

# PHASE I ENVIRONMENTAL SITE ASSESSMENT

PROPERTY OWNED BY:  
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LOT 71, BLOCK 1  
KENNICOTT MINE SITE SUBDIVISION, ALASKA

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Prepared for:

**National Park Service, Alaska Region**

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## ACRONYMS AND ABBREVIATIONS

ADEC .....	Alaska Department of Environmental Conservation
AST .....	aboveground storage tank
ASTM .....	American Society for Testing and Materials
BTEX.....	benzene, toluene, ethylbenzene, and xylenes
CERCLA.....	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS.....	Comprehensive Environmental Response, Compensation, and Liability Information System
CORRACTS..	corrective action
CSP .....	Contaminated Sites Program
DRO .....	diesel-range organics
EDR.....	Environmental Data Resources, Inc.
EPA.....	U.S. Environmental Protection Agency
ERNS .....	Emergency Response Notification System
ESA.....	Environmental Site Assessment
GKLC .....	Great Kennicott Land Company
LUST .....	leaking underground storage tank
NCP.....	National Oil and Hazardous Substances Pollution Contingency Plan
NFRAP .....	No Further Response Action Planned
NPL .....	National Priority List
NPS.....	National Park Service
OASIS .....	OASIS Environmental, Inc.
PAH.....	polycyclic aromatic hydrocarbons
RCRA.....	Resource Conservation and Recovery Act
RCRAInfo .....	RCRA Information System
RRO .....	residual-range organics
SCS.....	Soil Conservation Service
SHWS .....	State Hazardous Waste Sites
SQG .....	small quantity generator
TPH.....	total petroleum hydrocarbon
TSD.....	Treatment, Storage, and Disposal
USDA .....	U.S. Department of Agriculture
UST .....	underground storage tank

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## EXECUTIVE SUMMARY

This document presents the results of a Phase I Environmental Site Assessment (ESA) conducted by OASIS Environmental, Inc. (OASIS) for the National Park Service (Park Service).

The target property assessed is Lot seventy-one (71) Mill Site Unit, Kennicott Subdivision, Alaska. The parcel is shown on the site plan in Appendix A. This parcel is currently owned by Michael J. Monroe.

OASIS performed the ESA in conformance with the American Society for Testing and Materials (ASTM) E 1527-05 guidance document, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*. This report follows ASTM's recommended reporting format.

The Phase I ESA revealed evidence of recognized environmental conditions at the target parcel. Evidence of recognized environmental conditions includes:

- Releases of Bunker C fuel from the 273,000-gallon tank and associated fuel line have been documented (National Park Service 1996).
- Based on the date of construction, the 273,000-gallon tank may have been painted with lead-based paint.
- During the owner interview, the current property owner indicated that garbage, including an automobile battery, was burned at the site. Such burning may have released hazardous substances into the environment.
- The current property owner also indicated that a rodent chewed through a fuel line on a vehicle, which is reported to have resulted in a release of petroleum products at the site.
- Fuel drums stored at the site lack secondary containment. There is a significant possibility that releases could have occurred. Other unmarked drums are present at the site and may have released unknown contaminants.

The available data indicate that purchase of the property without defining the nature and extent of contamination may expose the Park Service to unacceptable financial risks. Details are provided in the body of the report; detailed findings and conclusions are presented in Section 7.

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## 1. INTRODUCTION

This document presents the results of a Phase I Environmental Site Assessment (ESA) conducted by OASIS Environmental, Inc. (OASIS) for the National Park Service.

The target property assessed is a portion of Lot seventy-one (71) Mill Site Unit, Kennicott Subdivision, Alaska. This parcel is currently owned by Michael J. Monroe.

### 1.1. Purpose

The purpose of this ESA is to identify recognized environmental conditions and evaluate the likelihood that the target property has been impacted with hazardous materials or petroleum products from activities conducted on or near the site.

The American Society for Testing and Materials (ASTM) defines the term recognized environmental condition as the presence or likely presence of any hazardous substances or petroleum products on a property under circumstances that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. A recognized environmental condition may include the presence or likely presence of hazardous substances or petroleum products under conditions in compliance with laws. Recognized environmental conditions do not include *de minimis* conditions that do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

This ESA includes information gathered from federal, state, and local agencies; a telephone interview with Michael Monroe; and a site visit conducted by Stephen Witzmann, PE on September 25, 2011.

### 1.2. Scope of Services

OASIS conducted the following tasks to accomplish the project objective:

- Researched past activities that occurred at the property to identify any former operations that may have impacted the property with hazardous substances or petroleum products.
- Reviewed local and state databases to identify past uses, hazardous substance or petroleum product use, storage, and/or releases at the property.
- Reviewed local published government agency documents to identify any properties within a 1-mile radius of the property with a reported release of hazardous materials or petroleum products. OASIS obtained and reviewed a government records search report from Environmental Data Resources, Inc. (EDR).
- Conducted interviews to assess any former operations that may have impacted the property with hazardous substances or petroleum products.
- Inspected the property for potential hazardous substance/petroleum product impact.

- Observed the condition of adjacent properties for any visual signs of potential environmental impact to the target property.
- Prepared this report with ESA findings, conclusions, and recommendations.

### 1.3. Significant Assumptions

Environmental assessments provide information regarding the environmental condition of a particular property or facility. This report is a professional opinion and judgment, dependent upon information obtained during the course of performance of the services.

Environmental conditions may exist at the site that cannot be identified only by visual observation. Where the scope of services is limited to observations made during site reconnaissance, interviews, and/or review of readily available reports and literature, any conclusions and/or recommendations are necessarily based in part on information supplied by others, the accuracy or sufficiency of which may not be independently reviewed by OASIS.

No investigation is thorough enough to exclude the presence of hazardous substances, petroleum products, or contamination resulting from spills of these products at a given site. Therefore, if no hazardous substances or materials or petroleum products are identified during the assessment, such a finding should not be construed as a guarantee of the absence of such materials or contamination due to such materials on the property, but rather should only be considered the results of services performed within the scope, limitations, and cost of the work performed.

### 1.4. Limitations and Exceptions

Any opinions and/or recommendations presented apply to site conditions existing at the time of performance of services. OASIS is unable to report on or accurately predict events that may impact the site following performance of the described services, whether occurring naturally or caused by external forces. OASIS assumes no responsibility for conditions that OASIS is not authorized to investigate, or conditions generally recognized as environmentally unacceptable at the time services are performed. OASIS is not responsible for changes in applicable environmental standards, practices, or regulations following performance of services.

Preparation of this ESA did not include the collection or analysis of soil, groundwater, surface water, or air samples.

### 1.5. Special Terms and Conditions

The ESA activities were conducted in accordance with ASTM guidelines (E 1527-05) for ESAs and practices and procedures generally accepted in the consulting engineering field. The professional judgment of OASIS to assess the potential for contamination is based on limited data; no other warranty is given or implied by this report.

## 1.6. User Reliance

This document was prepared for the sole use of the National Park Service; its affiliates, entities, and lenders; and its employees, agents, and contractors. No other party should rely on the information contained herein without prior written consent of OASIS and the National Park Service.

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## 2. SITE DESCRIPTION

The 1996 *Final Kennicott Pre-Acquisition Environmental Site Assessment* prepared by the National Park Service provided a description of the mines, the Mill Site area, the historical use, and locations of known and potential contamination. Relevant information from that report is provided in this section.

### 2.1. Location and Legal Description

The target site is located within the Kennecott Mines National Historic Landmark and within the larger boundary of the Wrangell-St. Elias National Park and Preserve. The property is described as Lot 71, Mill Site Unit Kennicott Subdivision, according to the official plat thereof, filed under Plat Number 76-12 and 77-12, Records of the Chitina Recording District, third Judicial District, State of Alaska. This parcel is currently owned by Michael J. Monroe.

A site plan is provided in Appendix A.

### 2.2. Site and Vicinity General Characteristics

The Kennecott Mines National Historic Landmark is located along the south side of the Wrangell Mountains, on the western slope of Bonanza Ridge. Bonanza Ridge rises more than 4,000 feet from the Kennicott Glacier on the west before descending into McCarthy Creek on the east.

The area was developed to extract rich copper deposits. The mines are located on Bonanza Ridge, high above the mill camp. For the most part, mine areas were constructed as independent and partially self-supporting units, with their own electrical and heating plants. The mines and the mill site area were connected with each other by aerial tramways, wagon roads, and trails. Underground, the mines were connected by tunnels except for Glacier Mine, which was a surface mine. Other structures or structural ruins, such as dams, water and telephone lines, and associated support structures, are located throughout the area of the mines.

The mill site area is extensive and complex. The concentrator, shipping facilities, power plant, major shops, warehouses, offices, bunkhouses, and other residences were located there when the mines were operating. This area is reasonably accessible and contains the structures associated with the public perception of Kennicott. Modern circulation patterns mimic the historic routes, with the older roads and trails still in use. All roads have gravel surfaces made up of mill tailings.

The historical patterns of land use were described in detail in the 1938 Fire Insurance Plan prepared by Kennecott Copper Corporation (Appendix B). Services in the mill site area were provided through a system of utilidors conveying steam and water for heating, domestic use, and fire suppression. In some areas, sewer lines were carried in the utilidors as well; others stood alone. Water for industrial and domestic use was drawn from Bonanza and National creeks through wooden pipes ranging from 6 to 16 inches in

diameter. The bunkhouses and the majority of the cottages were provided with water and sewer connections. Cottages on the south end of the camp used outhouses and presumably hauled water for domestic use. Waste water and sewage were discharged untreated onto the glacial moraine west of the Power House and just south of the cribbed dam on National Creek. Some process water was disposed of on the moraine as well. Industrial waste, primarily scrap metal and machinery discarded as the mine was upgraded, were dumped on the moraine west of the machine shop, along the railway embankment, and over the moraine at the south end of the camp. Domestic garbage was discarded over the tailings bank west of the schoolhouse in the area that failed and sloughed during the 1964 earthquake.

The target area, Lot 71, is located in the northern end of the mill site unit.

### **2.3. Current Use of Property**

The target area was is a privately owned lot with a single family residence.

### **2.4. Description of Structures, Roads, and Other Improvements on the Site**

A dirt road runs along the east side of the site and provides access to the property.

A decommissioned 273,000-gallon (6,500-barrel) tank historically used to store Bunker C fuel is located on the property. Note that in some historical documents, this tank is referred to as Tank 4(1). Fuel was transported from the tank by piping (across Lot 83 and a number of other lots) to the power plant which lay to the southeast (Lot 90). The approximate route of this line is shown on Figure 7 in Appendix H. The decommissioned tank has been refurbished with a door and windows to serve as warehouse space.

A single family residence is located on the property. Utilities include the following:

- Solar panels for electricity
- An aboveground water line which appears to lead off the site parallel to the fuel line
- Heat appears to be provided by propane and fuel oil, which is stored in a separate drum

A dirt driveway is located just north of the residence. A woodshed, a small sauna, and a separate cellar are located on the property. An outhouse was present on the property; a sewage system was not apparent.

### **2.5. Description of Adjoining Properties**

With the exception of Lot 83, surrounding lots are undeveloped. Lot 83 contains a single family residence. Lots 84, 62, 59, 70, and 72 appear to be undeveloped.

### 3. USER-PROVIDED INFORMATION

#### 3.1. Title Records

In 1910 Kennecott Mines Company purchased mining rights for Kennecott from the U.S. Government.

According to a quit claim deed dated 1957, the Consolidated Wrangell Mining Company acquired the mine from the Kennecott Copper Corporation. According to Jan Sosnowski (National Parks Service), Consolidated Wrangell Mining Company intended to reopen the mines and extract copper. This proved to be unfeasible, so the company subdivided the mill site unit as recreational lots to sell to private buyers.

The Great Kennicott Land Company (GKLC) acquired the rights to the lower claims on Bonanza Ridge. In 1976, GKLC subdivided 1,500 acres into lots and offered them to the public. Lots with houses on them and lots in the vicinity of the town site sold fairly quickly (NPS 1996).

The property was deeded from the Great Kennicott Land Company to Michael Monroe on September 29, 1976. Available deed information and property transfer information is provided in Appendix C.

#### 3.2. Environmental Liens or Activity and Use Limitations

There are no known environmental liens on the target property. The Kennicott mill site area was evaluated by the U.S. Environmental Protection Agency (EPA) for inclusion on the National Priority List (NPL), but did not score high enough for inclusion (NPS 1996).

There are use limitations described in the deed. A summary of these use limitations is provided below. The complete text and list of use limitations is provided in Appendix C.

1. Only a single-family dwelling may be constructed on the lot. The structure must not exceed two stories or contain a garage for more than two cars. Storage buildings may not be larger than 1,000 square feet and appearance must conform with the original structure.
2. No building, regardless of condition, shall be removed or dismantled without the express written permission of the Architectural Control Committee (assume committee is part of Great Kennicott Land Company).
3. All building plans must be approved by the Architectural Control Committee.
4. Buildings must be located greater than twenty (20) feet from the rear of the lot line and more than ten (10) feet from an interior lot line.
5. Easements must be maintained.
6. Lots may not be reduced by subdivision, except that owners of three contiguous lots may divide the inner lot to create two larger lots.
7. No oil drilling or mining.
8. No noxious or offensive activities are permitted.

9. No inoperative vehicles may be parked or left on the property.
10. No signs, posters, displays, or any other advertising is allowed without prior written approval from the Architectural Control Committee. This does not include identification signs, mail boxes, or for sale or rent signs.
11. Domestic cats, dogs, or household pets are allowed in reasonable quantities (less than three).
12. No temporary structures such as boats or campers may be used as permanent living areas, unless purpose is incidental to construction or improvements on the property.
13. Waste must be disposed of in designated trash containers. No portion of the property may hold building materials or refuse except those in connection with approved construction and then only until construction is completed. No exterior fires are allowed except those contained within receptacles.
14. No individual sewage system is permitted unless such system is designed, located, and constructed in accordance with the requirements, standards, and regulations of the appropriate governmental authorities and the Architectural Control Committee.
15. No standing timber may be cut except that which is necessary and reasonable for clearing for dwellings or other buildings or that which is necessary and reasonable to removed hazardous and dangerous timber or for the clearing of access roadways on any lot.

### **3.3. Specialized Knowledge**

The *Kennicott Pre-Acquisition Environmental Site Assessment* (National Park Service 1996) was provided by the National Park Service. This report is consistent with the description of available information on the Alaska Department of Environmental Conservation (ADEC) Contaminated Sites Database. This report documents soil contamination associated with the 273,000-gallon tank.

### **3.4. Valuation Reduction for Environmental Issues**

Recognized environmental conditions present at the site may result in a significant reduction in the value of the property. Because the nature and extent of contamination have not been defined, it is not possible to provide an accurate estimate of this reduction at the current time.

### **3.5. Owner, Property Manager, and Occupant Information**

Michael J. Monroe owns the property. There is no property manager or tenant.



### 3.6. Reason for Performing Phase I

This Phase I ESA was requested by the National Park Service.

In June of 1998, the National Park Service acquired many of the significant buildings and lands of the historic mining town of Kennecott. Listed on the National Register of Historic Places in 1978 and designated as a National Historic Landmark since 1986, Kennecott is considered by the National Park Service as the best remaining example of early 20th Century copper mining (<http://www.nps.gov/wrst/historyculture/kennecott.htm>). Because it provided fuel for the Kennicott power house, the 273,000-gallon fuel tank was an integral part of the mining town, and National Park Service is interested in acquiring the property.

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## 4. GOVERNMENT AND HISTORICAL RECORDS REVIEW

### 4.1. Standard Environmental Record Sources

OASIS retained EDR to perform the database search. Regulatory agency database information was obtained from an EDR Radius Map with GeoCheck<sup>®</sup>, which maps and lists sites in federal, state, and local government, tribal, and proprietary environmental databases with existing conditions or regulatory status that may have the potential to impact the property.

The search distances OASIS utilizes for Phase I reports meet those specified in ASTM Practice E 1527-05. An EDR report was requested centered on 61° 29' 7.1" north latitude and 142° 53' 18.2" west longitude. The EDR database search distances adequately encompass the target site and surrounding area. The databases searched by EDR are described in the following sections and listed below (the search distance for each report is listed in parentheses):

- EPA Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) report (½ mile) and sites on the NPL (1 mile)
- The EPA's Resource Conservation and Recovery Act (RCRA) total notifiers report (target site and adjoining properties), including RCRA Treatment, Storage, and Disposal (TSD) facilities (½ mile) and TSD facilities subject to Corrective Action (CORRACTS) under RCRA (1 mile)
- ADEC's Underground Storage Tank (UST) database (target site and adjoining properties)
- ADEC's Leaking Underground Storage Tank (LUST) database (½ mile)
- Emergency Response Notification System (ERNS) Spill Report
- State Hazardous Waste Sites (SHWS) database (1 mile)
- Landfills (½ mile)

The EDR Report was obtained on October 18, 2011 and is included as Appendix D. No sites were identified near the target site in the EDR database search. OASIS independently searched each of the databases. These searches were conducted from 26 September to 7 October 2011. Any conflicting information identified in the databases is described in the relevant sections.

#### 4.1.1. Delisted NPL and CERCLIS-No Further Response Action Planned

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425 (e), sites may be deleted from the NPL where no further response is appropriate. Concerning CERCLIS-No Further Response Action Planned (NFRAP), archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the NPL, unless information indicates this decision was

not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

The Kennicott Copper Mining Company, in Kennicott Alaska, is listed as an archived site (EPA ID AKD983073123). The site was assigned NFRAP status; its non-NPL status date is June 30, 1995. No other active or delisted NPL sites were identified in the Kennicott area.

#### **4.1.2. RCRA**

RCRAInfo is EPA's comprehensive information system, which includes selective information on sites that generate, transport, store, treat, and/or dispose of hazardous waste as defined by RCRA. No RCRA generators are listed in the Kennicott area.

EPA's *List of Reported RCRA Sites in the United States* was also consulted. No RCRA sites are listed in the Kennicott area.

#### **4.1.3. Underground Storage Tanks**

The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of RCRA. The data come from the ADEC Underground Storage Tank database. No USTs are registered with the ADEC in the Kennicott area.

#### **4.1.4. Leaking Underground Storage Tanks**

ADEC's leaking UST (LUST) list is limited to reported leaking USTs. The data comes from the ADEC Contaminated Sites Database LUST records. No LUSTs are reported in the Kennicott mill site area.

#### **4.1.5. Emergency Response Notification System Spill Report**

ERNS records and stores information on reported releases of oil and hazardous substances. No incidences were reported in the ERNS.

#### **4.1.6. State Hazardous Waste Sites Database**

SHWS records are the states' equivalent to CERCLIS. Sites listed here may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with where cleanup will be paid for by potentially responsible parties.

The ADEC Contaminated Sites Program (CSP) database contained four records pertaining to Kennicott. These reports are included as Appendix E.

The first report (Hazard ID 1307) pertains to the Powerhouse Fuel Tank Farm at Kennicott. The report states: "Soils contaminated from cumulative impacts of leaking tank and other unknown sources. Estimates of total area contaminated is approximately 79,000 square feet. Depth of contamination is from 2" to 2' and volume is estimated to be 1,000 cubic yards." The given area and volume match the estimates presented in the

1992 report. The Hazard ID 2441 report also states "Plan for stabilizing pools of bunker C by fixation is approved. The plan for treating ammonia solution by sulfide precipitation is conditionally approved." and "No further investigation or cleanup is needed for this spill."

The second report (Hazard ID 2440) appears to have no relevance to Lot 71, the target site.

The third report (Hazard ID 2441) pertains to Kennicott Mine Monroe Tank 4(1). This is the same 273,000-gallon tank (see Figure 7 in Appendix H). The report states: "1992 site investigation report included soil sample results which indicate high levels of petroleum contamination in proximity of a utilidor emanating from an aboveground storage tank (AST). No indication that contamination is migrating nor are there any nearby water bodies to be impacted. Depending upon the contamination level, cleanup may be needed after the historic/cultural aspects of the pipeline utilidor have been addressed."

The fourth report (Hazard ID 2445) presents a cleanup chronology for lead paint at the Kennicott Mine site. It states: "A 1992 site investigation report identified possible unacceptable lead levels in soil around some of the buildings. The Department does not object to deferring cleanup to the future. This would allow the Park Service to conduct historic/cultural investigations before commencement of corrective actions. The Department should be contacted upon completion of the historic/cultural investigation so that the lead impacted soils can be addressed." The reports also cites a 1999 work plan in which the Park Service would address lead paint issues. Because Lot 71 was not included with the initial purchase, it has been assumed that work to address lead paint and associated lead-contaminated soil did not include Lot 71 and the 273,000-gallon tank and pipeline. According to letters provided in the 1996 Kennicott ESA, both the EPA and the ADEC agreed that because the lead paint is on structures of national historic importance, the removal and/or encapsulation of the lead paint would be carried out over a long term historic stabilization program. This program pertains to all the historic structures in the Mill Site Unit and is described in the *Kennecott Mines National Historic Landmark: Lead-based Paint Management Plan* and is presumably ongoing.

#### 4.1.7. Landfills

The Solid Waste Facilities/Landfill Sites records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. ADEC's Solid Waste Information Management System (SWIMS) Permit Listing was reviewed and does not list any landfills in the Kennicott area.

According to the 1996 Final ESA, the dump used by McCarthy and Kennicott residents is located west of the former coal bunker. (For the location of the coal bunker, see Note 25 on the legend to the map in Appendix B). Other known dumps are located west of the mill site area. None of the landfills identified in the vicinity are near the target site.

Industrial waste, primarily scrap metal and machinery discarded as the mine was upgraded, were dumped on the moraine west of the machine shop, along the railway

embankment, and over the moraine at the south end of the camp. Domestic garbage was discarded over the tailings bank west of the schoolhouse in the area that failed and sloughed during the 1964 earthquake.

## **4.2. Additional Environmental Record Sources**

### **4.2.1. Aerial Photographs and Topographic Maps**

Historical aerial photographs and topographic maps of the vicinity were obtained from EDR. Aerial photographs from 1957, 1972, 1978, and 2004 and topographic maps from 1914, 1959, and 1994 were available and are provided in Appendix F.

### **4.2.2. Mine Tailings**

Mine tailings have been used as aggregate, in building foundations, and in surfacing roads and airstrips in the Kennicott-McCarthy area (NPS 1996). Mine tailings may have been used to improve the road bed located east of the target parcel or as structural fill beneath the 273,000-gallon tank. According to the 1996 Final ESA, the toxicity of mine tailings was tested and evaluated. Due to the high buffering capacity of limestone, the tailings, including those used for construction and road surfacing, pose no threat to human health and the environment.

### **4.2.3. 1938 Fire Insurance Plan**

The 1938 Fire Insurance Plan shows two small structures on the property (Appendix B). The plan also shows a large fuel tank located towards the center of the site, and the North Glacier Trail running along the eastern boundary of the site. The Power House is shown on Lot 90, to the south southwest of the target property.

### **4.2.4. 1992 Site Investigation Interim Report**

The *Kennicott Mine Site Investigation Interim Report* (American North Inc. 1992) presents the results of a summary investigation that was conducted at the Power House, the 273,000-gallon tank and other fuel tanks in the area. For reference, selected sections of this document are presented in Appendix H and are summarized below.

During the Site Investigation, hydrocarbon-impacted soils were identified near the 273,000-gallon tank and the tank was reported to be a discharge source.

#### **4.2.4.1. Historical Information**

The 273,000-gallon tank was probably installed sometime after 1904. The tank is constructed from individual steel panels that are riveted together. (Refer to Photos 1 through 4 in Appendix G.) A berm surrounds the tank, and the space between the tank and berm is approximately 3-feet wide.

When the mine was operational, heavy fuel oil was used to fuel locomotives and steam-generating boilers. Diesel fuel was used for the generators. The type of fuel spilled at Lot 71 was not identified.

At the time of the 1972 investigation, approximately 26,660 gallons of fuel remained in the 273,000-gallon tank. This fuel was identified as being Bunker C, or a similar fuel.

#### 4.2.4.2. Site Investigation Steps

At the time of the Site Investigation, the tank walls appeared to be in good conditions, although there were signs of minor leakage from rivet holes. The tank base was raised on wood cribbing, but there was not enough space to properly assess the condition of the base.

Visible surface soil staining was reported to be discontinuous. Surface oil staining was apparent within the berm, but was restricted to within 1 foot of the tank. At the time of the investigation, a utilidor connected the tank and the Power House. Occasional staining was also observed along the utilidor, for two feet on either side.

Soil samples were collected using either a hand auger or a pick and shovel. Drilling was considered to be impractical because of the steep slopes present.

#### 4.2.4.3. Analytical Results

Samples 17, 18, and 19 were collected near the tank and analyzed for total petroleum hydrocarbons (TPH). Results ranged from 3,500 to 120,000 mg/kg. Sample 19 was also analyzed for diesel-range hydrocarbons and benzene, toluene, ethylbenzene, and xylenes (BTEX). The sample contained 54,000 mg/kg of diesel-range hydrocarbons. BTEX results were below the respective reporting limits.

Samples 20, 21, 22, and 23 were collected along the fuel pipeline and were analyzed for TPH. Results ranged from 240 to 320,000 mg/kg. Sample 20 was also analyzed for diesel-range hydrocarbons and BTEX. The sample contained 250,000 mg/kg of diesel-range hydrocarbons; BTEX results were below the respective reporting limits.

Regulatory standards have changed considerably since 1992. The TPH analytical method is no longer recognized by ADEC. The diesel-range hydrocarbons analytical method (EPA Method 3550/8100) has been replaced by analytical method AK102. Because State of Alaska cleanup methods (18 AAC 75) are based on analytical method AK102, the 1992 analytical methods are not directly comparable. The reported Method Reporting Limit for benzene (0.05 mg/kg) is not sufficient to support decision making at the current 18 AAC 75 Migration to Groundwater cleanup level (0.025 mg/kg). Under current ADEC regulations, characterization of the fuel contamination at the site would require samples be collected and analyzed for diesel-range organics (DRO, AK102), residual-range organics (RRO, AK103), and polyaromatic hydrocarbons (PAHs). Thus, it would not be possible to determine the nature and extent of fuel contamination present based on the 1992 report.

### 4.3. Physical Setting Sources

#### 4.3.1. Soil and Geologic Conditions

Soil condition information was obtained from the 1996 Final ESA and the U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) National Cooperative Survey.

The USDA SCS identifies the soil component as "rough mountainous land." According to SCS, soils in the area are The Final ESA describes the geology for the area as "Nikolai Greenstone and overlaying Chitistone Limestone." Copper mineralization occurs in the dolomitized limestone at the contact between the two formations. About 75 percent of the ores mined were sulphides. Silver and lead (in galena) were also found in association with the copper ores, as were antimony, arsenic, and mercury.

The depth to bedrock in the general area has been estimated to range from less than three feet to greater than 20 feet (America North Inc. 1992)

#### 4.3.2. Groundwater Conditions

According the Final ESA, groundwater in the vicinity has not been well characterized. It is thought that groundwater flows as sheet flow along the contact between thin superficial layers of talus, colluviums, and glacial fluvio-glacial deposits and the relatively impervious bedrock layer. The groundwater feeds into the creeks draining the ridge or into the mix of surface water and glacial melt water beneath the glacier. There are numerous seeps throughout the area adjacent to bedrock outcrops.

The *Kennicott Mine Site Investigation Interim Report* (American North Inc. 1992) notes peaty soils near the 273,000-gallon tank, but coarse grained soils further down the slope. Beneath the pump house, groundwater discharges to the surface as a spring, and oil is pooled in depressions. The report infers that some of this fuel may have originated at the 273,000-gallon tank.

### 4.4. Historical Use Information

The rich history of the Kennicott area is well-known and described in Section 4.2 of the 1996 Final ESA.

The mill town surrounding the fourteen story concentrator consists of the power plant, the leaching and flotation plants, the shops and warehouses, and the residences of the work force (NPS 1996). There were two large bunkhouses, several residences for single staff, and private residences for senior management and staff with families. Steam heat and indoor plumbing was available to most buildings, sewage and domestic refuse went onto the moraine and into the stream paralleling the glacier.

Fuel was pumped into the 273,000-gallon tank for storage. The tanks elevated location then allowed it to gravity feed into the Power House. The Power House, in turn provided electricity for the mill. Fuel from the 273,000-gallon tank may have also been used for railroad locomotives.



## 5. SITE RECONNAISSANCE

### 5.1. Site Inspection Methodology

Stephen Witzmann, PE conducted a reconnaissance of the target site on September 25, 2011. The purpose of the site reconnaissance was to evaluate the site for recognized environmental conditions. The reconnaissance consisted of walking around and through the target property.

### 5.2. Site Inspection Observations

Reconnaissance photographs from the 2010 site reconnaissance are provided in Appendix G.

The parcel is a 1.00 acre portion of land located just west of the North Glacier Trail. It currently contains a single family residence (Photo 7), wood shed, sauna, separate cellar, and the 273,000-gallon tank. It is vegetated with deciduous shrubs and spruce trees. During the site visit, the residence, separate cellar, and the 273,000-gallon tank were not entered.

The ground surface throughout the target area was covered with humus consisting of dead leaf litter and organic soil.

#### 5.2.1. Aboveground Storage Tanks

The 273,000-gallon tank is located near the center of the lot. A door and windows have been cut into the tank (Photos 1 and 2). The tank appears to be painted black with some rust showing through. Based on the age of the tank, there is a significant possibility that the tank coating could contain lead-based paint. Note that in some areas of Alaska, coatings containing polychlorinated biphenyls (PCBs) were used on metal tanks, thus, PCBs could also be a concern.

As shown in Photo 3, the tank was supported with wood cribbing. The discharge piping for the tank is shown in Photo 4 and is located on the south southwest side of the tank. Portions of the same piping may have also been used to fill the tank.

A depression running to the south southwest of the tank is visible, and presumably carried the fill and discharge piping (Photo 5). Above groundwater lines are currently located in this depression.

Photo 6 shows the roof of the 273,000-gallon tank. In general, the roof appears to be in good condition. However, the vent has been covered in plastic sheeting, indicating that it may leak. This is mentioned because water in the tank can cause corrosion and leaks. Because fuel is lighter than water, the water flows to the bottom of the tank and may have caused the tank bottom to corrode.

A second above ground storage tank (approximately four feet in diameter by seven feet long) is stored under the wood shed. It appeared to be nearly empty at the time of the

site visit. The tank is not marked. Based on the fittings present, this tank may be used for water storage.

### **5.2.2. Underground Storage Tanks**

OASIS did not observe aboveground indications of USTs on the target site.

A detached cellar is present at the site (Photo 9). The purpose or use of this cellar could not be determined.

### **5.2.3. Drum and Chemical Containers**

A number of drums are present at the site, as are smaller containers that may have held liquids.

Photos 10, 11, and 12 show drums located immediately south of the sauna. The horizontally mounted drum is labeled heating fuel. The two upright drums are labeled diesel fuel. The area beneath the drums was inspected for the presence of a liner, but no liner was found.

Other drums and containers are also present at the site, but were not labeled. What these drums and containers held could not be immediately determined.

### **5.2.4. Drains and Septic System**

OASIS did not observe drains or indications of a septic system on the target site. An outhouse is present. It was not apparent how water piped to the site is disposed of.

### **5.2.5. Stains and Stressed Vegetation**

Although the historical record indicates fuel contamination near the 273,000-gallon tank, no signs of distressed vegetation were noted near the tank or fuel pipeline (Photos 1, 3, 4, and 5). No evidence of stained or discolored soil or distressed, discolored, or strained vegetation was observed elsewhere on the target property.

### **5.2.6. Solid Waste**

No evidence of landfills, illegal dumping, or burial activities was observed on or adjacent to the target site. Tires have been used to stabilize the slope at the south end of the property.

A derelict vehicle is located just north of the residence (Photo 8).

### **5.2.7. Polychlorinated Biphenyls**

Electricity appears to be supplied by solar panels mounted on the residence. No pole-mounted or pad-mounted electrical transformers were observed on the property. Based on the date of construction, the black paint on the 273,000-gallon tank may contain PCBs.

### **5.2.8. Lead-Based Paint**

Based on the date of construction, the black paint on the 273,000-gallon tank may contain lead.

### **5.2.9. Residence**

A residence is located towards the center of the property. The red-painted structure is approximately 15 feet wide by 20 feet long. It includes an arctic entry, which appears to have been added after construction of the remainder of the building. Visual evidence suggests that its historical use has been limited to residential functions, such as food preparation and sleeping.

The building is surrounded by a pair of electrical cables that serve as an electric fence to minimize potential damage caused by bears.

A large wooden box is located on the eastern wall of the structure and is visible on Photo 7. The box is outside of the structure but within the bear fence. It is approximately 5 feet long by 3 feet deep by 3 feet high. The box was locked at the time of the site visit and no connections (electrical cables or pipes) were visible in the space between the box and the building. It is hypothesized that the box houses a freezer.

The residence appears to use solar panels for electricity and heat appears to be provided by a propane tank (located along the southern exterior wall) and heating fuel which is stored in a separate drum (see Section 5.2.3 and photos 10, 11, and 12).

The water line runs from the residence to the 273,000-gallon Bunker C Aboveground Storage Tank and then off site parallel to the fuel line shown in Figure 1.

Visual observations did not identify any recognized environmental conditions associated with the residence, except as noted in Section 5.2.3.

### **5.2.10. Separate Cellar**

A separate cellar is located just to the north west of the sauna. As shown in Photo 9, the entrance to the cellar is covered by a single sheet of plywood. The cellar is located directly beneath the plywood and appeared to be about 8 feet deep. Access would require a ladder. At the time of the site inspection, it was not possible to safely enter the cellar. Visual observations from the ground surface showed that the cellar was relatively empty and did not identify any recognized environmental conditions.

Although beyond the scope of ASTE E 1527-05, it should be noted that arrangement of the cellar presents a significant safety risk and potential source of liability. There was nothing securing the plywood in place. Authorized or unauthorized visitors could easily fall into the cellar.

## **5.3. Adjacent Site and Vicinity Observations**

OASIS performed a visual reconnaissance of the adjacent properties to observe whether there was evidence of past activities that may have used, stored, generated, or disposed

of hazardous materials. However, no physical inspection of the adjacent properties or buildings on the properties was made.

The surrounding area consists of residential parcels in the mill site unit of the Kennicott Subdivision. Most of these parcels are undeveloped.

#### **5.3.1. North**

The parcels to the north (Lots 62 and 59) are undeveloped and forested.

#### **5.3.2. East**

The parcel to the east (Lot 70) is undeveloped and forested.

#### **5.3.3. South**

To the south of the target area is Lot 83. A single family residence and storage shed is present on this lot. In addition, the fuel utilidor running from Parcel 71 to the Power Plant crosses Lot 83.

Lot 72 is undeveloped and forested.

#### **5.3.4. West**

The parcel to the west (Lot 84) is undeveloped and forested.

## 6. INTERVIEWS

### 6.1. Interviews with Owner

The owner, Michael Monroe was contacted by telephone on September 22, 2011. He confirmed that he has owned the property since 1976. Mr. Monroe provided the following information regarding a number of activities that occurred onsite that could have resulted in releases of hazardous substances:

- In addition to the 273,000-gallon tank and fuel pipeline, Bunker C was used to preserve the ties under the tank. According to Mr. Monroe, Bunker C fuel may have been spilled over the hill.
- Trash has been burned at the site, some of which included the remains of an automobile battery.
- In the early 1980's rodents chewed through a gasoline line on a car stored at the site, releasing the contents of the fuel tank, perhaps 20-gallons of gasoline. It is not clear whether this is the vehicle shown in Photo 8.

During the interview, Mr. Monroe also provided additional information concerning the 273,000-gallon tank. In 1997, an environmental contractor hired by Kennicott Corporation emptied the Bunker C tank. At that time, there was approximately 20 inches of fuel in the tank. Once emptied, entrances were cut into the tank for a door and windows. The tank is currently used as a warehouse.

### 6.2. Interviews with Local Government Officials

In 2011, two Park Service employees, Jim Baker and Danny Rosenkrans, were contacted for information regarding the target property. Mr. Rosenkrans provided the following information that corroborated information from other sources (as described elsewhere in this report). The large aboveground storage tank at the property contained Bunker C fuel. Surface staining and been found at and down gradient from the site, and may have migrated off of the site. Mr. Rosenkrans said he was fairly certain that the tank was emptied and cleaned out in the early 1990's. The tank is now used for storage.

### 6.3. Interviews with Others

None.

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## 7. FINDINGS AND CONCLUSIONS

OASIS has performed a Phase I ESA in conformance with the scope and limitations of ASTM Practice E 1527 05, on the target portion of Lot 71, mill site unit, Kennicott Subdivision, Alaska.

The following findings apply to Lot 71.

1. Soil at the property is likely contaminated with Bunker C fuel from the 273,000-gallon tank and fuel line located at the property. Fuel-stained soil has previously been observed and documented at the property. The timbers underneath the tank appear to have been treated with Bunker C fuel. Bunker C fuel migrates very slowly (NPS 1996) and steam heat pipes were needed in conjunction with the fuel utilidors to allow the fuel to be transported through piping in this climate (personal communication with S. Harper, 2009). The nature and extent of Bunker C fuel contamination has not been defined. Nearby groundwater has been impacted with fuel contamination; it is unclear whether that contamination originated on Lot 71.
2. Based on the date of construction, the 273,000-gallon tank may have been painted with lead-based paint. This paint may also have contained PCBs. Lead-contaminated soil may be present in the vicinity of the tank as a result of leaching of lead-based paint or the presence of paint chips.
3. Mine tailings have been used as aggregate in building foundations, and in surfacing roads and airstrips in the Kennicott-McCarthy area (NPS 1996). Mine tailings may have been used to improve the road bed located east of the target property. According to the 1996 Final ESA, the toxicity of mine tailings was tested and evaluated. Due to the high buffering capacity of limestone, the tailings, including those used for construction and road surfacing, are not expected to pose a threat to human health or the environment.
4. The current property owner indicated that garbage, including an automobile battery, was burned at the site. Burning of plastic can release dioxins, dioxin-like compounds, and other toxic products. At other sites where open burning has occurred, ADEC has required analytical testing for dioxins. Automobile batteries contain separate plates of lead and lead dioxide in an electrolytic solution of sulfuric acid. Burning a battery may have released lead and other toxic compounds into the environment at the site.
5. The current property owner also indicated that a rodent chewed through a fuel line on a vehicle, releasing approximately 20 gallons of fuel at the site. This spill was reported to have occurred in the early 1980's when leaded gasoline was still commonly commercially available. Gasoline is highly mobile in the environment and a release of 20 gallons can have significant impacts.

6. Fuel drums stored at the site lack secondary containment. Based on experience at similar sites, there is a significant possibility that releases could have occurred. Unmarked drums are also present at the site and may have released contaminants.

Thus, it is our professional opinion that this assessment has revealed evidence of recognized environmental conditions in connection with Lot 71. If this lot is purchased, the Park Service may assume liabilities associated with investigation and remediation of the contamination. Given the available data, it is not possible to provide an accurate estimate of the cost for investigating and remediating this contamination.

Some of the contaminants potentially present at the site (such as lead from the automobile battery) do not fall under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) petroleum exclusion. Thus, if the property is purchased, CERCLA's provisions for both strict liability and joint and several liability may be applicable. This means that Park Service could be forced to pay the entire cost of investigation and cleanup. The Park Service should consult with legal council before proceeding.

Because of the risk involved in the purchase, additional investigation is considered appropriate prior to purchase. The purpose of the additional investigation would be to detect the presence of hazardous substances or petroleum products.

If it is important to the Park Service's goal to purchase the entire property, it is recommended that an investigation be conducted to document the nature and extent of contamination. The investigation should comply with 18 AAC 75.335. In addition, because of the potential presence of contaminants that fall outside of CERCLA's petroleum exclusion, it may be necessary for the investigation to comply with the provisions of 40 CFR 300.430. Data from the investigation should be used to assess potential remedial alternatives and to develop cost estimates for remediation of the site. Together the investigation, assessment of remedial alternatives, and cost estimates would provide the information required to determine whether value of the property outweighs the inherent liability. Purchase of the property without this data may expose the Park Service to unacceptable financial risks.

It may be possible for the Park Service to purchase only the 273,000-gallon tank and fuel pipeline along with an easement to access them, if this meets the Park Service's objectives. It is assumed that these are the only historically important portions of the property. This approach may allow Park Service to avoid involvement with the areas where trash and the automobile battery were burned, where the automobile fuel was released, and where some of the drums are stored. If this option is selected, it will still be important to define the nature and extent of contamination on the given portion of the property prior to the purchase.



## 8. REFERENCES

American Society for Testing and Materials (ASTM) E 1527-05 guidance document, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*.

National Park Service. *Final Kennicott Pre-Acquisition Environmental Site Assessment* December 1996.

American North, Inc. February 1992. *Kennicott Mine Site Investigation Interim Report, Volume 1*. Prepared by American North, Inc. 201 East 56<sup>th</sup>, Suite 300, Anchorage, Alaska 99518. Prepared for Kennecott Corporation, 10 East South Temple, P.O. Box 11248, Salt Lake City, Utah 84147.

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This document presents the results of a Phase I Environmental Site Assessment (ESA) conducted by OASIS Environmental, Inc. (OASIS) at the request of the National Park Service. OASIS performed this ESA in conformance with the American Society for Testing and Materials (ASTM) E 1527-05 guidance document *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*.

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I meet the standards and qualifications for an environmental professional outlined in ASTM E 1527-05 Appendix X2.1 (40 CFR §312.10(b)). I am a Registered Professional Engineer, hold a Masters Degree in Civil and Environmental Engineering, and have fourteen (14) years relevant experience as a site remediation professional.

 Stephen W. Witzmann P.E.

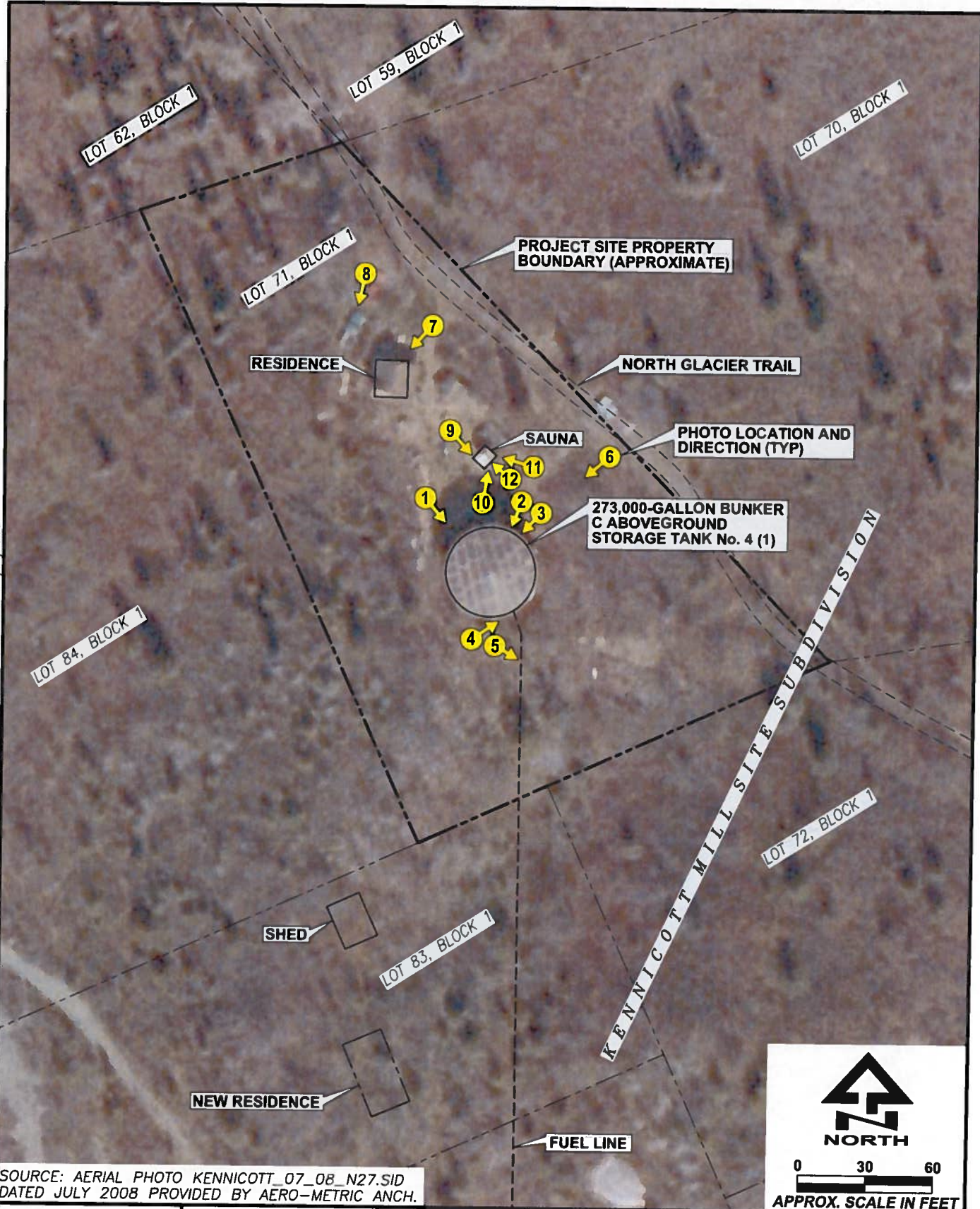
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Stephen W. Witzmann, PE  
Senior Engineer

January 4, 2012  
Date

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DATED JULY 2008 PROVIDED BY AERO-METRIC ANCH.



DATE: OCTOBER 2011  
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**MICHAEL J. MONROE  
 PROPERTY**  
 KENNICOTT MILL SITE SUBDIVISION  
 KENNICOTT HISTORICAL MONUMENT  
 Kennicott, Alaska

FIGURE  
 1

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