November 14, 2003

Mayor Shelly Wilson City of Tenakee Springs P.O. Box 52 Tenakee Springs, AK 99841

transmitted via facsimile to: (907) 736-2207

RE: Preliminary Survey of the Tenakee Tank Farm

Dear Mayor:

On November 11, 2003, I conducted a preliminary survey of the bulk fuel storage facility currently owned by Kadashan Bay Corporation and operated by the Snyder Mercantile Company of Tenakee.

### Facility History

The facility has been in operation since before 1951 when the facility was upgraded to its current configuration of three vertical, 20,000-gallon tanks and a vertical 12,000-gallon tank (currently not in use). The three operating tanks contain #2 diesel, #1 diesel, and regular gasoline. The tanks are labeled 76 unifuel (#2 diesel), 76 uniflame (#1 diesel), and 76 regular (gasoline). The tank foundations are 6" x 12" creosoted timbers, in four layers - two above ground, and two below ground. The tanks are situated in an earthen-diked area with no liner. The area is thick with vegetation.

According to 1998 site visit information provided by the Alaska Energy Authority (AEA) to ADEC and confirmed during my survey, there is no security fence and no locks on the valves. The tanks are welded steel construction. There is some rust along the base of the tanks. According to AEA, there is adequate normal venting, but no emergency venting for the tanks, which are gauged manually. Pipes are 3" steel with threaded connections. The ball valves at the tanks are non-ferrous. The pipes run down hill to a marine header at the dock. There is no secondary containment at the marine header.

Information from the U.S. Coast Guard indicates there is no record of any spills for the facility, other than a weeping fitting that was detected during an inspection in August of 2000. The problem was reportedly fixed in late August 2000.

### Preliminary Survey

A visual inspection of the facility confirmed rust and pitting along the base of the tanks. Submerged sediments inside the containment emit sheens in the standing water when disturbed. This generates a discharge of sheening water via a piped drain exiting the containment through the dike. In addition, a breach in the dike was noted along the west side of the containment. Given the breach and contaminated water discharge, some spread of contamination may therefore be occurring through surface water overland flow.

The survey effort consisted of hand-digging sixteen holes throughout the tank farm property and around the perimeter to attempt to identify the presence and extent of any contamination. Assisting me in the effort were community members Ron Flinn, JC Thomas, Paul Scriber, and Terry Kennedy. The holes were dug with shovels, picks and a post-hole digger. The depths of the holes ranged from 1-3 feet. Enclosure 1 provides a site sketch of the facility showing locations of all test holes.

Soil type and groundwater conditions were noted at each test hole. Soil at various depths was field screened using the warm water sheen test, visual and olfactory indications, and a photo-ionization detector (PID). The latter field screening technique is performed by collecting a small amount of soil and placing it in a ziploc bag, warming the sample to at least room temperature and reading the vapors inside the bag with the PID.

# Results

The results of the PID field screening as well as the observations noted at each hole are presented in tabular form in Enclosure 2 and are discussed in additional detail in the following paragraphs.

- Test holes 1 and 2 were excavated across the road from the tank farm property in beach sediments. While contamination was not apparent in test hole 1, a sheen and slightly elevated reading was detected in test hole 2. Contamination was also detected in test holes 3, 4 and 5, excavated in front of the old generator shed and the existing generator tank. Test hole 4, excavated at the southeast corner of the old shed, appeared black and oily, possibly indicating an older weathered source of fuel. According to local residents, the former generator tank had leaked chronically and may have caused the contamination found in the upper beach area. A fitting connecting the generator tank to a distribution line from the tank farm was observed to be leaking at the time of the survey.
- Four test holes were excavated inside the tank farm containment. Test holes 6, 7, and 8 were excavated to depths of approximately two and half feet in front of the tanks and valves, between the walkway and the pipe runs. The soil had a high organic content from the surface to a depth of about two feet where a mix of organics, till and gravel was found over a dense blue clay or till layer. Field screening readings from the three horizons of soil indicated significant petroleum impacts that were probably significantly in excess of ADEC's cleanup level for diesel hydrocarbons (see under <u>Discussion</u>) in the two upper layers, with the blue till layer exhibiting less contamination. Test hole 10, excavated in the rear

northeast corner of the containment area, had no odor or sheen at a depth of 10" in wet sandy till. The PID reading was comparatively low and likely less than the cleanup level.

- Test hole 9 was excavated just outside the southeast corner of the containment dike, near a small drainage that appeared to drain the containment area. In contrast to the other samples collected from inside the containment, the till layer in this hole had a much higher reading on the PID. This may be due to some residual oily water contamination on the clay sample when it was collected, or that petroleum contamination had permeated the upper layer of the till.
- Test holes 11 and 12 were excavated on the hillside below the fuel farm, and adjacent to a distribution line from the farm to the generator tank. The soil horizons in these holes were similar to the others. Samples were collected from the organic layer only in these holes, and both showed contamination consistent with what was found inside the containment area.
- Test hole 13 was excavated immediately behind a cabin owned by Snyder Mercantile. Samples from both the organic layer and the till layer showed no indication of contamination. Additionally, no water was observed in this hole.
- Test holes 14 and 15 were excavated just downslope from the fuel farm, near the two discarded tanks. Both holes were excavated to a depth of three feet. No detected contamination was found in test hole 14, in either the organic layer or the till layer. However, contamination was detected in both these layers in test hole 15.
- Test hole 16 was excavated approximately 60 feet west of the tank farm, near where the pipe runs turn and travel down along the access stairs to the road. Contamination similar in character to the other holes was observed in the organic soil layer and in the dense brown till layer encountered at a depth of two feet.

## Discussion

Most of the holes filled with water rapidly. Except for the holes excavated in the beach sediments, soil in all the holes had a significant amount of organic content, to an average depth of two feet where a dense blue clay or till was encountered. Although it was difficult to remove a clean sample of the till material, results from the field screening indicate the contamination has not significantly permeated this layer.

Field screening with a PID provides only a rough estimate of the contamination; in some instances the PID can fail to detect any petroleum contamination at all. Additionally, the results cannot be compared to laboratory analyses on a one-to-one basis. This is due to the manner in which the concentrations of petroleum are detected by the instrument. However, based on experience with the instrument, roughly 20 parts per million (ppm) on the PID usually represents an exceedance of the ADEC's most stringent cleanup level of 230 ppm for diesel range hydrocarbons. If we apply this criterion to our readings,

petroleum contamination is estimated to be above the cleanup level in a majority of the holes. Only test holes 1, 10, 13 and 14 showed little to no evidence of contamination.

While this survey represents only a cursory look at the environmental conditions of the site, the prevalence of the organic soil over a fairly consistent layer of blue till provide some benefits. The dense till found throughout the site may be serving as a confining layer that prevents the downward migration of the petroleum; therefore, the overall volume of contamination is limited. The percentage of organic carbon in the soil serves to bind up and retain a certain amount of petroleum, preventing it from migrating and contaminating groundwater. Because of this, the ADEC allows alternative cleanup levels to be calculated based on site-specific total organic carbon data. This means that a potentially less stringent cleanup level could be developed for the site, requiring less cleanup of soil.

Other alternatives for the site may include limited contaminant source removal, restricting the land use of the property to commercial or industrial status, or conducting a risk assessment. Regardless, additional information, including laboratory sampling and analysis is recommended before proceeding with any of these options. In the short-term, repairs to weeping fittings, improvements to the dike containment, and better management of the containment discharge may prevent further offsite migration of contamination.

Finally, you requested evaluation of the following two issues:

- 1) Does the current condition of the tank farm pose a public health threat to Tenakee residents, and
- 2) Is there any evidence of tank farm-related contamination on the beach.

Based on this preliminary survey, I identified no immediate threat to public health from the tank farm contamination. Secondly, while contamination was identified in the upper beach area downslope of the tank farm, the source or sources of this contamination was inconclusive, given that a generator facility and tank has been situated between the tank farm and the beach for many years.

We hope this information is helpful to the City of Tenakee in their decision to acquire the facility. We have appreciated the opportunity to assist the community of Tenakee on this project. If we can be of further assistance, please don't hesitate to contact us.

Sincerely,

Sally Schlichting Environmental Professional

Enclosures

#### Tenakee Springs -- Bulk Fuel Facility Summary of Field Screening Results November 11, 2003 Site Survey Enclosure 2

| Test Hole No. | Location   | Depth | Soil Type   | Groundwater? | Odor/Sheen               | Reading (ppm)* |
|---------------|--|-------|---|--------------|--------------------------|----------------|
| 1             | beach, mid-tide level, adjacent to Snyder Merc. Dock               | -12"  | black fine grained material beneath beach pebbles   | Yes          | sheen test negative      | 15.3           |
| 2             | beach, above high tide, adjacent to Snyder merc. Dock              | -10"  | organics w/beach gravles                            | Yes          | sheen                    | 20.1           |
| 3             | front southwest corner of old generator shed                       | -12"  | coarse beach sand                                   | Yes          | sheen                    | 54.7           |
| 4             | front southeast corner of the old generator shed                   | -6"   | oily stained organic soil                           | Yes          | heavy oil odor and sheen | 51.5           |
| 5             | below new generator tank   | -12"  | oily coarse materials                               | Yes          | heavy oil odor and sheen | 151            |
| 6             | inside containment- west hole between tanks 1 and 2                | -12"  | dense organics                                      | Yes          | heavy oil odor and sheen | 126            |
| 6             | inside containment- west hole between tanks 1 and 2                | -24"  | organics and gravels                                | Yes          | too much water to tell   | 259            |
| 6             | inside containment- west hole between tanks 1 and 2                | -30"  | dense blue till (clay)                              | Yes          | no remarks               | 13.9           |
| 7             | inside containment- center hole between tanks 2 and 3              | -20"  | silty organic soil with some small gravels and sand | Yes          | no remarks               | 117            |
| 7             | inside containment- center hole between tanks 2 and 3              | -24"  | wet soil with signficant organic content            | Yes          | odor and sheen           | 63.0           |
| 7             | inside containment- center hole between tanks 2 and 3              | -30"  | dense blue till (clay)                              | Yes          | no remarks               | 12.8           |
| 8             | inside containment-east hole between tanks 3 and 4                 | -24"  | wet organic soil                                    | Yes          | no remarks               | 250            |
| 8             | inside containment-east hole between tanks 3 and 4                 | -30"  | dense blue till (clay)                              | Yes          | no sheen on clay         | 59.0           |
| 9             | outside southeast corner of the containment in drainage area       | -12"  | wet organic soil                                    | Yes          | slight sheen             | 81.0           |
| 9             | outside southeast corner of the containment in drainage area       | -20"  | dense blue till (clay)                              | Yes          | heavy odor               | 598            |
| 10            | inside containment, behind tank 4, slightly upgradient             | -10"  | wet silty sand                                      | Yes          | no odor/sheen            | 11.1           |
| 11            | Next to fuel distribution line from farm to gen tank, below farm   | -18"  | organic soil with some gravels and sand             | Yes          | sheen/odor               | 65.2           |
| 12            | Next to fuel distribution line from farm to gen tank, further dowr | -20"  | organic layer                                       | Yes          | sheen                    | 134            |
| 13            | Behind small cabin (owned by Snyder Merc.)                         | -10"  | organic layer                                       | No           | no odor/sheen            | 11.2           |
| 13            | Behind small cabin (owned by Snyder Merc.)                         | -18"  | dense blue till (clay)                              | No           | no odor/sheen            | 11.0           |
| 14            | downgradient of containment area, near discarded tanks             | -30"  | rocky organic soil                                  | Yes          | no odor/sheen            | 7.6            |
| 14            | downgradient of containment area, near discarded tanks             | -36"  | dense blue till (clay)                              | yes          | no odor/sheen            | 6.7            |
| 15            | downgradient of containment area, below discarded tanks            | -36"  | dense organics w/some silt or till                  | yes          | sheen, no odor           | 37.6           |
| 16            | 60 feet west of the tank farm near the right-of-way stairs         | -24"  | sandy brown silts or till                           | yes          | sheen                    | 117            |

\*Numeric values obtained using a Photovac 2020 Photo-ionization Detector, calibrated to 100 ppm Isobutylene, and using response factor 1.0 Note: Readings of greater than 20 ppm are estimated to be above the ADEC cleanup level.

