– **Submission to the National Energy Board –**

Advance questions for Inuvik Roundtable

Public Review of Arctic Safety and Environmental Offshore Drilling Requirements

Submission organized by RESTCo Inc. (www.restco.ca)

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Introduction

Documentation that outlined fundamental research (and provided access to the reports on-line) undertaken on the impacts of oil drilling in the Arctic was submitted to the NEB earlier this year. (see files A28760/A1Y4Z9 and A1W4D9 and A1Y4Z9) This information and the recommendations provided were a result of the large and comprehensive Beaufort Sea Project undertaken in Canada by the Federal Government and the oil industry in the 1970s and completed in the early 1980s. Since that time little new research has been undertaken and none on the scale of the Beaufort Sea Project especially involving the experimental release of large quantities of crude oil into the environment to obtain real data under realistic Arctic conditions. We have assembled documentation on the oil industry and on studies that are publically available and that is relevant to the present NEB review. We include some of these in our list of references while a searchable data base will be available shortly. From this extensive review, we have prepared a number of questions that follow. Some are directed at the oil industry and to northern communities while others are offered to the NEB to assist them in preparing the Public Report and in setting the Filing Requirements for companies who wish to engage in off-shore drilling in the Arctic.

Possible Outcomes

There are three possible pictures with regard to drilling off-shore in the Arctic that most simplistically are:

1. Drilling takes place and no serious environmental degradation occurs over the life of the industrial activity in the order of 50 years

2. Drilling takes place with the current oil industry capabilities and practices and environmental degradation does occur through exposure of the Arctic Ocean to oil spills and emissions associated with the drilling and logistics, the production, and the transportation of the oil and gas to markets.

3. Drilling does not take place in the near future and the environment is preserved. The oil and gas reserves are left for future generations should they be required.

The NEB will provide a public report and associated Filing Requirements based on this NEB review that could result in outcomes anywhere from picture one to picture three.

From a study of past experiences with the oil industry, it appears that picture two is highly likely should drilling take place in the Arctic with today's industrial technology/practices, regulations and spill cleanup capabilities. The questions then arise as how to best improve industrial processes to avoid the consequences of picture two. The questions that we pose below are intended to set the bar for the Filing Requirements at a level that would either enable Picture one to be achieved or to postpone drilling to a time in the future when it will be safe due to enhanced industrial capabilities and regulatory oversight or when the fossil fuel economy has been left behind by a new fossil fuel free energy future.

Questions proposed for the Inuvik Roundtable

1. Since drilling will be taking place in Arctic waters that throughout the year are mostly ice covered, there are a number of conditions related to this environment that are distinctly different than drilling in more temperate and mostly ice-free conditions. When oil spills occur in the Arctic Ocean, the oil enters an environment where biological activities are associated with the open leads and on the ice/water interfaces both under and within the sea ice. The presence of oil thus has a much larger impact on the ecosystem than in the situation where oil enters open water. Seals and other sea mammals require the leads and pockets of air below the ice sheet for breathing so they are impacted over the area of the spill. The whole basis of the food chain, the primary productivity that occurs on the ice/water interfaces, is impacted by the accumulation of the oil under the ice surface. Records of past spills (such as the Gulf of Mexico or Exxon Valdez) show that only 3 to

5 % of spilled oil is recovered while the remainder of the oil is left in the environment either in the natural state of crude oil, a dispersed state due to emulsification from the escaping gases (or artificially introduced dispersants), or in the form of burn products.

Industry states that ice can provide a secure and safe method of storing spilled oil until it can be later collected or that a same season relief well is not required in the Arctic. Can these statements be reconciled with the ecological damage that oil in leads and under and within the sea ice, perhaps for a whole season, is bound to cause? Is there evidence that crude oil can be stored in or under sea ice for up to 12 months with no or minimal damage to the ecosystem?

2. **Liquid crude oil in Arctic formations is usually found with very large quantities of natural gas (NG). What evidence is required from companies seeking drilling permits to ensure their capacity to contain and control that escaping natural gas so that it will not further impact the dispersion of crude under the ice? Is the dispersal of natural gas taken into account in the testing and experimental data required on spill cleanup procedures and if not, does this not render this data invalid?**

3. Oil cleanup by burning and the use of dispersants are being promoted by industry and some government agencies as primary cleanup methods for oil spills in the Arctic. What impacts would the toxic soot products of burning and the toxic dispersants themselves have on the ecosystem and on the albedo of the sea ice downwind of the burn.

Another issue relates to whether oil is flammable and is mentioned in a section on water absorption by oil on page 4 of the SL Ross document. The document indicates that oil won't burn if it has absorbed 25-50% water content which eliminates industry's #1 tool for cleaning up oil in ice, in-situ burning.

It appears that there is some uncertainty related to this issue. After almost one year (6,000 hours) submerged under the ice, the oil will have absorbed well under 50% of its volume in water? The Report has just said 25-50% absorption could be reached in 24 hours. Has an 8-month immersion been documented in the Arctic in real time? Will it be possible to know where to find the oil in the spring to dispose of it by burning. In a 1 kt current, the oil will have travelled about 10,000 km, spreading laterally as it travels.
In the Western Arctic, the clockwise rotation in the Arctic Ocean results in a net east to west flow in the Beaufort Sea. Current speeds are moderate, on the order of 1 to 2 knots. Canadian Coast Guard

Experimental data on the feasibility and impacts of burning spilled oil as a cleanup procedure is required in light of the comments above. Information on burn

products and of dispersants on the Arctic environment should also be provided as a Filing Requirement. Such experimental data should indicate that the impacts would do minimal damage to the Arctic ecosystem, do not harm the health of the inhabitants or cleanup personnel, and would not modify the albedo of contaminated sea ice sufficiently to significantly change the extent and nature of the ice cover.

4. **This question is offered to industry representatives**. How do they defend the very low rate of recovery from the Gulf of Mexico oil spill in light of the fact that there were no logistical problems since the drilling was occurring close to many oil facilities and in temperate open water. How can industry propose a better outcome for Arctic spills knowing they will be occur 1000s of Kms from the closest major industrial facilities in a region with extremely low population that would be available to assist in the case of a spill? On top of this is the fact that Arctic conditions include a short drilling season with harsh conditions for equipment and personnel.

5. **Recovery time following an oil spill for Arctic ecosystems may be much longer than that in more temperate regions and some experimental information on this issue should be included in the NEB report. Is there data available from the Alaskan experience with north-slope oil drilling or from the Exxon Valdez spill that would allow some comparative analysis?** In the case of the Exxon Valdez spilled oil trapped under beach rocks is still fresh and toxic 20 years later. However, there was no ice to deal with, or extreme Experience in the Gulf of Mexico and in Nigeria could be examined for the situation in temperate regions. The cost per barrel of cleaning up the Exxon Valdez was 10X the cost per barrel of cleaning up oil in the lower 48 states. It's highly probable that the Arctic will prove 10X more costly per barrel than the Exxon Valdez.
Will it be necessary to evacuate northern communities if the ecosystem is damaged and their local food supply is not available or if the health of the community itself is threatened? Can the representatives of the local communities comment?

6. Who will benefit from off-shore drilling? This is a question posed to the NEB. **What is the situation now in Canada and what is planned with regard to distribution of leasing fees between various levels of government?**

7. What direct benefit will off-shore drilling bring to the local communities in the Arctic? In other jurisdictions throughout the world where oil companies have operated, the local population has not significantly improved their economic situation as a result of the oil company activities. Nigeria might be one such place and Mexico another. **This question**

is first posed to the communities represented in Inuvik to see what they expect to be the outcome, then to industry and government representatives present who may have thoughts on this topic.
What can individuals expect to receive and what percentage of the total net revenue will the local population receive over the course of the drilling activity?

8. **What is the energy cost of oil delivered to southern markets from Arctic off-shore drilling?** The purpose of this question is to put into perspective the net-energy value of investments in seeking to exploit frontier petroleum reserves as compared to other forms of energy investments such as expanding the tar sands or expansion of renewable energy options. This analysis should include full energy costing of icebreakers, delivery of fuel to the oil drilling rigs and the energy costs of transporting the oil out of the Arctic. **This analysis should be provided by the NEB in the review and provide a full list of assumptions. Note that it requires an energy based analysis not an economic based analysis.**

9. In oil spill situations, there is uncertainty about legal liability and thus who pays for the cleanup or for damages associated with the spill. **What is the insurance situation for drilling off-shore in the Arctic? Who will pay in the case of oil spills? Is there a limit on the liability of the polluter? If the cost of cleanup bankrupts the polluter who pays the bill? What are the legal documents that need to be in place to ensure that accountability is not questioned? These questions are for the NEB and industry and the answers should be clearly defined before drilling permits are approved.**

10. **What do the elders in the Arctic communities think about the trade-off between potential jobs for the youth in their communities from the oil industry and the potential of serious damage to the environment?**

11. Flaring or release of natural gas from drilling activities is required if there is no means of producing and transporting the gas to markets. In the Arctic formations being considered for the off-shore drilling program, it is reported that there are considerable reserves of natural gas accompanying the oil in the Canadian Arctic. It thus appears that this gas will have to be flared or released in the case of drilling off-shore in the Canadian Arctic. Such releases will have an impact by increasing the greenhouse gas burden associated with the crude oil produced in such off-shore wells. In addition, if the gases are flared then the soot products of the flaring will be deposed downwind of the rigs throughout the whole production cycle of many years.

A question for industrial representatives, since there are now LNG systems for operation from barges, perhaps in future for operation under Arctic conditions, will this technology be proposed for the Canadian drilling program? A question/suggestion is also posed here to the NEB that the extent of the environmental/climatic and health risks associated with flaring or release of gas be included as a requirement in the overall impact assessments of the off-shore drilling program.

12. Optimum oil spill management requires the ability to deploy measures within hours, followed by completion of oil recovery within days. This implies certain requirements for fleet logistics and for oil recovery technology - if the Macondo "leak" was 60,000 bbl/day and Shell promises over 90% recovery, then does the Shell response plan provide sufficient tanker storage and re-supply capacity to remove 54,000 bbl/day – i.e. icebreakers and tugs and barges. Only 100 miles per day is feasible when steaming through ice. Charts are only 20% accurate in much of the Arctic. Note typical capacity of one barge is 10,000 tonnes or 60,000 bbl - AND how much of recovered materials will be water not oil? **These are some of the timing and logistic questions that we would like to present to the industries present for their consideration and for discussion.**

References

DOCUMENTS (Includes only a short list of those consulted in our research)

1) The ITOPF 2011 handbook (54 pp) Copies being mailed from London UK to NEB Calgary.
Extracted from :
http://www.itopf.com/information-services/publications/documents/itopfhandbook2011.pdf

2) The Macondo Blowout Environmental Report Jan 2011 (9 pp)
Extracted from :
http://ccrm.berkeley.edu/pdfs_papers/DHSGWorkingPapersFeb16-2011/MacondoBlowoutEnvironmentalReport-TA_DHSG-Jan2011.pdf

3) The Captain Mark Turner report on Newfoundland Labrador offshore oil spill prevention and response capabilities Apr 2011 .
Extracted from :
www.gov.nl.ca/nr/publications/energy/nloffshore_oil_review.pdf

4) The SL Ross report Jul 2011 - Spill Response Gap Study for the Canadian Beaufort Sea and the Canadian Beaufort Sea and Davis Strait
Extracted from :
http://www.neb-one.gc.ca/fetch_e.asp?filingid=A30372

5) The PEW report Nov 2010 - Oil Spill Prevention and Response in the U.S. Arctic Ocean: Unexamined Risks, Unacceptable Consequences
Extracted from :
SUMMARY - http://www.pewtrusts.org/our_work_report_detail.aspx?id=61733&category=606
FULL REPORT
http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/Reports/Protecting_ocean_life/PEW-1010_ARTIC_Report.pdf

6) The NUKA report Jun 2007 - Oil Spill Response Mechanical Recovery Systems for Ice Infested Waters: Examination of Technologies for the Alaska Beaufort Sea.
Extracted from :
http://www.dec.state.ak.us/spar/ipp/docs/2007%20Mechanical%20Recovery%20Ice.pdf

7) The WWF report "Lessons not learned: 20 Years after the Exxon Valdez Disaster - Little Has Changed in How We Respond to Oil Spills in the Arctic" Feb 2009 16 pp.
Extracted from :
http://www.worldwildlife.org/what/howwedoit/policy/WWFBinaryitem11907.pdf

VIDEOS

8) The 1 minute video on the COSTCO BUSAN Oil Spill in San Francisco Bay Nov 2007
Extracted from :
http://www.youtube.com/watch?v=EHTsVD6b13Q

9) The 2 minute video on Alaskan oil boom 2000 tests "What If An Oil Spill Happened in the Arctic?"
Extracted from :
http://www.youtube.com/watch?v=2dL3RGwpBaI

10) The 26 minute video video recapping BP's Gulf Gusher's effects - Aug 2011
Extracted from :
http://www.gaia-health.com/articles501/000515-bp-gusher-cannot-be-stopped.shtml