subjects raised at the seminar concerned. Where the groups had need for expertise, specialists were moved between them to provide information (meteorology, for example, and satellite communication).

TREATMENT OF THE DATA I

- The groups held discussions related to the topic of each seminar.
- Issues and proposals for action were identified within each topic.
- Each issue and measure was categorised as a) resolved, b) easy to resolve or c) recommended for further action.
- Each identified condition was categorised in a brief HSWE challenge.
- Each group presented its findings in a plenary session.
- As a follow-up, the work of the groups (in the form of standardised spreadsheets) was further collated and similar points were merged.
- A summary of the group work was then provided for each seminar.
- Group responses from the various seminars were collected in a database utilising a standard format, which made it possible to see connections between the various seminars – such as general HSWE challenges.

TREATMENT OF THE DATA II

The items above have formed the basis for an extensive systematisation of the overall database. This has involved the following.

- Systematise topics to cover the main subjects addressed at the six seminars – they could thereby be reduced from 26 to 13.
- Systematise issues to achieve a “manageable” quantity – they could be reduced from 191 to 33.
- Systematise measures (resolved, easy to resolve, recommended for further action) – they could be reduced from 383 to 86.
- Topics, issues and measures are to some extent repetitive – in other words, they recur under the “resolved”, “easy to resolve” and “recommended for further action” statuses. The collated measures may accordingly contain elements in all these categories.

An attempt has been made to illustrate this process in the figure below.

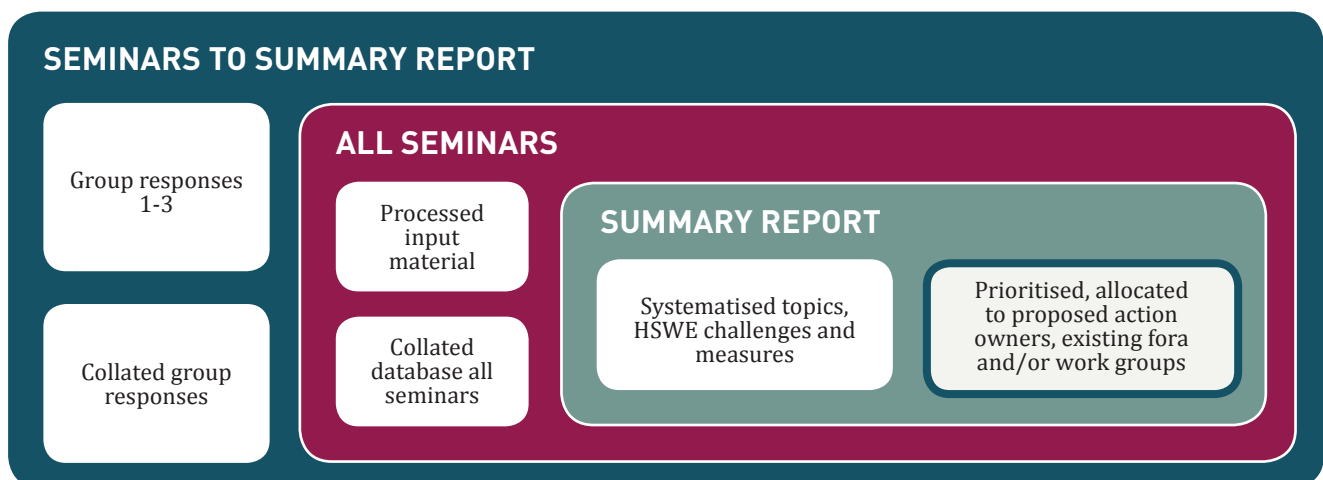


FIGURE 3: GROUP WORK - WORKING METHODOLOGY

This database has given rise to 54 issues/recommendations in the final summary report. See chapter 7.



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