

Amchitka Annual Site Inspection 2018 Trip Report Amchitka, Alaska, Site

January 2019

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Abbreviations

ATV	all-terrain vehicle
E	east
ft	feet
LM	Office of Legacy Management
LMS	Legacy Management Support
MM	mile marker
N	north
NE	northeast
NW	northwest
S	south
SE	southeast
SGZ	surface ground zero
SW	southwest
USFWS	U.S. Fish and Wildlife Service
W	west

1.0 Introduction

1.1 Purpose

In June 2014, a magnitude 7.9 earthquake off the northwest coast of Amchitka Island caused some damage to features at the Amchitka, Alaska, Site. The earthquake slightly damaged two mud pit caps, moderately damaged a third mud pit cap, and caused foundation soils beneath two other mud pit caps to become unstable. In response to the June 2014 earthquake damage, the U.S. Department of Energy Office of Legacy Management (LM) decided to perform annual inspections of the seven mud pit caps beginning in 2017 until a corrective action is implemented. The 2017 annual inspection site visit took place June 11–22, 2017, and was documented in the *Amchitka Annual Site Inspection Trip Report, Amchitka, Alaska, Site* (DOE 2017), also called the 2017 Amchitka inspection report. This 2018 trip report summarizes the August 15–25, 2018, site visit to Amchitka Island made by personnel from LM and the Legacy Management Support (LMS) contractor, Navarro Research and Engineering, Inc.

The scope of the 2018 annual inspection is similar to inspections performed in 2006, 2011, 2014, 2015, 2016, and 2017, with an added emphasis on the earthquake damage. Visual observations of the mud pit caps were compared to the visual observations performed in 2017 to determine whether additional damage has occurred since the 2017 inspection. Vegetation inspections of the caps were not part of this 2018 annual site inspection. Additional observations were made and recorded regarding site conditions and access that might affect any future corrective actions.

1.1.1 Site

Amchitka, Alaska, Site

1.1.2 Project

Amchitka Site 2018 Annual Mud Pit Caps Inspection

1.1.3 Inspection Team

- Stephen Pitton (LMS site lead)
- Dan Nordeen (LMS Engineering department)
- Jason Nguyen (LM site manager)
- Bruce Wright (Aleutian Pribilof Islands Association Inc. representative)
- Ed Decleva (U.S. Fish and Wildlife Service [USFWS] representative)

2.0 Basic Itinerary

- Wednesday, August 15, through Saturday, August 17, 2018
 - Inspection team arrived on Adak Island.
 - Inspection team reviewed existing documents and continued planning and logistics for the mud pit cap inspections.
 - USFWS all-terrain vehicles (ATVs) were inspected.
- Saturday, August 18, 2018
 - USFWS vessel Tiglax arrived on Adak Island and the inspection team boarded with gear.
 - Ship left for Amchitka Island.
- Sunday, August 19, 2018
 - Inspection team arrived at Amchitka Island at approximately 11:45 a.m.
 - Unloaded equipment onto pier and set up for inspections.
 - Reviewed scope for the day, reviewed coordination and logistics with the ship crew, and reviewed and signed the job safety analysis.
 - Inspected the Rifle Range mud pit site.
- Monday, August 20, 2018
 - Inspection team reviewed scope for the day, reviewed coordination and logistics with the ship crew, performed the daily safety inspection of equipment, and held the daily safety discussion.
 - Inspected the stream crossing at Infantry Road mile marker (MM) 4 and set fish baskets in the stream.
 - Set fish baskets in stream MM 8 stream crossing.
 - Inspected the Milrow surface ground zero (SGZ) plaque.
 - Inspected the Cannikin Ground Zero mud pit site, including the mud pit cap and the Cannikin SGZ plaque.
 - Inspected Cannikin Post Shot mud pit site (formerly called the Cannikin South mud pit site).
 - Inspected the Drill Site D mud pit site.
- Tuesday, August 21, 2018
 - Inspection team reviewed scope for the day, reviewed coordination and logistics with the ship crew, performed the daily safety inspection of equipment, and held the daily safety discussion.
 - Inspected the Long Shot mud pit site including the mud pit cap and the Long Shot SGZ plaque.

- Collected fish baskets from MM 4 and MM 8 streams.
- Inspected the Drill Site E mud pit site.
- Inspected the Drill Site F mud pit site.
- Traveled to near MM 38 to look for and inspect a well that was part of the Plowshare program, but did not find any evidence of the well.
- Wednesday, August 22, 2018
 - Inspection team reviewed scope for the day, reviewed coordination and logistics with the ship crew, performed the daily safety inspection of equipment, and held the daily safety discussion.
 - Investigated the stream at MM 4 for blockages or drops as it approaches the ocean.
- Thursday, August 23, 2018
 - Investigated the stream at MM 8 for blockages or drops as it approaches the ocean.
 - Visited the U.S. Geological Survey site to view the seismic monitoring station.
 - Cleaned equipment and prepared for the trip back to Adak Island.
 - Tiglax sailed for Adak Island.
- Friday August 24, 2018
 - Inspection team arrived at Adak Island.
 - Unloaded equipment and gear. Cleaned equipment and placed it in storage on Adak Island.
- Saturday August 25, 2018
 - Inspection team traveled home.

3.0 Observations

Each of the seven mud pits were visually inspected by walking the perimeter of the cap toe and then walking across the top of each mud pit in a direction perpendicular to the longest pit dimension at approximately 50-foot intervals. The mud pit caps and the surrounding areas were inspected for evidence of subsidence, cracking, animal burrowing, and other types of erosion. All of the cracks and damaged areas that were identified were inspected, measured to verify GPS coordinates, and photographed to document any changes from previous inspections. The photograph locations are shown in the individual maps of five of the mud pit sites (Figure 1 through Figure 5) in Appendix A, and the photographs with their descriptions are shown in Appendix B. The two Cannikin mud pit caps did not have any damage and therefore figures were not created for this report. The extent of current cracks and damage was noted and compared to GPS coordinates collected on previously noted cracks. New GPS coordinates were collected for comparison to 2017 GPS coordinates to look for any change in conditions. Two damaged stream crossings were inspected for consideration of future modifications that would allow equipment to cross. In addition, the streams were investigated for aquatic life, including anadromous fish or the potential to support anadromous fish.

3.1 Rifle Range Mud Pit Site

In general, no new earthquake damage was seen on the Rifle Range mud pit site and it appeared to show signs of self-healing compared to previous inspections. The previously observed primary crack on the north side of the pit (see photograph RR06) was still visible but new vegetation was growing in most of the cracks. The primary crack was measured to be approximately 20 feet (ft) long in 2017. The GPS coordinates for the primary crack matched the GPS coordinates recorded in 2017. No exposed liner was visible.

Surface water was collecting and had ponded at the edge of the cap in the designed toe drain (north side). The existing pond at the southeast side of the cap (approximately 5 ft off the edge of the cap toe) contained water but did not show signs of impacting the cap. New signs of rodent burrowing were discovered on the cap. Rat tracks and baby bird remains were discovered near one burrow on the northern side of the cap. The burrowing holes were approximately 2.5 to 3 inches in diameter and did not extend beyond 6 inches in depth below the surface, which means the holes were contained within the vegetative layer. The holes that were investigated appeared, on average, to extend approximately 3 ft in length. None of the burrowing holes showed signs of impacting the integrity of the cap. The need for maintenance repairs will be assessed upon the next site inception in 2019. Any minor repairs will be completed at that time.

See Appendix B for photos and the inspection checklist.

3.2 Long Shot Mud Pit Site

Overall the Long Shot mud pit site seemed to be in the same to slightly better condition compared to what was observed in 2017. The crack/scarps, depression area, and burrowing holes that were noted in 2017 Amchitka inspection report (DOE 2017) were inspected, and the GPS coordinates collected in 2017 for each feature were compared to the current field condition. Most of the crack/scarps remained visible and did not show any change in condition. All of the cracks appeared to have lots of new vegetation growth, and it was unclear whether the increased vegetation was related to the 2018 inspection occurring later in the growing season than the 2017 inspection. The small cracks along the north side continued to be self-healing and were almost invisible through the vegetation. Longitudinal and transverse cracking ranged from approximately 1 to 6 inches wide and from 4 to 8 inches deep. The vegetation made it difficult to make measurements.

No new scarps or cracks were observed. Existing scarps showed signs of healing, and no fresh damage was observed. The geomembrane liner was not visible. The small animal burrowing holes did not appear to have increased in number from those observed in 2017. The undulations across the entire southeast side observed in the 2017 inspection were still visible. It is unknown whether the undulations are left over from the original construction and equipment or if settlement is occurring. The need for maintenance repairs will be assessed upon the next site inception in 2019. Any minor repairs will be completed at that time.

See Appendix B for photos and the inspection checklist.

3.3 Drill Site D Mud Pit Site

In general, the Drill Site D mud pit cap did not show any new damage. The north side of the mud pit cap appeared to be in slightly better condition, and the south side appeared to be in the same condition that was described in the 2017 Amchitka inspection report (DOE 2017). All noted damage areas from 2017 were inspected and GPS coordinates collected in 2017 were compared to the current field condition. Damage along the north side was no longer visible. The mud pit marker signs at the north end of the east cap and four signs along the east side of the east cap were damaged by weather (primarily wind) and were no longer attached to the metal T-posts. It is recommended that they be replaced. During the 2018 visit, the loose signs were either reattached or placed at the base of the metal T-posts.

The drainage channel between the east cap and the west cap had ponded water at both the north and south ends. Compared to past inspections, there was no change in the small depression/seep where exposed water has an oily or biogenic sheen near the top of the southwest side slope of the west mud pit cap. As has been noted in past inspections, this feature, which is not related to a linear crack, might increase in size if the seepage persists. Cracks labeled D1 and D5 in the *Amchitka Mud Pit Caps 2016 Post-Closure Monitoring and Inspection Report, Amchitka Island, Alaska* (DOE 2016), also called the 2016 Amchitka inspection report, were no longer visible and appeared to be self-healed. The crack labelled D6 in the 2016 Amchitka inspection report was still visible with 0 to 8 inches of displacement and no gaps, and it showed signs of self-healing and had vegetation growing in it. The terracing slump area (labeled D3 in the 2016 Amchitka inspection report, and near to an observation hole dug in 2017) did not show visible signs of any changes. The investigation hole that was dug in 2017 was located by the GPS during the 2018 inspection and it was no longer visible. The damage along the entire south side remained in the same condition as previously observed. The two locations of exposed liner were inspected and still appeared to be in acceptable condition. The material around the exposed liner was still saturated but it was unclear whether the material was saturated from water under the liner or from water above the liner. A breach in the sediment trap southwest of the west mud pit cap that was noted in the 2016 Amchitka inspection report (DOE 2016) did not show any new signs of erosion, and the rocky slope along the southwest edge of the west mud pit cap also showed no new signs of erosion. A potential new slump/settlement area was found along the east side of channel D-2 (on the west side of west cap), but there were no visible signs of erosion and it was undetermined whether the area had recently settled or was a remnant from the original construction.

Two areas along the east side of the east cap had ponded water. It was unclear whether these areas were new settlement or it was a low area left over from the original construction.

3.4 Drill Site F Mud Pit Site

In general, the Drill Site F mud pit cap did not show any new damage and appeared to be in the same condition as described in the 2017 Amchitka inspection report (DOE 2017). The earthquake damage along the south side that was observed in 2017 was still visible. No geomembrane was exposed. The south side damage still showed several terracing scarps but did not appear to be expanding; the upper area showed approximately 4 to 8 inches of vertical displacement, and the middle and bottom areas showed 6 to 18 inches of vertical displacement. Vegetation growth and heavy fog during the inspection made it difficult to identify detailed changes. GPS coordinates collected in 2017 were compared to the current field condition and

did not appear to have any changes. The depression in the southwest side of the cap, which was described in previous inspection reports, remained in the same condition. Pondered water continued to accumulate at the east end of the mud pit cap in Channel F1 and in a trench to the south. As noted in the 2017 inspection report the actual edge of the cap on the south side is not in the failure area. The distance from where the geomembrane is placed in the anchor trench is estimated to be approximately 10 ft from the shoulder of the slope where the scarp is located. Therefore, the cap integrity is still in an undamaged state. No repairs are required at this time. It is recommended that an engineering evaluation should be performed to determine if the failing slope outside the mud pit cap will impact the cap integrity.

See Appendix B for photos and the inspection checklist.

3.5 Cannikin Ground Zero Mud Pit Site



Note

The Cannikin Ground Zero mud pit site has been referred to by various names in past documents (including the name “Cannikin North mud pit site”), but going forward it will be referred to as the “Cannikin Ground Zero mud pit site.”

No distress or changes were observed at this mud pit site.

See Appendix B for photos and the inspection checklist.

3.6 Cannikin Post Shot Mud Pit Site



Note

The Cannikin Post Shot mud pit site has been referred to by various names in past documents (including the name “Cannikin South mud pit site”), but going forward it will be referred to as the “Cannikin Post Shot mud pit site.”

No distress or changes were observed at this mud pit site.

See Appendix B for photos and the inspection checklist.

3.7 Drill Site E Mud Pit Site

In general, the Drill Site E mud pit cap did not show any new damage and appeared to be in the same condition as described in the 2017 Amchitka inspection report (DOE 2017). The earthquake damage along the south side and the scarp on the north side that were observed in 2017 were still visible. No geomembrane was exposed. The south side damage did not show any signs of expanding or migrating toward the mud pit. The cap soils were wet and soft. The minor scarps and cracks on the south side noted in the 2017 Amchitka inspection report were heavily covered with vegetation and were located only by using the GPS coordinates that were collected in 2017. The reddish brown seeps noted in the previous inspection were still visible and remained in the same condition. No repairs are required at this time and it is recommended that an engineering evaluation is performed to determine if the failures outside the mud pit cap (upgradient crack and downgradient slumping) will impact the cap integrity.

See Appendix B for photos and the inspection checklist.

3.8 MM 4 and MM 8 Stream Crossing Areas

The stream crossing areas on Infantry Road at MM 4 and MM 8 were in the same condition as was described in the 2017 Amchitka inspection report (DOE 2017). The two areas showed no new signs of erosion and appeared to be in a stable condition. Existing conduit is buried at crossings approximately 4 ft below grade and 5 ft from the edge of road. The contents and condition of the material inside the conduits was not investigated. The road width was approximately 25 ft at MM 4 and 25 ft at MM 8. The slope from the shoulder at the road centerline to the near edge of the stream was measured at 12.5 ft at MM 4 and 10.5 ft at MM 8. The crossings were not passable by equipment and will require repair. Two fish baskets (traps) were set downstream of each stream crossing to check for aquatic life. After approximately 4.5 hours, a combined fish count of 16 (all Dolly Varden) was collected at MM 4, and a combined fish count of 18 (all Dolly Varden) was collected at MM 8. Baskets were rebaited and left in place overnight. After approximately 18 hours, the two MM 4 baskets collected a combined fish count of 11 (10 Dolly Varden and 1 sculpin) and the two MM 8 baskets collected a combined fish count of 30 (all Dolly Varden). Both streams at MM 4 and MM 8 were walked downstream to investigate for significant drops or blockages. Not all sections of the streams were walked, but both streams appeared to provide good access to the ocean for potential navigation by anadromous fish.

See Appendix B for photos.

3.9 MM 5.5 Road Damage

The road at approximately MM 5.5 had several large cracks along one side of the road that range from 6 to 10 ft wide and from 1 to 2.5 ft deep. These cracks appeared to be in the same condition as was observed in 2017. No new erosion was visible. The road was accessible by an ATV but will require repairs for access by standard-sized vehicles and equipment. Grading of the existing road material will likely fix the problem. New measurements were not taken during this inspection.

3.10 MM 18 Road Damage

The road damage at MM 18 was similar to what was observed during the 2017 inspection (DOE 2017). There was no new signs of erosion and the road damage appeared to be in a stable condition. The cracks were not measured during this inspection. This area is currently not passable by equipment and will require repair. Due to heavy fog and a focus on completing the inspections at the Drill Site E and Drill Site F mud pit sites, not much time was spent investigating this area.

3.11 MM 8 Borrow Pit

A visual inspection of the MM 8 borrow pit determined that additional material could be removed by extending the existing excavation area further into the hillside or by scraping the surface in the area southwest of the original borrow area. This area was observed and discussed with Ed Decleva (USFWS) for potential historical and cultural impacts. Mr. Decleva did not see anything that would affect cultural resources or require additional investigations. A subsurface

investigation and geotechnical analysis of the soil is recommended to determine the available volumes and soil characteristics.

3.12 Action Items

LM will continue annual inspections until corrective actions have been completed.

4.0 References

DOE (U.S. Department of Energy), 2016. *Amchitka Mud Pit Caps 2016 Post-Closure Monitoring and Inspection Report, Amchitka Island, Alaska*, LMS/AMC/S15131, Office of Legacy Management, November.

DOE (U.S. Department of Energy), 2017. *Amchitka Annual Site Inspection Trip Report, Amchitka, Alaska, Site*, LMS/AMC/S16605, Office of Legacy Management, August.

Appendix A

Mud Pit Figures

Figure 1, "Rifle Range Mud Pit Site"

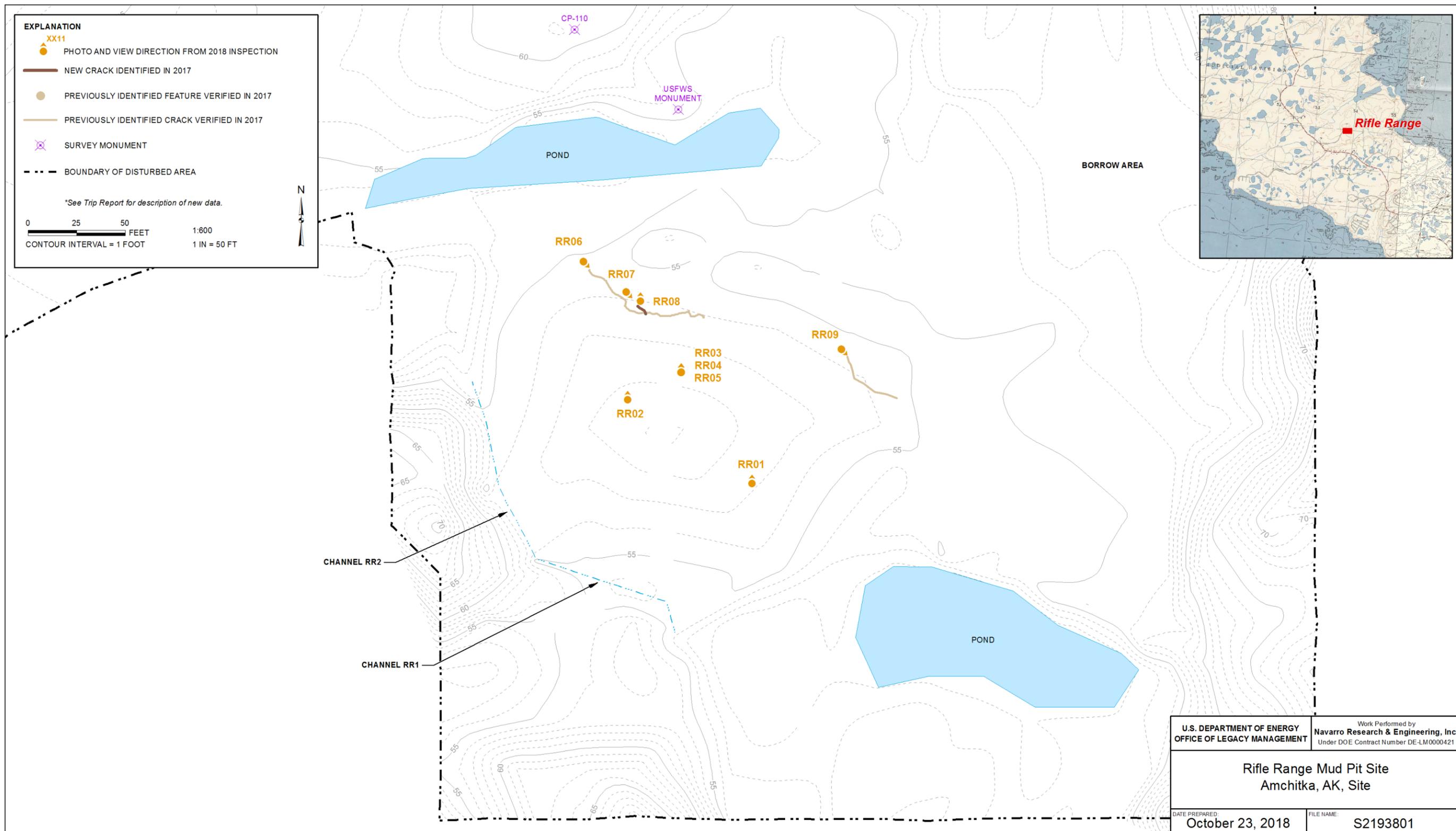
Figure 2, "Long Shot Mud Pit Site"

Figure 3, "Drill Site D Mud Pit Site"

Figure 4, "Drill Site F Mud Pit Site"

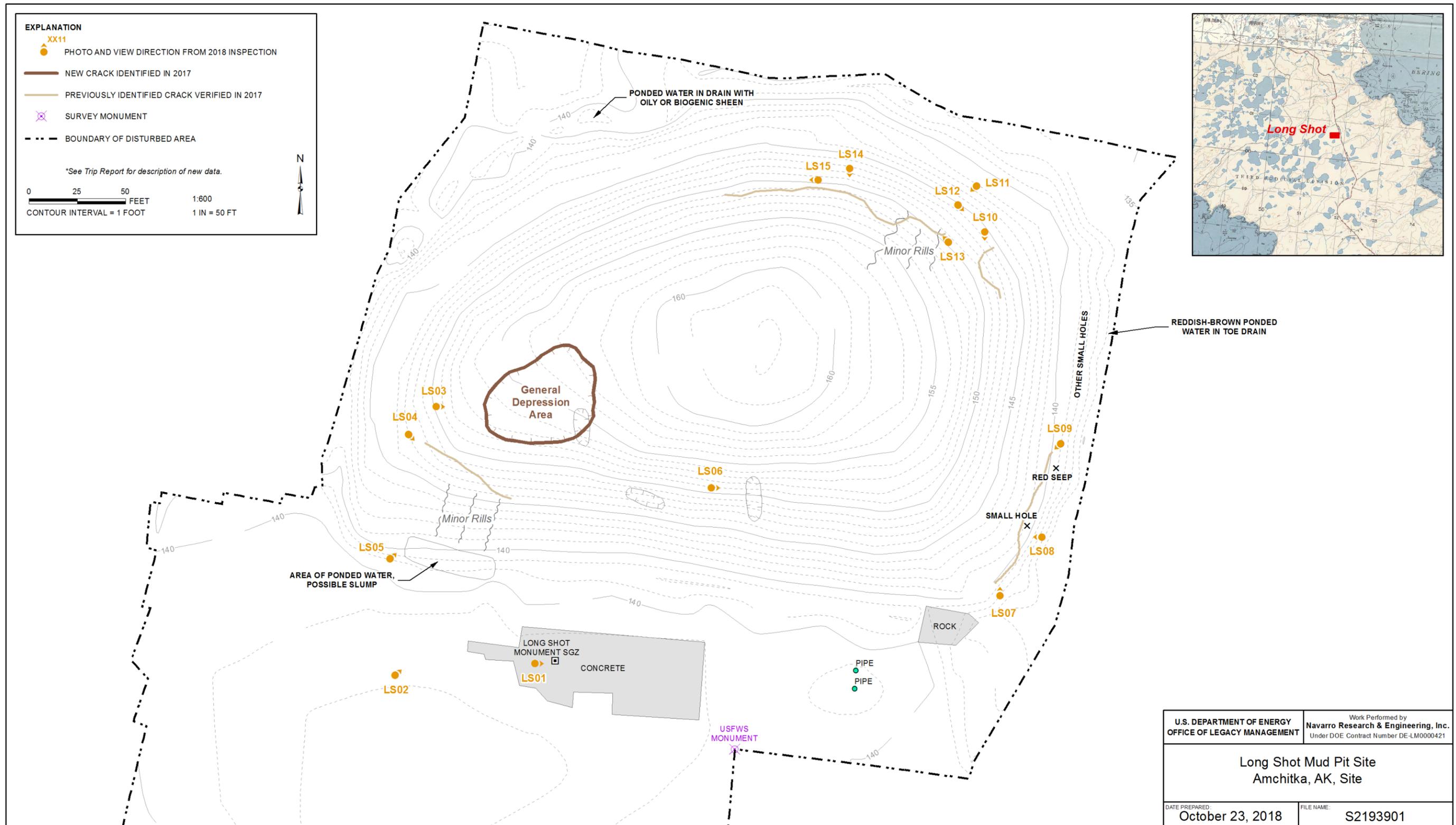
Figure 5, "Drill Site E Mud Pit Site"

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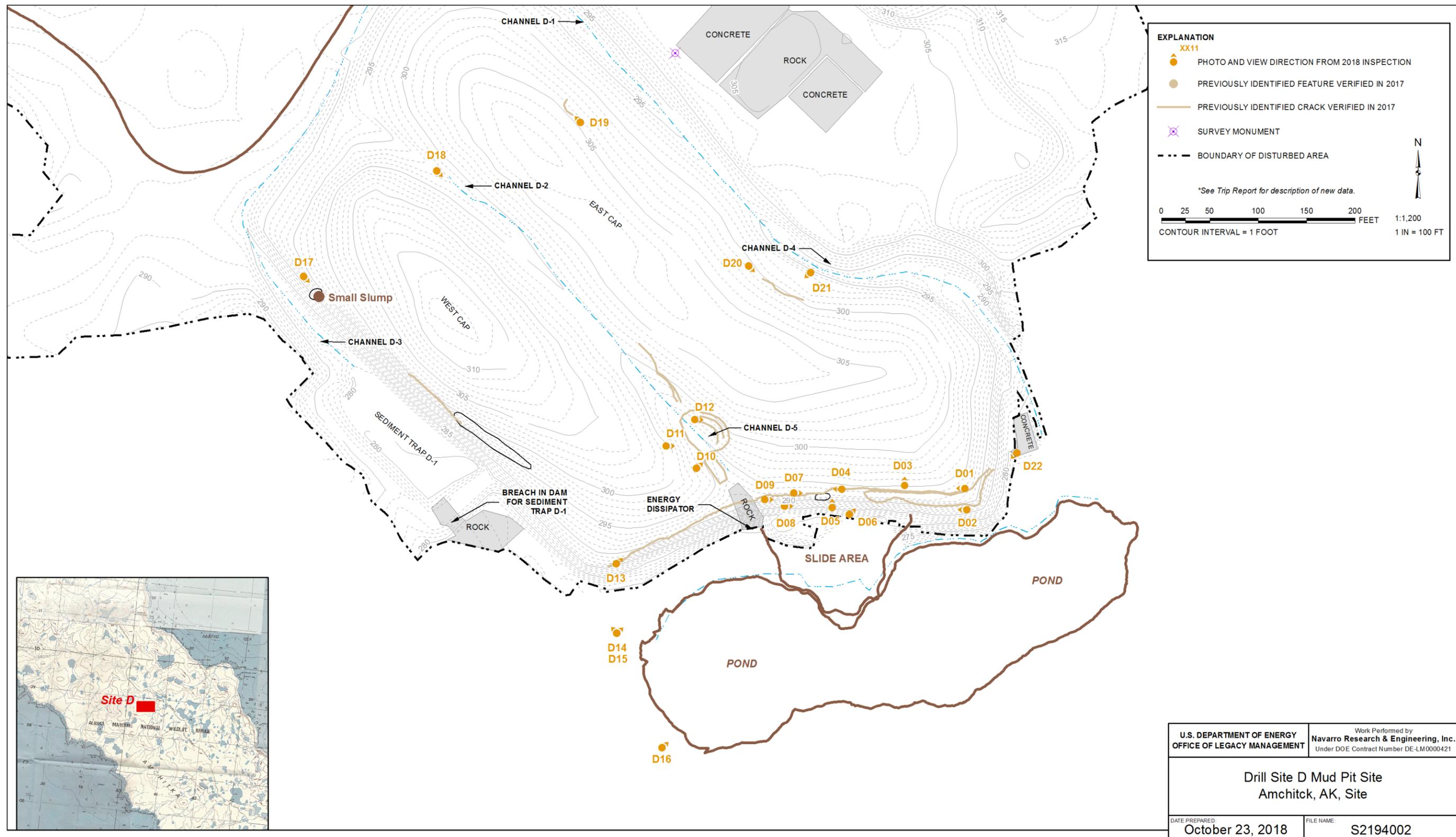
\\Lmless\Env\Projects\EBM\LT\S\111\0077\18\002\S21938\S2193801.mxd HyattT 10/23/2018 10:31:02 AM

Figure 1. Rifle Range Mud Pit Site



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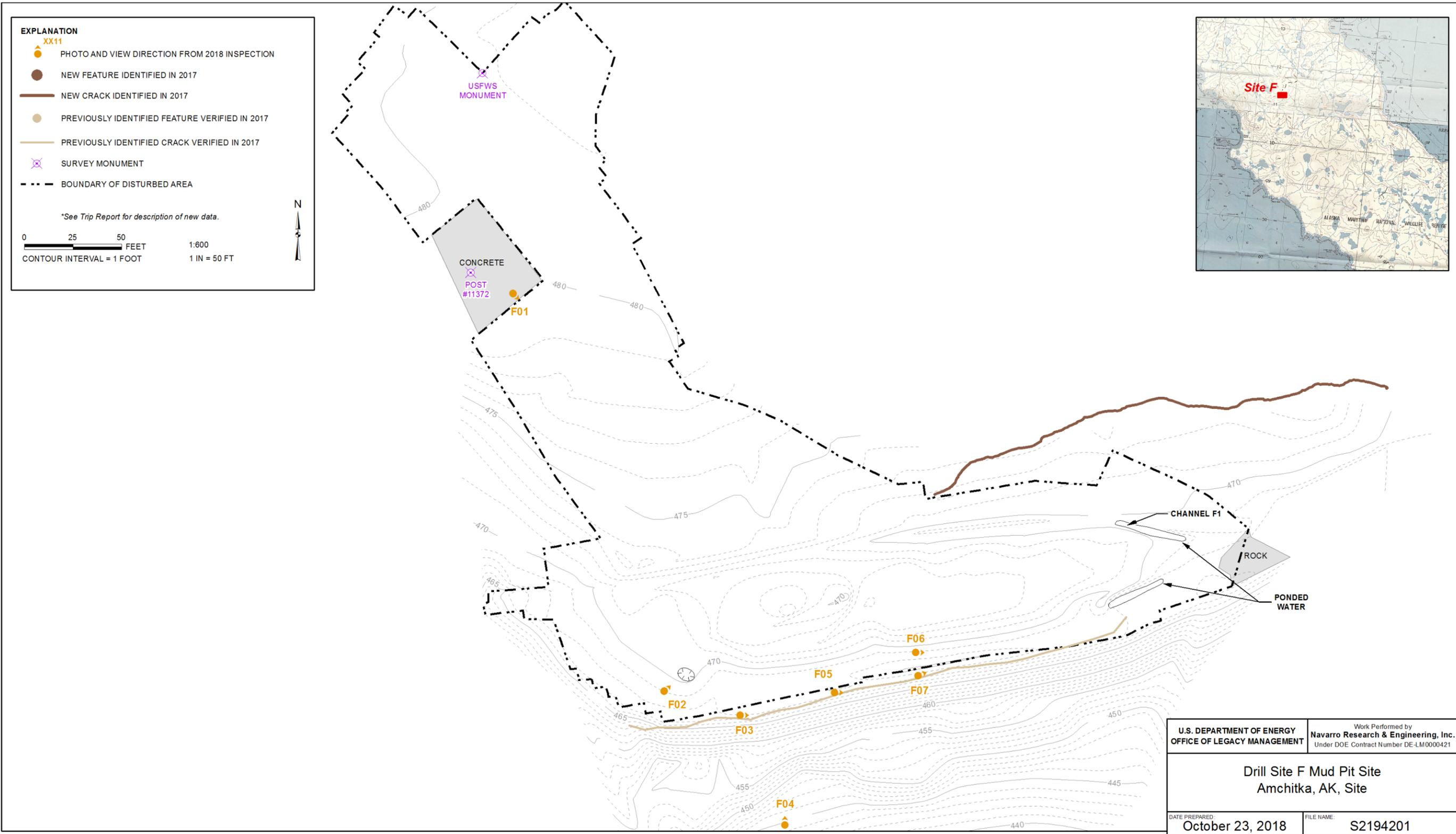
Figure 2. Long Shot Mud Pit Site



U.S. DEPARTMENT OF ENERGY OFFICE OF LEGACY MANAGEMENT	Work Performed by Navarro Research & Engineering, Inc. Under DOE Contract Number DE-LM0000421
Drill Site D Mud Pit Site Amchitka, AK, Site	
DATE PREPARED: October 23, 2018	FILE NAME: S2194002

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Figure 3. Drill Site D Mud Pit Site



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Figure 4. Drill Site F Mud Pit Site

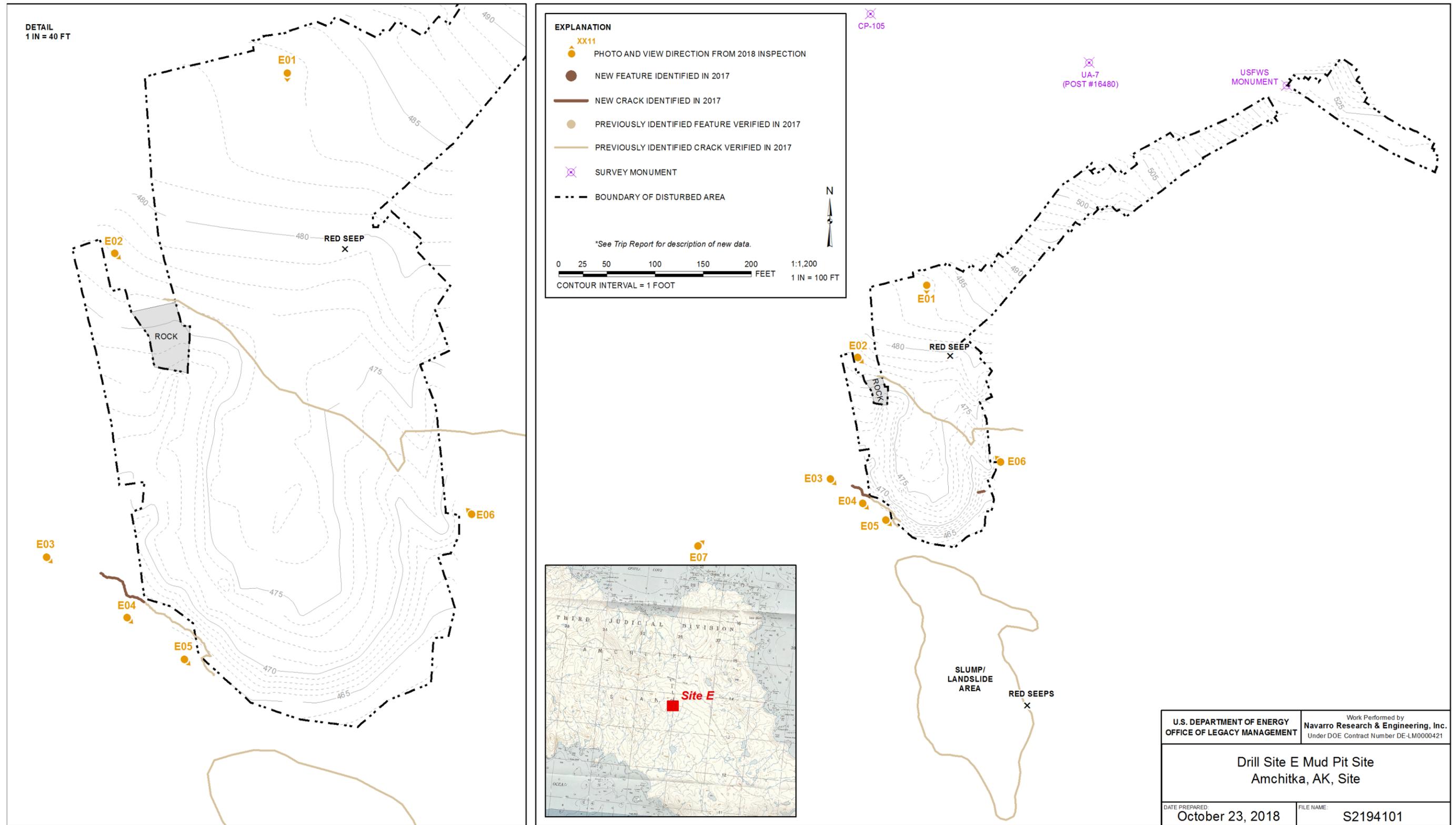


Figure 5. Drill Site E Mud Pit Site

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Appendix B

Mud Pit Inspection Checklists and Photos

Rifle Range Mud Pit Site	B-1
Long Shot Mud Pit Site	B-15
Drill Site D Mud Pit Site.....	B-29
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Cannikin Post Shot Mud Pit Site	B-61
Drill Site E Mud Pit Site.....	B-67
MM 4 and MM 8 Stream Crossing Areas.....	B-77

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Mud Pit Inspection Checklist and Photos
Rifle Range Mud Pit Site

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AMCHITKA MUD PIT SITES POST-CLOSURE MONITORING CHECKLIST			
Mud Pit Site: Rifle Range (RR)	Date of Inspection: August 19, 2018		
Responsible Agency: U.S. Department of Energy – Legacy Management	LM Project Manager: Jason Nguyen		
Inspector (name, title, organization): Navarro: Stephen Pitton (Site Lead, Inspection Lead), Dan Nordeen (Project Engineer)			
A. General Instructions			
<ol style="list-style-type: none"> 1. All checklist items must be completed and detailed comments made to document the results of the site inspection. 2. The completed checklist is part of the field record of the inspection. Additional pages should be used as necessary to ensure that a complete record is made. Number and attach the additional pages upon completion of the inspection. 3. Any checklist line item marked by an inspector in a SHADED BOX must be fully explained or an appropriate reference to previous reports provided. The explanation should include the inspector's rationale for conclusions and recommendations, if appropriate. Explanations are to be placed on additional attachments and cross-referenced appropriately, and may take the form of sketches, measurements, and/or annotated site maps. 4. The site inspection is a walking inspection of the entire site, including the perimeter and sufficient transects to be able to inspect the entire surface and all features specifically described in this checklist. Attach a drawing indicating the starting and ending points and the direction and pattern of the inspection. 5. A standard set of color 35 mm photographs (or equivalent) is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken. 			
B. Preparation (to be completed prior to site visit)			
	YES	NO	EXPLANATION
1. Site as-built plans and site base map reviewed	X		Mud Pit Closure Plans and As-Built
2. Previous inspection reports reviewed	X		2016 and 2017 Inspection Reports
a. Were anomalies or trends detected on previous inspections?	X		From 2014, 2015, 2016, 2017 inspections, no new findings
b. Was maintenance performed on areas with anomalies?			Not Applicable
3. Site maintenance and repair records reviewed			No previous maintenance activities were done
a. Has site repair resulted in a change from as-built conditions?			Not Applicable. No repairs have been made
b. Are revised as-builts available that reflect repair changes?			Not Applicable. No repairs have been made
C. Site Inspection (to be completed during inspection)			
	YES	NO	EXPLANATION
1. Adjacent offsite features within mud pit site area			
a. Changes in use of adjacent area?		X	Wildlife refuge
b. Any new roads or trails?		X	None detected
c. Change in the position of nearby washes?		X	None detected
d. Erosion/deposition of nearby washes?		X	No new erosion
e. New drainage channels?		X	None detected
f. Change in surrounding vegetation?		X	Not inspected
2. Security markers; signs			
a. Displacement of site markers, boundary markers, or monuments?		X	All signs are in good condition.
b. Signs damaged or removed?		X	All signs are in good condition.
3. Cap			
a. Evidence of subsidence?		X	
b. Evidence of cracking?	X		No new cracks, existing are self-healing
c. Evidence of erosion (wind or water)?		X	
d. Evidence of animal burrowing?	X		Some animal burrow holes were stomped close. Small bird nest found with baby bird remnants found from possible rat attack.
e. Are site markers disturbed? By man? _____ By natural processes? _____			Not Applicable, none exist
f. Do natural processes threaten the integrity of cap or site marker?		X	

AMCHITKA MUD PIT SITES POST-CLOSURE MONITORING CHECKLIST (continued)

Mud Pit Site: Rifle Range (RR)

Date of Inspection: August 19, 2018

C. Site inspection (continued)

	YES	NO	EXPLANATION
4. Vegetative cover			
a. Is plant cover adequate to prevent erosion?			Not Applicable, Not inspected
b. Are weedy annual plants present? Do they require removal?			Not Applicable, Not inspected
c. Evidence of animals on cap?			Not Applicable, Not inspected
d. Evidence of excessive plant mortality?			Not Applicable, Not inspected
e. Has a vegetative cover log been completed?			Not Applicable, Not inspected
5. Photo Documentation			
a. Has a photo log been prepared?			Not Applicable, Not inspected
b. How many photos were taken?			

D. Field Conclusions

1. Imminent hazard to integrity of cap? (If yes, immediate report required. Note the person or agency the report will be made to.)		X	
2. Are more frequent inspections required?		X	Currently annual inspection will be performed
3. Are existing maintenance actions satisfactory?		X	Not Applicable, No maintenance was done or required
4. Are existing repair actions satisfactory?			Not Applicable, No maintenance was done or required
5. Is other maintenance/repair necessary?		X	
6. Rationale for field conclusions: See attached trip report			
7. Factors contributing to or impacting inspection: Vegetation appeared to be thicker due to time of year for inspection which restricted visibility of cap surface.			

E. Certification

I certify that I have conducted an inspection of the Rifle Range Mud Pit Site cap in accordance with the discussed and approved annual inspection criteria as recorded on this checklist, discussion in Trip Report, field notes, and photos.

Inspector Printed Name: Stephen Pitton

Inspector Signature:

Title: Site Lead, Inspection Lead

Date:

PHOTOGRAPH LOG

Mud Pit Site: Rifle Range			
Date	Photo ID	Direction of Photo	Description
8/19/2018	RR01		Two animal burrows at the Rifle Range mud pit site
8/19/2018	RR02		New animal burrow (first of two) at the Rifle Range mud pit site
8/19/2018	RR03		New animal burrow (second of two) at the Rifle Range mud pit site
8/19/2018	RR04		Investigating animal burrow at the Rifle Range mud pit site
8/19/2018	RR05		Revealing animal burrow at the Rifle Range mud pit site
8/19/2018	RR06	Looking SE	Existing crack on the Rifle Range mud pit cap, similar to photo PL-RR01 in the 2017 Amchitka inspection report (DOE 2017)
8/19/2018	RR07	Looking SE	Existing crack on the Rifle Range mud pit cap, similar to photo PL-RR03 in the 2017 Amchitka inspection report (DOE 2017)
8/19/2018	RR08		Bird nest, baby bird remains, rat tracks, and hole at the Rifle Range mud pit site
8/19/2018	RR09	Looking SE	Existing crack on the Rifle Range mud pit cap, similar to photo PL-RR02 in the 2017 Amchitka inspection report (DOE 2017)



Photo RR01: Two animal burrows at the Rifle Range mud pit site



Photo RR02: New animal burrow (first of two) at the Rifle Range mud pit site



Photo RR03: New animal burrow (second of two) at the Rifle Range mud pit site



Photo RR04: Investigating animal burrow at the Rifle Range mud pit site



Photo RR05: Revealing animal burrow at the Rifle Range mud pit site



Photo RR06: Existing crack on the Rifle Range mud pit cap, similar to photo PL-RR01 in the 2017 Amchitka inspection report (DOE 2017)



Photo RR07: Existing crack on the Rifle Range mud pit cap, similar to photo PL-RR03 in the 2017 Amchitka inspection report (DOE 2017)



Photo RR08: Bird nest, baby bird remains, rat tracks, and hole at the Rifle Range mud pit site



Photo RR09: Existing crack on the Rifle Range mud pit cap, similar to photo PL-RR02 in the 2017 Amchitka inspection report (DOE 2017)

Mud Pit Inspection Checklist and Photos

Long Shot Mud Pit Site

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AMCHITKA MUD PIT SITES POST-CLOSURE MONITORING CHECKLIST			
Mud Pit Site: Long Shot (LS)		Date of Inspection: August 21, 2018	
Responsible Agency: U.S. Department of Energy – Legacy Management		LM Project Manager: Jason Nguyen	
Inspector (name, title, organization): Navarro: Stephen Pitton (Site Lead, Inspection Lead), Dan Nordeen (Project Engineer)			
A. General Instructions			
1. All checklist items must be completed and detailed comments made to document the results of the site inspection. 2. The completed checklist is part of the field record of the inspection. Additional pages should be used as necessary to ensure that a complete record is made. Number and attach the additional pages upon completion of the inspection. 3. Any checklist line item marked by an inspector in a SHADED BOX must be fully explained or an appropriate reference to previous reports provided. The explanation should include the inspector's rationale for conclusions and recommendations, if appropriate. Explanations are to be placed on additional attachments and cross-referenced appropriately, and may take the form of sketches, measurements, and/or annotated site maps. 4. The site inspection is a walking inspection of the entire site, including the perimeter and sufficient transects to be able to inspect the entire surface and all features specifically described in this checklist. Attach a drawing indicating the starting and ending points and the direction and pattern of the inspection. 5. A standard set of color 35 mm photographs (or equivalent) is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.			
B. Preparation (to be completed prior to site visit)			
	YES	NO	EXPLANATION
1. Site as-built plans and site base map reviewed	X		Mud Pit Closure Plans and As-Built
2. Previous inspection reports reviewed	X		2016 and 2017 Inspection Report
a. Were anomalies or trends detected on previous inspections?	X		From 2014, 2015, 2016, 2017 inspections, no new findings
b. Was maintenance performed on areas with anomalies?		X	No maintenance has been done on any of the effects resulting from the earthquake
3. Site maintenance and repair records reviewed		X	No previous maintenance activities were done
a. Has site repair resulted in a change from as-built conditions?		X	No detectable changes from as-built condition
b. Are revised as-builts available that reflect repair changes?		X	Not Applicable. No repairs have been made
C. Site Inspection (to be completed during inspection)			
	YES	NO	EXPLANATION
1. Adjacent offsite features within mud pit site area			
a. Changes in use of adjacent area?		X	Wildlife refuge
b. Any new roads or trails?		X	Per previous photos and as-built drawings
c. Change in the position of nearby washes?		X	None detected
d. Erosion/deposition of nearby washes?		X	None detected
e. New drainage channels?		X	None detected
f. Change in surrounding vegetation?		X	None detected
2. Security markers; signs			
a. Displacement of site markers, boundary markers, or monuments?		X	USFWS Monument was present/good condition. Ground Zero Monument was intact
b. Signs damaged or removed?		X	All signs are all in good condition.
3. Cap			
a. Evidence of subsidence?	X		Same small depressions in S part of mud pit cap as noted in 2017 trip report and captured again in 2018
b. Evidence of cracking?	X		Four cracks and associated small slumps from the 2014 earthquake are in the SW, NE, and SE parts of the mud pit cap. No change from previous inspection.
c. Evidence of erosion (wind or water)?	X		Some rills on steep slopes in the NE and SW sides of the mud pit cap, as noted in the trip report
d. Evidence of animal burrowing?	X		Some small holes along E base of mud pit cap and along N side
e. Are site markers disturbed? By man? _____ By natural processes? _____		X	
f. Do natural processes threaten the integrity of cap or site marker?		X	

AMCHITKA MUD PIT SITES POST-CLOSURE MONITORING CHECKLIST (continued)				
Mud Pit Site: Long Shot (LS)		Date of Inspection: June 19, 2017		
C. Site inspection (continued)		YES	NO	EXPLANATION
4. Vegetative cover				
a. Is plant cover adequate to prevent erosion?				Not Applicable, not inspected
b. Are weedy annual plants present? Do they require removal?				Not Applicable, not inspected
c. Evidence of animals on cap?				Not Applicable, not inspected
d. Evidence of excessive plant mortality?				Not Applicable, not inspected
e. Has a vegetative cover log been completed?				Not Applicable, not inspected
5. Photo Documentation				
a. Has a photo log been prepared?				Not Applicable, not inspected
b. How many photos were taken?				
D. Field Conclusions				
1. Imminent hazard to integrity of cap? (If yes, immediate report required. Note the person or agency the report will be made to.)			X	
2. Are more frequent inspections required?			X	Currently annual inspection will be performed
3. Are existing maintenance actions satisfactory?				Not Applicable. No maintenance was done or required.
4. Are existing repair actions satisfactory?				Not Applicable. No repairs were done or required.
5. Is other maintenance/repair necessary?			X	
6. Rationale for field conclusions: See attached trip report				
7. Factors contributing to or impacting inspection: Vegetation appeared to be thicker due to time of year for inspection which restricted visibility of cap surface.				
E. Certification				
I certify that I have conducted an inspection of the Long Shot Mud Pit Site cap in accordance with the discussed and approved annual inspection criteria as recorded on this checklist, discussion in Trip Report, field notes, and photos.				
Inspector Printed Name: Stephen Pitton		Inspector Signature:		
Title: Site Lead, Inspection Lead		Date:		

PHOTOGRAPH LOG

Mud Pit Site: Long Shot			
Date	Photo ID	Direction of Photo	Description
8/21/2018	LS01	Looking E	Long Shot SGZ plaque
8/21/2018	LS02	Looking NE	Long Shot mud pit cap
8/21/2018	LS03	Looking E	General depression area at the Long Shot mud pit site that was described in the 2017 Amchitka inspection report
8/21/2018	LS04	Looking SE	Slump/scarp in southwest corner of the Long Shot mud pit cap, similar to photo PL-LS01 in the 2017 Amchitka inspection report (DOE 2017)
8/21/2018	LS05	Looking NE	Rills on the east side of the Long Shot mud pit cap, similar to photo PL-LS02 in the 2017 Amchitka inspection report (DOE 2017)
8/21/2018	LS06	Looking E	Undulating surface along entire south side of the Long Shot mud pit cap, viewed from approximately the middle of the cap looking east, similar to photo PL-LS013 in the 2017 Amchitka inspection report (DOE 2017)
8/21/2018	LS07	Looking N	Crack along the east side of the Long Shot mud pit cap near the toe of the slope, similar to photo PL-LS07 in the 2017 Amchitka inspection report (DOE 2017)
8/21/2018	LS08	Looking W	Small holes near the east base and a crack on east side of the Long Shot mud pit cap, similar to photos PL-LS03 and PL-LS04 in the 2017 Amchitka inspection report (DOE 2017)
8/21/2018	LS09	Looking SW	Crack along the east side and near the toe of the slope of the Long Shot mud pit cap, similar to photos PL-LS05 and PL-LS06 in the 2017 Amchitka inspection report (DOE 2017)
8/21/2018	LS10	Looking S	Crack along the northeast side of the Long Shot mud pit cap, similar to photo PL-LS08 in the 2017 Amchitka inspection report (DOE 2017)
8/21/2018	LS11	Looking SW	Similar to photo PL-LS010 in the 2017 Amchitka inspection report (DOE 2017) looking at northeast corner of the Long Shot mud pit cap. Minor rills and cracks are hidden by vegetation.
8/21/2018	LS12	Looking SE	Crack along the northeast side of the Long Shot mud pit cap, similar to photo PL-LS08 in the 2017 Amchitka inspection report (DOE 2017)
8/21/2018	LS13	Looking NW	Crack approximately midslope (i.e., halfway between top and toe) on the north side of the Long Shot mud pit cap, similar to photo PL-LS09 in the 2017 Amchitka inspection report (DOE 2017)
8/21/2018	LS14	Looking S	Small burrow holes in the Long Shot mud pit cap, similar to photo PL-LS011 in the 2017 Amchitka inspection report (DOE 2017)
8/21/2018	LS15	Looking W	Crack along the north side of the Long Shot mud pit cap, similar to photo PL-LS012 in the 2017 Amchitka inspection report (DOE 2017)



Photo LS01: Long Shot SGZ plaque



Photo LS02: Long Shot mud pit cap



Photo LS03: General depression area at the Long Shot mud pit site that was described in the 2017 Amchitka inspection report



Photo LS04: Slump/scarp in southwest corner of the Long Shot mud pit cap, similar to photo PL-LS01 in the 2017 Amchitka inspection report (DOE 2017)



Photo LS05: Rills on the east side of the Long Shot mud pit cap, similar to photo PL-LS02 in the 2017 Amchitka inspection report (DOE 2017)



Photo LS06: Undulating surface along entire south side of the Long Shot mud pit cap, viewed from approximately the middle of the cap looking east, similar to photo PL-LS013 in the 2017 Amchitka inspection report (DOE 2017)



2018/08/21

Photo LS07: Crack along the east side of the Long Shot mud pit cap near the toe of the slope, similar to photo PL-LS07 in the 2017 Amchitka inspection report



2018/08/21

Photo LS08: Small holes near the east base and a crack on east side of the Long Shot mud pit cap, similar to photos PL-LS03 and PL-LS04 in the 2017 Amchitka inspection report (DOE 2017)



Photo LS09: Crack along the east side and near the toe of the slope of the Long Shot mud pit cap, similar to photos PL-LS05 and PL-LS06 in the 2017 Amchitka inspection report (DOE 2017)



Photo LS10: Crack along the northeast side of the Long Shot mud pit cap, similar to photo PL-LS08 in the 2017 Amchitka inspection report (DOE 2017)



Photo LS11: Similar to photo PL-LS010 in the 2017 Amchitka inspection report (DOE 2017) looking at northeast corner of the Long Shot mud pit cap. Minor rills and cracks are hidden by vegetation.



Photo LS12: Crack along the northeast side of the Long Shot mud pit cap, similar to photo PL-LS08 in the 2017 Amchitka inspection report (DOE 2017)



Photo LS13: Crack approximately midslope (i.e., halfway between top and toe) on the north side of the Long Shot mud pit cap, similar to photo PL-LS09 in the 2017 Amchitka inspection report (DOE 2017)



Photo LS14: Small burrow holes in the Long Shot mud pit cap, similar to photo PL-LS011 in the 2017 Amchitka inspection report (DOE 2017)



Photo LS15: Crack along the north side of the Long Shot mud pit cap, similar to photo PL-LS012 in the 2017 Amchitka inspection report (DOE 2017)

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Mud Pit Inspection Checklist and Photos

Drill Site D Mud Pit Site

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AMCHITKA MUD PIT SITES POST-CLOSURE MONITORING CHECKLIST

Mud Pit Site: Drill Site D	Date of Inspection: August 20, 2018
Responsible Agency: U.S. Department of Energy – Legacy Management	Project Manager: Jason Nguyen
Inspector (name, title, organization): Navarro: Stephen Pitton (Site Lead, Inspection Lead), Dan Nordeen (Project Engineer)	

- A. General Instructions**
- All checklist items must be completed and detailed comments made to document the results of the site inspection.
 - The completed checklist is part of the field record of the inspection. Additional pages should be used as necessary to ensure that a complete record is made. Number and attach the additional pages upon completion of the inspection.
 - Any checklist line item marked by an inspector in a SHADED BOX must be fully explained or an appropriate reference to previous reports provided. The explanation should include the inspector’s rationale for conclusions and recommendations, if appropriate. Explanations are to be placed on additional attachments and cross-referenced appropriately, and may take the form of sketches, measurements, and/or annotated site maps.
 - The site inspection is a walking inspection of the entire site, including the perimeter and sufficient transects to be able to inspect the entire surface and all features specifically described in this checklist. Attach a drawing indicating the starting and ending points and the direction and pattern of the inspection.
 - A standard set of color 35 mm photographs (or equivalent) is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.

B. Preparation (to be completed prior to site visit)	YES	NO	EXPLANATION
1. Site as-built plans and site base map reviewed	X		Mud Pit Closure Plans and As-Built
2. Previous inspection reports reviewed	X		2016 and 2017 Inspection Reports
a. Were anomalies or trends detected on previous inspections?	X		From 2014, 2015, 2016, 2017 inspections, no new findings
b. Was maintenance performed on areas with anomalies?		X	No maintenance has been done on any of the effects resulting from the earthquake
3. Site maintenance and repair records reviewed		X	No previous maintenance activities were done
a. Has site repair resulted in a change from as-built conditions?		X	No detectable changes from as-built condition
b. Are revised as-builts available that reflect repair changes?		X	Not Applicable. No repairs have been made

C. Site Inspection (to be completed during inspection)	YES	NO	EXPLANATION
1. Adjacent offsite features within mud pit site area			
a. Changes in use of adjacent area?		X	Wildlife refuge
b. Any new roads or trails?		X	None detected
c. Change in the position of nearby washes?		X	None detected
d. Erosion/deposition of nearby washes?		X	None detected
e. New drainage channels?		X	Breach in dam for Sediment Trap D-1 just W of Overflow Spillway, no changes from past inspections
f. Change in surrounding vegetation?		X	None detected
2. Security markers; signs			
a. Displacement of site markers, boundary markers, or monuments?		X	USFWS Monument was present/Good condition
b. Signs damaged or removed?	X		Most signs are all in good condition several need to be replaced along north and east sides (4 total), same as observed in 2017

AMCHITKA MUD PIT SITES POST-CLOSURE MONITORING CHECKLIST (continued)

Mud Pit Site: Drill Site D

Date of Inspection: August 20, 2018

C (continued). Site Inspection (to be completed during inspection)

	YES	NO	EXPLANATION
3. Cap			
a. Evidence of subsidence?		X	
b. Evidence of cracking?	X		A long, semi-continuous crack and associated scarps and slumps are along the S sides of E and W mud pit caps. Several other cracks and small slumps also occur, mostly on the E mud pit cap. All are effects of the 2014 earthquake. No changes in condition from previous inspections on major failures, small cracks appear to be self-healing.
c. Evidence of erosion (wind or water)?		X	No evidence was observed
d. Evidence of animal burrowing?	X		A few burrowing holes were found
e. Are site markers disturbed? By man? _____ By natural processes? _____		X	No site markers exist, only IC signs
f. Do natural processes threaten the integrity of cap or site marker?	X		Another large earthquake could cause additional slumping along the S sides of the mud pit caps that could breach the geomembrane.
4. Vegetative cover			
a. Is plant cover adequate to prevent erosion?			Not Applicable, Not inspected
b. Are weedy annual plants present? Do they require removal?			Not Applicable, Not inspected
c. Evidence of animals on cap?			Not Applicable, Not inspected
d. Evidence of excessive plant mortality?			Not Applicable, Not inspected
e. Has a vegetative cover log been completed?			Not Applicable, Not inspected
5. Photo Documentation			
a. Has a photo log been prepared?			Not Applicable, Not inspected
b. How many photos were taken?			

D. Field Conclusions

1. Imminent hazard to integrity of cap? (If yes, immediate report required. Note the person or agency the report will be made to.)		X	
2. Are more frequent inspections required?		X	Currently annual inspections will be performed
3. Are existing maintenance actions satisfactory?			Not Applicable. No maintenance was done or required.
4. Are existing repair actions satisfactory?			Not Applicable. No repairs were done or required.
5. Is other maintenance/repair necessary?		X	
6. Rationale for field conclusions: See attached trip report			
7. Factors contributing to or impacting inspection: Vegetation appeared to be thicker due to time of year for inspection which restricted visibility of cap surface.			

AMCHITKA MUD PIT SITES POST-CLOSURE MONITORING CHECKLIST (continued)	
Mud Pit Site: Drill Site D	Date of Inspection: August 20, 2018
E. Certification	
I certify that I have conducted an inspection of the Drill Site D Mud Pit Site cap in accordance with the discussed and approved annual inspection criteria as recorded on this checklist, discussion in Trip Report, field notes, and photos.	
Inspector Printed Name: Stephen Pitton	Inspector Signature:
Title: Site Lead, Inspection Lead	Date:

Abbreviations: IC = institutional control

PHOTOGRAPH LOG

Mud Pit Site: Drill Site D			
Date	Photo ID	Direction of Photo	Description
8/20/2018	D01	Looking W	Southeast corner of the Drill Site D mud pit cap, similar to photo PL-D021 in the 2017 Amchitka inspection report (DOE 2017) and photo IMG_743 in the 2016 Amchitka inspection report (DOE 2016)
8/20/2018	D02	Looking W	Midslope on the southeast side of the Drill Site D mud pit cap looking west along a failure zone
8/20/2018	D03	Looking N	Cracks on the southeast side of the Drill Site D mud pit cap, where the cracks appear to be self-healing
8/20/2018	D04	Looking W	Exposed liner on the east side of the Drill Site D mud pit cap, similar to photo PL-D023 in the 2017 Amchitka inspection report (DOE 2017) and photo IMG_744 in the 2016 Amchitka inspection report (DOE 2016)
8/20/2018	D05	Looking N	Exposed liner on the south side of the Drill Site D mud pit cap, similar to photo PL-D010 in the 2017 Amchitka inspection report (DOE 2017)
8/20/2018	D06	Looking NE	Damaged area (which is a possible new erosion area) southeast of the exposed liner area on the south side of the Drill Site D mud pit cap
8/20/2018	D07	Looking E	Closer view of exposed liner area on the south side of the Drill Site D mud pit cap
8/20/2018	D08	Looking E	More distant view of exposed liner area on the south side of the Drill Site D mud pit cap
8/20/2018	D09	Looking E	Another view of exposed liner area on the south side of the Drill Site D mud pit cap, similar to photo IMG_747 in the 2016 Amchitka inspection report (DOE 2016)
8/20/2018	D010	Looking NE	Terracing slump/failure on the east cap at the Drill Site D mud pit site, similar to photo PL-D017 in the 2017 Amchitka inspection report (DOE 2017)
8/20/2018	D011	Looking E	Terracing slump/failure on the east cap at the Drill Site D mud pit site, similar to photo PL-D019 in the 2017 Amchitka inspection report (DOE 2017)
8/20/2018	D012	Looking E	Terracing slump/failure on the east cap at the Drill Site D mud pit site, similar to photo PL-D018 in the 2017 Amchitka inspection report (DOE 2017)
8/20/2018	D013	Looking NE	Failure area on the west cap at the Drill Site D mud pit site, similar to photo IMG_738 in the 2016 Amchitka inspection report (DOE 2016)
8/20/2018	D014	Looking NE	The toe of the failure area on the west cap at the Drill Site D mud pit site, similar to photo PL-D030 in the 2017 Amchitka inspection report (DOE 2017)
8/20/2018	D015	Looking NW	Sediment trap at the Drill Site D mud pit site, similar to photo PL-D013 in the 2017 Amchitka inspection report (DOE 2017)
8/20/2018	D016	Looking NE	The south side failure area viewed from the southwest corner of the pond at the Drill Site D mud pit site
8/20/2018	D017	Looking SE	A depression/ponding area on the southwest side of the west cap at the Drill Site D mud pit cap, similar to photo PL-D08 in the 2017 Amchitka inspection report (DOE 2017)
8/20/2018	D018	Looking S	Potential new slump area east of channel D-2 on the west side of the east cap at the Drill Site D mud pit site
8/20/2018	D019	Looking NE	The crack in photo PL-D09 from the 2017 Amchitka inspection report (DOE 2017) is no longer visible and appears to have "self-healed"
8/20/2018	D020	Looking SE	Standing water and a possible settlement area approximately at the north-to-south midpoint of the east slope of the east cap at the Drill Site D mud pit site
8/20/2018	D021	Looking SW	Another view of the standing water and a possible settlement area approximately at the north-to-south midpoint of the east slope of the east cap at the Drill Site D mud pit site
8/20/2018	D022	Looking SW	A view from the southwest corner of a concrete pad of a crack at the shoulder on the southeast corner of the east cap at the Drill Site D mud pit site

Notes: Only noteworthy photos are listed to support this trip report.



Photo D01: Southeast corner of the Drill Site D mud pit cap, similar to photo PL-D021 in the 2017 Amchitka inspection report (DOE 2017) and photo IMG_743 in the 2016 Amchitka inspection report (DOE 2016)



Photo D02: Midslope on the southeast side of the Drill Site D mud pit cap looking west along a failure zone



Photo D03: Cracks on the southeast side of the Drill Site D mud pit cap, where the cracks appear to be self-healing

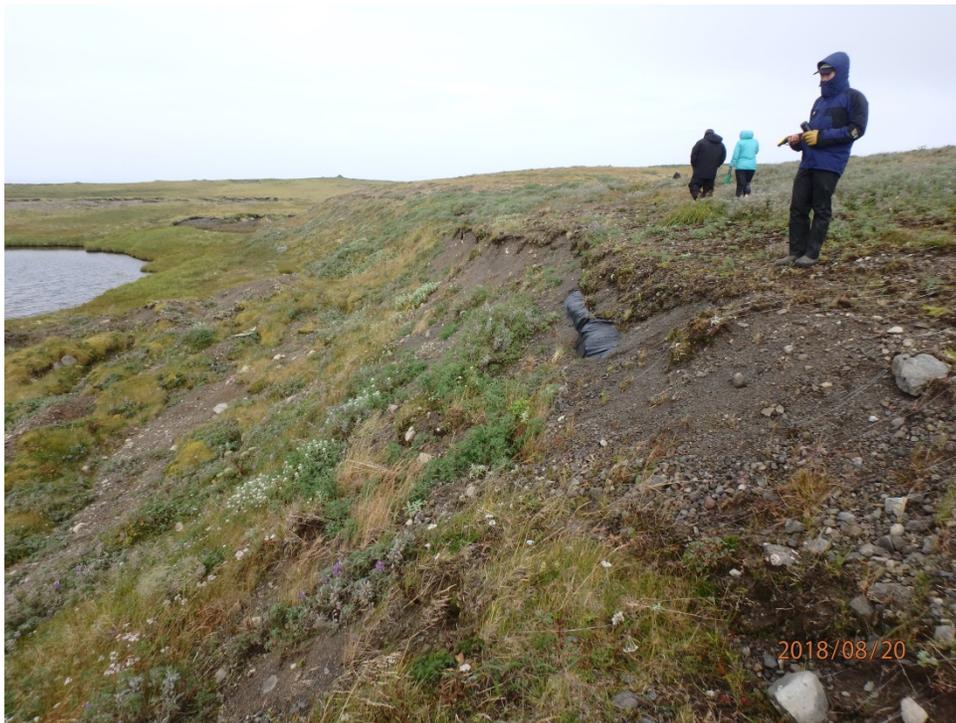


Photo D04: Exposed liner on the east side of the Drill Site D mud pit cap, similar to photo PL-D023 in the 2017 Amchitka inspection report (DOE 2017) and photo IMG_744 in the 2016 Amchitka inspection report (DOE 2016)



Photo D05: Exposed liner on the south side of the Drill Site D mud pit cap, similar to photo PL-D010 in the 2017 Amchitka inspection report (DOE 2017)



Photo D06: Damaged area (which is a possible new erosion area) southeast of the exposed liner area on the south side of the Drill Site D mud pit cap



Photo D07: Closer view of exposed liner area on the south side of the Drill Site D mud pit cap



Photo D08: More distant view of exposed liner area on the south side of the Drill Site D mud pit cap



Photo D09: Another view of exposed liner area on the south side of the Drill Site D mud pit cap, similar to photo IMG_747 in the 2016 Amchitka inspection report (DOE 2016)



Photo D010: Terracing slump/failure on the east cap at the Drill Site D mud pit site, similar to photo PL-D017 in the 2017 Amchitka inspection report (DOE 2017)



Photo D011: Terracing slump/failure on the east cap at the Drill Site D mud pit site, similar to photo PL-D019 in the 2017 Amchitka inspection report (DOE 2017)



Photo D012: Terracing slump/failure on the east cap at the Drill Site D mud pit site, similar to photo PL-D018 in the 2017 Amchitka inspection report (DOE 2017)



Photo D013: Failure area on the west cap at the Drill Site D mud pit site, similar to photo IMG_738 in the 2016 Amchitka inspection report (DOE 2016)



Photo D014: The toe of the failure area on the west cap at the Drill Site D mud pit site, similar to photo PL-D030 in the 2017 Amchitka inspection report (DOE 2017)



Photo D015: Sediment trap at the Drill Site D mud pit site, similar to photo PL-D013 in the 2017 Amchitka inspection report (DOE 2017)



Photo D016: The failure area viewed from the southwest corner of the pond at the Drill Site D mud pit site



Photo D017: A depression/ponding area on the southwest side of the west cap at the Drill Site D mud pit cap, similar to photo PL-D08 in the 2017 Amchitka inspection report (DOE 2017)



Photo D018: Potential new slump area east of channel D-2 on the west side of the east cap at the Drill Site D mud pit site



Photo D019: The crack in photo PL-D09 from the 2017 Amchitka inspection report (DOE 2017) is no longer visible and appears to have “self-healed”.



Photo D020: Standing water and a possible settlement area approximately at the north-to-south midpoint of the east slope of the east cap at the Drill Site D mud pit site



Photo D021: Another view of the standing water and a possible settlement area approximately at the north-to-south midpoint of the east slope of the east cap at the Drill Site D mud pit site



Photo D022: A view from the southwest corner of a concrete pad of a crack at the shoulder on the southeast corner of the east cap at the Drill Site D mud pit site

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Mud Pit Inspection Checklist and Photos

Drill Site F Mud Pit Site

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AMCHITKA MUD PIT SITES POST-CLOSURE MONITORING CHECKLIST			
Mud Pit Site: Drill Site F (DSF)	Date of Inspection: August 21, 2018		
Responsible Agency: U.S. Department of Energy – Legacy Management	Project Manager: Jason Nguyen		
Inspector (name, title, organization): Navarro: Stephen Pitton (Site Lead, Inspection Lead), Dan Brennecke (Engineering Manager), Dan Nordeen (Project Engineer)			
A. General Instructions			
1. All checklist items must be completed and detailed comments made to document the results of the site inspection. 2. The completed checklist is part of the field record of the inspection. Additional pages should be used as necessary to ensure that a complete record is made. Number and attach the additional pages upon completion of the inspection. 3. Any checklist line item marked by an inspector in a SHADED BOX must be fully explained or an appropriate reference to previous reports provided. The explanation should include the inspector's rationale for conclusions and recommendations, if appropriate. Explanations are to be placed on additional attachments and cross-referenced appropriately, and may take the form of sketches, measurements, and/or annotated site maps. 4. The site inspection is a walking inspection of the entire site, including the perimeter and sufficient transects to be able to inspect the entire surface and all features specifically described in this checklist. Attach a drawing indicating the starting and ending points and the direction and pattern of the inspection. 5. A standard set of color 35 mm photographs (or equivalent) is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.			
B. Preparation (to be completed prior to site visit)			
	YES	NO	EXPLANATION
1. Site as-built plans and site base map reviewed	X		Mud Pit Closure Plans and As-Built
2. Previous inspection reports reviewed	X		2016 and 2017 Inspection Reports
a. Were anomalies or trends detected on previous inspections?	X		From 2014, 2015, 2016, 2017 inspections, no new findings
b. Was maintenance performed on areas with anomalies?		X	No maintenance has been done on any of the effects resulting from the earthquake
3. Site maintenance and repair records reviewed		X	No previous maintenance activities were done
a. Has site repair resulted in a change from as-built conditions?		X	No detectable changes from as-built condition
b. Are revised as-builts available that reflect repair changes?		X	Not Applicable. No repairs have been made
C. Site Inspection (to be completed during inspection)			
	YES	NO	EXPLANATION
1. Adjacent offsite features within mud pit site area			
a. Changes in use of adjacent area?		X	Wildlife refuge
b. Any new roads or trails?		X	None detected
c. Change in the position of nearby washes?		X	None detected
d. Erosion/deposition of nearby washes?		X	None detected
e. New drainage channels?		X	None detected
f. Change in surrounding vegetation?		X	None detected
2. Security markers; signs			
a. Displacement of site markers, boundary markers, or monuments?		X	All signs are in good condition.
b. Signs damaged or removed?		X	All signs are in good condition.
3. Cap			
a. Evidence of subsidence?		X	None detected
b. Evidence of cracking?	X		No new cracking. The cracks noted in the 2017 inspection along the S edge of the mud pit cap (outside the cap boundary) and the crack/scarp NE of the mud pit cap (outside the cap boundary) were still visible but unchanged.
c. Evidence of erosion (wind or water)?		X	Ponded water in Channel F1 at the E end of the mud pit cap noted in this and past inspections could lead to future erosion
d. Evidence of animal burrowing?		X	
e. Are site markers disturbed? By man? _____ By natural processes?		X	

AMCHITKA MUD PIT SITES POST-CLOSURE MONITORING CHECKLIST (continued)

Mud Pit Site: Drill Site F

Date of Inspection: August 21, 2018

C. Site inspection (continued)	YES	NO	EXPLANATION
f. Do natural processes threaten the integrity of cap or site marker?		X	At this time the longitudinal crack/scarp NE of the cap does not impact the mud pit but if erosion continues global failure may occur. If the scarp south of the cap continues to erode then it may impact the integrity of the cap's south side.
4. Vegetative cover			
a. Is plant cover adequate to prevent erosion?			Not Applicable, not inspected
b. Are weedy annual plants present? Do they require removal?			Not Applicable, not inspected
c. Evidence of animals on cap?			Not Applicable, not inspected
d. Evidence of excessive plant mortality?			Not Applicable, not inspected
e. Has a vegetative cover log been completed?			Not Applicable, not inspected
5. Photo Documentation			
a. Has a photo log been prepared?			Not Applicable, not inspected
b. How many photos were taken?			

D. Field Conclusions			
1. Imminent hazard to integrity of cap? (If yes, immediate report required. Note the person or agency the report will be made to.)		X	
2. Are more frequent inspections required?		X	Currently annual inspection will be performed
3. Are existing maintenance actions satisfactory?			Not Applicable. No maintenance was done or required.
4. Are existing repair actions satisfactory?			Not Applicable. No repairs were done or required.
5. Is other maintenance/repair necessary?		X	
6. Rationale for field conclusions: See attached trip report			
7. Factors contributing to or impacting inspection: Vegetation appeared to be thicker due to time of year for inspection which restricted visibility of cap surface. Heavy fog and rain impacted visibility.			

E. Certification	
I certify that I have conducted an inspection of the Drill Site F cap in accordance with the discussed and approved annual inspection criteria as recorded on this checklist, discussion in Trip Report, field notes, and photos.	
Inspector Printed Name: Stephen Pitton	Inspector Signature:
Title: Site Lead, Inspection Lead	Date:

PHOTOGRAPH LOG

Mud Pit Site: Drill Site F			
Date	Photo ID	Direction of Photo	Description
8/21/2018	F01	Looking SE	The Drill Site F mud pit cap viewed from the concrete drill pad
8/21/2018	F02	Looking NE	A depression in southwest part of the Drill Site F mud pit cap, similar to photo PL-F05 in the 2017 Amchitka inspection report (DOE 2017)
8/21/2018	F03	Looking E	A scarp on the southern side of the Drill Site F mud pit cap, similar to photo PL-F04 in the 2017 Amchitka inspection report (DOE 2017)
8/21/2018	F04	Looking N	The southern side of the Drill Site F mud pit cap, similar to photo PL-F03 in the 2017 Amchitka inspection report (DOE 2017)
8/21/2018	F05	Looking E	The southern side of the Drill Site F mud pit cap, similar to photo PL-F06 in the 2017 Amchitka inspection report (DOE 2017)
8/21/2018	F06	Looking E	The southern side of the Drill Site F mud pit cap, similar to photo PL-F07 in the 2017 Amchitka inspection report (DOE 2017)
8/21/2018	F07	Looking E	The southern side of the Drill Site F mud pit cap, similar to photo PL-F08 in the 2017 Amchitka inspection report (DOE 2017)



Photo F01: The Drill Site F mud pit cap viewed from the concrete drill pad



Photo F02: A depression in southwest part of the Drill Site F mud pit cap, similar to photo PL-F05 in the 2017 Amchitka inspection report (DOE 2017)



Photo F03: A scarp on the southern side of the Drill Site F mud pit cap, similar to photo PL-F04 in the 2017 Amchitka inspection report (DOE 2017)



Photo F04: The southern side of the Drill Site F mud pit cap, similar to photo PL-F03 in the 2017 Amchitka inspection report (DOE 2017)



Photo F05: The southern side of the Drill Site F mud pit cap, similar to photo PL-F06 in the 2017 Amchitka inspection report (DOE 2017)



Photo F06: The southern side of the Drill Site F mud pit cap, similar to photo PL-F07 in the 2017 Amchitka inspection report (DOE 2017)



Photo F07: The southern side of the Drill Site F mud pit cap, similar to photo PL-F08 in the 2017 Amchitka inspection report (DOE 2017)

Mud Pit Inspection Checklist and Photos
Cannikin Ground Zero Mud Pit Site

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AMCHITKA MUD PIT SITES POST-CLOSURE MONITORING CHECKLIST

Mud Pit Site: Cannikin Ground Zero (CGZ) Date of Inspection: August 20, 2018

Responsible Agency: U.S. Department of Energy – Legacy Management Project Manager: Jason Nguyen

Inspector (name, title, organization): Navarro:
Stephen Pitton (Site Lead, Inspection Lead), Dan Nordeen (Project Engineer)

A. General Instructions

1. All checklist items must be completed and detailed comments made to document the results of the site inspection.
2. The completed checklist is part of the field record of the inspection. Additional pages should be used as necessary to ensure that a complete record is made. Number and attach the additional pages upon completion of the inspection.
3. Any checklist line item marked by an inspector in a SHADED BOX must be fully explained or an appropriate reference to previous reports provided. The explanation should include the inspector’s rationale for conclusions and recommendations, if appropriate. Explanations are to be placed on additional attachments and cross-referenced appropriately, and may take the form of sketches, measurements, and/or annotated site maps.
4. The site inspection is a walking inspection of the entire site, including the perimeter and sufficient transects to be able to inspect the entire surface and all features specifically described in this checklist. Attach a drawing indicating the starting and ending points and the direction and pattern of the inspection.
5. A standard set of color 35 mm photographs (or equivalent) is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.

B. Preparation (to be completed prior to site visit)	YES	NO	EXPLANATION
1. Site as-built plans and site base map reviewed	X		Mud Pit Closure Plans and As-Built
2. Previous inspection reports reviewed	X		2016 and 2017 Inspection Reports
a. Were anomalies or trends detected on previous inspections?	X		From 2014, 2015, 2016, 2017 inspections, no new findings
b. Was maintenance performed on areas with anomalies?			Not Applicable
3. Site maintenance and repair records reviewed		X	No previous maintenance activities were done
a. Has site repair resulted in a change from as-built conditions?		X	No detectable changes from as-built condition
b. Are revised as-builts available that reflect repair changes?			Not Applicable. No repairs have been made

C. Site Inspection (to be completed during inspection)	YES	NO	EXPLANATION
1. Adjacent offsite features within mud pit site area			
a. Changes in use of adjacent area?		X	Wildlife refuge
b. Any new roads or trails?		X	None detected
c. Change in the position of nearby washes?		X	None detected
d. Erosion/deposition of nearby washes?		X	None detected
e. New drainage channels?		X	None detected
f. Change in surrounding vegetation?		X	None detected
2. Security markers; signs			
a. Displacement of site markers, boundary markers, or monuments?		X	All signs are in good condition
b. Signs damaged or removed?		X	All signs are in good condition.
3. Cap			
a. Evidence of subsidence?		X	None detected
b. Evidence of cracking?		X	None detected
c. Evidence of erosion (wind or water)?		X	None detected
d. Evidence of animal burrowing?	X		Few scattered burrows along south, southeast side
e. Are site markers disturbed? By man? _____ By natural processes? _____		X	None detected
f. Do natural processes threaten the integrity of cap or site marker?		X	None detected

AMCHITKA MUD PIT SITES POST-CLOSURE MONITORING CHECKLIST (continued)

Mud Pit Site: Cannikin Ground Zero (CGZ)

Date of Inspection: August 20, 2018

C. Site inspection (continued)	YES	NO	EXPLANATION
4. Vegetative cover			
a. Is plant cover adequate to prevent erosion?			Not Applicable, Not inspected
b. Are weedy annual plants present? Do they require removal?			Not Applicable, Not inspected
c. Evidence of animals on cap?			Not Applicable, Not inspected
d. Evidence of excessive plant mortality?			Not Applicable, Not inspected
e. Has a vegetative cover log been completed?			Not Applicable, Not inspected
5. Photo Documentation			
a. Has a photo log been prepared?			Not Applicable, Not inspected
b. How many photos were taken?			

D. Field Conclusions			
1. Imminent hazard to integrity of cap? (If yes, immediate report required. Note the person or agency the report will be made to.)		X	
2. Are more frequent inspections required?		X	Currently annual inspection will be performed
3. Are existing maintenance actions satisfactory?			Not Applicable. No maintenance was done or required.
4. Are existing repair actions satisfactory?			Not Applicable. No repairs were done or required.
5. Is other maintenance/repair necessary?		X	
6. Rationale for field conclusions: See attached trip report			
7.			
8. Factors contributing to or impacting inspection: Vegetation appeared to be thicker due to time of year for inspection which restricted visibility of cap surface.			

E. Certification	
I certify that I have conducted an inspection of the Cannikin Ground Zero Mud Pit Site cap in accordance with the discussed and approved annual inspection criteria as recorded on this checklist, discussion in Trip Report, field notes, and photos.	
Inspector Printed Stephen Pitton	Inspector Signature:
Title: Inspection Site Lead, Inspection Lead	Date:

PHOTOGRAPH LOG

Mud Pit Site: Cannikin Ground Zero			
Date	Photo ID	Direction of Photo	Description
8/20/2018	CGZ01	Looking W	Looking west at the Cannikin Ground Zero mud pit site
8/20/2018	CGZ02		Cannikin SGZ plaque on the Cannikin Ground Zero mud pit site



Note

The Cannikin Ground Zero mud pit site has been referred to by various names in past documents (including the name “Cannikin North mud pit site”), but going forward it should always be called the “Cannikin Ground Zero mud pit site.”



Photo CGZ01: Looking west at the Cannikin Ground Zero mud pit site



Photo CGZ02: Cannikin SGZ plaque on the Cannikin Ground Zero mud pit site

Mud Pit Inspection Checklist and Photo
Cannikin Post Shot Mud Pit Site

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Note

The Cannikin Post Shot mud pit site has been referred to by various names in past documents (including the name “Cannikin South mud pit site” in the monitoring checklist below), but going forward it should always be called the “Cannikin Post Shot mud pit site.”

AMCHITKA MUD PIT SITES POST-CLOSURE MONITORING CHECKLIST			
Mud Pit Site: Cannikin South (CS)	Date of Inspection: August 20, 2018		
Responsible Agency: U.S. Department of Energy – Legacy Management	Project Manager: Jason Nguyen		
Inspector (name, title, organization): Navarro: Stephen Pitton (Site Lead, Inspection Lead), Dan Nordeen (Project Engineer)			
A. General Instructions			
1. All checklist items must be completed and detailed comments made to document the results of the site inspection. 2. The completed checklist is part of the field record of the inspection. Additional pages should be used as necessary to ensure that a complete record is made. Number and attach the additional pages upon completion of the inspection. 3. Any checklist line item marked by an inspector in a SHADED BOX must be fully explained or an appropriate reference to previous reports provided. The explanation should include the inspector’s rationale for conclusions and recommendations, if appropriate. Explanations are to be placed on additional attachments and cross-referenced appropriately, and may take the form of sketches, measurements, and/or annotated site maps. 4. The site inspection is a walking inspection of the entire site, including the perimeter and sufficient transects to be able to inspect the entire surface and all features specifically described in this checklist. Attach a drawing indicating the starting and ending points and the direction and pattern of the inspection. 5. A standard set of color 35 mm photographs (or equivalent) is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.			
B. Preparation (to be completed prior to site visit)	YES	NO	EXPLANATION
1. Site as-built plans and site base map reviewed	X		Mud Pit Closure Plans and As-Built
2. Previous inspection reports reviewed	X		2016 and 2017 Inspection Reports
a. Were anomalies or trends detected on previous inspections?	X		From 2014, 2015, 2016, 2017 inspections, no new findings
b. Was maintenance performed on areas with anomalies?			Not Applicable
3. Site maintenance and repair records reviewed		X	No previous maintenance activities were done
a. Has site repair resulted in a change from as-built conditions?		X	No detectable changes from as-built condition
b. Are revised as-builts available that reflect repair changes?		X	Not Applicable. No repairs have been made
C. Site Inspection (to be completed during inspection)	YES	NO	EXPLANATION
1. Adjacent offsite features within mud pit site area			
a. Changes in use of adjacent area?		X	Wildlife refuge
b. Any new roads or trails?		X	None detected
c. Change in the position of nearby washes?		X	None detected
d. Erosion/deposition of nearby washes?		X	None detected
e. New drainage channels?		X	None detected
f. Change in surrounding vegetation?		X	None detected
2. Security markers; signs			
a. Displacement of site markers, boundary markers, or monuments?		X	All signs are in good condition
b. Signs damaged or removed?		X	All signs are in good condition.
3. Cap			
a. Evidence of subsidence?		X	None detected
b. Evidence of cracking?		X	None detected
c. Evidence of erosion (wind or water)?		X	None detected
d. Evidence of animal burrowing?		X	None detected
e. Are site markers disturbed? By man? _____ By natural processes? _____		X	None detected
f. Do natural processes threaten the integrity of cap or site marker?		X	None detected

AMCHITKA MUD PIT SITES POST-CLOSURE MONITORING CHECKLIST (continued)

Mud Pit Site: Cannikin South (CS)

Date of Inspection: August 20, 2018

C. Site inspection (continued)	YES	NO	EXPLANATION
4. Vegetative cover			
a. Is plant cover adequate to prevent erosion?	<input type="checkbox"/>	<input type="checkbox"/>	Not Applicable, Not inspected
b. Are weedy annual plants present? Do they require removal?	<input type="checkbox"/>	<input type="checkbox"/>	Not Applicable, Not inspected
c. Evidence of animals on cap?	<input type="checkbox"/>	<input type="checkbox"/>	Not Applicable, Not inspected
d. Evidence of excessive plant mortality?	<input type="checkbox"/>	<input type="checkbox"/>	Not Applicable, Not inspected
e. Has a vegetative cover log been completed?	<input type="checkbox"/>	<input type="checkbox"/>	Not Applicable, Not inspected
5. Photo Documentation			
a. Has a photo log been prepared?	<input type="checkbox"/>	<input type="checkbox"/>	Not Applicable, Not inspected
b. How many photos were taken?			

D. Field Conclusions	YES	NO	EXPLANATION
1. Imminent hazard to integrity of cap? (If yes, immediate report required. Note the person or agency the report will be made to.)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2. Are more frequent inspections required?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Currently annual inspection will be performed
3. Are existing maintenance actions satisfactory?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not Applicable. No maintenance was done or required.
4. Are existing repair actions satisfactory?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not Applicable. No repairs were done or required.
5. Is other maintenance/repair necessary?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6. Rationale for field conclusions: See attached trip report			
7. Factors contributing to or impacting inspection: Vegetation appeared to be thicker due to time of year for inspection which restricted visibility of cap surface.			

E. Certification
I certify that I have conducted an inspection of the Cannikin South Mud Pit Site cap in accordance with the discussed and approved annual inspection criteria as recorded on this checklist, discussion in Trip Report, field notes, and photos.
Inspector Printed Name: Stephen Pitton
Inspector Signature:
Title: Site Lead, Inspection Lead
Date:

PHOTOGRAPH LOG

Mud Pit Site: Cannikin Post Shot			
Date	Photo ID	Direction of Photo	Description
8/20/2018	CPS01	Looking NW	Looking northwest at the Cannikin Post Shot mud pit cap



Photo CPS01: Looking northwest at the Cannikin Post Shot mud pit cap

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Mud Pit Inspection Checklist and Photos

Drill Site E Mud Pit Site

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AMCHITKA MUD PIT SITES POST-CLOSURE MONITORING CHECKLIST (continued)

Mud Pit Site: Drill Site E

Date of Inspection: August 21, 2018

C. Site inspection (continued)	YES	NO	EXPLANATION
4. Vegetative cover			
a. Is plant cover adequate to prevent erosion?			Not Applicable, Not inspected
b. Are weedy annual plants present? Do they require removal?			Not Applicable, Not inspected
c. Evidence of animals on cap?			Not Applicable, Not inspected
d. Evidence of excessive plant mortality?			Not Applicable, Not inspected
e. Has a vegetative cover log been completed?			Not Applicable, Not inspected
5. Photo Documentation			
a. Has a photo log been prepared?			Not Applicable, Not inspected
b. How many photos were taken?			

D. Field Conclusions			
1. Imminent hazard to integrity of cap? (If yes, immediate report required. Note the person or agency the report will be made to.)		X	
2. Are more frequent inspections required?		X	
3. Are existing maintenance actions satisfactory?		X	Not Applicable. No maintenance was done or required.
4. Are existing repair actions satisfactory?		X	Not Applicable. No repairs were done or required.
5. Is other maintenance/repair necessary?		X	
6. Rationale for field conclusions: See attached trip report			
7. Factors contributing to or impacting inspection: Vegetation appeared to be thicker due to time of year for inspection which restricted visibility of cap surface. Heavy fog and rain impacted visibility.			

E. Certification	
I certify that I have conducted an inspection of the Drill Site E Mud Pit Site cap in accordance with the discussed and approved annual inspection criteria as recorded on this checklist, discussion in Trip Report, field notes, and photos..	
Inspector Printed Name: Stephen Pitton	Inspector Signature:
Title: Site Lead, Inspection Lead	Date:

PHOTOGRAPH LOG

Mud Pit Site: Drill Site E			
Date	Photo ID	Direction of Photo	Description
8/21/2018	E01	Looking S	Drill Site E mud pit cap, similar to photo PL-E02 in the 2017 Amchitka inspection report (DOE 2017)
8/21/2018	E02	Looking SE	Crack north of the Drill Site E mud pit cap, outside of the cap toe, similar to photo PL-E08 in the 2017 Amchitka inspection report (DOE 2017)
8/21/2018	E03	Looking SE	Crack south of the Drill Site E mud pit cap, outside of the cap toe, similar to photo PL-E010 in the 2017 Amchitka inspection report (DOE 2017)
8/21/2018	E04	Looking SE	Crack south of the Drill Site E mud pit cap, outside of the cap toe, similar to photo PL-E011 in the 2017 Amchitka inspection report (DOE 2017)
8/21/2018	E05	Looking SE	Crack south of the Drill Site E mud pit cap, outside of the cap toe, similar to photo PL-E012 in the 2017 Amchitka inspection report (DOE 2017)
8/21/2018	E06	Looking NW	Crack to the north side of the Drill Site E mud pit cap, outside of the cap toe
8/21/2018	E07	Looking NE	Slump/scarp area south of the Drill Site E mud pit cap, similar to photo PL-E04 in the 2017 Amchitka inspection report (DOE 2017)



Photo E01: Drill Site E mud pit cap, similar to photo PL-E02 in the 2017 Amchitka inspection report (DOE 2017)



Photo E02: Crack north of the Drill Site E mud pit cap, outside of the cap toe, similar to photo PL-E08 in the 2017 Amchitka inspection report (DOE 2017)



Photo E03: Crack south of the Drill Site E mud pit cap, outside of the cap toe, similar to photo PL-E010 in the 2017 Amchitka inspection report (DOE 2017)



Photo E04: Crack south of the Drill Site E mud pit cap, outside of the cap toe, similar to photo PL-E011 in the 2017 Amchitka inspection report (DOE 2017)



Photo E05: Crack south of the Drill Site E mud pit cap, outside of the cap toe, similar to photo PL-E012 in the 2017 Amchitka inspection report (DOE 2017)



Photo E06: Crack north of the Drill Site E mud pit cap, outside of the cap, looking northwest toe



Photo E07: Slump/scarp area south of the Drill Site E mud pit cap, similar to photo PL-E04 in the 2017 Amchitka inspection report (DOE 2017)

Inspection Photos
MM 4 and MM 8 Stream Crossing Areas

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PHOTOGRAPH LOG

Stream Crossing Areas: MM 4 and MM 8			
Date	Photo ID	Direction of Photo	Description
8/20/2018	MM4_01	Looking N	Looking north at the MM 4 stream crossing
8/20/2018	MM4_02	Looking W	Looking west (upstream) at the MM 4 stream crossing
8/20/2018	MM4_03	Looking E	Looking east (downstream) at the MM 4 stream crossing
8/20/2018	MM4_04	Looking W	Looking west (upstream) at the MM 4 stream crossing from east of Infantry Road
8/20/2018	MM4_05		A fish basket in the stream east (downstream) of the MM 4 stream crossing
8/20/2018	MM4_06		A sample bucket with fish from the fish basket east (downstream) of the MM 4 stream crossing
8/20/2018	MM4_07		A Dolly Varden fish captured in the fish basket east (downstream) of the MM 4 stream crossing
8/20/2018	MM4_08	Looking E	The drainage of the MM 4 stream as it connects to the Bering Sea
8/20/2018	MM8_01	Looking W	Looking west (upstream) at the MM 8 stream crossing
8/20/2018	MM8_02	Looking E	Setting fish baskets in the stream east (downstream) of the MM 8 stream crossing
8/20/2018	MM8_03	Looking W	The stream west (upstream) of the MM 8 stream crossing
8/20/2018	MM8_04	Looking W	Partial blockage on the west (upstream) side of the MMN 08 stream crossing
8/20/2018	MM8_05	Looking N	Looking north at the MM 08 stream crossing
8/20/2018	MM8_06		A fish basket in the stream east (downstream) of the MM 8 stream crossing
8/20/2018	MM8_07		A Dolly Varden fish captured in the fish basket east (downstream) of the MM 8 stream crossing
8/20/2018	MM8_08		A freshwater Sculpin fish captured in the fish basket east (downstream) of the MM 8 stream crossing
8/20/2018	MM8_09	Looking E	The MM 8 stream near to where it connects to the Bering Sea



Photo MM4_01: Looking north at the MM 4 stream crossing



Photo MM4_02: Looking west (upstream) at the MM 4 stream crossing



Photo MM4_03: Looking east (downstream) at the MM 4 stream crossing



Photo MM4_04: Looking west (upstream) at the MM 4 stream crossing from east of Infantry Road



Photo MM4_05: A fish basket in the stream east (downstream) of the MM 4 stream crossing



Photo MM4_06: A sample bucket with fish from the fish basket east (downstream) of the MM 4 stream crossing



Photo MM4_07: A Dolly Varden fish captured in the fish basket east (downstream) of the MM 4 stream crossing



Photo MM4_08: The drainage of the MM 4 stream as it connects to the Bering Sea



Photo MM8_01: Looking west (upstream) at the MM 8 stream crossing

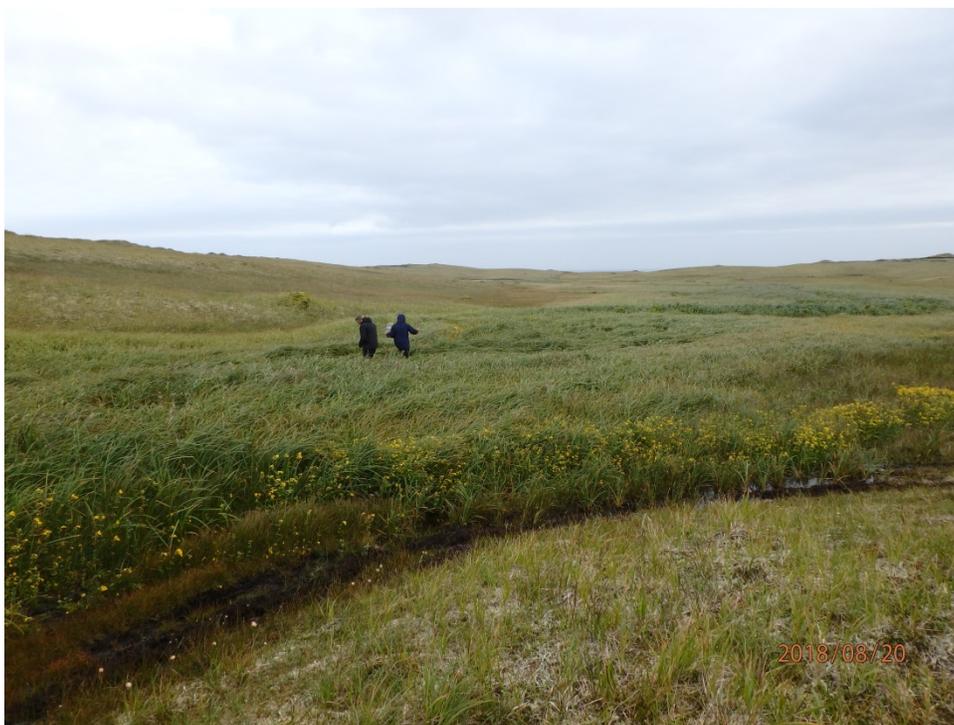


Photo MM8_02: Setting fish baskets in the stream east (downstream) of the MM 8 stream crossing



Photo MM8_03: The stream west (upstream) of the MM 8 stream crossing



Photo MM8_04: Partial blockage on the west (upstream) side of the MM 8 stream crossing



Photo MM8_05: Looking north at the MM 8 stream crossing



Photo MM8_06: A fish basket in the stream east (downstream) of the MM 8 stream crossing



Photo MM8_07: A Dolly Varden fish captured in the fish basket east (downstream) of the MM 8 stream crossing



Photo MM8_08: A freshwater Sculpin fish captured in the fish basket east (downstream) of the MM 8 stream crossing



Photo MM8_09: The MM 8 stream near to where it connects to the Bering Sea