

Prospectus for the 2006 Arctic Council. Assessment of Potential Impacts of Oil and Gas Activities in the Arctic.

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Arctic Monitoring and Assessment Programme (AMAP)

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Prospectus for the 2006 Arctic Council

**Assessment of Potential Impacts of
Oil and Gas Activities in the Arctic**

SCOPE:

This assessment report is being prepared in response to a request from the Ministers and Senior Arctic Officials of the Arctic Council. They have requested a report at the Ministerial meeting in 2006 that builds on and expands the AMAP assessment completed in 1997, and that evaluates four types of impacts or effects associated with oil and gas activities in the Arctic:

- social and economic consequences
- environmental impacts from pollution
- environmental effects from physical impacts and disturbances
- effects on human health

These four components of the assessment form four strands of information flow in the assessment report as illustrated in Figure 1. Note that this assessment specifically does not include the relation between Arctic oil and gas development and the global CO₂ emissions and greenhouse warming. This topic is covered in other assessments, e.g. ACIA, IPCC, national assessments.

The assessment will begin an introductory chapter (Chapter 1) that sets the stage for the assessment, describes its scope and the processes used to accomplish it. The second chapter will include an overview of oil and gas activities in the Arctic. In this assessment, the use of the word "activities" is taken to mean leasing/licensing, seismic and drilling exploration, production drilling and development construction, continuing production operations, all facets of transportation, and eventual decommissioning of facilities. Chapter 2 will look back on the last several decades of activity, describe current activity, and look forward as far as current plans allow.

The socio-economic strand discussed in Chapter 3 includes the social and economic consequences of the oil and gas activities in the Arctic described in Chapter 2 and will evaluate historical data and also project forward as far as possible. It also includes a consideration of the social and economic consequences of environmental effects of pollution and physical impacts and disturbances as examined in Chapters 6 and 7. The intent is to provide a comprehensive and balanced view of the positive and negative socio-economic consequences associated with oil and gas development in the Arctic.

The pollution strand identifies sources of contaminant input in Chapter 4 based on information in Chapter 2 on the petroleum industry and available information on other sources. This strand goes on to consider environmental concentrations,

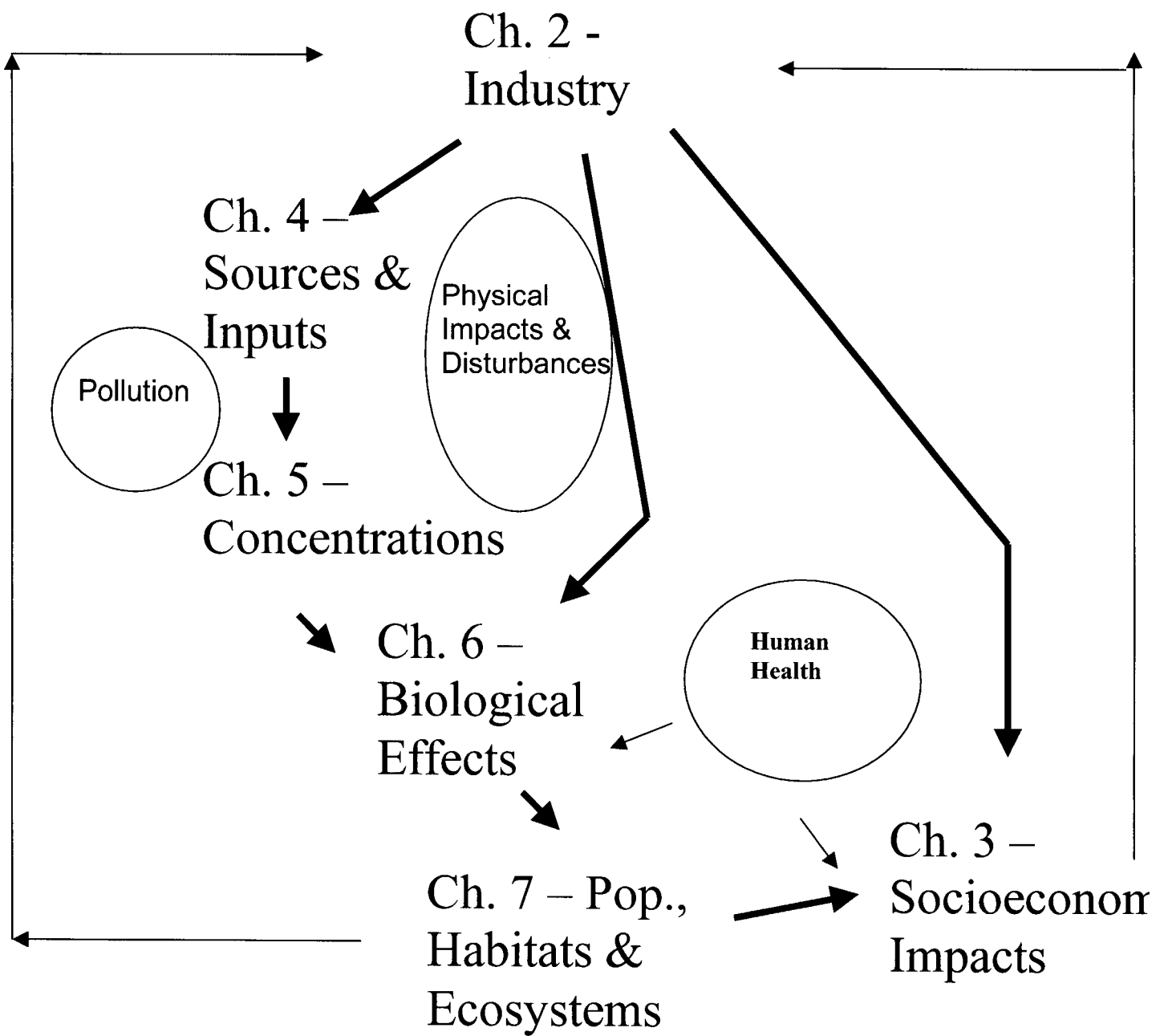


Figure 1 – Flow of information in the assessment

pathways and fates of the contaminants in Chapter 5 and their biological effects at the organism level in Chapter 6. The environmental impacts at the levels of populations, habitats and ecosystems are considered in Chapter 7.

The strand on physical impacts and disturbances starts with information on the physical activities (construction work, land use, pipelines, roads, noise etc.) presented in Chapter 2 and goes on to consider their biological effects on organisms in Chapter 6. The consequences at the levels of populations, habitats and ecosystem are then examined in Chapter 7.

The strand on human health will be considered in two chapters. Discussion of occupational and behavioral health is included in the consideration of the socio-economic consequences in Chapter 3. Discussion of any identified effects on human health from contaminants is included in Chapter 6. This assessment will update and expand the AMAP Assessments on Human Health completed in 1997 and 2003.

In Chapter 8, the various strands will be brought together to provide an overall assessment and set of conclusions. The chapter will include also recommendations to the Ministers for their consideration in developing responses to the assessment.

Before being released, the assessment will be subjected to both peer and national review to ensure the highest quality and to avoid statements that may have unintended consequences at national or local levels.

It is intended to undertake two or more outreach tasks as part of this assessment to convey the key findings from the assessment to the general public. One of these will be a symposium, scheduled for summer of 2005. The purpose of the symposium will be: a) to hear from experts in all relevant fields on the current state of the science and technology relating to oil and gas activities in the Arctic; b) to promote dialogue among scientists of different types, industry and government officials, Arctic residents, and other stakeholders; and c) to identify critical information or expertise not already included in the assessment itself. See Appendix C for more information on the planned symposium. Another key outreach effort will be production of an overview report that covers all of the chapters and summarizes and integrates their findings in an easy to understand format. Other outreach efforts may be defined during the preparation of the assessment.

DRAFT OUTLINE OF ASSESSMENT REPORT:

0 Executive summary

This will be developed after the assessment is completed and will convey the key findings and recommendations from all of the chapters.

1 Introduction

Background and introduction to the assessment, emphasizing recent and future developments, and the need to assess environmental, social, and economic consequences including the sustainable development implications of oil and gas activities in the Arctic. This would include a summary of and reference to past relevant assessments and studies by the Arctic Council and its working groups.

2 Oil and gas activities in the Arctic

The assessment of oil and gas activities in the Arctic will consider the history of activities, ongoing activities, planned activities for the next ten years, and include a qualitative projection of activities “on the horizon”, for example gas hydrate exploration and research. This review will provide the context for socio-economic and environmental issues that will be discussed in subsequent chapters.

The assessment will include discussion of both historical and current oil and gas activities in the Arctic, including exploration, production, and transportation in Russia, Canada, USA, Greenland, Faroe Islands, and Norway.

To evaluate future activities, this chapter will bring together information on known petroleum or gas basins in the Arctic and national plans for leasing, exploration, and development. This information, along with an evaluation of current economic, environmental, and policy conditions, will enable an assessment of priority areas for future activities. Other factors, e.g., technology development, climate change effects, will be considered if possible. Assessment of future activities will need to be determined for specific sub-regions or on the basis of national sovereignty. See Appendix A for more information on this chapter.

3 Social and economic consequences of oil and gas activities in the Arctic

This chapter will assess socioeconomic, human health, and sustainable development implications of oil and gas activities and the possible impact on lifestyles of indigenous and non-indigenous residents of the Arctic. The assessment will have to consider regional and national differences. It is intended to identify a set of socio-economic “indicators” that can be used to produce a semi-quantitative result. The assessment process will include evaluation of the early history of oil and gas activities in the Arctic. In particular, the assessment will include a review of how local governments acted in response to oil and gas development and how development was managed on a local basis. It will consider impacts and benefits at the local to national/regional level at all stages of the life cycle of an oil or gas field. It will also look at the impacts and benefits to individuals in areas such as employment, quality of life, energy needs, occupational health, behavioral health, etc. If possible, the assessment will consider economic “progressions”, for example

when mining in a remote area becomes possible because of the onset of production of oil or gas nearby. See Appendix B for more information on this chapter.

4 Sources and inputs of petroleum hydrocarbons, PAHs, and other relevant contaminants in the Arctic

The chapter will give an overview of sources of inputs of contaminants related to oil and gas activities in the Arctic. This will include contaminants from discharges, emissions and spills from petroleum exploration, production, and transportation, as well as other sources from human activities and long-range transport and should include naturally occurring sources. The substances considered would include all relevant contaminants from oil and gas development and use, i.e. petroleum hydrocarbons, petroleum related PAHs, oil related substances in produced water (e.g. phenols), and production chemicals, including radionuclides in drill cuttings. Information should be given on source characteristics and approaches to identify and distinguish different sources.

The chapter should also give an overview of the amounts of inputs of petroleum hydrocarbons, PAHs, and other relevant substances to the different regions of the Arctic.

5 Concentrations and fate of petroleum hydrocarbons and PAHs and other relevant contaminants in the Arctic

This chapter will give an updated description of concentrations of petroleum hydrocarbons, PAHs, and other relevant substances in different compartments (sediments, soils, water, and biota) of the Arctic terrestrial, freshwater and marine environments. This will be based on existing information from national monitoring, and research activities. The chapter will also describe transport pathways and fates of hydrocarbons, PAHs, etc. in the Arctic environment, including oil-ice interactions and physical-chemical weathering processes. Information on temporal trends will be included based upon results from long-term monitoring and sediment cores where such information exists. The spatial and temporal patterns in concentration of the contaminants will be examined in relation to sources and inputs.

6 Effects of pollutants and disturbance on organisms (individual level) and effects of pollutants on human health

This chapter will consist of five main parts:

- a. Biological uptake, accumulation, and metabolism of petroleum hydrocarbons, PAHs, and other relevant substances in various organisms in the Arctic.
- b. Overview of the various types of biological effects from oil, PAHs, other substances, to include discussion of lethal and sub-lethal effects including those from radionuclides or other hazards from discharged drill cuttings or fluids.

- c. Overview of effects of physical disturbance, including noise, on Arctic animals, e.g. mammals and birds
- d. Summary of information on the sensitivity and vulnerability to oil and petroleum activities at the individual level of selected Arctic species or groups of organisms of high sensitivity and/or high importance to humans (birds, mammals, fish, vegetation, plankton, and benthos)
- e. Human health aspects related to pollution

The chapter will include results and experiences from accidental oil spills as well as laboratory and field studies. The emphasis will be to summarize new information.

7 Environmental status and impacts on populations, habitats and ecosystems in the Arctic

Building on the information on biological effects in the previous chapter, and the description of current and expected oil and gas activities in chapter 2, this chapter will address the environmental quality status and impacts or threats by pollution, disturbance or physical structures related to petroleum activities on populations, habitats and ecosystems in the Arctic.

- a. The chapter will provide a brief overview of ecosystems and habitats based on geographic divisions, such as river systems and drainage basins, and large marine ecosystems. This will include information on species, populations and habitats that are vulnerable and/or of special conservation concern in relation to pollution and petroleum activities. Information on the environmental quality status of habitats and ecosystems will be summarized from case studies.
- b. Information will also be summarized from environmental assessments and impact analyses and risk assessments that have been carried out in relation to petroleum development activities. This will include experience from research and monitoring of impacts from existing developments in the Arctic.
- c. Information on impacts on habitats, populations and ecosystems after accidental oil spills will be summarized
- d. The information will be used to make an assessment of the environmental impacts of oil and gas activities including the full life cycle of developments, and the potential impact from accidental spills and other factors related to petroleum development
- e. The assessment will include potential impacts on populations of harvested species (including subsistence harvest) (feeding into chapter 3)
- f. The current status as well as a realistic future scenario (based on chapter 2 and ACIA) will be assessed

8 Conclusions and recommendations

Information from the preceding chapters will be brought together and a set of key findings and conclusions will be developed. Based on these, a set of recommendations to Arctic Council Ministers will be presented as suggestions for

improving the implementation of oil and gas activities in the Arctic and for enhancing the benefits of such activities to Arctic residents.

SCHEDULE:

A detailed schedule for producing the assessment products has been developed that calls for work to begin by June of 2004 and for peer review of the near final documents to begin in October of 2005. The final printed documents are to be delivered at the Arctic Council Ministerial meeting in September or October of 2006. The complete schedule is available in Appendix D.

PROCESS:

Experts in the various disciplines relevant to each chapter will produce the assessment. . These experts will be nominated as authors by the eight Arctic countries, with the assumption that nomination carries with it a promise of support adequate to permit the work to be done according the time schedule. For each chapter there will be a lead author (or co-lead authors if more than one country desires a leadership position) and an appropriate number of contributing authors.

IDENTIFICATION OF LEAD AUTHORS (Countries):

For each of the key science chapters (Chapters 2-7), one or more lead authors will be nominated by interested countries. As of January 29, 2004, interest in specific chapters has been expressed as follows regarding intention to supply a lead author:

- Chapter 2 – US, lead author to be determined
- Chapter 3 – US, lead author to be determined
- Chapter 4 – none
- Chapter 5 – Norway, lead author to be determined
- Chapter 6 – none
- Chapter 7 – Norway, lead author to be determined

The US and Norway have expressed their willingness to have co-lead authors for the chapters they have selected.

ASSESSMENT STEERING GROUP:

Completion of the assessment will be under the direction of the Assessment Steering Group that will report directly to the AMAP Working Group and indirectly to all of the participating Arctic Council working groups. Membership will include one or more representatives from each participating Arctic Council Working Group, the Lead Authors of the assessment, and others to be determined.