Greenpeace comments to Cairn's application for two test drills in the Sigguk area vest for the Disko Bay

> **"(…) it must not be concealed that effective action in the waters around Greenland is an extremely difficult task. Not only the climate, but also the very large distances, makes a quick and effective response extremely difficult**" (Niels Erik Sørensen, Head of the Island Greenland Command)[1].

Executive summary

There is a broad range of reasons as to why Naalakkersuisut (Greenland Home Rule Government) should reject Cairn Energy's request for permission to commence with the second set of drillings in the Sigguk block west of the Disko Island. There are also very strong arguments that should make Naalakkersuisut abstain from giving further drilling permits for oil at sea. This hearing submission will go through those key arguments and is summarized below.

The process for allowing the drillings is lacking the necessary openness for evaluating the situation, and it is at the same time clear there is a big difference between the Greenlandic authorities' formal standards and the actual standards Cairn has been presented for.

As Cairn has decided not to disclose its emergency response and contingency plan in case of a spill it is impossible to assess the impacts of a spill or the robustness of the response plan. There is however enough information in Cairns Environmental Impact Assessment and Bureau for Minerals and Petroleum's (BMP) paper on permit conditions and security requirements[2] to identify a wide range of problems with security, environmental standards and response measures. These are:

It is very unclear which standards Cairn will follow, and it seems very unlikely that they will follow the best available practices – even though Naalakkersuisut has demanded this. The conditions for the first set of permits (which seems to have been written after Cairn began drilling the first two wells), allows Cairn to largely interpret the standards themselves, and potentially opens for an extensive use of toxic chemicals and discharges of for example water based mud back into the ocean.

The used definition of deep water very conveniently ignores the fact, that the risk for a blowout is at least the same as in the Mexican Gulf, as the drilling technology is very similar. And that adding an extra shear ram won't help solving this, as it probably wasn't the shear ram itself that failed on the Deepwater Horizon, but the supply of energy to start the ram. The term "probably" is used, as nobody yet has a

[1] Forord, Beredskabsplan for Grønlands Kommando til bekæmpelse af forurening af havet med olie og andre skadelige stoffer i farvandet ud for Grønland.
[2] "Godkendelsesvilkår og sikkerhedsvilkår for efterforskningsboringer i henhold til § 15 i tilladelse 2008/10 med eneret til efterforskning og udnyttelse af kulbrinter"; Grønlands Selstyre, Råstofdirektoratet, juli 2010

clear picture of what exactly went wrong in the Gulf, which is only another reason for not approving the next set of deepwater drillings in Greenland.

However, even if Cairn had taken this into account, the complicated drilling situation in the Arctic causes further problems. Spills in ice covered waters are more problematic to clean up and worse for the environment for a wide variety of reasons. However, Cairns modeling of spill effects only assume that spills could happens in the ice free periods. This is very far from true. If a blowout happens, Cairn will only have until end of November to drill a relief well and close the hole before sea ice is expected to cover the area. The assessment in the were that it would take four months. If Cairn is not able to stop a spill before the sea ice gets to thick, they will have to leave it open until spring. There is also a serious risk of spills after the drillings has ended. If Cairn finds oil, they will cover the well head with a security mechanism. The risk of an iceberg hitting the well head on the ocean is definitely present. If that happens, the security mechanisms will unfortunately not provide much safety.

If a larger spill happens, it is not only the potential sea ice that will cause problems. Natural vaporization and dispersion of the oil will only to a very low extent be present in the Arctic. The human effort will therefore be the deciding factor in cleaning up a spill. Unfortunately, all the traditional methods to clean up oil only have little use in the Arctic. Only incineration, which has significant negative side effects, can potentially work. For incineration to work, rapid response is essential. This is not possible in Greenland as the necessary equipment has to be flown in from abroad, which will further hamper the cleaning up.

Introduction

As the sea ice is melting and the earth is getting warmer, areas that used to be inaccessible for industrial exploitation is opening up. That Greenland, one of the countries in the world that is most vulnerable to climate change, sees this as an opportunity to increase the search for oil is paradoxical.

A vast majority of countries support limiting the global warming to a maximum of 2 degree C, as more will cause uncontrollable mechanisms to take over – for example irreversible melting of the Greenland ice sheet.

To limit global warming to a maximum of 2 degrees, the amount of fossil fuel that can be burned is limited. We can in the period up till 2050 only afford to burn less than a quarter of the already known fossil fuel reserves[3]. Now is not the time to start looking for new reserves; now is the time to go new ways – to go beyond oil.

As we have to leave more than 75 percent of the known fossil fuel resources in the ground, means that we have to quickly start a transition to a fossil free economy. This is of course a process that takes time, but the first steps should be to stop exploiting sensitive and deep sea areas. Opening for oil exploration in Arctic waters is extremely risky and can potentially have severe negative impacts not only for the Arctic nature, but also for the livelihood of the Inuit's and Greenlanders.

British Petroleum's mishandling of its activities in the Mexican Gulf resulted in the worst man-caused oil leak ever. A mishandling, that will have severe consequences for the local environment and economy for years to come. In the light of the disaster, USA has instated a moratorium on offshore drillings and EU's Energy Commissioner Günther Oettinger has called for an instant moratorium on deep water drilling and drilling under extreme conditions:
"*Given the current circumstances, any responsible government would at present practically freeze new permits for drilling with extreme parameters and conditions*", (speech in the European Parliament, 8.7.2010).

The only responsible action from the Greenland Government is to cancel further drillings in the challenging areas off the coast West Greenland. As Greenpeace will describe in the following, there is a long range of reasons as to why Greenland should not approve further drilling in its waters, but rather pursue sustainable resource extraction and development.

Access to information

Greenpeace want to stress that the low level of assessable information is extremely problematic for a thorough evaluation of the potential effects of an oil spill. Naalakkersuisut hasn't been willing to disclose neither Cairn Energy's contingency plan for a spill or Naalakkersuisut/BMP's direct comments/communication with Cairn regarding the plans. At the same time the Island Command

[3] Meinshausen et al: "Greenhouse-gas emission targets for limiting global warming to 2°C"; Nature 458, April 30th 2009.

Greenland's (Grønlandskommandoen) response plan from 2007 is in the process of being updated. This means that it is not possible to assess any relevant response plan. And even if the Island Command Greenland's response plan already had been updated, it would not significantly improve the situation, as it has been made very clear that Cairn Energy is responsible for any cleaning after a potential spill. A hearing without inclusion of this information is very problematic, and Greenpeace urges Naalakkersuisut to initiate a new hearing round which at a minimum includes Cairn Energy's response plan.

It is furthermore deeply concerning that BMP's paper on permit conditions and security requirements apparently was written in July – after the first two drillings had begun. As Naalakkersuisut has decided not to disclose its communication with Cairn Energy, it is impossible to assess whether the requirements has at all been included in the response plan and the EIA. It is also unclear whether the BMP has made a new document with permit conditions and security requirements for the two new drillings or if the initial paper will stay in effect. This only further undermines the basis for this hearing – especially as Greenpeace didn't get access to the BMP paper until we filed a request for access to information. And even after this, it took the Greenland authorities more than a month to disclose the permit condition paper.

Standards

Naalakkersuisut claims to be following the best available standards (NORSOK/the Norwegian standards), which should minimize the risks. First of all, the Norwegian government has not opened areas with icebergs or risks of sea ice to drilling. This means that the Norwegian standards are not directly transferable to the Greenland drillings. Naalakkersuisut should take the consequences of this and either development own standards or adapt the NORSOK standards to regional conditions.

This said, it is also extremely unclear how and when the Norwegian standards have been used, and there can be no doubt that neither the EIA nor Naalakkersuisut/BMP's approval conditions are even close to fulfilling Norwegian standards. It is furthermore evident that best industry practices, contrary to what is claimed, has not been applied.

Take for example chapter 7-13 from the EIA:
"Drilling chemicals registered under both OSPAR (HOCNF) and Danish registration systems will be used, with chemicals identified as PLONOR (Pose Little or No Risk) being used wherever feasible".

Does this mean that Cairn Energy can just add the chemicals they need and dump whatever overboard? In Norway, the drilling company needs to apply for every ton of chemicals that will be used, inform about toxic characteristics and green-yellow-red-black category, and inform whether and in what quantities these will be discharged. The Norwegian State Pollution Authority can also demand use of other less harmful chemicals, if too harmful components are being suggested.

Another example from chapter 7-13 is that "cuttings drilled using WBM will be treated to remove mud for reuse, and then discharged to sea". WBM – Water Based Mud – is very alkali with a PH of 10-12,

which have a negative impact on the environment. As Cairn has 11 support vessels in the area, all materials should be transported to Greenland or other countries, with sufficient capacity to handle them. To discharge it to the sea is definitely not best practice. Zero Discharge is, and it has been practiced for years in Canada, Alaska, the Caspian Sea and in the North/Barents seas. There is no explaining as to why this practice is not followed here in Greenland.

Problems with unclarities and to low standards also apply to Naalakkersuisuts own permit conditions. See for example page 10+12:
"(…) påhviler det virksomhederne at sørge for at nedbringe de sikkerheds- og sundhedsmæssige risici, så meget som det til enhver tid er rimeligt praktisk muligt[4]".

And page 16, 3.1.3.1.1:
"Inden boringerne igangsættes skal der foretages HAZIDs og HAZOPs (…)[5]".
HAZID and HAZOP are both used for identifying risks and to (p. 2):
"(…) gennemgå korrigerende tiltag for at reducere disse [risici] til acceptable niveauer[6]".

Reducing the risks to what is reasonably practicable and acceptable levels, is very far from the highest possible standards, and would never be accepted in for example Norway. Conditions like these leave it fully to Cairn to decide what the levels shall be. Both the EIA and Naalakkersuisuts internal papers are obviously insufficient, and if Naalakkersuisut wants Cairn to apply to apply to the best possible standards, the whole process must be reviewed. In relation to this, it is very hard to understand, why the permits for the first set of drillings have been given, while we are still waiting for the conclusions from the Mexican Gulf.

BMP lacks relevant information

On top of the problems with clear and high standards, it is several places in the permit condition paper obvious that the BMP didn't have all relevant information from Cairn before the permits were given and drillings commenced.

An example of this can be found at page 19:
"Capricorn og deres tekniske operatører/underleverandører vil, i perioden frem til boringens påbegyndelse, gennemgå brønddesignet og operationsplanerne. Denne gennemgang kan medføre ændringer, som vil blive indarbejdet i det endelige boreprogram[7]".

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[4] "The company is responsible for reducing security and health risks, as much as it at any time is reasonably practicable"
[5] "Before the drillings have begun, HAZID and HAZOPs need to be initiated"
[6] "Undergo corrective actions to reduce them [risks] to acceptable levels"
[7] Capricorn and their technical operators/suppliers will, in the period up to the drillings begin, go through the well design and operational plans. This can result in changes, which will be incorporated in the final drilling program.

And at page 12, 2.1.1:
"(…) valg af operatør er sket på baggrund af en gennemført foreløbig evaluering[8]"

And again at page 18, para 1:
"Der er udarbejdet foreløbige boreprogrammer for hver af de to brønde der skal bores[9]"

This clearly shows that either the BMP has not updated their conditions for granting the permits according to the new information. Another interpretation is of course that Cairn Energy just never checked the well design and operational plans. It is, no matter what the reason is, not acceptable that the permits are given on temporary information.

In light of the problem with standards and the permit condition paper – and due to the fact that Greenland only have had jurisdiction over this area since January 2010 – it is very valid to ask what the BMP and Naalakkersuisut qualifications are for approving the drilling programs. This is not specified in any documents, that we have gained access to, and we would like to be informed to which extent the BMP has used its own experts or if they hired external experts. Greenpeace would also like to be informed of the used experts' qualifications.

Definition of deep water

Greenpeace is aware that Naalakkersuisut doesn't consider the drillings in the Sigguk block as deep water drillings (the drillings is on depths from 360 to 500 meters). The Bureau of Minerals and Petroleum claim that the definition of deep water drilling starts at 600-800 meter. Greenland is one of the few places where this is the case. The US's moratorium on deep water drilling is at 150 meters, and their normal definition of deep water drilling is at 300 meters. Furthermore divers cannot operate deeper than 200 meters, and repairs are thus more complicated and time consuming.

Ove Karl Berthelsen, Member of Naalakkersuisut, Department of Business and Employment, has claimed that the 1.500 meter depth of the BP project in the Mexican Gulf is vastly different from the 360-500 meters depths Cairn is drilling at. This is not correct. The main problem for all floating drilling units is that they all use Marine Risers, a telescopic tube from the drilling unit down to the sea floor. This riser returns the mud from the wellbore to the rig. The Marine Riser is an integral part of the hydraulic column that extends to the bottom of the wellbore. If the Riser starts leaking, is damaged or breaks, a substantial part of the fluid columns that is holding the wellbore in balance is removed. This will cause an imbalance in the wellbore pressures and may cause a blowout.

On top of this, most problems with a deep water spill apply as much to a spill at 200 meters as to a spill at 1,500 meters[10]. Naalakkersuisut/BMP has made no references to scientific articles, which give

[8] "(…) choice of operator is made at a conducted, preliminary evaluation"
[9] "There has been prepared preliminary drilling programs for each of the two wells to be drilled"
[10] Page 107, Oil in the Sea III: Inputs, Fates and Effects; National Research Council; National Academic Press 2003

grounds to why the geological structure of the area could cause Naalakkersuisut to reach its conclusion. As the situation is now there is no scientific or technical reason to claim this is not deep water drilling, or to avoid taking in the lessons that must be learnt from the Gulf disaster.

Technical risks

Shear Rams

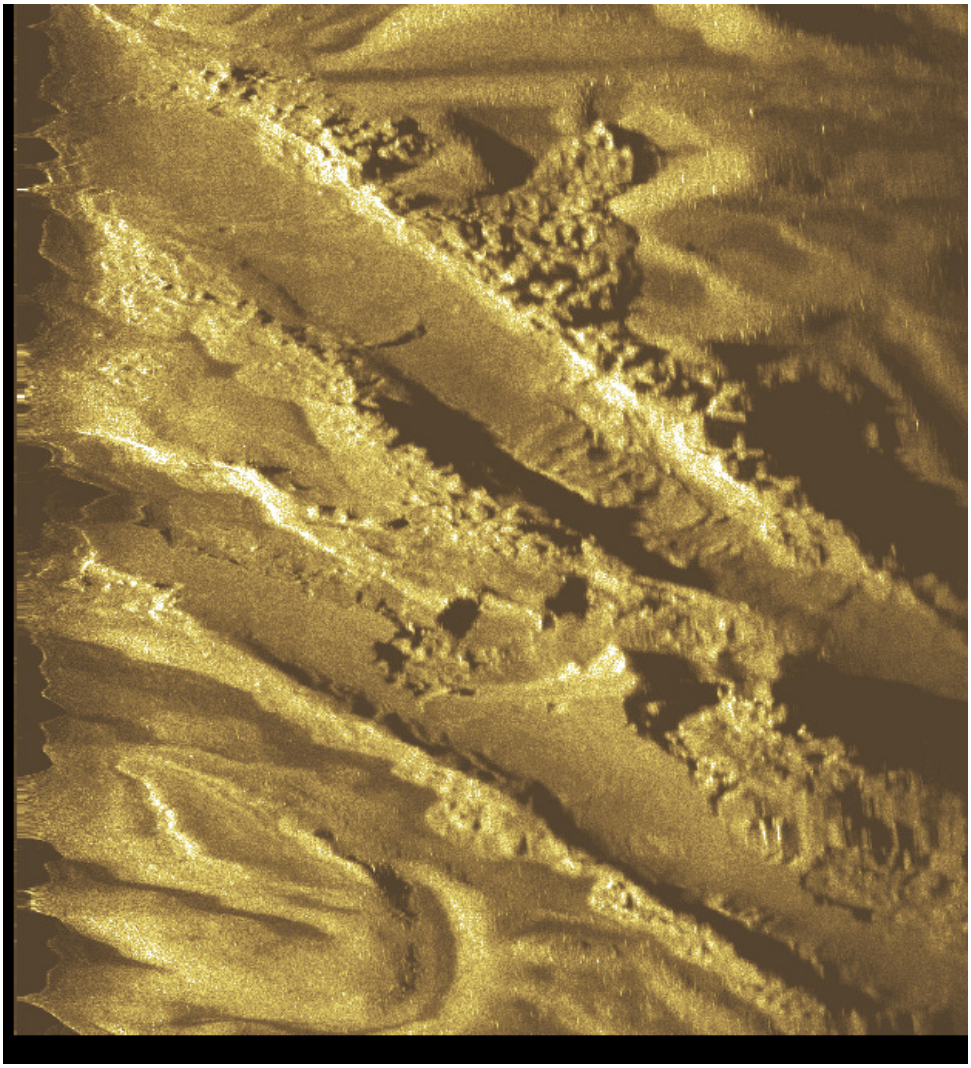
The Shear Ram is part of the BOP system. In order for any of the rams to work, all other parts of the system must also be functional, including accumulators, BOP control panels, remote controls etc. Adding an extra set of Shear Rams is not really adding to the safety of the project unless there is a redundancy of the rest of the parts of the system as well.

A BOP is a stack of valves with different functions. The main "valves" are the Pipe Rams, Blind Rams, Annular Preventer and Shear Rams. The Shear Rams is an oversized pair of scissors that is designed to cut the pipe inside the BOP. The Shear Ram is driven by a pair of hydraulic cylinders and the "shear capacity" is a function of square area of the cylinder multiplied with the pressure exerted. The Shear Ram is normally only used when *control of the well is already lost*. Using the Shear Rams is not "a controlled shutdown" of the well; it is the absolute last chance to contain the well. Also worth noting is that the Shear Ram cuts the pipe/casing, effectively severing the contact to the bottom of the hole. The only contact to the wellbore is then through the Choke & Kill-lines, mounted on the BOP. The Choke & Kill-lines are a set of high pressure hoses, 2" to 3" in diameter, which is used to bleed off pressure or pump heavy mud through. Therefore, using the Shear Rams basically removes contact to the bottom of the well and reduces the possibilities of repairing the well.

In the BP case, it seems that it was the supply of energy that was to activate the Shear Rams that was missing, not necessarily a malfunction of the Shear Rams themselves. Again, adding a pair of Shear Rams does not add to the security.

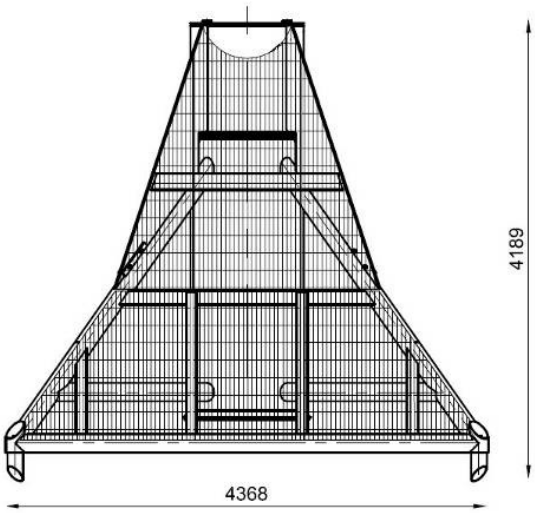
Iceberg alley

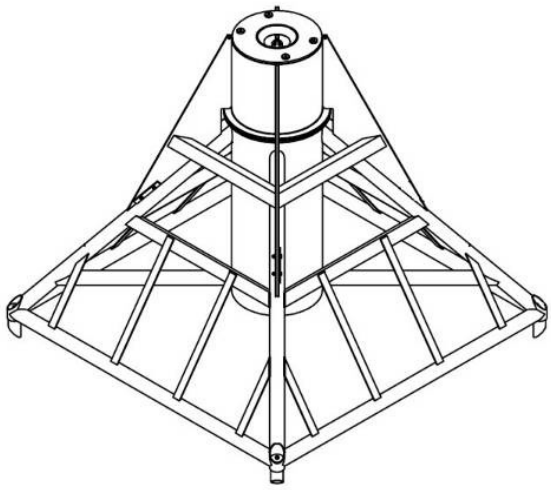
Icebergs are frequently passing the drilling area. Cairn has a PDF called "iceberg scours.pdf". Look at page 12 (and 13) for subsea pictures of the track an iceberg leaves. The screenshot below is taken from page 12.



The traces of the icebergs are clear, and as the EIA also notes on page 6 “Surveys of the area have found that areas of the seabed have been scoured by icebergs”.

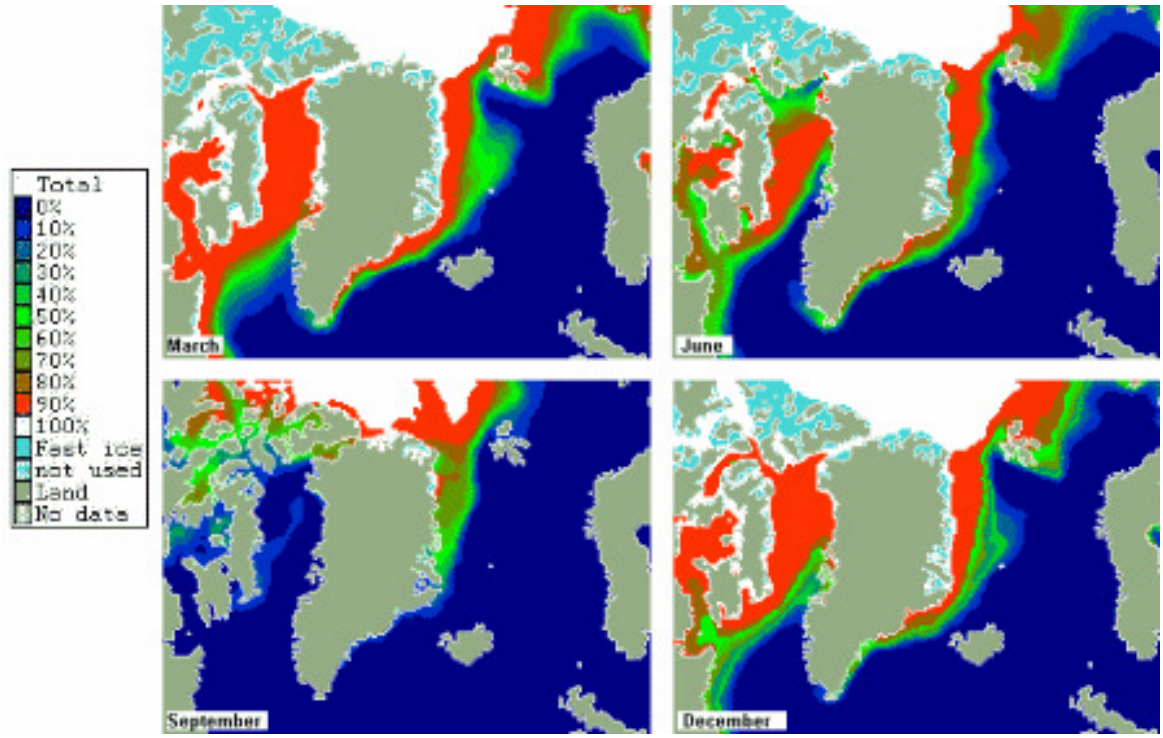
In addition to potentially putting the drilling operation at risk, an iceberg can also damage the wellhead after the rig has left. Below is a screenshot of the protective arrangement (from page 136 in the “EIA Cairn Energy.pdf”). The wellhead protection is supposed to be left there after drilling has finished (if they find any oil). The device weighs 7 ton, which is far from enough to stop an iceberg. There will most likely not be any ships to remove unruly icebergs after the drillings have ended and Cairn/Greenland has to rely on the grating/pure luck to keep the icebergs out. Damaging the wellhead could result in a blowout, which is an unacceptable risk.


4189
4368



Relief Well

The drilling schedule ends September 30th with the possibility to prolong them until end of November if it is necessary to drill a relief well. By then the ice sheet gets to thick and thus makes it impossible to continue drilling. In December there is 80 % chance that the Baffin Bay will be covered by ice.



(http://www.dmi.dk/dmi/index/viden/temaer/havis_og_isbjerge_omkring_groenland/havis_og_isbjerge_omkring_groenland_-_havis.htm)

This gives the company only, in a worst case scenario, two months to drill a relief well. Considering that it took BP approximately four months to drill a relief well in the Mexican Gulf, it is at best extremely unclear, how Cairn Energy will be able to drill a relief well in such a short time span – especially as there is a significant risk that several attempts is necessary. If it is not possible to drill the well within the time window, then the consequence is very likely that Cairn Energy will be forced to leave the spill open until the ice melts during spring.

EIA completely ignores this risk (and the risk of a spill during wintertime). Even though the EIA very briefly notes the special circumstances with oil spills in ice (EIA Annex E, box 1.1), all spill scenarios was simulated at 5°C water temperatures, and ice cover/ice-oil interaction was not taken into account (EIA Annex E, page 5).

As "the behavior of oil (…) is modified by the presence of the ice and by the lower temperature[11]", it is necessary to include the effect of ice in the modeling of oil spills. It is also necessary to include the different ice conditions, as they largely dictate the fate and behavior of oil in a specific situation[12].

If ice is present during an oil spill, the range of the spill will be significantly larger and lesser parts of the oil will have evaporated when it reaches the surface. Furthermore the oil can be trapped in the ice for 7-10 years. However, the ultimate fate of oil in the Arctic depends largely on the location and the ice conditions[13].

Response measures

Naalakkersuisut has very clearly stated that Cairn will be responsible for any cleaning, and that Cairn has put forward a guarantee of 10 billion $ per drilling. However, as soon as the accident has happened and if the response is not adequate, the guarantee is too little and too late to save the environment or the livelihood of the Greenlandic people.

Logistics

Both the BMP and Cairn Energy have made it clear that there is only equipment in the area for a tier 1 or 2 spill. Equipment in the case of tier 3 spills would have to be imported from Scotland (EIA Annex E page 16)[14]. In the current response plan from the Island Greenland Command the goal is to be able to handle up to 20,000 liters without help from abroad (page 9). To comparison the Exxon Valdez spill was at around 41 million liters and the BP-disaster is estimated to 775 million liters. It is therefore clear that Greenland and Cairn Energy could easily be forced to import the necessary equipment, which would take several days or weeks.

According to scientist from ARTEK and SINTEF[15] the initial stage of the cleanup is the essential phase, as cleaning methods in Arctic regions, at larger spills, is only effective if the oil hasn't dispersed yet[16]. It is

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[11] Page 104, Oil in the Sea III: Inputs, Fates and Effects; National Research Council; National Academic Press 2003 – from Fingas and Hollebone, 2001

[12] Page 104, Oil in the Sea III: Inputs, Fates and Effects; National Research Council; National Academic Press 2003 – from Fingas and Hollebone, 2001

[13] Page 105, Oil in the Sea III: Inputs, Fates and Effects; National Research Council; National Academic Press 2003

[14] The EIA's own definition doesn't include amounts of oil for the different tiers, but is described as:

- "Tier 1: a small spill which can be combated using facilities available from the contractor during drilling or local to the spill site during operations.
- Tier 2: a medium spill which is estimated to be very unlikely in terms of probability and which requires the involvement of the project emergency response resources in addition to contractor facilities and manpower.
- Tier 3: a large spill which requires external resources to combat."

[15] Janne Fritt-Rasmussen, ph.d. student, ARTEK, DTU; Arne Willumsen, Professor & Centre Director, ARTEK, DTU; Per Johan Brandvik, senior scientist at maritime environmental technology, SINTEF and Erling H. Stenby, Professor & Centre Director at Centre for Energy Ressources, DTU

[16] Aktuel Naturvidenskab no. 3, 2010

therefore critical that Cairn Energy will have to import the equipment from abroad, which will delay the cleanup.

Methods

In the Mexican Gulf, it is the general belief that the majority of the oil, which is no longer visible, was removed by natural processes. It is estimated that around 875,000 barrels from the total spill of 5.5 million barrels either evaporated due to the high temperatures or were digested by microorganisms. Even though it is still highly uncertain as to what extent the oil in the Mexican Gulf has been subject to these processes, or whether the oil just no longer is visible to the human eye, it is crucial to note that both the microorganisms and the vaporization will only to a very low extent be present in the Arctic. The human effort will therefore be the deciding factor in cleaning up a spill.

The scientist from ARTEK and SINTEF states that all the traditional methods to clean up oil unfortunately only have little use in the Arctic[17]. Burning the oil – which is still at an experimental stage – is the only potentially effective method of cleaning a spill in the Arctic. Besides the experimental status of this method, the incineration will cause a high release of toxic chemicals and sod into the surrounding environment.

[17] Aktuel Naturvidenskab no. 3, 2010