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DIVISION OF PUBLIC HEALTH
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Tuluksak River Water Quality: Available Data

February 28, 2013

Wascca Fly
Village Council President
Tuluksak Native Community
P.O. Box 95
Tuluksak, AK 99679

Dear Mr. Fly,

In response to concerns of river water quality and cancer health concerns from the village of Tuluksak, the Environmental Public Health Program, Alaska Section of Epidemiology reviewed both water quality data for the Tuluksak River and cancer data for Tuluksak. Water quality concerns stem primarily from historic and potentially current mining activities upstream of Tuluksak on the Tuluksak River and its tributaries.

Water Quality

Water quality data for Tuluksak River were available from three reports. These reports are briefly summarized in Table 1 below. The reports include test results of potential contaminants that are related to mining activities and may be of potential health concern (for example, arsenic and mercury). In addition, the reports include test results of potential contaminants not usually of health concern that are often naturally present in water and soil and may even be essential for good health (for example, potassium and sodium). Also available in two reports are counts of coliform bacteria. While we do not have enough information to know if these coliforms cause disease in humans, we it is not certain that they do, as coliforms are not uncommon in rivers and are usually present in the environment and in the feces of animals and humans.

We recommend using the community water system for drinking. If using water from the community water system is not possible, we recommend boiling the water and letting it cool down before drinking. If the water has a flat taste, pour it back and forth between two containers two or three times to aerate. You can also add one to three drops of Clorox, Purex, White Sail, B.K. Rainbow (containing 3.5% available chlorine) to each quart of water.

Table 1. Historic Water Contaminant Data for the Tuluksak River

Report Title	**Date(s) of Water Collection**	**Water Sample Collection Site**	**Potential Contaminants Analyzed**	**Potential Health Risks**
Hydrologic Reconnaissance of the Tuluksak River Basin, Alaska, 1984-85	March 26-27, 1985; June 18-22, 1984	1. Bear Creek above Nyac Dredge 2. Bear Creek below Nyac Dredge 3. Tuluksak River mile 64 4. Tuluksak River mile 60.5 5. Tuluksak River mile 46.5 6. Fog River 7. Tuluksak River (left channel) mile 22 8. Tuluksak River mile 21.5	Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chloride, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Potassium, Selenium, Silica, Silver, Sodium Sulfate, Strontium, Titanium, Vanadium, and Zinc	None from chemicals at any of the locations. Locations may be too far from village river drinking water source.
Tuluksak River Stream Gaging Project Trip Report (Alaska Department of Natural Resources)	June 22, 2004	Four locations, three upstream and one downstream of the village, and approximately one mile away from the village	**Locations 1 and 2:** Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Phosphorous, Potassium, Selenium, Silicon, Silver, Sodium, Thallium, Tin, Titanium, Vanadium, and Zinc. **Locations 3 and 4:** Fecal Coliforms	None from chemicals at any of the locations. ’Coliform bacteria exceeded acceptable levels, but the sample information is not enough for us to know if they could cause diseases in people.
Water Source Study: Tuluksak Native Community, Tuluksak, Alaska (CE2 Engineers, Inc. for the United States Environmental Protection Agency)	November 17, 2010		Aluminum, Antimony, Arsenic, Barium, Beryllium, Bromide, Cadmium, Calcium, Chloride, Chromium, Copper, Cyanide, Color (True), Color (Apparent), Fluoride, Iron, Manganese, Magnesium, Mercury, Nickel, Nitrate, Nitrite, Selenium, Silver, Sodium, Sulfate, Thallium, Total Diss. Solids, Total Organic Carbon, Total	None from chemicals at any of the locations. Coliform bacteria exceeded acceptable levels, but the sample information is not enough for us to know if they could cause diseases in people.

Report Title	Date(s) of Water Collection	Water Sample Collection Site	Potential Contaminants Analyzed	Potential Health Risks
			Organic Carbon, Dissolved, Total Trihalomethanes (water chlorination byproducts) Formation Potential, Turbidity, Zinc, E. Coli bacteria, Odor, Total Coliform	

Upon reviewing these data, we find that the available Tuluksak River water test results do not show anything of health concern. High concentrations (levels) of certain metals, such as magnesium and iron, at the concentrations found, are not associated with adverse (harmful) health effects. Iron, for example, is in many foods; the body will not absorb it when it has enough of it, and it is only toxic at amounts that are much higher than those found in the water.

Noteworthy is that these water tests occurred on three occasions during the past 28 years. While they generally do not indicate health risks, more systematic and coordinated testing is justified to determine if there are contaminant levels that may be of health concern to those who drink water from the river. More frequent testing of river water as a source of drinking water for Tuluksak is also desirable.

Cancer

We also understand that the village has concerns that the drinking water has caused an increase in cancers in the village. We asked the Alaska Cancer Registry in the Department of Health and Social Services to share any data they have on cancers in Tuluksak. Table 2 shows the cancer incidence data for Tuluksak from 1996, the year Cancer Registry was established, until 2011. It shows the number of Tuluksak residents diagnosed with cancer during these years. According to the cancer registry, some years have more than others and some years have none, but it does not seem to show any trend related to a specific cause and may be due to chance alone.

Table 2. Number of Tuluksak, AK residents diagnosed with cancer (1996 – 2011)

Year of Diagnosis	Number of cancers diagnosed
1996-1999	1
2000-2003	3
2004-2007	3
2008-2011	8

After analyzing the data for Tuluksak, that are available since 1996, the year the Alaska Cancer Registry was established, the Alaska Cancer Registry concluded that there are no unusually high numbers of cancer cases that have occurred in the village of Tuluksak. The cancer registry based their conclusion partly on the following points:

1. There does not appear to be a high number of uncommon cancers. This means that the cancers found in Tuluksak are similar to those seen in people in Alaska and the U.S.
2. These cancer types are common and their numbers are typically what would be expected in the population. No one year had more than three cancer diagnoses. Approximately one out of four Alaskans have died from cancer between 1996 and 2009 as compared to one out of five in Tuluksak. That means that Tuluksak residents are less likely to have died from cancer than the rest of Alaska residents.

Cancers have many causes. Different types of cancer have different causes and usually depend on many factors. Some cancers may be related to chemical, environmental, genetic, immunologic, or viral origin. Cancers also can arise spontaneously from causes that are unexplained yet. Some risk factors for cancer include age, race, sex, genetic factors, diet, and exposure to chemicals, radiation, and tobacco, alcohol, and sedentary (less active) lifestyle. Finally, it is worth noting that cancers are common diseases. About a third of women and about a half of men in the U.S. will develop some sort of cancer in their lifetime.

In addition, in response to your request, we plan to coordinate with the village a visit during which we will collect hair samples for mercury testing. Hair mercury testing can give us an idea about mercury content in the body and usually indicate how much mercury has come into the body by eating fish and other seafood. During this trip, we would also be willing to share information about Tuluksak River water quality in any way you believe will reach the greatest number of community members.

Please feel free to contact us with any questions about this letter or with any other concerns about contaminants and health.

Sincerely,

Ali Hamade, PhD, DABT
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Alaska Section of Epidemiology
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