U.S. DEPARTMENT OF ENERGY | Office of Science

DOE/SC-ARM-15-042

Visitor's Guide to Oliktok Point Atmospheric Radiation Measurement Climate Research Facility, North Slope of Alaska

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April 2016

ARM
CLIMATE RESEARCH FACILITY

DISCLAIMER

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Office of Science, Office of Biological and Environmental Research

Executive Summary

The importance of Oliktok Point, Alaska, as a focal point for climate research in the Arctic continues to grow with the addition of a U.S. Department of Energy (DOE) Atmospheric Radiation Monitoring (ARM) Climate Research Facility Mobile Facility (AMF) and the expansion of infrastructure to support airborne measurements. The site hosts a suite of instruments for making multi-year, high-fidelity atmospheric measurements; serves as a base of operations for field campaigns; and contains the only Restricted Airspace and Warning Area in the U.S. Arctic, which enables the use of unmanned aircraft systems. The use of this site by climate researchers involves several considerations, including its remoteness, harsh climate, and location amid the North Slope oilfields. This guide is intended to help visitors to Oliktok Point navigate this unique physical and administrative environment, and thereby facilitate safe and productive operations.

Acronyms and Abbreviations

AFB	Air Force Base
AMF	ARM Mobile Facility
ARM	Atmospheric Radiation Monitoring Climate Research Facility
ATV	all-terrain vehicle
BLM	U.S. Bureau of Land Management
BP	British Petroleum
DEET	diethyltoluamide
DEW	Distant Early Warning
DOE	U.S. Department of Energy
F	Fahrenheit
FAA	Federal Aviation Administration
lbs	pounds
LRRS	Long-Range Radar Site
MSL	mean sea level
nm	nautical mile
NSA	North Slope of Alaska
SNL	Sandia National Laboratories
V	volt

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1.0 Introduction

Sandia National Laboratories (SNL) manages a mobile climate research facility and restricted airspace at Oliktok Point, Alaska, on behalf of the U.S. Department of Energy's (DOE) Atmospheric Radiation Monitoring (ARM) Climate Research Facility. The Oliktok Point site is the newest addition to the ARM Climate Research Facility on the North Slope of Alaska (NSA), joining sites in Barrow and Atqasuk (Figure 1). The Oliktok Point site consists mainly of an aircraft hangar, gravel runway, instrumentation vans, and lodging that are located on the grounds of an active U.S. Air Force facility, the Oliktok Point Long-Range Radar Site (LRRS). Restricted airspace R-2204 encompasses a 2-mile radius centered on Oliktok Point that can be accessed from a gravel runway and gravel pads at the LRRS. Warning Area W-220 extends approximately 700 nautical miles (nm) into international airspace starting at the 12-mile limit and is approximately 40 nm wide centered on R-2204.

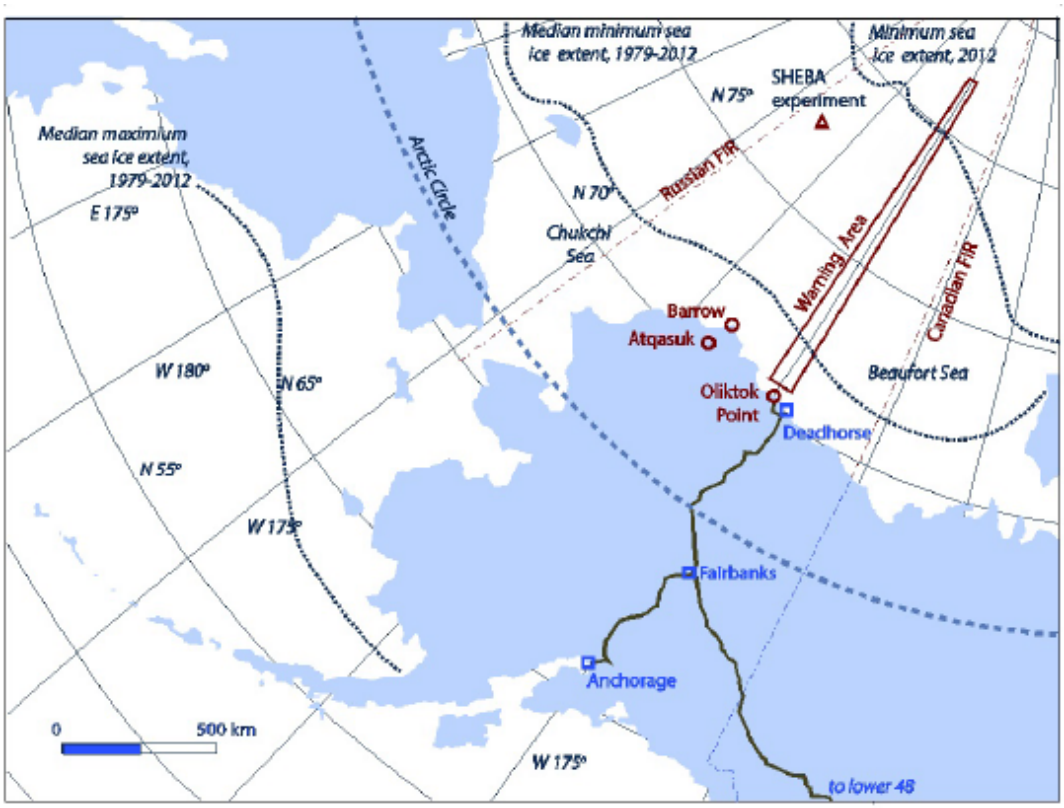


Figure 1. ARM Climate Research Facility sites on the NSA.

The Oliktok Point site is in several respects unique among ARM facilities. It is the only ARM site with restricted airspace, which provides opportunities for research with tethered balloons, unmanned aircraft systems, and modified manned aircraft without the need for a Federal Aviation Administration (FAA) waiver. It is also the only ARM site located within oilfields on the NSA, and the only site hosted by the U.S. Air Force. The proximity to the Air Force LRRS and to ongoing oil extraction activities provides Oliktok Point with amenities, infrastructure, and logistical services not readily found elsewhere in the Arctic. This guide highlights some of the unique aspects of the ARM facility at Oliktok Point, and provides useful maps, directions, and contact information for visitors.

2.0 Orientation: Who's Who on the North Slope

The primary economic activity throughout the region is petroleum recovery. Most of the land in the Prudhoe Bay area is owned by the State of Alaska, and the subsurface mineral rights are leased by the state to private companies for extraction. For administrative purposes, the State of Alaska has divided the North Slope oilfields into distinct operating units controlled by different lease holders. In support of their extraction activities, lease holders also maintain substantial control over surface activities within the oilfields and are a major authority in the area. The LRRS is not located on state land, but instead lies on an enclave of land owned by the U.S. Bureau of Land Management (BLM). The LRRS parcel (Appendix A, Map A.1) was formally withdrawn from BLM-owned property and is currently administered by Elmendorf Air Force Base (Elmendorf AFB) in Anchorage. While on the LRRS site, Elmendorf AFB is the primary authority, and Air Force rules supersede all other rules. Outside the LRRS parcel, visitors must comply with regulations of the leaseholders and the State of Alaska. Photographs of the LRRS are shown in Figure 2.

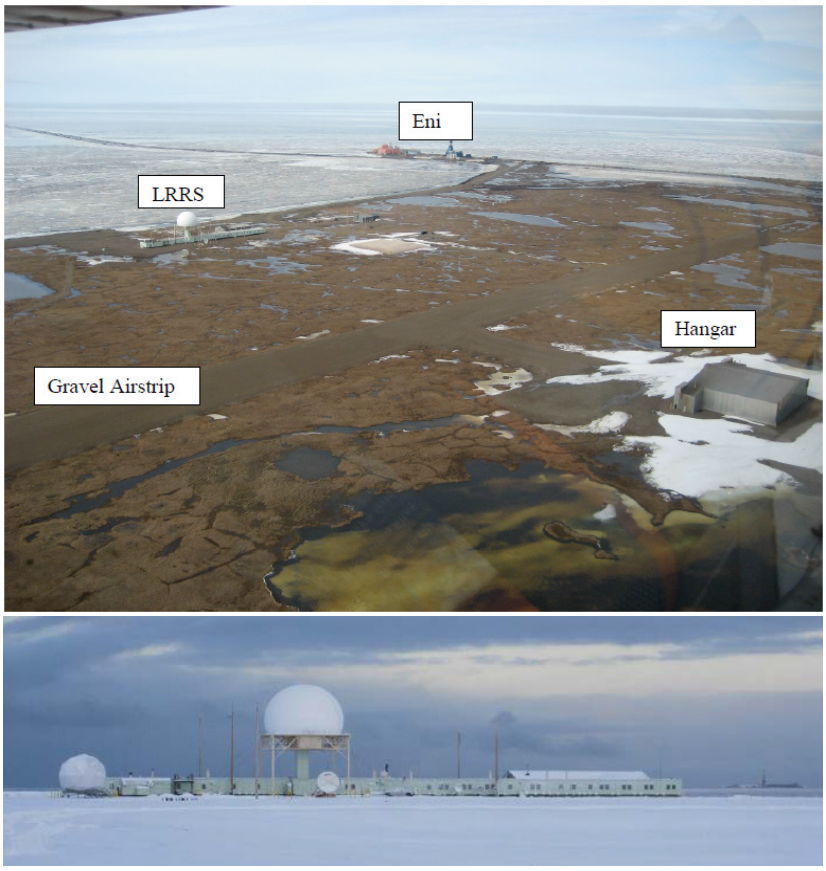


Figure 2. Top: Aerial view of LRRS, Eni, airstrip, and hangar at Oliktok Point. Bottom: Ground-level view of the LRRS at Oliktok Point.

Under a permit issued by Elmendorf AFB, SNL occupies a small portion of the LRRS, including part of the hangar and the adjacent gravel pad (Appendix A, Map A.2). While the LRRS site is owned and controlled by the Air Force, the facility and radar equipment are operated and maintained by ARCTEC Alaska, a contractor to Elmendorf AFB.

To reach the LRRS by car, one must drive on the Spine Road from Deadhorse. The Spine Road passes through the Kuparuk River Unit (operated by ConocoPhillips) and Prudhoe Bay Unit (operated by British Petroleum [BP]). The LRRS is surrounded by the Kuparuk River Unit, and as a practical matter, the main authority in the area is the leaseholder ConocoPhillips. Maintenance and security on the Spine Road is provided through cooperative arrangements (shared services) between the various leaseholders in the area, including ConocoPhillips. Note that activities at the LRRS predate petroleum extraction on the North Slope, and that Air Force personnel, their contractors, and other approved users of the LRRS at Oliktok Point retain the right to pass through the operating units while conducting their business. It is important to respect and comply with all oilfield regulations while traveling through leaseholder land. This means checking in and out with security and obeying all traffic rules.

Although the main authority in the Kuparuk River Unit is ConocoPhillips, other companies have a presence in the area through onshore tie-in facilities and work camps located near Oliktok Point. Two companies worth noting here are Eni Petroleum, which uses a hovercraft and helicopters to reach facilities within the offshore Nikaitchuq Unit, and Pioneer Natural Resources Alaska, which maintains helicopter service to facilities within the offshore Oooguruk Unit. Both of these companies maintain industrial facilities and lodging near Oliktok Point (Appendix A, Map A.1). ConocoPhillips operates the enormous Oliktok Point Kuparuk Seawater Treatment Plant, which is on the point adjacent to the LRRS and the Eni hovercraft building. ConocoPhillips also has operations in the Alpine Unit, to the west of the Kuparuk River Unit. Petroleum companies often hire aviation companies based in Deadhorse and elsewhere to move personnel and equipment across the oilfields.

3.0 Pre-Visit Requirements

3.1 Site Access Requests

All NSA ARM sites, including the restricted airspace and the third ARM Mobile Facility (AMF3) at Oliktok Point, are controlled areas. **Only U.S. citizens are allowed access to the LRRS Oliktok Point site.** Site access arrangements must be made through Valerie Sparks at SNL (505-844-7116), who provides the required notice to the Air Force and its contractors at the LRRS. At least 30 days' notice is recommended. Let Valerie know of any dietary restrictions when you contact her to obtain access to the LRRS for you.

3.2 Lodging

Small numbers of visitors (typically up to six, including at least one SNL staff member) can be housed at the U.S. Air Force's LRRS (a.k.a., "the DEW [Distant Early Warning] Line") at Oliktok Point. LRRS housing includes meals and linens. Cell phone service and internet access via Wi-Fi is available at the LRRS. Reservations should be made at least 30 days in advance via Valerie Sparks. Other lodging options may be available at privately operated work camps near Oliktok Point, the Kuparuk Operations Center, Deadhorse, or locations in between. Note that work camps are temporary in nature, and that rooms might be not available depending on the level of oilfield activities. For more information on Oliktok Point and Deadhorse lodging options, contact Valerie Sparks at the telephone number provided above and in Table 1. More information about lodging at the LRRS is provided in Section 0.

3.3 Approval for Aviation-Related Activities

All activities involving the use of aircraft within the restricted airspace or using SNL-permitted areas at the LRRS, including the operation of unmanned balloons, unmanned multicopters, or fixed-wing unmanned aircraft systems, require prior approval from DOE, SNL, or both. Contact Mark Ivey, the ARM NSA manager (505-844-7786), for approval.

4.0 Oliktok Point Logistics

4.1 Picking Up a Vehicle in Deadhorse

Rental vehicles are available from Delta Leasing Inc. (907-659-9056). Call Delta Leasing to have them pick you up at the Deadhorse Airport.

4.2 Fueling

Fuel can be obtained at two locations in Deadhorse (Appendix A, Map A.3). Note that service stations in Deadhorse:

- Are generally not staffed or are understaffed
- May be poorly signed, and not obvious
- Require payment by credit card
- Require use of a "duck pond" when filling a vehicle or containers (Figure 3).

Deadhorse Service Stations (Appendix A, Map A.3)

- *NANA*. On Airport Way, close to the Deadhorse Airport
- *Tesoro*. About 2 miles northeast of the Deadhorse Airport.

4.3 Supplies in Deadhorse

If you did not bring it, you will need to buy it at Brooks Range Supply or the Prudhoe Bay General Store (Appendix A, Map A.3) that is located in the same building. Work clothes, safety glasses, and an array of hardware and parts can be found at these stores. Make sure to pick up your supplies before leaving Deadhorse. Supplies are not available at the LRRS.

4.4 Checking in at the Security Checkpoint

Access to the North Slope oilfields is controlled by a security check point (Security Check Point 1, Appendix A, Map A.3) located less than a mile from the airport. From the airport, one can head either left or right to reach the check point (the roads rejoin at the other end of Lake Colleen).

IMPORTANT: Always use A "Duck Pond" when fueling a vehicle or filling a container. Yellow duck ponds are available at the pumps or close by. Alaska State Law requires that all spills regardless of size or location must be reported immediately to the appropriate authority in the operating area.

Figure 3. Vehicle being fueled with duck pond properly located to collect spilled fuel.

All visitors must check in and provide credentials to the security guard.

- Your name must be on the access list at the check point. Your name is placed on the access list via the site access request process administered by Valerie Sparks (see Section 3.1).
- You must present a valid driver license and a photo ID to the security officer at the checkpoint.

4.5 Driving on the Spine Road

Oliktok Point is accessed via the Spine Road, a gravel road that is the main transportation route on the North Slope oilfields. The road is well maintained throughout most of the year, but may be heavily potholed during wet conditions and may be snow covered in winter. Under good visibility and driving conditions, the ~50-mile drive to Oliktok Point will take about 2 hours. Road closures can occur without warning, particularly when rigs are being moved along the Spine Road. The majority of your trip from Deadhorse to Oliktok will be on the Spine Road. **Set the vehicle odometer to zero upon departure from Security Checkpoint 1 in Deadhorse.** This will make the landmarks easier to follow along the way.

Use extreme caution when driving the Spine Road (Figure 4).

- Speed limits are strictly enforced.
- Pass other vehicles only when necessary.
- When equipment is encountered along the Spine Road, the speed limit is **15 mph**.
- When crews are working along the Spine Road, the speed limit is **5 mph**.
- The speed limit on bridges is **5 mph**.
- **Safety glasses must be worn at all times by all persons in a vehicle**.
- **In winter, be prepared for an emergency (such as a flat tire) with cold weather gear, water, a cell phone, and food. Stay in the vehicle. Do not attempt to change a flat tire. Call oilfield security for assistance or wait for another vehicle to drive by that can take you to a safe location.**

Figure 4. Spine road in early winter.

Note that during inclement weather oilfield security may close oilfield roads or require that travel be conducted in convoys of two or more vehicles. Check with the LRRS Station Chief for current road/travel restrictions before driving from the LRRS.

The LRRS is open to vehicular traffic from Oliktok Point. Visitors must check in with the ARCTEC Station Chief when they first arrive at the LRRS. Navigation points between Check Point 1 at Deadhorse and the LRRS are provided in Appendix B.

4.6 Site Safety

SNL has maintained user facilities on the North Slope in Barrow and Atqasuk for many years. Hazards at Oliktok Point, including wildlife and extreme weather, are similar to the hazards at Barrow and Atqasuk. Required reading (in addition to this guide) includes:

- *Cold Weather Hazards*: (http://www.arm.gov/sites/nsa/docs/nsacwh.pdf?id=0)
- *Bear Safety Plan*: (http://www.arm.gov/sites/nsa/docs/nsabsp.pdf?id=53)
- *ES&H Policy*: (http://www.arm.gov/about/safetypolicy)
- *ES&H Standard Operating Procedure*: (http://www.arm.gov/sites/nsa/docs/nsasop.pdf?id=15).

Visitors must also receive a safety briefing from the LRRS Station Chief upon their arrival.

Conditions at the LRRS and AMF3 can be physically demanding. Typical work can involve lifting 30 lbs or more and, in winter, shoveling snow in temperatures as low as -40°F, climbing snow-covered stairs, and walking through knee-depth snow for a hundred yards or more. Snow and ice create significant slip and fall hazards. Be sure that you are physically able to meet the conditions that you will experience at Oliktok Point. Emergency medical services are available on the North Slope oilfields but response is not immediate. If you have a chronic medical condition (e.g., diabetes), we advise you to provide that information to your SNL host and the LRRS Station Chief and bring an ample supply of medicine.

Awareness is the key to safety at LRRS. ALWAYS know and understand your surroundings and conditions, the inherent hazards, and how to avoid an accident.

4.6.1 Winter Safety

- Check weather prior to going outdoors. Weather can be checked in the room directly across from station chief's desk near the sign-in station.
- **SNL employees, contractors, and visitors are required to stay indoors at the LRRS when the wind chill reaches or exceeds -50°F and during limited visibility conditions such as whiteout.**
- Adequate Arctic cold weather gear (e.g., insulated/waterproof boots, gloves or mittens, ski bibs/insulated coveralls/windproof pants, stocking cap, parka with hood, ski mask or scarf, ski goggles, etc.) is required when going outdoors during winter.
- Ice and snow provide ample opportunity for slips and falls. Be careful when walking.
- In addition, inform the LRRS Station Chief (extension 209 at the LRRS or 907-440-6790) when you leave the LRRS and when you return if you do not have a buddy with you when you leave the LRRS.

4.6.2 Summer Safety

Mosquitoes are the primary outdoor hazard in the summer at Oliktok Point. Long sleeve shirts, long pants, a hat, gloves, and a head net are recommended. You may want to use Velcro strips or rubber bands at pants cuffs and shirt sleeves to keep mosquitoes from entering your pants legs and shirt sleeves. Insect repellant containing 100% DEET also is recommended. Cabela's "Classic Bug I" hooded jacket and pants, or equivalent reportedly provide good protection from the ever-present summer mosquitoes at Oliktok Point.

Danger: Polar bears and grizzly bears are a hazard that can be encountered at any time of the year. **SNL employees, contractors, and visitors are required to stay indoors at the LRRS for 12 hours after a reported bear sighting.**

4.7 Staying at the LRRS

Important: Always check in with the LRRS Station Chief when first arriving. You must receive a site safety briefing from the Station Chief.

By agreement with the Air Force, SNL personnel and their guests may use up to six rooms at the Oliktok Point LRRS for lodging. The LRRS and AMF3 are non-smoking facilities. Meals and basic housekeeping also are provided by the LRRS staff. The LRRS provides linens (sheets, pillow cases, blankets, towels, wash cloths, etc.). A clothes washer and dryer (and laundry detergent and dryer sheets) and ironing board and iron also are available for guest use. There are two bathrooms with showers. One bathroom is designated for men; the other is designated for women, but is available for use by men if no women are at the LRRS. Water is trucked to the LRRS, so showers must be short to conserve water. You will need to bring personal toiletry items (including bath soap, shampoo, and hair dryer). Keep in mind that the guest bathrooms, laundry room, and entry to the LRRS and access to AMF3 and the roof-mounted instruments involve stairs.

Breakfast is self-prepared with dry cereal, juice, instant oatmeal, coffee, tea, milk, peanut butter, jelly, honey, cream cheese, muffins, bagels, and bread provided. A hot lunch is served at noon. Dinner is served at 5:00 p.m. Snacks and soft drinks are available at all times.

You are a guest at the LRRS. Good hygiene, housekeeping, and manners are expected and appreciated.

As shown in Figure 5, the accommodations include:

- Exercise Room
- Laundry Room
- TV Room with DVD player and Dish Network access
- Movie Library with a large selection of movies
- Book Library with many books
- Weather station
- Wi-Fi internet access (for business and personal use with the understanding that there is no expectation of privacy and access to inappropriate sites is forbidden)
- Cell phone service.

Figure 5. Accommodations at the LRRS.

4.8 Winter Transportation at the LRRS

NOTE: Never leave the LRRS without a fully charged cell phone. Carry the cell phone in an inside pocket to keep it warm.

The vehicle typically supplied by Delta Leasing is a quarter-ton, 4x4, Crew Cab pickup truck. It is equipped with a 110-volt (V) block heater. Always park the vehicle facing away from the wind and plug the block heater into a 110-V outlet at the LRRS when remaining at the LRRS for more than an hour or two. If there is blowing snow, before starting the engine, raise the hood and remove snow from the engine compartment, paying particular attention to snow on the serpentine belt(s) and pulleys. Failure to remove engine compartment snow will likely cause a serpentine belt to come off a pulley, which will require a call to Delta Leasing to send a technician to the LRRS to replace the belt.

Use four-wheel drive in snow conditions. Only drive on roadways. Be very cautious because low-light conditions in winter make drifts hard to see, and it is easy to drive into a drift and get the vehicle stuck. If the vehicle becomes stuck, stay inside the vehicle and call the LRRS Station Chief (907-440-6790), who will send help to pull the vehicle from the drift.

SNL has a four-track all-terrain vehicle (ATV) (Figure 6) that is the vehicle of choice for traveling between the LRRS and AMF3 when snow conditions exist. When the vehicle is not in use, connect the block heater to a 110-V outlet outside AMF3 or the LRRS.

Figure 6. SNL's four-track ATV.

Before using the four-track ATV:

- Read the operator's manual
- Inspect the vehicle for:
  - Leaks
  - Broken glass
  - Broken tracks
  - Functionality of lights, heater
  - Fluid levels
- Clean windows of frost, snow, and/or ice
- Disconnect the block heater.

Before driving the ATV:

- Start the engine and allow it to reach operating temperature.
- Fasten seat belts.

Driving the ATV:

- DO NOT turn the front tracks when the vehicle is stopped.

- Use caution when turning; make wide turns.
- Do not speed. Approach snow drifts slowly.

Parking the vehicle:

- Park the vehicle where it does not block any doors.
- Plug the block heater into a 110-V outlet.

Refueling the ATV:

- Diesel fuel is located in the storage tank, which has an electrically operated pump.
- Use a duck pond at all times when refueling.

5.0 Special-Use Airspace at Oliktok

5.1 Restricted Area R2204

A unique feature of Oliktok Point is the presence of restricted airspace R-2204. In 2004, the Federal Aviation Administration (FAA) created R-2204 (Appendix A, Maps A.1 and A.4) at Oliktok Point with the DOE as the controlling agency. The restricted airspace encompasses a 2-nautical-mile radius centered on Oliktok Point and is segmented by altitude into R-2204 Low (0 to 1500 ft) and R-2204 High (1500 to 7000 ft). Low or high segments can be activated independently or at the same time, allowing flexibility in accommodating local aviators during campaigns at Oliktok Point.

Note that prior to conducting aviation operations within R-2204, the user must also meet the requirements of the DOE Office of Science, the DOE Office of Aviation Management, and SNL. These requirements are not described here. For more information contact Mark Ivey, the SNL North Slope Site Manager, at 505-844-7786.

The Point Barrow aeronautical sectional chart can be obtained at:

- http://aeronav.faa.gov/index.asp?xml=aeronav/applications/VFR/chartlist_sect

5.2 Warning Area W-220

In May of 2015, the FAA approved Warning Area W-220. An excerpt from the Notices to Airmen publication (May 28, 2015) is included below. Maps for W-220 are included in Appendix A (Maps A.5 and A.6).

Warning Area W-220 is being established to support research conducted by DOE as part of the NSA ARM Climate Research Facility.

Due to the yearly print cycle of the Point Barrow Sectional, W-220 will be effective before the charting in 2016. This graphic notice is provided until the Point Barrow Sectional chart is updated to reflect the W-220 airspace.

W-220 is divided in 16 sub-areas, W-220A throughW-220 H, each with a high and low division. Only W-220A and W-220B will appear on the sectional chart; the remaining areas fall outside the lateral boundaries of the U.S. Sectional publications, extending north to 82º00'00" N. In all subdivisions, the Times of Use are by Notice to Airmen, the Controlling Agency is Anchorage Air Route Traffic Control Center, and the Using Agency is DOE, Office of Science, Office of Biological and Environmental Research.

The descriptions of W-220A and W-220B are as follows:

W-220A Low Oliktok, Alaska

Boundaries: Beginning at latitude 70°47'00" N, longitude 150°58'15" W
To latitude 71°37'00" N, longitude 151°01'03" W
To latitude 71°37'00" N, long 148°42'04" W
To latitude 70°47'00" N, longitude 148°44'52" W
To the point of beginning.

Altitudes: Surface up to but not including 2000 feet above mean sea level (MSL).

W-220A High Oliktok, Alaska

Boundaries: Beginning at latitude 70°47'00" N., longitude 150°58'15" W
To latitude 71°37'00" N, longitude 151°01'03" W
To latitude 71°37'00" N, longitude 148°42'04" W
To latitude 70°47'00" N, longitude 148°44'52" W
To the point of beginning.

Altitudes: 2000 feet MSL up to but not including 10,000 feet MSL.

W- 220B Low Oliktok, Alaska

Boundaries: Beginning at latitude 71°37'00" N, longitude 151°01'03" W
To latitude 72°27'00" N, longitude 151°04'09" W
To latitude 72°27'00" N, longitude 148°39'03" W
To latitude 71°37'00" N, longitude 148°42'04" W
To the point of beginning.

Altitudes: Surface up to but not including 2000 feet MSL.

W-220B High Oliktok, Alaska

Boundaries: Beginning at latitude 71°37’00” N, longitude 151°01’03” W
To latitude 72°27’00” N, longitude 151°04’09” W
To latitude 72°27’00” N, longitude 148°39’03” W
To latitude 71°37’00” N, longitude 148°42’04” W.

Altitudes: 2000 feet MSL up to but not including 10,000 feet MSL.

6.0 Contact Information

6.1 Urgent Care near Oliktok Point

- *Kuparuk Camp*: the Kuparuk Camp is operated by ConocoPhillips and is the largest facility in the Kuparuk River Unit. It contains helipads and a well-maintained landing strip. **From Oliktok Point, the drive to Deadhorse is ~15.8 miles.**

6.2 Emergency Telephone Numbers

- *Medical emergency*: Call Kuparuk Security: 907-659-7300
- *Spills or unauthorized discharges*: Call Kuparuk Security: 907-659-7300
- *FAA Anchorage Air Traffic Control Center (ZAN ARTCC)*: 907-269-1137
- *ARM Climate Research Facility*
  - Jim Mather, Technical Director: 509-375-4533, 509-420-0698 (cell), 509-375-2111 (Admin)
  - Jimmy Voyles, Chief Operating Officer: 979-571-2060 (cell)

6.3 Other Important Contact Information

- *LRRS*. Carter Boyd, LRRS Station Chief/Mechanic, Alaska Radar System: 907-440-6790, carter.boyd@arctecalaska.com
- *Brooks Range Supply*: 907-659-2550
- *Delta Leasing*: 907-659-9056
- *Aurora Hotel*: 907-670-0600
- *Gasoline/service stations*
  - NANA Oilfield Services: 907-659-2840
  - Tesoro Service Station (operated by Colville): 888-659-3198
- *AMF3/Oliktok technical staff*: cell phone 907-782-7181
- *ARM Mobile Facility*: IP/Internet phone 331-318-3343

- *SNL personnel*: Project cell phone 505-331-1808. See Table 1 for additional SNL contact information.

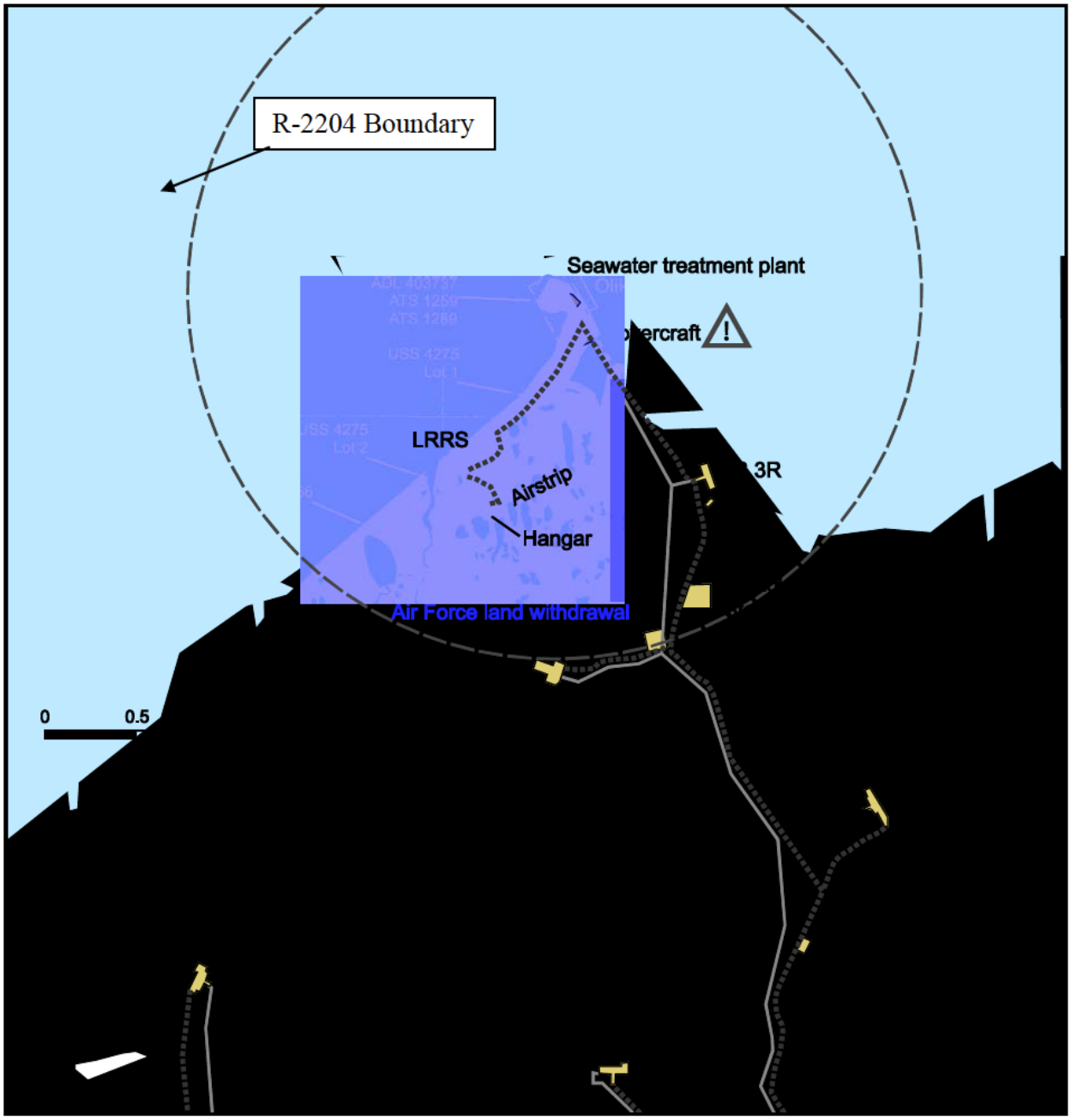
Table 1. SNL personnel contact information.

Staff	Role	Office	Cell	E-Mail
Mark Ivey	Site Manager	505-884-7786	505-553-2304	mdivey@sandia.gov
Valery Sparks	Access Administrator	505-884-7116	505-269-7160	vsparks@sandia.gov
Amy Halloran	Functional Manager	505-884-4904	505-449-7013	arhallo@sandia.gov
Joan Wolf	Administrative Support	505-884-8015		jwolf@sandia.gov
Daniel Lucero	Staff Member	505-884-3025	505-503-5170	dalucer@sandia.gov
Fred Helsel	Staff Member	505-884-3620	505-529-0058	fmhelse@sandia.gov
Bernie Zak	Contractor	505-884-8631	505-508-8204	bdzak@sandia.gov
Joe Hardesty	Staff Member	505-884-8388	505-284-9088	joharde@sandia.gov
Dari Dexheimer	Staff Member	505-884-7685	505-328-9409	ddexhei@sandia.gov
Dean Archuleta	Staff Member	505-884-1062	505-239-8636	djarchu@sandia.gov
Todd Houchens	Staff Member	505-884-5087	505-235-0967	tahouch@sandia.gov

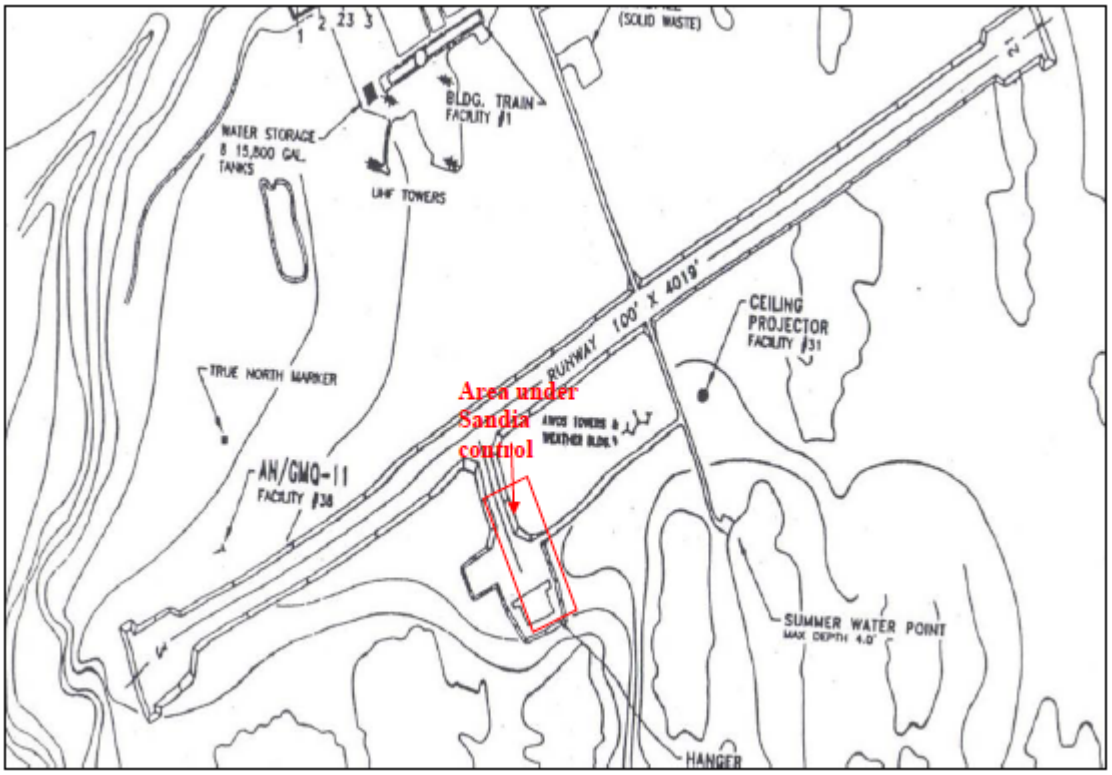
Appendix A

Maps

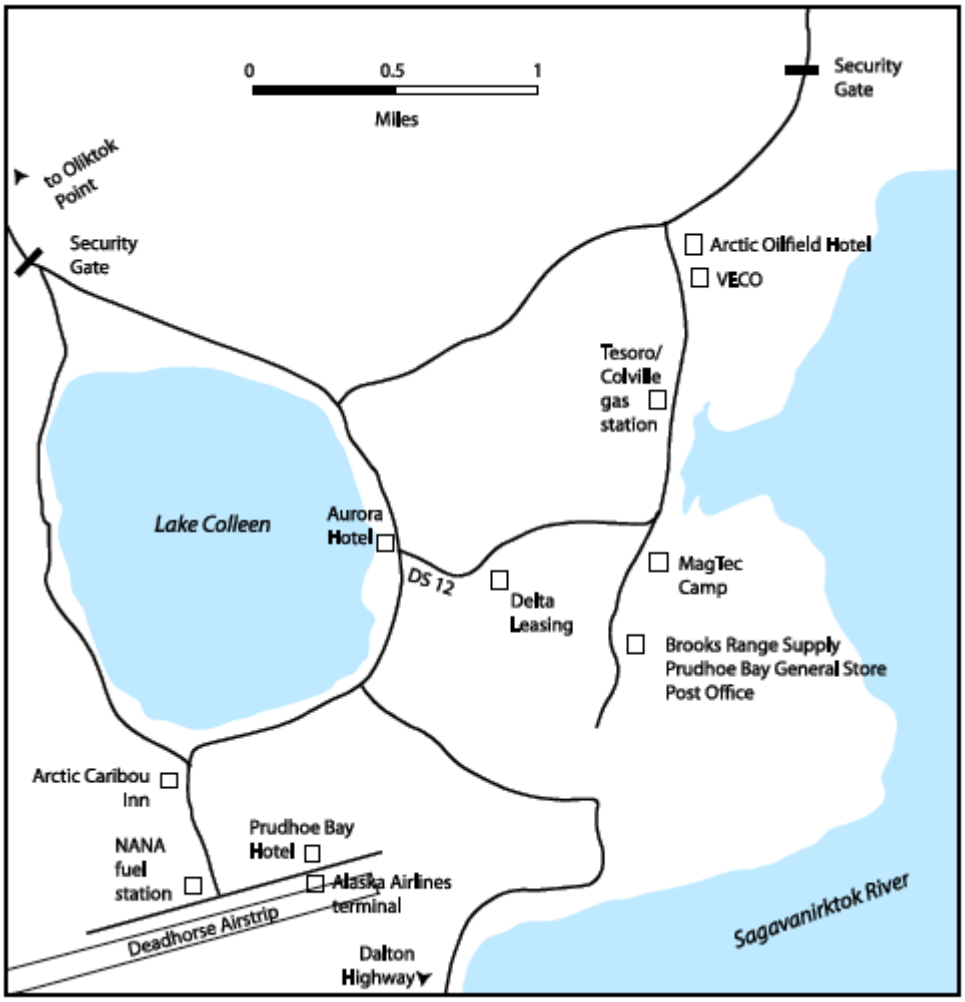
A.1 Map A.1. Oliktok Point Long-Range Radar Station (LRRS)



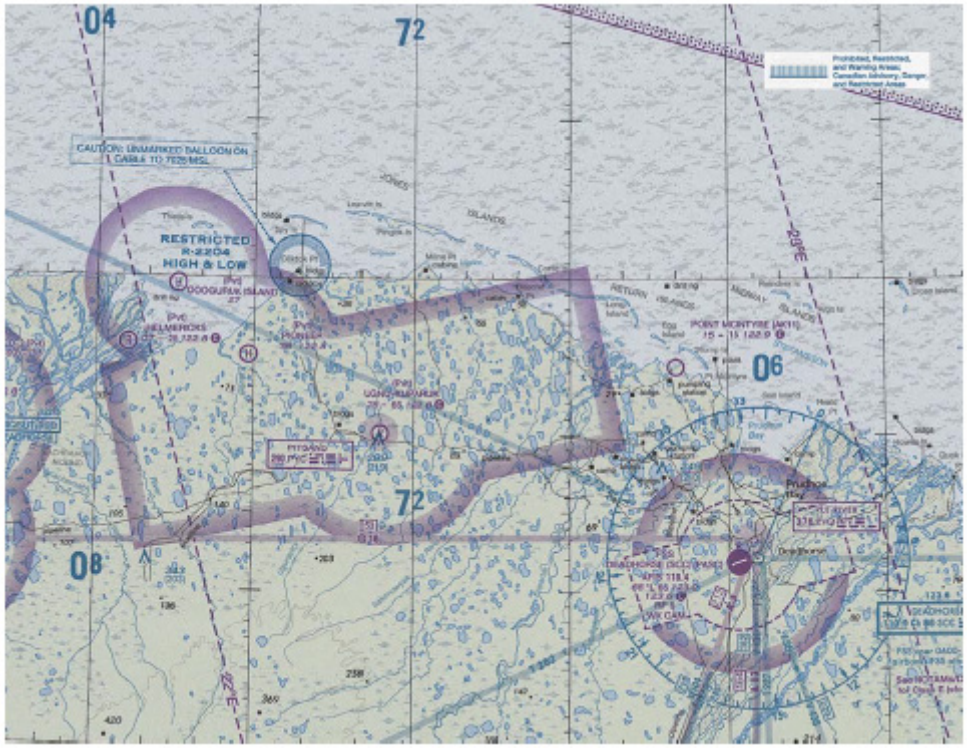
A.2 Map A.2. Runway and Hangar Layout at Oliktok Point LRRS



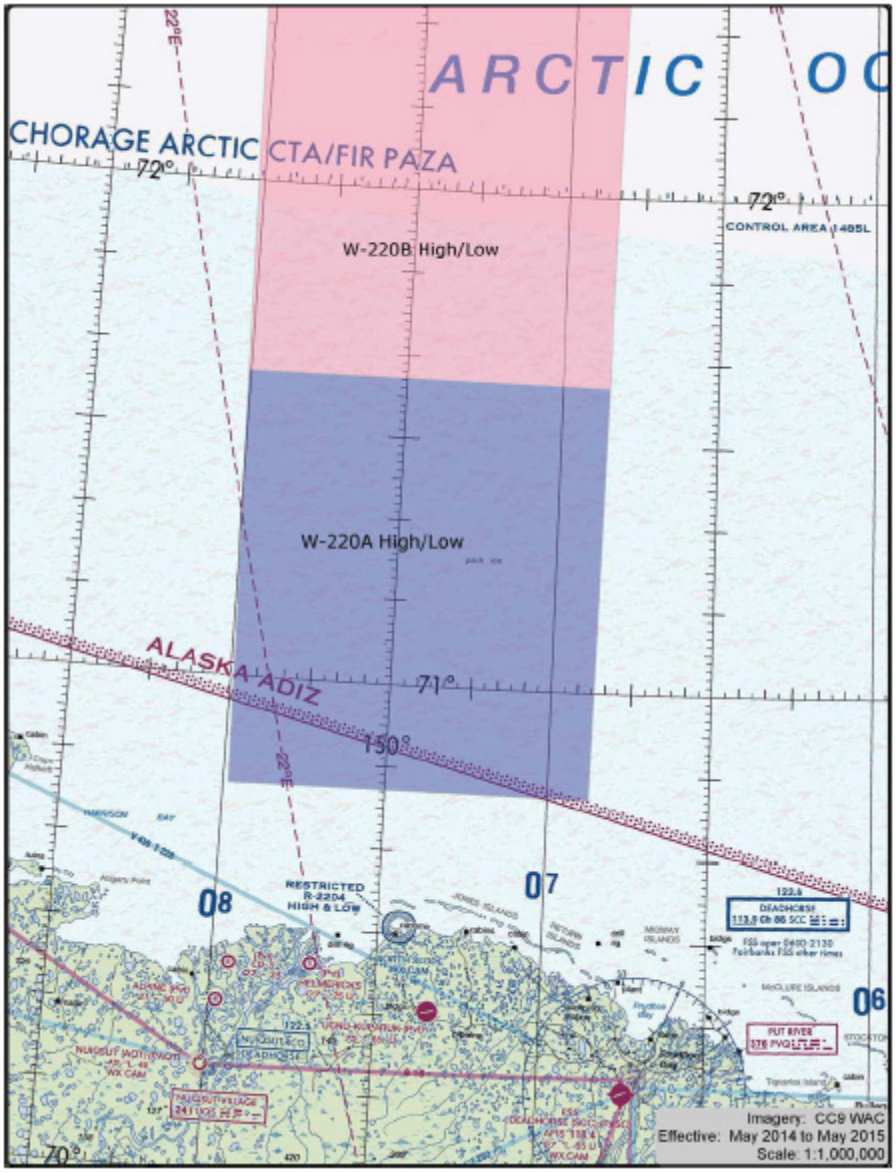
A.3 Map A.3. Deadhorse, Alaska, and Vicinity



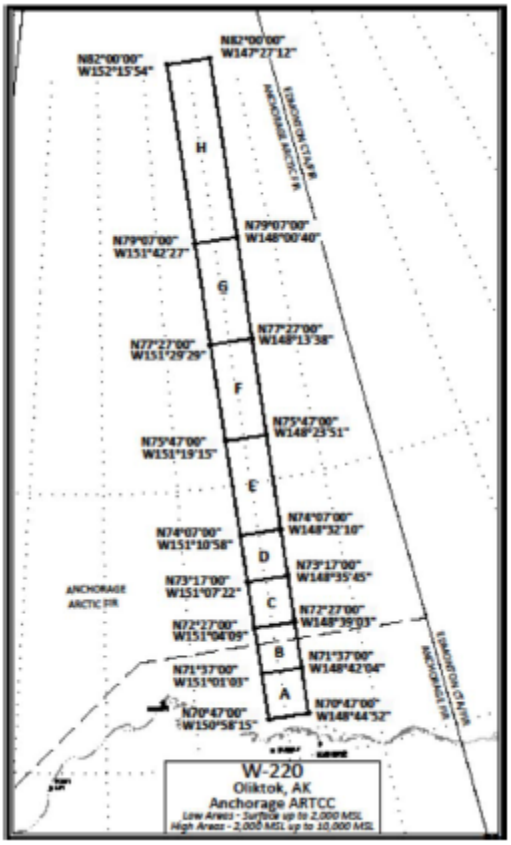
A.4 Map A.4. Aeronautical Chart for Oliktok Point and Vicinity



A.5 Map A.5. Warning Area W-220 A and B



A.6 Map A.6. Warning Area W-220



Appendix B

Navigation Points from the Security Checkpoint in Deadhorse to the LRRS

Navigation Points from the Security Checkpoint in Deadhorse to the LRRS

NOTE: Set the vehicle odometer to zero at the first landmark, which is Security Checkpoint 1.

Cumulative Miles from Security Checkpoint 1	Miles between Landmarks	Landmarks from Security Checkpoint 1 to the LRRS	Cumulative Miles from the LRRS
0	0	**Security Checkpoint**	48.9
1	1	Pad 3 on right	47.9
3	2	DS-14 on left	45.9
4.3	1.3	Pump station on left	44.6
5.0	0.7	River crossing	43.9
6.1	1.1	CPS on right	42.8
6.9	0.8	GC3 on right (green buildings)	42.0
7.7	0.8	BOC on right (brown buildings – BP)	41.2
8.9	1.2	GC1 on right (green buildings)	40.0
9.7	0.8	CSP on right (supply yard, pipe, etc.)	39.2
10.3	0.6	Frontier Camp on right (at 90-degree turn in road to west)	38.6
14.7	4.4	East Channel of Kuparuk River and M pad	34.2
16.5	1.8	West Channel of Kuparuk River. Will pass Q & J pads, CC2A, and N, U, and P pads before reaching the river	32.4
19.2	2.7 SW	Major intersection at large lake on right, **stay right**.	29.7
26.2	7.0 W	Milne Point Road. **Stay left toward Kuparuk** across barren landscape with pipeline on left. Security Checkpoint 2 (closed) at intersection of Spine Road and Milne Point Road.	22.7
29.2	3.0 SW	Three-way stop sign and 1D. Large orange-colored facility with snow fences and multiple large-diameter pipelines on left. Will pass S, Mobile (orange), W, and Z pads.	19.7
32	2.8 NW	Conoco-Phillips Kuparuk Camp on left and asphalt airstrip on right.	16.9
33.3	1.3	"Y" intersection, **stay right**.	15.6
33.6	0.3	"Y" intersection, **stay left**. Large orange multi-pad on left with north-south lagoons.	15.3
34.9	1.3	Three-way intersection, **stay right**. D pit (large orange building) on right	14.0
35.5	0.6 NW	KCS pad on right (large yellow buildings) and Kuparuk Drilling tool house.	13.4
37.4	1.0 NW	DS 1Q on right (orange building)	11.5
39.8	2.4 N	Three-way stop sign, **stay right**. Pioneer Oooguruk Tie-in Pad Camp on left (large brown facility) with natural gas flares.	9.1

Cumulative Miles from Security Checkpoint 1	Miles between Landmarks	Landmarks from Security Checkpoint 1 to the LRRS	Cumulative Miles from the LRRS
40.7	0.9 N	DS 3C on right.	8.2
42.6	1.9 N	DS 3K, E Pit, and DS 3N.	6.3
44.6	2.0 N	"Y" intersection, **stay left**. DS 3O on right.	4.3
46.2	1.6 NW	Eni Nikaichuq Operating Center (NOC) on left (large gray buildings with communications tower).	2.7
46.5	0.9 N	DS3R on right (orange buildings with two-stack burner)	2.4
47.1	0.9 NW	Eni facility at Oliktok Point (Figure B.1). **Turn left** at the first opportunity after the pipe goes underground. A white Sprung structure will be on the right after the turn (Figure B.2).	1.8
48.0	0.1	**Turn right** at the first opportunity	0.9
48.1	0.8	**Turn left** onto the LRRS access road. Watch for a very small "RESTRICTED AREA, USAF" sign on the right. The narrow road will lead to the LRRS.	0.8
48.9	0	**LRRS**.	0

Caution: The access road to the LRRS fom Oliktok Point hugs the coastline, and the road is narrow and susceptible to wave damage. Drive slowly, and watch out for sections of road that have been washed out by waves, especially when driving at night.

Hovercraft Warning: Eni operates a hovercraft between Oliktok Point and offshore facilities on Spy Island. *Do not go within 200 feet of the hovercraft if it has its engine on*. The hovercraft fan has been known to kick up rocks and gravel from the barren ground. Always watch for the hovercraft and any other heavy equipment as one approaches the Eni facility and the Sprung Structure and while driving on the LRRS access road, which is essentially a one-lane road.

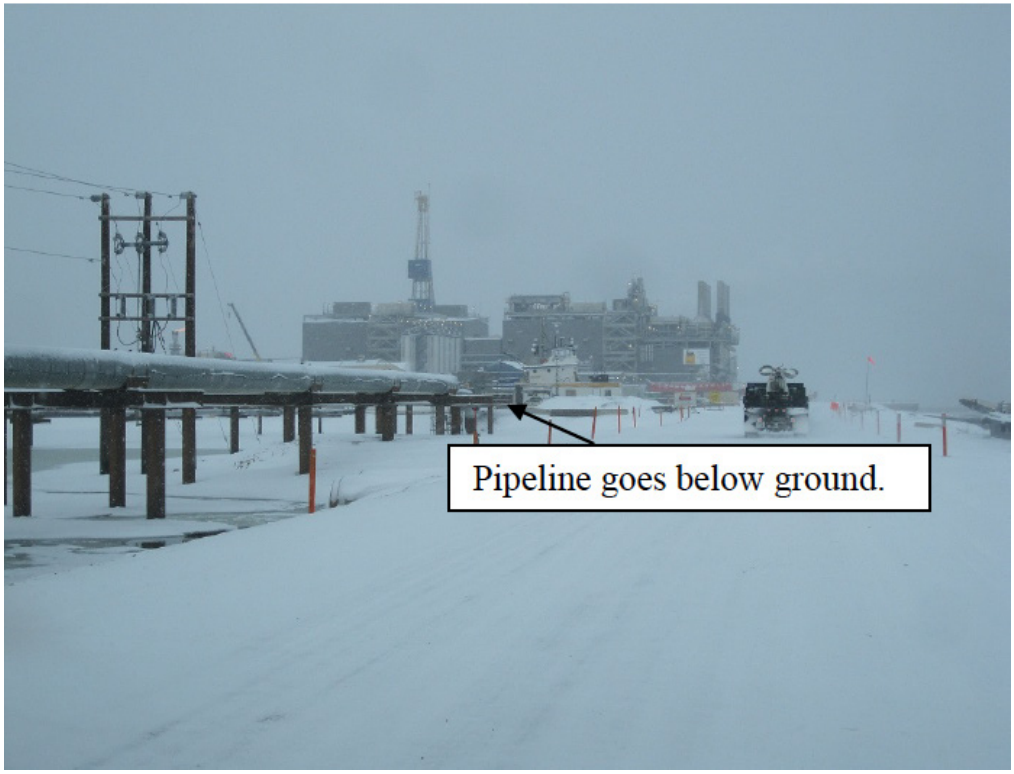


Figure B.1. Approaching Oliktok Point with Eni oil processing facility in the background.

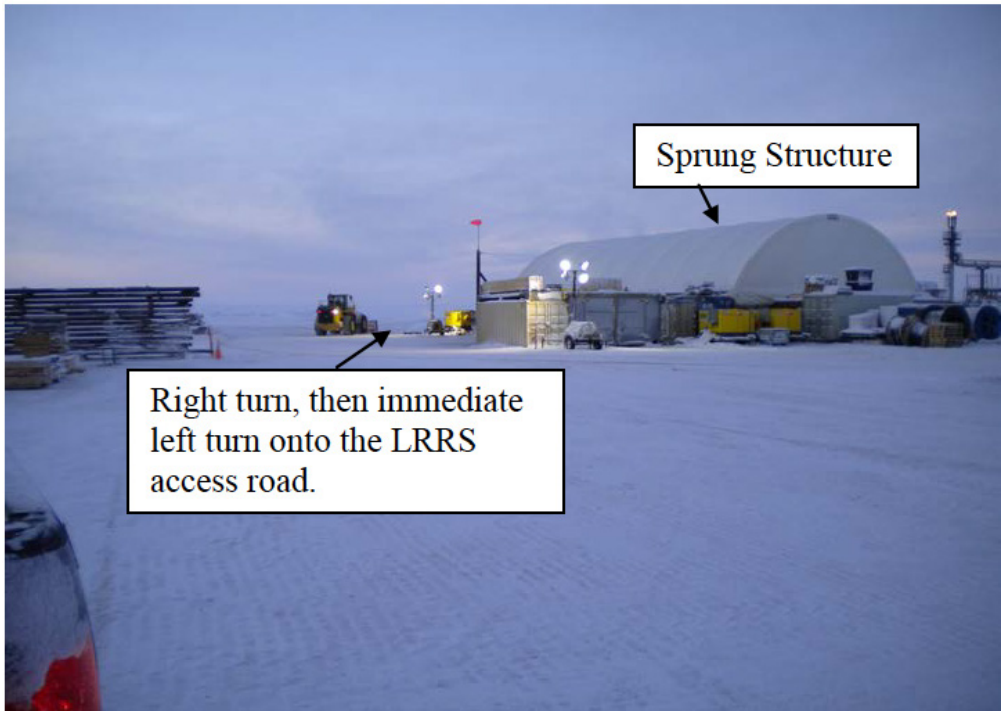


Figure B.2. Left turn off the spine road at the end of the pipeline.

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