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A LONG-TERM ENVIRONMENTAL MONITORING PROGRAM AT MCMURDO STATION, ANTARCTICA

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In October 1998 The Protocol on Environmental Protection to the Antarctic Treaty entered into force. To comply with the protocol's requirements that human activities in Antarctica be planned and conducted to limit adverse environmental impacts, a long-term environmental monitoring program for the US Antarctic Program's McMurdo Station has been developed. It is now being conducted annually and provides cost-effective monitoring of anthropogenic contaminants (petroleum hydrocarbons, polychlorinated biphenyls (PCBs) and trace metals) on Ross Island and in adjacent areas of McMurdo Sound.

During the program's three-year pilot phase (1999-2001), samples were collected at nearly 1500 terrestrial and at 30 marine sites. This sampling delineated spatial patterns of human impacts in and around the station. In McMurdo Sound, impacts are limited to within a few hundred meters of the station including a PCB spill within Winter Quarters Bay. However, even within the bay contamination is patchy and localized. Contamination on Ross Island in the vicinity of the station is largely confined to areas with a legacy of hydrocarbon spills. Historical aerial photographs and other archival materials reveal that most of the area impacted by human activities today was disturbed within 10-15 years after the station's establishment in 1955. Ongoing activities continue to impact previously disturbed areas but the "footprint" does not appear to enlarging. Activities with the potential for ongoing environmental impact, including fuel handling and storage, are often within areas with a history of these activities.

A reduced sampling plan has been implemented for three years, collecting samples at approximately 150 terrestrial and 9 marine sites each year. This continued monitoring is designed to determine if measured levels of anthropogenic inputs are increasing or decreasing in response to ongoing station activities and changing management practices. These new results will also be used to test all design elements and propose an improved long-term monitoring program.