

from McMurdo Station occurs in late February. Thus, there are no penguins in the area at that time, since the birds will have already gone out to sea again.

Further, both the National Marine Fisheries Service and the Fish and Wildlife Service have agreed that the disposal of ice piers from McMurdo Station will not have any effect on endangered or threatened species, nor is the action likely to adversely affect any critical habitats.

In addition, the time that the loops of cable are suspended from the bottom of the ice pier would be expected to be relatively brief. Once a substantial portion of the cable in each layer is released from the ice by melting processes, the weight of the suspended cable will act to detach the remainder of the layer of cable from the pier. As discussed above, the entire length of cable would then fall rapidly to the ocean bottom.

Although the wooden utility poles and the bollards are cut off at the level of the ice surface before the pier is towed for dumping, the six or seven stump ends of the poles, approximately four feet long, remain frozen in the pier. (The NSF requires that the longer, exposed lengths of the utility poles be returned for recycling back to the United States; they are never disposed of in the ocean). When eventually released from the pier during the disintegration process, the stump ends of the poles could float for several years, providing substrate for attachment of sessile organisms. Eventually, however, the poles will be destroyed by biological processes. Navigational hazards from the poles are unlikely, because of their small size and limited number.

Of potentially greater environmental concern are any operational discharges, leaks, or spills that may have contaminated the surface of the pier over the period of its existence. Examples of such possible releases include AN-8 (jet fuel formulated for cold environment use by heavy diesel engines and aircraft) or gasoline during the annual unloading process from the resupply oil tanker; spills of material due to leaks or cracks in containers or drums during the annual offloading from the supply vessel; leaks of AN-8, gasoline, engine lubricating oil, hydraulic fluid, or ethylene glycol (antifreeze) from equipment working on the pier; or spills of liquids or chemicals being stored on, or moved across, the pier. These discharges, leaks, and spills could result in contamination of parts of the pier with chemical compounds of concern to the marine environment.

To assess this potential further, in February 1993 the NSF analyzed eleven

ice samples taken from the ice pier at McMurdo Station. The samples were collected in the following manner. The central portion of the pier was first divided into 21 equal area quadrats, each approximately 100' × 100'. The center of each plot was then identified, and four additional sample locations were identified in an equidistant "X" pattern from the center sample point. One sample was collected from each of the five points in each plot, and the five sub-samples were then composited into a single sample for each plot. Composited samples were analyzed for alternating plots throughout the grid pattern, *i.e.*, the composited sample for every other plot was analyzed, for a total of eleven analyses. The samples were analyzed for two compounds: ethylene glycol (antifreeze) and total extractable hydrocarbons (TEH). Ethylene glycol was selected because of the possibility of leaks from engine blocks; TEH was selected because of the need for a broad spectrum analytical procedure, and because the presence of TEH would represent any possible extractable petroleum discharges onto the surface of the ice pier. Ethylene glycol was not detected in any of the eleven samples, at a detection limit of 16 mg/kg; TEH was not detected in ten of the eleven samples, at a detection limit of 3 mg/kg. Only one sample, collected beneath two 55-gallon fuel drums used to provide heat for a warming hut on the ice pier, showed a concentration of 70 mg/kg. This sample was collected directly underneath fuel drums where dripping had occurred during drum exchange operations.

Subsequently, the NSF issued a directive that at all locations where fuel drums for building heating systems, or fuel transfer stations are found, such locations shall be underlain with secondary containment methods, to facilitate capture of leaks or spills. Secondary containment methods include large metal pans or impermeable liners placed beneath the potential contaminant source. Drip pans were installed under the fuel drums at the warming hut on the ice pier.

In February 1994, the approximately 800' by 300' surface of the ice pier was again divided into 21 quadrats for further examination of locations of contamination. NSF personnel examined the entire surface of the pier, after the non-slip gravel surface had been removed, and any points on the pier showing signs of contamination from leaks or spills were marked and noted. Five samples were taken from each of the 21 quadrats; the samples were composited and analyzed for total petroleum hydrocarbons (TPH). TPH

analysis, which identifies a narrower range of analytes than the broader TEH analytical procedure, was used because previous analyses demonstrated that only analytes from the narrower range are present. TPH has a detection limit of 10 mg/kg; for all samples except one, TPH was undetected. That single sample had a TPH concentration of 50 mg/kg. Analysis of that single sample was unable to specifically determine the chemical composition of the contaminants; vehicle engine fuel or hydraulic fluids were identified as the most likely possibilities.

The NSF has a spill prevention, control, and countermeasures (SPCC) plan for all of the stations and bases under NSF jurisdiction in Antarctica. The plan, revised in September 1994, and currently being updated, includes a section addressing fuel storage and transfer systems for the ice pier at McMurdo Station. The SPCC plan identifies the annual unloading of petroleum products from the supply tanker as having the greatest potential for accidental discharge of contaminants. Previously, four-inch diameter hoses made up in 50-foot lengths were used to unload fuel from the tanker to the tank farms on the mainland at McMurdo Station. However, to reduce the risk of a potential fuel spill during the tanker unloading operation, new six-inch diameter hoses made up in 660-foot lengths replaced the older hoses in 1993. The new hoses significantly reduced the number of hose connections (and potential leaks) on the ice pier. For further protection, the connecting point from the tanker to the transfer hose was underlain by large drip pans.

In addition, the SPCC plan identifies the annual unloading of drummed lubricants, solvents, and hazardous materials from the cargo freighter, and the subsequent loading of the freighter with materials destined to be returned to New Zealand or the United States, as potential sources of accidental discharge or spills. As a result, to reduce the potential for discharges, the plan requires all materials received from, or loaded onto, the cargo vessel to be containerized in double-walled military vans.

#### D. Discussion

Today EPA is proposing to issue a new general permit to NSF and its agents for the ocean dumping of man-made ice piers from the NSF research station at McMurdo Sound, Antarctica, subject to specific conditions. Agents of the NSF are included in the permit because transportation for the purpose of dumping the pier may be by vessels