White Paper
U.S. Arctic Research Commission Recommends Steps to Expanded U.S. Funding for Arctic/Subarctic Oil Spill Research

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*This paper was initially drafted prior to the Gulf Oil Spill and has since been modified to more accurately reflect concerns related to non-natural (anthropogenic) oil leaks and spills

Summary

The U.S. Arctic Research Commission (USARC) recommends steps that the U.S. government should take to invigorate oil spill research in the United States. The Commission specifically emphasizes the growing need for more-effective spill prevention and response in the Arctic region, and a greater understanding of oil and gas metabolism and toxicity in the Arctic marine ecosystem. If greater offshore energy exploration and production are realized, the risks of oil spills will increase concomitantly. The challenges of such exploration are compounded by the real and projected increase in Arctic shipping, by exploration in deeper, offshore waters, and by a marine environment that is undergoing dramatic change, particularly with respect to climate and ice conditions. The promise of a rigorous and coordinated national research program on oil spills, made in the Oil Pollution Act of 1990 (OPA 90), after the *Exxon Valdez* disaster, has fallen short. The current spill-related disaster in the Gulf of Mexico makes this white paper all the more timely and should result in greater consideration of our proposed actions. USARC has worked closely with the federal Interagency Coordinating Committee on Oil Pollution Research (ICCOPR), stakeholders, and the public to develop ideas on this subject, which are integrated into this white paper.

This paper recommends several priority actions:

1. Government should update national and regional research plans as mandated by OPA 90 and should fund those plans, as authorized, through the $2.7 billion Oil Spill Liability Trust Fund (OSLTF), which is replenished by an eight cents per barrel tax on crude oil produced in or imported to the United States.[1] ICCOPR is the leader of this federal research effort, as prescribed by law.
2. Expand the "endowment" funding for the National Oceanic and Atmospheric Administration (NOAA)-chaired Arctic/subarctic-focused spill research program created in OPA 90, the Prince William Sound Oil Spill Recovery Institute (OSRI). OSRI should serve as a funding model for the national ICCOPR program.
3. Increase National Science Foundation (NSF) and NOAA funding to enable scientists better understand the basic ecological structure and populations of key indicator species in the Arctic, including the deepwater column that feeds surface life. These species are important for subsistence and the survival of the entire ecosystem.
4. Increase understanding of the convective distribution of oil spilled in the ocean through additional support of physical oceanography studies (e.g., circulation, tides, and currents) of the Arctic Ocean and adjacent seas. There needs to be greater exploration and

[1] 26 U.S.C. 4611 (c) (2) (B)

characterization of subsurface Arctic Ocean ecosystems to estimate plume lengths and distribution. Further develop, scale, and refine modeling efforts.

5. Study the metabolism of oil and gas (e.g., methane) and their toxicity to Arctic marine bacteria, benthos, and other members of the ecosystem. NOAA, NSF, and the Environmental Protection Agency (EPA) should be tasked accordingly.
6. Federal agencies should use a rigorous and thorough stakeholder consultation process in planning research and development objectives, funding them, and reviewing the results.
7. NOAA should co-chair ICCOPR, along with the U.S. Coast Guard (USCG), as NOAA has significant experience in directly conducting scientific research and in overseeing research conducted by NOAA-sponsored research entities. NSF should be invited to join ICCOPR and, thus, become more engaged in oil spill research.

Background

The United States acutely needs to improve capacity for oil spill research and response efforts in Arctic and Subarctic regions, including cases of both anthropogenic spills and leaks of oil and gas at surface and subsurface levels. Unique circumstances in the North include a virtually unexplored ocean ecosystem, protracted darkness, cold, variable ice conditions, and powerful storms. These conditions complicate prevention and response efforts for spills on land and sea, especially in ice-covered ocean waters. Basic biological considerations remain poorly known for the much of the region, such as the region's ecology and spatial habitat. We also need to better understand oil metabolism, toxicity, and accumulation in high-latitude flora and fauna (from the microbiological level on up). These data are necessary to develop appropriate impact assessment, mitigation strategies, and response intervention.

Despite these limitations, the Arctic is an area of increasing opportunity for both energy exploration and marine shipping. A 2008 U.S. Geological Survey (USGS) assessment[2] estimated that 13% of the world's undiscovered oil and 30% of its undiscovered gas lies within the Arctic. All five Arctic Ocean coastal states and Iceland have offshore exploration or production programs underway. There are currently over 600 active leases in Alaskan outer continental shelf (OCS) waters. A 2009 *Arctic Marine Shipping Assessment*[3], endorsed by the eight-nation Arctic Council, projects greater use of the Arctic Ocean by mariners. Over time, such shipping will initially serve communities and resource development, and may ultimately provide trans-Arctic "shortcut" routes for global shipping.

As the United States, Russia, Canada, Greenland, Iceland, and Norway all proceed with plans for high-Arctic oil and gas exploration, political and legal requests for improved spill response capability are on the rise. The current oil spill disaster in the Gulf of Mexico only amplifies the importance and the need for action. In 2007, North Slope Borough Mayor, Edward Itta, said, "We oppose offshore [drilling] until somebody proves to us they can clean up an oil spill in the Arctic"[4]. Though his views have tempered recently, the fear of oil spills impacting subsistence resources is very much alive in the mind of the public inhabiting a region in which any response capacity is minimal and fraught with difficulty. It is not surprising that representatives of the oil and gas industry argue that, with the appropriate precautions, the risks of oil spills are sufficiently low to enable safe, secure, and reliable exploration and production of

[2] Circum-Arctic Resource Appraisal: Estimates of Undiscovered Oil and Gas North of the Arctic Circle (*2008).* Available at: http://energy.usgs.gov/arctic/ (accessed July 12, 2010). See specifically "Slide Presentation."

[3] AMSA. 2009. *Arctic Marine Shipping Assessment.* Arctic Council, April 2009, second printing, 187 pp. Available online at: http://www.arctic.gov/publications/AMSA_2009_Report_2nd_ print.pdf (accessed July 12, 2010).

[4] Ipsen, B. 2007. Residents voice opposition to Shell's offshore drilling. *Pacific Environment*, 19 April 2007. Available at: http://www.pacificenvironment.org/article.php?id=2340 (accessed July 12, 2010)/

offshore energy. Nevertheless, in communicating to USARC, these same industry representatives, in the United States, Canada, and Norway, express widespread agreement and support for increased research and development in spill prevention and response.

Federal research on Arctic ecosystems is primarily undertaken by NSF (Division of Polar Programs), NOAA, the Department of the Interior's Minerals Management Service (MMS), now renamed the Bureau of Ocean Energy (BOE), and the North Pacific Research Board. Federal research on Arctic oil spill prevention and response is currently carried out primarily by the USCG, BOE, NOAA's Coastal Response Research Center (CRRC), EPA, and OSRI. At least two federal interagency committees have been established by law to coordinate these activities: the Interagency Arctic Research Policy Committee (IARPC), established by the Arctic Research and Policy Act of 1984, which coordinates planning for all U.S. Arctic research programs throughout the government, and ICCOPR, established in OPA 90[5]. IARPC is chaired by NSF; ICCOPR is chaired by USCG.

Recent dialogue between USARC and ICCOPR has highlighted several "themes of importance." These themes relate to funding, Arctic-specific response (including defining the area in question, necessary baseline environmental research, unique conditions, such as ice-covered waters, and unique logistics), infrastructure capabilities, national priorities, opportunities for cooperation and collaboration between agencies and other stakeholder groups, use of "spills of opportunity" and controlled burns as research tools, building the next generation of researchers, and keeping abreast of industry research and development (R&D) reports with specific emphasis on the efforts of the International Petroleum Industry Environmental Association (IPIECA), which currently has a task force developing a prioritized list of additional research and technology projects to further advance oil spill preparedness in Arctic locations. We hope that, with the adoption of a regular ICCOPR meeting schedule, these themes will be addressed in crafting a new national research program.

USARC, under its authority to establish national policy, priorities, and goals for Arctic research, has long supported an appropriate basic and applied research program to find better methods to prevent and respond to oil spills in the Arctic region, as well as to understand the Arctic ecosystem and the metabolism and toxicity of oil released into the environment. We were asked by the State of Alaska to recommend that priorities meet natural resource management needs and the needs established by regulatory processes for contingency planning[6]. The Commission published *Oil Spill Response in Ice-Covered Waters* in 2004, [7] in which we found that "consistent long-term funding is needed for developing and improving response options for dealing with accidental oil spills in ice-covered waters." Following the 1989 *Exxon Valdez* oil spill and during the legislative consideration of the Oil Pollution Act of 1990, USARC supported the creation of the Oil Spill Recovery Institute[8]. USARC recently helped the United States complete the *Arctic Marine Shipping Assessment*,[9] in which the United States, along with the seven other Arctic nations, agreed on the need for more research[10]. The Commission also worked with

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[5] Oil Pollution Act of 1990, 101 H.R. 1465, P.L. 101-380. http://thomas.loc.gov/cgi-bin/bdquery/z?d101:h.r.01465:/.

[6] Alaska Department of Environmental Conservation, Division of Spill Prevention and Response, USARC Oil Spill White Paper comments, March 5, 2010.

[7] *Oil Spill Response in Ice-Covered Waters* (2004). Available online at: http://www.arctic.gov/publications/oil_in_ice.pdf (accessed July 12, 2010).

[8] Oil Spill Recovery Institute, http://www.pws-osri.org.

[9] AMSA. 2009. *Arctic Marine Shipping Assessment.* Arctic Council, April 2009, second printing, 187 pp. Available online at: http://www.arctic.gov/publications/AMSA_2009_Report_2nd_ print.pdf (accessed July 12, 2010).

[10] The AMSA report is the result of a four-year, multinational-led project that was subsequently adopted in the 2009 Tromsø Declaration, a set of guidelines for the Arctic Council during the next two years that was ratified on April 29 by the eight Arctic states, including Deputy Secretary of State James Steinberg, who

Congress, the State of Alaska, and USCG to encourage an oil spill risk assessment in the Aleutian Islands. We co-sponsored a CRRC workshop[11] and a U.S.-Canada workshop[12], and visited the Joint Industry Program at SINTEF on oil in ice, which explored new spill mitigation strategies[13]. Finally, from a local perspective, the Commission recognizes and supports the call for in situ spill scenario testing promulgated by Mayor Itta and others. Integration of traditional knowledge into spill prevention and response efforts and oil spill-related social science research, essential to the determination of impacts, are also of great importance.

These priorities, and the actions that they support, are timely. If the debate on offshore exploration in America's Arctic, specifically the Beaufort and Chukchi seas, was not enough to make these proposals timely, the 2010 blowout in the Gulf of Mexico is. This disaster has the potential to cause severe environmental and economic effects in the southeastern United States and elsewhere, despite the fact that it happened in a temperate region with substantial and proximal spill response infrastructure available.

We hope now the United States will commit to funding a long-term, appropriate, and robust spill research program that contains a component that focuses on Arctic waters, including basic research on the biota, metabolism, and toxicity of oil in the Arctic. We urge the interagency committee to include a circumpolar approach in its research program to identify best management practices (BMPs)[14] from other nations' work in the Arctic, such as Norway's Barents Sea regulations. This approach will help ensure that research supports existing legal goals to constantly improve spill response. Alaska state and federal law requires spill prevention and response capabilities to improve dynamically over time[15], ensuring that best available technology and techniques are always deployed.

Despite the growing needs for such research, and the glaring absence of it as revealed by the ongoing Gulf of Mexico spill[16], much of the funding authorized in OPA 90 has expired. Oil pollution effects research, regional research programs, demonstration projects in New York and New Jersey, Los Angeles and Long Beach, and New Orleans, and a joint program from the Department of Commerce and EPA to monitor the environmental effects of oil discharges have all lost funding authorizations in the recent past. Although improvements are needed in both the

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led the U.S delegation. Among many other findings, the AMSA report states that the "current lack of infrastructure" in the Arctic makes it more difficult to respond to spills because of the Arctic's "vast geographic distances in various seasonal and climactic circumstances."

[11] *Opening the Arctic Seas: Envisioning Disasters and Framing Solutions*. Report of a workshop held March 18–20, 2008, and sponsored by the Coastal Response Research Center at the University of New Hampshire. Available online at http://www.crrc.unh.edu/workshops/arctic_spill_summit/arctic_summit_report_final.pdf (accessed July 12, 2010).

[12] *Northern Oil and Gas Research Forum: Current Status and Future Directions in the Beaufort Sea, North Slope and Mackenzie Delta*. A workshop held in Anchorage, Alaska, October 28–30, 2009.

[13] The Joint Industry Program for Oil in Ice, Selskapet for Industriell og Teknisk Forskning ved norges tekniske hoegskole (The Foundation for Scientific and Industrial Research at the Norwegian Institute of Technology), http://www.sintef.no/Projectweb/JIP-Oil-In-Ice.

[14] Best management practices (BMPs) are defined under the Clean Water Act as a permit condition used in place of or in conjunction with effluent limitations to prevent or control the discharge of pollutants. BMPs may include a schedule of activities, prohibition of practices, maintenance procedure, or other management practice.

[15] Section 7001(c) of OPA 90 (33 U.S.C. sec. 2761) and Alaska Statutes 46.04.030(e).

[16] Schrope, M. 2010. Flood of oil, drought of research. *Nature* 27 465:404–405. Available online at: http://www.nature.com/news/2010/100525/full/465404a.html (accessed July 12, 2010).

ability to clean up oil spilled under ice and the detection of thin oil slicks trapped under ice in the Arctic and Subarctic regions, little progress has been made over the last two decades[17]. Recovery statistics for mechanical response techniques are similarly disappointing. Improvements are needed in areas such as health and human safety concerns (getting response personnel safely to spill sites), operability of equipment in icy arctic conditions, and rapid transport of equipment (including leak control devices) from populated areas with manufacturing capability (e.g., Houston) to remote spill sites. Concerns remain surrounding the environmental effects of in situ burning, chemical dispersants, and herding agents. Though some data exist, much additional research is needed in all of these areas, especially reegarding metabolism and toxicity on Arctic biota.

From the existing arctic/cold water response research, the "state of the art" is defined by technical reports and conference proceedings ("gray literature") that do not always meet the higher standards of peer review, and these documents are often not readily available to researchers and the public who might benefit from it. The Commission encourages ICCOPR to endorse the practice of publishing high-quality, peer-reviewed research related to oil spill response and prevention, as feedback has shown these types of articles are a necessary part of gaining the trust of stakeholder groups in research of this nature. We also suggest NSF/EPA foster the publication of results of oil metabolism and toxicity studies in Arctic biota, as well as studies involving modeling of convective plumes in the Arctic Ocean.

In a more favorable light, some research efforts are being conducted on priority issues, most recently by the SINTEF organization, in cooperation with various stakeholder groups. We encourage transparency in the conduct of research and peer-reviewed publication as a critical part of the broad distribution of the results. We look forward to learning more about the group's progress when the final report is released in the near future.

Despite these recent efforts, the Commission concludes that federal oil spill research efforts for Arctic conditions are fragmented, uncoordinated, under-funded, and in dire, immediate need of improvement.

Commission Recommendations

To this end, the Commission proposes the following coordinated actions among the Executive Branch, Congress, the State of Alaska and its municipalities, industry, academia, and other stakeholder groups:

1. **Strengthen interagency planning and coordination.** ICCOPR, created by OPA 90, should begin to meet regularly in a transparent fashion and with a regular agenda to develop justification for an appropriate level of national funding for oil spill research. Meetings should involve state environmental agencies, industry, and academic institutions, as they did in the early 1990s. ICCOPR needs to produce a regularly updated research and development program plan. It should be prioritized to reduce the greatest risks in the chain of oil exploration, production, transport, and use. Notices of meetings, minutes, and agendas should be posted online for the public to see. Congress should exercise its oversight, and the Office of Science and Technology Policy (OSTP) should exercise its coordination powers to ensure the research provisions of OPA 90 are followed. We recommend that ICCOPR establish a Federal Advisory Committee Act (FACA)-governed advisory committee comprised of a general advisory arm (involving academic and other nonfederal members)

[17] 2006 MMS Svalbard Experimental Spill to Study Spill Detection and Oil Behavior in Ice

and a scientific advisory arm (involving academic and industry members, and others based on their scientific or technical expertise). This committee would help leverage public-private partnerships and promote stronger cooperation with nongovernmental researchers and may help build trust among stakeholders. With the expertise from advisory committee members, federal officials and the nation would have access to information and advice on a broad range of issues affecting ICCOPR policies and programs. The public, in return, would be afforded an opportunity to participate actively in the ICCOPR decision-making process.

2. **Create and fund a regional plan specific to the Arctic.** The Commission appreciates the fact that as we crafted this white paper, the members of ICCOPR met in Anchorage, Alaska, on March 4, 2010 with the Commission and Commission experts to review oil spill research needs in the Arctic. A day later, ICCOPR chair Capt. Anthony Lloyd joined the Commission in a public discussion of this paper's recommendations, and on April 13, 2010, the Commission received additional written comments from ICCOPR.

   The law sets out the means for research planning in OPA 90 and in the Arctic Research and Policy Act. Given the significant potential of offshore oil and gas in America's Arctic, an Alaska-specific research plan should be developed for presentation to both ICCOPR and IARPC. IARPC has already assigned the drafting of a "civil infrastructure research" plan to the U.S. Army Corps of Engineers, and an Arctic spill research plan could become part of that work product.

   Regarding the development of an Alaska-region research plan for oil spill research, ICCOPR should work closely with other interagency research entities created by Congress and based in Alaska. One such entity is OSRI, which has already done much of the groundwork. OSRI provides public funding for Arctic/Subarctic spill research. The board of directors to OSRI, and their scientific advisory committee, includes representatives from a broad cross section of federal agencies, the State of Alaska, and the general public. The Commission met with the OSRI board in February 2010 to discuss this proposal. The matter is to be given further consideration at their upcoming meeting.

   Other congressionally chartered research or spill response entities that should be involved include the members of the Regional Response Team for Alaska, the North Pacific Research Board, the North Slope Science Initiative, Regional Citizens Advisory Councils, the Arctic Institute of North America, and the Alaska Ocean Observing System. Additionally, Alaska coastal municipalities, the University of Alaska, and the University of New Hampshire's NOAA-sponsored Coastal Response Research Center have much to add. The plan should be cognizant of, and support cooperation with, oil spill research programs of Arctic industry and response cooperatives, including IPIECA, efforts of the Arctic Council, and well-established efforts at SINTEF in Norway and in the Arctic and Marine Oil-spill Program (AMOP) sponsored by Environment Canada. This list is not meant to be exclusive, but highlights existing infrastructure and cooperating groups that have made contributions so far. Senator Mark Begich has proposed legislation to fund research to further define Arctic Ocean research needs. Such a study should have an Arctic regional research plan to review. When a U.S. Arctic oil spill research plan is complete, it can be forwarded to ICCOPR and IARPC for inclusion in both national plans. We recommend plan renewal at least every five years.

3. **An "endowment approach" will ensure long-term funding.** Given recent lease sales earning close to $3 billion in revenues for the United States, other offshore development in Arctic/Subarctic ice-covered areas that will serve U.S. markets, and the increasing amount of shipping of all types occurring in the Arctic Ocean, USARC recommends a research funding level of $30 to $50 million per year for a national program, with $8–10 million per year dedicated to Alaska. This work would cover both the baseline biological research required in the Arctic as well as aggressively improve research, development, and on-water (in situ) experimentation of spill response in ice-covered conditions. Support is also needed for oiled wildlife response research and practices, as is additional funding specific to laboratory-based R&D for spill-response tactics. Major support should be given to basic research on Arctic ecosystems, including developing a thorough understanding of oil and gas metabolism and toxicity to Arctic microbes, benthic life, and other denizens of the water column, including fish and birds and mammals that depend on its productivity. NSF and EPA are likely to be the primary funding sources for these efforts. Oil spill research and development needs long-term funding continuity and commitment to facilities and people, particularly in the Arctic. An attached amendment to OPA 90 (Annex 1) would create a funding stream from the OSLTF[18] and be spent through a competitive program managed by ICCOPR agencies. Besides the "endowment approach," Congress could authorize an appropriate amount of funding from the OSTLF to go to oil spill research by annual appropriation. The built-in "endowment approach" is now used to fund research and oil tank upgrade/replacement work by OSRI and the Denali Commission.

4. The Commission has considered the need for new legislation in the following areas:

a. Support the aforementioned "endowment approach," and appropriate authorizations needed for the OSLTF to maintain a competitive research program involving industry and academic applicants with local stakeholders.

b. Support an increase to the "endowment" fund for the OSRI by approximately $12 million for inflation proofing, as is now contained in Senate Bill S. 1194.

c. Support for Senator Mark Begich's initiative, Senate bill S. 1564, to fund a study to review research needs in the areas of spill response and prevention and to investigate the utility of Response Gap Analysis research. One example of this type of study would be a rapid report by the National Academy of Sciences. This report should include a focus on the metabolism and toxicity of oil in Arctic biota and include an analysis of novel biotechnology approaches to rapidly detoxify oil spills. We recommend the generation of a "State of the Science" report from these efforts to be compiled via a joint IARPC and ICCOPR effort followed by *external* peer review. This report would analyze existing information, define BMPs and use these data as a basis for defining new R&D priorities.

d. Expand the membership of the Interagency Oil Pollution Research Coordinating Committee to include NSF, OSRI, CRRC, industry, state, local and academic members, and tie ICCOPR's work to that of the White House-chaired National Science and Technology Council. Additionally, NOAA should co-chair ICCOPR, along with USCG, as NOAA has significant experience in directly conducting scientific research and in overseeing research conducted by NOAA-sponsored research entities.

[18] The Oil Spill Liability Trust Fund was established by section 9509 of the Internal Revenue Code of 1986 (26 U.S.C. 9509).

e. Allow EPA and other appropriate regulators to waive restrictions that have so far prevented on-water testing of oil spills in the waters of the United States. Legislation could also encourage "spills of opportunity" to be used to test new response techniques.

f. Direct the Department of Justice to see that fines and penalties for oil spills are allocated to further support research.

Annex 1

Proposed Amendment to Increase Oil Spill Research Funding

The proposed amendment would fund the Oil Pollution Research and Development Program coordinated by the Interagency Coordinating Committee on Oil Pollution Research (33 U.S.C. 2761(c)) with annual interest earned on a $1 billion investment from the Oil Spill Liability Trust Fund established by 26 U.S.C. 2509. The purpose of this amendment is to create a dedicated funding stream for coordinated oil spill research without requiring new appropriations. It is important for the Committee to expand its research funding and coordination efforts as oil exploration, shipping, transportation, and other forms of commerce in Arctic waters increase in the coming years. The proposed amendment also modifies the existing statute to require agencies that are members of the Committee to spend Program funds on grants and cooperative agreements with independent entities including universities, research institutions, industry, and state and foreign governments to the maximum extent practicable.

1) Purpose and Awarding of Grants

Section 2761(c)(10) of title 33, United States Code, is amended by striking "may" from the first sentence and replacing it with "shall to the extent practicable" and by inserting "joint industry programs, pilot projects financed jointly with state or foreign governments," before "and other persons." Section 2761(c)(10) is further amended by inserting after the first paragraph the following:

"(a) Competitive awards. Contracts, cooperative agreements, and grants entered into under this section shall to the extent practicable be awarded on a competitive basis. Applications for awards will be subject to scientific merit review (peer review) and will be evaluated based on criteria developed by the Interagency Committee."

2) Funding

Section 2761(f) of title 33, United States Code, is amended by striking paragraph (f) and inserting in lieu thereof:

"(f)(1) Amounts in the Fund shall be available without further appropriation and without fiscal year limitation, to carry out this section except for subsection (c)(8) of this section.

(2) USE OF INTEREST ONLY. The amount of funding to be made available annually to establish and implement the program under (c) of this section shall be the interest produced by the Fund's investment of $1,000,000,000 and currently deposited in the Fund and invested by the Secretary of the Treasury in income producing securities along with other funds compromising the Fund. The National Pollution Funds Center shall transfer all such accrued interest annually to the Coast Guard beginning no more than six months after enactment of this Act, for the program.

(3) Congress may appropriate such additional funds as may be necessary to carry out this section."