



DOD/ONR Arctic Nuclear Waste Assessment Program

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Abstract

The Arctic Nuclear Waste Program (ANWAP) was initiated in 1993 as a result of congressional concern over the disposal of nuclear materials by the former Soviet Union into the Arctic marine environment. The program is part of the larger DOD cooperative Threat Reduction (CTR) Program. Specific management of ANWAP is conducted by the Ocean, Atmosphere and Space Modeling and Prediction Division of the Office of Naval Research.

ANWAP is specifically aimed at addressing the following questions:

- 1) What is the magnitude and location of the radioactive waste which has entered into the Arctic marine environment;
- 2) How is radioactive contamination transported about the Arctic basin and what are the present levels away from the various contamination sources; and
- 3) What is the risk to the environment and to human health as a result of this radioactive contamination.

The program is comprised of approximately 70 different projects conducting research of all types; field surveys, laboratory experiments, modeling studies and archival data analysis. The investigators include contractors, academic institutions, government laboratories and agencies, and foreign institutions. Of particular emphasis is an attempt to include Russian institutions in this research program. To date approximately ten percent of the funds has gone to Russia institutions for research or logistical support. Additionally, ANWAP has strong linkages and collaborations include the IAEA International Arctic Seas Assessment Program and the Arctic Environmental Protection Strategy - Arctic Monitoring and Assessment Program.

The major conclusion from the research to date is that the largest signals for region-wide radionuclide contamination in the Arctic marine environment appear to arise from the following:

- 1) atmospheric testing of Nuclear weapons, a practice that has been discontinued;
- 2) nuclear fuel re-processing wastes carried in the Arctic from re-processing facilities in Western Europe, and
- 3) accidents such as Chernobyl and the 1957 explosion at Chelyabinsk-65

The order listed above represents the relative magnitude of the contribution to the contamination from each source. Because the signals from 1 and 2 have decreased with time, region-wide concentrations of radionuclides in the water column and in surface sediments appear to have decreased significantly from their peak levels. Overall, levels of radionuclide activity in the Arctic and Pacific regions are low. So far, the Yenisey and Ob rivers appear to have had only a modest impact on radionuclide levels in the Kara Sea and the Arctic Ocean region in general. However, local sites of elevated radionuclide concentration arising from FSU dumping and weapons testing have been identified in the Kara Sera region.

While initial results are encouraging there still exists scientific issues which must be addressed. Sediment and sea ice processes which affect contaminant transport; data from winter periods; watershed and river transport of contaminants; and other unique processes in the Arctic remain to be investigated. Additionally, quantification of the terrestrial source term and its impact on the marine environment is just beginning. The final result of ongoing research as well as the new initiatives addressing this issues will be a formal, integrated risk assessment.