



ARCTIC ENVIRONMENTAL SOLUTIONS

The development of the offshore oil and gas industry in the Arctic requires specialised knowledge and know-how.

The environmental concerns for the pristine Arctic environment require appropriate and timely consideration. The oil and gas industry has an obligation and a responsibility to ensure that the environmental impact of the industry's activities is as low as possible.

Ramboll has become known for providing engineering services to the oil and gas industry, offshore as well as onshore, since the 1970s. Our advanced know-how within the oil and gas sector is based on the experience of working in the hostile North Sea and other demanding environments such as Arctic Greenland and the Arabian Gulf.

Arctic HSEQ challenges

While some HSEQ challenges are comparable to general practice within the oil and gas industry, the Arctic environment poses an additional challenge.

Annual variations in sea ice extent and thickness, the amount and size of icebergs as well as wind, ocean currents and temperature are all factors which should be examined and considered during the development of the project. In addition to the technical challenges, there is a need for specialised environmental knowledge on the Arctic environment.

Strategic environmental assessments (SEA) have identified major oil spill as the most significant environmental concern in Arctic exploitation. An oil spill could have long lasting impacts on vulnerable species, such as marine mammals, and a possible effect on the ecosystem level. HSEQ management alongside with an environmental assessment of a potential oil spill are particularly important to consider in Arctic projects.

Global knowledge - local knowledge

With more than 9000 specialists, Ramboll is able to offer a full range of technical and environmental services.

Ramboll's presence in the Arctic region is supported by several offices in the Barents region and Greenland.

A highly qualified team of Ramboll specialists is devoted to external environmental aspects within the oil and gas industry. Engineers, biologists, geophysicists and geographers are collaborating and

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SELECTED ARCTIC REFERENCES

- True North Gems 2007-2009: Extensive environmental baseline study (limnic and marine) for a new ruby mine in Aappaluutq, Greenland
- Noreco 2008: Environmental Impact Assessment for the production platform Rau, North Sea
- Danish Environmental Protection Agency 2005-2007: Environmental remediation on the Dundas peninsula, Greenland
- Nordstream 2006-2010: Environmental impact assessments, assistance with the transboundary ESPOO EIA, monitoring, risk assessment of a gas pipeline, Baltic Sea
- ConocoPhillips 2002-2009: Studies, technical consultancy, environmental assessment, supervision and offshore sampling activities for the decommissioning of the Ekofisk tank, North Sea

cover special areas such as:

- Environmental legislation
- Air
- Water and soil pollution
- Arctic engineering
- Sea ice
- Chemicals
- Monitoring
- Modeling
- Presentation and public outreach.

Environmental care is knowledge based

The environmental assessments are based on knowledge of the local conditions, including identification of vulnerable habitats and species. This knowledge is obtained through a combination of review of scientific and technical literature and field work.

Ramboll has the expertise and equipment to perform chemical, biological and physical monitoring.

Offshore and onshore assessments

Ramboll's environmental team is professionally equipped to advise on environmental matters throughout the entire process, from conceptual studies to decommissioning.

Based on our environmental and technical oil and gas expertise, we offer a full range of multidisciplinary offshore and onshore services:

- Environmental assessment at all levels – from pre-establishment to decommissioning
- EIAs (Environmental Impact Assessments)
- HSE management
- Identification of environmental risks from all activities
- Recommendations on mitigating measures
- Site surveys
- Offshore supervision
- Strategic studies - SEA - planning
- Life cycle analysis (LCA)

About Ramboll

Ramboll is a leading engineering, design and consultancy company founded in Denmark in 1945. Today, we employ close to 9000 experts with a strong presence in Northern Europe, Russia, India and the Middle East. With almost 200 offices in 20 countries, we emphasise local experience combined with a global knowledge base.

The business unit Ramboll Oil and Gas provides highly specialised engineering consultancy services to the worldwide oil and gas industry.

We employ approximately 700 dedicated oil and gas specialists and have 30 years of experience in the offshore and onshore industry.



LEFT

Ramboll has the expertise and equipment to perform chemical, biological and physical monitoring

RIGHT

Walrus are particularly at risk from oil spills as their diet of benthic invertebrates are known to accumulate hydrocarbons