known nuclear-weapons production facilities on this river system are the probable sources of the radionuclides measured.

Chlorine-36 (^{36}Cl) concentrations were determined by accelerator mass spectrometry (AMS) for 500 mL (milliliter) water samples prefiltered through the 63-μm nylon media. Concentrations of ^{36}Cl were measured at all five stations and ranged from $4.0 \pm 0.1 \times 10^7$ atoms/L for the sample only influenced by nuclear-weapons testing and not by waste disposal (station 1) to $2.4 \pm .03 \times 10^9$ atoms/L for the sample nearest a plutonium production facility (station 2). The ^{36}Cl concentration for the sample from the station most distant from any waste source and nearest to the Ob Gulf (station 5) was $5.0 \pm 0.2 \times 10^8$ atoms/L.

Plutonium (Pu) isotopic concentrations and strontium-90 (^{90}Sr) concentrations were determined by conventional decay-counting methods. The only Pu isotopes detected in 20 L water samples were ^{238}Pu at station 1 and ^{239}Pu at station 2. No detectable concentrations of ^{90}Sr were measured in 400 mL water samples from any of the stations. Gamma-spectroscopy measurements also showed no detectable concentrations of anthropogenic gamma-emitting radionuclides from the 20 L water samples. These results suggest that AMS offers a method of determining radioactivity concentrations in the environment at greater distances away from a source than do conventional decay-counting methods because of the smaller analytical method detection limit associated with AMS for select radionuclides.

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BOMB-PRODUCED CHLORINE-36 FLUX CALCULATED FROM MID-LATITUDE GLACIAL ICE OF NORTH AMERICA

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In 1991, the U.S. Geological Survey collected a 159.7-m ice core from the Upper Fremont Glacier in the Wind River Range, Wyoming (Naftz *et al.* 1993). In 1994, the ice was processed at the National Ice Core Laboratory in Denver, Colorado, and analyzed for chlorine-36 (^{36}Cl) by accelerator mass spectrometry at Purdue University. A tritium bomb peak identified in the work by Naftz and others was used as a marker to estimate the depth of bomb-produced ^{36}Cl. Tritium concentrations ranged from 0 tritium units (TU) for older ice to >300 TU at 29 m below the ice surface, a depth that includes ice that was deposited during nuclear-weapons tests through the early 1960s. Maximum ^{36}Cl production during nuclear-weapons tests was in the late 1950s; therefore, the analyses were performed on ice from a depth of 29.8 to 32 m. Calculated flux for ^{36}Cl in ice deposited in the late 1950s ranged from $4.5 \pm 0.1 \times 10^6$ atoms/cm^2 yr for a 0.6-m section of ice centered at a depth of 30.1 m to $11 \pm 0.2 \times 10^6$ atoms/cm^2 yr for a 0.5-m section of ice centered at a depth of 31.8 m. Ice samples from a depth of 104.7 to 106.3 m were selected to represent pre-weapons tests ^{36}Cl flux. Calculated flux for ^{36}Cl in this deeper ice was $1.7 \pm 0.2 \times 10^5$ atoms/cm^2 yr for a 0.8-m section of ice centered at a depth of 105.1 m and $7.4 \pm 0.4 \times 105$ atoms/cm^2 yr for a 0.8-m section of ice cen-