

**NULLAGVIK HOTEL
SITE CHARACTERIZATION REPORT**

Prepared for

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1.0 INTRODUCTION

The following site characterization report summarizes field activities performed by Travis/Peterson Environmental Consulting, Inc. (TPECI) at the Nullagvik Hotel in Kotzebue, Alaska. Field activities included removing an underground storage tank (UST), collecting confirmation soil samples, and investigating a possible petroleum release by a second UST. The environmental work occurred on November 1, and 2, 2006.

2.0 SITE DESCRIPTION

The site is located in Kotzebue, Alaska in the Northwest Arctic Borough, Latitude 66° 53' 54" N, Longitude 162° 35' 48" W. The site encompasses approximately 0.41 acres east of Shoreline Avenue and on the corner of Tundra Way (Figure 1).

3.0 UST CONTAMINATED SOILS

This section summarizes the UST removal, inspection methods for contaminated soils, temporary stockpile measures, and soil sampling and analysis results.

3.1 UST REMOVAL AND EXCAVATION

On November 1, 2006, TPECI personnel oversaw the removal of a 2,000-gallon heating oil underground storage tank (UST) that was located along the north side of the hotel building (Figure 2). KIC operated the excavator. The UST removal and the excavation of possible contaminated soil were done in accordance with the approved Release Investigation Plan (TPECI, 2006). TPECI personnel also collected confirmation soil samples from within the UST excavation as per State of Alaska regulation 18 AAC 75 Articles 3 and 9.

Prior to conducting soil field screening with the photo ionization detector (PID), TPECI personnel calibrated the PID with fresh air and isobutylene standard gas. All field screening was conducted using the headspace sampling method. Soil samples were collected by hand with a decontaminated trowel into a one-gallon Ziploc™ bag. The bags were sealed and taken indoors and allowed to warm a minimum of ten minutes. Upon warming to room temperature, the soil headspace was analyzed using a PID for a minimum of 15 seconds or as long as it took for the PID to stabilize. The highest value displayed on the PID from each sample was recorded in a bound field notebook along with the corresponding sample ID.

During the UST excavation, all soil was stockpiled on the frozen ground. Soil from the UST stockpile was screened using a PID. Initially two Ziploc baggies of soil were collected and screened indoors using a PID. The PID values recorded for these two samples were 23.4 parts per million (ppm) and 13.2 ppm. Based on these values, TPECI personnel decided to resample the soil stockpile to confirm the PID readings. TPECI personnel recalibrated the PID and recollected soil samples from the stockpile. The soil samples were again taken indoors and allowed to warm to room temperature. The highest PID value observed after a 30 second wait on both samples was 0.0 ppm. Confirmation analytical samples were not collected from this stockpile.

Insert Figure 1 Here

Insert Figure 2 Here

Upon reaching the UST, excavation ceased and KIC removed the UST using the Kobelco 907LC11 backhoe excavator. The UST appeared in good condition and there were no apparent cracks or holes in the tank. KIC hauled the UST off site to their shop and decommissioned it by cutting it up.

Upon removal of the UST, soil headspace samples were collected from each of the four sidewalls and two from the excavation bottom. Upon reaching room temperature inside the hotel, PID readings were taken from each bag of soil. PID readings ranged from 4.1 ppm for Sidewall 1, to 5.2 ppm for Sidewall 2, to 0.7 ppm for Sidewall 3, to the highest reading at greater than 50 ppm for Sidewall 4 located on the east end of the UST excavation. The two soil samples collected from the bottom of the excavation had PID readings of 0.2 ppm near the west end of the excavation and 23.8 ppm near the east end of the excavation.

TPECI personnel surmised that the elevated PID readings were associated with the layer of soil that exhibited profuse amounts of demolition debris and refuse from previous buildings (Appendix A). KIC staff member, Mr. Wally Carter Sr., told TPECI personnel that a fish cannery existed on this site approximately 35 to 40 years ago. Prior to constructing the Nullagvik Hotel, this cannery was demolished and any refuse or debris left on site is likely from the demolition of that building. TPECI personnel photo documented the debris found in the excavated soil. The debris included many can lids, glass bottles, metal machinery parts, coal, and wood. This layer of soil also exhibited a distinct petroleum hydrocarbon odor. The remaining three sidewalls in the UST excavation area were relatively uncontaminated according to field screening results.

The sample collected from the east end of the UST excavation displayed a PID value of greater than 50 ppm. At this time, TPECI personnel directed KIC equipment operator Mr. Dan Willey to remove additional soil from this location and stockpile it on a 6-mil polyethylene liner. An additional cubic yard of material was removed and TPECI collected a second soil headspace sample. A headspace PID reading was taken at that time and it was determined that the soil was still contaminated (> 50 ppm).

Additional soil needed to be removed from within the UST excavation. However, to make sufficient room for the backhoe to operate, some of the original screened stockpile needed to be removed. One dump truck load of this soil was removed and hauled to the Kotzebue landfill for disposal. The remaining clean soil was eventually used to backfill the UST excavation.

Upon removing an additional two to three yards of soil, KIC and TPECI staff noticed that the subsurface soil contained a profuse amount of debris not associated with the UST. Photo documentation of the debris and soil that were removed are provided in the attached Photo Log.

TPECI personnel collected confirmation soil samples from the UST excavation sidewalls and bottom in addition to one confirmation sample from the suspected contaminated stockpile.

3.2 SAMPLING AND ANALYSIS RESULTS

Soil samples collected from the UST excavation and the first four test holes were analyzed for the following compounds:

- DRO (AK Method 102);

- GRO (AK Method 101);
- PAH (EPA Method 8270); and
- BTEX (EPA Method 8021).

As per Alaska Department of Environmental Conservation (ADEC) requirements, a sample was collected for polycyclic aromatic hydrocarbons (PAHs) by method EPA 8270 sim and gasoline range organics (GRO) by method AK 101 from the east end of the UST excavation (Sidewall 4). All samples collected during this project were shipped to Test America laboratories in Anchorage, Alaska for analysis.

TABLE 1
SOIL SAMPLING RESULTS FOR UST REMOVAL

Sample ID	Date	DRO	GRO	Benzene	Flourene	Phenanthrene	Pyrene
ADEC CLEANUP*	mg/kg	500	100	0.5	(5,500)	(41,000)	(4,100)
SW-1	11/01/06	ND	--	ND	--	--	--
SW-2	11/01/06	100	--	ND	--	--	--
SW-3	11/01/06	328	--	ND	--	--	--
SW-4	11/01/06	1430	5.47	0.0127	.632	1.22	412
EXB-1	11/01/06	98	--	ND	--	--	--
EXB-2	11/01/06	484	--	ND	--	--	--

NOTES:
 * Cleanup levels reported from Table A2 – Method One Arctic Zone
 A cleanup level of 500 mg/kg was used for DRO based on the fact that all BTEX isomers are reported below 15 mg/kg and benzene is reported at less than 0.5 mg/kg in all soil samples that detected benzene.
 () - Indicates the soil cleanup levels for ingestion in the Arctic Zone (Table B1) were used.

SW – side wall
 EXB – excavation bottom
 DRO – diesel range organics
 GRO – gasoline range organics

mg/kg – milligrams per kilogram
 ADEC – Alaska Department of Environmental Conservation
 ND – analyte was not detected
 -- sample not analyzed

After reviewing the ADEC cleanup standards for both the Under 40 Inch Zone and the Arctic Zones, TPECI personnel considered the ADEC Soil Cleanup standards for the Arctic Zone for inhalation. The soil contamination detected near the former UST and in test holes 1 through 4 is within the permafrost and does not appear to be mobile. This contamination and debris do not appear to be related to any known onsite sources of contamination.

3.3 SOIL STOCKPILE MEASURES

Upon completing the UST removal and excavation approximately three to four cubic yards of contaminated soil and debris were stockpiled onto a 6-mil polyethylene liner on site (Appendix A). This soil stockpile was sampled and analytical results are displayed in Table 2. The stockpile was covered with additional 6-mil polyethylene plastic and weighted down to prevent the cover from blowing away. The stockpile currently remains on site.

4.0 RELEASE INVESTIGATION

A suspected fuel release from UST No. 2 was confirmed during drilling conducted on November 2, 2006 by TPECI and KIC personnel. Impacts to groundwater were limited to an area immediately surrounding the hotel building. A layer of supra-permafrost melt water was

encountered in some of the test holes. The remaining test holes had permafrost to greater than 18 feet below ground surface.

TABLE 2
SOIL SAMPLING RESULTS FOR PLUME DELINEATION

Sample ID	Date	DRO	GRO	Benzene	Flourene	Phenanthrene	Napthalene
ADEC CLEANUP*	mg/kg	500	100	0.5	(5,500)	(41,000)	(2,700)
TH-1-8	11/01/06	25.2	--	ND	--	--	--
TH-2-4	11/01/06	1580	--	0.0210			
TH-3-6	11/01/06	499	--	ND	--	--	--
TH-4-4	11/01/06	143	--	ND	--	--	--
TH-5-6	11/02/06	26	--	ND	--	--	--
Duplicate	11/02/06	--	--	ND	--	--	--
TH-6-6	11/02/06	31.5	--	ND	--	--	--
TH-7-10	11/02/06	578	35.9	ND	5.05	10.9	3.38
Duplicate	11/02/06	486	--	--	--	--	--
TH-8-2	11/02/06	330	--	ND	--	--	--
TH-9-10	11/02/06	ND	--	ND	--	--	--
TH-10-6	11/02/06	29.8	--	ND	--	--	--
TH-11-2	11/02/06	453	--	ND	--	--	--
Stockpile	11/02/06	403	--	ND	--	--	--

NOTES:
 * Cleanup levels reported from Table A2 – Method One Arctic Zone
 A cleanup level of 500 mg/kg was used for DRO based on the fact that all BTEX isomers are reported below 15 mg/kg and benzene is reported at less than 0.5 mg/kg in all soil samples that detected benzene.
 () - Indicates the soil cleanup levels for ingestion in the Arctic Zone (Table B1) were used.
 DRO – diesel range organics
 GRO – gasoline range organics
 PAHs - polycyclic aromatic hydrocarbons
 mg/kg – milligrams per kilogram
 ADEC – Alaska Department of Environmental Conservation
 ND – analyte was not detected
 -- sample not analyzed

4.1 SOIL BORINGS AND SOIL ANALYTICAL RESULTS

On November 2, 2006, TPECI personnel oversaw a plume delineation conducted at the Nullagvik Hotel. A Foremost rig equipped with a 16-inch diameter auger (Texoma Reedrill, Model 6400-35) was used to drill test holes on the hotel property to delineate a suspected diesel contaminant plume related to the UST located underneath the hotel foundation.

A total of 11 test holes were drilled on the property (Figure 3). Soil samples were collected directly off the auger flight every two feet down to groundwater or permafrost, whichever was encountered. In many cases, test holes were drilled in excess of 16 to 18 feet and no groundwater was reached. Drilling continued at the property until the lateral extent of the diesel plume had been sufficiently delineated or until an obstacle was encountered. Three sets of overhead power lines crossed the property and drilling was conducted a minimum of 10 feet away from any live power lines for safety assurance purposes. While drilling in Tundra Way, KIC encountered buried steel pipe and concrete at three different locations making it difficult to put additional points down and cross gradient of the suspected diesel plume.

Insert Figure 3 here

Based on PID and laboratory analysis of soils, the extent of diesel contamination is confined to within 15 feet of the building foundation. Test hole locations farther away from the building had minimal to no contamination related to this UST release. However, most of the test holes exhibited characteristics similar to that found in the excavation of UST #1.

4.2 GROUNDWATER SAMPLING AND ANALYSIS

Two temporary groundwater monitoring wells were installed to delineate the plume. One was located near UST#2 along the east side of the building (Figure 3). The second well was located down gradient of UST #2 in the direction of Shoreline Avenue. The monitoring wells were placed in the areas of highest apparent contamination. This was determined by the presence of a strong petroleum odor, visible impact to subsurface soil, and an oily sheen on the gravel at depths eight to ten feet below ground surface.

The monitoring well locations appeared to have sufficient groundwater in the soil during drilling. After installation, the wells were allowed to stabilize for approximately four to six hours. TPECI personnel gauged the depth to groundwater in both wells. Monitoring well MW-1 was dry and was installed to a depth of ten feet. Monitoring well MW-2 had minimal groundwater present and had been installed to a depth of 9.5 feet below ground surface. During drilling and installation, the two test holes kept collapsing at 8 to 10 feet below ground surface making installation of the wells beyond this depth difficult.

One groundwater sample was collected from MW-2 using a plastic bailer and analyzed for DRO by method AK 102. Analytical results for MW-2 indicate concentrations of DRO at 15.4 mg/L which is well above the MCL of 1.3 mg/L. TPECI personnel believe that the groundwater encountered in this location is actually supra-permafrost melt water and is not connected to a continuous aquifer. TPECI personnel also believe that the hotel building has created a heat island or artificially warmed area immediately adjacent to the foundation. This end of the hotel facing Tundra Way has a basement and crawl space, which is a heat source for the surrounding permafrost.

This supra-permafrost melt water is not an aquifer large enough to serve as a drinking water source. It is also likely saline water considering its proximity to Kotzebue Sound.

5.0 HISTORIC CONTAMINATION SOURCES

Historic contamination sources at this site are not fully known. Prior to the Nullagvik Hotel being constructed in 1975, verbal reports from KIC staff confirmed the existence of a building that housed a post office and had a fish cannery in it approximately 35 to 40 years ago. When this structure was torn down some of the demolition debris appears to have been left in place leading to widespread contamination located below the backfill layer that the hotel currently stands on.

In the 1990's, a fuel release from UST No. 2 was suspected at the time the tanks were taken out of service. Geotechnical drilling conducted in 2003 by Dowl Engineers confirmed that a petroleum odor existed in the soil near the side of the building where UST No. 2 is located.

6.0 RELEASE MECHANISMS

There are no other release mechanisms on the subject property. The diesel contamination relating to UST No. 2 appears to be isolated to the north side of the subject property.

7.0 IMPACTED MEDIA

Impacted media is limited to the soil affected by the contaminants and the localized area of supra-permafrost melt water.

8.0 MIGRATION PATHWAYS

The diesel fuel contamination appears limited to the subject property. The historic contamination discovered during the UST removal appears widespread throughout the subject property parking lot. However, both sources of contamination appear to be immobile due to the presence of permafrost.

9.0 EXPOSURE ROUTES

TPECI identified ingestion, inhalation, and dermal contact as potential exposure routes. The onsite exposure routes at this location are limited to the contaminated soil stockpile and the subsurface soil and localized groundwater plume if these become excavated. Potentially, excavation of soils may result in dermal and inhalation exposure. There are no known or potential offsite migration pathways.

10.0 IMPACT LOCATION

Based on TPECI site investigations, the contaminants of concern are confined on site. Subsurface investigations proved that the contaminants have not spread off site.

11.0 POTENTIAL RECEPTORS

There is currently no possibility for contamination to be exposed or released. If the site is redeveloped provisions should be made for handling contaminated material during excavation activities.

12.0 CONCLUSIONS

On behalf of NANA, TPECI requests a conditional closure for UST #1. Demolition debris was encountered at approximately three to four feet below ground surface and appeared wide spread throughout the property. KIC personnel verbally confirmed the existence of a fish cannery and post office building at the site approximately 35 to 40 years ago. This structure was demolished prior to the hotel being constructed. Past activities relating to the cannery resulted in wide spread diesel range and PAH contamination in the soil. This contamination was confirmed by analytical samples collected during the UST excavation and removal process. The soil throughout much of the site is dry permafrost which serves to confine contamination to the site.

TPECI requests ADEC permission to develop a plan to close UST #2 in place. UST # 2 located along the east facing side of the hotel and is underneath the foundation. Removal of the UST

would compromise the hotel building. UST #2 appears to have released diesel fuel into the soil and groundwater immediately adjacent to the building on the east and north sides. This confined area of diesel impacted soil and water does not appear to be moving off site. Due to the presence of permafrost, TPECI personnel believe that the contamination detected is relatively immobile and does not present any threat to human health or the environment in its current state.

13.0 REFERENCES

- 18 AAC 75 *Oil and Hazardous Substances Pollution Control Regulations, Discharge Reporting, Cleanup, and Disposal of Oil and Other Hazardous Substances*
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- TPECI, 2006. Release Investigation Plan, Nullagvik Hotel, Kotzebue, Alaska. Prepared for NANA Development Corporation. Prepared by Travis/Peterson Environmental Consulting, Inc. (TPECI) August 2006.

APPENDIX A
PHOTOGRAPHIC LOG

APPENDIX B

**LABORATORY ANALYTICAL REPORT
AND QA/QC CHECKLISTS**

APPENDIX C

CONCEPTUAL SITE MODEL SCOPING FORM