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#### J.5 - Marine Geotechnical Report

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USAL-FG-GRZZZ-00-002015-011	LNG Facilities Marine Geotechnical Data Report	Rev 0	Public





### LNG FACILITIES MARINE GEOTECHNICAL DATA REPORT

USAL-FG-GRZZZ-90-002015-011

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### Alaska LNG

# LNG FACILITIES MARINE GEOTECHNICAL DATA REPORT MARINE LNG FACILITIES ALASKA LNG PROJECT NIKISKI, ALASKA

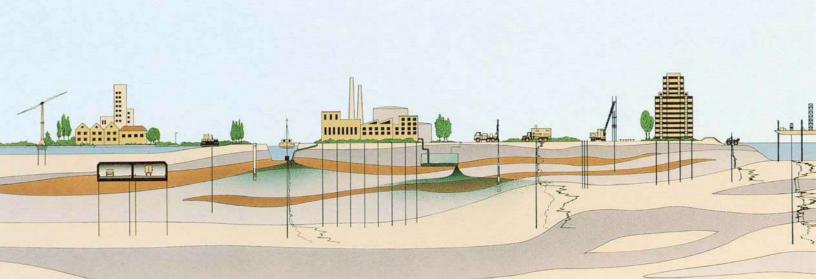
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REPORT NO. 04.10140334-9

EXXONMOBIL ALASKA LNG LLC (EMALL)

HOUSTON, TEXAS

Rev	Date	Revision Description	Originator	Reviewer	Approver
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6100 Hillcroft (77081) Houston, Texas 77274 Tel: (713) 369-5400 P.O Box 740010

Fax: (713) 369-5518

AKLNG Document No. USAL-FG-GRZZZ-90-002015-011 Fugro Report No. 04.101400334-9 June 20, 2016

#### ExxonMobil Alaska LNG LLC (EMALL)

10613 W. Sam Houston Pkwy N, Suite 500 Houston, TX, 77064

Attention: Patrick Wong

Geotechnical Engineer/Technical POC

## Marine Geotechnical Data Report Marine LNG Facilities Alaska LNG Project Nikiski, Alaska

Fugro Consultants, Inc. (Fugro) is pleased to present this geotechnical data report for the marine facilities of the Alaska LNG Project (AKLNG) located in Nikiski, Alaska. Our services were authorized under Service Work Order No. AKLNG-FUG-US-003 Rev 0, dated February 5, 2015 in accordance with the Service Agreement No. A2275592 between Fugro and ExxonMobil Global Services Company, dated October 29, 2012. Fugro has been performing geophysical and geotechnical site investigation (G&G) for the proposed AKLNG Project since August 2014.

Marine geotechnical investigation was performed between August 2015 and November 2015. This report presents the field and laboratory test results for the marine field investigation performed to support the 2015 G&G program.



#### FUGRO CONSULTANTS, INC.

We appreciate the opportunity to be of service to EMALL. Please call us at (713) 369-5400 if you have any questions or comments concerning this report, or when we may be of further assistance.

Sincerely, FUGRO CONSULTANTS, INC. TBPE Firm Registration No. 299

Baret Binatli, E.I.T. Project Professional

Sochan Jung, P. E. (Texas) Senior Project Professional

Abhishek S. Shethji, P.E. (Texas) Project Manager Thomas A. Posey, P.E. (Alaska) Engineering Manager

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#### 1.0 INTRODUCTION

#### 1.1 Project Description

The Alaska Gasline Development Corporation, BP Alaska LNG LLC, ConocoPhillips Alaska LNG Company, and ExxonMobil Alaska LNG LLC (Applicants and also referred as EMALL in this report) plan to construct one integrated liquefied natural gas (LNG) Project (Project) with interdependent facilities for the purpose of liquefying supplies of natural gas from Alaska, in particular from the Point Thomson Unit (PTU) and Prudhoe Bay Unit (PBU) production fields on the Alaska North Slope (North Slope), for export in foreign commerce and opportunities for in-state deliveries of natural gas.

The Natural Gas Act (NGA), 15 U.S.C. § 717a(11) (2006), and Federal Energy Regulatory Commission (FERC) regulations, 18 C.F.R. § 153.2(d) (2014), define "LNG terminal" to include "all natural gas facilities located onshore or in State waters that are used to receive, unload, load, store, transport, gasify, liquefy, or process natural gas that is exported to a foreign country from the United States." With respect to this Project, the "LNG Terminal" includes the following: a liquefaction facility (Liquefaction Facility) in Southcentral Alaska; an approximately 804-mile gas pipeline (Mainline); a gas treatment plant (GTP) on the North Slope; an approximately 62-mile gas transmission line connecting the GTP to the PTU gas production facility (PTU Gas Transmission Line or PTTL); and an approximately 1-mile gas transmission line connecting the GTP to the PBU gas production facility (PBU Gas Transmission Line or PBTL). All of these facilities are essential to export natural gas in foreign commerce.

These components are shown in Resource Report No. 1, Figure 1.1 - 1, as well as the maps found in Appendices A and B of Resource Report No. 1. Their current basis for design is described as follows.

The new Liquefaction Facility would be constructed on the eastern shore of Cook Inlet just south of the existing Agrium fertilizer plant on the Kenai Peninsula, approximately 3 miles southwest of Nikiski and 8.5 miles north of Kenai (Plate 1). The Liquefaction Facility would include the structures, equipment, underlying access rights, and all other associated systems for final processing and liquefaction of natural gas, as well as storage and loading of LNG, including terminal facilities and auxiliary marine vessels used to support Marine Terminal operations (excluding LNG carriers [LNGCs]). The Liquefaction Facility would include three liquefaction trains combining to process up to approximately 20 million metric tons per annum (MMTPA) of LNG. Two 240,000-cubic-meter tanks would be constructed to store the LNG. The Liquefaction Facility would be capable of accommodating two LNG carriers. The size of LNGCs that the Liquefaction Facility would accommodate range between 125,000 – 216,000-cubic-meter vessels.

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In addition to the Liquefaction Facility, the LNG Terminal would include the following interdependent facilities:

- Mainline: A new 42-inch-diameter natural gas pipeline approximately 804 miles in length would extend from the Liquefaction Facility to the GTP on the North Slope, including the structures, equipment, and all other associated systems. The Mainline would include up to eight compressor stations; one standalone heater station, one heater station co-located with a compressor station, and six cooling stations associated with six of the compressor stations; four meter stations; 53 mainline block valves; one pig launcher facility at the GTP meter station, one pig receiver facility at the Nikiski meter station, and eight combined pig launcher and receiver facilities at each of the compressor stations; and associated infrastructure facilities. Associated infrastructure facilities would include additional temporary work spaces, access roads, helipads, construction camps, pipe storage areas, material extraction sites, and material disposal sites. Along the Mainline route, there would be at least five gas interconnection points to allow for future in-state deliveries of natural gas. The approximate locations of three of the gas interconnection points have been tentatively identified by the State of Alaska as follows: MP 475 to serve Fairbanks, MP 763 to serve the Matanuska-Susitna Valley and Anchorage, and MP 804 to serve the Kenai Peninsula. The size and location of the remainder of interconnection points are unknown at this time. None of the potential third-party facilities used to condition, if required, or move natural gas away from these off-take interconnection points are part of the Project. Potential third-party facilities will be addressed in the Cumulative Impacts analysis found in Appendix L of Resource Report No. 1.
- GTP: A new GTP and associated facilities in the Prudhoe Bay area would receive natural gas from the PBU Gas Transmission Line and the PTU Gas Transmission Line. The GTP would treat/process the natural gas for delivery into the Mainline. There would be custody transfer, verification, and process metering between the GTP and PBU for fuel gas, propane make-up, and byproducts. All of these would be on the GTP or PBU pads.
- PBU Gas Transmission Line: A new 60-inch natural gas transmission line would extend approximately 1 mile from the outlet flange of the PBU gas production facility to the inlet flange of the GTP. The PBU Gas Transmission Line would include one-meter station on the GTP pad.
- PTU Gas Transmission Line: A new 32-inch natural gas transmission line would extend approximately 62 miles from the outlet flange of the PTU gas production facility to the inlet flange of the GTP. The PTU Gas Transmission Line would include one-meter station on the GTP pad, four MLBVs, and two pig launcher and receiver facilities—one each at the PTU and GTP pads.

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Existing State of Alaska transportation infrastructure would be used during the construction of these new facilities including ports, airports, roads, railroads, and airstrips (potentially including previously abandoned airstrips). A preliminary assessment of potential new infrastructure and modifications or additions to these existing in-state facilities will be provided in Appendix L of Resource Report No.1. The Liquefaction Facility, Mainline, and GTP would require the construction of modules that may or may not take place at existing or new manufacturing facilities in the United States. EMALL's Draft Resource Report No. 1, Appendix A, contains maps of the Project footprint. Appendices B and E of Resource Report No. 1 depict the footprint, plot plans of the aboveground facilities, and typical layout of above-ground facilities.

AKLNG contracted Fugro to investigate the site conditions of the onshore LNG facilities, marine LNG Terminal, and marine pipeline corridors. Plate 1 and Plate 2 show the overview of overall project facilities described above and the proposed location of the onshore facilities, marine terminal area, and the pipeline corridors of the proposed LNG plant. More details regarding the project can be found in document USAKE-PT-SRREG-00-0001 released by AKLNG.

The summary of the reports developed as a part of site investigation are listed in Table 1.1.

**Table 1.1: Summary of Reports** 

Report Title	AKLNG Document Number	Fugro Report Number		
Project Execution Plan for 2015 Onshore and Marine G&G Program	USAL-FG-GRZZZ-00-002015-002	04.10140334-1		
LNG Facilities Onshore Geologic Field Mapping Report	USAL-FG-GRZZZ-00-002015-004	04.10140334-2		
Pipeline Marine Geophysical Survey Report - Route 1	USAP-FG-GRZZZ-10-002015-013	04.10140334-3		
Pipeline Marine Geophysical Survey Report - Route 2	USAP-FG-GRZZZ-10-002015-014	04.10140334-4		
LNG Facilities Marine Geophysical Survey Report	USAL-FG-GRZZZ-90-002015-010	04.10140334-5		
LNG Facilities Probabilistic Seismic Hazard Analysis (PSHA) Report	USAL-FG-GRHAZ-00-002015-001	04.10140334-6		
LNG Facilities Onshore Geophysical Survey Report	USAL-FG-GRZZZ-00-002015-005	04.10140334-7		
LNG Facilities Onshore Geotechnical Data Report	USAL-FG-GRZZZ-00-002015-006	04.10140334-8		

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Report Title	AKLNG Document Number	Fugro Report Number
LNG Facilities Marine Geotechnical Data Report	USAL-FG-GRZZZ-90-002015-011	04.10140334-9
LNG Facilities Geologic Hazard Report	USAL-FG-GRHAZ-00-002015-002	04.10140334-10
LNG Facilities Onshore Groundwater Monitoring Well Installation Report	USAL-FG-GRZZZ-00-002015-007	04.10140334-11
LNG Facilities Onshore Hydrogeologic Report	USAL-FG-GRZZZ-00-002015-008	04.10140334-12
LNG Facilities Seismic Engineering Report	USAL-FG-GRZZZ-00-002015-003	04.10140334-13
LNG Facilities Onshore Integrated Site Characterization and Geotechnical Engineering	USAL-FG-GRZZZ-00-002015-009	04.10140334-14
LNG Facilities Marine Integrated Site Characterization and Geotechnical Engineering	USAL-FG-GRZZZ-90-002015-012	04.10140334-15

This report presents the geotechnical data collected during our 2015 G&G Program.

#### 1.2 Purpose and Scope

The main purpose of this study was:

- to explore and evaluate subsurface conditions in the vicinity of the proposed marine LNG facilities for the AKLNG project, and
- to provide geotechnical and geophysical input for a site model and design of the marine LNG facilities.

Following is a brief summary of the field investigation program completed for this study. Additionally, detailed summary of the completed borings including their as-built coordinates, elevations, actual completion depths, etc. is presented on Plate A1-1 in Appendix A of this report.

- Supervision and management of various field operations including but not limited to, seabed hazard evaluation; evaluating various site moves; and SIMOPS with other marine operations;
- Drilling a total of twenty-five (25) marine geotechnical soil borings with depths ranging from 47.1 ft to 305.4 ft and collecting geotechnical samples.
- Drilling a total of four (4) marine soil borings for sediment chemical testing (i.e. Tier 1 and Tier 2 sediment characterization) purposes with depths ranging from 18.5 ft to 20.5 ft and collecting samples.

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- Performing field and laboratory tests on the selected samples to evaluate geotechnical engineering properties of subsurface soils;
- Performing nine (9) PS Logging tests measuring seismic shear wave velocities to a maximum depth of 292 ft below mudline;
- Generalizing subsurface soil stratigraphy based on the collected subsurface data;
- Assessing groundwater conditions when observable; and
- Preparing this geotechnical report summarizing our factual findings.

#### 1.3 Applicability of Report

We have prepared this factual report for EMALL for use as geotechnical input for the design of the proposed Alaska LNG project. The scope of the explorations and tests performed in this report are for the Alaska LNG Project only. The tests were selected or developed based on our understanding of the project as described in this report and our discussions with Client representatives and their Contractors. The information presented in this report is intended to be used for the design of the project. Additional studies will be needed to complete the FEED level and final design stages of the project once the location of the structure/equipment and detailed loading conditions are available.

#### 1.4 Limitations

Fugro makes no claim or representation concerning any activity or condition falling outside the specified purposes to which this report is directed. We have conducted our work using the standard level of care and diligence normally practiced by recognized engineering firms now performing similar services under similar circumstances. We intend for this report, including all illustrations, to be used in its entirety. The information presented in this report may not apply to locations not explored by borings or areas outside the project boundaries. This information should be made available to prospective users for information only, and not as a warranty of subsurface conditions.

#### 1.5 Unit Conversions and Datums

The recommendations presented herein are based on the Imperial Unit System. Table 1.2 provides a quick reference for conversion from Imperial Units to SI.

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**Table 1.2: Conversion Units** 

From Imperial System	To SI System	Divide by
Kips – k	Kilo Newtons – kN	0.224809
Kips – k	Mega Newtons – MN	224.809
Pounds/foot <sup>2</sup> - psf	Kilo Newtons/meter <sup>2</sup> – kN/m <sup>2</sup> (kPa)	20.885
Pounds/foot <sup>3</sup> - pcf	Kilo Newtons/meter <sup>3</sup> – kN/m <sup>3</sup>	6.3659
Feet – ft	Meters – m	3.2808
Inches – in.	Millimeters – mm	0.03937

All coordinates are reported in Zones AK3 AK4 AK5 North, NAD83 (NSRS 2007), and are in feet. Bathymetric elevations for marine areas are referenced to MLLW. The following formula is used to convert the elevations from MLLW to NAVD88:

• Elevation, in feet (NAVD88) = Elevation, in ft (MLLW) – 7.32 ft

Elevations presented in this report, and the corresponding illustrations and engineering plates are all referenced to the MLLW datum, unless noted otherwise.

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#### 2.0 GEOTECHNICAL FIELD EXPLORATION

#### 2.1 General

Our scope of services for the geotechnical and geophysical program were based on Exhibit A -Scope of Work Document No. USAL-PL-GBZZZ-00-000001-000 dated June 29, 2015 (SOW). Our field exploration plan was generally based on the information provided to us in the above-listed document, however, the proposed scope of work was revised multiple times based on our discussion with AKLNG. A detailed project execution plan (PEP) providing our field procedures, Safety, Security, Health, and Environment (SSHE) plans, and quality plan for the proposed G&G program was submitted to AKLNG for review on March 2, 2015 (Fugro Document No. 04.10140334-1, AKLNG Document No. USAL-FG-GPZZZ-00-000002-000). Hazard Identification (HAZID) workshops were conducted based on our draft execution plan along with representatives from various technical disciplines, subcontractors, field SSHE representatives, site managers, and project manager. Based on the workshop discussions a revised work execution plan was submitted on April 6, 2015. Readiness review meetings were also conducted before commencing the fieldwork. Additional revisions were needed as the field work progressed and a final copy of the work execution plan was submitted on August 23, 2015. Additionally, a one-day site induction meeting was conducted with every individual working on the site for this project by Fugro/AKLNG SSHE representatives.

Overall the field services for the marine geotechnical program consisted of drilling and sampling geotechnical borings to support geotechnical engineering evaluations, conducting drive sampling, (an alternative sampling method to collect material for chemical evaluation of dredge material), and performing PS logging within selected borings. Geotechnical field services were completed between August 18, 2015 and November 4, 2015.

Summary of the completed borings are provided on Plates A1-1 in Appendix A. Locations of soil borings, drive sampling, and PS logging locations are presented on Plate 3 and Plate 4 of this report. A detailed description of our equipment/vessel details and methodologies about the exploration activities are described in our PEP. Additionally, various method statements were prepared and submitted to AKLNG as a part of the proposed fieldwork. Copies of all the submitted method statements are presented in Appendix F of this report that provide details on equipment/vessels and methods used in the field to complete the marine geotechnical investigation. A brief description of various field activities is provided in the following sections of this report.

#### 2.2 Staging Area

The field activities for the entire geotechnical and geophysical program were based in Nikiski, Alaska utilizing office, warehouse facilities and dockside space and assistance provided by ASRC (Arctic Slope Regional Corporation). Crew, material, and soil sample transfers were performed along the beach area adjacent to the ASRC Rig Tenders quay. ASRC facilities were strategically

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located within close proximity of field operations and aided support in providing continuity with field operations.

#### 2.3 Vessels and Equipment

Marine geotechnical drilling operations were conducted from Fugro's purpose-built "Skate 3" jack-up barge (JUB) using a Comacchio MC1200 drill rig. Crew transfers were conducted using a landing craft vessel, "My Marie", (LCV) or as a secondary means JUB's dedicated rigid inflatable boat (RIB). Material and soil sample transfers between the JUB and beach area adjacent to the ASRC Rig Tender Quay were also executed by the LCV.

A tug boat, "Norman O", was also present full time on site during the operations, to assist the JUB with the moves between locations due to the strong tidal currents on site. The tug boat also acted as the security vessel to ensure the JUB is not boarded or vandalized when unattended.

Specifications for the vessels and equipment used for the marine geotechnical investigation are presented in Appendix A.

#### 2.4 Permits

Permits for marine drilling activities for 2015 geotechnical investigation in Cook Inlet were conducted under United State Army Corp of Engineers Nationwide Permit #6 (AKLNG Document No. USAI-P2-SGPER-00-000001-003) and Alaska Pollutant Discharge Elimination System (APDES) Permit AK0062278 (AKLNG Document No. USAI-P2-SGPER-00-000002-003). Permits were obtained by AKLNG and were delivered to Fugro through Aconex document control portal. A permit deconstruction process was conducted by AKLNG to clearly communicate the requirements of the permits with Fugro crews prior to start of work.

#### 2.5 Preplanning

Prior to the commencement of the field activities, a thorough planning was performed by Fugro and AKLNG representatives using multiple safety and quality tools, and conducting various assessment and analyzes. As mentioned above, Fugro developed a PEP including Emergency Response Plan (ERP), Environmental Management Plan (EMP), Method Statements for major operations and assisted AKLNG for developing the Best Management Practices Plan (BMPP). In addition, the below listed meetings were performed periodically to ensure the preparedness for the field activities:

- a) <u>Hazard Identification (HAZID)</u>: Meetings performed and HAZID forms reviewed in order to identify and rate the risks/hazards and agree what controls could be put in place to eliminate or reduce the potentiality of the hazards to an acceptable level (see Fugro PEP, AKLNG Document No. USAL-FG-GPZZZ-00-000002-000).
- b) Readiness Review Meeting: Meetings were held to test the preparedness of each item crucial for the work execution via an official checklist. The checklist was compiled by AKLNG Site Manager with the aid of the lead names for each task.

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c) Webmapper Updates: Webmapper is an online GIS viewing and plotting tool developed by EXP (a subcontractor to AKLNG) that gives the ability to explore, visualize and share GIS information. All project mapping information is uploaded to Webmapper in order to receive the final approvals from AKLNG. This tool was used before, during and after the field operations to ensure the effective data sharing between multiple entities involved with the project.

#### 2.6 Notifications

Due to the complexity of the work in Cook Inlet waters a notification procedure was established including Notice to Mariners, Notifications to Local Emergency Services and Set Net Leaseholders in the proximity of the project area.

- a) Notice to Mariners: A notice to mariners (NTM) was issued to the United States Coastguard to advise mariners of important matters affecting navigational safety, including location of the works area, details of the marine vessels that will be operating within the area and required navigational exclusion areas from the operational marine plant.
- b) <u>Set Net Lease Holders</u>: It was identified that within the LNG area there are several set net fishing leases which have subsea equipment that would pose a hazard to the JUB. Through coordination with the lease holders the project team was able to;
  - i. Locate the subsea equipment and formulate a digital model that was entered into the JUB navigation and positioning system. This allowed the JUB to plan the movement/transit routes between locations avoiding the subsea equipment and orientate the JUB to prevent damage to subsea equipment when jacking up.
  - ii. Reach agreement with the lease holders to place marker buoys onto the subsea equipment to aid safe navigation of the JUB assist vessels.
- c) <u>Local Emergency Services</u>: Due to the remote location and challenges face in casualty management from marine vessels early coordination with the local Emergency Services was vital in the planning of the project. Through a number of meetings with the local Fire Chief a workable Emergency Management Plan was developed for the project. Furthermore, all the local fire fighters and paramedics visited the JUB for familiarization tours of the JUB.

#### 2.7 Equipment Inspections

Upon the completion of the mobilization of all marine equipment an independent marine inspector (Ron Bennet) that was approved by AKLNG was contracted to investigate whether the vessels were in compliance with all marine regulations and safe to conduct the marine operations planned. The inspector coordinated with the USCG, INSB and AKLNG Safety Security Health and Environment representatives (SHHE) to ensure that any project specific requirements were met.

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In addition to the third party inspection, Port State Inspection was also required for the foreign marine vessels that wish to enter or work in US ports or waters for the purpose of verifying that the competency of the master and officers on board, and the condition of the ship and its equipment comply with the requirements of international conventions (e.g. SOLAS). Hence, an inspection was performed by United States Coastguard (USCG) prior to start of the field program.

#### 2.8 Hazard Studies

Earthquake integrity for the JUB was established using a combination of natural period specific hazard curves and a structural analysis of the JUB. Additionally, a thorough, all party, risk analysis was initiated, and additional mitigation measures were implemented to reduce the risk.

Also, prior to commencing the works, a desktop study was performed to identify any potential subsea obstacles or hazards utilizing the bathymetry, side scan, and magnetometer data collected by Fugro during the 2014 G&G program. Additionally, as mentioned earlier with the assistance from set-net lease holders, marker buoys were placed onto the subsea equipment and a map indicating the locations of the clump weights was developed for navigation of the JUB and the support vessels. Bathymetry and clump weight location datasets were uploaded to the navigation systems of the vessels for continued evaluation of the target locations for the duration of the site investigation.

#### 2.9 Geotechnical Borings

A total of twenty five (25) marine geotechnical borings were drilled during the 2015 site investigation program (see Plate 3 for boring locations). The 2015 marine boring program was conducted between August 18, 2015 and November 4, 2015.

Drilling and sampling equipment schematics, rig specifications and pictures are presented in Appendix A.

Field activities related to geotechnical borings, drilling and sampling methods, geophysical borehole testing and borehole completion are discussed herein.

Method Statements (MS) were prepared for each major activity as part of the preplanning of the field activities. The MS documents for this project are included in Appendix F of this report.

**2.9.1 JUB Logistics.** The JUB, comprises seven pontoons, four leg bearing assemblies, and four 36 m (118 ft) long legs, and was mobilized to the ASRC dock in modules via land transportation. The assembly took place at the ASRC dockside using a 300-ton crane and multiple loaders available at ASRC Rig Tenders Terminal, upon a thorough equipment and material check, between August 1, 2015 and August 16, 2015.

Historical data and forecasts related to currents, wave heights, weather conditions, including wind speed and directions were evaluated to plan the moves between locations using several websites, such as National Oceanic Atmospheric Administration (NOAA, marine.weather.gov), Windfinder (www.windfinder.com) and Alaska Ocean Observing System (www.aoos.org). The boring priority

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list provided by AKLNG was also considered while development of the movement plan. However, the Barge Master was the final responsible person for coordinating positioning of the jack-up depending the actual weather conditions. Once on location the JUB was jacked above the water level to allow a safe working operation. The JUB was elevated above seabed to an elevation equal to at least water depth plus the maximum tidal variation plus the maximum expected wave height (Hmax) plus a safety margin. The JUB was also equipped with a Valeport 106 current meter which recorded the actual currents (see Appendix A for specifications).

Following completion of the drilling, sampling, and testing of each location, equipment was seafastened for the move, and the rig was jacked down for movement to the subsequent location. Due to the significant tidal swing and strong current characteristics of the Cook Inlet all moves were performed during slack tides.

The JUB is self-propelled by means of a hydraulic thruster, however a tug boat, "Norman O", was used for the majority of the moves between locations due to the strong tidal currents in Cook Inlet. Before the transit initiates, the vessel masters of the jack-up and tow vessel carried out a risk assessment including the factors such as tide, wind and wave direction and magnitude, weather, and tow distance, navigational requirements, access limitations at the work area (e.g. clump weights close to the beach locations) and stability of the equipment involved. Whilst towing the tug Captain and Bargemaster communicated frequently via VHF/UHF radio to assess progress and monitoring weather conditions.

Crew or cargo transfer was carried on with an LCV (see Section 2.3) between the beach adjacent to the ASRC Quay and the JUB. Sample boxes were unloaded when weather and tidal conditions are suitable, and ideally at times of high water or when the jack up is on the water (legs in the sea bed) so as to minimize the distance for the transfer. All sample box transfers were take place using the LCV for details about sample storage and shipping (see Section 2.14).

The field services for the Skate 3 were performed on a 24-hour basis using two crews. Crew transfer was conducted aboard the JUB using an LCV or as a secondary means the dedicated rigid inflatable boat (RIB) captained by the on-shift Bargemaster or qualified coxswain. Transfers were conducted from the beach area adjacent to the ASRC Quay and from the dockside depending on the tide level at Nikiski.

Crew transfers comprised crew embarking on to the landing craft (maximum 8 people), transferring to the JUB and disembarking via the fixed access ladder on the leg of the JUB.

Further details of the crew change procedure are given in the crew change method statement Appendix F including limiting factors.

**2.9.2 Surveying and Positioning.** Once JUB was jacked-up on location, a GPS system (Fugro Starfix Positioning System) was used to record the location of the exploration at the start of each drilling. Coordinates of the actual locations were reported in the NAD83 NRS2007 and WGS84 coordinate systems.

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Surveyed as-built coordinates and elevations for the marine explorations are presented in Appendix A, also included on the respective boring logs and "Starfix Mean Positioning Report" documents presented in Appendix B. Once the Skate 3 was close to the borehole location, the Bargemaster maneuvered the platform onto location by spinning on one spud leg with assistance from thrusters. The tug remained nearby until all four legs of the platform were spudded and no further assistance was required.

Before the drilling operations started, the Skate 3 was elevated to an appropriate level, with adequate clearance above sea-level, to allow for the safe operations, considering the anticipated sea state and tidal conditions. Positioning reports were generated for each location, they are presented in Appendix B.

- 2.9.3 Water Depth and Seabed Elevation. Once the platform was positioned at a location, water depth measurements were taken prior to the commencement of drilling operations. Seafloor elevations were then calculated and referenced to datum NAVD88. Measured and calculated elevations are presented in Appendix A, including point data interpolated using Fugro 2014 bathymetry data.
- **2.9.4 Drilling and Sampling.** The drilling operations were conducted using a Comacchio MC1200 drill rig with Fugro designed CR2 drill derrick mounted on the Skate 3 JUB. The borings were performed through the centre of a 400 mm diameter moon pool. Schematics of drill equipment and methods that were implemented during drilling and sampling are in presented in Appendix A.

<u>Drilling Methods.</u> Wet rotary drilling techniques were used for the marine site investigation, comprising the use of two sizes of conductor casing, drilling rods (NWY) and Geobor S coring barrel.

Upon positioning at each boring location a conductor casing was run from deck level to the sea floor to serve as a conduit for the coring string. A 7-in OD conductor casing was solely used initially during the drilling of the twelve (12) borings, however due to the existence of the strong currents a slaked 12-inch OD conductor casing was added to provide additional stability to the smaller sections operating inside while drilling in strong currents. The penetration of the 12-in OD casing ranged between 0.3 ft and 3.0 ft below the seafloor under self-weight at the other 13 boring locations.

Wet rotary drilling was accomplished by advancing a rotating drill pipe into the subsurface with the Comacchio MC1200 drill rig. The 7-in OD casing pipe assembly was fitted with a Terracore drill bit at the bottom that allowed the drill string to progress downward into the subsurface. Once reached the required sampling depth the NWY rod string was then deployed with the appropriate sampler attached to the tip. When hard/dense strata were encountered Geobor S wireline casing with appropriate drill bit was lowered down inside the 7-in OD casing for borehole advancement and sampling by coring. When recovery was not achieved with coring, non-coring device (NCD), such as drag bit or tri-cone, was used for borehole advancement until the next sampling interval.

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PS Suspension Logging tests were performed at 9 borehole locations after completion of geotechnical sampling (Section 2.11 PS Suspension Logging Test). As the measurement point on the logging probe is approximately 12.5 feet above its base, it is customary to drill 15 ft to 20 ft deeper than the last geotechnical sampling interval (referred to as a "rat hole") to facilitate deployment of the logging probe. The rat holes were drilled without sampling using Geobor S coring and if necessary NCD drilling techniques.

To adhere to the permit requirements, the mud was recirculated while drilling. As the drill pipe progressed into the subsurface, drilling fluid was pumped from the mud tank, through the top drive mechanism, down the pipe, through the drill bit, and up the annulus of the drilled hole (space between the pipe and the drilled hole) where it returned back into the mud tank.

Drilling fluid, consisted primarily of sea water and Guar Gum, was used in the rotary and core drilling process to cool the bit, remove the cuttings from the drill hole, and to stabilize the boring walls during the drill process. The water was pumped from the sea into the holding tank aboard the deck of the jack-up by a submersible pump suspended from the drilling deck into the ocean. When required, environmentally friendly guar gum drilling additives was added to the water to stabilize the borehole and provide for circulation during the drilling and coring process. The additives were mixed on-board in the mud tank on an as-needed basis.

The returning drill flush was re-circulated through an on-board system that utilised a "mudslayer" (mud management unit and settlement tank installed on the JUB) to remove all solids and a settlement tank with internal weir system. Once cleaned the drill flush was pumped into either a holding tank for return into the drill string or a drilling mud tank depending on the requirements of the ground being drilled. The drilling fluids were then collected in a baffled mud tank adjacent to the moon pool secured to the side of the JUB. Upon completion of the boring the drilling fluids and excess cuttings were stored in 55-gallon drums on-board the JUB.

<u>Sampling Methods.</u> Sampling was performed continuously at (2.5-ft intervals) within the upper 40 feet, at 5 feet intervals to a depth of 100 feet, and at 10 feet intervals below 100 feet of depth and at changes in soil stratification, to termination depth of each boring, as per the requirements outlined in AKLNG SOW and Fugro PEP.

Undisturbed samples of cohesive soils were obtained by pushing a 3-in OD, thin-wall tube (Shelby) about 3 ft or to refusal, whichever occurred first. The field procedure for cohesive soil sampling was conducted in general accordance with the Standard Practice for Thin-Walled Tube Sampling of Soils (ASTM D1587). Pocket penetrometer and/or hand Torvane readings were generally conducted in the recovered soil materials exposed in the bottom ends of the tube samples where appropriate and when possible. The readings are reported on the respective boring logs presented in Appendix B and on the summary of test results in Appendix E.

 <u>Pocket Penetrometer Tests.</u> This test is performed by slowly pressing a small flat-ended cylindrical metal rod (6.3 mm diameter) into the flat surface of the soil sample through a spring until it is embedded a predetermined depth within the sample. The resistance to

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penetration is recorded by the spring that is calibrated to read the unconfined compressive strength of the soil based on spring compression.

Torvane Tests. In the Torvane test, a small hand-operated device, consisting of a metal disc with thin, radial vanes projecting from one face, is pressed against the flat surface of the soil until the vanes are fully embedded. The device is then rotated through a torsion spring until the soil is sheared. The device is calibrated to indicate the undrained shear strength of the soil directly from the rotation of the torsion spring.

Disturbed soil samples were obtained by driving a 2-in OD split-barrel standard penetration test (SPT) sampler in general accordance with the Standard Penetration Test (SPT) procedure described in ASTM D1586. The SPT N-values, defined as the number of blows required for a 140 lbs hammer falling 30 in to drive the split-barrel sampler the final 12 in of the 18 in sampling interval, are recorded during sampling and are presented on the boring logs presented in Appendix B.

Once hard/dense soil conditions were encountered triple-tube Geobor S 146 mm OD (5¾ in OD) wireline coring assembly was deployed and drilling was accomplished by rotary drilling procedures in general accordance with the Standard Practice for Diamond Core Drilling for Site Investigation (ASTM D2113) to achieve the sampling depths per above mentioned requirements. The wireline core assembly allows quick retrieval of the inner core barrel from the downhole core/drill string using a hydraulically operated wireline winch and an overshot retrieval tool. The hard/dense soils were generally continuously cored at 5-ft intervals to total depth. However, depending upon the soil characteristics (e.g. presence of cobbles, boulders affecting recovery) and in order to achieve the desired sampling depths, some core runs were shortened. Full core runs 5 ft were reestablished as conditions permitted. When desired sampling depth was reached NWY assembly with SPT or thin wall tube was run inside the Geobor string for further sampling. Additional samples (i.e. grab samples) were saved from the cores collected as part of Geobor drilling techniques in order to refine the stratum descriptions. Both the driller and the engineer/geologist on shift generated accurate logs of all activities performed, observations during drilling and all recovered soil samples.

#### 2.10 SPT Hammer Energy Calibration

Fugro performed energy measurements on two hammers that were utilized to collect Standard Penetration Test (SPT) samples. The purpose of SPT energy calibration described herein was to determine the average energy transferred from the exploration rig hammer to the drilling rods during SPT sampling. The energy testing methods were performed in accordance with the ASTM D4633 Standard Test Method for Energy Measurement of Dynamic Penetrometers. SPT-N values reported herein are field values. The measured energy may then be used to correct the measured SPT N-values to a standardized energy level, typically 60% of the theoretical energy ( $N_{60}$ ). Appendix C provided details and the results of the SPT automatic hammer calibration tests.

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#### 2.11 PS Suspension Logging Test

PS Suspension Logging data was acquired within the nine (9) marine borings (MB-03, MB-06, MB-13, MB-17, MB-19, MB-21, MB-22, MB-23 and MB-27) to measure the in-situ compression and shear wave velocities. This data can be used to assess the dynamic soil properties to assist with determining the low strain dynamic soil properties and for site response models. PS Suspension Logging Method.

The data was acquired with Robertson Geologging PS suspension Logging probe (specifications provided in Appendix D), a Robertson Geologging 500 m (1640 ft) winch, Micrologger logging console, and the Robertson Geologging Digital Suspension Logging software.

**2.11.1 PS Suspension Logging Method.** The PS suspension logging tool is a single probe that contains a seismic source and two sets of receivers, separated by a 1 meter (3.28 feet) interval. The probe is operated within uncased borings and during data collection, three individual shots are recorded on separate data channels, which are optimized for positive and negative polarity shear waves and compression waves, respectively. The operator can view the data in real-time and if needed, can record multiple files at each test depth or stack multiple shots in order to increase the signal to noise ratio and facilitate identification of the compression and shear wave arrivals at each of the receivers. By analyzing the relative differences in the arrival times of the shear and compression waves at the two sets of receivers, the velocity of the 1-meter soil column between the receivers can be calculated.

The main advantage of the PS suspension logging method, when compared to other more traditional velocity measurements, is that the source is local to the receivers; which both eliminates the need for additional equipment on the seafloor and reduces most depth-related limitations. The main drawback is that as the measurements are recorded within an open-hole, borehole stability is therefore critical for the success of the method.

The PS suspension logging was conducted promptly after the completion of the geotechnical drilling and sampling. For all borings, the logging was conducted in multiple, separate logging runs, after removing sections of the drill casing. The amount of casing removed was based on the drillers' observations and preliminary geotechnical soils classification tests, in an attempt to maintain boring stability. Where weak strata were identified, the casing was withdrawn so that the base of the casing was 5-10 feet below the weak strata and the lower, open hole section of the boring was logged. Additional casing was then removed and the probe re-lowered into the boring to a target depth that overlaps the first logging run below the weak strata, and logging was continued.

For each logging run, the PS suspension logging probe was deployed by rigging the wireline cable through a sheave suspended from derrick of the drill rig. The probe was lowered into the drill casing until the cable-head of the probe was at the top of the casing. At this point, the logging

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system depth reference was set relative to the mudline, which was calculated by using the deck height above the mudline (provided by the barge-master) and the height of the casing above deck. The probe was then lowered to the base of the target section of the boring and data was recorded while withdrawing the probe and temporarily holding it stationary at each test elevation.

The data recorded was assessed in real-time by the operator and (where necessary) adjustments to the number of individual stacks, record length and sample interval were made in order to adequately capture the compression and shear wave arrivals. In many instances, multiple files were recorded at each test elevation until the operator was satisfied that clear, consistent compression and shear wave arrivals were recorded.

Prior to withdrawing the probe from the boring, the depth reference point was reoccupied to ensure the depth measurements were within tolerance. In order to correct the depth of the wireline measurements, the offset from the cable-head to the probe measurement point (from manufacturer specifications) was applied using post-processing software.

Further details of the PS suspension logging method is provided under the method statement in Appendix F of this report.

A summary of the borings survey with the PS suspension logging method and the individual logging runs conducted are summarized in Table 2.1, below. The log depths provided are all referenced to the measurement point of the probe, which is approximately 12.5 feet above its base and 8 feet below the cable-head. Therefore, it is customary for the log start depth to be 15 - 20 feet shallower than the drilled depth of the borings and the log end depth to be 5 - 10 feet shallower than the casing depth.

**Table 2.1: Summary of PS Suspension Logging Tests** 

Boring	Drilled Depth (ft)	Logging Run	Casing Depth (ft)	Log Start Depth (ft)	Log End Depth (ft)	Comments
		1	112.9	144.7	107.6	-
MB-03	162.7	2	64.0	114.2	58.1	-
		3	35.1	41.0	27.6	Wireline went slack at 42.6ft depth; possible hole collapse
MB-06	149.3	1	88.6	128.9	81.0	Wireline went slack at 132.2ft depth; possible hole collapse
WD-00	148.5	2	39.4	65.0	37.2	After removing 7" casing, boring collapsed at 80.7ft depth
MB-13	164.0	1	101.4	142.4	93.2	After removing 7" casing, boring collapsed at 144.3ft depth

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Boring	Drilled Depth (ft)	Logging Run	Casing Depth (ft)	Log Start Depth (ft)	Log End Depth (ft)	Comments
		2	32.5	96.5	24.3	-
	213.2	1	111.5	165.7	104.7	Wireline went slack at 166.7ft depth; possible hole collapse
		2	92.2	120.1	86.9	-
MB-17		3	61.0	96.8	55.4	-
		4	33.1	63.6	53.5	-
		5	13.1	60.0	-6.6	-
MB-19	167.3	1	91.9	132.7	83.5	Wireline went slack at 150.3ft depth; possible hole collapse
		2	23.0	79.6	15.6	-
	164.0	1	125.6	150.3	118.8	Wireline went slack at 151.6ft depth; possible hole collapse
MB-21		2	96.8	137.8	89.9	-
		3	49.5	96.5	46.9	-
		4	13.1	56.6	3.9	-
MB-22	151.2	1	26.6	63.4	17.5	Wireline went slack at 77.4ft depth; possible hole collapse
		1	265.7	292.0	258.8	-
		2	220.1	264.4	213.2	-
	305.4	3	169.9	222.4	163.0	-
MB-23		4	112.2	140.1	103.7	Wireline went slack at 143.0ft depth; possible hole collapse
		5	78.7	113.2	73.5	-
		6	35.8	70.2	30.5	Wireline went slack at 72.5ft depth; possible hole collapse
		7	12.5	27.6	8.9	-

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Boring	Drilled Depth (ft)	Logging Run	Casing Depth (ft)	Log Start Depth (ft)	Log End Depth (ft)	Comments
MB-27	164.0	1	87.6	148.6	79.7	Wireline went slack at 150.3ft depth; possible hole collapse
WID-27	104.0	2	23.0	30.3	15.6	Wireline went slack at 44.5ft depth; possible hole collapse

From Table 2.1 above, it is apparent that the PS suspension logging operations for this project were challenging, as for many of the individual logging runs, the wireline went slack prior to reaching the target depth, suggesting possible collapse of the borings. These possible collapses occurred predominantly at localized depths within sand or gravel strata. This is likely to be a direct result of the restrictions imposed by the permit requirements, which excluded the use of heavy drill muds that are customarily used to maintain the integrity of the boring wall in granular materials.

**2.11.2 Data Processing.** Analysis of the PS suspension logging data was carried out using the Robertson Geologging PS Log Analysis software package in which all of the data files recorded were individually assessed. During this process, many of the data files recorded in close proximity (within 5 – 10 feet) of the bottom of the drill casing (and therefore affected by mechanical vibrations from the jack-up barge) were omitted. Similarly, where multiple files were recorded at the same test elevation, the initial suspect measurements were discarded. For the remaining files at all test elevations, compression and shear wave arrivals times for each receiver were identified and the difference used to compute the respective interval velocities. These interval velocities have been presented on Plates D2-1 & D2-2, D3-1 & D3-2, ..., through Plates D10-1 & D10-2 for borings MB-03, MB-06, MB-13, MB-17, MB-19, MB-21, MB-22, MB-23 and MB-27, respectively.

Prior to using the computed interval velocities in further analyses, it is important to gain an understanding of the possible limitations and uncertainties associated with the PS suspension logging technique. For the compression wave velocities, it is worth considering that the measurements are taken within a fluid-filled boring. As compressional waves can transmit through fluids, a pressure wave will travel from the source to the receivers through the borehole annulus (between the probe and the wall of the boring) and within the flushed and/or invaded zone of the borehole formation. This pressure wave will propagate at the velocity of the drill fluid, which for guar gum, is on the order of 5,000 – 5,500 ft/s and will prohibit the detection of any slower compression waves travelling within the (uninvaded) borehole formation. Therefore, should the calculated P-wave velocity be within this range, it is likely that it is due to compression waves travelling within the borehole annulus (or within the flushed and/or invaded zone) and rather than being representative of the borehole formation. To illustrate, the P-wave velocities from boring MB-21 between -80 and -140 ft elevation (Plate D7-1) appear to be within this range and therefore may not be representative of the surrounding formation.

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As shear waves do not propagate within fluids, the above observation does not affect the calculated shear wave velocities. However, as the shear waves travel within the borehole wall and surrounding formation, they sample a combination of the flushed, invaded and uninvaded zones surrounding the boring; due to drilling disturbance, the shear wave velocity of the flushed and invaded zones may theoretically be lower than the uninvaded formation. Therefore, should the thickness of the flushed and invaded zones be appreciable, the PS suspension logging technique may yield anomalously low velocities. Although no data was available to assess the flushed and invaded zones for this project, as previously mentioned, the permit requirements prohibited the use of heavy drilling muds and therefore the thickness of the mud cake was likely to have been minimal. For permeable strata (sands and gravels), this in turn means the thickness of the flushed and invaded zones may have been appreciable.

When reviewing the shear wave interval velocities, it has been noted that within permeable strata a certain degree of scatter is observed within the data. To illustrate, this scatter can be observed in the S-wave velocities from boring MB-23 below -176 ft elevation (Plate D9-2) where the strata were predominantly sands with some silts and occasional gravels. It is considered unlikely that this scatter is due to measurement errors, as for test elevation where multiple data files were recorded, the velocities are generally within 200 ft/s of each other (note the 'pairs' of data points between 145 and 165 ft depth). The scatter has therefore been associated with the formation. Whether it is the presence of the flushed and/or invaded zone being of appreciable thickness (resulting in anomalously low velocities) or the presence of frequent cobbles and boulders in close proximity to the boring (resulting in anomalously high velocities), or a combination of both, is unknown from the PS suspension logging data alone.

In order to obtain an understanding of the (low strain) dynamic soil properties, the established interval velocities were used to calculate the Poisson's ratio, shear modulus, Young's modulus and bulk modulus for each test interval, using the following equations:

Poisson's ratio 
$$v = \frac{V_P^2 - 2V_S^2}{2(V_P^2 - V_S^2)}$$

Shear modulus 
$$G_{\text{max}} = \rho V_S^2$$

Young's modulus 
$$E = 2G_{\text{max}}(1+\nu)$$

Bulk modulus 
$$K = \frac{E}{3(1-2\nu)}$$

Where  $V_P$  = Compression wave velocity

 $V_{\rm s}$  = Shear wave velocity

 $\rho$  = Submerged unit weight

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The calculated Poisson's ratios are presented on Plates D2-3, D3-3,..., etc. through Plates D10-3. Profiles of the assumed submerged unit weight values (inferred from the laboratory tests conducted on the soil samples and literature review) have been presented on Plates D2-4, D3-4,..., etc. through Plates D10-4. The calculated shear modulus, Young's and bulk modulus values are presented on Plates D2-5 – D2-7, Plates D3-5 – D3-7,..., etc. through Plates D10-5 – D10-7 for borings MB-03, MB-06, MB-13, MB-17, MB-19, MB-21, MB-22, MB-23 and MB-27, respectively.

It should be appreciated that the Poisson's ratio, low strain shear, Young's and bulk modulus values have all been calculated using the compression and shear wave velocities derived from the PS suspension logging data, under the assumption that each subsurface interval is homogeneous and isotropic. Similarly, the calculated dynamic soil properties are representative of soil behavior at (very) low strains and are typically 1 – 2 orders of magnitude greater than those calculated from static pressure meter or dilatometer tests. Finally, due to the uncertainties associated with the velocities measured the PS suspension logging technique (outlined above), similar uncertainties existing within the calculated dynamic soil properties presented.

#### 2.12 Tier 1 (T1) and Tier 2 (T2) Sediment Sampling

Two locations, DS-4 and DS-5 (See Plate 3), were selected by AKLNG to conduct the T1/T2 sampling at the proposed marine test pit location to assist for the future dredging work. Initially, 2015 Marine Site Investigation SOW included marine Vibracore sampling for dredge material testing purposes. However, due to the operational difficulties with deployment of the Vibracore equipment (i.e. challenging tides and weather conditions in Cook Inlet in late season), alternative sampling methods were sought for collection of "Tier 1 and Tier 2 sediment characterization" (T1/T2) samples from Skate 3 JUB.

Field execution of the T1/T2 sampling included:

- <u>U-100 Hammer sampler</u>. 18-in long and approximately 4-in ID PVC liner was driven into the seabed with a downhole drive hammer (U-100) attached to a winch wire, then retrieved to deck. The remaining material was cleaned out of the hole to the next sampling interval with a 7-in bailer, then the sampler was deployed again. This method is referred as "Drive Sampling".
- <u>Core barrel.</u> Samples were collected in 5 ft long and approximately 4-in ID PVC liner that was inserted in triple-tube Geobor S 5¾ in OD wireline coring assembly. This method is referred as "Core Sampling".

Once on location, the 12-in OD conductor casing was deployed and set into the seabed to stabilize the drilling environment. Once the conductor casing was set, the 7-in OD casing was deployed to the sea bed. The 18-in long PVC sampling tube was inserted into the ground with drive sampler (U-100 hammer sampler).

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Drive sampling was performed up to at least 15.5 ft, every 2 ft with 0.5 ft gaps between samples when no refusal was encountered. When drive sampling refused due to dense/hard material or cobbles/boulders, sampling was carried on with continuous core sampling.

In order to prevent contamination of the soils, no drilling fluid was used or circulated during T1/T2 sampling operations. In addition, all liners and cutting shoes were decontaminated on the JUB with a "cleaning fluid mix", consisted of Alconox powder and potable water that was supplied from ASRC Rig Tenders, and then triple rinsed.

As the preferred method (i.e. drive sampling) does not provide continuous samples, each sampling location was supplied with a pair of borings. A second boring, adjacent to the first one, was performed with the same method, but with an offset in sampling depths in order to fill the information gaps (i.e. 0.5 ft) between drive samples in the first boring. Boring locations for DS-4A/DS-4B and DS-5A/DS-5B are shown on Plate 3 and associated boring logs for DS-4A/DS-4B and DS-5A/DS-5B are presented in Appendix B.

It should be noted that field recorded soil observations presented on the logs for DS-4A/4B and DS-5A/5B were refined based on the soil descriptions and the results of the laboratory tests performed by CH2M on individual and combined soil samples, obtained from explorations DS-4A and DS-4B. CH2M laboratory results and interpreted soil descriptions are presented in document USAL-CH-JRZZZ-90-000032-000 Test Pit Dredge Material Characterization Report (Rev.0).

#### 2.13 Borehole Completion

As per the permits listed in Section 2.4, the marine borings were not backfilled and the borings were allowed to cave-in once the drilling and sampling was completed.

Artesian conditions were encountered in Boring MB-24 and hence backfilling using cement and bentonite was performed. Details about the conditions encountered in MB-24 and subsequent plugging/backfilling activities were submitted to AKLNG in a memorandum (AKLNG Document No. USAL-FG-GRZZZ-90-002015-017).

#### 2.14 Sample Storage and Shipping

Fugro's field geotechnical engineer visually classified and logged the recovered soil samples collected at each boring location. The recovered samples were labeled and transported to the Fugro onsite laboratory. The following outlines our general procedure for sample storage and shipping:

- Soil samples were immediately logged, sealed, and labelled with project number, date, depth, boring number, etc. upon collection.
- All disturbed samples were photographed in color, packaged, and labeled for further storage and shipping. Shelby tubes were capped and sealed with electric tape, and placed in appropriate containers for storage and shipment.

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 Transportation was provided by the jack-up's support vessel (LCV) and occurred at regular intervals throughout the drilling scope. Additionally, Shelby tubes were further sealed with wax at the on-site laboratory for further storage and shipping.

A portion of the samples were tested at the onsite laboratory located at ASRC Rig Tenders facility in Nikiski, Alaska and then the soil samples were packaged for shipment to the Fugro's laboratory located in Houston, Texas under chain-of-custody documentation. Laboratory tests conducted at the onsite laboratory in Nikiski, Alaska are marked with a superscript "a" in the summary of test results presented in Appendix E.

#### 2.15 Drill Cuttings and Discharge

The drilling mud used was collected, re-conditioned and re-used through a mudslayer mud management unit and settlement tank installed on the JUB. As mentioned earlier, all reconditioned drilling fluids were pumped into the settlement tank that included 3 No., 55-gallon collection barrels, separated by baffles. Any remaining silt was allowed to filter and settle at the base of the barrels. Once the barrels were full, or moving of the JUB is required, they were collected by the JUB's LCV. The barrels were lifted using the on-board crane and placed onto the LCV deck and then transferred to ASRC for further disposal. For information on how this waste is disposed, please refer to MS005 Spoil Removal in Appendix F.

As per the APDES discharge permit requirements daily observations on drilling fluid losses and deck drainage discharge were calculated and documented by onboard geologist/engineer using a form created by AKLNG and Fugro. Additionally, Static sheen tests were performed at the end of each exploration. APDES daily observation and static sheen test forms are presented in Appendix B.

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#### 3.0 LABORATORY TESTING

#### 3.1 General

The laboratory-testing program was designed to evaluate pertinent engineering properties of the foundation soils. All laboratory testing was performed at Fugro laboratories located in Nikiski, Alaska and Houston, Texas.

A majority of the basic laboratory tests (e.g., water content, particle size, Atterberg Limits) were assigned by the Field Geotechnical Engineer after logging the borings at the time of drilling. Soil samples were initially transported to the Fugro laboratory at Nikiski. Some selected tests were performed at Nikiski laboratory and all the remaining samples were then shipped to Fugro laboratory located in Houston, Texas. Laboratory tests conducted at the onsite laboratory in Nikiski, Alaska are marked with a superscript "a" in the summary of test results presented in Appendix E. Additional laboratory tests, including advanced testing (e.g., triaxial, consolidation, monotonic and cyclic shear tests etc.), were assigned by Fugro Geotechnical Engineers in Houston. Critical samples were examined through X-ray Radiography prior to laboratory testing to determine sample disturbance and homogeneity. Classification tests, triaxial unconsolidated-undrained compression (UU) tests, consolidation tests, corrosion potential tests were performed on selected soil samples. Further testing will be performed based on the engineering evaluations and calculations (including resonant column, monotonic and cyclic shear tests etc.), and results will be provided in the final version of this report.

The following sections present a brief description of the soil tests performed on the selected samples. Laboratory tests were performed in general accordance with ASTM standards and are summarized in Table 3.1.

#### 3.2 Classification Tests

The classification tests included tests for natural water content, specific gravity, liquid and plastic limits (collectively termed Atterberg Limits), sieve analysis, material finer than the No. 200 sieve (percent fines), and hydrometer tests. These tests aid in classifying the soils and are used to correlate the results of other tests performed on samples taken from different borings and/or different depths. The results of these tests are presented on the boring logs in Appendix B and in summary of test results tables in Appendix E on Plates E1-1 through E1-33. Grain size curves and plasticity charts are also presented in Appendix E of this report, on Plates E2-1 through E2-35 and E3-1 through E3-49 respectively.

#### 3.3 Maximum and Minimum Index Density Tests

Maximum index density, maximum unit weight and minimum index density tests were performed on oven-dried soil samples per ASTM standards D4253 and D4254, respectively. The results from the maximum and minimum dry density tests were used in calculating target molding dry density

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(based on the estimated target in-situ relative density) of the soil samples prepared for the direct simple shear tests. The results of the minimum and maximum density tests are presented in summary of test results tables in Appendix E, on Plates E1-1 through E1-45.

#### 3.4 Unconsolidated-Undrained Triaxial Compression Tests (UU)

The undrained shear strength was evaluated for selected undisturbed samples of cohesive soils by performing unconsolidated-undrained (UU) triaxial compression tests (ASTM D2850). The natural water content and dry unit weights were determined as routine parts of the laboratory strength tests. The results of the laboratory undrained shear strength tests, along with the field estimates of undrained shear strength, are presented on the boring logs in Appendix B and in summary tables in Appendix E on Plates E1-1 through E1-33. The UU Triaxial Compression test curves are presented on Plates E4-1 through E4-18 in Appendix E.

#### 3.5 Consolidated Undrained Triaxial Tests (CIUTX)

Consolidated-undrained (CU) triaxial compression tests with pore pressure measurements were performed as part of the testing program. The specimen was mounted in the triaxial cell after being extruded from the tube. Specimen saturation was achieved by applying back pressure and then the samples were isotropically consolidated to the desired effective stresses. The effective consolidation stresses were determined based on the estimated in-situ effective stress at the particular sample depth. The specimen was then loaded in a multistage format, allowing the specimen to approach failure at the first two effective confining stresses, and failing the sample at the final effective confining stress. The natural water content and dry unit weights were determined as routine parts of the CU triaxial compression tests. The CU Triaxial Compression test results are presented on Plates E5-1 through E5-6 in Appendix E.

#### 3.6 Ko-Consolidated Static Undrained Direct Simple Shear Tests (cKoU-DSS)

The  $K_o$  consolidated, undrained static direct simple shear test was performed using strain-controlled loading in general accordance with ASTM Test Method D6528, using GEOTAC apparatus (designed by Trautwein). The in-situ relative densities of the selected samples were estimated based on SPT (N) blow-counts. The target dry density of a sample was determined based on this estimated in-situ relative density and the results of the maximum and minimum dry density for that specific sample.

The test specimen had a diameter of about 66.5 mm (2.62 in.) and height of about 19 mm (0.75 in.). Drainage is allowed on the top and bottom boundaries during consolidation. During shear, the volume of the test specimen was kept constant by keeping the specimen's height constant. As a result, undrained conditions (no volume change) were maintained during shearing. Therefore, it can be assumed that the change in vertical stress is equivalent to the change in pore water pressure (PWP), which can be considered that the sample is either expanding (dilating) or contracting (compressing) in size via the pore water pressure.

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The specimen was incrementally consolidated to the target stress level, with the final effective- vertical stress ( $\sigma'_{v,c}$ ) maintained constant for about 24 hours (curing or simulated aging) or one log cycle of time past the time to reach 90 percent consolidation ( $t_{90}$ ). The sample was then sheared at a strain rate of about 5 %/hr.

The direct simple shear test results are presented on Plates E6-1 through E6-6 in Appendix E.

#### 3.7 Compressibility Tests

The compressibility characteristics of select undisturbed samples of cohesive soils were determined by completing one-dimensional incremental consolidation and one-dimensional Constant Rate of Strain (CRS) tests per ASTM D2435 and D4186 standards, respectively. Each test was performed with a rebound-reload cycle. Natural moisture content, Atterberg limits, percent fines, and dry unit weight of the soil samples were also determined as part of our consolidation testing.

The results of the consolidation tests are presented on Plates E7-1 through E7-24 in Appendix E.

#### 3.8 Resonant Column Tests

The resonant column test is the most commonly used laboratory test for characterizing the shear modulus and the material damping ratio of the soils at small strains. It subjects hollow cylindrical specimens to harmonic torsional or axial loading by an electromagnetic loading system. The results of these tests will be used to evaluate the site response characteristics of the proposed marine site of the LNG facilities by measuring the cyclic behaviors of the marine soils.

The results of the consolidation tests are presented on Plates E8-1 through E8-6 in Appendix E.

#### 3.9 Cyclic Direct Simple Shear Tests

Strain-controlled cyclic direct simple shear (CDSS) test is performed to evaluate the degradation of shear modulus and increase of material damping ratio of soils at large strains. It subjects solid cylindrical specimens to stress similar to earthquake loading conditions applied to the top and the bottom of the soil specimen. The results of these tests will be used to evaluate the liquefaction characteristics of the soils existing at the proposed marine site of the LNG facilities by measuring the soil properties under cyclic loading. These tests are in progress and results will be presented in the final version of this report.

The results of the consolidation tests are presented on Plates E9-1 through E9-4 in Appendix E.

#### 3.10 Corrosion Potential Tests

The corrosion potential of the soils at the site was evaluated using a series of laboratory tests including pH, sulfate ion concentration, chloride ion concentration, and electrical resistivity. Samples from various depths and locations were selected for testing. The corrosion potential test results are presented in summary tables in Appendix E on Plates E1-1 through E1-33 on Summary of Test Results tables, and on laboratory sheets presented on Plates E10-1 through E10-12.

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#### 3.11 Summary of Laboratory Tests

The laboratory tests were performed in general accordance with ASTM standards and are presented in Table 3.1 along with the quantity of each test type performed.

**Table 3.1: Summary of Laboratory Tests** 

Laboratory Test	Testing Standard	Quantity
Water Content	ASTM D2216	762
Atterberg Limits	ASTM D4318	356
Sieve Analysis	ASTM D422	204
Hydrometer	ASTM D422	22
Percent Finer than No. 200 Sieve	ASTM D1140	340
Unconsolidated-Undrained Triaxial Compression (Intact)	ASTM D2850	108
Unconsolidated-Undrained Triaxial Compression (Remolded)	ASTM D2850	46
Consolidated-Undrained Triaxial Compression	ASTM D4767	6
Maximum & Minimum Index Density	ASTM D4253 / ASTM D4254	4
One-Dimensional CRS Consolidation	ASTM D4186	22
One-Dimensional Incremental Consolidation	ASTM D2435	2
Direct Simple Shear	ASTM D6528	6
Resonant Column	ASTM D4015	6
Cyclic Direct Simple Shear	ASTM D6528 & D3999	4
X-Ray Radiography	ASTM D4452	49
pH of Soil	ASTM D4972	12
Sulfate Ion Concentration	ASTM D516	12
Chloride Ion Concentration	ASTM D512	12
Floatrical Decistivity	ASTM G57	3
Electrical Resistivity	ASTM G187	9

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#### 4.0 GENERAL SITE AND SUBSURFACE CONDITIONS

#### 4.1 General Site Conditions

The proposed project site lies on the north-central coastline of the Kenai Peninsula, approximately two miles west of the town of Nikiski. The proposed marine LNG terminal site is located on the Cook Inlet adjacent to the western margin of the Kenai Peninsula, a low relief plain of Quaternary glacial and glaciofluvial deposits. Coastal bluffs are approximately 100 to 120 feet tall. The region is moderately to heavily developed, with industrial facilities (such as docks, trestles, storage tanks) located at the northern edge of the potential project boundary, as well as residential and small business buildings in the remaining areas of the project site.

The following sections present information on regional geology and geomorphology, regional seismicity, site geology, and site specific subsurface and groundwater conditions.

#### 4.2 Regional Geology and Geomorphology

Large glaciers, flowing south from the Alaska Range, covered most of the Cook Inlet during the last major glaciation, leaving deposits of glacial moraine and outwash across the Cook Inlet and the Kenai Peninsula (Reger et al., 2007). The last major glacial advance to extend across the Cook Inlet was the Naptowne glaciation, which included four advances, or stades, named from oldest to youngest: Moosehorn, Killey, Skilak, and Elemndorf. Mapping by Reger et al, (2007) shows that only the Moosehorn (at 27,000 to 32,000 years before present) and Killey (at 17,500 to 18,500 years before present) stades of the Naptowne glaciation extended across the 5-mile site radius. Deposits and landforms associated with these advances include alternating swaths of northeast-trending kettle lakes and closed depressions, the largest of which include Bernice Lake and Island Lake, outwash plains, as well as coarse grained ice-proximal sediments and finer-grained ice-distal sediments.

The dominant structural feature in the Cook Inlet is a series of fault-cored folds, known as the Cook Inlet folds, well-expressed in the Tertiary marine sediments which underlie the Quaternary deposits (Koehler et al., 2012). The Cook Inlet faults and folds are sub-parallel and generally trend north-northeast. Tertiary sediment fills the Cook Inlet forearc basin to depths of approximately 20,000 feet in the site area.

#### 4.3 Site Geology

In the marine LNG terminal area, erosion by waves and currents has removed the Killey deposits, resulting in a sea floor underlain primarily by Moosehorn and pre-Moosehorn Quaternary deposits. These consist of fine-grained glacially derived subestuarine sediments, sandy and gravelly glacial outwash deposits, and poorly sorted bouldery to gravelly glacial till deposits.

The Quaternary deposits overlie an erosional surface cut on gently folded Tertiary marine sediments, a surface referred to as the Quaternary/Tertiary unconformity. Immediately below the

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unconformity lies the Pliocene Sterling Formation, the youngest in the sequence of Tertiary formations filling the Cook Inlet basin. The Sterling Formation sediments are described as well-sorted, fine to coarse-grained sands that are rich in volcanic lithic fragments, quartz, and feldspars (McElmoyl, 2013). They may include conglomerate beds, thin seams of coal, and clays.

Borings drilled in the marine terminal area penetrate the Moosehorn and pre-Moosehorn Quaternary deposits. Locally, currents have deposited waves and ridges of sand and silt, forming a mantle of very young sediment over the older deposits. Large boulders are scattered across the sea floor, likely a lag from erosion of the upper beds of the Moosehorn deposit which contains large glacial drop-stones.

The marine terminal site is located on the east limb of the Middle Ground Shoal anticline, one of the larger of the Cook Inlet folds. Bedding in the Tertiary deposits beneath the site dips gently to the east-southeast on the limb of this fold.

#### 4.4 Regional Seismicity

The study region is located at the active convergent margin between the North American Plate (Southern Alaska block) and the Pacific Plate. The study region, centered in Cook Inlet basin, is characterized by high rates of seismicity and relatively frequent moderate (> M 5.0 to 5.9) to great (> M 8.0) earthquakes. This includes the 1964 moment magnitude (Mw, or M) 9.2 Great Alaskan or Good Friday earthquake, the largest recorded event in Alaska.

Earthquakes with accompanying fault displacement, ground deformation, and secondary effects such as earthquake-induced liquefaction and tsunamis are among the known geologic hazards of the region. Paleoseismic investigations indicate seven to ten great earthquakes took place on the Prince William Sound segment of the Aleutian megathrust in the last 4,000 to 6,000 years (Carver and Plafker, 2008; Shennan et al., 2014). The 1964 M9.2 Great Alaskan earthquake caused extensive damage and surface deformation throughout the Cook Inlet, including 0.9 feet of subsidence recorded at a standard U.S. Coast and Geodetic Survey tide-gage station near Nikiski (Foster and Karlstrom, 1967).

#### 4.5 Subsurface Conditions

The subsurface conditions presented in this section are mainly based on the soil conditions encountered in twenty-five (25) marine geotechnical borings and T1/T2 sediment samples during the 2015 G&G program. In addition to the information obtained from the borings and the results of the laboratory tests, the results of PS Logging tests, and the information obtained from the geophysical surveys was also reviewed.

Based on the as-built boring elevations obtained from bathymetry data collected by Fugro (2014), the seabed elevations varies from about El. -40.3 ft MLLW to about El. -7.7 ft MLLW. Plate 4 presents a color coded bathymetry map, indicating the areas of low and the high grades at the site.

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Based on the information obtained from the borings drilled for this site investigation, generalized cross sections were prepared and presented on Plates 5 through 13. The orientations of all the cross section profile lines are shown on Plates 3 and 4 of this report. Cross sections were selected based on the completed boring locations and considering the available proposed marine LNG facilities layout provided by AKLNG. Please note that an integrated interpretation of the cross sections based on the geotechnical and geophysical data will be presented later in the LNG Facilities Marine Integrated Site Characterization and Engineering Report (See Table 1.1).

The generalized subsurface cross sections illustrate the horizontal and vertical variation of the geology across the entire site. Stratigraphy, material descriptions, index properties and strengths of the soil materials are presented on each of the boring logs presented in Appendix B on Plates B-1 through B-29.

#### 4.6 Artesian Water Conditions

Artesian conditions were observed in one offshore boring, MB-24. At this location two artesian conditions were encountered, one during drilling and one during borehole closure activities, both related to the confining pressure of two distinct clay layers. The upper confining layer comprised a 16.5-foot-thick layer of hard clay interspersed with subangular gravel layers. The upper confining layer began at the submerged mudline and was underlain by a sand and gravel aquifer possessing a hydraulic head that rose about 3.5 feet above the base of the confining layer. The lower confining layer, observed to be 13 feet of hard clay with subangular gravel, was penetrated and revealed a flowing artesian condition. The flowing artesian condition possessed a hydraulic head which rose about 8 feet above the barge/skate deck (about 129 feet above the base of the confining layer). The water in both artesian conditions were observed to be fresh water. Further details related to artesian conditions are provided in a memorandum submitted to AKLNG with document number USAL-FG-GRZZZ-90-002015-017 and Fugro Hydrogeologic report (See Table 1.1).

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#### 4.7 Variations

Our interpretations of soil and groundwater conditions, as described in this report, are based on the boring logs from our field exploration, the results of the completed laboratory tests, geophysical surveys, our discussions with AKLNG and our experience with similar projects. Although we have allowed for minor variations in the subsurface conditions, the data provided may not be appropriate for subsurface conditions other than those reported herein. It is possible that undisclosed variations in soil conditions may occur outside the boring locations. We recommend performing careful review of subsurface conditions during engineering analysis and design to verify our generalized subsurface interpretations. Should variations from our interpretations be found, we recommend that we be notified and authorized to evaluate what, if any, revisions should be made to our recommendations.

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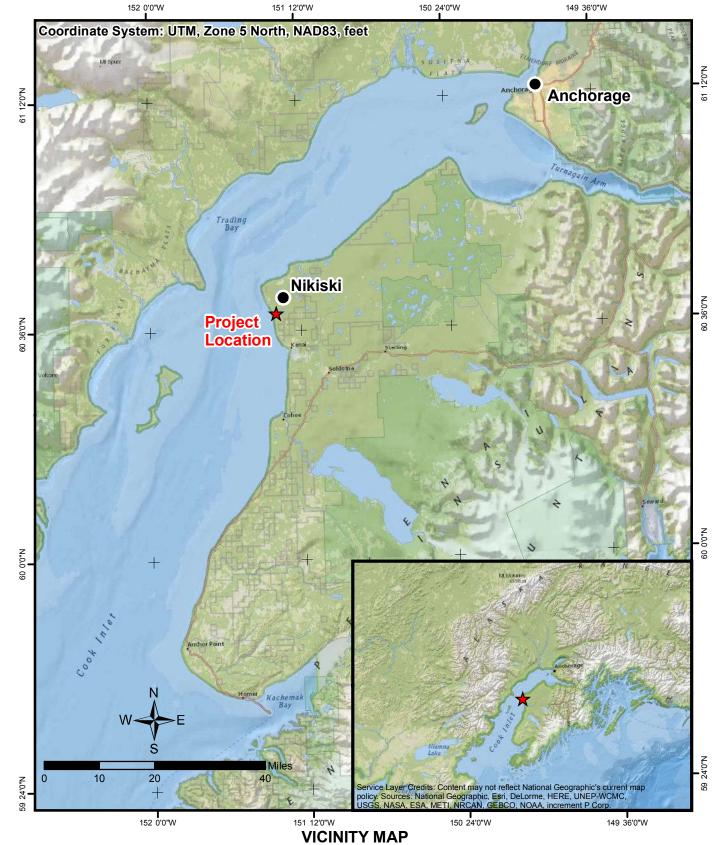
#### **ILLUSTRATIONS**

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# Confidential LNG Facilities Marine Geotechnical Data Report USAL-FG-GRZZZ-00-002015-011 Rev.0 20-Jun-16







VICINITY MAP
MARINE LNG FACILITIES
ALASKA LNG PROJECT
NIKISKI, ALASKA



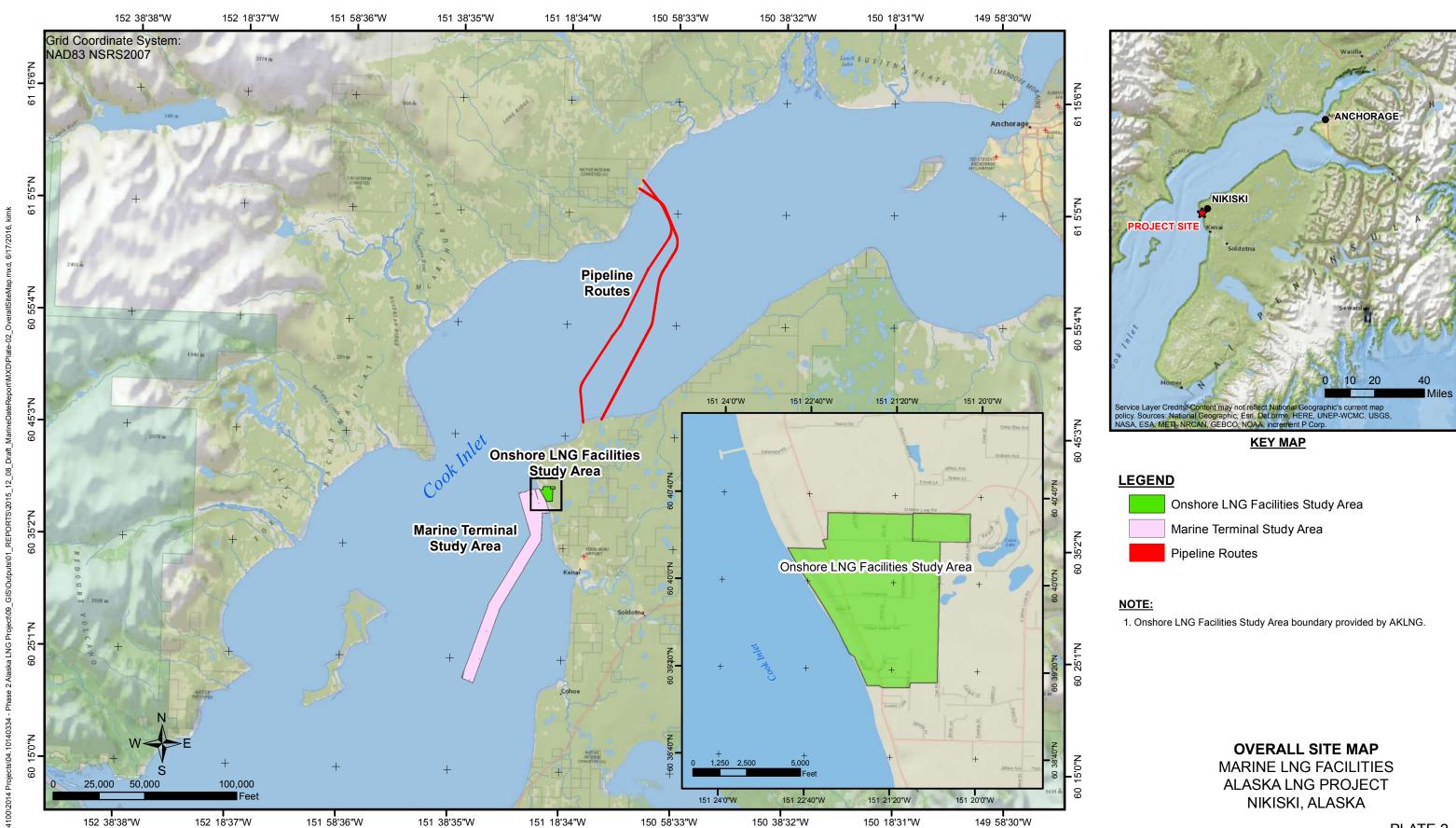
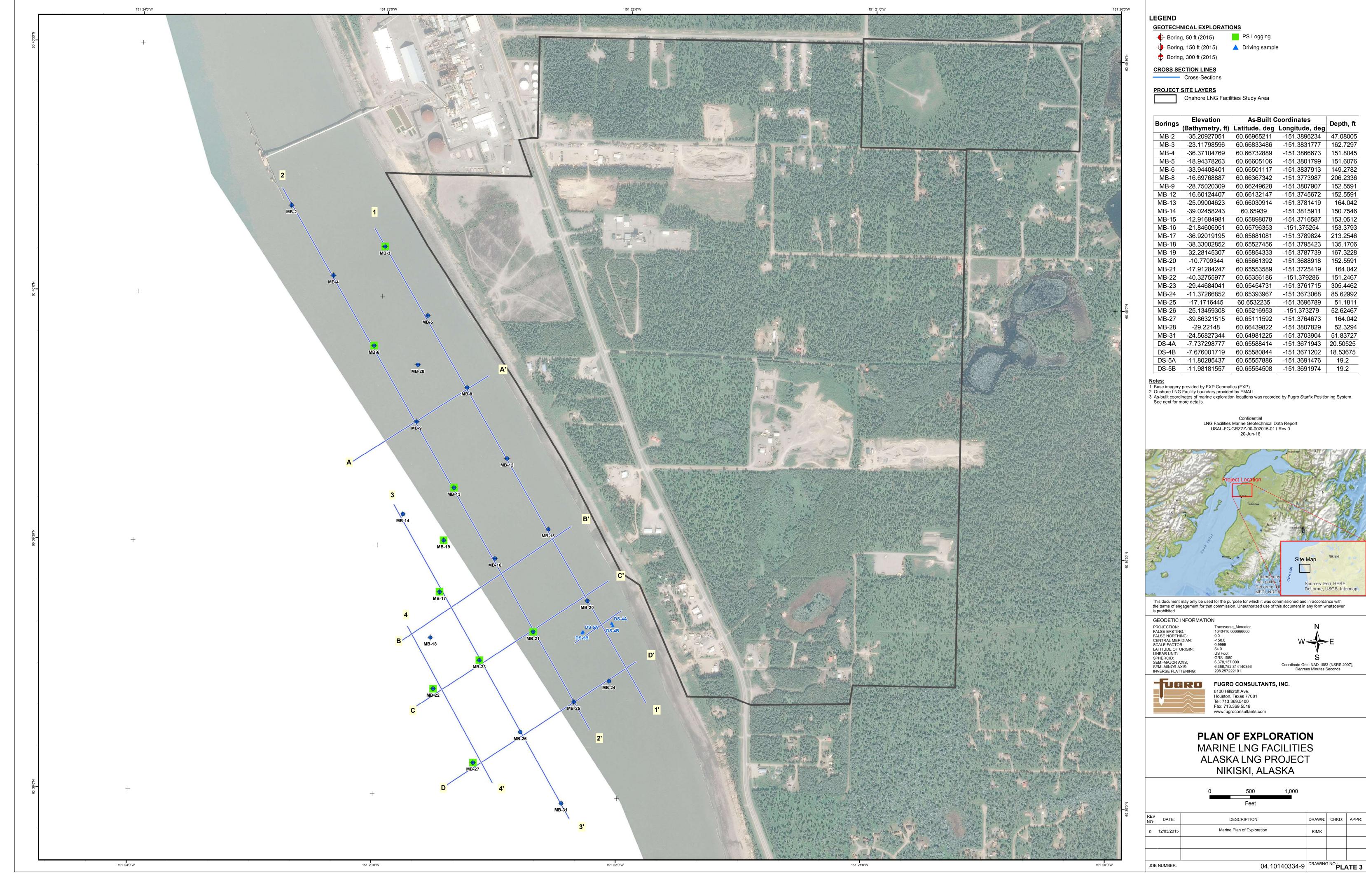
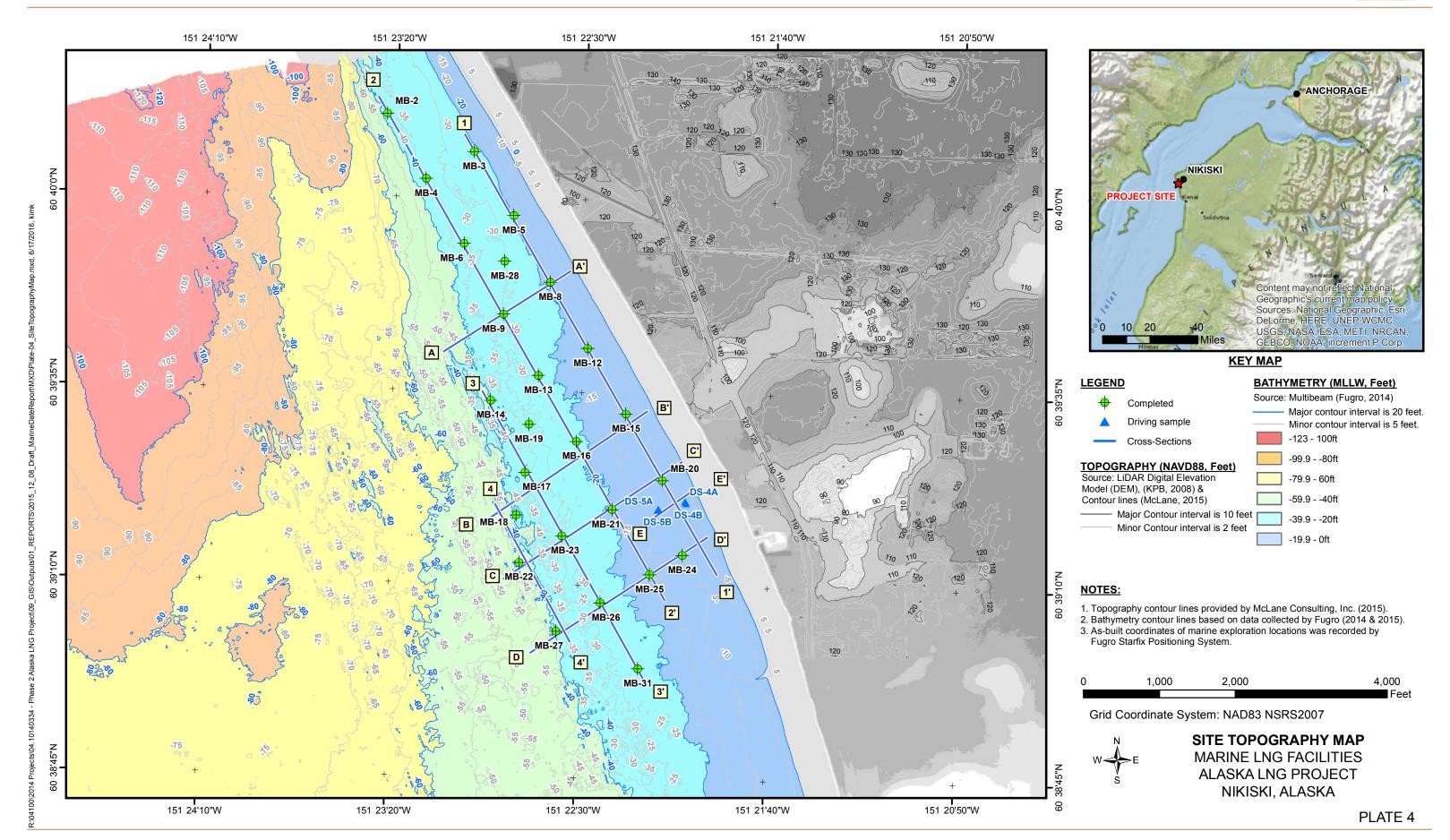


PLATE 2

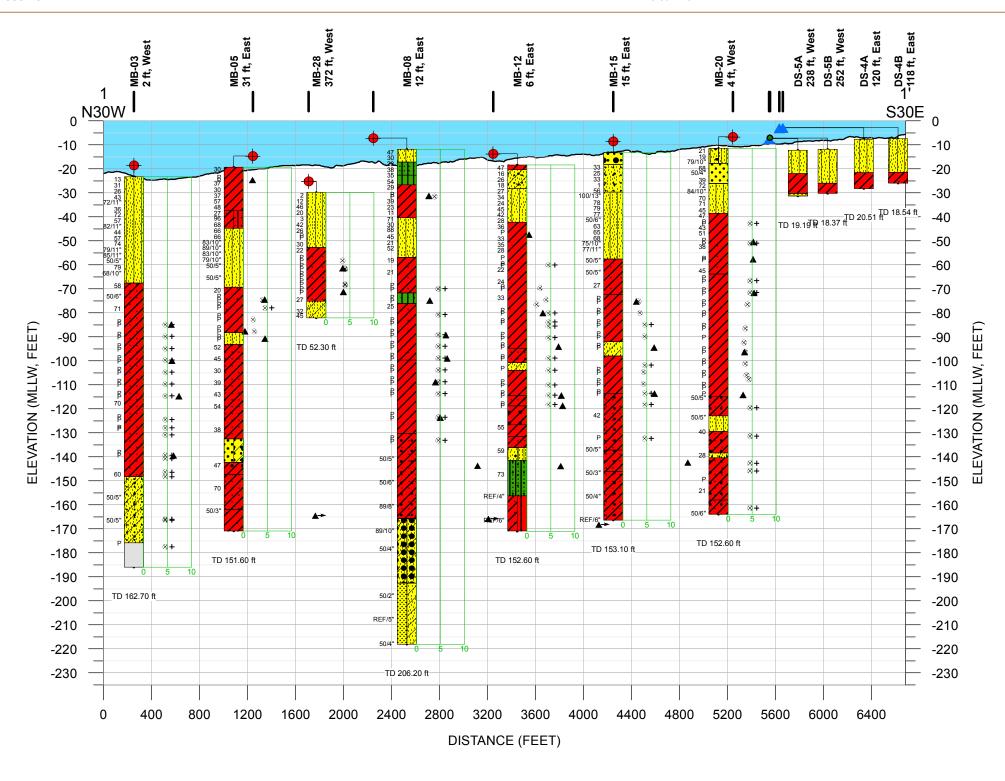


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- ▲ Unconsolidated Undrained Triaxial
- ⊕ Torvane
- ⊗ Pocket Penetrometer
- + Soil Strength Exceeds Instrument's Maximum Measurable Strength.

#### **TUBE AND SPT SAMPLES**

- P Push thin-walled 3" tube.
- Number of blows to produce 12" of penetration after the initial 6" of seating.
- 86/11" Number of blows required to produce the indicated penetration after an initial 6" seating.
- Ref/3" 50 blows produced the indicated penetration during the initial 6" interval.

#### NOTES:

- 1) Bathymetry data collected by Fugro in 2014 and 2015. Elevation is referenced to MLLW.
- 2) As-Built coordinates of marine exploration locations was recorded by Fugro Starfix Positioning System.
- As-built elevations of the exploration locations are referenced to MLLW and calculated using bathymetry data (Fugro 2014 & 2015).
- 4) See Plate 3 and Plate 4 for location of explorations and cross section lines.
- The following formula is used to convert the elevations from MLLW to NAVD88 for marine LNG Facilities area: EL in feet (NAVD88) = EL in feet (MLLW) - 7.32ft

#### **LEGEND**

#### **GEOTECHNICAL EXPLORATIONS**

Marine Boring (2015)

— Bathymetry, MLLW, Feet

Drive Sampling

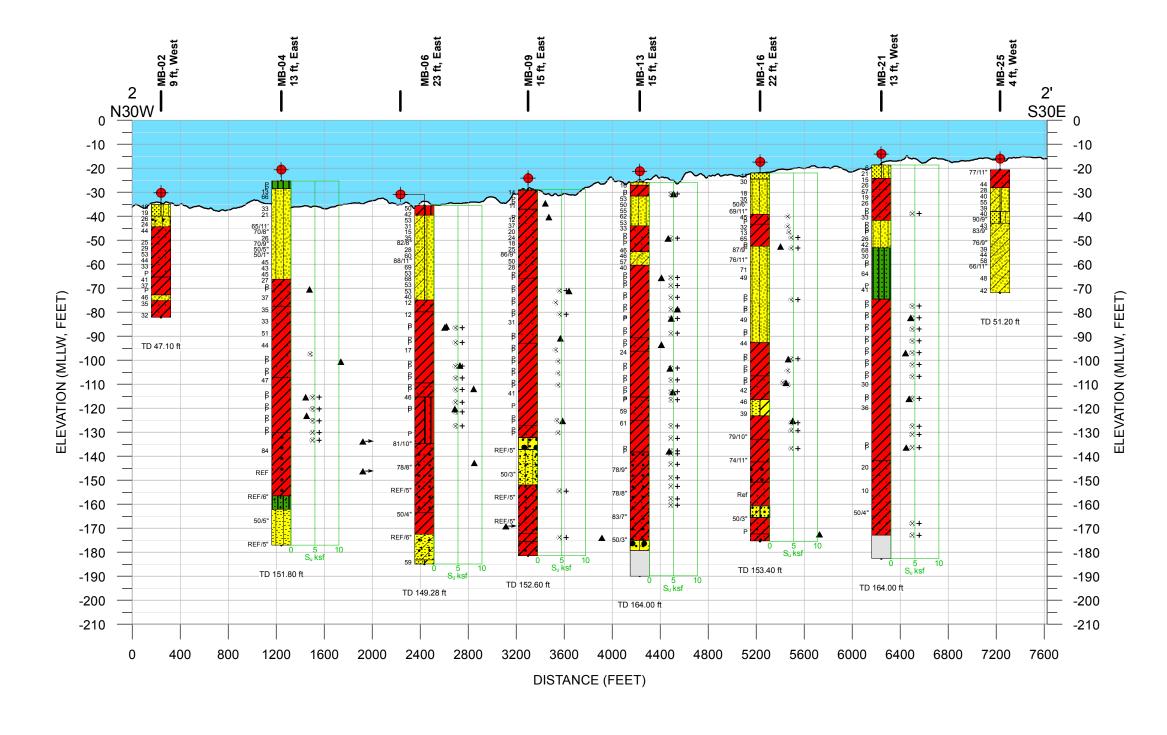
#### SOIL DESCRIPTIONS

- Lean Clay (CL)
- Lean Clay with Gravel (CL)
- Sandy Lean Clay (CL)
- Lean Clay with Sand (CL)
- Sandy Lean Clay with Gravel (CL)
- Clayey Gravel (GC)
- Silty Gravel (GM)
- Gravel (GP)
- Gravel (GW)
- Silt (ML)
- Sandy Silt (ML)
- Sandy Silt with Gravel (ML)
- Silt with Sand (ML)
- /// Clayey Sand (SC)
- Clayey Sand with Gravel (SC)
- Silty Sand (SM)
- Sand (SP)
- Sand with Silt (SP-SM)
- Sand with Gravel (SW)
- Sand with Clay and Gravel (SW-SC)
- Sand with Silt and Gravel (SW-SM)
- Rat Hole for PS Logging

40 ft

Vertical Exaggeration = 20.0X

SUBSURFACE CROSS SECTION 1 - 1'



- ▲ Unconsolidated Undrained Triaxial
- ⊕ Torvane
- ⊗ Pocket Penetrometer
- + Soil Strength Exceeds Instrument's Maximum Measurable Strength.

#### **TUBE AND SPT SAMPLES**

- P Push thin-walled 3" tube.
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- 86/11" Number of blows required to produce the indicated penetration after an initial 6" seating.
- Ref/3" 50 blows produced the indicated penetration during the initial 6" interval.

#### NOTES:

- 1) Bathymetry data collected by Fugro in 2014 and 2015. Elevation is referenced to MLLW.
- 2) As-Built coordinates of marine exploration locations was recorded by Fugro Starfix Positioning System.
- As-built elevations of the exploration locations are referenced to MLLW and calculated using bathymetry data (Fugro 2014 & 2015).
- 4) See Plate 3 and Plate 4 for location of explorations and cross section lines.
- The following formula is used to convert the elevations from MLLW to NAVD88 for marine LNG Facilities area: EL in feet (NAVD88) = EL in feet (MLLW) - 7.32ft

#### **LEGEND**

#### **GEOTECHNICAL EXPLORATIONS**

Marine Boring (2015)

Bathymetry, MLLW, Feet

#### SOIL DESCRIPTIONS

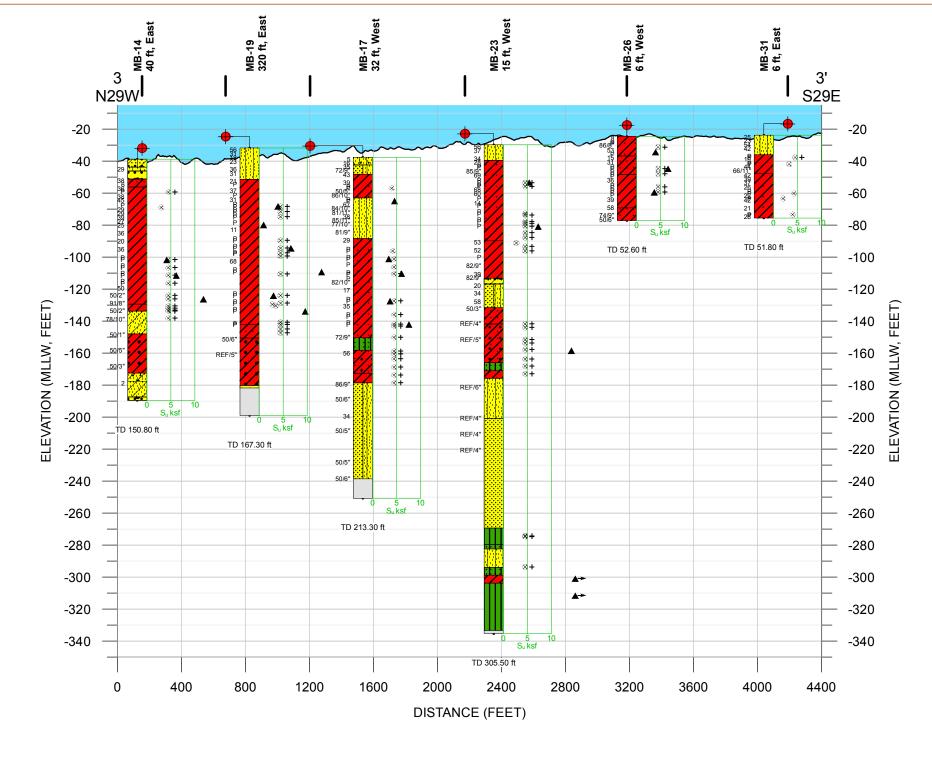
- Lean Clay (CL)
- Lean Clay with Gravel (CL)
- Sandy Lean Clay (CL)
- Lean Clay with Sand (CL)
- Sandy Lean Clay with Gravel (CL)
- Clayey Gravel (GC)
- Silty Gravel (GM)
- Gravel (GP)
- Gravel with Clay and Sand (GP-GC-S)
- Gravel (GW)
- Silt (ML)
- Sandy Silt (ML)
- Sandy Silt with Gravel (ML)
- Silt with Sand (ML)
- Clayey Sand (SC)
- Clayey Sand with Gravel (SC)
- Silty Sand (SM)
- Sand (SP)
- Sand with Silt (SP-SM)
- Sand (SW)
- Sand with Gravel (SW)
- Rat Hole for PS Logging

40 ft

<sub>I</sub> 800 ft

Vertical Exaggeration = 20.0X

#### **SUBSURFACE CROSS SECTION 2 - 2'**



- ▲ Unconsolidated Undrained Triaxial
- ⊕ Torvane
- ⊗ Pocket Penetrometer
- + Soil Strength Exceeds Instrument's Maximum Measurable Strength.

#### **TUBE AND SPT SAMPLES**

- P Push thin-walled 3" tube.
- Number of blows to produce 12" of penetration after the initial 6" of seating.
- 86/11" Number of blows required to produce the indicated penetration after an initial 6" seating.
- Ref/3" 50 blows produced the indicated penetration during the initial 6" interval.

#### NOTES:

- 1) Bathymetry data collected by Fugro in 2014 and 2015. Elevation is referenced to MLLW.
- 2) As-Built coordinates of marine exploration locations was recorded by Fugro Starfix Positioning System.
- As-built elevations of the exploration locations are referenced to MLLW and calculated using bathymetry data (Fugro 2014 & 2015).
- 4) See Plate 3 and Plate 4 for location of explorations and cross section lines.
- 5) The following formula is used to convert the elevations from MLLW to NAVD88 for marine LNG Facilities area: EL in feet (NAVD88) = EL in feet (MLLW) 7.32ft

#### **LEGEND**

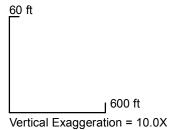
#### **GEOTECHNICAL EXPLORATIONS**

Marine Boring (2015)

— Bathymetry, MLLW, Feet

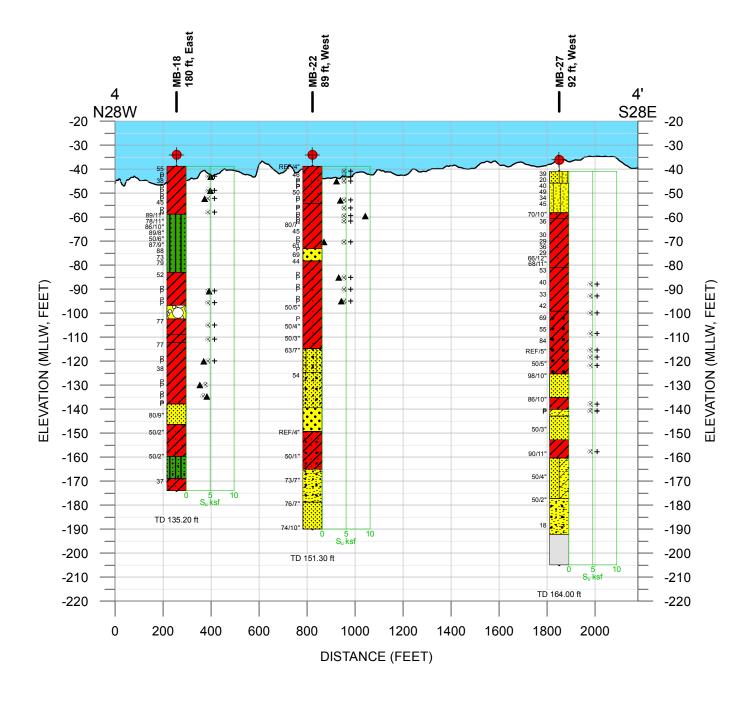
#### **SOIL DESCRIPTIONS**

- Lean Clay (CL)
- Lean Clay with Gravel (CL)
- Sandy Lean Clay (CL)
- Lean Clay with Sand (CL)
- Sandy Lean Clay with Gravel (CL)
- Clayey Gravel with Sand (GC)
- Gravel (GP)
- Gravel (GW)
- Silt (ML)
- Sandy Silt (ML)
- Clayey Sand (SC)
- Clayey Sand with Gravel (SC)
- Silty Sand (SM)
- Silty Sand with Gravel (SM)
- Sand (SP)
- Sand with Silt (SP-SM)
- Sand with Clay and Gravel (SP-SC)
  - Rat Hole for PS Logging



#### SUBSURFACE CROSS SECTION 3 - 3'





- ▲ Unconsolidated Undrained Triaxial
- ⊕ Torvane
- ⊗ Pocket Penetrometer
- + Soil Strength Exceeds Instrument's Maximum Measurable Strength.

#### **TUBE AND SPT SAMPLES**

- P Push thin-walled 3" tube.
- Number of blows to produce 12" of penetration after the initial 6" of seating.
- 86/11" Number of blows required to produce the indicated penetration after an initial 6" seating.
- Ref/3" 50 blows produced the indicated penetration during the initial 6" interval.

#### IOTES:

- 1) Bathymetry data collected by Fugro in 2014 and 2015. Elevation is referenced to MLLW.
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- As-built elevations of the exploration locations are referenced to MLLW and calculated using bathymetry data (Fugro 2014 & 2015).
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- The following formula is used to convert the elevations from MLLW to NAVD88 for marine LNG Facilities area: EL in feet (NAVD88) = EL in feet (MLLW) - 7.32ft

#### **LEGEND**

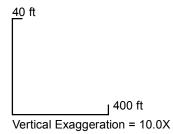
#### GEOTECHNICAL EXPLORATIONS

Marine Boring (2015)

--- Bathymetry, MLLW, Feet

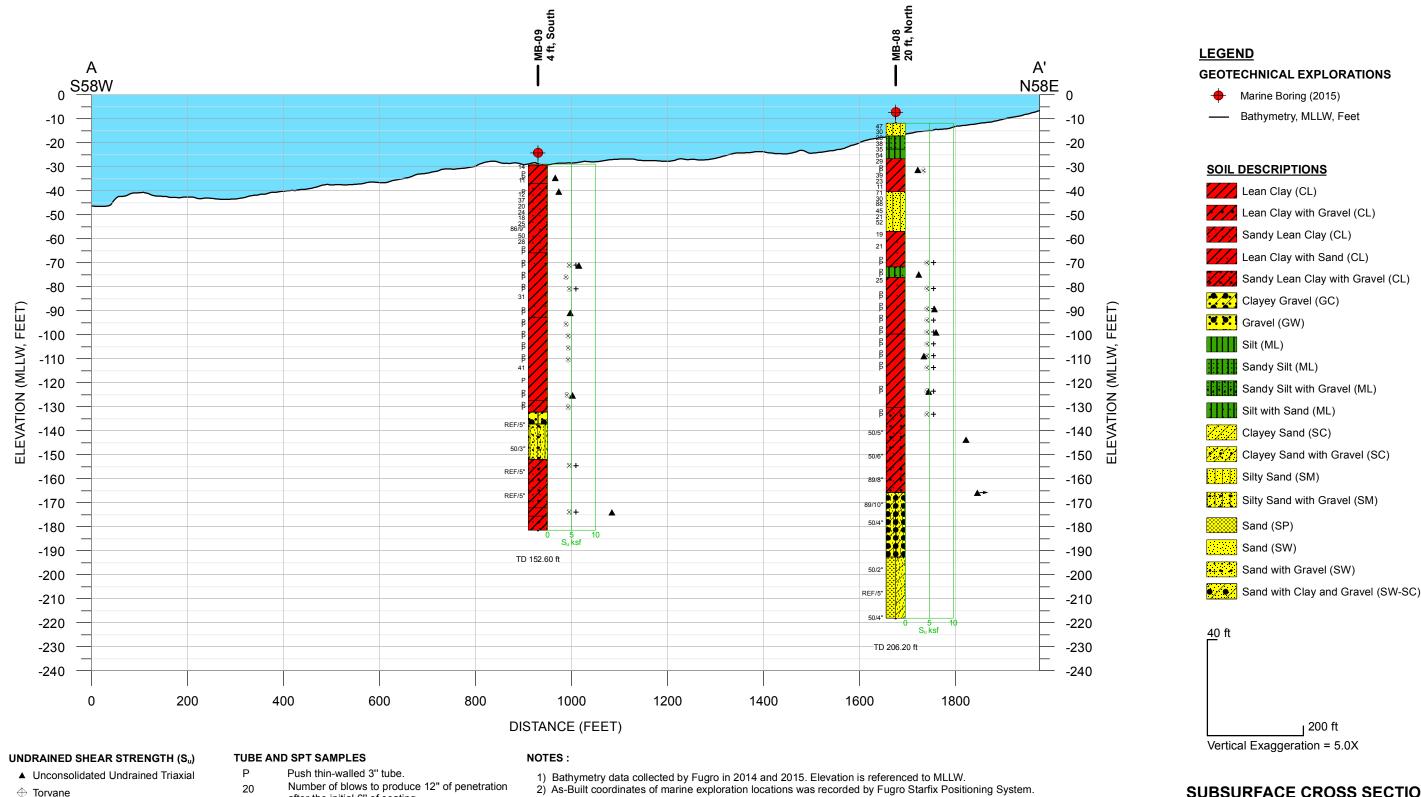
#### SOIL DESCRIPTIONS

- Lean Clay (CL)
- Lean Clay with Gravel (CL)
- Sandy Lean Clay (CL)
- Sandy Lean Clay with Gravel (CL)
- Lean Clay with Sand (CL)
- Granite Boulder (COBBLE)
- Gravel (GP)
- Sandy Silt (ML)
- Sandy Silt with Gravel (ML)
- Silt with Sand (ML)
- Clayey Sand (SC)
- Clayey Sand with Gravel (SC)
- Silty Sand (SM)
- Sand with Silt (SP-SM)
- Sand (SP)
- Sand with Gravel (SP)
- Sand with Gravel (SW)
- Rat Hole for PS Logging



#### SUBSURFACE CROSS SECTION 4 - 4'





3) As-built elevations of the exploration locations are referenced to MLLW and calculated using

4) See Plate 3 and Plate 4 for location of explorations and cross section lines.

5) The following formula is used to convert the elevations from MLLW to NAVD88 for

marine LNG Facilities area: EL in feet (NAVD88) = EL in feet (MLLW) - 7.32ft

bathymetry data (Fugro 2014 & 2015).

## SUBSURFACE CROSS SECTION A - A' MARINE LNG FACILITIES

ALASKA LNG PROJECT NIKISKI, ALASKA

⊗ Pocket Penetrometer

+ Soil Strength Exceeds Instrument's

Maximum Measurable Strength

after the initial 6" of seating.

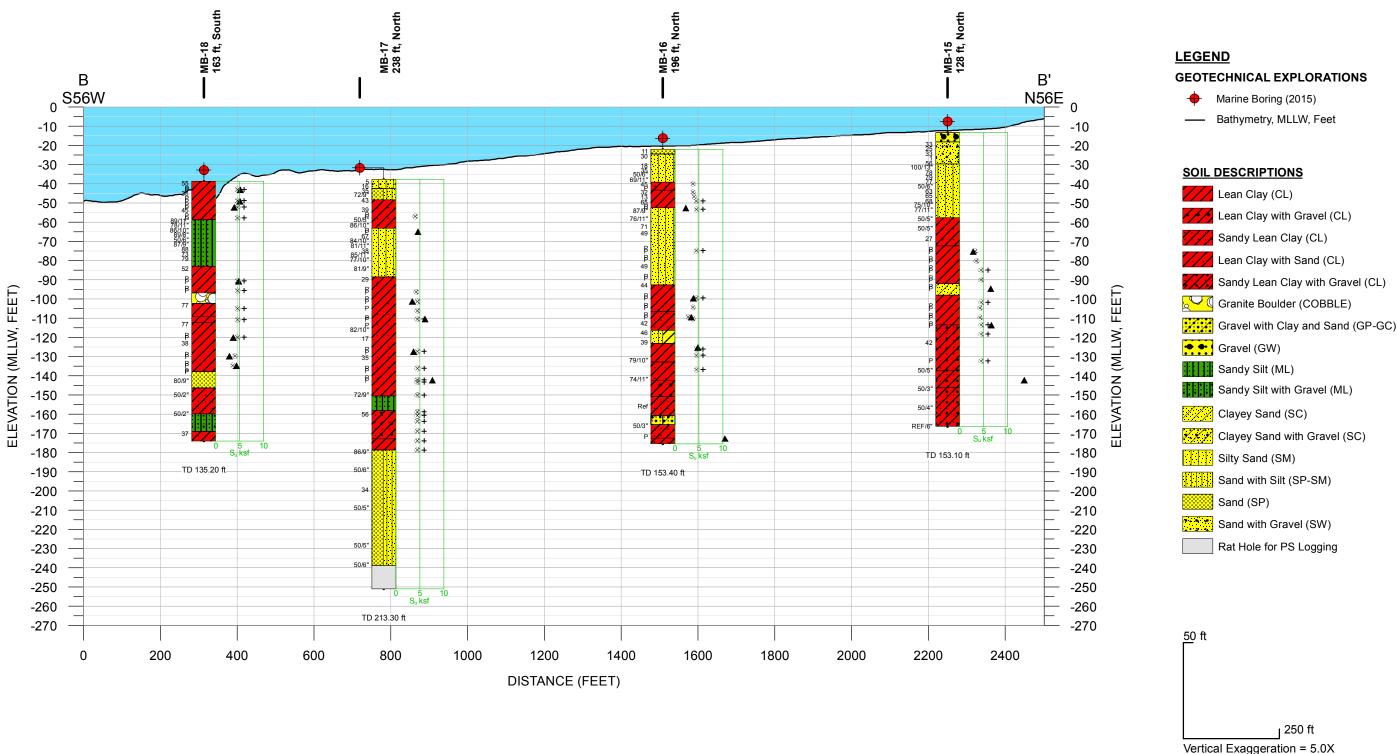
during the initial 6" interval.

Number of blows required to produce the

indicated penetration after an initial 6" seating.

50 blows produced the indicated penetration





- ▲ Unconsolidated Undrained Triaxial
- ⊕ Torvane
- ⊗ Pocket Penetrometer
- + Soil Strength Exceeds Instrument's Maximum Measurable Strength.

#### **TUBE AND SPT SAMPLES**

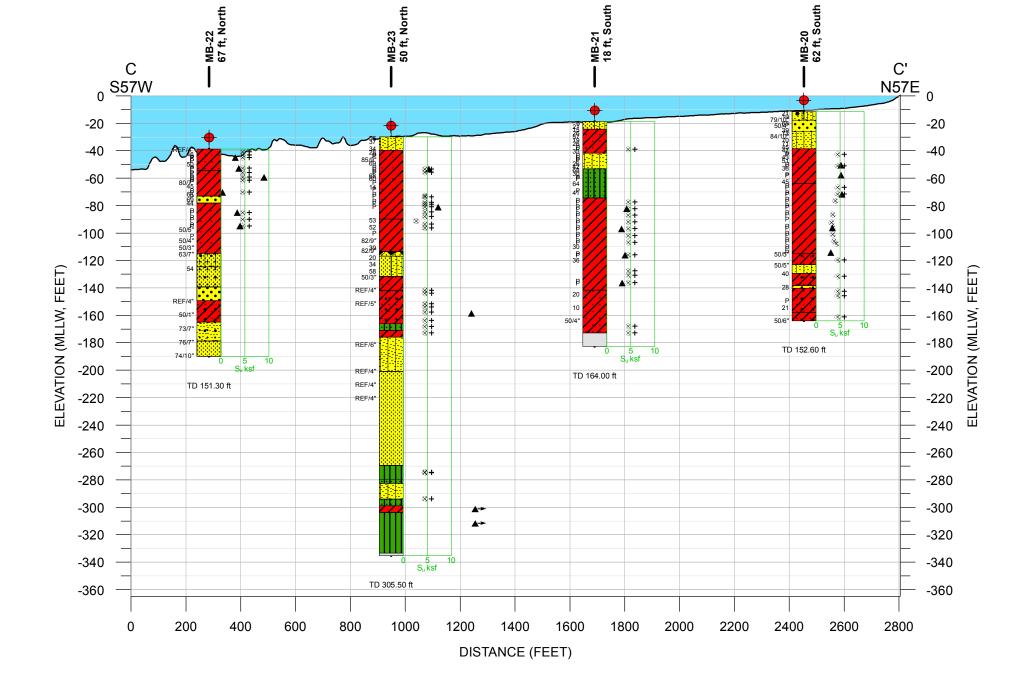
- P Push thin-walled 3" tube.
- Number of blows to produce 12" of penetration after the initial 6" of seating.
- 86/11" Number of blows required to produce the indicated penetration after an initial 6" seating.
- Ref/3" 50 blows produced the indicated penetration during the initial 6" interval.

#### NOTES:

- 1) Bathymetry data collected by Fugro in 2014 and 2015. Elevation is referenced to MLLW.
- 2) As-Built coordinates of marine exploration locations was recorded by Fugro Starfix Positioning System.
- As-built elevations of the exploration locations are referenced to MLLW and calculated using bathymetry data (Fugro 2014 & 2015).
- 4) See Plate 3 and Plate 4 for location of explorations and cross section lines.
- The following formula is used to convert the elevations from MLLW to NAVD88 for marine LNG Facilities area: EL in feet (NAVD88) = EL in feet (MLLW) - 7.32ft

#### SUBSURFACE CROSS SECTION B - B'





- ▲ Unconsolidated Undrained Triaxial
- ⊕ Torvane
- ⊗ Pocket Penetrometer
- + Soil Strength Exceeds Instrument's Maximum Measurable Strength.

#### **TUBE AND SPT SAMPLES**

- P Push thin-walled 3" tube.
- Number of blows to produce 12" of penetration after the initial 6" of seating.
- 86/11" Number of blows required to produce the indicated penetration after an initial 6" seating.
- Ref/3" 50 blows produced the indicated penetration during the initial 6" interval.

#### NOTES:

- 1) Bathymetry data collected by Fugro in 2014 and 2015. Elevation is referenced to MLLW.
- 2) As-Built coordinates of marine exploration locations was recorded by Fugro Starfix Positioning System.
- As-built elevations of the exploration locations are referenced to MLLW and calculated using bathymetry data (Fugro 2014 & 2015).
- 4) See Plate 3 and Plate 4 for location of explorations and cross section lines.
- 5) The following formula is used to convert the elevations from MLLW to NAVD88 for marine LNG Facilities area: EL in feet (NAVD88) = EL in feet (MLLW) 7.32ft

#### **LEGEND**

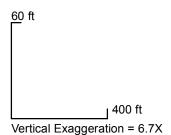
#### **GEOTECHNICAL EXPLORATIONS**

Marine Boring (2015)

--- Bathymetry, MLLW, Feet

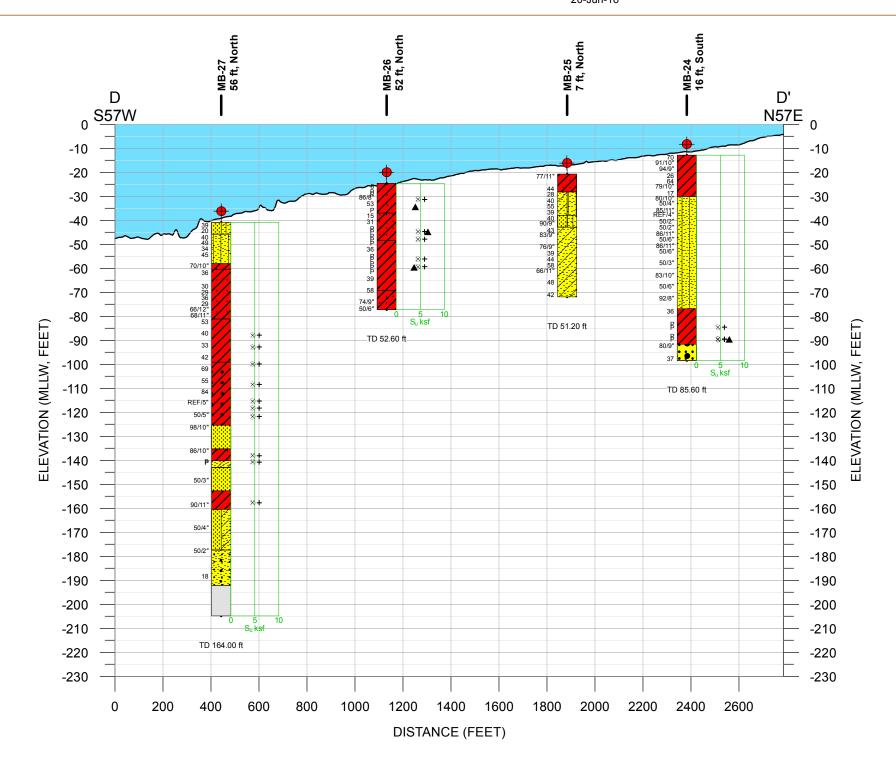
#### SOIL DESCRIPTIONS

- Lean Clay (CL)
- Sandy Lean Clay (CL)
- Lean Clay with Sand (CL)
- Sandy Lean Clay with Gravel (CL)
- Clayey Gravel with Sand (GC)
- Gravel (GP)
- Silt (ML)
- Sandy Silt (ML)
- Silty Sand (SM)
- Sand with Silt (SP-SM)
- Sand (SP)
- Sand with Gravel (SP)
- Sand with Gravel (SW)
- Sand with Silt and Gravel (SW-SM)
- Rat Hole for PS Logging



SUBSURFACE CROSS SECTION C - C'





- ▲ Unconsolidated Undrained Triaxial
- ⊕ Torvane
- ⊗ Pocket Penetrometer
- + Soil Strength Exceeds Instrument's Maximum Measurable Strength.

#### **TUBE AND SPT SAMPLES**

- P Push thin-walled 3" tube.
- Number of blows to produce 12" of penetration after the initial 6" of seating.
- 86/11" Number of blows required to produce the indicated penetration after an initial 6" seating.
- Ref/3" 50 blows produced the indicated penetration during the initial 6" interval.

#### NOTES:

- 1) Bathymetry data collected by Fugro in 2014 and 2015. Elevation is referenced to MLLW.
- 2) As-Built coordinates of marine exploration locations was recorded by Fugro Starfix Positioning System.
- As-built elevations of the exploration locations are referenced to MLLW and calculated using bathymetry data (Fugro 2014 & 2015).
- 4) See Plate 3 and Plate 4 for location of explorations and cross section lines.
- 5) The following formula is used to convert the elevations from MLLW to NAVD88 for marine LNG Facilities area : EL in feet (NAVD88) = EL in feet (MLLW) 7.32ft

#### <u>LEGEND</u>

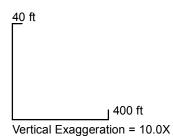
#### **GEOTECHNICAL EXPLORATIONS**

Marine Boring (2015)

— Bathymetry, MLLW, Feet

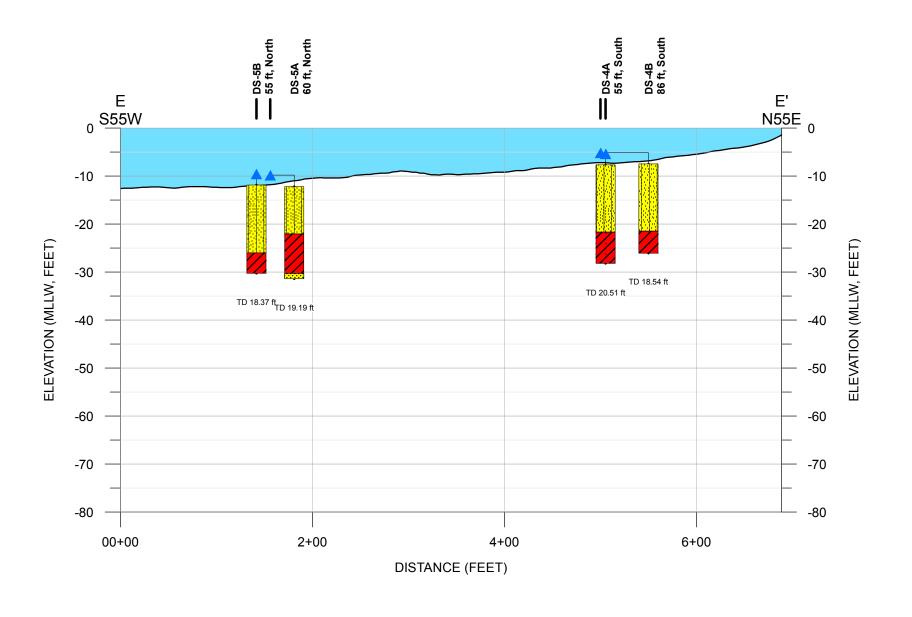
#### SOIL DESCRIPTIONS

- Lean Clay (CL)
- Lean Clay with Gravel (CL)
- Sandy Lean Clay (CL)
- Lean Clay with Sand (CL)
- Gravel (GW)
- Clayey Sand (SC)
- Silty Sand (SM)
- Sand with Silt (SP-SM)
- Sand (SP)
- Sand with Gravel (SW)
- Rat Hole for PS Logging



### SUBSURFACE CROSS SECTION D - D'



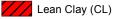


#### **LEGEND**

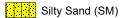
#### **GEOTECHNICAL EXPLORATIONS**

Bathymetry, MLLW, FeetDrive Sampling

#### **SOIL DESCRIPTIONS**









# \_\_\_\_\_\_ 100 ft Vertical Exaggeration = 5.0X

#### SUBSURFACE CROSS SECTION E - E'

MARINE LNG FACILITIES ALASKA LNG PROJECT NIKISKI, ALASKA

#### UNDRAINED SHEAR STRENGTH (Su)

- ▲ Unconsolidated Undrained Triaxial
- ⊕ Torvane
- ⊗ Pocket Penetrometer
- + Soil Strength Exceeds Instrument's Maximum Measurable Strength.

#### **TUBE AND SPT SAMPLES**

- P Push thin-walled 3" tube.
- Number of blows to produce 12" of penetration after the initial 6" of seating.
- 86/11" Number of blows required to produce the indicated penetration after an initial 6" seating.
- Ref/3" 50 blows produced the indicated penetration during the initial 6" interval.

#### IOTES ·

- 1) Bathymetry data collected by Fugro in 2014 and 2015. Elevation is referenced to MLLW.
- As-Built coordinates of marine exploration locations was recorded by Fugro Starfix Positioning System.
   As-built elevations of the exploration locations are referenced to MLLW and calculated using
- bathymetry data (Fugro 2014 & 2015).
- 4) See Plate 3 and Plate 4 for location of explorations and cross section lines.
  5) The following formula is used to convert the elevations from MLLW to NAVD88 for
- marine LNG Facilities area : EL in feet (NAVD88) = EL in feet (MLLW) 7.32ft

Report No. 04.10140334-9



#### **APPENDIX A**

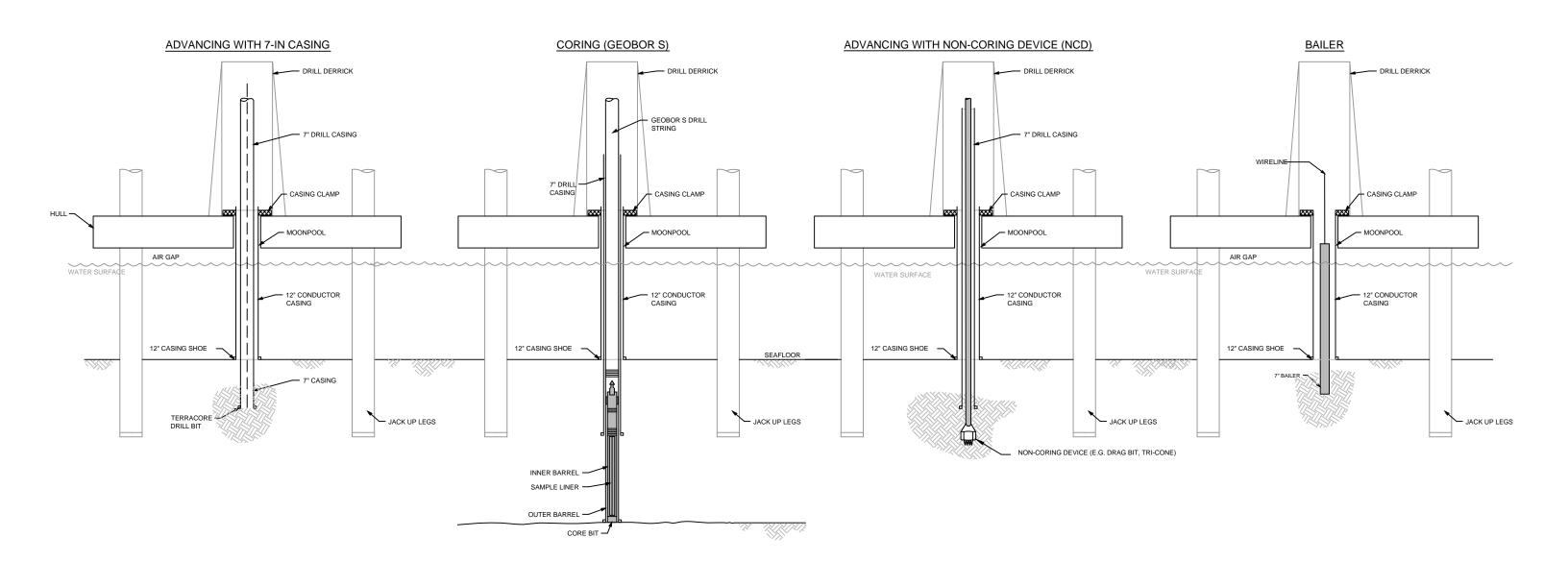
Summary of Explorations

Drilling and Sampling Schematics

Vessel Specifications



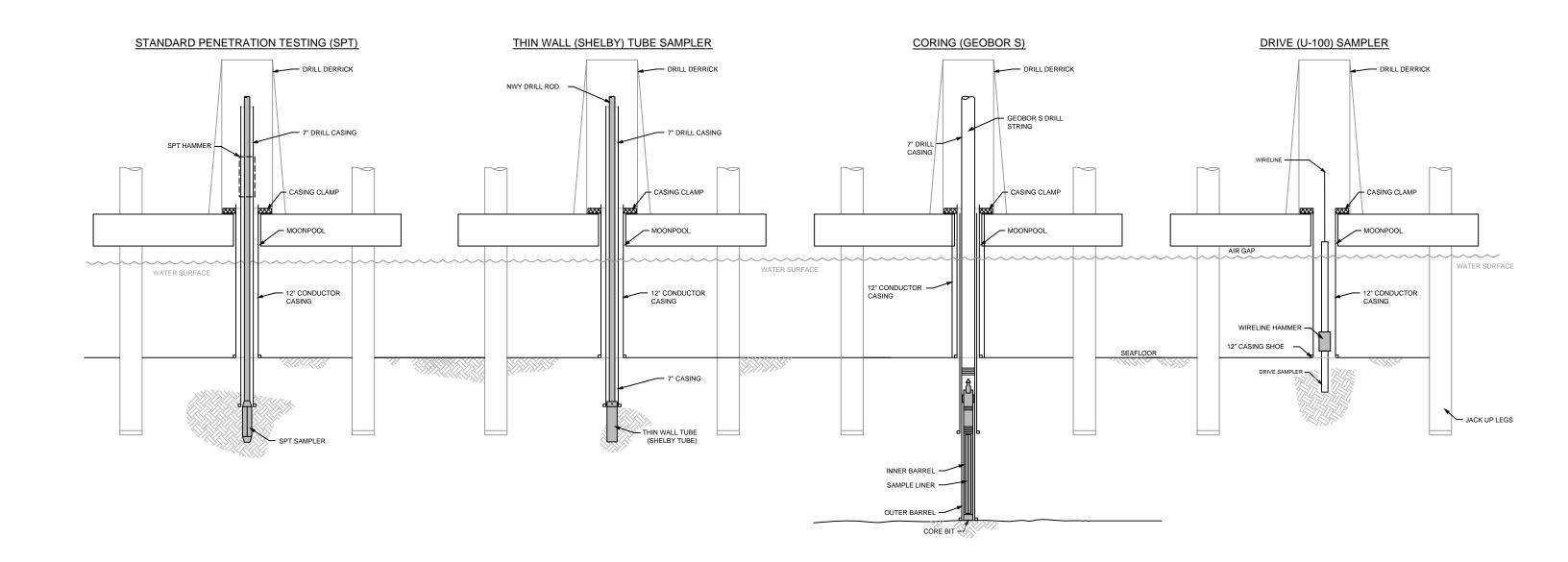
										SUMMARY (	F FIELD OPE	RATION											
Exploration						Coordinates and Elevations										Drillin <sup>,</sup>		ing Status					
	Туре	Area	PS-Logging	g SPT Hammer	12-in Casing Depth (ft)	7-in Casing Depth (ft)	Proposed Coordinates (NAD83) and Elevation Actual Coordinates (NAD83) Mudline Elevation																
Explorations (Completed)							Latitude (deg)	Longitude (deg)	Elev (ft, MLLW)	Latitude (deg)	Longitude (deg)	Deck to Mudline (ft)	Water Depth (ft)		nd Time easurement)	Starfix Deck Level (ft, MLLW)	Mudline Elevation based on Starfix Deck Level (ft, MLLW)	Mudline Elevation based on Tide Level (ft, MLLW)	Mudline Elevation based on Bathymetry (ft,	Proposed Depth (ft)	Actual Depth (ft)	Date Started	Date Completed
MB-02	Boring	Marine Terminal		SPT-09 / SPT-02	-	47.1	60.66968565	-151.38955043	-34.0	60.66965211	-151.38962336	60.37	48.6	12-Sep-15	2:05	25.20	-35.2	-35.0	-35.2	50	47.1	11-Sep-15	12-Sep-15
MB-03	Boring	Marine Terminal	Х	SPT-02	3	36.9	60.66837816	-151.38310777	-22.2	60.66833486	-151.38317767	51.51	39.4	23-Oct-15	16:10	27.89	-23.6	-23.3	-23.1	150	162.7	23-Oct-15	
MB-04	Boring	Marine Terminal		SPT-09	-	85.3	60.66733148	-151.38670417	-36.3	60.66732889	-151.38666733	61.02	44.6	20-Aug-15	5:10	26.15	-34.9	-36.3	-36.4	150	151.8	20-Aug-15	21-Aug-15
MB-05	Boring	Marine Terminal		SPT-09	-	68.9	60.66602656	-151.38026536	-19.7	60.66605106	-151.38017992	46.26	29.2	18-Aug-15	3:58	25.46	-20.8	-19.4	-18.9	150	151.6	18-Aug-15	19-Aug-15
MB-06	Boring	Marine Terminal	X	SPT-02	23.6	64	60.66498006	-151.38386173	-34.9	60.66501117	-151.38379131	63.32	51.2	16-Sep-15	16:55	28.54	-34.8	-35.6	-33.9	150	149.3	16-Sep-15	18-Sep-15
MB-08	Boring	Marine Terminal		SPT-09	-	139.1	60.66367207	-151.37741997	-16.8	60.66367342	-151.37739867	41.01	26.9	23-Aug-15	13:00	25.95	-15.1	-11.8	-16.7	300	206.2	23-Aug-15	25-Aug-15
MB-09	Boring	Marine Terminal		SPT-09	-	78.7	60.66264565	-151.38096312	-29.7	60.66249628	-151.38079069	54.13	36.9	25-Aug-15	21:30	27.56	-26.6	-28.9	-28.8	150	152.6	25-Aug-15	28-Aug-15
MB-12	Boring	Marine Terminal		SPT-09	-	54.1	60.66132056	-151.37457866	-16.7	60.66132147	-151.37456722	48.56	35.4	21-Aug-15	23:05	23.95	-24.6	-18.4	-16.6	150	152.6	21-Aug-15	23-Aug-15
MB-13	Boring	Marine Terminal	Х	SPT-09	1.6	23.8	60.66027548	-151.37817623	-25.0	60.66030914	-151.37814189	52.49	32.8	2-Oct-15	12:30	26.12	-26.4	-26.0	-25.1	150	164.0	2-Oct-15	4-Oct-15
MB-14	Boring	Marine Terminal		SPT-02	1.6	59.9	60.65936928	-151.38157163	-38.8	60.65939000	-151.38159111	63.32	54.8	21-Oct-15	14:15	23.65	-39.7	-38.9	-39.0	50	150.8	21-Oct-15	23-Oct-15
MB-15	Boring	Marine Terminal		SPT-09	-	55.8	60.65896617	-151.37173437	-13.2	60.65898078	-151.37165869	39.37	30.5	3-Sep-15	10:23	25.49	-13.9	-13.3	-12.9	150	153.1	3-Sep-15	4-Sep-15
MB-16	Boring	Marine Terminal		SPT-09	-	79.6	60.65791979	-151.37533010	-21.9	60.65796353	-151.37525403	45.93	39.0	5-Sep-15	0:05	22.64	-23.3	-22.0	-21.8	150	153.4	5-Sep-15	7-Sep-15
MB-17	Boring	Marine Terminal	Х	SPT-02	2.3	38.5	60.65685945	-151.37897324	-36.8	60.65681081	-151.37898244	62.34	51.2	18-Sep-15	17:30	25.56	-36.8	-37.6	-36.9	150	213.3	18-Oct-15	20-Oct-15
MB-18	Boring	Marine Terminal		SPT-09	1.6	58.1	60.65531462	-151.37951053	-38.7	60.65527456	-151.37954225	67.91	48.2	19-Sep-15	17:00	29.40	-38.5	-38.7	-38.3	300	135.2	19-Sep-15	21-Sep-15
MB-19	Boring	Marine Terminal	Х	SPT-09	1.6	37.7	60.65856157	-151.37877812	-32.2	60.65854333	-151.37877392	61.68	47.9	9-Oct-15	18:00	28.97	-32.7	-31.8	-32.3	150	167.3	9-Oct-15	11-Oct-15
MB-20	Boring	Marine Terminal		SPT-09	-	57.4	60.65661431	-151.36889362	-10.8	60.65661392	-151.36889178	35.43	19.7	7-Sep-15	10:09	24.31	-11.1	-11.4	-10.8	150	152.6	7-Sep-15	8-Sep-15
MB-21	Boring	Marine Terminal	Х	SPT-02	1.6	36.7	60.65556812	-151.37248932	-18.2	60.65553589	-151.37254192	51.18	39.4	16-Oct-15	18:25	31.99	-19.2	-18.7	-17.9	150	164.0	16-Oct-15	17-Oct-15
MB-22	Boring	Marine Terminal	Х	SPT-09	1	1.3	60.65354222	-151.37931635	-40.5	60.65356186	-151.37928597	67.91	55.8	5-Oct-15	12:30	26.87	-41.0	-38.8	-40.3	150	151.2	5-Oct-15	7-Oct-15
MB-23	Boring	Marine Terminal	Х	SPT-09 / SPT-02	1.6	37.7	60.65451384	-151.37609289	-28.2	60.65454731	-151.37617150	51.18	42.3	12-Oct-15	14:00	22.01	-29.2	-29.8	-29.4	150	305.4	12-Oct-15	15-Oct-15
MB-24	Boring	Marine Terminal		SPT-02	0.3	64	60.65394631	-151.36724314	-11.4	60.65393967	-151.36730675	49.21	34.1	27-Oct-15	15:20	36.38	-12.8	-12.8	-11.4	150	85.6	27-Oct-15	2-Nov-15
MB-25	Boring	Marine Terminal		SPT-09	-	51.2	60.65321625	-151.36964880	-17.1	60.65322350	-151.36967892	33.79	18.7	9-Sep-15	9:30	16.37	-17.4	-17.3	-17.2	50	51.2	9-Sep-15	9-Sep-15
MB-26	Boring	Marine Terminal		SPT-09	-	52.6	60.65215172	-151.37327709	-25.4	60.65216953	-151.37327900	52.82	43.0	9-Sep-15	17:50	27.92	-24.9	-24.6	-25.1	50	52.6	10-Sep-15	11-Sep-15
MB-27	Boring	Marine Terminal	Х	SPT-09	1.6	37.7	60.65108266	-151.37650592	-39.7	60.65111592	-151.37646725	67.26	57.4	7-Oct-15	15:55	24.93	-42.3	-40.8	-39.9	150	164.0	7-Oct-15	9-Oct-15
MB-28	Boring	Marine Terminal		SPT-09	1.6	52.3	60.66436151	-151.38083773	-29.1	60.66439822	-151.38078286	61.35	42.7	11-Oct-15	13:40	31.73	-29.6	-29.9	-29.2	50	52.3	11-Oct-15	12-Oct-15
MB-31	Boring	Marine Terminal		SPT-09	-	51.8	60.64981415	-151.37039894	-24.6	60.64981225	-151.37039036	49.54	41.0	11-Sep-15	6:06	24.48	-25.1	-23.8	-24.6	50	51.8	11-Sep-15	11-Sep-15
DS-4A	Boring	Marine Terminal		-	1.6	4.11	60.65585278	-151.36719444	-7.8	60.65588414	-151.36719431	32.81	15.1	2-Nov-15	16:15	24.44	-8.4	-7.7	-7.7	19	20.5	2-Nov-15	2-Nov-15
DS-4B	Boring	Marine Terminal		-	1.3	1.6	60.65585278	-151.36719444	-7.8	60.65580844	-151.36712022	33.14	18.0	3-Nov-15	0:15	25.00	-8.1	-7.5	-7.7	19	18.5	3-Nov-15	3-Nov-15
DS-5A	Boring	Marine Terminal		-	1.3	19.19	60.65559167	-151.36910000	-11.7	60.65557886	-151.36914764	34.12	29.5	4-Nov-15	12:40	20.96	-13.2	-12.2	-11.8	19	19.2	4-Nov-15	4-Nov-15
DS-5B	Boring	Marine Terminal		-	1.3	16.4	60.65559167	-151.36910000	-11.7	60.65554508	-151.36919739	34.45	18.4	4-Nov-15	18:05	21.69	-12.8	-11.9	-12.0	19	19.2	4-Nov-15	4-Nov-15



## SCHEMATIC FOR BOREHOLE ADVANCEMENT MARINE LNG FACILITIES

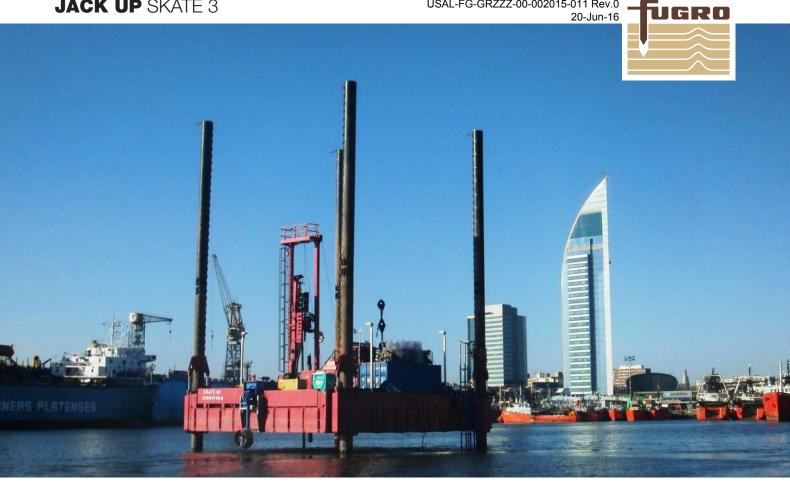
ALASKA LNG PROJECT NIKISKI, ALASKA (NOT TO SCALE)





## SCHEMATIC FOR BOREHOLE SAMPLING MARINE LNG FACILITIES

ALASKA LNG PROJECT NIKISKI, ALASKA (NOT TO SCALE)



## **FUGRO SEACORE** SKATE 3

The Skate 3 range consists of medium sized, high payload, container transportable jack-up platforms. These platforms have a low international transport cost coupled with high performance capabilities.

Skate 3's modular design means that jack-ups can be provided in a variety of sizes, with deck areas ranging from 178 m2 to 238.1 m2 and the capability of operating in water depths between 1-30m. Each craft in the Skate range has a rapid deck elevating system and is equipped with 4 legs mounted externally to provide maximum stability.

All pontoon components and equipment are designed around the container freight concept. The pontoons double as containers in which the jack-up legs, power units and all other ancillary equipment are housed. This allows cost-effective international transportation by road, rail or container ship. Assembly and

commissioning of the jack-up is achieved in under two shifts.

The jack-ups can be fitted with one of the range of Fugro Seacore hydraulic thrusters to provide self propulsion. In compact configurations, these fast elevating, self propelled jack-up craft are ideal for confined intertidal areas, where swift, accurate moving and positioning is required. In their larger configuration Skate 3 jack-ups are capable of working safely in exposed open seas.

For maximum safety, they are equipped with rigid steel bulwarks and 110V fluorescent lights providing full inboard and outboard illumination for 24 hour working.

All Fugro Seacore jack-ups are equipped with VHF radios, life saving and first aid equipment, and high-speed, outboard driven personnel launches.

Operated and maintained exclusively by Fugro Seacore's trained and experienced marine engineers, the Skate 3 jack-up is a versatile, stable, self-elevating platform for overwater work.



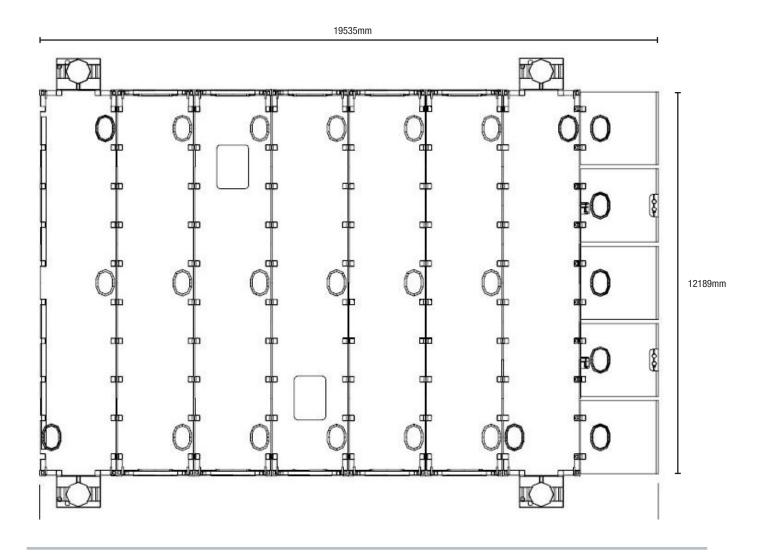
Skate 3 on site in Uruquay.



## **SPECIFICATIONS**

#### Skate 3 Jack Up Barge

Max Separation:	32m
Working Draft:	0.985m
No. of Containers	7
Deck Area:	238.1 sq m
Leg Size:	762mm
Elevating System:	Hydraulic Ram & Duo Pin Rack
Accommodation	Workshop/canteen container



#### **Fugro Seacore Ltd**

Bickland Industrial Park
Falmouth

Cornwall

TR11 4TA

T +44 (0) 1326 254 500

E info@seacore.com

www.seacore.com



## FUGRO SEACORE COMACCHIO MC1200

The MCS 1200 is a hydraulic skid mounted drilling rig capable of operating all rotary and/or rotary percussive drilling systems.

During the design stage Fugro Seacore worked closely with Comacchio to ensure the development of fully integrated drilling unit capable of withstanding both the complex and rigorous nature of marine works. For example the MCS 1200 has a unique triple holding clamp and breakout arrangement for handling the various casings required, these are complimented by a set of hydraulically adjusted drill string centralisers.

The main mast is equipped with a crane boom and a drill string manipulator arm that enables drill rods and casings to be manoeuvred to and from the working deck with minimal manual intervention.

The main power supply is fully silenced and the hydraulics operate a closed system with bio-degradable oil.

The control console is deployed on a multi positional arm enabling the driller an uninterrupted view of all drilling activities and all rotating parts are guarded within a fully interlocked cage.

The MCS 1200 is suitable for all aspects of rotary soil investigations, core drilling as well as specialised civil engineering works such as micropiles, anchors and ground consolidation works.

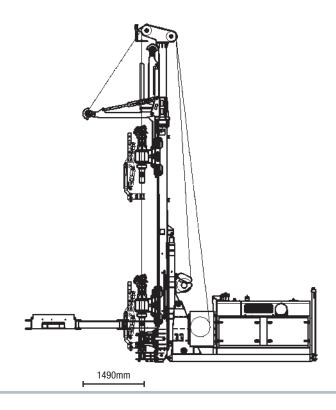


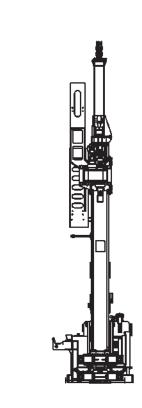


## **SPECIFICATIONS**

Power Pack:	
Diesel Engine:	New generation 132 Kw DEUTZ diesel engine series 2012
Engine power:	132Kw (180HP)/ 2300 rpm
Main Pump:	2 x 190 lt/min / 2 x 50,2 gal/min
Oil tank:	400Lt / 105,6 gal
Fuel tank:	350lt / 92,5 gal
Mast	
Feed stroke:	4.750/7.200/10.200mm
Total length:	7.100/9.550/12.550 mm/ 23,3/31,3/41,2 ft
Feed force:	7.000 daN/ 15,736 lbs
Retract force:	7,000 daN/ 15,736 lbs
Clamps:	
Min Handling:	45mm / 1,8 in
Max Handling:	360mm /14,1 in
Clamping force:	280KN / 62,946 lbs
Breaking torque:	3.500 daNm / 25,814 lb ft

Rotary Head:		
Gears:	6	
Max torque:	1,230 daNm/ 9,072 lb-ft	
Max speed:	340 (550) rpm	
Head passage:	93mm/3,6 in	
Swivel passage:	2"	
we i		
Winch:		
Max line pull:	2.000daN / 4.496 lbs	
Drum capacity:	50mt / 164 ft	
Rope speed:	30mt/min / 98 ft/min	
Rope diameter:	10mn / 0,39 in	





9076mm

#### **Fugro Seacore Ltd**

Bickland Industrial Park Falmouth Cornwall TR11 4TA

T +44 (0) 1326 254 500 E info@seacore.com

www.seacore.com

## **FUGRO SEACORE** CR2 MARINE DRILL

Fugro Seacore's specialised inshore marine drilling mast CR2 is a multi-purpose, twin 'A' frame mast measuring 12m x 2.1m. It is designed to reduce the unproductive, labour intensive operations normally associated with overwater drilling.

Cable tool boring is carried out using a 2.5 tonne freefall winch. The use of the hydraulic rod/casing clamp replaces time consuming, conventionally bolted clamps.

Deck mounted mechanical bailing tippers allow removal of spoil from drilling tools in a productive, but safe, operative manner.

If required insitu testing equipment, rods, conductor casings etc., can be vertically stacked within the mast in 9 metre lengths. These are handled by a 5T hydraulic winch. The CR2 incorporates a high powered Dando 500 hydraulic power swivel for rotary drilling and coring.

For rotary open-hole drilling the boreholes are excavated without conductor or liner casings. Stability of the unlined holes is provided by drilling muds which are guar-based, non toxic and bio-degradable.

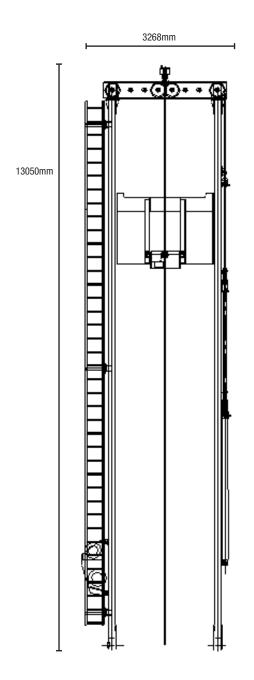
Conventional or wireline cores can be carried in a variety of sizes.

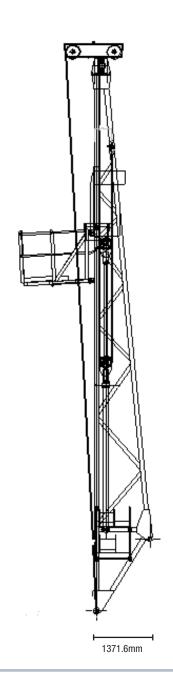


CR2 Marine Drill at Barrow OWF



## **SPECIFICATIONS**





#### **Fugro Seacore Ltd**

Bickland Industrial Park
Falmouth
Cornwall
TR11 4TA
T +44 (0) 1326 254 500
E info@seacore.com

www.seacore.com

USAL-FG-GRZZZ-00-002015-011 Rev.0 20-Jun-16



#### **GEOBOR-S**



GEOBOR-S triple tube wireline drilling system which has been specially developed for high quality geotechnical investigations of soil and rock formations

In its 30 years of drilling experience, Fugro Seacore has examined and tested many methods of coring - aiming to minimise core disturbance and maximise core recovery.

#### **GEOBOR-S System**

Our experience leads us to recommend the use of GEOBOR-S triple tube wireline drilling system, which has been specially developed for core drilling and undisturbed sampling in a wide variety of soil and rock formations. The GEOBOR-S is a "triple tube" core barrel which cuts an "S" size core sample. It has a plastic core liner, which is seated within the inner barrel assembly, considerably reducing friction between the core and the inner tube and enhancing core recovery.

#### **Sample Recovery**

A nominal 102 mm diameter core sample is recovered from this system, generally in 1.5 m lengths. This larger diameter enhances drilling performance whilst obtaining t high quality core samples, for soil and rock testing.

We provide a wide range of coring bits including, for example, annular and face discharge, surface set and impregnated diamond bits, saw tooth and tungsten carbide etc.

The core barrel itself is designed for flushing with water, mud or air, and can easily be adapted for most soil and rock conditions by the use of an appropriate core bit or non coring devise.



#### **GEOBOR-S**



#### **Core Liner**

The core liner is a rigid, transparent PVC tube with a wall thickness of approximately 1 mm, that fits snugly inside the GEOBOR-S core barrel inner tube, trimmed to 1.5 m lengths. This is provided for all coring works.

The core samples are recovered within the core line tube and removed from the inner barrel between each consecutive run. The sample can be retained within the core line tube sealed at both ends and placed into the core box. This minimises handling induced core disturbance, both on the drill deck, and during subsequent transport of the core sample to the onshore core store and testing laboratories.

From our experience the combination of the GEOBOR-S system used with core liners:

- reduces coring and transport induced disturbance
- maintains sample quality
- significantly enhances recovery especially in mixed formations

Furthermore, we monitor the effectiveness of the various bit types throughout drilling, selecting bits appropriate to varying ground conditions as each borehole progresses. This allows us to maximise core quality and recovery in an appropriate and cost effective manner. **Four methods** can be used:

- In medium to hard formations most suitable for soil conditions, all types of core bits can be used depending on the formation.
- 2. For coring in soft soil formations, only TC-set bits are used and the bit consist of two parts (pilot and reamer)
- 3. For coring in very soft or loose formations, only TC-set bits are used. The bit is in two parts as in method two but one core lifter is extended to run 25 mm in front of the bit.
- 4. For coring in very soft, loose formations with varying layers. The spring-loaded inner tube assembly is extended to run in front of the bit, but is retractable for optimized adaptation to the consistency and density of the ground.

#### **Other Advantages**

The advantages of wireline coring over conventional coring (using drill rods and core barrels) are:

- separate temporary lining casing for borehole stabilization may not be required
- the drill string is more rigid
- the core barrel may be recovered without the need to remove the outer drill rod, thus the disturbance to the borehole wall is minimized
- the small annulus between the drill pipe and borehole wall requires significantly lower volumes of flush fluid compared to conventional drilling to achieve adequate uphole velocity for removal of cuttings from the hole. As a consequence, erosion of the formation (particulary at the bit face) is reduced.

#### **Technical Specifications**

	Metric	Imperial
Hole diameter, method 1-4	146.0 mm	5.75 in
Hole diameter, method 2-3	150.0 mm	5.90 in
Drill bit outer diameter	145.6 / 149.6 mm	5.73 / 5.90 in
Drill rod outer diameter	139.7 mm	5.58 in
Bit kerf, method 1	21.8 mm	0.86 in
Bit kerf, method 2-3	23.8 mm	0.94 in
Core diameter	102.0 mm	4.05 in
Hole area (od 146/150)	167.3 / 176.7 cm <sup>2</sup>	26.0 / 27.4 in <sup>2</sup>
Core area	81.7 cm <sup>2</sup>	12.7 in <sup>2</sup>
Cutting area in % of hole area	51.7 %	51.7 %

#### **Fugro Seacore Ltd**

Bickland Industrial Park Falmouth Cornwall TR11 4TA

Telephone: + 44 (0) 1326 254500

Email: info@seacore.com





#### **MODEL 106 Current Meter**



The Model 106 Current Meter is a light weight, cost effective impeller current meter, designed for real time current measurement or short to medium term autonomous deployments. Titanium construction ensures durability, and the optional temperature and pressure sensors increase the versatility of the instrument. Ideal for use in rivers and coastal applications, or from small boats, the Model 106 is simple to use with either the Windows based PC software supplied, or an optional dedicated display unit.

#### **Sensors**

#### **Speed**

High Impact Styrene Impeller Type: 125mm diameter by 270mm pitch Size:

0.03 to 5m/s Range:

±1.5% of reading above 0.15m/s Accuracy:

±0.004m/s below 0.15m/s

**Direction** 

Flux gate compass Type:

Range: 0 to 360° Accuracy: + 2.5° Resolution: 0.5°

#### **Temperature**

Type: Thermistor Range: -5 to 35°C Accuracy: ± 0.2°C 0.01°C Resolution:

#### **Pressure**

Strain Gauge Transducer Type: 50, 100, 200 or 500 dBar Range:

Accuracy: ± 0.2% Range. Resolution: 0.025% Range

#### **Data Acquisition**

The current meter works on a basic 1 second cycle, during which the impeller counts are taken and a single compass heading reading is made. From this, East and North velocity vectors are calculated, which are then summed over the averaging period. The additional parameters of temperature and pressure (if fitted) are sampled once every sample period, and averaged over the averaging period.

#### **Data Recovery**

Direct to PC via communications port. Maximum RS232 data rate of 19200 baud.

#### **Switching On/Off**

The meters are switched on and off through software control, either by the DataLog™ software or by using the Model 8008 CDU. However, for autonomous, self recording operation the 106 is supplied with a subconn switch cap which fits in place of a direct cable connection.

#### **Display Unit**

The Model 106 may be used with a dedicated display unit for real time operations allowing instrument setup and data display.

Size: 244 x 193 x 94mm, 2kg Protection: IP67 (10 secs @ 0.3m)

#### Memory

512 Kbyte Solid State Memory. Each parameter record uses 2 bytes. As an example, this gives a duration of over 1 week with full parameter sampling every 10 seconds, or 220 days with sampling every 5 minutes.



**Power** 

Internal: 1 x D cell. 1.5v alkaline cell gives approximately 30

days at 10 second sample rate, or 56 days at 5 minute sample rate. 3.6v Lithium cell gives approximately 90 days at 10 second sample rate,

or 180 days at 5 minute sample rate.

External: For external supply, 12-20v DC is required. Power

can also be taken from the Model 8008 CDU.

#### **Communications**

Fitted with Subconn MCBH10F (Brass) RS232 to PC over cable lengths up to 200m.

Digital Current Loop to Model 8008 CDU, or to PC over longer cable

lengths (requires additional adaptor).

#### **Physical**

Instrument

Materials: Titanium, acetal and ABS plastic

640mm x 50mm Ø, (tail 133mm wide x 270mm Size:

high)

Weiaht: 3kg (air), 2kg (water)

Depth Rating: 500m

#### Shipping

Model 106 Size: 84 x 42 x 39cm

Model 106 Weight: 17kg

50m Cable Size: 42 x 33 x 49cm

50m Cable Weight: 11kg

#### Software

System is supplied with DataLog ™ Windows based PC software, for instrument setup, data extraction and display of tabular and graphical data plots. DataLog is license free.

#### **Ordering**

0106005SCXX

0105005SC

0106001SC Model 106 Self Recording/Direct Reading unit,

> fitted with speed and direction sensors. Supplied with communications lead (3m Y lead), switch cap, set of tools, operating manual, software and system

transit case.

0106003SC As 0106001SC plus Temperature option 0106004SCXX As 0106001SC plus Depth option

> As 0106001SC plus Temperature & Depth option (XX denotes pressure transducer range)

Control Display Unit set, comprising deck lead and

Model 8008 CDU.

Datasheet Reference: MODEL 106 version 2b, June 2013



#### **Tug Specification Sheet**

GENERAL INFO HULL

Name: "Norman O" Type of Vessel: 1500 HP Twin Screw

 Official No:
 525967
 Length:
 75'

 Gross Tons:
 96 GRT
 Beam:
 24'

 Net Tons:
 65 NRT
 Draft:
 10'

Fuel Capacity: 20,000 gals #2 Diesel Builder: Albina Shipyard

Potable Water: 1,500 gals Year Built: 1970

Main Engine:1,500 HP Tier 3 CumminsHull:Steel

Props: SS 72" dia X 50/54'"pitch

<u>DECK</u> <u>NAVIGATION</u>

Almon Johnson 1600'

**Bow Winch**: Foss **Radar**: 2 - Furuno

Tow Winch:

1 3/8" Tow Wire

GPS:

2

Anchor: 1500 lb, 7 Shots Chain AIS: 1

SS Radio: 1
COMMUNICATIONS VHF Radios: 3

**Satellite Phone** #0693 (866) 866-9836 **Auto pilot**: 1

Satellite Email n/a Computers: 2

w/electronic charts &

Cell Phone (907) 617-4742 currents





Sundog Charters 2026 Arlington Drive Anchorage, AK 99517 Sundogcharters.com info@sundogcharters.com



#### **VESSEL PARTICULARS**

LENGTH OVERALL 42'
BEAM 10.5'
DRAFT 3'
22' X 9.5 FOREWARD WORK DECK
30 KNOT CRUISING SPEED
200 GALLON FUEL CAPACITY
200 MILE RANGE
6,000 LB CARGO CAPACITY
LANDING CRAFT STYLE BOW GATE

#### **EXTERNAL EQUIPMENT**

FORTRESS 60LB ANCHOR
ELECTRIC WINDLESS
FRANCIS 250 WATT SPOTT LIGHT
2) 250 WATT WORK LIGHTS
DAVIT ARM
ALUMINUM BOARDING STEPS WITH HANDRAILS
HYDRAULIC LIFTING A-FRAME-1,000 LB CAPACITY

#### **INTERIOR**

RED DOT CABIN HEATER (FROM ENGINE COOLING SYSTEM WALLAS 2 BURNER STOVE/CABIN HEATER DEEP STAINLESS STEEL SINK, 85 GALLONS POTABLE WATER PAR MARINE TOILET WITH 18 GALLON HOLDING TANK MICROWAVE OVEN DINETTE SEATING FOR 4 OVERNIGHT ACCOMODATIONS FOR 2 26" TV MONITOR FREEDOM MARINE 3,000 WATT, 140 AMP INVERTER 30 AMP SHORE POWER CONNECTION XANTREX 30 AMP MAIN BREAKER

Vessel Documentation #123188 EIN: 47-2974096 Duns # 07-978-4508

#### **MACHINERY**

(2) JOHN DEERE 6068 SFM 50 DIESELS, 310 HP EACH BORG WARNER VELVET DRIVE REDUCTION GEARS, 1:1 RATIO (2) ULTRAJET 305 HT JET DRIVES WITH HYDRAULIC BUCKET CONTROLS
DUAL RACOR 75/1000 FUEL FILTERS/WATER SEPERATORS (2) 65 AMP ALTERNATORS
NEXT GENERATION UCM 5.5 KW GENERATOR (2) RULE 2000 12 VOLT BILGE PUMPS
SEA STAR/TELEFLEX HYDRAULIC STEERING DUAL CONTROL STATIONS, CABIN AND FOREDECK MORSE DUAL LEVER CABLE CONTROL LEVERS

#### **ELECTRONICS**

GARMIN GPS MAP 4210 PLOTTER/ SOUNDER/RADAR COBRA VHF MARINE RADIO WITH DSC GARMIN VHF200 VHF MARINE RADIO

#### **SAFETY**

8 PERSON OFFSORE LIFERAFT 20" THROW RING 8 IMMERSION SUITS 8 TYPE I PFD'S 406 MHZ EPIRB DAY/NIGHT DISTRESS SIGNALS

\*EASILY CUSTOM MODIFIED TO FOR CLIENT NEEDS FOR SPECIFIC PROJECTS\*

THIS SPECIFICATION IS PRELIMINARY AND SUBJECT TO CHANGE WITHOUT NOTICE. EXACT TANK CAPACITIES, RANGES, DECK CARGO CAPACITY AND OTHER FIGURES THAT HAVE BEEN CALCULATED MAY CHANGE WHEN THE ACTUAL VESSEL IS DELIVERED

Report No. 04.10140334-9



#### **APPENDIX B**

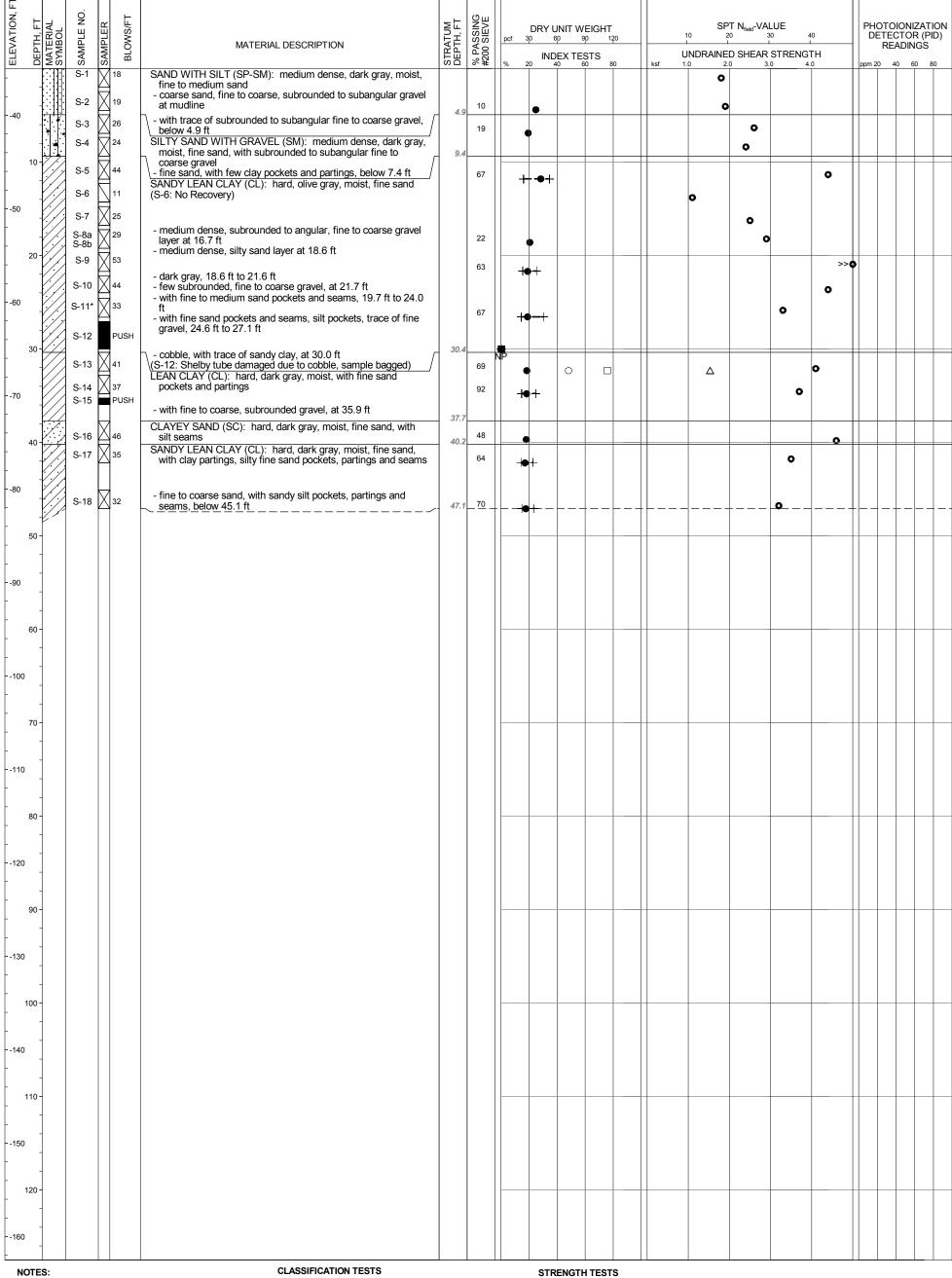
**Boring Logs** 

Starfix Mean Positioning Reports

APDES Daily Observation and Static Sheen Test Forms







1) The log and data presented are a simplification 

• of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note 4) in sample no indicates different

LOGGED BY: J. Greenwald/A. Fee

SPT hammer used below the depth.

COMPLETION DEPTH: 47.1 ft
COORDINATES: W151.389623 N60.669652 (GCS, NAD 1983, NSRS2007, degrees)
MUDLINE ELEVATION: -35.00 ft (rel. MLLW datum)
EXPLORATION START DATE: 9/11/2015 COMPLETION DATE: 9/12/2015

Water Content

Dry Unit Weight Submerged Unit Weight 0

Plastic Limit

Non-Plastic

Liquid Limit

⊗ Pocket Penetrometer

Torvane  $\oplus$ Remote Vane  $\Phi$ 

Miniature Vane

Unconsolidated Undrained Triaxial

Unconfined Compression

Residual Vane

 $\Diamond$ 

Open symbols indicate remolded tests

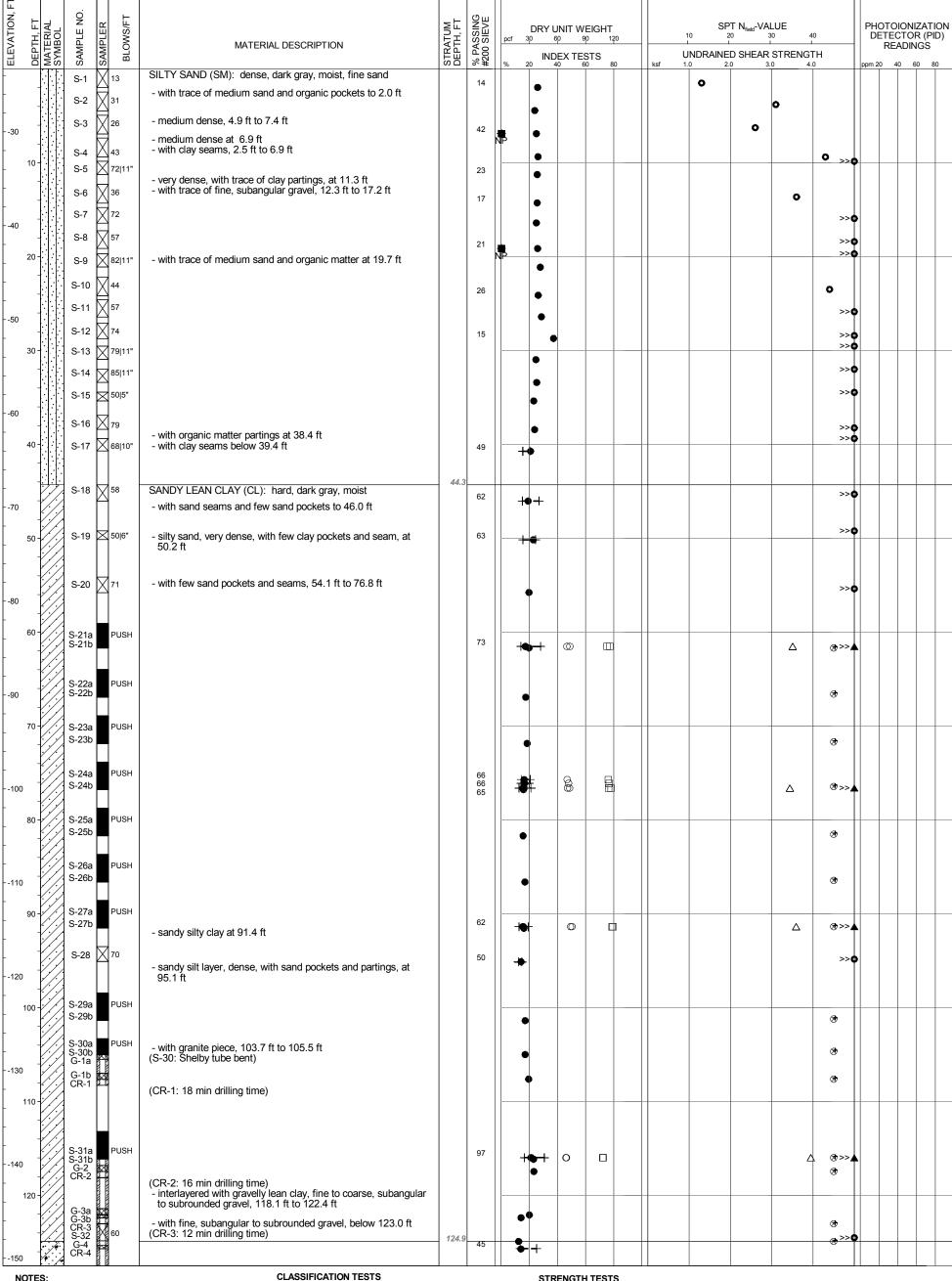
SPT N<sub>Field</sub>-Value >> Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer PID

> DRILLING COMPANY: Fugro DRILLER: T.Wills/J.Wilson VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 24.0 ft SPT-02 to 47.1 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 47.1 ft CASING: 7" -dia. to 47.1 ft PLATE B1-1

**BORING LOG MB-02** MARINE LNG FACILITIES ALASKA LNG PROJECT NIKISKI, ALASKA







# NOTES:

1) The log and data presented are a simplification 

• of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) in sample no indicates different

SPT hammer used below the depth.

LOGGED BY: S. Pant/ E. Pulido

# COMPLETION DEPTH: 162.7 ft COORDINATES: W151.383178 N60.668335 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -23.30 ft (rel. MLLW datum) EXPLORATION START DATE: 10/23/2015 COMPLETION DATE: 10/27/2015

Water Content

Submerged Unit Weight

□ Dry Unit Weight

Non-Plastic

Plastic Limit

0

**BORING LOG MB-03** MARINE LNG FACILITIES ALASKA LNG PROJECT

NIKISKI, ALASKA

Torvane

Remote Vane

Miniature Vane

Unconfined Compression

Unconsolidated Undrained Triaxial

 $\oplus$ 

 $\Phi$ 

Liquid Limit

STRENGTH TESTS

⊗ Pocket Penetrometer Residual Vane  $\Leftrightarrow$ 

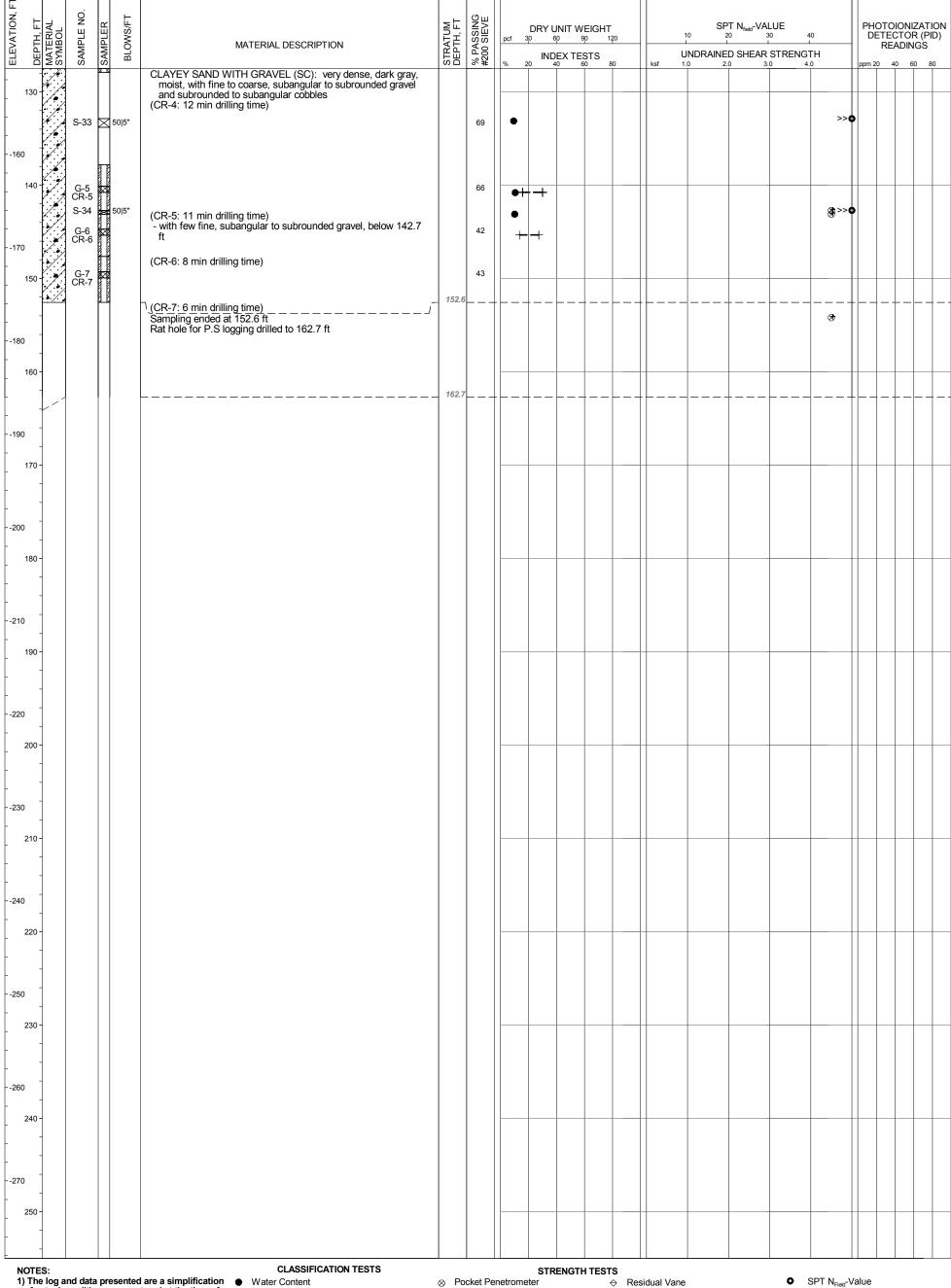
Open symbols indicate remolded tests

SPT N<sub>Field</sub>-Value Exceeds Data Scale >> WOR - Weight of Rod WOH - Weight of Hammer PID

> DRILLING COMPANY: Fugro DRILLER: R. Smith/ M. Bray VESSEL: SKATE 3A SPT HAMMER: SPT-02 to 162.7 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 162.7 ft CASING: 12" -dia. to 3.0 ft, 7" -dia. to 36.9 ft

Alaska LNG





1) The log and data presented are a simplification • Water Content of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) in sample no indicates different

SPT hammer used below the depth.

COMPLETION DEPTH: 162.7 ft COORDINATES: W151.383178 N60.668335 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -23.30 ft (rel. MLLW datum) EXPLORATION START DATE: 10/23/2015

COMPLETION DATE: 10/27/2015 LOGGED BY: S. Pant/ E. Pulido

□ Dry Unit Weight Submerged Unit Weight 0

> Non-Plastic Liquid Limit Plastic Limit

⊗ Pocket Penetrometer

Torvane  $\oplus$  $\Phi$ Remote Vane

Miniature Vane

Unconsolidated Undrained Triaxial Unconfined Compression

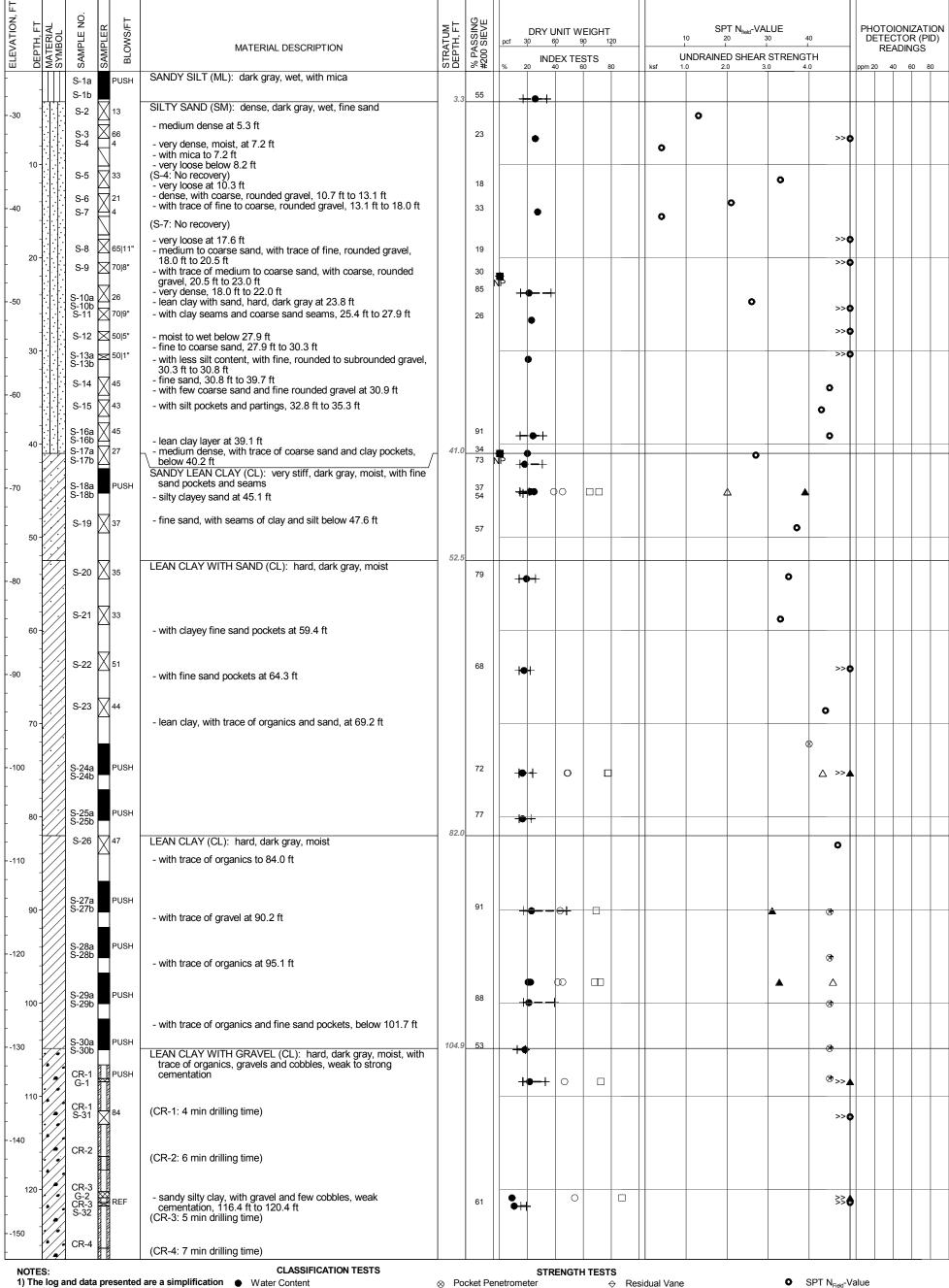
Open symbols indicate remolded tests

SPT N<sub>Field</sub>-Value >> Exceeds Data Scale WOR -Weight of Rod WOH -Weight of Hammer PID

DRILLING COMPANY: Fugro DRILLER: R. Smith/ M. Bray VESSEL: SKATE 3A
SPT HAMMER: SPT-02 to 162.7 ft
BACKFILL: N/A
DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 162.7 ft CASING: 12" -dia. to 3.0 ft, 7" -dia. to 36.9 ft







of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) in sample no indicates different

LOGGED BY: J. Greenwald/A. Fee

SPT hammer used below the depth.

### COMPLETION DEPTH: 151.8 ft COORDINATES: W151.386667 N60.667329 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -25.26 ft (rel. MLLW datum) EXPLORATION START DATE: 8/20/2015 COMPLETION DATE: 8/21/2015

Submerged Unit Weight

Liquid Limit

□ Dry Unit Weight

Plastic Limit

Non-Plastic

0

⊗ Pocket Penetrometer

Torvane  $\oplus$ 

Remote Vane  $\Phi$ Miniature Vane

Unconsolidated Undrained Triaxial

Unconfined Compression

Residual Vane

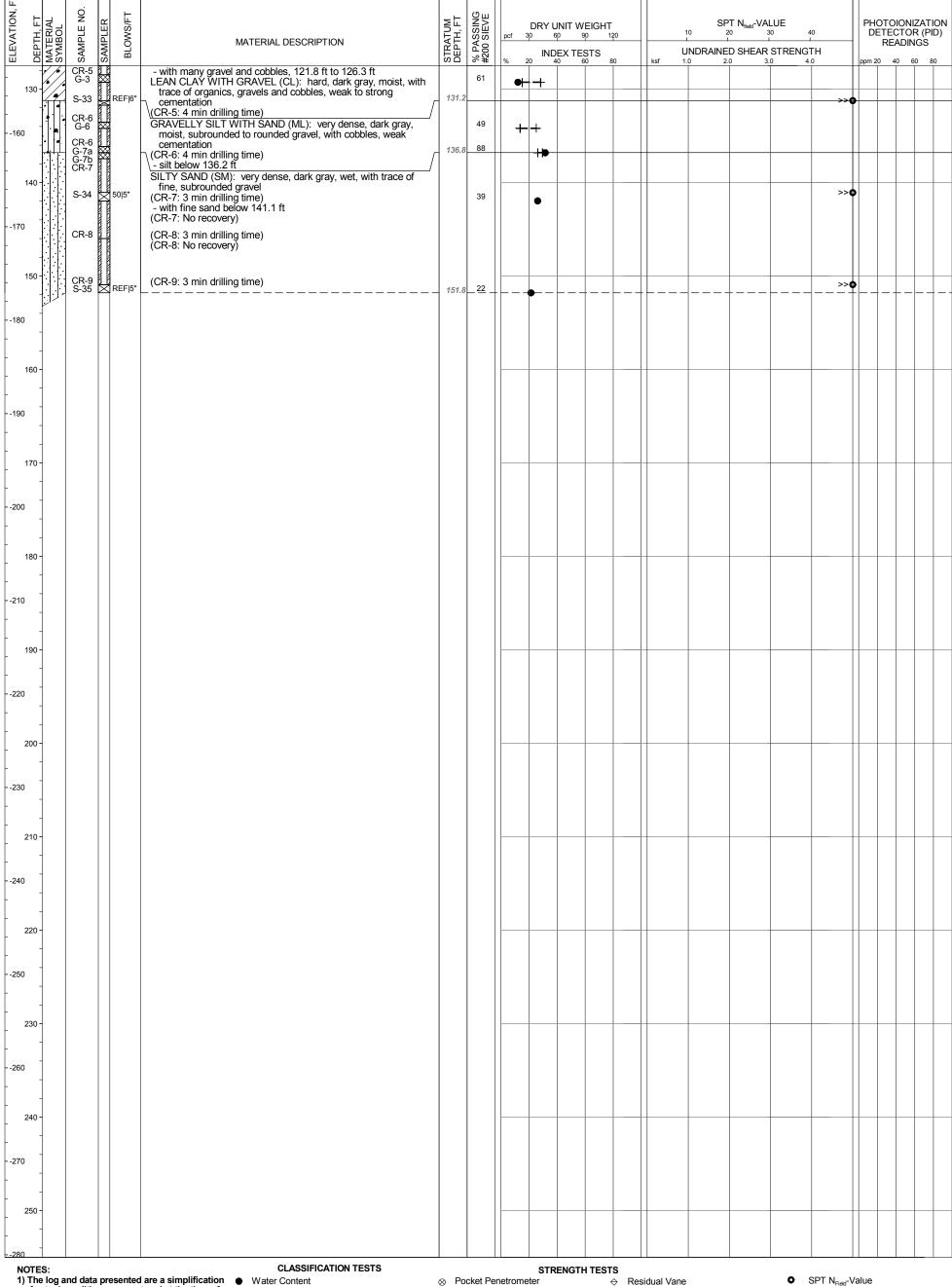
Open symbols indicate remolded tests

SPT N<sub>Field</sub>-Value Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer PID

> DRILLING COMPANY: Fugro DRILLER: T.Wills/H. Russell VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 151.8 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 151.8 ft CASING: 7" -dia. to 85.3 ft







1) The log and data presented are a simplification of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) in sample no indicates different

SPT hammer used below the depth.

LOGGED BY: J. Greenwald/A. Fee

COMPLETION DEPTH: 151.8 ft COORDINATES: W151.386667 N60.667329 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -25.26 ft (rel. MLLW datum)
EXPLORATION START DATE: 8/20/2015 COMPLETION DATE: 8/21/2015

□ Dry Unit Weight

Non-Plastic

Plastic Limit

0

Submerged Unit Weight

**BORING LOG MB-04 MARINE LNG FACILITIES** ALASKA LNG PROJECT

Liquid Limit

⊗ Pocket Penetrometer

Torvane  $\oplus$ 

NIKISKI, ALASKA

 $\Phi$ Remote Vane

Miniature Vane

Unconsolidated Undrained Triaxial Unconfined Compression

SPT N<sub>Field</sub>-Value Exceeds Data Scale >> WOR - Weight of Rod WOH - Weight of Hammer ▼ PID

Open symbols indicate remolded tests

DRILLING COMPANY: Fugro DRILLER: T.Wills/H. Russell VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 151.8 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 151.8 ft CASING: 7" -dia. to 85.3 ft







1) The log and data presented are a simplification 

• of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) in sample no indicates different

SPT hammer used below the depth. COMPLETION DEPTH: 151.6 ft COORDINATES: W151.380180 N60.666051 (GCS, NAD 1983, NSRS2007, degrees)

MUDLINE ELEVATION: -19.36 ft (rel. MLLW datum) EXPLORATION START DATE: 8/18/2015 COMPLETION DATE: 8/19/2015 LOGGED BY: J. Greenwald/A. Fee

Water Content □ Dry Unit Weight Submerged Unit Weight 0

Non-Plastic

Liquid Limit Plastic Limit

⊗ Pocket Penetrometer  $\oplus$ 

Torvane Remote Vane

 $\Phi$ Miniature Vane

Unconsolidated Undrained Triaxial **Unconfined Compression** 

Residual Vane  $\Leftrightarrow$ 

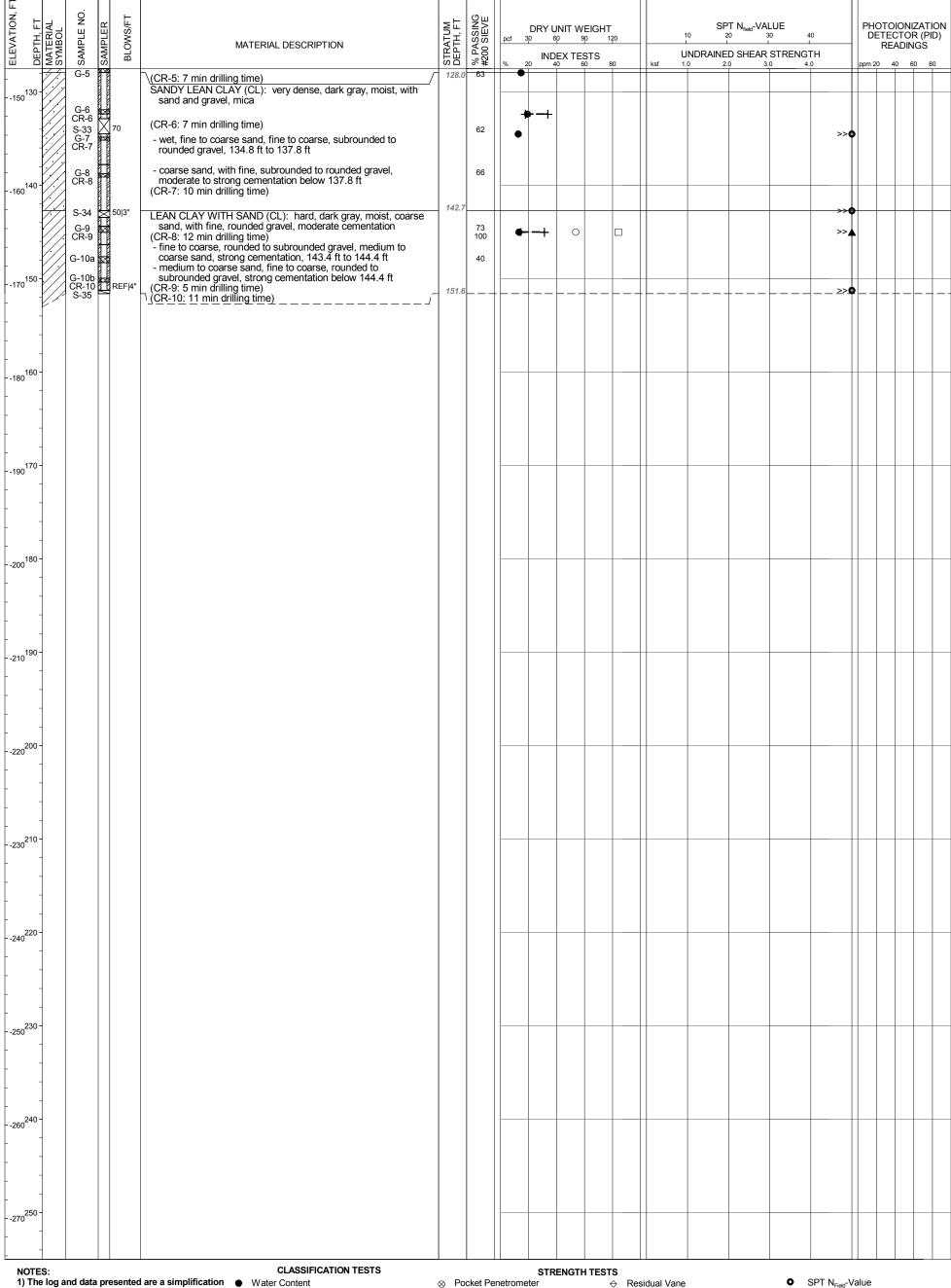
Open symbols indicate remolded tests

>> Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer PID

> DRILLING COMPANY: Fugro DRILLER: Z.Smart/H.Russell VESSEL: SKATE 3A
> SPT HAMMER: SPT-09 to 151.6 ft
> BACKFILL: N/A
> DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 151.6 ft CASING: 7" -dia. to 68.9 ft







of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note4) in sample no indicates different

SPT hammer used below the depth.

COMPLETION DEPTH: 151.6 ft
COORDINATES: W151.380180 N60.666051 (GCS, NAD 1983, NSRS2007, degrees)
MUDLINE ELEVATION: -19.36 ft (rel. MLLW datum)
EXPLORATION START DATE: 8/18/2015

COMPLETION DATE: 8/19/2015 LOGGED BY: J. Greenwald/A. Fee Water Content

□ Dry Unit Weight Submerged Unit Weight 0

> Non-Plastic Liquid Limit Plastic Limit

Torvane  $\oplus$ 

 $\Phi$ Remote Vane

Miniature Vane Unconsolidated Undrained Triaxial

**BORING LOG MB-05** 

MARINE LNG FACILITIES

ALASKA LNG PROJECT

NIKISKI, ALASKA

Unconfined Compression

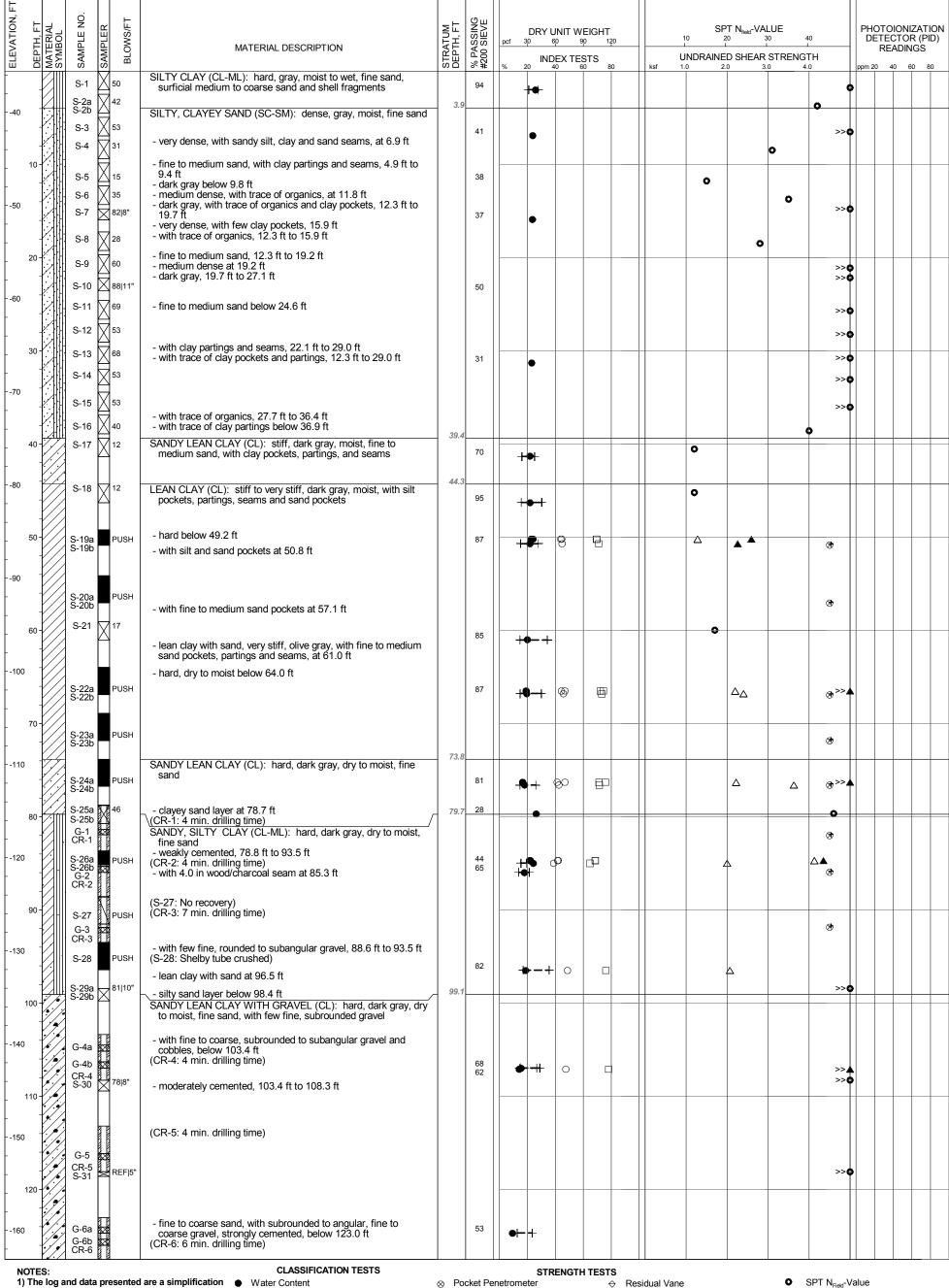
Open symbols indicate remolded tests

SPT N<sub>Field</sub>-Value Exceeds Data Scale >> WOR - Weight of Rod WOH - Weight of Hammer PID

> DRILLING COMPANY: Fugro DRILLER: Z.Smart/H.Russell VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 151.6 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 151.6 ft CASING: 7" -dia. to 68.9 ft







1) The log and data presented are a simplification 

• of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note in sample no indicates different

SPT hammer used below the depth.

# COMPLETION DEPTH: 149.28 ft COORDINATES: W151.383791 N60.665011 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -35.60 ft (rel. MLLW datum) EXPLORATION START DATE: 9/16/2015

0

COMPLETION DATE: 9/18/2015 LOGGED BY: J. Greenwald/A. Fee

Water Content □ Dry Unit Weight

Submerged Unit Weight  $\Phi$ 

Non-Plastic Plastic Limit Liquid Limit

Torvane  $\oplus$ Remote Vane

Miniature Vane Unconsolidated Undrained Triaxial **Unconfined Compression** 

Residual Vane  $\Leftrightarrow$ Open symbols indicate

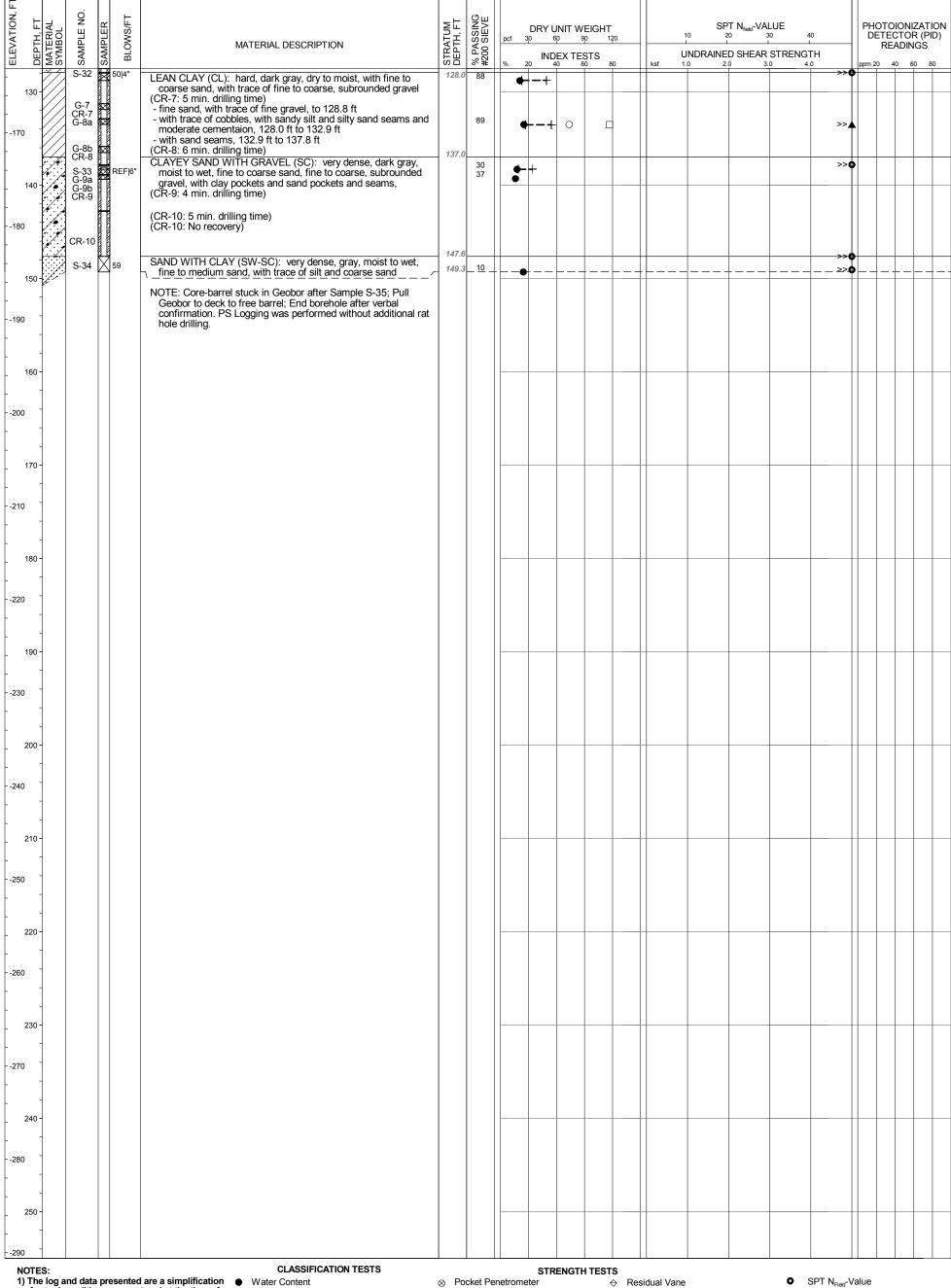
remolded tests

SPT N<sub>Field</sub>-Value >> Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer PID

DRILLING COMPANY: Fugro DRILLER: R. Smith/ A. Cook VESSEL: SKATE 3A SPT HAMMER: SPT-02 to 149.3 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 149.3 ft CASING: 12" -dia. 23.6 ft, 7" -dia. to 64.0 ft

Alaska LNG





of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note4) in sample no indicates different

SPT hammer used below the depth.

COMPLETION DEPTH: 149.28 ft COORDINATES: W151.383791 N60.665011 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -35.60 ft (rel. MLLW datum) EXPLORATION START DATE: 9/16/2015

COMPLETION DATE: 9/18/2015 LOGGED BY: J. Greenwald/A. Fee

Water Content □ Dry Unit Weight

Non-Plastic

Submerged Unit Weight 0

> Liquid Limit Plastic Limit

⊗ Pocket Penetrometer

Torvane  $\oplus$ 

Remote Vane  $\Phi$ 

Miniature Vane

Unconsolidated Undrained Triaxial Unconfined Compression

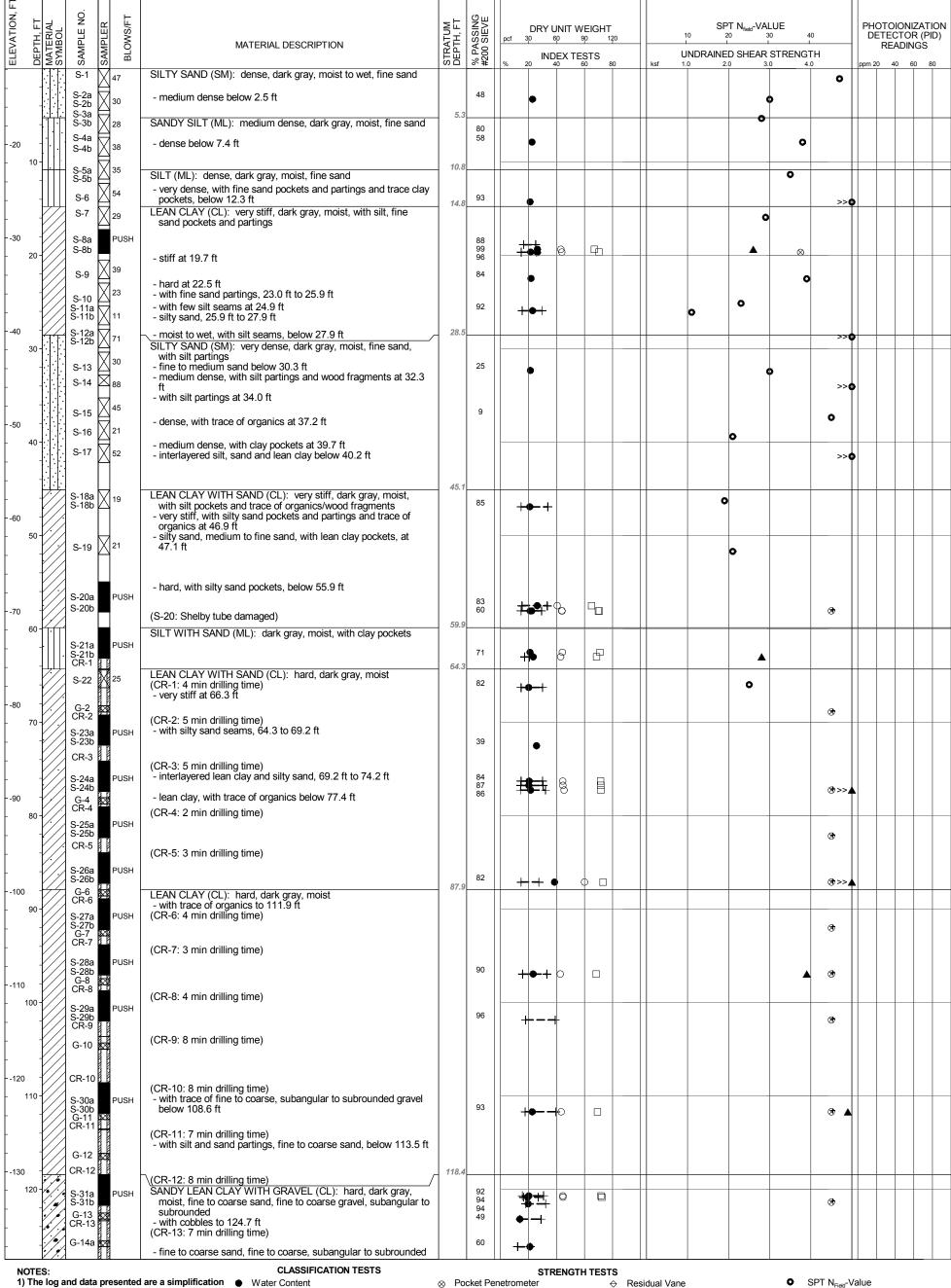
Open symbols indicate remolded tests

SPT N<sub>Field</sub>-Value Exceeds Data Scale >> WOR - Weight of Rod WOH - Weight of Hammer PID

DRILLING COMPANY: Fugro DRILLER: R. Smith/ A. Cook VESSEL: SKATE 3A SPT HAMMER: SPT-02 to 149.3 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 149.3 ft CASING: 12" -dia. 23.6 ft, 7" -dia. to 64.0 ft







1) The log and data presented are a simplification 

• of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

COMPLETION DATE: 8/25/2015

LOGGED BY: J. Greenwald/A. Fee

3) DN = Driller's Note4) in sample no indicates different SPT hammer used below the depth. COMPLETION DEPTH: 206.2 ft
COORDINATES: W151.377399 N60.663673 (GCS, NAD 1983, NSRS2007, degrees)
MUDLINE ELEVATION: -11.88 ft (rel. MLLW datum)
EXPLORATION START DATE: 8/23/2015

# Submerged Unit Weight

Water Content □ Dry Unit Weight 0

Non-Plastic Liquid Limit Plastic Limit

Torvane  $\oplus$ 

Remote Vane  $\Phi$ Miniature Vane

Unconsolidated Undrained Triaxial

**Unconfined Compression** 

# Residual Vane

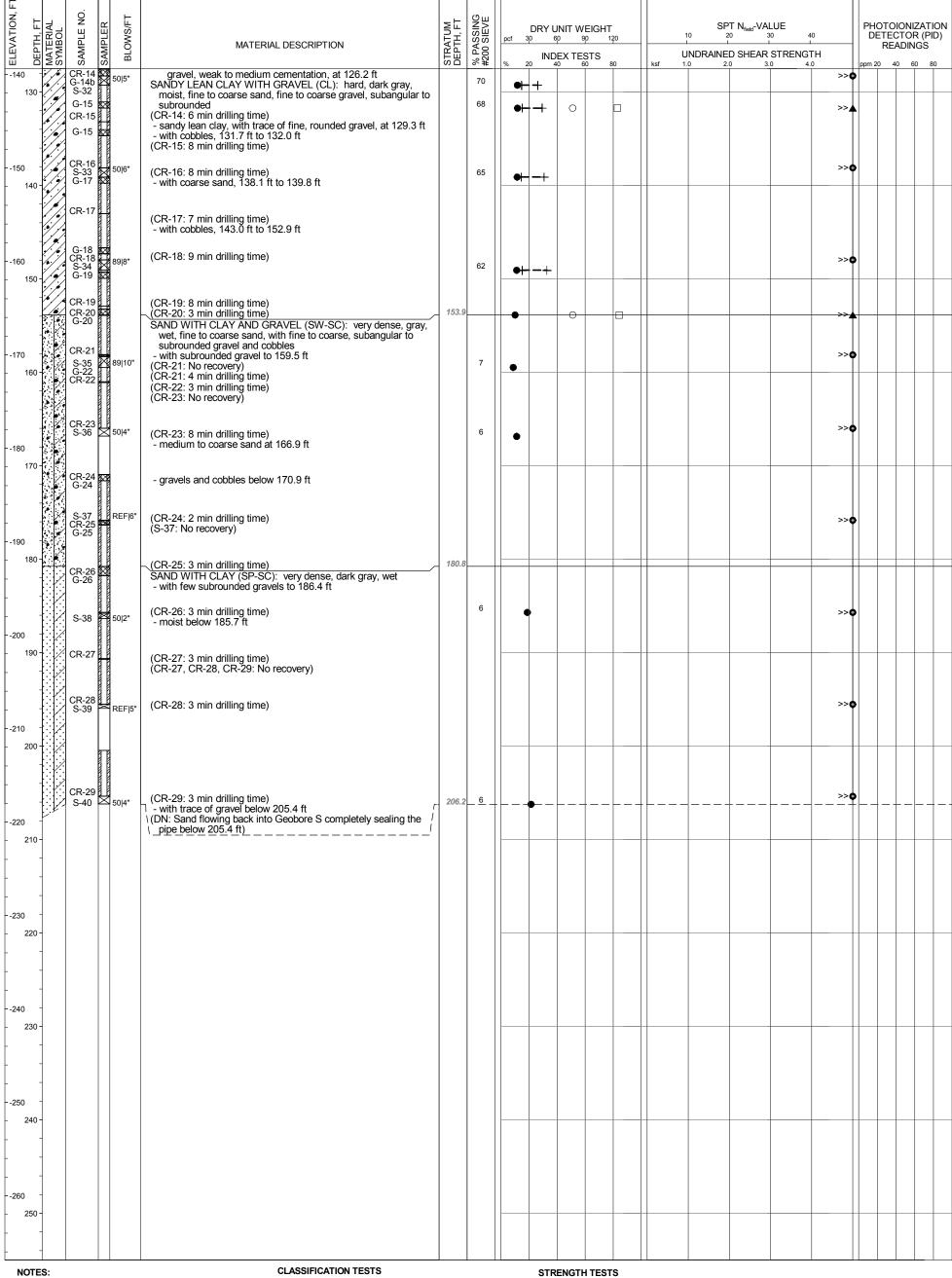
Open symbols indicate remolded tests

SPT N<sub>Field</sub>-Value **>>** Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer PID

> DRILLING COMPANY: Fugro DRILLER: J. Wilson/T. Wills VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 206.2 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 206.2 ft CASING: 7" -dia. to 139.1 ft







1) The log and data presented are a simplification 

• of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note in sample no indicates different SPT hammer used below the depth.

COMPLETION DEPTH: 206.2 ft COORDINATES: W151.377399 N60.663673 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -11.88 ft (rel. MLLW datum) EXPLORATION START DATE: 8/23/2015 COMPLETION DATE: 8/25/2015 LOGGED BY: J. Greenwald/A. Fee

Water Content □ Dry Unit Weight Submerged Unit Weight 0

Non-Plastic

Plastic Limit Liquid Limit

⊗ Pocket Penetrometer  $\oplus$ 

Torvane

Remote Vane  $\Phi$ 

Miniature Vane

Unconsolidated Undrained Triaxial Unconfined Compression

Residual Vane

 $\Diamond$ 

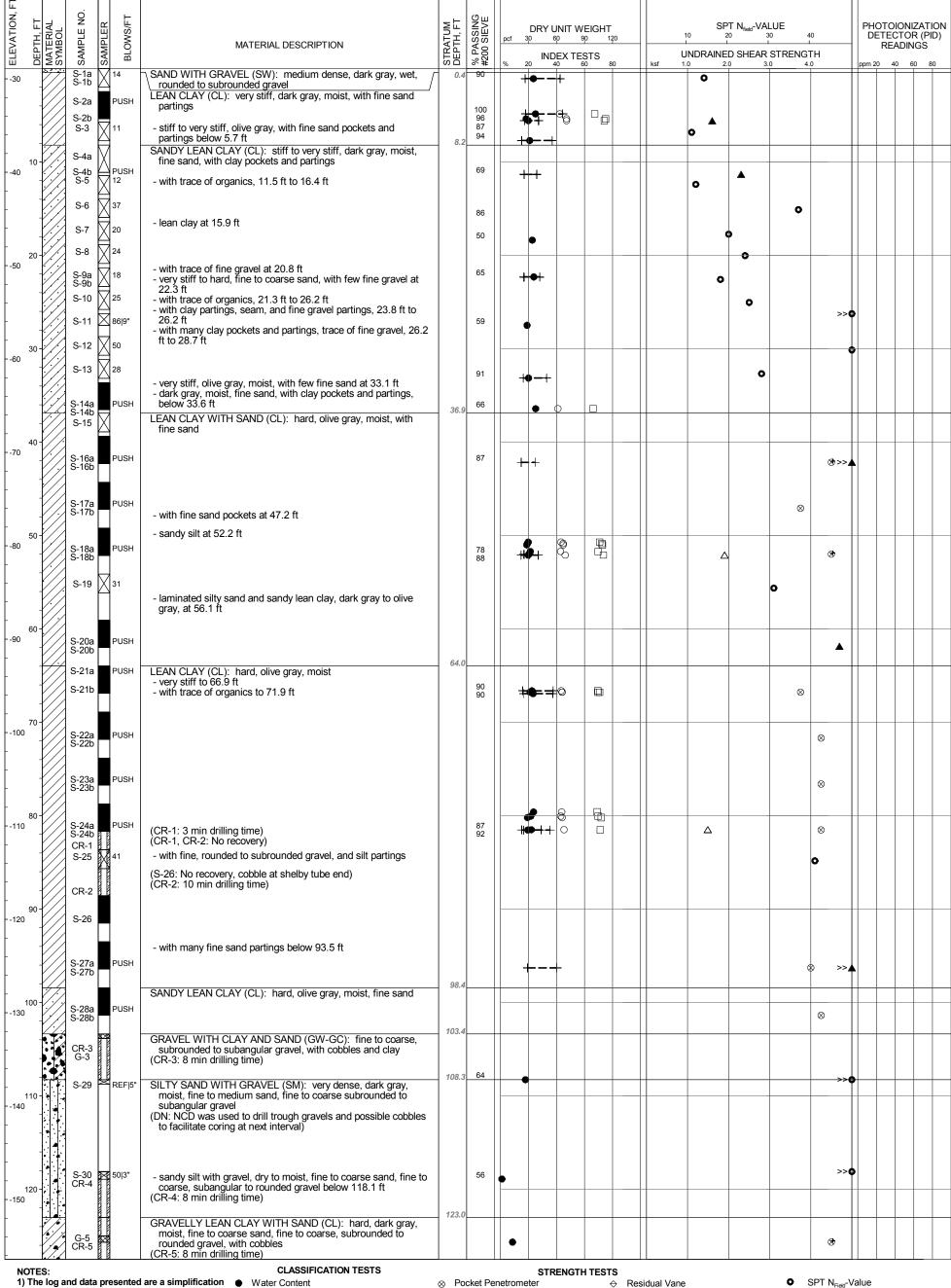
Open symbols indicate remolded tests

SPT N<sub>Field</sub>-Value Exceeds Data Scale >> WOR - Weight of Rod WOH - Weight of Hammer PID

> DRILLING COMPANY: Fugro DRILLER: J. Wilson/T. Wills VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 206.2 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 206.2 ft CASING: 7" -dia. to 139.1 ft

Alaska LNG





of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) in sample no indicates different

SPT hammer used below the depth.

## COMPLETION DEPTH: 152.6 ft COORDINATES: W151.380791 N60.662496 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -28.90 ft (rel. MLLW datum) EXPLORATION START DATE: 8/25/2015

□ Dry Unit Weight

Plastic Limit

Non-Plastic

0

Submerged Unit Weight

Liquid Limit

COMPLETION DATE: 8/28/2015 LOGGED BY: J. Greenwald/A. Fee ⊗ Pocket Penetrometer

Torvane  $\oplus$ 

Remote Vane  $\Phi$ Miniature Vane

Unconsolidated Undrained Triaxial Unconfined Compression

Open symbols indicate

remolded tests

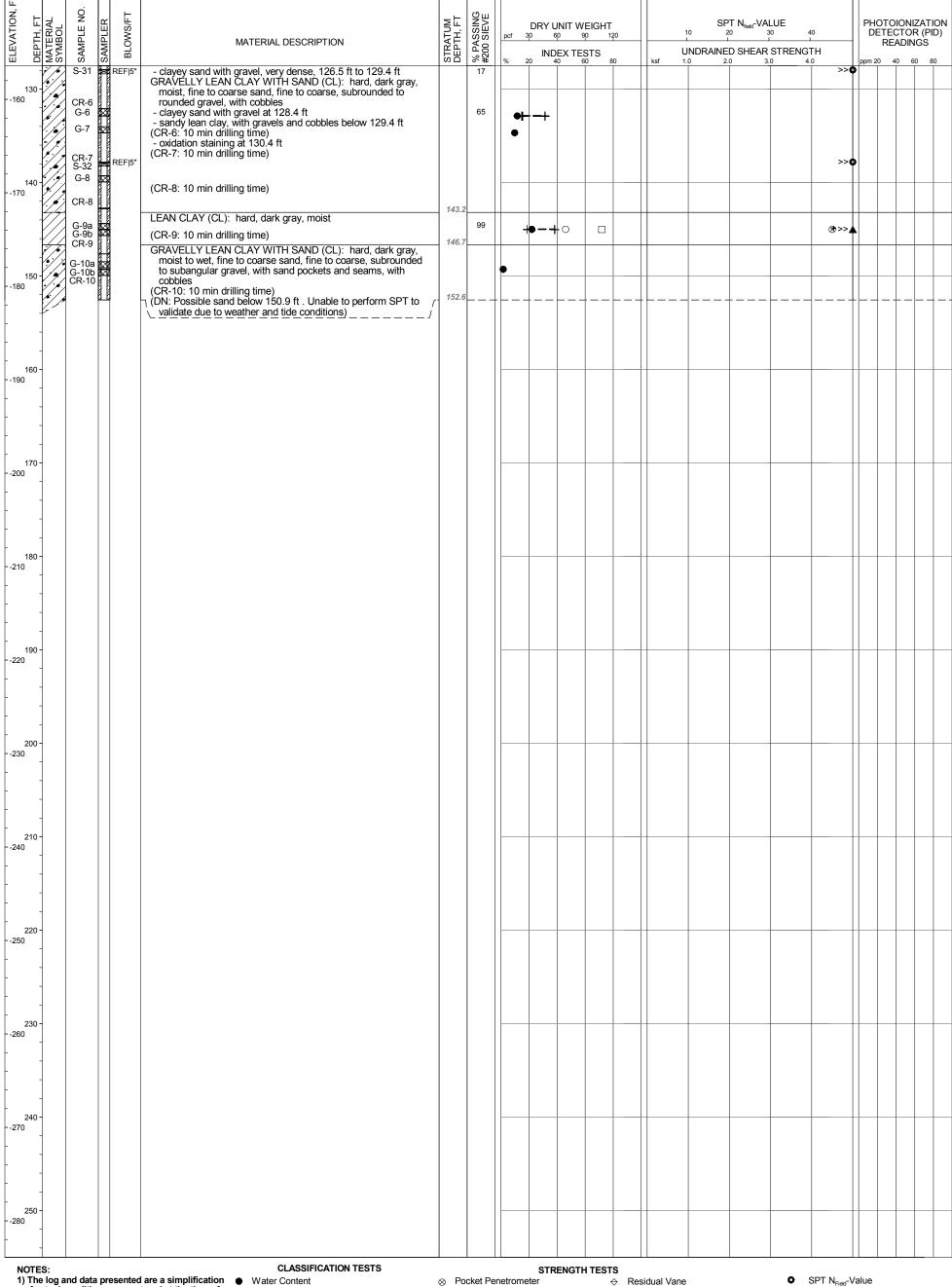
Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer PID

> DRILLING COMPANY: Fugro DRILLER: T. Wills/J. Wilson VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 152.6 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 152.6 ft CASING: 7" -dia. to 78.7 ft

NIKISKI, ALASKA







of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note 4) in sample no indicates different

LOGGED BY: J. Greenwald/A. Fee

SPT hammer used below the depth.

COMPLETION DEPTH: 152.6 ft COORDINATES: W151.380791 N60.662496 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -28.90 ft (rel. MLLW datum)
EXPLORATION START DATE: 8/25/2015

COMPLETION DATE: 8/28/2015

□ Dry Unit Weight

Liquid Limit

Submerged Unit Weight

Non-Plastic

Plastic Limit

0

Torvane  $\oplus$ Remote Vane  $\Phi$ 

**BORING LOG MB-09** 

**MARINE LNG FACILITIES** 

ALASKA LNG PROJECT

NIKISKI, ALASKA

Miniature Vane

Unconsolidated Undrained Triaxial Unconfined Compression

Open symbols indicate

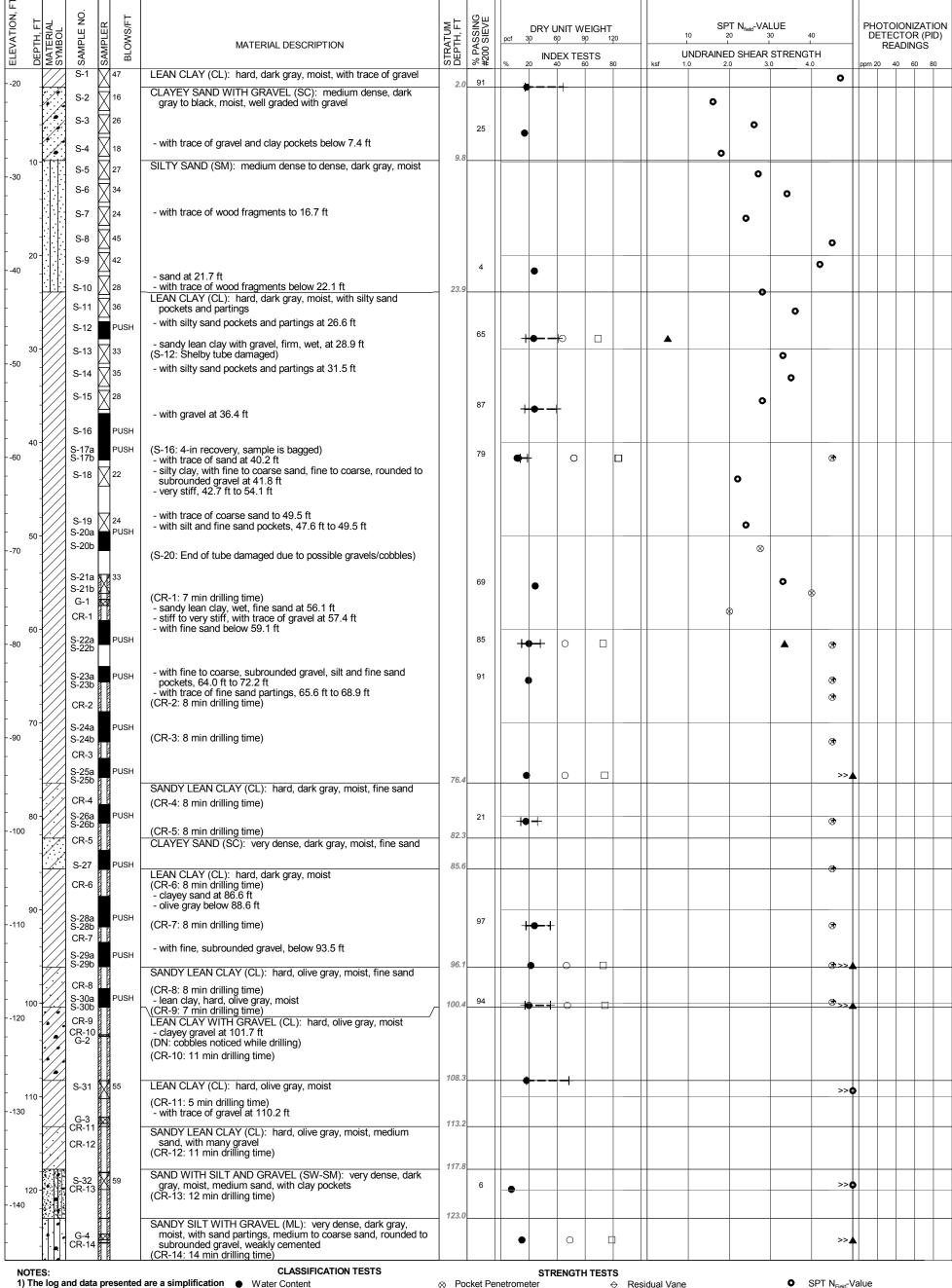
remolded tests

SPT N<sub>Field</sub>-Value Exceeds Data Scale >> WOR - Weight of Rod WOH - Weight of Hammer PID

> DRILLING COMPANY: Fugro DRILLER: T. Wills/J. Wilson VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 152.6 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 152.6 ft







of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

MUDLINE ELEVATION: -18.41 ft (rel. MLLW datum)
EXPLORATION START DATE: 8/21/2015

COORDINATES: W151.374567 N60.661322 (GCS, NAD 1983, NSRS2007, degrees)

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note in sample no indicates different

COMPLETION DATE: 8/23/2015

LOGGED BY: J. Greenwald/A. Fee

SPT hammer used below the depth. COMPLETION DEPTH: 152.6 ft

Water Content

□ Dry Unit Weight Submerged Unit Weight 0

Non-Plastic

Plastic Limit Liquid Limit ⊗ Pocket Penetrometer

Torvane  $\oplus$ Remote Vane  $\Phi$ 

Miniature Vane

Unconsolidated Undrained Triaxial Unconfined Compression

remolded tests

Open symbols indicate

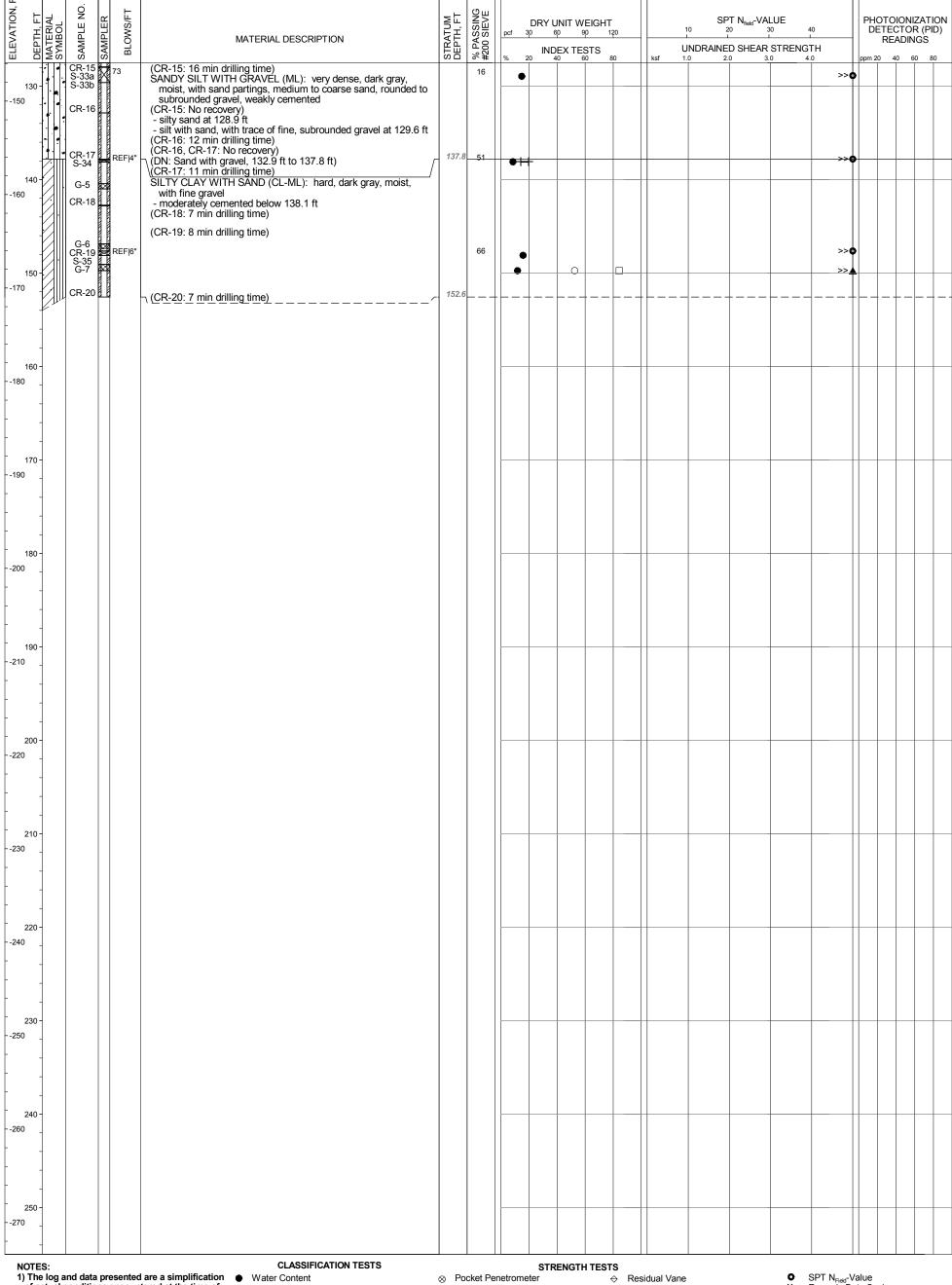
SPT N<sub>Field</sub>-Value >> Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer PID

> DRILLING COMPANY: Fugro DRILLER: T. Wills/H. Russell VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 152.6 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 152.6 ft CASING: 7" -dia. to 54.1 ft

**BORING LOG MB-12** MARINE LNG FACILITIES ALASKA LNG PROJECT NIKISKI, ALASKA

Alaska LNG





of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

LOGGED BY: J. Greenwald/A. Fee

3) DN = Driller's Note
4) in sample no indicates different SPT hammer used below the depth.

COMPLETION DEPTH: 152.6 ft COORDINATES: W151.374567 N60.661322 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -18.41 ft (rel. MLLW datum) EXPLORATION START DATE: 8/21/2015 COMPLETION DATE: 8/23/2015

□ Dry Unit Weight

Submerged Unit Weight 0 Non-Plastic

> Liquid Limit Plastic Limit

Torvane  $\oplus$ 

 $\Phi$ Remote Vane

Miniature Vane

Unconsolidated Undrained Triaxial Unconfined Compression

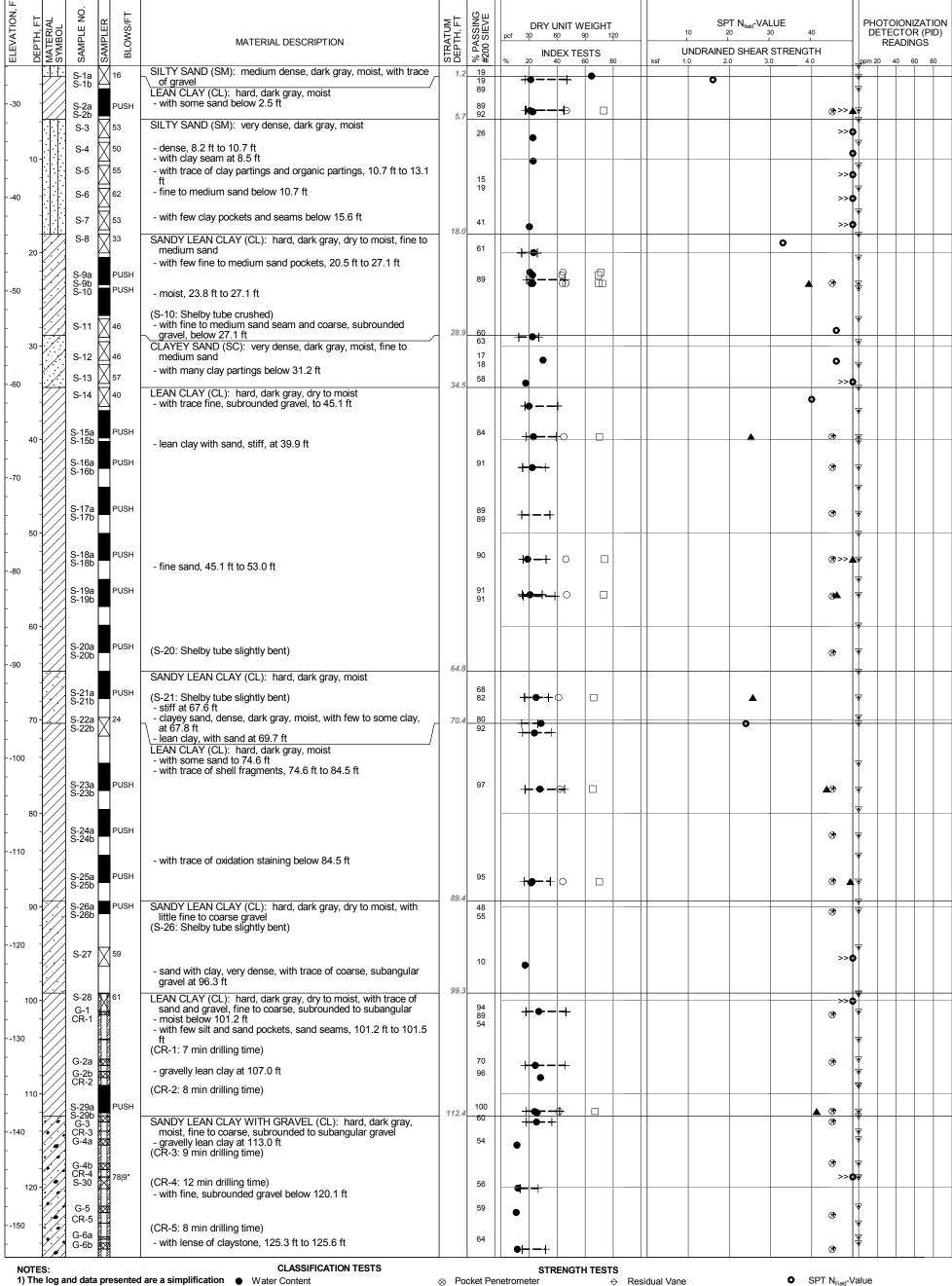
Open symbols indicate remolded tests

Exceeds Data Scale >> WOR - Weight of Rod WOH - Weight of Hammer ▼ PID

> DRILLING COMPANY: Fugro DRILLER: T. Wills/H. Russell VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 152.6 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 152.6 ft CASING: 7" -dia. to 54.1 ft

Alaska LNG





# of actual conditions encountered at the time of

sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) in sample no indicates different SPT hammer used below the depth.

LOGGED BY: S. Pant/ A. Fee

COMPLETION DEPTH: 164 ft COORDINATES: W151.378142 N60.660309 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -25.90 ft (rel. MLLW datum)
EXPLORATION START DATE: 10/2/2015 COMPLETION DATE: 10/3/2015

□ Dry Unit Weight

Non-Plastic

Plastic Limit

0

Submerged Unit Weight

**BORING LOG MB-13** MARINE LNG FACILITIES ALASKA LNG PROJECT

NIKISKI, ALASKA

Torvane

Remote Vane

Miniature Vane

Unconsolidated Undrained Triaxial

**Unconfined Compression** 

 $\oplus$ 

 $\Phi$ 

Liquid Limit

SPT N<sub>Field</sub>-Value **>>** Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer PID

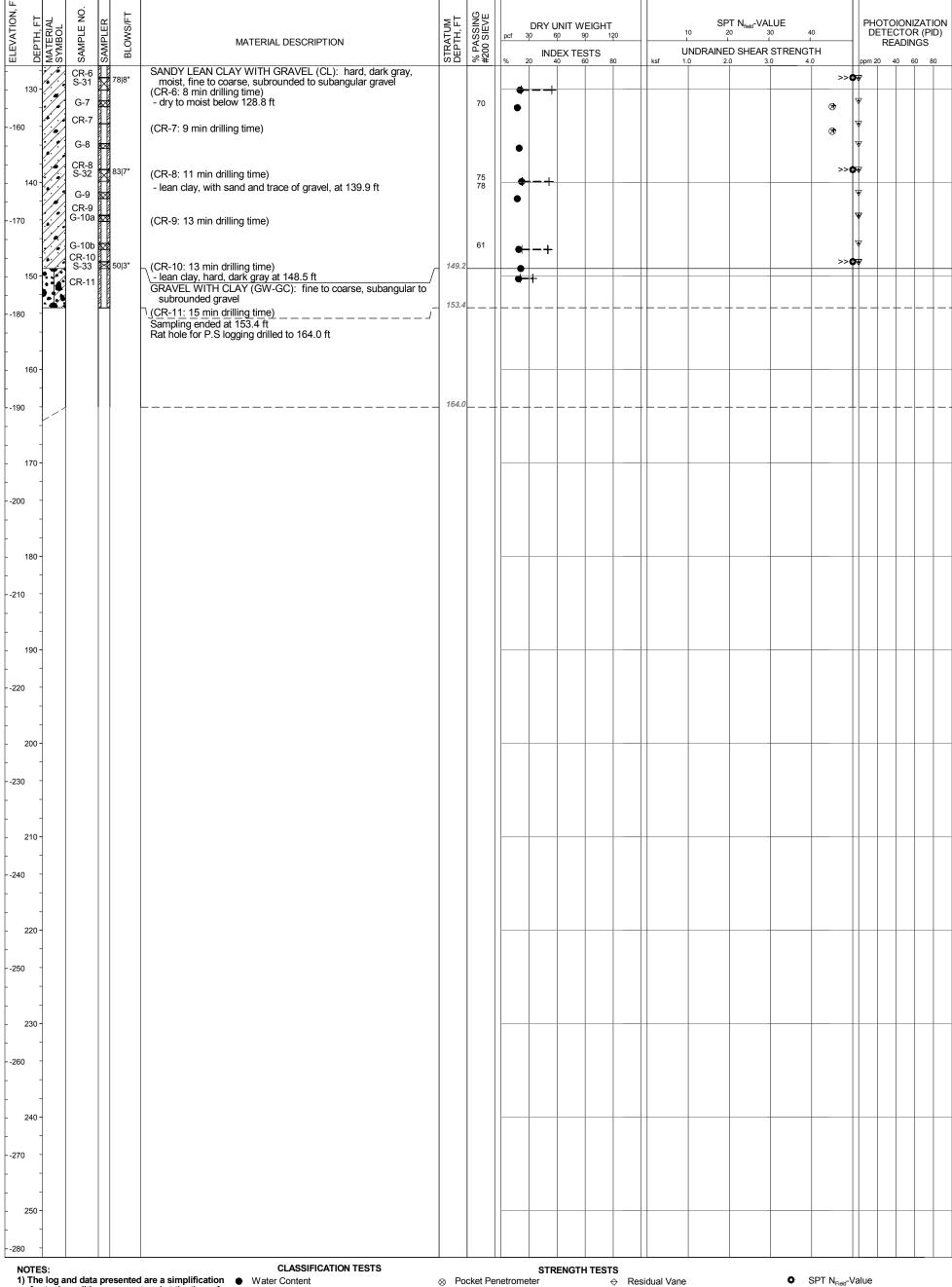
Open symbols indicate

remolded tests

DRILLING COMPANY: Fugro DRILLER: R. Smith/ A. Cook VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 164.0 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 164.0 ft CASING: 12" -dia. to 1.6 ft, 7" -dia. to 23.8 ft

Alaska LNG





1) The log and data presented are a simplification of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

LOGGED BY: S. Pant/ A. Fee

3) DN = Driller's Note
4) in sample no indicates different SPT hammer used below the depth.

COMPLETION DEPTH: 164 ft COORDINATES: W151.378142 N60.660309 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -25.90 ft (rel. MLLW datum) EXPLORATION START DATE: 10/2/2015 COMPLETION DATE: 10/3/2015

□ Dry Unit Weight

Non-Plastic

Plastic Limit

0

Submerged Unit Weight

**BORING LOG MB-13** MARINE LNG FACILITIES ALASKA LNG PROJECT

NIKISKI, ALASKA

Torvane

Remote Vane

Miniature Vane

Unconfined Compression

Unconsolidated Undrained Triaxial

 $\oplus$ 

 $\Phi$ 

Liquid Limit

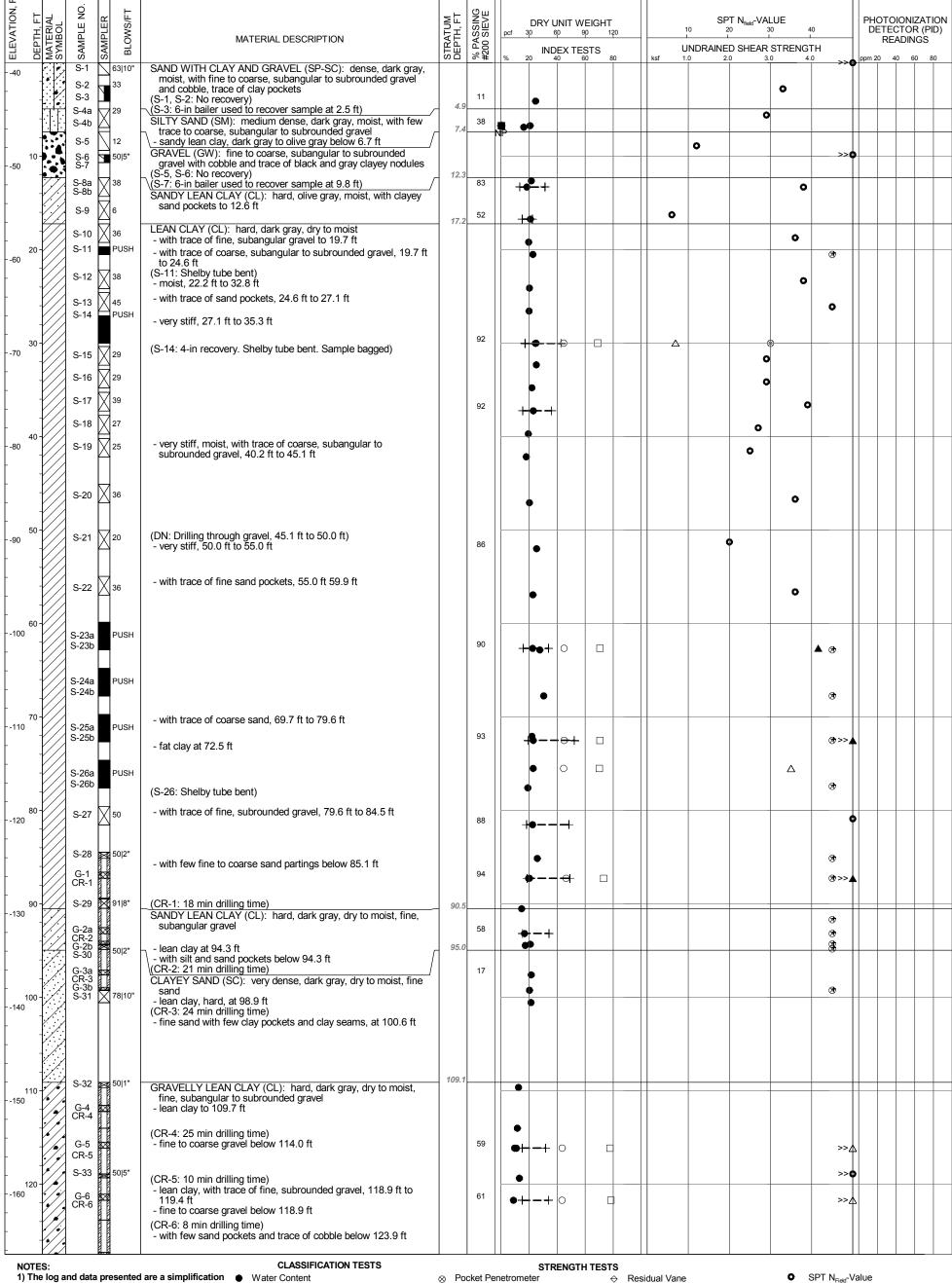
SPT N<sub>Field</sub>-Value Exceeds Data Scale >> WOR - Weight of Rod WOH - Weight of Hammer PID

Open symbols indicate remolded tests

DRILLING COMPANY: Fugro DRILLER: R. Smith/ A. Cook VESSEL: SKATE 3A
SPT HAMMER: SPT-09 to 164.0 ft
BACKFILL: N/A
DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 164.0 ft CASING: 12" -dia. to 1.6 ft, 7" -dia. to 23.8 ft







of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

MUDLINE ELEVATION: -38.94 ft (rel. MLLW datum)
EXPLORATION START DATE: 10/21/2015

COORDINATES: W151.381591 N60.659390 (GCS, NAD 1983, NSRS2007, degrees)

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note4) in sample no indicates different

COMPLETION DATE: 10/23/2015

LOGGED BY: S. Pant/ E. Pulido

SPT hammer used below the depth. COMPLETION DEPTH: 150.8 ft

# Submerged Unit Weight

Water Content □ Dry Unit Weight

0 Non-Plastic

> Plastic Limit Liquid Limit

⊗ Pocket Penetrometer

Torvane  $\oplus$ 

Remote Vane  $\Phi$ Miniature Vane

Unconsolidated Undrained Triaxial

**Unconfined Compression** 

SPT N<sub>Field</sub>-Value **>>** Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer

PID

Open symbols indicate

remolded tests

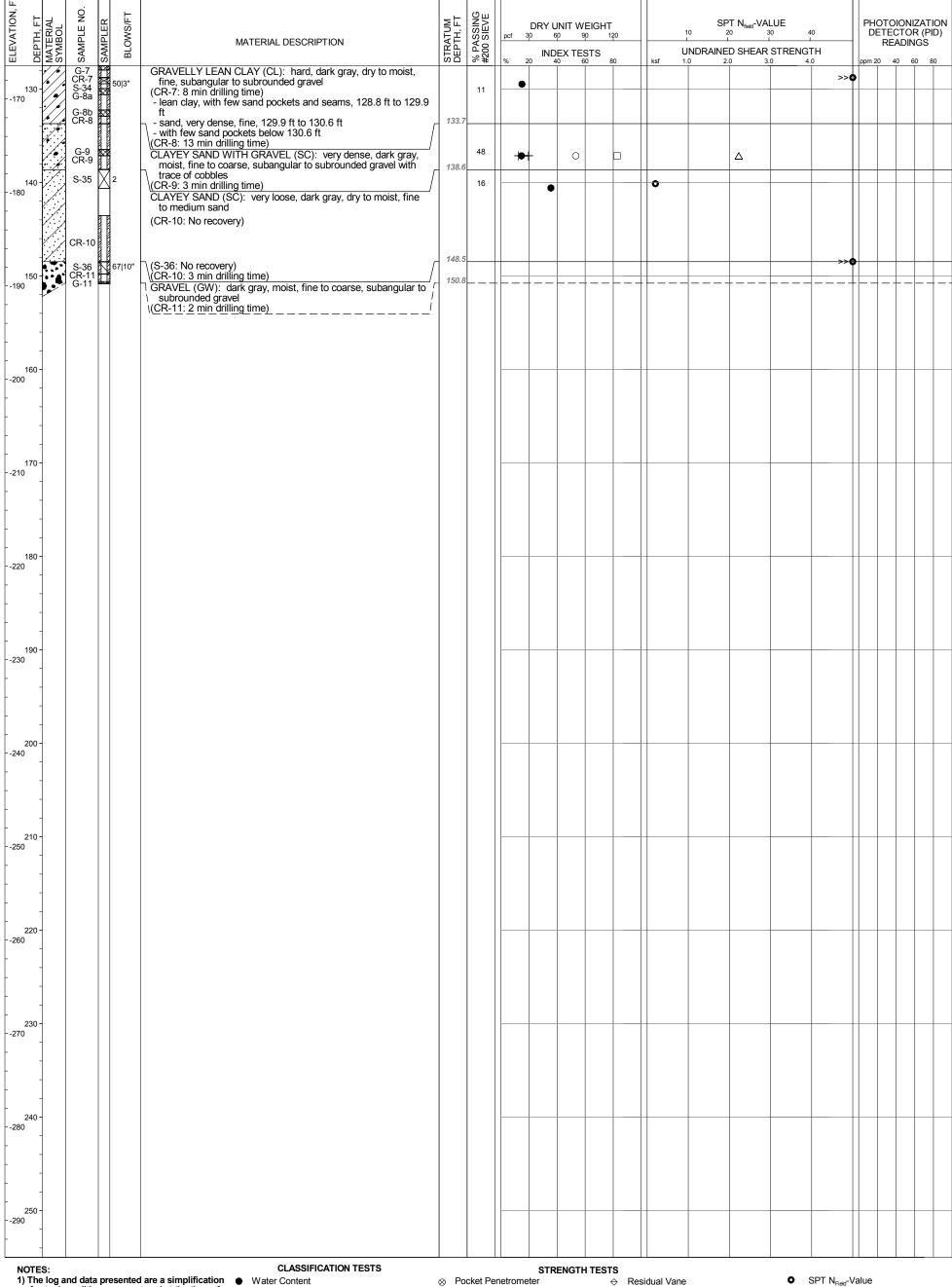
DRILLING COMPANY: Fugro DRILLER: R. Smith/ M. Bray VESSEL: SKATE 3A
SPT HAMMER: SPT-02 to 150.8 ft
BACKFILL: N/A
DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 150.8 ft CASING: 12" -dia. to 1.6 ft, 7" -dia. to 59.9 ft

**BORING LOG MB-14** MARINE LNG FACILITIES ALASKA LNG PROJECT

NIKISKI, ALASKA







of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note4) in sample no indicates different

SPT hammer used below the depth.

COMPLETION DEPTH: 150.8 ft COORDINATES: W151.381591 N60.659390 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -38.94 ft (rel. MLLW datum) EXPLORATION START DATE: 10/21/2015

COMPLETION DATE: 10/23/2015 LOGGED BY: S. Pant/ E. Pulido

Water Content

Non-Plastic

□ Dry Unit Weight Submerged Unit Weight 0

> Liquid Limit Plastic Limit

⊗ Pocket Penetrometer

Torvane  $\oplus$ 

 $\Phi$ Remote Vane

Miniature Vane Unconsolidated Undrained Triaxial

Unconfined Compression

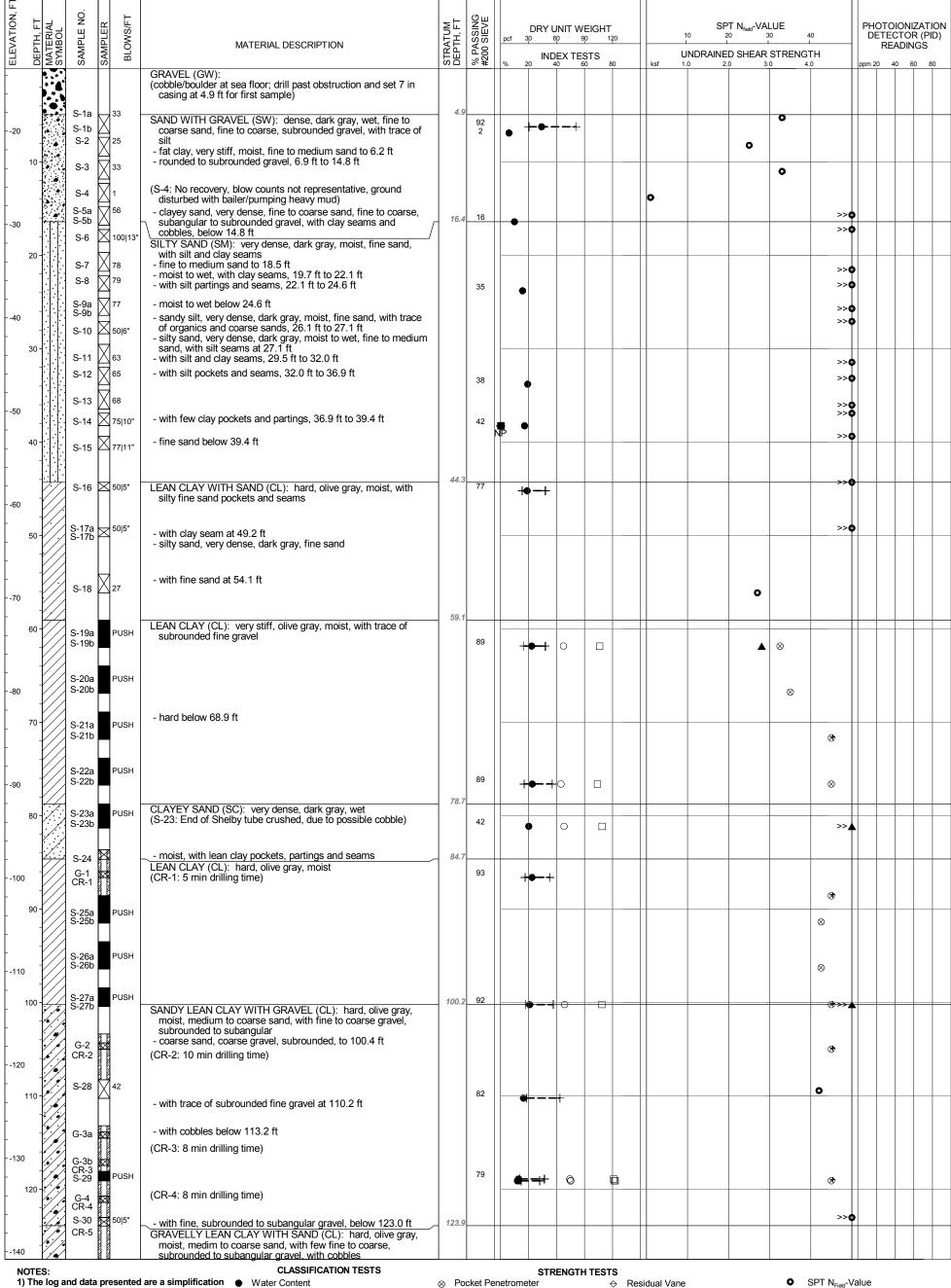
Open symbols indicate remolded tests

SPT N<sub>Field</sub>-Value Exceeds Data Scale >> WOR - Weight of Rod WOH - Weight of Hammer PID

DRILLING COMPANY: Fugro DRILLER: R. Smith/ M. Bray VESSEL: SKATE 3A SPT HAMMER: SPT-02 to 150.8 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 150.8 ft CASING: 12" -dia. to 1.6 ft, 7" -dia. to 59.9 ft







1) The log and data presented are a simplification 

• of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note4) in sample no indicates different

COMPLETION DATE: 9/4/2015

LOGGED BY: J. Greenwald/A. Fee

SPT hammer used below the depth. COMPLETION DEPTH: 153.1 ft
COORDINATES: W151.371659 N60.658981 (GCS, NAD 1983, NSRS2007, degrees)
MUDLINE ELEVATION: -13.30 ft (rel. MLLW datum)
EXPLORATION START DATE: 9/3/2015

□ Dry Unit Weight Submerged Unit Weight 0

Non-Plastic Plastic Limit Liquid Limit

Torvane  $\oplus$ 

Remote Vane  $\Phi$ 

Miniature Vane

Unconsolidated Undrained Triaxial **Unconfined Compression** 

# Residual Vane

Open symbols indicate

remolded tests

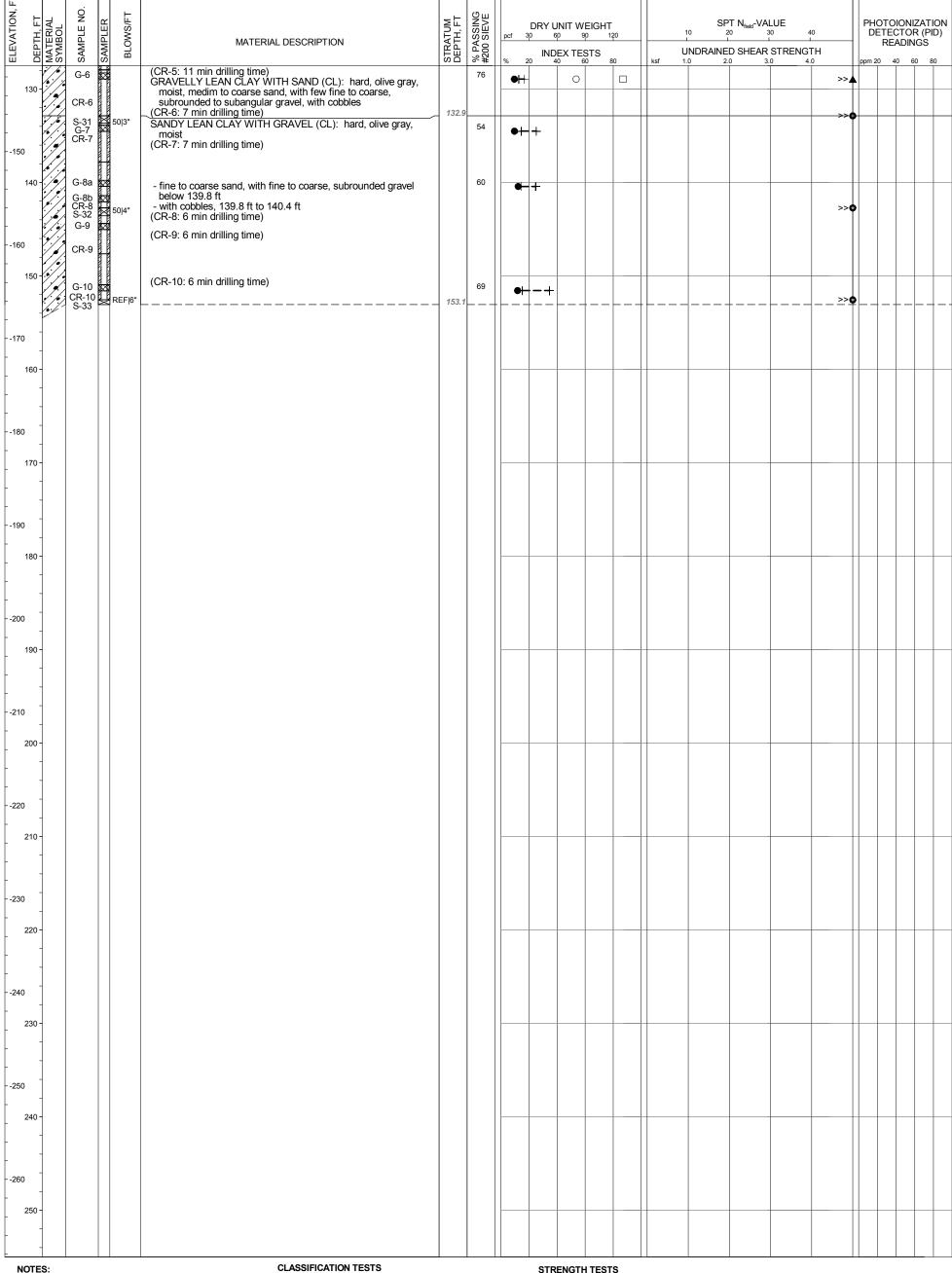
SPT N<sub>Field</sub>-Value **>>** Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer PID

> DRILLING COMPANY: Fugro DRILLER: H. Russel/T. Wills VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 153.1 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 153.1 ft CASING: 7" -dia. to 55.8 ft

NIKISKI, ALASKA







1) The log and data presented are a simplification of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

LOGGED BY: J. Greenwald/A. Fee

3) DN = Driller's Note
4) in sample no indicates different SPT hammer used below the depth.

COMPLETION DEPTH: 153.1 ft
COORDINATES: W151.371659 N60.658981 (GCS, NAD 1983, NSRS2007, degrees)
MUDLINE ELEVATION: -13.30 ft (rel. MLLW datum)
EXPLORATION START DATE: 9/3/2015 COMPLETION DATE: 9/4/2015

Water Content □ Dry Unit Weight

Submerged Unit Weight 0

Non-Plastic

Liquid Limit Plastic Limit

⊗ Pocket Penetrometer

**BORING LOG MB-15** 

MARINE LNG FACILITIES

ALASKA LNG PROJECT

NIKISKI, ALASKA

Torvane  $\oplus$ 

 $\Phi$ Remote Vane

Miniature Vane

Unconsolidated Undrained Triaxial Unconfined Compression

Open symbols indicate remolded tests

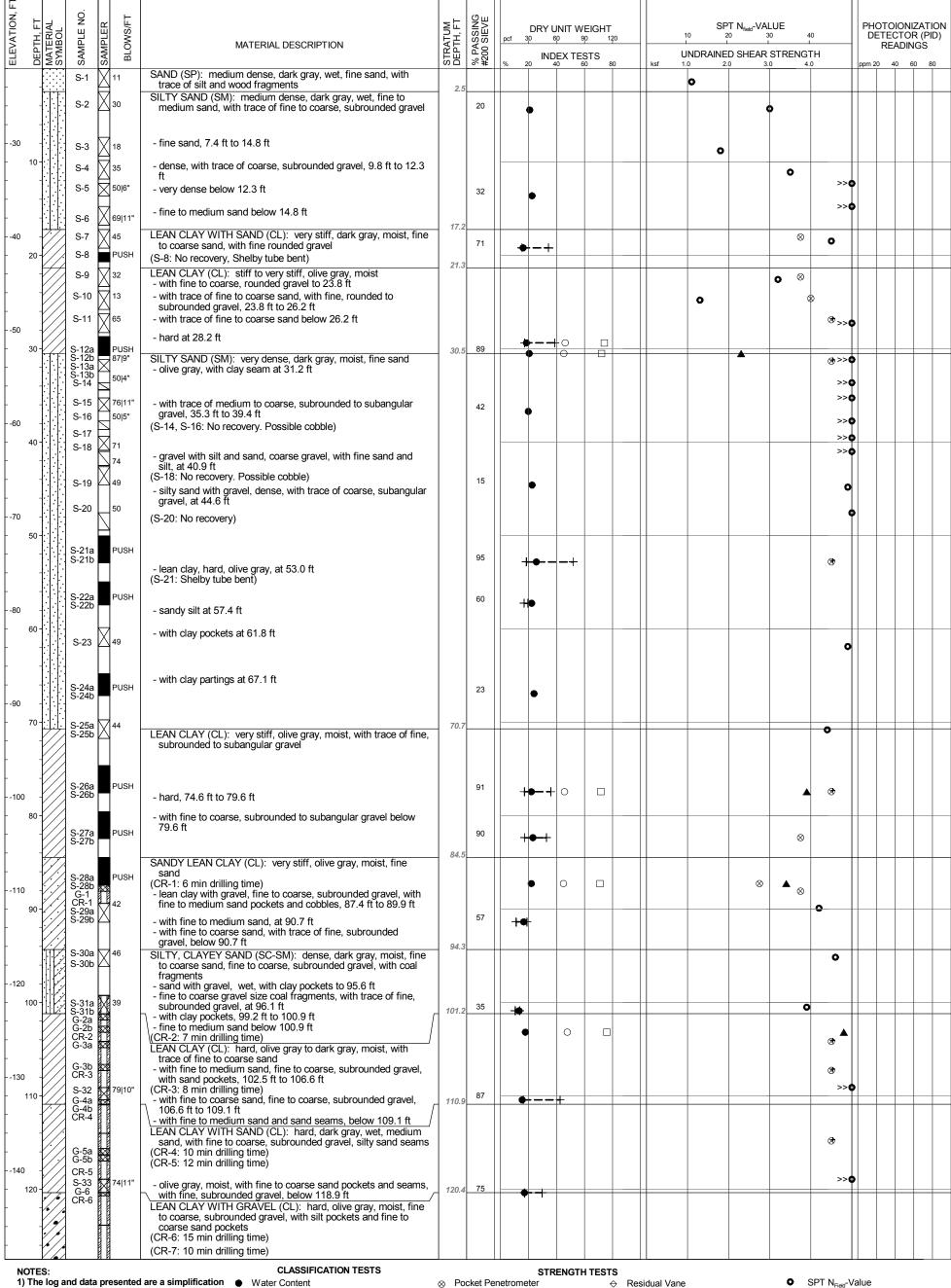
SPT N<sub>Field</sub>-Value Exceeds Data Scale >> WOR -Weight of Rod WOH -Weight of Hammer PID

> DRILLING COMPANY: Fugro DRILLER: H. Russel/T. Wills VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 153.1 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 153.1 ft

CASING: 7" -dia. to 55.8 ft







of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs. 3) DN = Driller's Note

in sample no indicates different SPT hammer used below the depth.

LOGGED BY: J. Greenwald/A. Fee

Water Content

□ Dry Unit Weight Submerged Unit Weight 0

Non-Plastic

Plastic Limit Liquid Limit  $\oplus$ 

Torvane Remote Vane

Miniature Vane

Unconsolidated Undrained Triaxial

Unconfined Compression

SPT N<sub>Field</sub>-Value Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer PID

Open symbols indicate

remolded tests

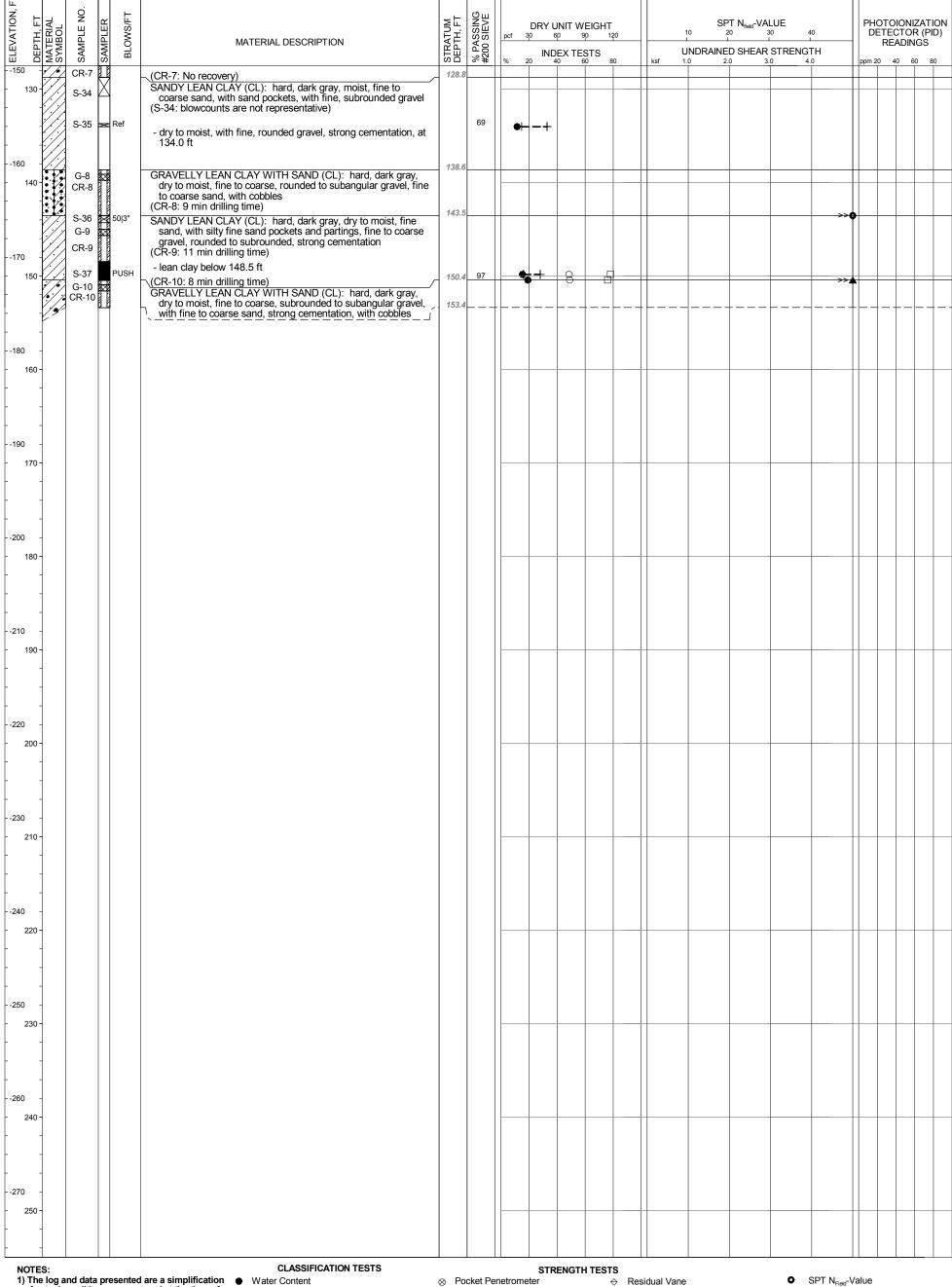
DRILLING COMPANY: Fugro DRILLER: T. Wills/H. Russell VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 153.4 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 153.4 ft CASING: 7" -dia. to 79.6 ft

**BORING LOG MB-16** MARINE LNG FACILITIES ALASKA LNG PROJECT

NIKISKI, ALASKA







of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note 4) in sample no indicates different

SPT hammer used below the depth.

COMPLETION DEPTH: 153.4 ft
COORDINATES: W151.375254 N60.657964 (GCS, NAD 1983, NSRS2007, degrees)
MUDLINE ELEVATION: -22.00 ft (rel. MLLW datum)
EXPLORATION START DATE: 9/5/2015

□ Dry Unit Weight

Non-Plastic

Plastic Limit

0

Submerged Unit Weight

COMPLETION DATE: 9/7/2015 LOGGED BY: J. Greenwald/A. Fee

**BORING LOG MB-16** MARINE LNG FACILITIES ALASKA LNG PROJECT

NIKISKI, ALASKA

Torvane

 $\oplus$ 

 $\Phi$ 

Liquid Limit

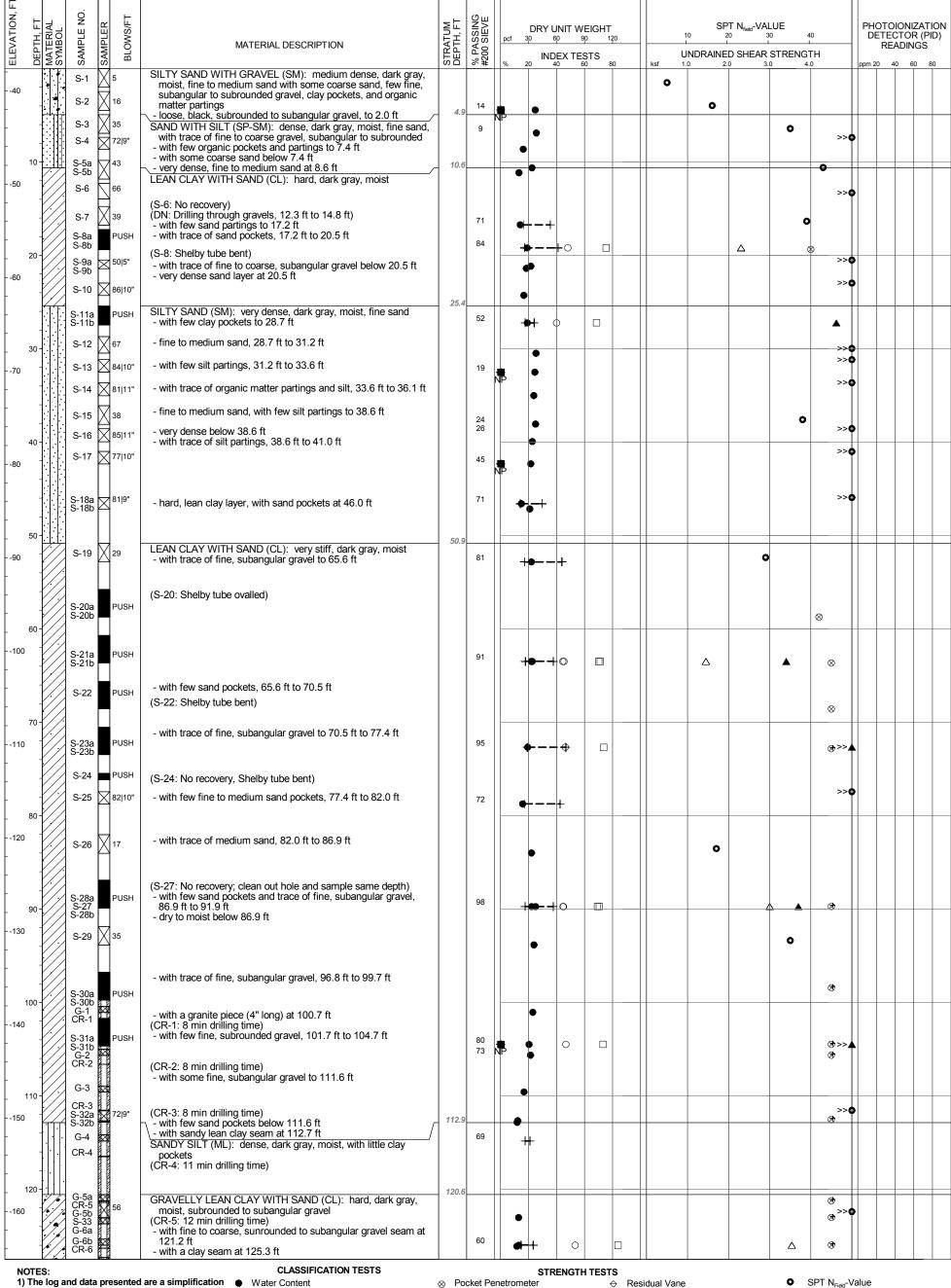
Open symbols indicate Remote Vane remolded tests Miniature Vane Unconsolidated Undrained Triaxial Unconfined Compression

SPT N<sub>Field</sub>-Value Exceeds Data Scale >> WOR - Weight of Rod WOH - Weight of Hammer PID

> DRILLING COMPANY: Fugro DRILLER: T. Wills/H. Russell VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 153.4 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 153.4 ft







1) The log and data presented are a simplification 

• of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs. 3) DN = Driller's Note

MUDLINE ELEVATION: -37.63 ft (rel. MLLW datum)
EXPLORATION START DATE: 10/18/2015

COORDINATES: W151.378982 N60.656811 (GCS, NAD 1983, NSRS2007, degrees)

in sample no indicates different SPT hammer used below the depth. COMPLETION DEPTH: 213.3 ft

COMPLETION DATE: 10/20/2015

LOGGED BY: S. Pant/ E. Pulido

Water Content

□ Dry Unit Weight Submerged Unit Weight 0

Non-Plastic Plastic Limit

Liquid Limit

 $\oplus$ 

Torvane

Remote Vane  $\Phi$ 

Miniature Vane

Unconsolidated Undrained Triaxial **Unconfined Compression** 

SPT N<sub>Field</sub>-Value **>>** Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer

PID

Open symbols indicate

remolded tests

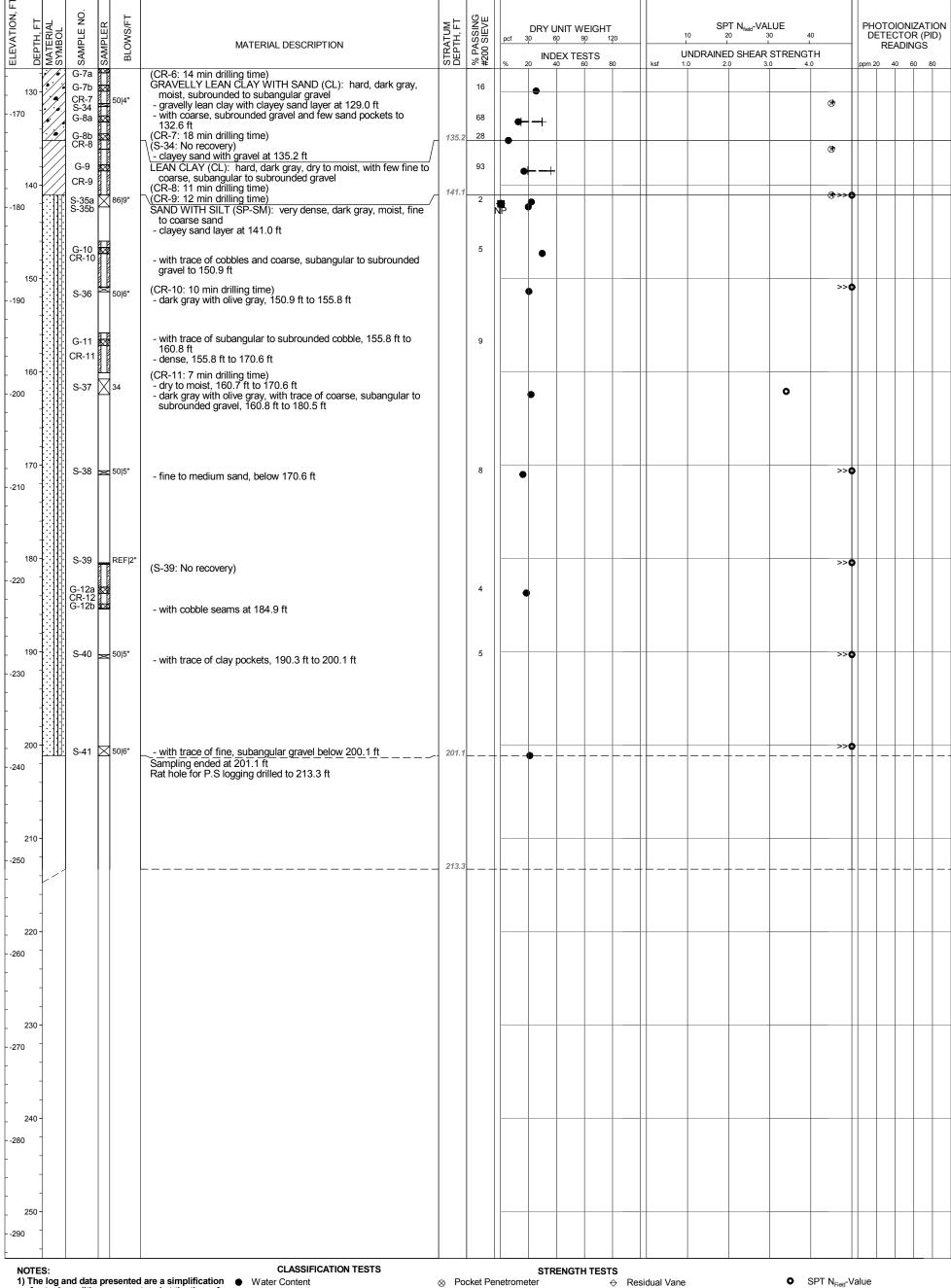
DRILLING COMPANY: Fugro DRILLER: R. Smith/ M. Bray VESSEL: SKATE 3A SPT HAMMER: SPT-02 to 213.3 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 213.3 ft CASING: 12" -dia. to 2.3 ft, 7" -dia. to 38.5 ft

**BORING LOG MB-17** MARINE LNG FACILITIES ALASKA LNG PROJECT

NIKISKI, ALASKA







1) The log and data presented are a simplification 

• of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs. 3) DN = Driller's Note

in sample no indicates different

LOGGED BY: S. Pant/ E. Pulido

# SPT hammer used below the depth.

COMPLETION DEPTH: 213.3 ft COORDINATES: W151.378982 N60.656811 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -37.63 ft (rel. MLLW datum)
EXPLORATION START DATE: 10/18/2015 COMPLETION DATE: 10/20/2015

Water Content

□ Dry Unit Weight Submerged Unit Weight 0 Non-Plastic

Plastic Limit

# Liquid Limit

⊗ Pocket Penetrometer

Torvane  $\oplus$ 

Remote Vane  $\Phi$ 

Miniature Vane

Unconsolidated Undrained Triaxial Unconfined Compression

 $\Diamond$ 

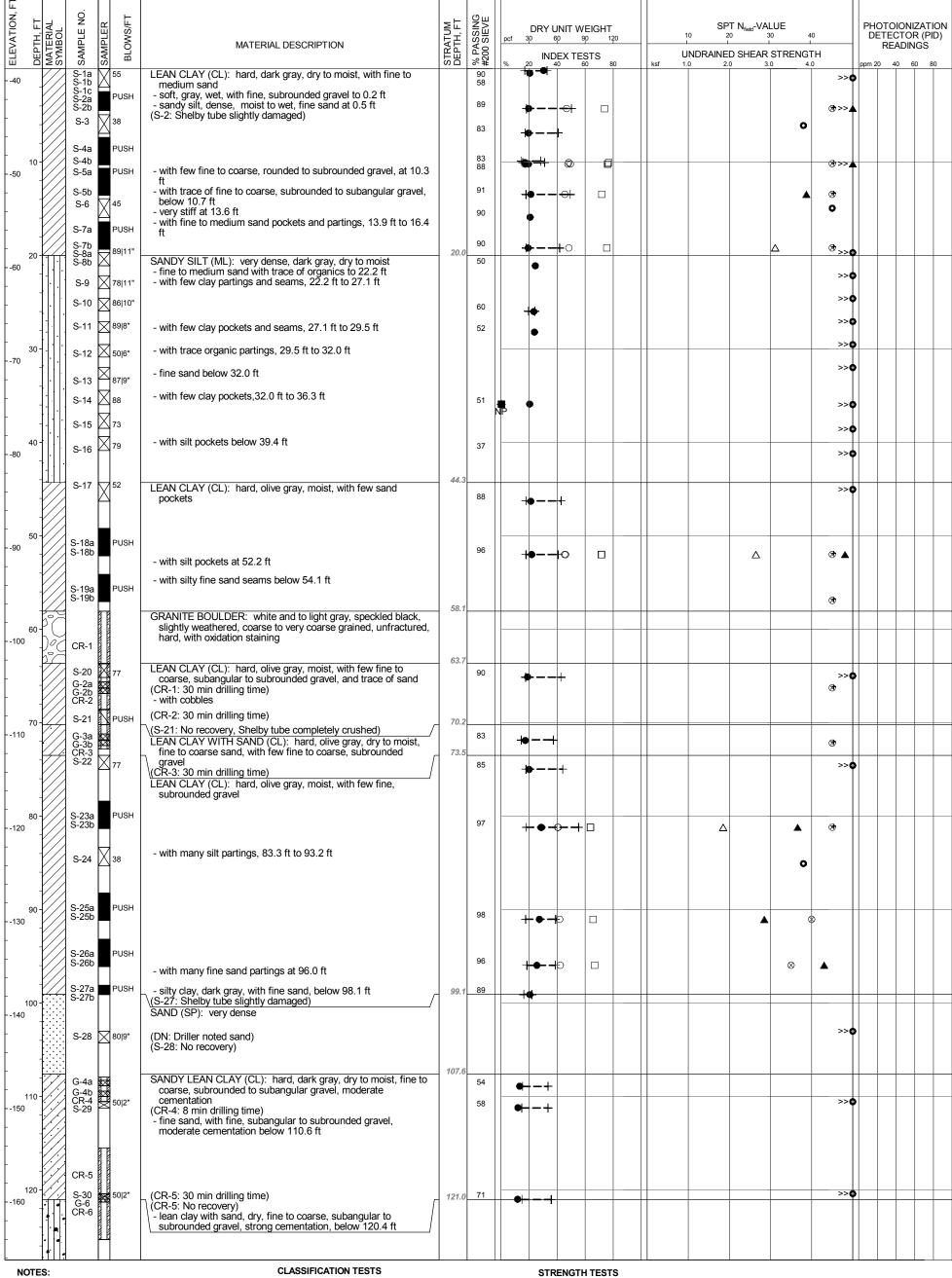
Open symbols indicate remolded tests

>> Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer PID

> DRILLING COMPANY: Fugro DRILLER: R. Smith/ M. Bray VESSEL: SKATE 3A SPT HAMMER: SPT-02 to 213.3 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 213.3 ft CASING: 12" -dia. to 2.3 ft, 7" -dia. to 38.5 ft







1) The log and data presented are a simplification 

• of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note 4) in sample no indicates different SPT hammer used below the depth.

COMPLETION DEPTH: 135.2 ft COORDINATES: W151.379542 N60.655275 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -38.70 ft (rel. MLLW datum)
EXPLORATION START DATE: 9/19/2015 COMPLETION DATE: 9/21/2015 LOGGED BY: J. Greenwald/A. Fee

0

Submerged Unit Weight

Non-Plastic

Plastic Limit

Liquid Limit

Water Content ⊗ Pocket Penetrometer Dry Unit Weight

Torvane  $\oplus$ Remote Vane  $\Phi$ 

Miniature Vane

Unconsolidated Undrained Triaxial **Unconfined Compression** 

### Residual Vane $\Leftrightarrow$

Open symbols indicate remolded tests

SPT N<sub>Field</sub>-Value Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer PID

DRILLING COMPANY: Fugro DRILLER: R. Smith/ A. Cook VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 135.2 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 135.2 ft CASING: 12" -dia. to 1.6 ft, 7" -dia. to 58.1 ft

Alaska LNG



ELEVATION, FT	MATERIAL SYMBOL	SAMPLE NO.	SAMPLER	BLOWS/FT	MATERIAL DESCRIPTION	STRATUM DEPTH, FT	% PASSING #200 SIEVE	pcf 3	DRY U	DRY UNIT WEIGHT			SPT N <sub>field</sub> -VALUE  10 20 30 40						PHOTOIONIZATIO DETECTOR (PID) READINGS		
	MATE	SAME	SAMF	BLO	MATERIAL DESCRIPTION		% PA #200		INDEX TESTS			0	UNDRAINED SHEAR ksf 1.0 2.0 3.0			STRENGTH		READINGS ppm 20 40 60 80			
					GRAVELLY SILT WITH SAND (ML): very dense, dark gray, wet, fine sand, with fine to coarse, subangular to subrounded gravel, with silt pockets (CR-6: 30 min drilling time)  SANDY LEAN CLAY (CL): hard, olive gray, moist, with fine to coarse sand pockets, partings, seams and few fine to coarse, subrounded gravel  - dry to moist, with trace of fine to coarse sand, and fine, subrounded gravel, below 130.3 ft (CR-7: 30 min drilling time)	130.2															
170		S-31 G-7 CR-7	M	37	Gravel, with silt pockets (CR-6: 30 min drilling time)	700.2	70	•		+						0					
-		CR-7			coarse sand pockets, partings, seams and few fine to coarse, subrounded gravel	135.2															
					- dry to moist, with trace of fine to coarse sand, and fine, subrounded gravel, below 130.3 ft	133.2															
ļ	_				\(CR-7: 30 min drilling time)																
180	, ]																				
-	_																				
	-																				
	_																				
190	' ]																				
-	_																				
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200	) -																			_	
240	-																				
-																					
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210	) -																	-			
250	-																				
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220	)-																	$\vdash$		+	
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230	)-																	+		+	_
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NOT	ES: ne log a	and dat	a pre	esented	CLASSIFICATION TESTS  are a simplification   Water Content		cket Pe	enetrome	STRI	ENGTH			idual Vane			0 :	SPT N <sub>Field</sub> -V	/alue			

1) The log and data presented are a simplification of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) in sample no indicates different SPT hammer used below the depth.

COMPLETION DEPTH: 135.2 ft
COORDINATES: W151.379542 N60.655275 (GCS, NAD 1983, NSRS2007, degrees)
MUDLINE ELEVATION: -38.70 ft (rel. MLLW datum)
EXPLORATION START DATE: 9/19/2015
COMPLETION DATE: 9/21/2015
LOGGED BY: J. Greenwald/A. Fee

LOGGED BY: J. Greenwald/A. Fee

Liquid Limit

♦ Torvane Remote Vane

Miniature Vane

▲ Unconsolidated Undrained Triaxial Unconfined Compression

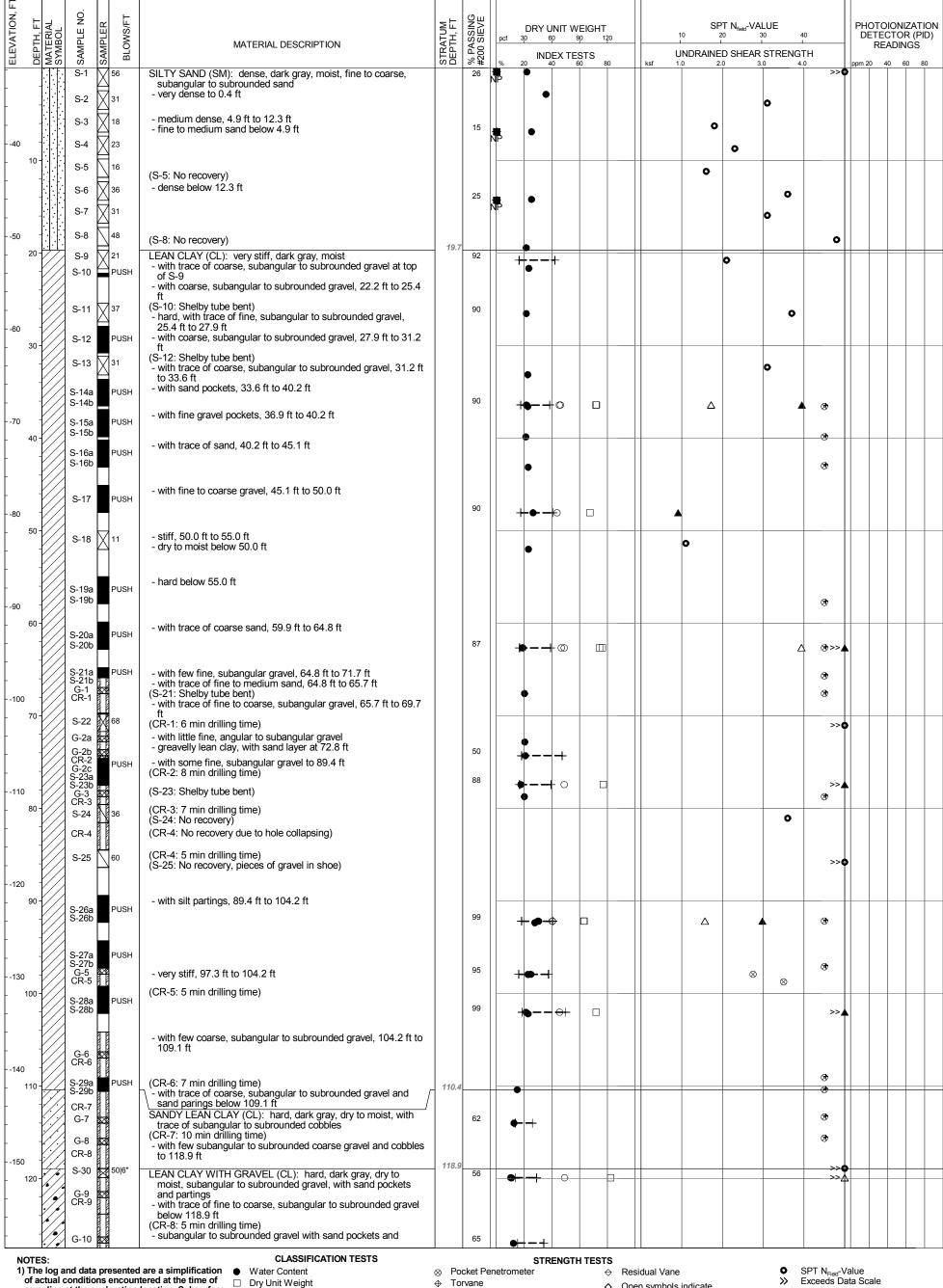
Open symbols indicateΔ remolded tests

>> Exceeds Data Scale WOR -Weight of Rod WOH -Weight of Hammer ▼ PID

DRILLING COMPANY: Fugro
DRILLER: R. Smith/ A. Cook
VESSEL: SKATE 3A
SPT HAMMER: SPT-09 to 135.2 ft
BACKFILL: NA
DRILLING METHOD
HOLLOW STEM AUGER: N/A
WET ROTARY: 0 to 135.2 ft
CASING: 12" -dia. to 1.6 ft, 7" -dia. to 58.1 ft







## of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) in sample no indicates different

SPT hammer used below the depth.

LOGGED BY: S. Pant/ E. Pulido

COMPLETION DEPTH: 167.3 ft COORDINATES: W151.378774 N60.658543 (GCS, NAD 1983, NSRS2007, degrees)

0

Submerged Unit Weight

Liquid Limit

Non-Plastic

Plastic Limit

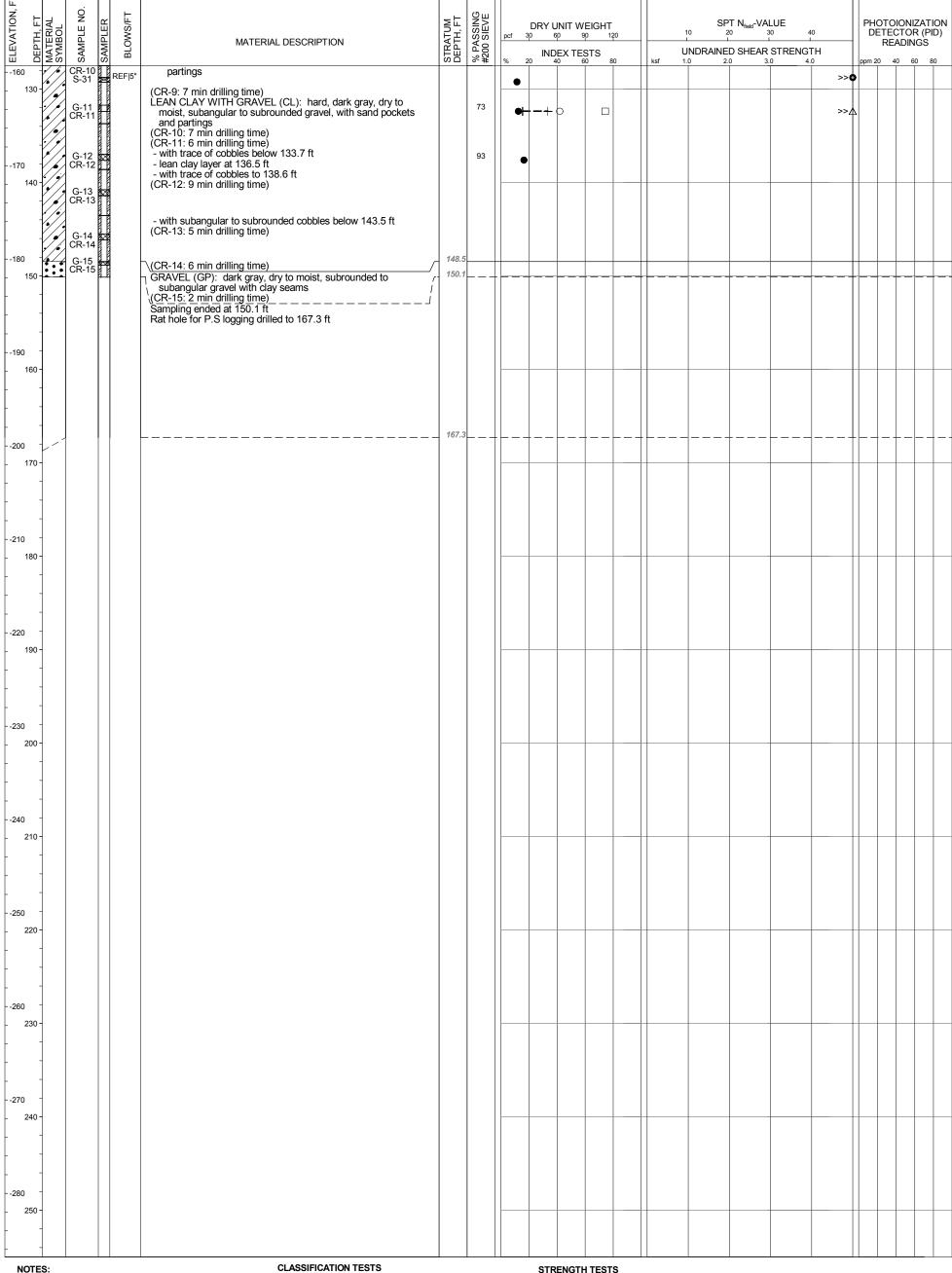
MUDLINE ELEVATION: -31.80 ft (rel. MLLW datum)
EXPLORATION START DATE: 10/9/2015 COMPLETION DATE: 10/11/2015

- Torvane  $\oplus$
- Remote Vane  $\Phi$
- Miniature Vane
- Unconsolidated Undrained Triaxial **Unconfined Compression**
- Open symbols indicate remolded tests
- Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer PID

DRILLING COMPANY: Fugro DRILLER: R. Smith/ A. Cook VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 167.3 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 167.3 ft CASING: 12" -dia. to 1.6 ft, 7" -dia. to 37.7 ft







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the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) in sample no indicates different SPT hammer used below the depth.

LOGGED BY: S. Pant/ E. Pulido

COMPLETION DEPTH: 167.3 ft
COORDINATES: W151.378774 N60.658543 (GCS, NAD 1983, NSRS2007, degrees)
MUDLINE ELEVATION: -31.80 ft (rel. MLLW datum)
EXPLORATION START DATE: 10/9/2015 COMPLETION DATE: 10/11/2015

Water Content □ Dry Unit Weight

Submerged Unit Weight 0

Non-Plastic

Plastic Limit

Liquid Limit

⊗ Pocket Penetrometer

Torvane  $\oplus$ 

 $\Phi$ Remote Vane Miniature Vane

Unconsolidated Undrained Triaxial

Unconfined Compression

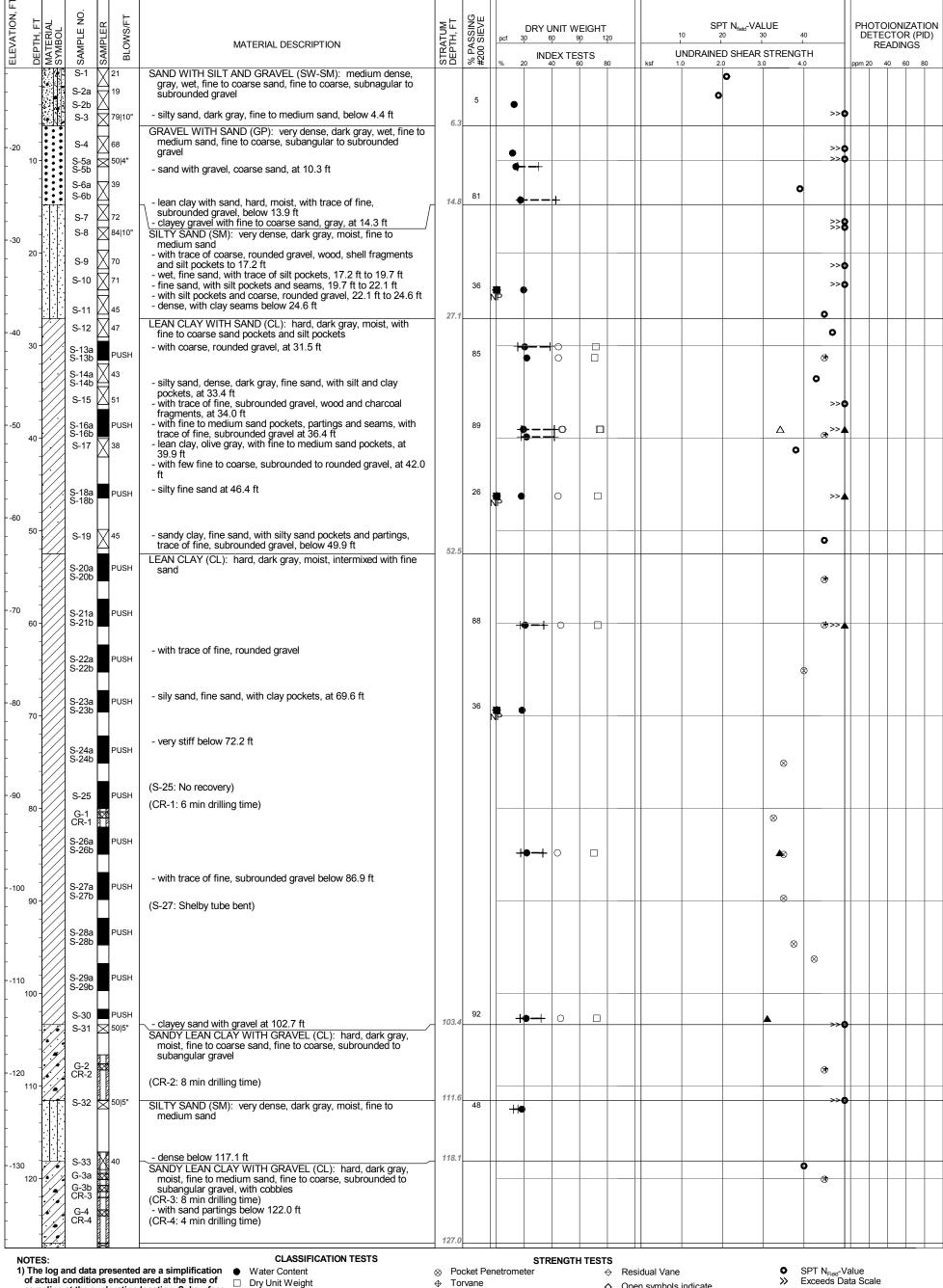
Open symbols indicate remolded tests

SPT N<sub>Field</sub>-Value Exceeds Data Scale >> WOR - Weight of Rod WOH - Weight of Hammer PID

> DRILLING COMPANY: Fugro DRILLER: R. Smith/ A. Cook VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 167.3 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 167.3 ft CASING: 12" -dia. to 1.6 ft, 7" -dia. to 37.7 ft







of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) in sample no indicates different

LOGGED BY: J. Greenwald/A. Fee

SPT hammer used below the depth.

# COMPLETION DEPTH: 152.6 ft COORDINATES: W151.368892 N60.656614 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -11.40 ft (rel. MLLW datum) EXPLORATION START DATE: 9/7/2015 COMPLETION DATE: 9/8/2015

Submerged Unit Weight

Non-Plastic

Plastic Limit

0

**BORING LOG MB-20** MARINE LNG FACILITIES ALASKA LNG PROJECT

NIKISKI, ALASKA

Remote Vane

Miniature Vane

Unconfined Compression

Unconsolidated Undrained Triaxial

 $\oplus$ 

 $\Phi$ 

Liquid Limit

Exceeds Data Scale **>>** Open symbols indicate WOR - Weight of Rod WOH - Weight of Hammer

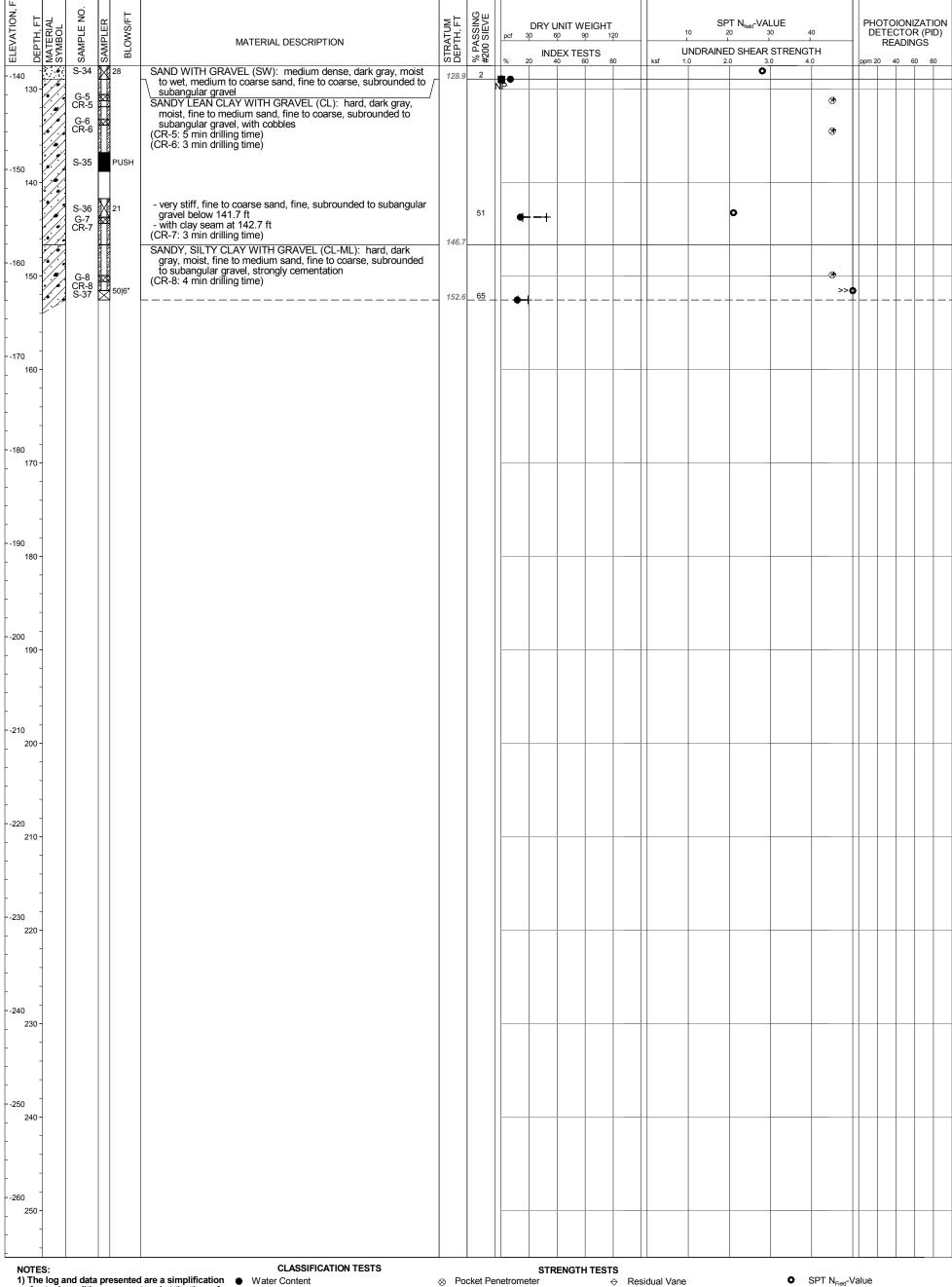
PID

remolded tests

DRILLING COMPANY: Fugro DRILLER: J. Wilson/T. Wills VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 152.6 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 152.6 ft CASING: 7" -dia. to 57.4 ft

Alaska LNG





of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) in sample no indicates different

SPT hammer used below the depth.

COMPLETION DEPTH: 152.6 ft
COORDINATES: W151.368892 N60.656614 (GCS, NAD 1983, NSRS2007, degrees)
MUDLINE ELEVATION: -11.40 ft (rel. MLLW datum)
EXPLORATION START DATE: 9/7/2015

COMPLETION DATE: 9/8/2015 LOGGED BY: J. Greenwald/A. Fee

Water Content □ Dry Unit Weight

Submerged Unit Weight 0

Non-Plastic Plastic Limit

Liquid Limit

⊗ Pocket Penetrometer

Torvane  $\oplus$ 

 $\Phi$ Remote Vane

Miniature Vane

Unconsolidated Undrained Triaxial Unconfined Compression

Open symbols indicate

remolded tests

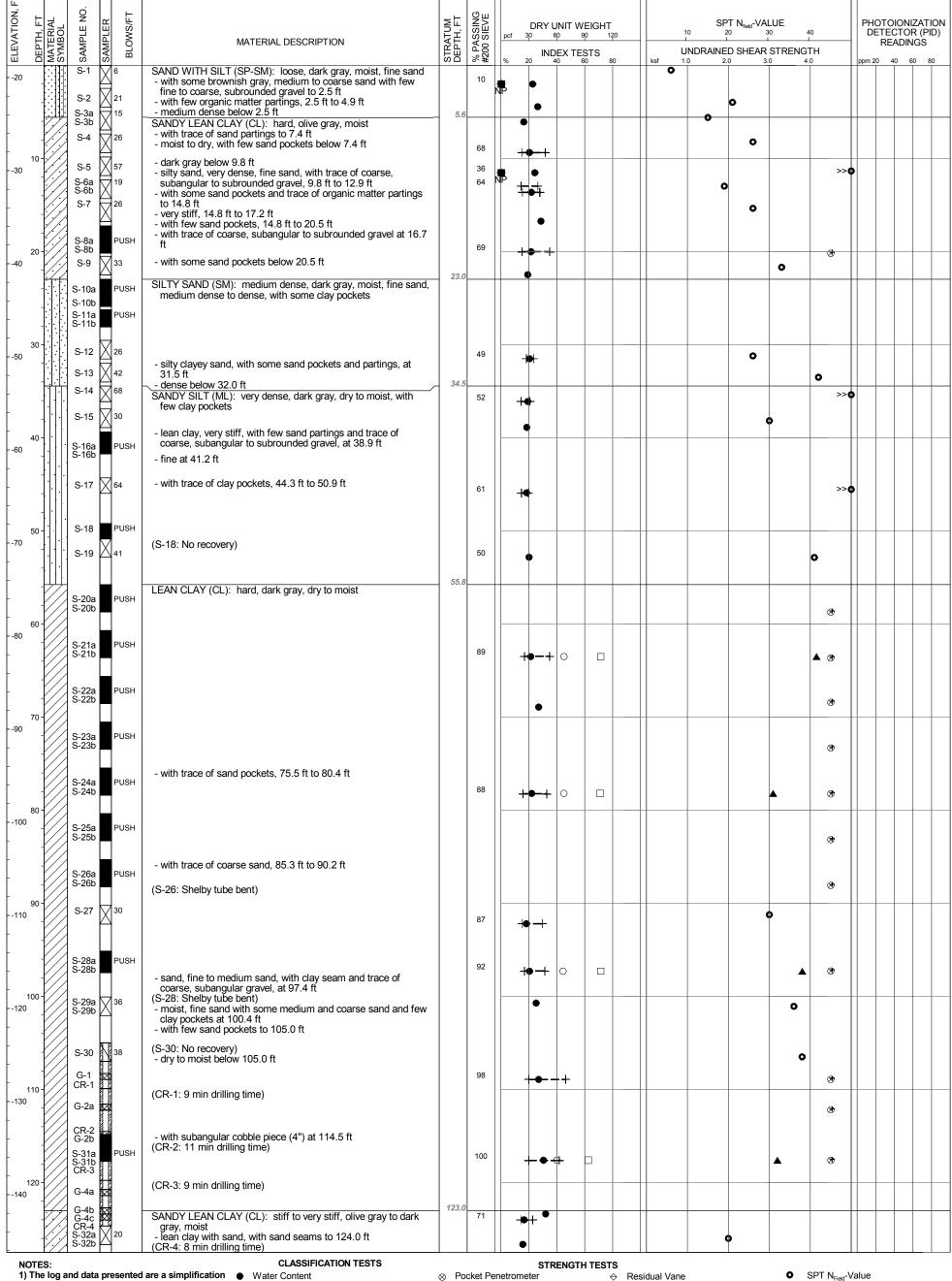
SPT N<sub>Field</sub>-Value Exceeds Data Scale >> WOR - Weight of Rod WOH - Weight of Hammer PID

> DRILLING COMPANY: Fugro DRILLER: J. Wilson/T. Wills VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 152.6 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 152.6 ft CASING: 7" -dia. to 57.4 ft

PLATE B1-16b

Alaska LNG





of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) in sample no indicates different

SPT hammer used below the depth.

COMPLETION DEPTH: 164 ft
COORDINATES: W151.372542 N60.655536 (GCS, NAD 1983, NSRS2007, degrees)
MUDLINE ELEVATION: -18.70 ft (rel. MLLW datum)
EXPLORATION START DATE: 10/16/2015

COMPLETION DATE: 10/17/2015 LOGGED BY: S. Pant/ E. Pulido

Water Content

□ Dry Unit Weight Submerged Unit Weight 0 Non-Plastic

> Plastic Limit Liquid Limit

Torvane  $\oplus$ Remote Vane  $\Phi$ 

Miniature Vane

Unconsolidated Undrained Triaxial

**Unconfined Compression** 

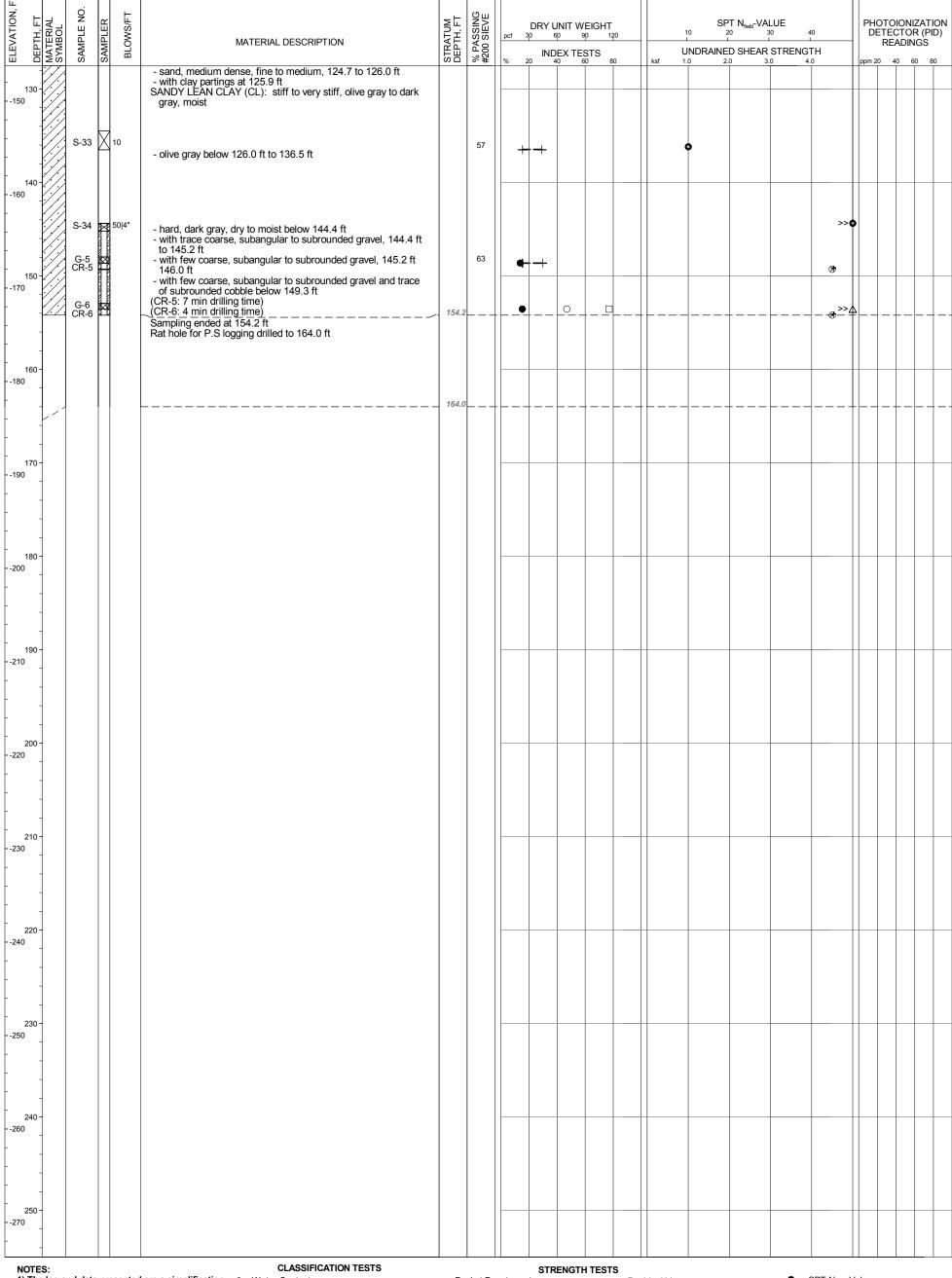
Open symbols indicate remolded tests

SPT N<sub>Field</sub>-Value Exceeds Data Scale **>>** WOR - Weight of Rod WOH - Weight of Hammer PID

DRILLING COMPANY: Fugro DRILLER: R. Smith/ A. Cook VESSEL: SKATE 3A SPT HAMMER: SPT-02 to 164.0 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 164.0 ft CASING: 12" -dia. to 1.6 ft, 7" -dia. to 36.7 ft

Alaska LNG





of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) in sample no indicates different

SPT hammer used below the depth.

COMPLETION DEPTH: 164 ft COORDINATES: W151.372542 N60.655536 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -18.70 ft (rel. MLLW datum) EXPLORATION START DATE: 10/16/2015

COMPLETION DATE: 10/17/2015 LOGGED BY: S. Pant/ E. Pulido

Water Content

□ Dry Unit Weight Submerged Unit Weight 0

Non-Plastic

Liquid Limit Plastic Limit

⊗ Pocket Penetrometer

Torvane  $\oplus$ 

 $\Phi$ Remote Vane

Miniature Vane

Unconsolidated Undrained Triaxial Unconfined Compression

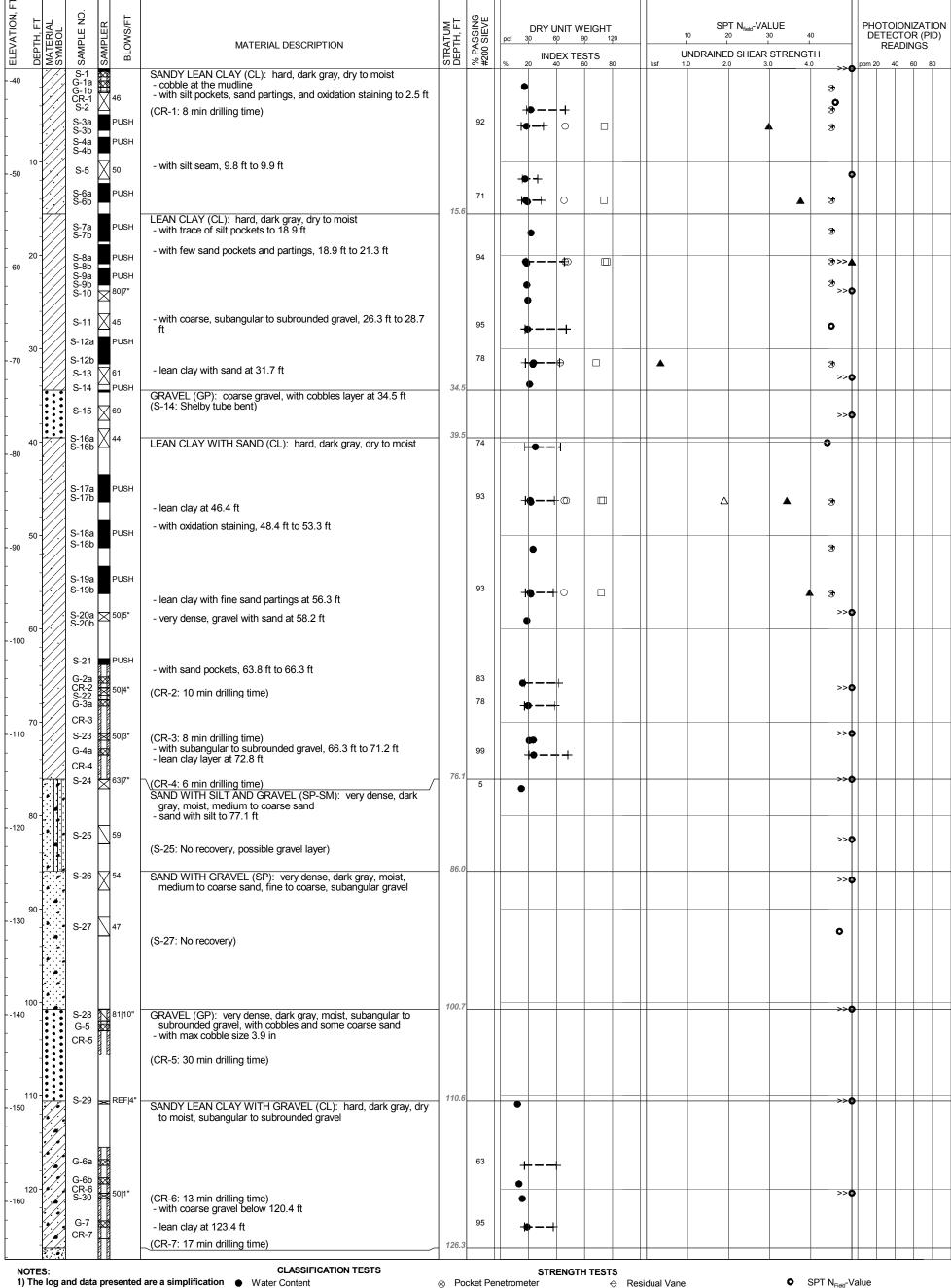
Open symbols indicate remolded tests

SPT N<sub>Field</sub>-Value Exceeds Data Scale >> WOR - Weight of Rod WOH - Weight of Hammer PID

DRILLING COMPANY: Fugro DRILLER: R. Smith/ A. Cook VESSEL: SKATE 3A
SPT HAMMER: SPT-02 to 164.0 ft
BACKFILL: N/A
DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 164.0 ft CASING: 12" -dia. to 1.6 ft, 7" -dia. to 36.7 ft







1) The log and data presented are a simplification 

• of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) in sample no indicates different

LOGGED BY: S. Pant/ E. Pulido

SPT hammer used below the depth.

COMPLETION DEPTH: 151.3 ft COORDINATES: W151.379286 N60.653562 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -38.70 ft (rel. MLLW datum)
EXPLORATION START DATE: 10/5/2015 COMPLETION DATE: 10/7/2015

Water Content □ Dry Unit Weight Submerged Unit Weight

Plastic Limit

0 Non-Plastic

Liquid Limit

 $\oplus$ 

Torvane

 $\Phi$ Remote Vane Miniature Vane

Unconsolidated Undrained Triaxial **Unconfined Compression** 

# Residual Vane

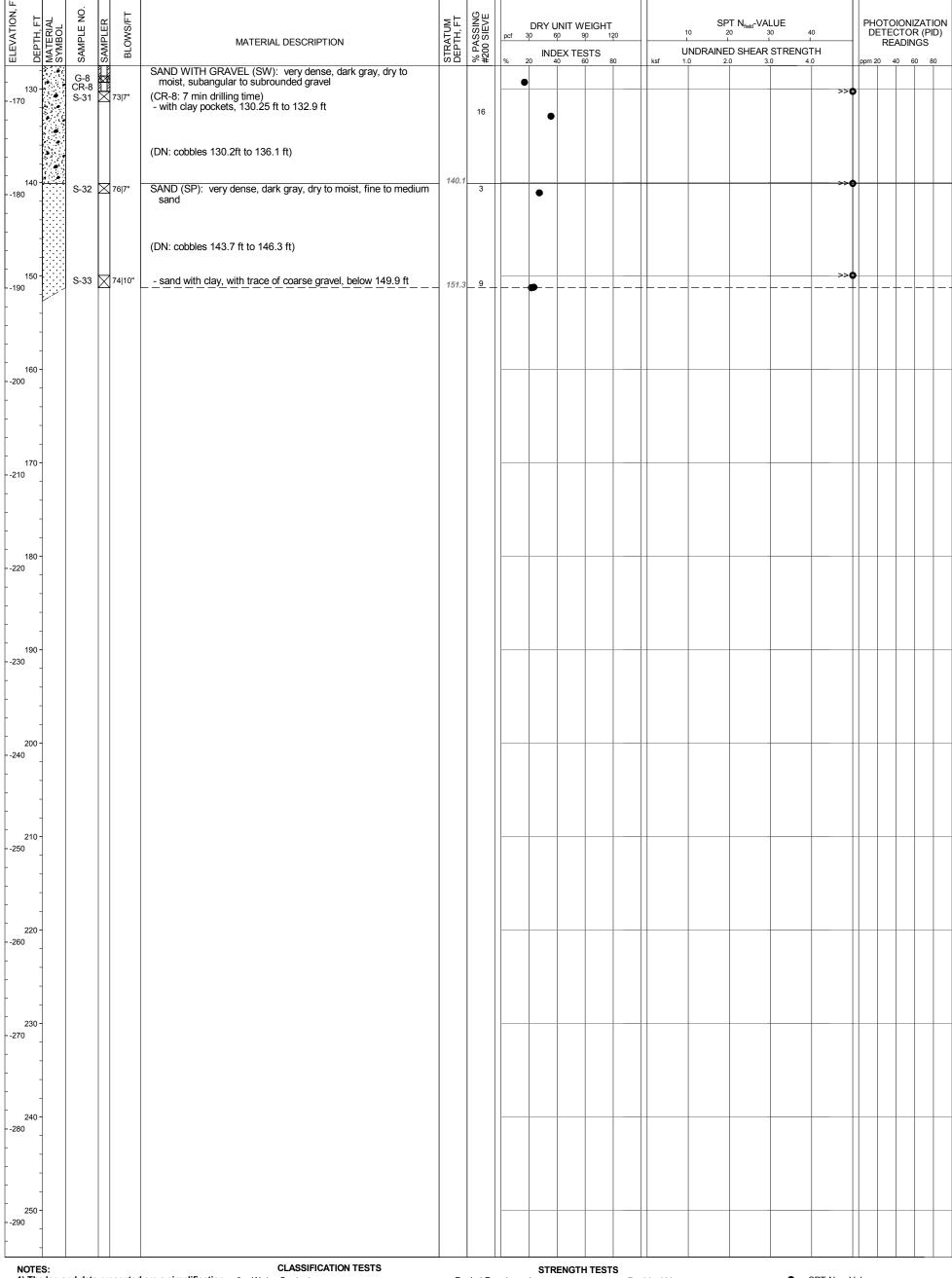
Open symbols indicate remolded tests

SPT N<sub>Field</sub>-Value **>>** Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer PID

DRILLING COMPANY: Fugro DRILLER: R. Smith/ A. Cook VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 151.2 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 151.3 ft CASING: 12" -dia. to 1.0 ft, 7" -dia. to 1.3 ft







of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) in sample no indicates different SPT hammer used below the depth.

COMPLETION DEPTH: 151.3 ft
COORDINATES: W151.379286 N60.653562 (GCS, NAD 1983, NSRS2007, degrees)
MUDLINE ELEVATION: -38.70 ft (rel. MLLW datum)
EXPLORATION START DATE: 10/5/2015

COMPLETION DATE: 10/7/2015 LOGGED BY: S. Pant/ E. Pulido

Water Content

Plastic Limit

□ Dry Unit Weight Submerged Unit Weight 0

Non-Plastic

Liquid Limit

⊗ Pocket Penetrometer

Torvane  $\oplus$ 

 $\Phi$ Remote Vane

Miniature Vane Unconsolidated Undrained Triaxial

Unconfined Compression

→ Residual Vane

Open symbols indicate remolded tests

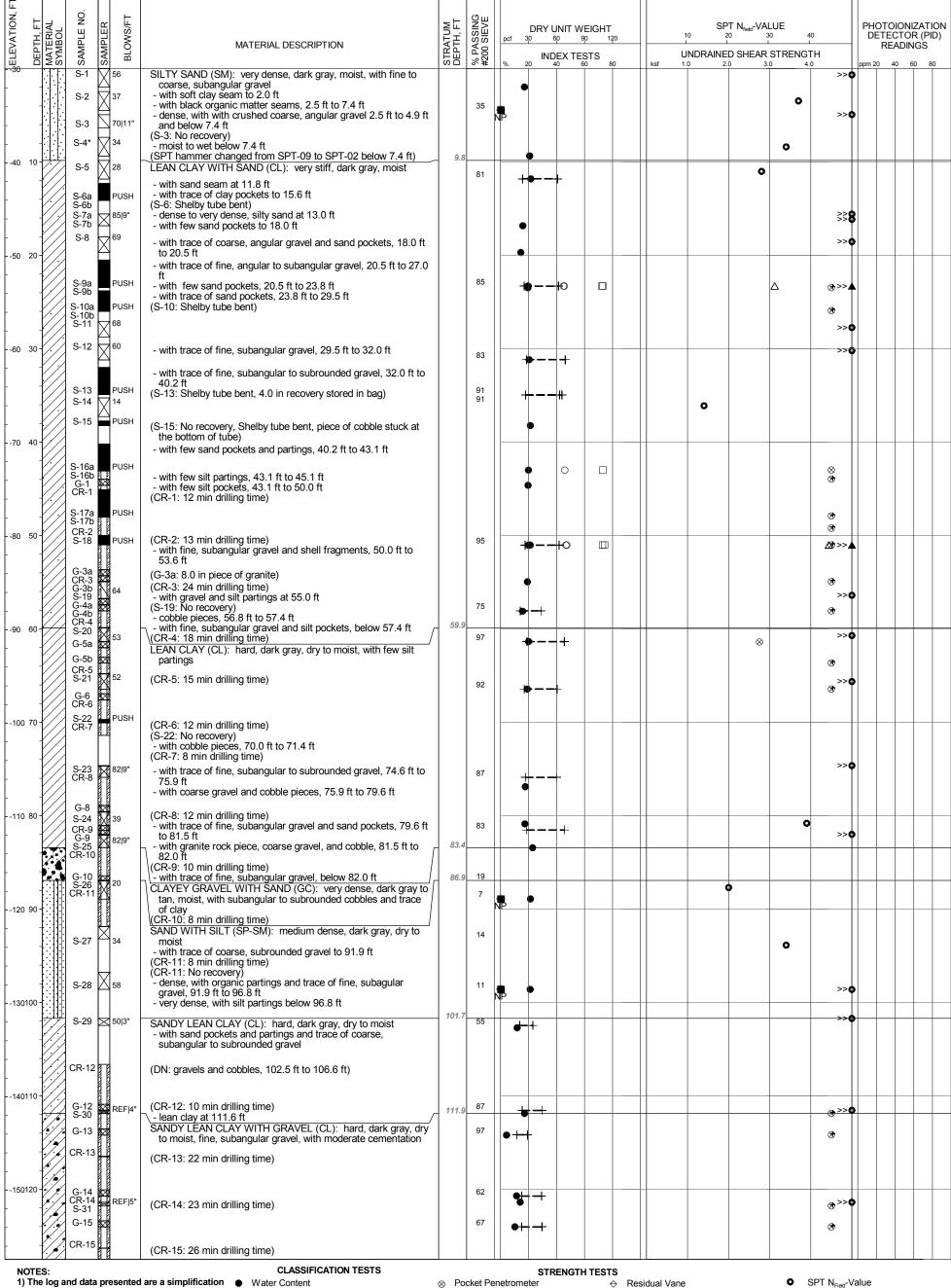
SPT N<sub>Field</sub>-Value >> Exceeds Data Scale WOR -Weight of Rod WOH -Weight of Hammer PID

DRILLING COMPANY: Fugro DRILLER: R. Smith/ A. Cook VESSEL: SKATE 3A
SPT HAMMER: SPT-09 to 151.2 ft
BACKFILL: N/A
DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 151.3 ft CASING: 12" -dia. to 1.0 ft, 7" -dia. to 1.3 ft

**BORING LOG MB-22** MARINE LNG FACILITIES ALASKA LNG PROJECT NIKISKI, ALASKA







# 

of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

MUDLINE ELEVATION: -29.90 ft (rel. MLLW datum)
EXPLORATION START DATE: 10/12/2015

COORDINATES: W151.376172 N60.654547 (GCS, NAD 1983, NSRS2007, degrees)

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs. 3) DN = Driller's Note

in sample no indicates different SPT hammer used below the depth. COMPLETION DEPTH: 305.5 ft

COMPLETION DATE: 10/15/2015

LOGGED BY: S. Pant/ E. Pulido

Water Content

□ Dry Unit Weight Submerged Unit Weight 0

Non-Plastic Plastic Limit Liquid Limit  $\oplus$ 

Torvane

Remote Vane  $\Phi$ 

Miniature Vane

Unconsolidated Undrained Triaxial

**Unconfined Compression** 

Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer

> DRILLING COMPANY: Fugro DRILLER: R. Smith/ A. Cook VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 7.4 ft SPT-02 7.4 ft to 305.5 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A

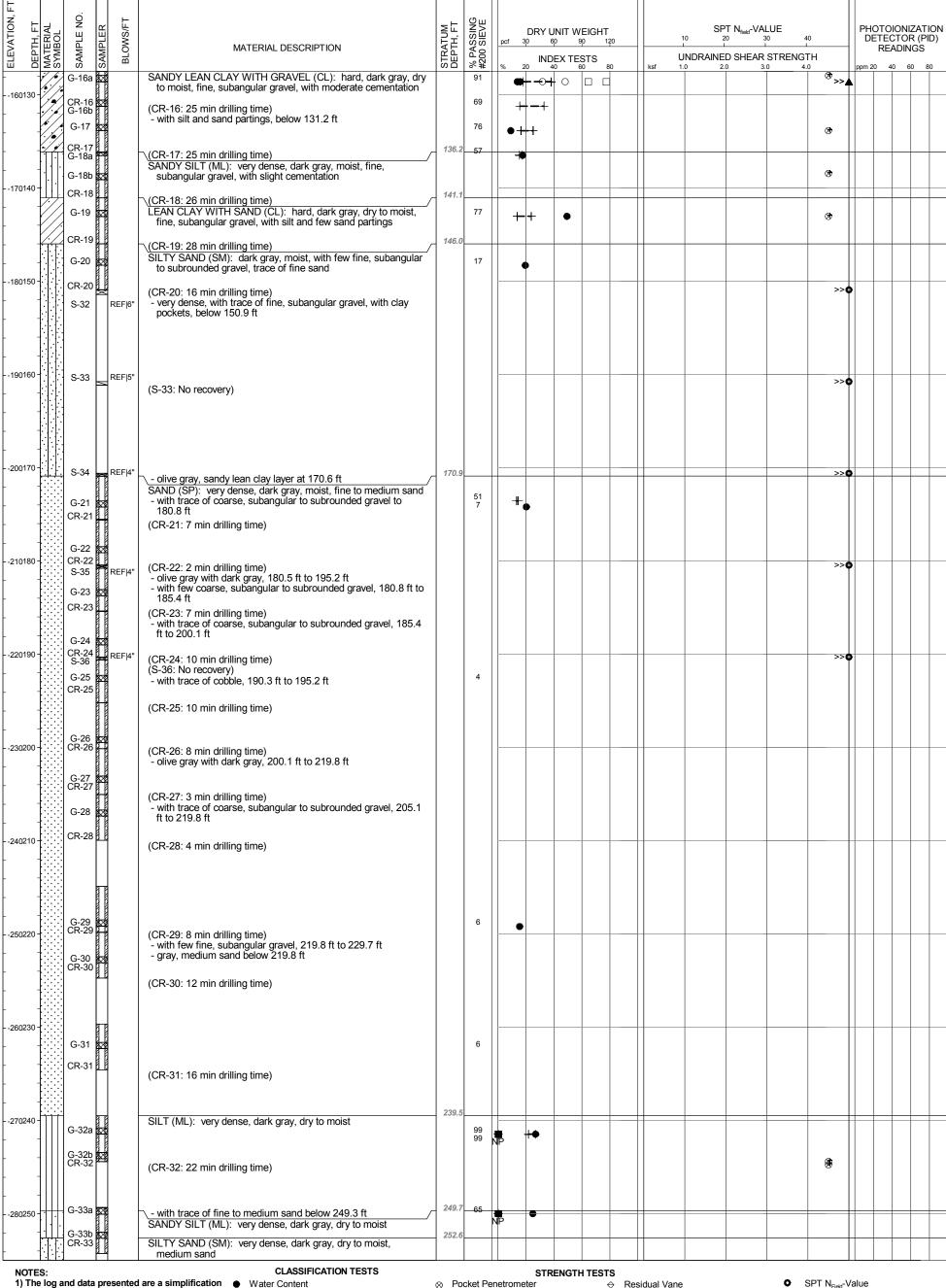
**BORING LOG MB-23** MARINE LNG FACILITIES ALASKA LNG PROJECT NIKISKI, ALASKA

Open symbols indicate

remolded tests







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the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note

in sample no indicates different SPT hammer used below the depth.

LOGGED BY: S. Pant/ E. Pulido

COMPLETION DEPTH: 305.5 ft COORDINATES: W151.376172 N60.654547 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -29.90 ft (rel. MLLW datum)
EXPLORATION START DATE: 10/12/2015 COMPLETION DATE: 10/15/2015

Water Content □ Dry Unit Weight

Submerged Unit Weight 0 Non-Plastic

> Liquid Limit Plastic Limit

⊗ Pocket Penetrometer

Torvane  $\oplus$ Remote Vane  $\Phi$ 

Miniature Vane

Unconsolidated Undrained Triaxial **Unconfined Compression** 

Residual Vane

Open symbols indicate remolded tests

SPT N<sub>Field</sub>-Value Exceeds Data Scale >> WOR - Weight of Rod WOH - Weight of Hammer

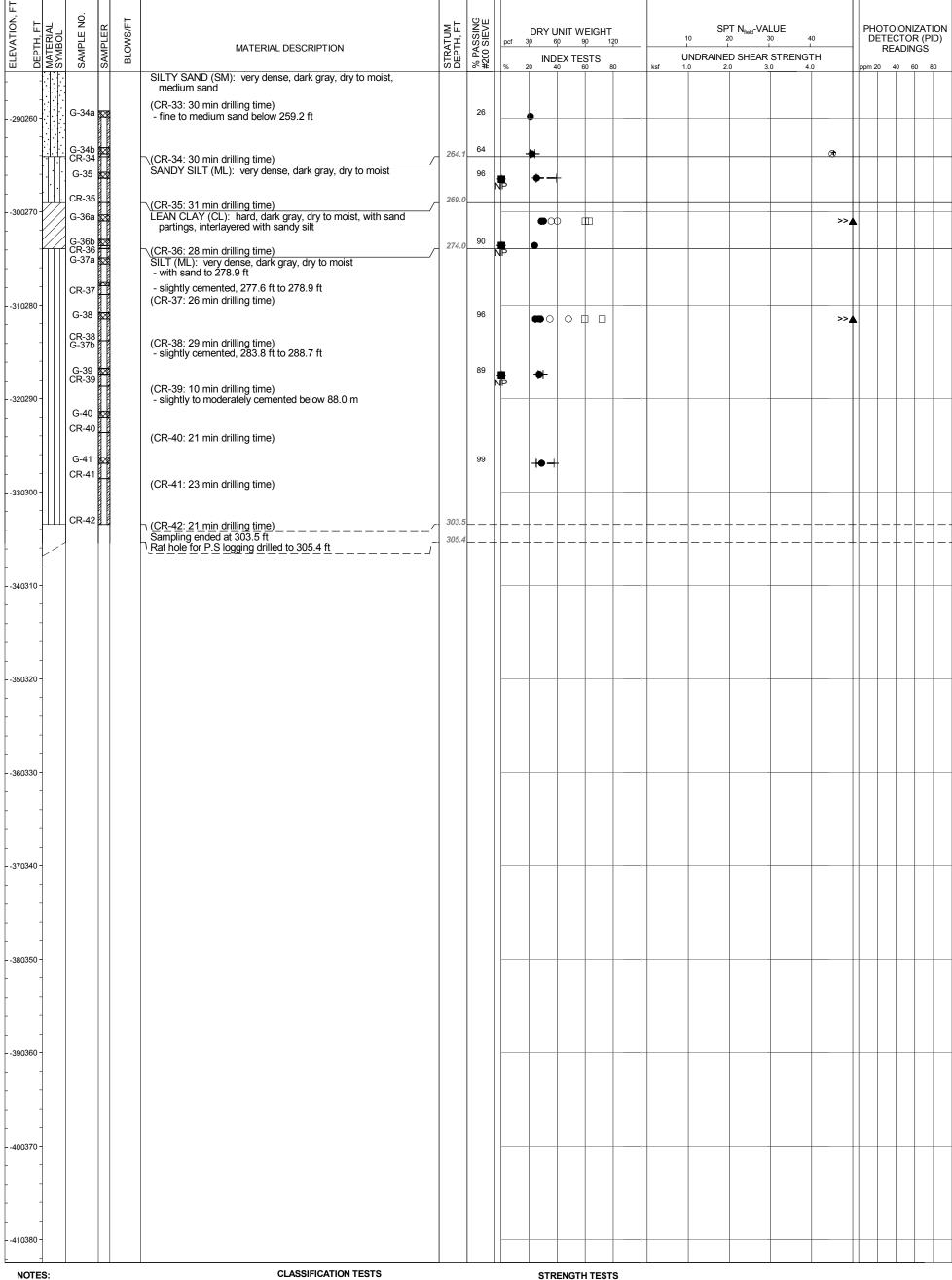
DRILLING COMPANY: Fugro DRILLER: R. Smith/ A. Cook VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 7.4 ft SPT-02 7.4 ft to 305.5 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 305.5 ft CASING: 12" -dia. to 1.6 ft, 7" -dia. to 37.7 ft

PLATE B1-19b

**BORING LOG MB-23** MARINE LNG FACILITIES ALASKA LNG PROJECT NIKISKI, ALASKA







of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

LOGGED BY: S. Pant/ E. Pulido

3) DN = Driller's Note
4) in sample no indicates different SPT hammer used below the depth.

COMPLETION DEPTH: 305.5 ft COORDINATES: W151.376172 N60.654547 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -29.90 ft (rel. MLLW datum) EXPLORATION START DATE: 10/12/2015 COMPLETION DATE: 10/15/2015

Water Content □ Dry Unit Weight Submerged Unit Weight 0

Plastic Limit

Non-Plastic

# Liquid Limit

⊗ Pocket Penetrometer

Torvane  $\oplus$ 

Remote Vane  $\Phi$ 

Miniature Vane Unconsolidated Undrained Triaxial

Unconfined Compression

Open symbols indicate remolded tests

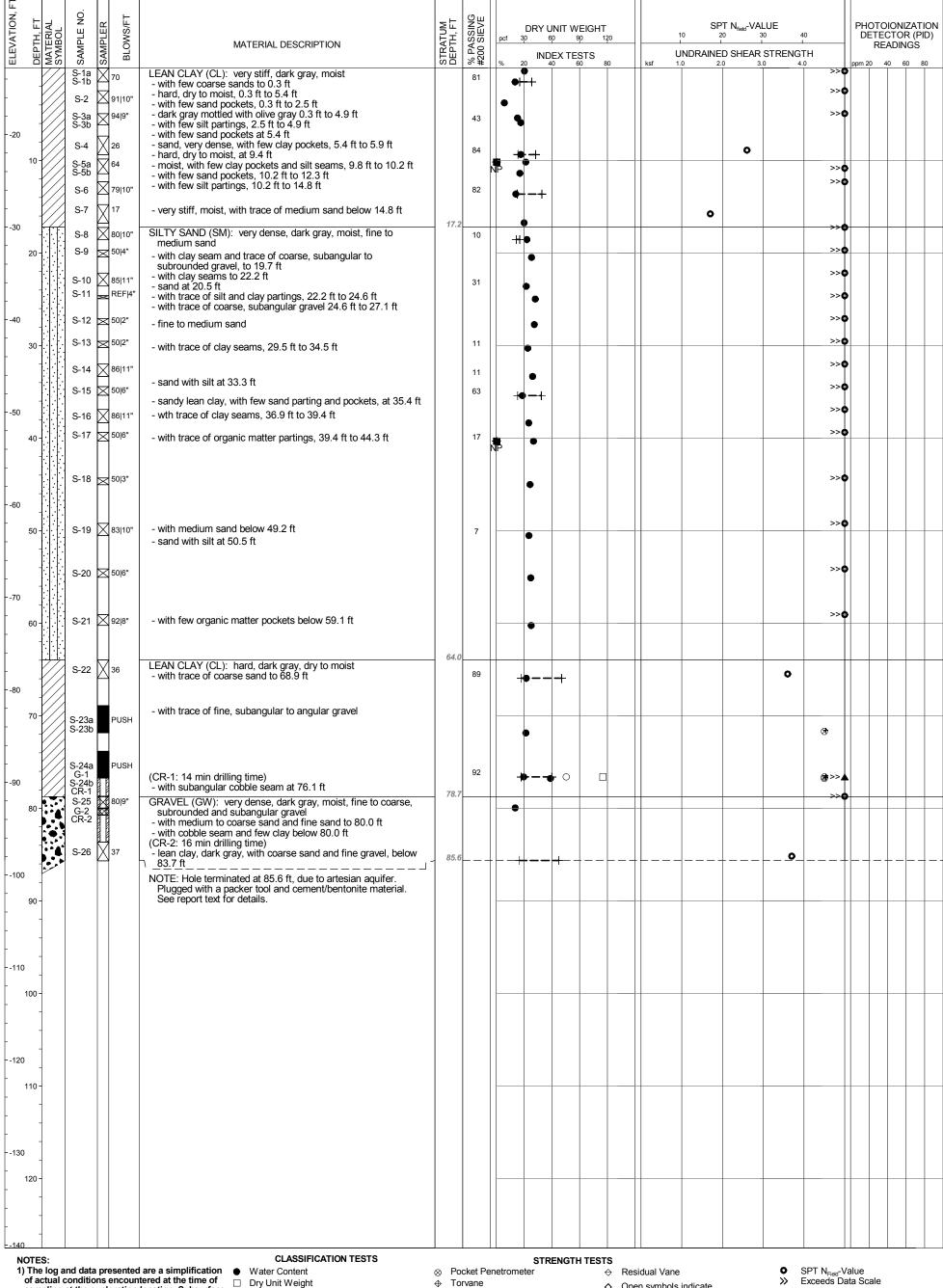
SPT N<sub>Field</sub>-Value Exceeds Data Scale >> WOR - Weight of Rod WOH - Weight of Hammer PID

DRILLING COMPANY: Fugro DRILLER: R. Smith/ A. Cook VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 7.4 ft SPT-02 7.4 ft to 305.5 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 305.5 ft CASING: 12" -dia. to 1.6 ft, 7" -dia. to 37.7 ft PLATE B1-19c

**BORING LOG MB-23** MARINE LNG FACILITIES ALASKA LNG PROJECT NIKISKI, ALASKA







of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

LOGGED BY: S. Pant/ E. Pulido

3) DN = Driller's Note in sample no indicates different SPT hammer used below the depth.

COMPLETION DEPTH: 85.6 ft COORDINATES: W151.367307 N60.653940 (GCS, NAD 1983, NSRS2007, degrees)
MUDLINE ELEVATION: -12.80 ft (rel. MLLW datum)
EXPLORATION START DATE: 10/27/2015 COMPLETION DATE: 10/28/2015

0

Submerged Unit Weight

Non-Plastic

Plastic Limit

**BORING LOG MB-24** MARINE LNG FACILITIES ALASKA LNG PROJECT

NIKISKI, ALASKA

Remote Vane

Miniature Vane

Unconfined Compression

Unconsolidated Undrained Triaxial

 $\oplus$ 

 $\Phi$ 

Liquid Limit

Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer

PID

Open symbols indicate

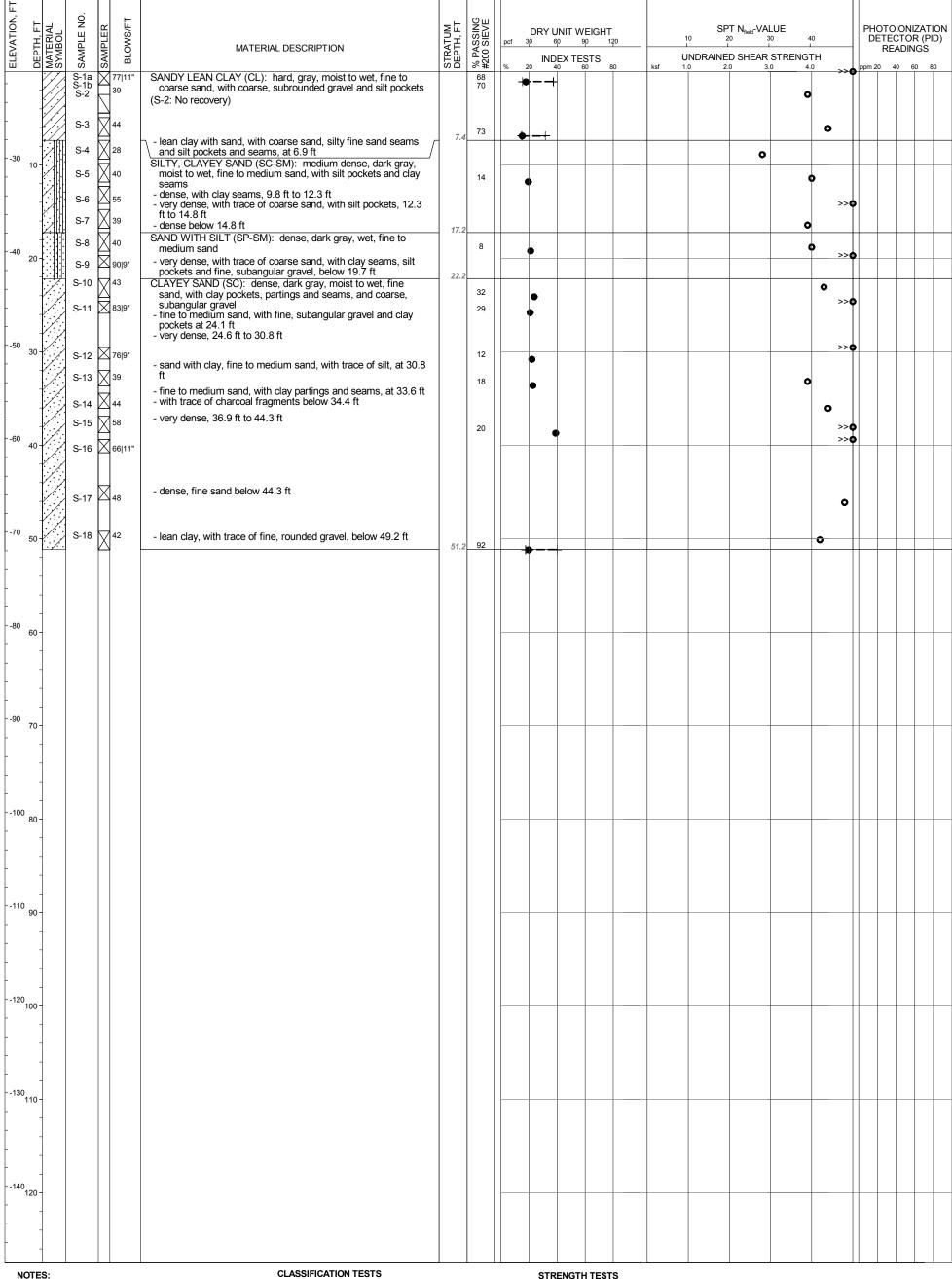
remolded tests

DRILLING COMPANY: Fugro DRILLER: J. Wilson/J. Barfield VESSEL: SKATE 3A SPT HAMMER: SPT-02 to 85.6 ft BACKFILL: Packer Tool and Cement-Bentonite

<u>DRILLING METHOD</u> HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 85.6 ft CASING: 12" -dia. to 0.3 ft, 7" -dia. to 64.0 ft







1) The log and data presented are a simplification 

• of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note 4) in sample no indicates different

SPT hammer used below the depth.

COMPLETION DEPTH: 51.2 ft COORDINATES: W151.369679 N60.653224 (GCS, NAD 1983, NSRS2007, degrees)

MUDLINE ELEVATION: -20.70 ft (rel. MLLW datum)
EXPLORATION START DATE: 9/9/2015 COMPLETION DATE: 9/9/2015 LOGGED BY: J. Greenwald/A. Fee

Water Content □ Dry Unit Weight

Submerged Unit Weight 0 Non-Plastic

> Liquid Limit Plastic Limit

⊗ Pocket Penetrometer

**BORING LOG MB-25** 

MARINE LNG FACILITIES

ALASKA LNG PROJECT

NIKISKI, ALASKA

Torvane  $\oplus$ 

Remote Vane  $\Phi$ Miniature Vane

Unconsolidated Undrained Triaxial

Unconfined Compression

Residual Vane

Open symbols indicate remolded tests

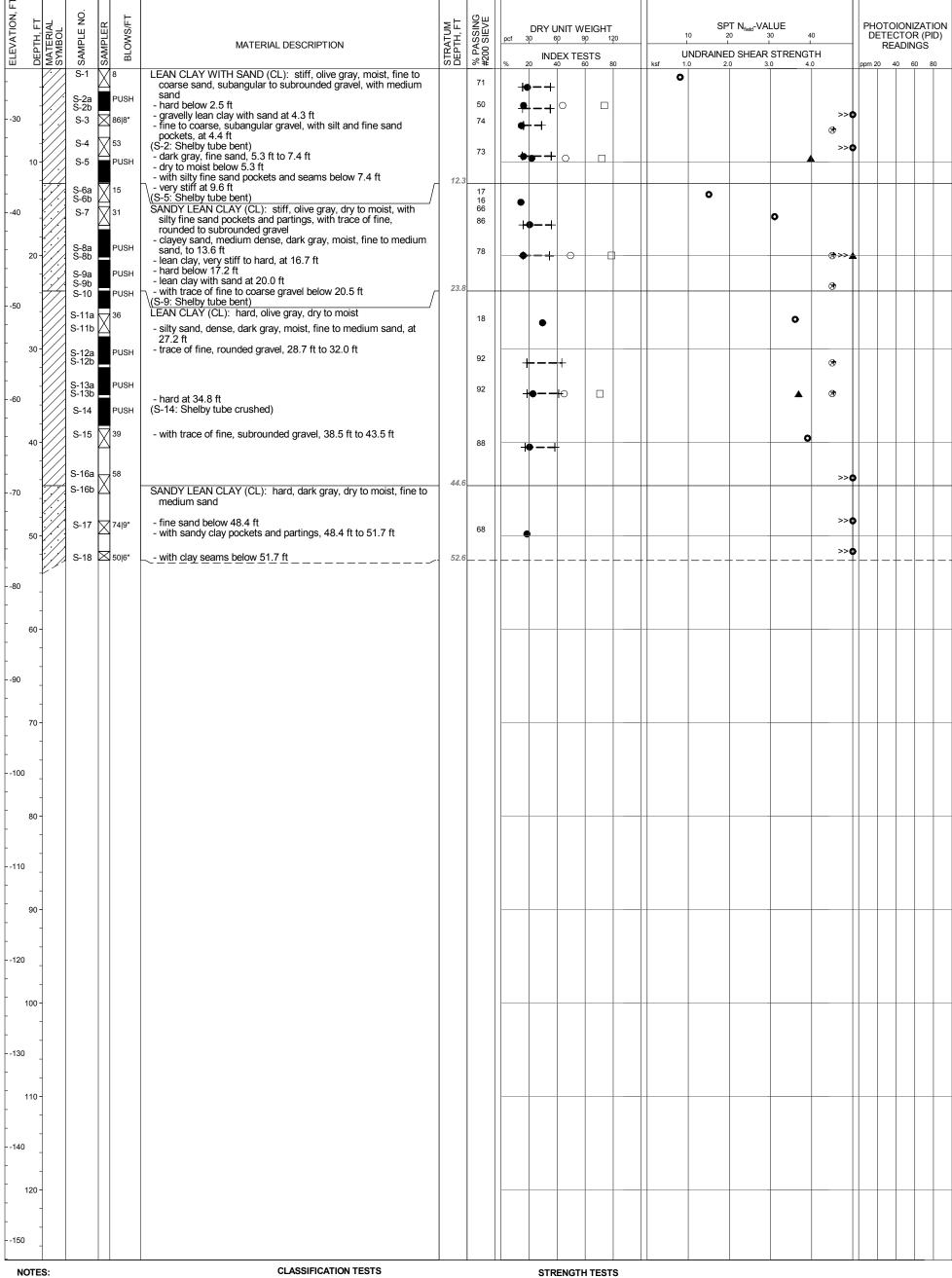
 $\Diamond$ 

SPT N<sub>Field</sub>-Value >> Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer PID

> DRILLING COMPANY: Fugro DRILLER: H. Russel/T. Wills VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 51.2 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 51.2 ft







1) The log and data presented are a simplification 

• of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note 4) in sample no indicates different

SPT hammer used below the depth.

COMPLETION DEPTH: 52.6 ft COORDINATES: W151.373279 N60.652170 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -24.60 ft (rel. MLLW datum)
EXPLORATION START DATE: 9/11/2015 COMPLETION DATE: 9/11/2015 LOGGED BY: J. Greenwald/A. Fee

Water Content Dry Unit Weight 

Plastic Limit

Submerged Unit Weight 0 Non-Plastic

Liquid Limit

⊗ Pocket Penetrometer  $\oplus$ 

**BORING LOG MB-26** 

MARINE LNG FACILITIES

ALASKA LNG PROJECT

NIKISKI, ALASKA

Torvane

Remote Vane  $\Phi$ 

Miniature Vane

Unconsolidated Undrained Triaxial Unconfined Compression

Residual Vane

 $\Diamond$ 

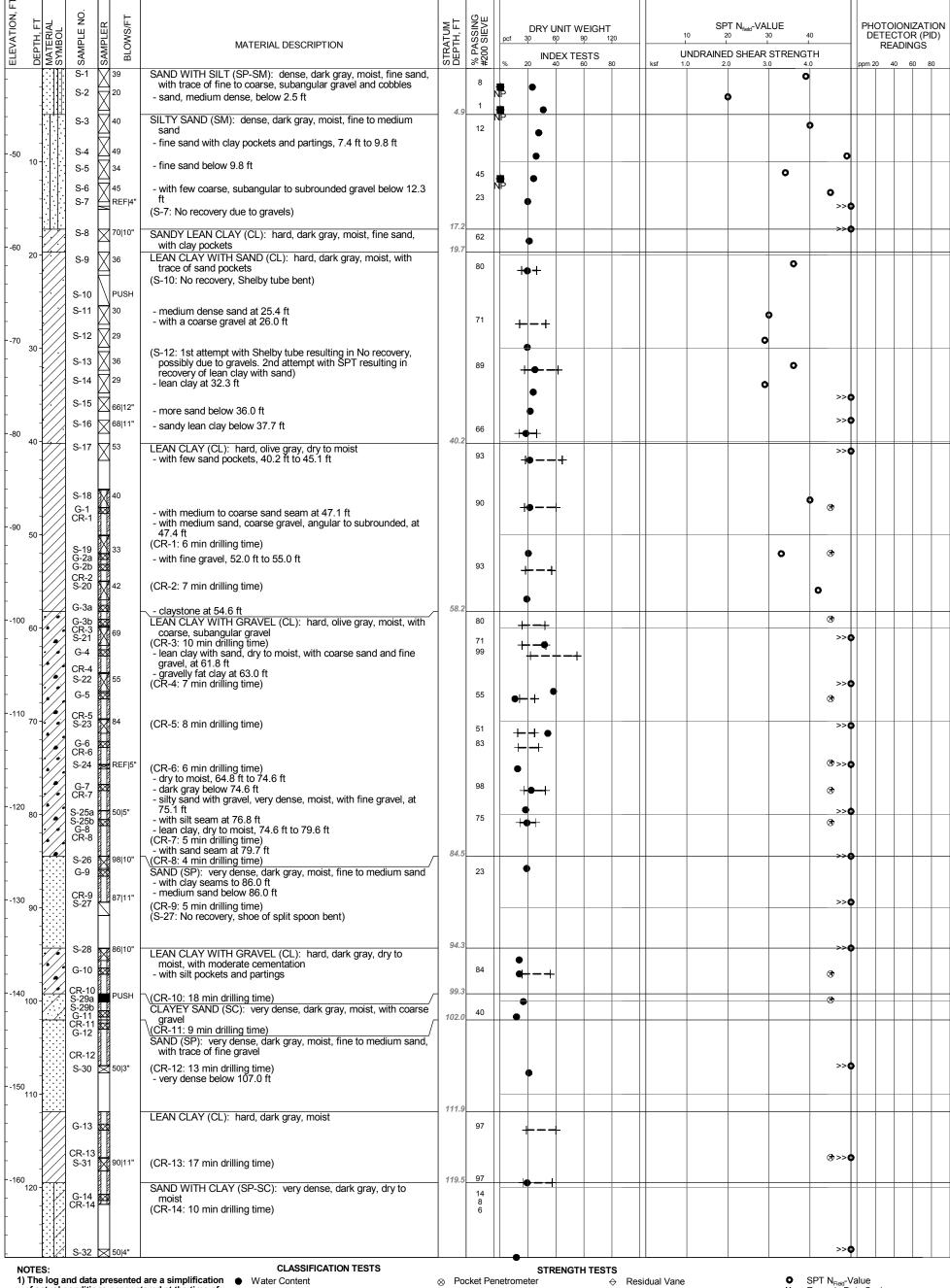
Open symbols indicate remolded tests

SPT N<sub>Field</sub>-Value >> Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer PID

> DRILLING COMPANY: Fugro DRILLER: J. Wilson/T. Wills VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 52.6 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 52.6 ft







of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) in sample no indicates different

LOGGED BY: S. Pant/ E. Pulido

SPT hammer used below the depth.

COMPLETION DEPTH: 164 ft COORDINATES: W151.376467 N60.651116 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -40.85 ft (rel. MLLW datum) EXPLORATION START DATE: 10/7/2015 COMPLETION DATE: 10/9/2015

Plastic Limit

0

□ Dry Unit Weight Submerged Unit Weight Non-Plastic

Liquid Limit

Torvane  $\oplus$ 

Remote Vane  $\Phi$ 

Miniature Vane

Unconsolidated Undrained Triaxial **Unconfined Compression** 

Open symbols indicate remolded tests

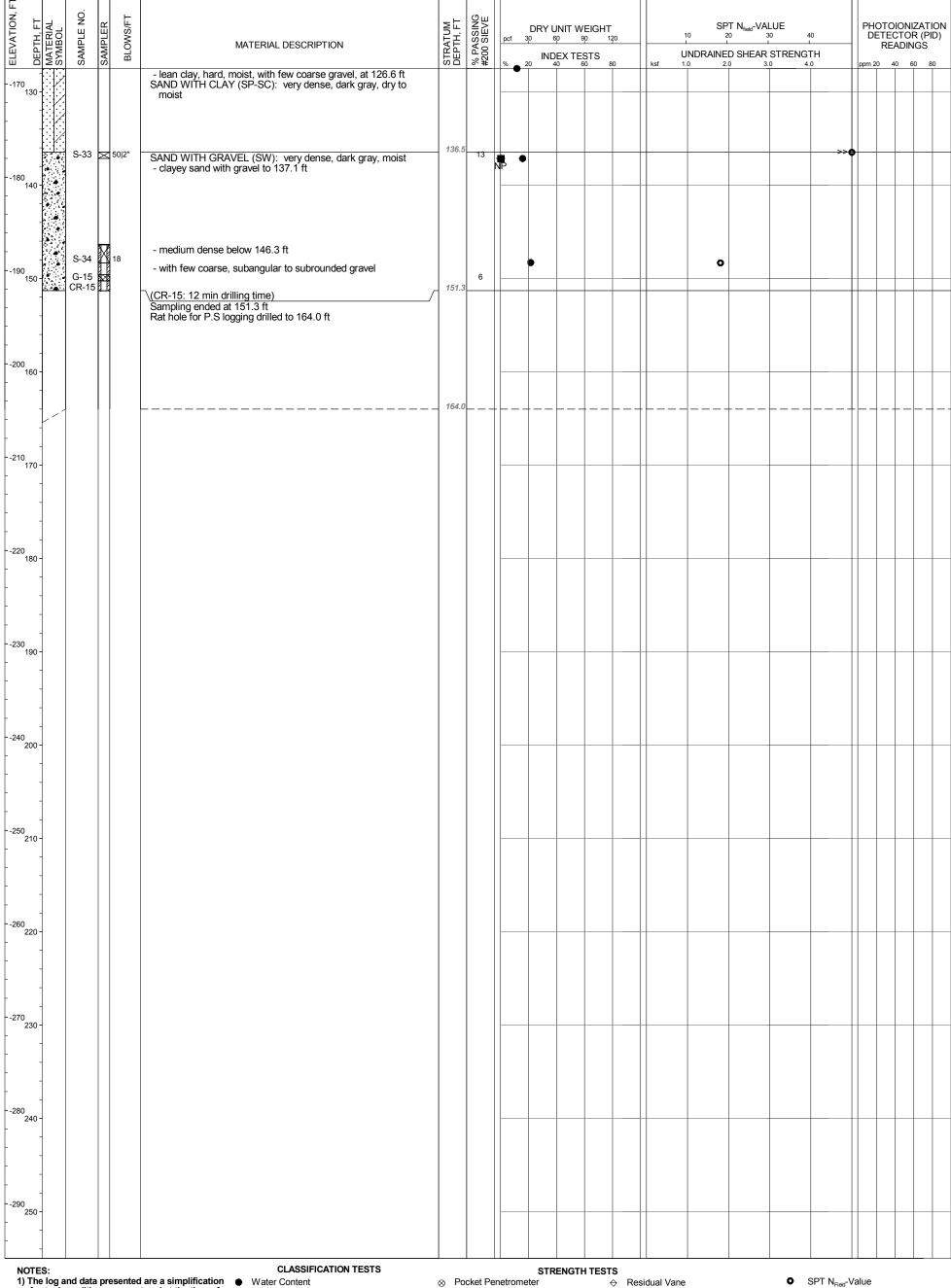
Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer PID

DRILLING COMPANY: Fugro DRILLER: R. Smith/ A. Cook VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 164.0 ft BACKFILL: N/A

DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 164.0 ft CASING: 12" -dia. to 1.6 ft, 7" -dia. to 37.7 ft







1) The log and data presented are a simplification • Water Content of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) in sample no indicates different

SPT hammer used below the depth.

COMPLETION DEPTH: 164 ft COORDINATES: W151.376467 N60.651116 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -40.85 ft (rel. MLLW datum) EXPLORATION START DATE: 10/7/2015

COMPLETION DATE: 10/9/2015 LOGGED BY: S. Pant/ E. Pulido

Non-Plastic

□ Dry Unit Weight Submerged Unit Weight 0

> Liquid Limit Plastic Limit

⊗ Pocket Penetrometer

Torvane  $\oplus$  $\Phi$ Remote Vane

Miniature Vane

▲ Unconsolidated Undrained Triaxial

Unconfined Compression

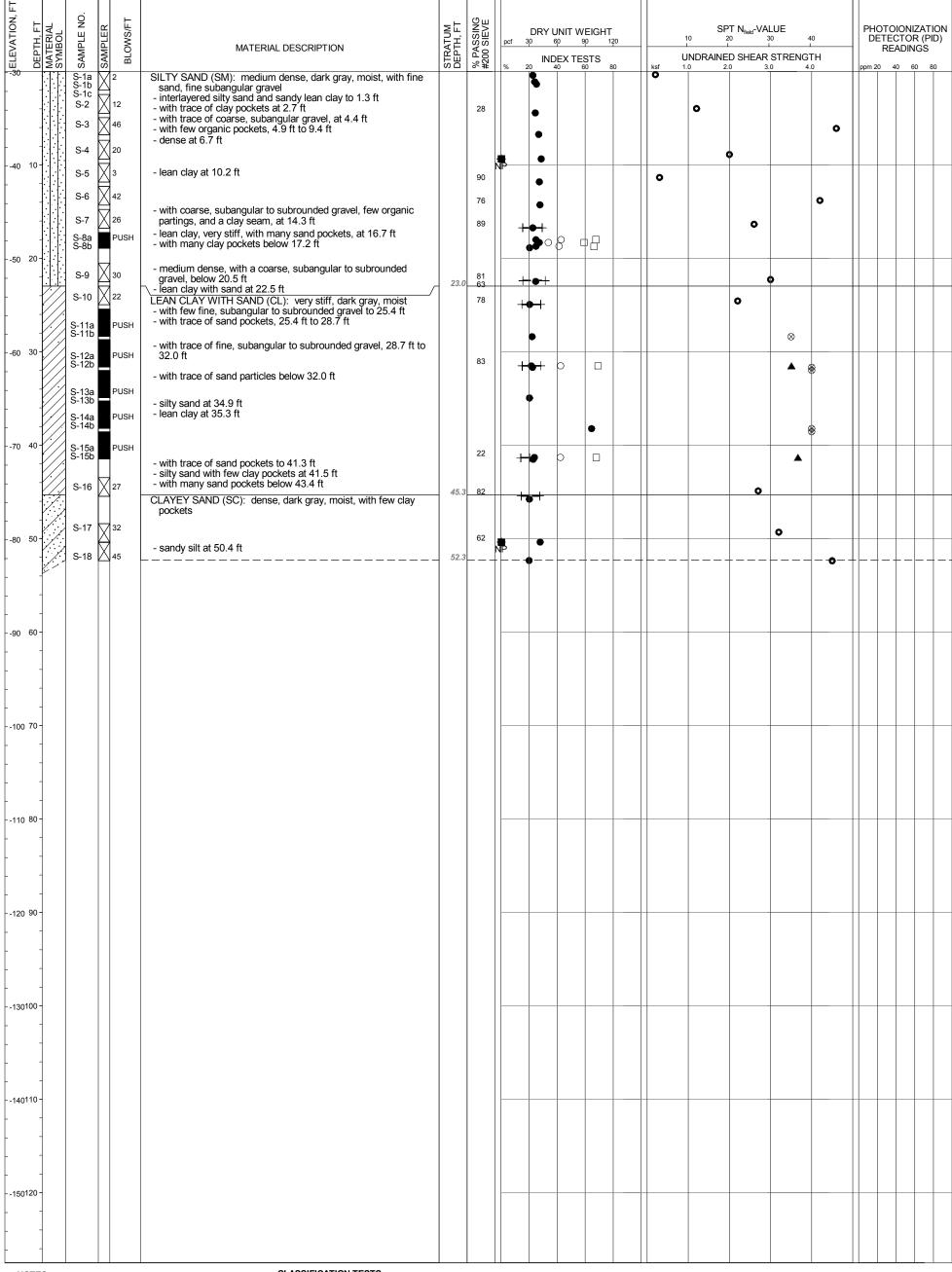
Open symbols indicate remolded tests

SPT N<sub>Field</sub>-Value >> Exceeds Data Scale WOR -Weight of Rod WOH -Weight of Hammer PID

DRILLING COMPANY: Fugro DRILLER: R. Smith/ A. Cook VESSEL: SKATE 3A
SPT HAMMER: SPT-09 to 164.0 ft
BACKFILL: N/A
DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 164.0 ft CASING: 12" -dia. to 1.6 ft, 7" -dia. to 37.7 ft







# NOTES:

1) The log and data presented are a simplification 

• of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note 4) in sample no indicates different

SPT hammer used below the depth.

COMPLETION DEPTH: 52.3 ft COORDINATES: W151.380783 N60.664398 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -29.86 ft (rel. MLLW datum)
EXPLORATION START DATE: 10/11/2015

COMPLETION DATE: 10/12/2015 LOGGED BY: S. Pant/ E. Pulido

# **CLASSIFICATION TESTS**

Water Content □ Dry Unit Weight Submerged Unit Weight 0

Non-Plastic

Liquid Limit Plastic Limit

# STRENGTH TESTS

⊗ Pocket Penetrometer

Torvane  $\oplus$ Remote Vane  $\Phi$ 

Miniature Vane

Unconsolidated Undrained Triaxial

Unconfined Compression

Residual Vane

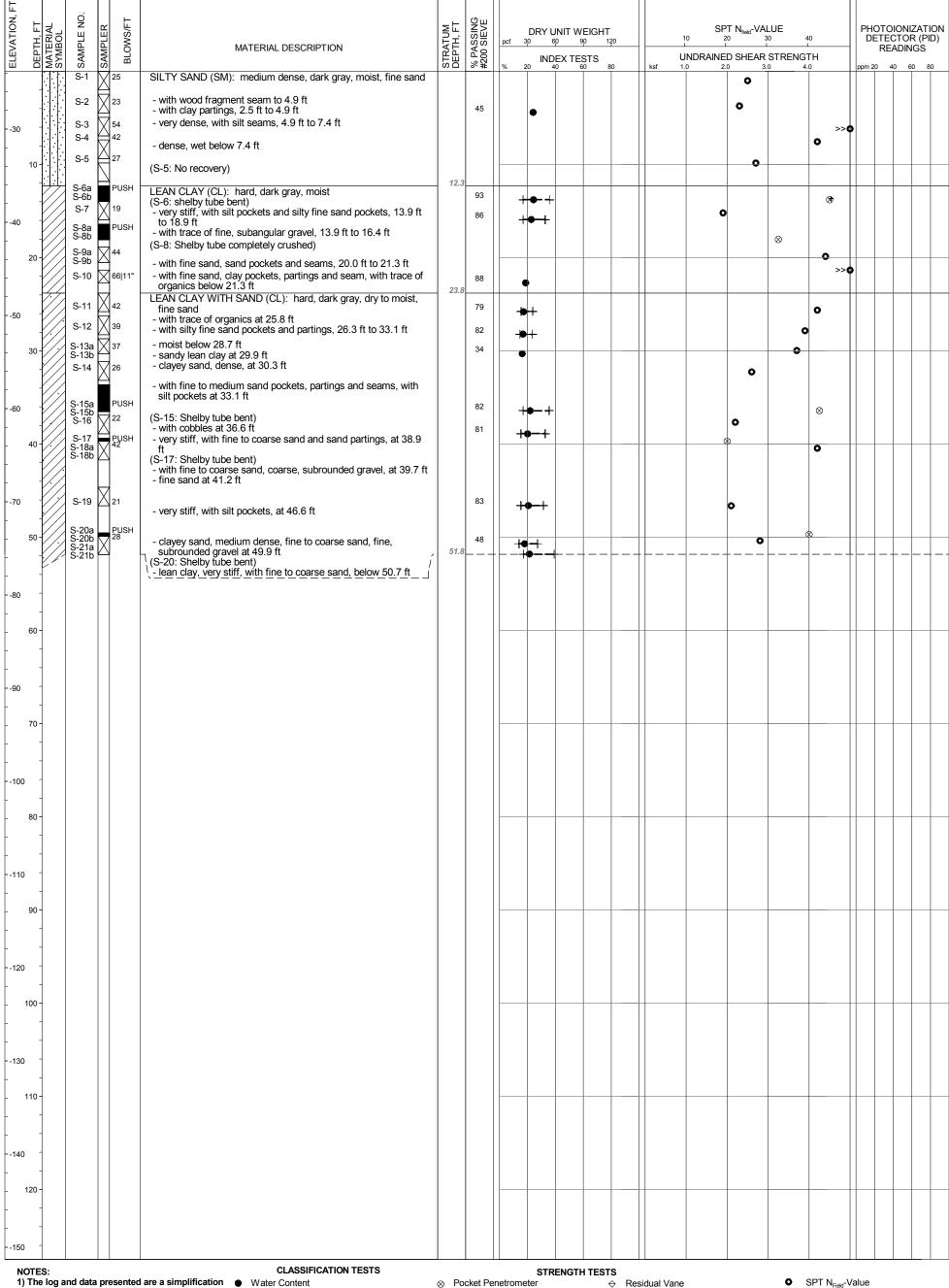
 $\Diamond$ Open symbols indicate remolded tests

SPT N<sub>Field</sub>-Value >> Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer PID

> DRILLING COMPANY: Fugro DRILLER: R. Smith/ A. Cook VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 52.3 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 52.3 ft CASING: 12" -dia. to 1.6 ft, 7" -dia. to 52.3 ft







1) The log and data presented are a simplification 

• of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note in sample no indicates different

SPT hammer used below the depth.

COMPLETION DEPTH: 51.8 ft COORDINATES: W151.370390 N60.649812 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -23.80 ft (rel. MLLW datum)
EXPLORATION START DATE: 9/11/2015 COMPLETION DATE: 9/11/2015 LOGGED BY: J. Greenwald/A. Fee

Water Content Dry Unit Weight

Submerged Unit Weight 0 Non-Plastic

> Plastic Limit Liquid Limit

⊗ Pocket Penetrometer

Torvane  $\oplus$ Remote Vane  $\Phi$ 

Miniature Vane

Unconsolidated Undrained Triaxial Unconfined Compression

Open symbols indicate

remolded tests

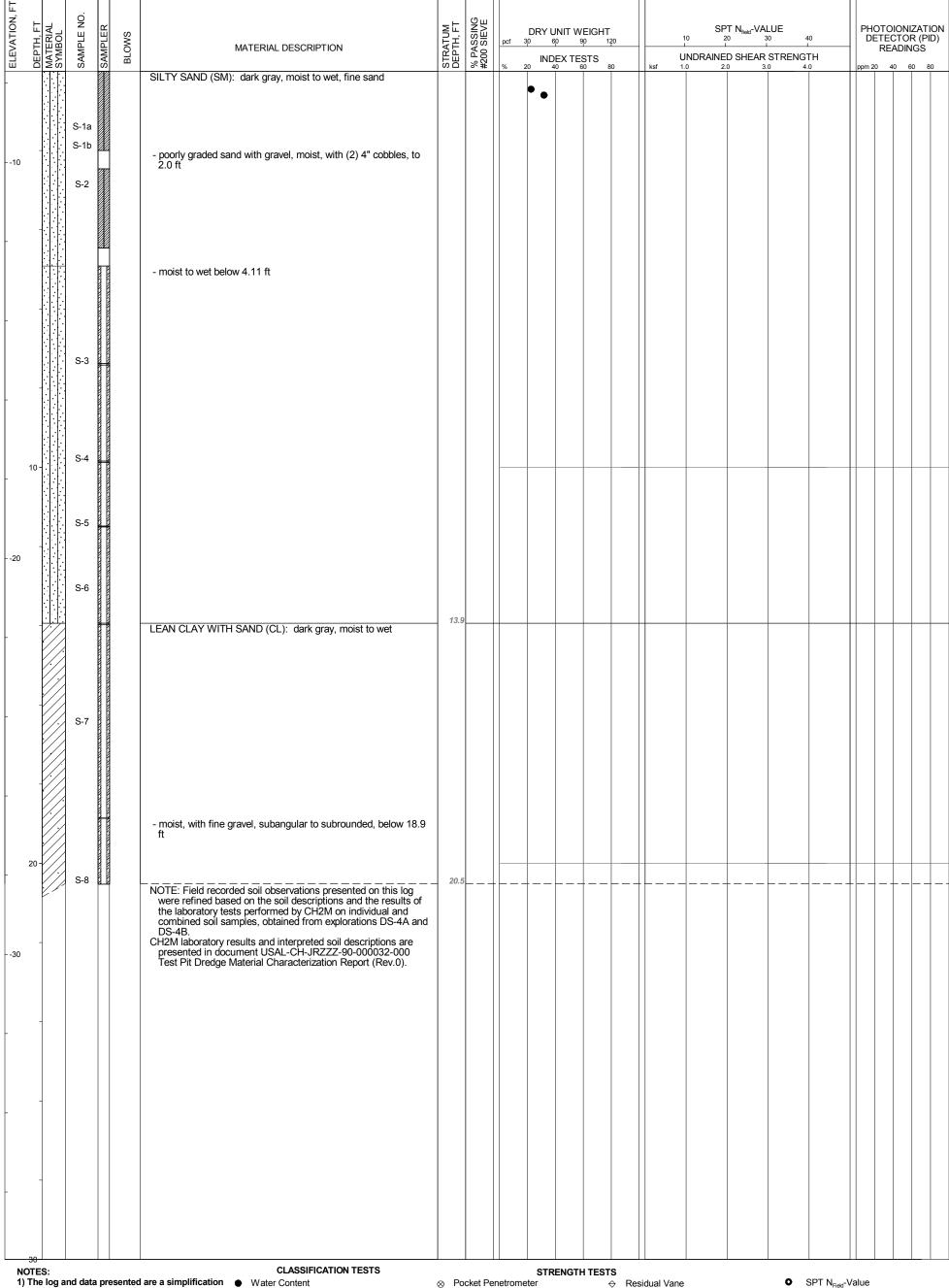
SPT N<sub>Field</sub>-Value Exceeds Data Scale >> WOR - Weight of Rod WOH - Weight of Hammer PID

> DRILLING COMPANY: Fugro DRILLER: T. Wills/H. Russell VESSEL: SKATE 3A SPT HAMMER: SPT-09 to 51.8 ft BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 51.8 ft CASING: 7" -dia. to 51.8 ft

Report No. 04.10140334-9







of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) When available, blows are presented for the sampling operations performed with U-100 Hammer sampler.

COMPLETION DEPTH: 20.51 ft COORDINATES: W151.367194 N60.655884 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -7.70 ft (rel. MLLW datum)
EXPLORATION START DATE: 11/2/2015

COMPLETION DATE: 11/2/2015 LOGGED BY: S. Pant/ E. Pulido

Water Content □ Dry Unit Weight Submerged Unit Weight 0

Non-Plastic

Plastic Limit

Liquid Limit

⊗ Pocket Penetrometer

Torvane  $\oplus$ Remote Vane

 $\Phi$ Miniature Vane

Unconsolidated Undrained Triaxial

Unconfined Compression

SPT N<sub>Field</sub>-Value Exceeds Data Scale >> Open symbols indicate remolded tests WOR - Weight of Rod WOH - Weight of Hammer

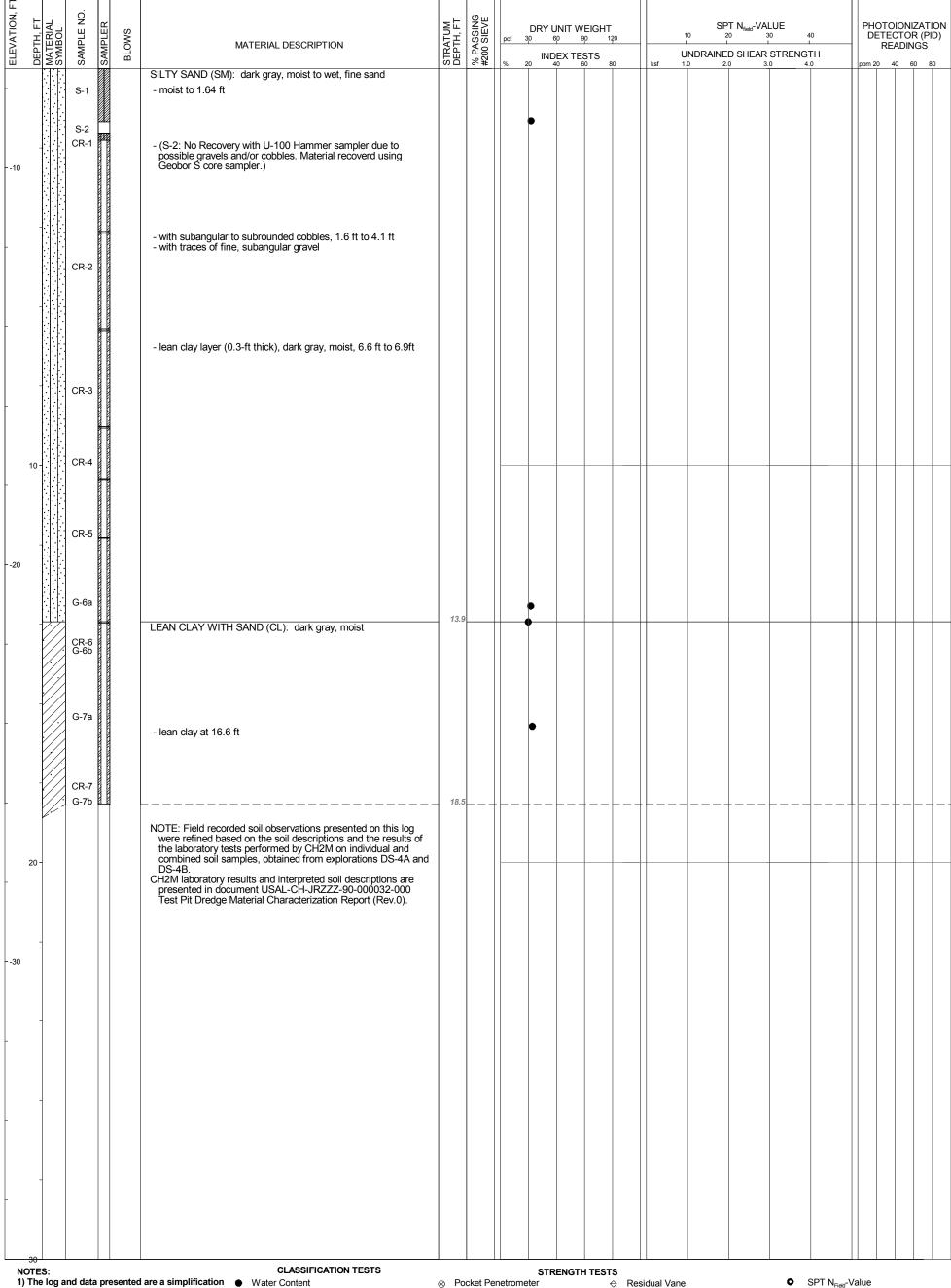
PID

DRILLING COMPANY: Fugro DRILLER: J. Wilson/J. Barfield VESSEL: SKATE 3A SPT HAMMER: BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 20.5 ft CASING: 12" -dia. to 1.6 ft, 7" -dia. to 4.11 ft

**BORING LOG DS-4A** 

Alaska LNG





of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) When available, blows are presented for the sampling operations performed with U-100 Hammer sampler.

COMPLETION DEPTH: 18.54 ft
COORDINATES: W151.367120 N60.655808 (GCS, NAD 1983, NSRS2007, degrees)
MUDLINE ELEVATION: -7.50 ft (rel. MLLW datum)
EXPLORATION START DATE: 11/3/2015

COMPLETION DATE: 11/3/2015 LOGGED BY: S. Pant/ E. Pulido

Water Content □ Dry Unit Weight Submerged Unit Weight 0

Non-Plastic Plastic Limit

Liquid Limit

Torvane  $\oplus$  $\Phi$ 

Remote Vane

Miniature Vane

**BORING LOG DS-4B** 

MARINE LNG FACILITIES

ALASKA LNG PROJECT

NIKISKI, ALASKA

Unconsolidated Undrained Triaxial

Unconfined Compression

Residual Vane

 $\Diamond$ 

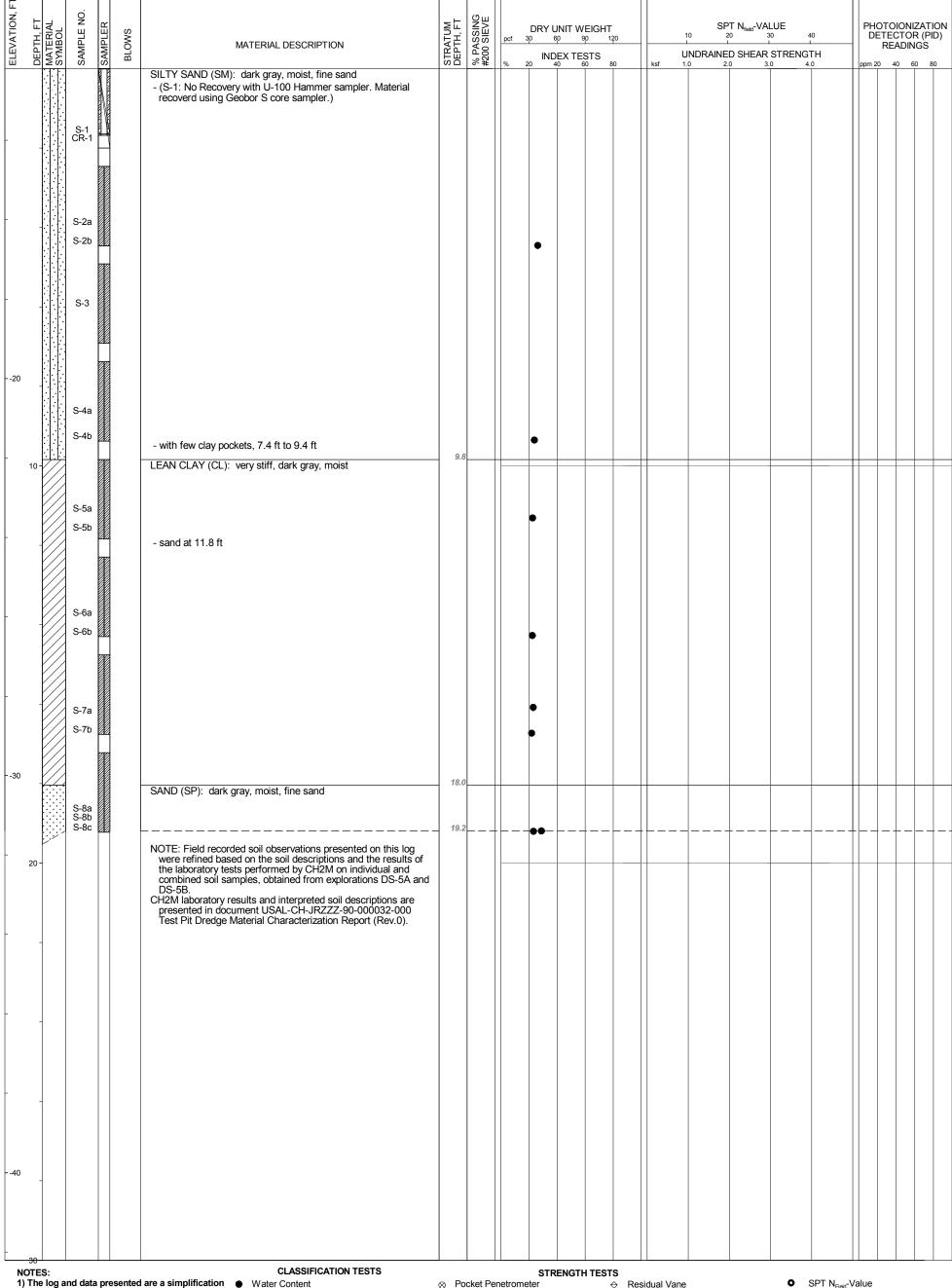
Open symbols indicate remolded tests

SPT N<sub>Field</sub>-Value >> Exceeds Data Scale WOR - Weight of Rod WOH - Weight of Hammer PID

DRILLING COMPANY: Fugro DRILLER: J. Wilson/J. Barfield VESSEL: SKATE 3A SPT HAMMER: BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 18.54 ft CASING: 12" -dia. to 1.3 ft, 7" -dia. to 1.6 ft







of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) When available, blows are presented for the sampling operations performed with U-100 Hammer sampler. COMPLETION DEPTH: 19.19 ft COORDINATES: W151.369148 N60.655579 (GCS, NAD 1983, NSRS2007, degrees) MUDLINE ELEVATION: -12.20 ft (rel. MLLW datum) EXPLORATION START DATE: 11/4/2015

COMPLETION DATE: 11/4/2015 LOGGED BY: S. Pant/ E. Pulido

Water Content □ Dry Unit Weight Submerged Unit Weight 0

Non-Plastic

Plastic Limit

# Liquid Limit

 $\oplus$  $\Phi$ Remote Vane Miniature Vane

Unconsolidated Undrained Triaxial Unconfined Compression

Torvane

Residual Vane  $\Diamond$ 

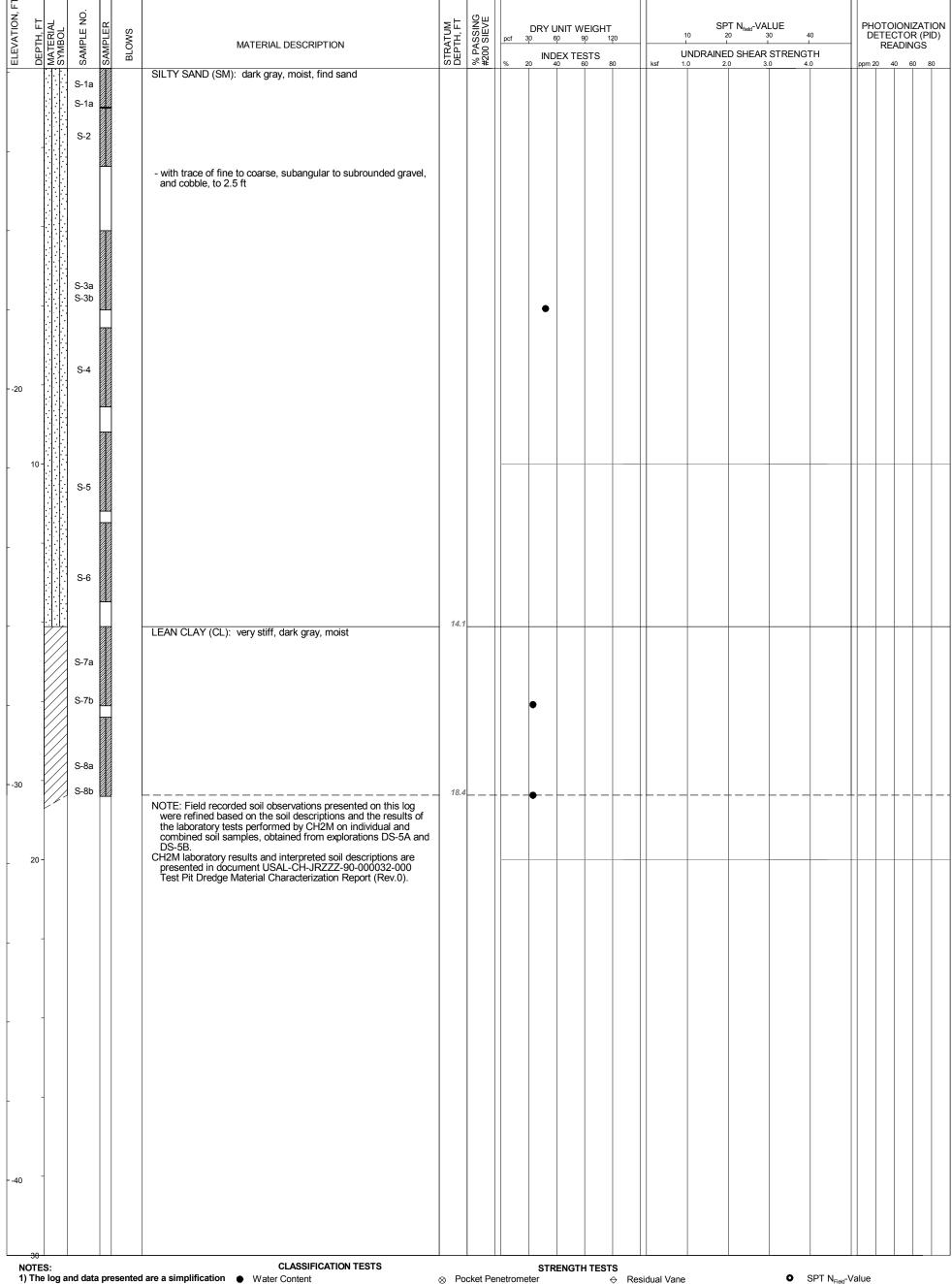
Open symbols indicate remolded tests

SPT N<sub>Field</sub>-Value Exceeds Data Scale >> WOR - Weight of Rod WOH - Weight of Hammer PID

DRILLING COMPANY: Fugro DRILLER: J. Wilson/J. Barfield VESSEL: SKATE 3A SPT HAMMER: BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 19.19 ft CASING: 12" -dia. to 1.3 ft, 7" -dia. to 19.19 ft







of actual conditions encountered at the time of sampling at the exploration location. Subsurface conditions may differ at other locations and with

the passage of time.

2) For additional symbol identification, refer to Key to Terms & Symbols Used on Logs.

3) DN = Driller's Note
4) When available, blows are presented for the sampling operations performed with U-100 Hammer sampler.

COMPLETION DEPTH: 18.37 ft
COORDINATES: W151.369197 N60.655545 (GCS, NAD 1983, NSRS2007, degrees)
MUDLINE ELEVATION: -11.90 ft (rel. MLLW datum)
EXPLORATION START DATE: 11/4/2015

COMPLETION DATE: 11/4/2015 LOGGED BY: S. Pant/ E. Pulido

Water Content □ Dry Unit Weight Submerged Unit Weight 0

Non-Plastic

Plastic Limit

# Liquid Limit

# ⊗ Pocket Penetrometer

- Torvane  $\oplus$
- $\Phi$ Remote Vane
- Miniature Vane Unconsolidated Undrained Triaxial
- Unconfined Compression
- Residual Vane

Open symbols indicate remolded tests

SPT N<sub>Field</sub>-Value Exceeds Data Scale >> WOR -Weight of Rod WOH -Weight of Hammer PID

DRILLING COMPANY: Fugro DRILLER: J. Wilson/J. Barfield VESSEL: SKATE 3A SPT HAMMER: BACKFILL: N/A DRILLING METHOD HOLLOW STEM AUGER: N/A WET ROTARY: 0 to 18.37 ft CASING: 12" -dia. to 1.3 ft, 7" -dia. to 16.4 ft

Report No. 04.10140334-9





#### **SOIL TYPES**

Sandy GRAVEL (GP)	Poorly-Graded SAND with Silt (SP-SM)	Lean CLAY (CL)
Gravelly Poorly-Graded SAND (SP)	Well-Graded SAND with Silt (SW-SM)	Silty CLAY (CL-ML)
Gravelly Well-Graded SAND (SW)	SAND with Clay (SP-SC)	Silty CLAY with Sand (CL-ML)
Poorly-Graded SAND (SP)	Clayey SAND (SC)	Sandy SILT (ML)
Well-Graded SAND (SW)	Silty SAND (SM)	Topsoil
Gravelly Poorly-Graded SAND with Silt (SP-SM)	Sandy Lean CLAY (CL)	
Well-Graded SAND with Silt and Gravel (SW-SM)	Lean CLAY with Sand (CL)	

SAMPLERS			
Grab Sample	Standard Penetration Test (SPT) Sampler	Thin-Walled Shelby Tube Sampler	Drive Sampler (U-100 Hammer)
Oversized Split-Spoon Sampler (OSPT)	Bailer	Geobore S - Soil Coring	No Recovery

### STRENGTH TESTS

- ⊗ Pocket Penetrometer
- ◆ Torvane
- ♦ Remote Vane
- ♦ Residual Vane Miniature Vane
- ▲ Unconsolidated Undrained Triaxial
- Unconfined Compression (Su)

- SPT N-Value
- **≫●** SPT N-Value Exceeds Data Scale
- ▼ PID
- ♦ △ (Open symbols indicate remolded tests)
  - + Strength exceeds capacity of measuring device

WOR - Weight of Rods WOH - Weight of Hammer

# **CLASSIFICATION TEST/BLOW COUNTS**

- Water Content (%)
- □ Unit Dry Weight
- O Submerged Unit Weight

Liquid Limit Plastic Limit +----

■ Non-Plastic

KEY TO TERMS AND SYMBOLS USED ON BORING LOGS

MARINE LNG FACILITIES ALASKA LNG PROJECT NIKISKI, ALASKA



# STANDARD PENETRATION TEST (SPT)

A 2-in.-OD, 1-3/8-ID split spoon sampler is driven 1.5 ft into undisturbed soil with a 140-pound hammer free falling 30 in. After the sampler is seated 6 in. into undisturbed soil, the number of blows required to drive the sampler the last 12 in. is the Standard Penetration Resistance or "N" value, which is recorded as blows per foot as described below.

### STANDARD PENETRATION TEST AND THIN-WALLED SAMPLERS

Samplers were driven with a 140 pound automatic hammer dropped approximately 2-1/2 feet.

20 Number of blows to produce 12" of penetration after the initial 6" of seating.

86/11" Number of blows required to produce the indicated penetration after an initial 6" seating.

Ref/3" 50 blows produced the indicated penetration during the initial 6" interval.

WOH Sampler advanced with the weight of the 140 pound hammer.

PUSH Pushed thin-walled 3" tube.

#### SOIL GRAIN SIZE

U.S. STANDARD SIEVE

3	3"	3" 3	3/4"	#4 #	:10 #	40 #2	200	
COARSE	FINE	GR	AVEL		SAND		SILT	CLAY
COARSE	FIINE	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAT
15	2	76.2 1	9.1 4.	76 2	.00 0.4	420 0.0	074 0.	002
SOIL GRAIN SIZE IN MILLIMETERS								

# **DENSITY OF GRANULAR SOILS**

Practice, 2nd Ed.

# STRENGTH OF COHESIVE SOILS

Descriptive Term	*Relative Density, %	Blows Per Foot (SPT)	Term	Undrained Shear Strength, ksf	Blows Per Foot (SPT) (approximate)
Very Loose	< 15	0 to 4	Very Soft	<0.25	0 to 2
Loose	15 to 35	4 to 10	Soft	0.25 to 0.50	2 to 4
Medium Dense	35 to 65	10 to 30	Firm	0.50 to 1.00	4 to 8
Dense	65 to 85	30 to 50	Stiff	1.00 to 2.00	8 to 16
Very Dense	> 85	> 50		2.00 to 4.00	
*Estimated from samp	ler driving record.			> 4.00	
Source: Terzaghi and		hanics in Engineering	Source: Terza	ghi and Peck (1967), Soil Mecha	nics in Engineering

# Practice, 2nd Ed. SOIL STRUCTURE

Slickensided	Having planes of weakness that appear slick and glossy. The degree of slickensidedness depends upon the spacing of slickensides and the ease of breaking along these planes.
Fissured	Containing shrinkage of relief crack, often filled with fine sand or silt, usually more or less vertical.
Pocket	 Inclusion of material of different texture that is smaller than the diameter of the sample.
Parting	 Inclusion less than 1/8 inch thick extending through the sample.
Seam	 Inclusion 1/8 to 3 inches thick extending through the sample.
Layer	 Inclusion greater than 3 inches thick extending through the sample.
Laminated	 Soil sample composed of alternating partings or seams of different soil types.
Interlayered	 Soil sample composed of alternating layers of different soil types.
Intermixed	Soil sample composed of pockets of different soil types and layered or laminated structure is not evident.
Calcareous	Having appreciable quantities of carbonate.

# **KEY TO TERMS & SYMBOLS USED ON LOGS**

MARINE LNG FACILITIES ALASKA LNG PROJECT NIKISKI, ALASKA

PLATE B1-30b



#### Vessel

Vessel Name

AKLNG\_150242 Project Name Project Number AKLNG\_150242
Offset Name MainVessel\_C MainVessel CRP

Sampling Started 12-Sep-2015 02:07:58 (UTC-07:00) Sampling Ended 12-Sep-2015 02:13:00 (UTC-07:00)

Comment DTM-18.4m, DTW-3.60m at 02:05am, Deck Level Above

 ${\tt MLLW-9.85m,\ MB-02,\ C1707,\ 12.09.15}$ 

#### Results

Mean	l	Standard Deviation
Local Latitude 60°	40'10.7476"N	
Local Longitude 151°	23'22.6441"W	
Ellipsoidal Height	0.00 ftUS	
Local Easting 139	1214.02 ftUS	0.04 ftUS
Local Northing 243	9289.33 ftUS	0.03 ftUS
Orthometric Height	0.00 ftUS	0.00 ftUS
WGS84 Latitude 60°	40'10.7417"N	
WGS84 Longitude 151°	23'22.7366"W	
Ellipsoidal Height	1.48 ftUS	
Quality	0.63	0.02 ftUS
Depth	0.00 ftUS	0.00 ftUS
Heading	153.07°G	0.18°

#### Line Navigation Data

Point Navigation Data Point Name MB-02 Line Name N/A 1391227.35 ftUS Chainage N/AEasting Cross Track 2439301.31 ftUS N/A Northing

Range 17.93 ftUS Bearing TO 48.05°G FROM 228.05°G

Observations

Used 300 out of 300

#### Geodetic Parameters

Geodetic Datum NAD83 NSRS2007 Ellipsoid GRS80

Semi-Major Axis 6378137.000

Inverse Flattening 298.2572221010 Eccentricity^2 0.006694380022901

DX 1.0058m RX 0.0000 arc seconds RY DY -1.0516m0.0000 arc seconds RZ DZ0.0000 arc seconds -0.3048m

D Scale mqq00000.0Rotation Convention +RZ=-RLongitude

Projection Transverse Mercator

Grid Name Alaska Zone 4 Latitude of Origin 54°00'00.0000"N Longitude of Origin 150°00'00.0000"W False Easting 1640416.667ftUS False Northing 0.000ftUS - 1°12'41.5610" Convergence

Grid Calculation Mode



#### Vessel

Vessel Name

Project Name AKLNG\_150242 Project Number AKLNG\_150242 Offset Name MainVessel\_CRP

Sampling Started 23-Oct-2015 17:11:17 (UTC-07:00) Sampling Ended 23-Oct-2015 17:16:17 (UTC-07:00)

DTM-15.70m DTW-3.70m at 16.10, Deck level above ML Comment

LW-8.50m MB03,C1707, 23.10.15

### Results

	Mean	Standard Deviation
Local Latitude	60°40'06.0055"N	
Local Longitude	151°22'59.4396"W	
Ellipsoidal Heigh	t 0.00 ftUS	
Local Easting	1392359.68 ftUS	0.14 ftUS
Local Northing	2438783.53 ftUS	0.12 ftUS
Orthometric Heigh	t 0.00 ftUS	0.00 ftUS
WGS84 Latitude	60°40'05.9997"N	
WGS84 Longitude	151°22'59.5321"W	
Ellipsoidal Heigh	t 1.48 ftus	
Quality	1.47	0.05 ftus
Depth	0.00 ftus	0.00 ftus
Heading	157.45°G	0.30°

#### Line Navigation Data

Point Navigation Data Line Name N/A Point Name MB-03

Chainage N/AEasting 1392372.55 ftUS Cross Track N/ANorthing 2438799.09 ftUS Range 20.19 ftUS Bearing TO 39.59°G

FROM 219.59°G

Used 300 out of 300

#### Geodetic Parameters

Observations

Geodetic Datum	NAD83	NSRS2007
Ellipsoid	GRS80	

Semi-Major Axis 6378137.000

Inverse Flattening 298.2572221010 Eccentricity^2 0.006694380022901

0.0000 arc seconds DX 1.0058m RX DΥ 0.0000 arc seconds -1.0516mRY 0.0000 arc seconds D7-0.3048mRZ

D Scale 0.0000ppm Rotation Convention +RZ=-RLongitude

Projection Transverse Mercator

Grid Name Alaska Zone 4 Latitude of Origin 54°00'00.0000"N Longitude of Origin 150°00'00.0000"W False Easting 1640416.667ftUS False Northing 0.000ftUS Convergence - 1°12'21.2722"

Calculation Mode Grid



#### Vessel

Vessel Name Project Name

Project Number AKLNG 150242
Offset Name MainVessel\_CRP

Sampling Started 20-Aug-2015 06:06:26 (UTC-07:00) Sampling Ended 20-Aug-2015 06:11:29 (UTC-07:00)

Comment DTM = 18.60m, DTW = 5.0m, Deck Level Above \*\*\*. =

-33.28

# Results

		Mean	Standard Deviation	n	
	Local Latitude	60°40'02.3840"N		_	
	Local Longitude	151°23'12.0024"W			
	Ellipsoidal Height	t 0.00 ftUS			
	Local Easting	1391726.15 ftUS	0.03 ftUS		
	Local Northing	2438429.07 ftUS	0.04 ftUS		
	Orthometric Height	t 0.00 ftUS	0.00 ftUS		
	WGS84 Latitude	60°40'02.3782"N			
	WGS84 Longitude	151°23'12.0949"W			
	Ellipsoidal Height	t 1.48 ftUS			
	Quality	0.67	0.00 ftUS		
	Depth	0.00 ftUS	0.00 ftUS		
	Heading	157.76°G	0.12°		
Line	Navigation Data		Point Navigation	Data	
	Line Name	N/A	Point Name	MB-04	
	Chainage	N/A	Easting	1391719.57	ftUS
	Cross Track	N/A	Northing	2438430.15	ftUS
			Range	6.67 ftUS	
			Bearing TO	279.34°G	
Obser	vations		FROM	99.34°G	
	Used 300 out of 30	00			

Geodetic Datum Ellipsoid Semi-Major Axis Inverse Flattening	NAD83 NSRS2007 GRS80 6378137.000 298.257222	1010		
Eccentricity^2	0.006694	380022901		
DX	1.0058m	RX	0.0000	arc seconds
DY	-1.0516m	RY	0.0000	arc seconds
DZ	-0.3048m	RZ	0.0000	arc seconds
D Scale	0.000ppm			
Rotation Convention	+RZ=-RLongitude			
Projection	Transverse Mer	cator		
Grid Name	Alaska Zone 4			
Latitude of Origin	54°00'00.0000	"N		
Longitude of Origin	150°00'00.0000	" W		
False Easting	1640416.667ft	JS		
False Northing	0.000ft	JS		
Convergence	- 1°12'32.183	1"		
Calculation Mode	Grid			



#### Vessel

Vessel Name Skate 3

Project Name AKLNG Marine GI 2015
Project Number O4.10140334 (C1707)
Offset Name MainVessel\_CRP

Sampling Started 18-Aug-2015 05:02:05 (UTC-07:00) Sampling Ended 18-Aug-2015 05:07:07 (UTC-07:00)

Comment DTM = 14.10m, DTW = 5.20m, Deck Level Above MLLW =

-32.59

### Results

Mean	Standard Deviation
Local Latitude 60°39'57.7838"N	I
Local Longitude 151°22'48.6477"W	ī
Ellipsoidal Height 0.00 ftUS	3
Local Easting 1392879.70 ftus	0.03 ftUS
Local Northing 2437937.56 ftus	0.04 ftUS
Orthometric Height 0.00 ftUS	0.00 ftUS
WGS84 Latitude 60°39'57.7779"N	I
WGS84 Longitude 151°22'48.7402"W	ī
Ellipsoidal Height 1.48 ftus	3
Quality 0.79	0.02 ftUS
Depth 0.00 ftus	0.00 ftUS
Heading 149.93°G	0.21°

#### Line Navigation Data

### Point Navigation Data

Line Name	N/A	Point Name	MB-05
Chainage	N/A	Easting	1392864.19 ftUS
Cross Track	N/A	Northing	2437928.93 ftUS
		Range	17.75 ftUS
		Bearing TO	240.91°G
vations		FROM	60.91°G

# Observations

Used 300 out of 300

### Geodetic Parameters

Geodetic Datum	NAD83	NSRS2007
Ellipsoid	GRS80	

Semi-Major Axis 6378137.000

Inverse Flattening 298.2572221010 Eccentricity^2 0.006694380022901

D Scale 0.0000ppm Rotation Convention +RZ=-RLongitude

# Projection Transverse Mercator

Grid Name Alaska Zone 4
Latitude of Origin 54°00'00.0000"N
Longitude of Origin 150°00'00.0000"W
False Easting 1640416.667ftUS
False Northing 0.000ftUS
Convergence - 1°12'11.7655"

Calculation Mode Grid



#### Vessel

Vessel Name SkateIIIA
Project Name AKLNG\_150242
Project Number AKLNG\_150242

Offset Name Rotary

Sampling Started 16-Sep-2015 18:04:53 (UTC-07:00) Sampling Ended 16-Sep-2015 18:09:59 (UTC-07:00)

Comment DTM-19.3m, DTW-3.70m at 16:55, Deck Level Above ML

LW-10.87m, MB-06, C1707, 16.09.15

# Results

Local Latitude Local Longitude		Standard Deviation	<u>n</u>
3	1392224.06 ftUS 2437571.13 ftUS t 0.00 ftUS	0.05 ftUS	
WGS84 Longitude Ellipsoidal Heigh Quality Depth Heading	151°23'01.7412"W	0.04 ftUS 0.00 ftUS 0.15°	
Line Navigation Data Line Name Chainage Cross Track	N/A N/A N/A	Point Navigation : Point Name Easting Northing Range Bearing TO	Data MB-06 1392211.19 ftUS 2437560.03 ftUS 16.99 ftUS 229.22°G
Observations Used 300 out of 3	00	FROM	49.22°G

Geodetic Datum Ellipsoid Semi-Major Axis Inverse Flattening Eccentricity^2	NAD83 NSRS2007 GRS80 6378137.000 298.25722210 0.00669438		L	
DX	1.0058m	RX	0.0000	arc seconds
DY	-1.0516m	RY	0.0000	arc seconds
DZ	-0.3048m	RZ	0.0000	arc seconds
D Scale	0.000ppm			
Rotation Convention	+RZ=-RLongitude			
Projection	Transverse Merca	ator		
Grid Name	Alaska Zone 4			
Latitude of Origin	54°00'00.0000"1	N .		
Longitude of Origin	150°00'00.0000"7	V		
False Easting	1640416.667ftUS	3		
False Northing	0.000ftUS	5		
Convergence	- 1°12'23.0568'	ı		
Calculation Mode	Grid			



#### Vessel

Vessel Name Project Name

Project Number AKLNG 150242
Offset Name MainVessel\_CRP

Sampling Started 23-Aug-2015 16:42:41 (UTC-07:00) Sampling Ended 23-Aug-2015 16:47:47 (UTC-07:00)

Comment DTM = 12.50m, DTW = 4.3m, Deck Level Above \*\*\*. =

-33.08

# Results

		Mean	Standard Deviatio	n	
	Local Latitude	60°39'49.2243"N		<del>_</del>	
	Local Longitude	151°22'38.6352"W			
	Ellipsoidal Heigh	t 0.00 ftUS			
	Local Easting	1393360.26 ftUS	0.16 ftUS		
	Local Northing	2437058.14 ftUS	0.33 ftUS		
	Orthometric Heigh	t 0.00 ftUS	0.00 ftUS		
	WGS84 Latitude	60°39'49.2184"N			
	WGS84 Longitude	151°22'38.7277"W			
	Ellipsoidal Heigh	t 1.48 ftUS			
	Quality	0.69	0.05 ftUS		
	Depth	0.00 ftUS	0.00 ftUS		
	Heading	155.04°G	0.18°		
Line	Navigation Data		Point Navigation	Data	
	Line Name	N/A	Point Name	MB-08	
	Chainage	N/A	Easting	1393356.43	ftUS
	Cross Track	N/A	Northing	2437057.73	ftUS
			Range	3.85 ftUS	
			Bearing TO	263.90°G	
Obser	vations		FROM	83.90°G	
	Used 300 out of 3	00			

Geodetic Datum	NAD83 NSRS2	007			
Ellipsoid	GRS80				
Semi-Major Axis	6378137.000				
Inverse Flattening	298.257	2221010			
Eccentricity^2	0.006	694380022901			
DX	1.0058m	RX	0.0000	arc	seconds
DY	-1.0516m	RY	0.0000	arc	seconds
DZ	-0.3048m	RZ	0.0000	arc	seconds
D Scale	0.0000pp	m			
Rotation Convention +RZ	:=-RLongitude				
Projection	Transverse	Mercator			
Grid Name	Alaska Zone	4			
Latitude of Origin	54°00'00.0	000"N			
Longitude of Origin	150°00'00.0	000"W			
False Easting	1640416.66	7ftUS			
False Northing	0.00	0ftUS			
Convergence	- 1°12'02.	9348"			
Calculation Mode	Grid				



#### Vessel

Vessel Name Project Name

Project Number AKLNG 150242
Offset Name MainVessel\_CRP

Sampling Started 26-Aug-2015 02:59:25 (UTC-07:00) Sampling Ended 26-Aug-2015 03:04:27 (UTC-07:00)

Comment DTM = 17.50m, DTW = 3.20m, Deck Level Above MLLW.

= 10.57m

# Results

	Mean	Standard Deviatio	'n	
Local Latitude	60°39'44.9866"N		_	
Local Longitude	151°22'50.8465"W			
Ellipsoidal Heigh	nt 0.00 ftUS			
Local Easting	1392742.87 ftUS	0.04 ftUS		
Local Northing	2436640.70 ftUS	0.04 ftUS		
Orthometric Heigh	nt 0.00 ftUS	0.00 ftUS		
WGS84 Latitude	60°39'44.9807"N			
WGS84 Longitude	151°22'50.9390"W			
Ellipsoidal Heigh	nt 1.48 ftUS			
Quality	0.64	0.03 ftUS		
Depth	0.00 ftUS	0.00 ftUS		
Heading	161.18°G	0.18°		
Line Navigation Data		Point Navigation	Data	
Line Name	N/A	Point Name	MB-09	
Chainage	N/A	Easting	1392734.64	ftUS
Cross Track	N/A	Northing	2436660.46	ftUS
		Range	21.41 ftUS	
		Bearing TO	337.39°G	
Observations		FROM	157.39°G	
Used 300 out of 3	300			

Geodetic Datum Ellipsoid Semi-Major Axis Inverse Flattening Eccentricity^2	NAD83 NSRS2007 GRS80 6378137.000 298.257222103				
DX	1.0058m	RX	0.0000	arc	seconds
DY	-1.0516m	RY	0.0000	arc	seconds
DZ	-0.3048m	RZ	0.0000	arc	seconds
D Scale	0.0000ppm				
Rotation Convention	+RZ=-RLongitude				
Projection	Transverse Merca	tor			
Grid Name	Alaska Zone 4				
Latitude of Origin	54°00'00.0000"N				
Longitude of Origin	150°00'00.0000"W				
False Easting	1640416.667ftUS				
False Northing	0.000ftUS				
Convergence	- 1°12'13.5316"				
Calculation Mode	Grid				



#### Vessel

Vessel Name Project Name

Project Number AKLNG 150242
Offset Name MainVessel\_CRP

Sampling Started 22-Aug-2015 00:05:14 (UTC-07:00) Sampling Ended 22-Aug-2015 00:10:27 (UTC-07:00)

Comment DTM = 14.80m, DTW = 4.0m, Deck Level Above \*\*\*. =

-31.08

# Results

Toga	ıl Latitude	Mean 60°39'40.7573"N	Standard Deviatio	<u>n</u>	
	il Latitude il Longitude				
	n nongitude .psoidal Heigh				
		1393850.09 ftUS	0 02 f+IIC		
		2436187.94 ftUS			
	ometric Heigh		0.00 1005		
		60°39'40.7515"N			
	_	151°22'28.5345"W			
	psoidal Heigh				
Qual	-	0.66	0.03 ftUS		
Dept	.h	0.00 ftUS	0.00 ftUS		
Head	ling	157.72°G	0.14°		
Line Navig	gation Data		Point Navigation	Data	
Line	. Name	N/A	Point Name	MB-12	
Chai	.nage	N/A	Easting	1393848.03	ftUS
Cros	s Track	N/A	Northing	2436187.65	ftUS
			Range	2.08 ftUS	
			Bearing TO	261.90°G	
Observation	ns		FROM	81.90°G	
Used	l 300 out of 3	00			

Geodetic Datum Ellipsoid Semi-Major Axis Inverse Flattening	NAD83 NSRS2007 GRS80 6378137.000 298.257222				
Eccentricity^2	0.006694	380022901			
DX	1.0058m	RX	0.0000	arc	seconds
DY	-1.0516m	RY	0.0000	arc	seconds
DZ	-0.3048m	RZ	0.0000	arc	seconds
D Scale	0.0000pm				
Rotation Convention +	RZ=-RLongitude				
Projection	Transverse Mer	cator			
Grid Name	Alaska Zone 4				
Latitude of Origin	54°00'00.0000	"N			
Longitude of Origin	150°00'00.0000	" W			
False Easting	1640416.667ft	US			
False Northing	0.000ft	US			
Convergence	- 1°11'53.948	0 "			
Calculation Mode	Grid				



#### Vessel

Vessel Name

Project Name AKLNG\_150242
Project Number AKLNG\_150242
Offset Name MainVessel\_CRP

Sampling Started 02-Oct-2015 13:31:49 (UTC-07:00) Sampling Ended 02-Oct-2015 13:36:54 (UTC-07:00)

Comment DTM-16.00m, DTW-6.00m at 12:30, Deck Level Above M

LLW-10.13m, MB-13, C1707, 02.10.15

# Results

	l Latitude l Longitude	Mean 60°39'37.1129"N 151°22'41.3108"W	Standard Deviation	<u>n</u>	
	psoidal Heigh				
_	_	1393201.18 ftUS	0.03 ftUS		
	_	2435831.40 ftUS			
	ometric Heigh				
	_	60°39'37.1071"N			
WGS8	1 Longitude	151°22'41.4033"W			
Ellij	psoidal Heigh	t 1.48 ftUS			
Qual	ity	0.82	0.02 ftUS		
Dept	ı	0.00 ftUS	0.00 ftUS		
Head	ing	154.18°G	0.22°		
Line Naviga	ation Data		Point Navigation	Data	
Line	Name	N/A	Point Name	MB-13	
Chai	nage	N/A	Easting	1393194.76	ftUS
Cros	s Track	N/A	Northing	2435819.22	ftUS
			Range	13.76 ftUS	
			Bearing TO	207.79°G	
Observation	ns		FROM	27.79°G	
Used	300 out of 3	00			

1.0058m	RX	0.0000	arc	seconds
-1.0516m	RY	0.0000	arc	seconds
-0.3048m	RZ	0.0000	arc	seconds
0.000ppm				
:=-RLongitude				
Transverse Mer	cator			
Alaska Zone 4				
54°00'00.0000	"N			
150°00'00.0000	" W			
1640416.667ft	US			
0.000ft	US			
- 1°12'05.125	0 "			
Grid				
	GRS80 6378137.000 298.257222 0.006694 1.0058m -1.0516m -0.3048m 0.0000ppm G-RLongitude Transverse Mer Alaska Zone 4 54°00'00.0000 150°00'00.0000 1640416.667ft 0.000ft - 1°12'05.125	GRS80 6378137.000 298.2572221010 0.006694380022901 1.0058m RX -1.0516m RY -0.3048m RZ 0.0000ppm G=-RLongitude Transverse Mercator Alaska Zone 4 54°00'00.0000"N 150°00'00.0000"W 1640416.667ftUS 0.000ftUS - 1°12'05.1250"	GRS80 6378137.000 298.2572221010 0.006694380022901 1.0058m RX 0.0000 -1.0516m RY 0.0000 -0.3048m RZ 0.0000 0.0000ppm G-RLongitude Transverse Mercator Alaska Zone 4 54°00'00.0000"N 150°00'00.0000"W 1640416.667ftUS 0.000ftUS - 1°12'05.1250"	GRS80 6378137.000 298.2572221010 0.006694380022901 1.0058m RX 0.0000 arc -1.0516m RY 0.0000 arc -0.3048m RZ 0.0000 arc 0.0000ppm G=-RLongitude Transverse Mercator Alaska Zone 4 54°00'00.0000"N 150°00'00.0000"W 1640416.667ftUS 0.000ftUS - 1°12'05.1250"



#### Vessel

Vessel Name Project Name

Project Number AKLNG 150242
Offset Name MainVessel\_CRP

Sampling Started 21-Oct-2015 15:17:11 (UTC-07:00) Sampling Ended 21-Oct-2015 15:22:25 (UTC-07:00)

Comment DTM-19.30m DTW-2.60m at 14.15, Deck level above ML

LW-7.21m, MB-14, C1707, 21.10.15

# Results

Local Latitude Local Longitude	Mean 60°39'33.8040"N 151°22'53.7280"W	Standard Deviation	<u>on</u>
Ellipsoidal Heigh			
Local Easting		0.03 ftUS	
2	2435508.46 ftUS		
Orthometric Heigh		0.00 ftUS	
WGS84 Latitude	60°39'33.7981"N		
WGS84 Longitude	151°22'53.8205"W		
Ellipsoidal Heigh	it 1.48 ftUS		
Quality	0.65	0.02 ftUS	
Depth	0.00 ftUS	0.00 ftUS	
Heading	154.12°G	0.33°	
Line Navigation Data		Point Navigation	Data
Line Name	N/A	Point Name	MB-14
Chainage	N/A	Easting	1392578.78 ftUS
Cross Track	N/A	Northing	2435500.82 ftUS
		Range	8.34 ftUS
		Bearing TO	156.41°G
Observations		FROM	336.41°G
Used 300 out of 3	00		

Geodetic Datum Ellipsoid Semi-Major Axis Inverse Flattening Eccentricity^2	NAD83 NSRS200 GRS80 6378137.000 298.25722 0.00669				
DX	1.0058m	RX	0.0000	arc	seconds
DY	-1.0516m	RY	0.0000	arc	seconds
DZ	-0.3048m	RZ	0.0000	arc	seconds
D Scale	0.000ppm				
Rotation Convention +RZ	:=-RLongitude				
Projection	Transverse Me	ercator			
Grid Name	Alaska Zone	1			
Latitude of Origin	54°00'00.000	00"N			
Longitude of Origin	150°00'00.000	0 " W			
False Easting	1640416.6671	tus			
False Northing	0.0001	tus			
Convergence	- 1°12'15.91	L18"			
Calculation Mode	Grid				



#### Vessel

Vessel Name Project Name

Project Number AKLNG 150242
Offset Name MainVessel\_CRP

Sampling Started 03-Sep-2015 11:27:41 (UTC-07:00) Sampling Ended 03-Sep-2015 11:32:56 (UTC-07:00)

Comment DML 12.00m DWL 2.70m Deck level above MLLW 9.94m

# Results

	Mean	Standard Deviation	on
Local Latitu	de 60°39'32.3308"N		
Local Longit	ude 151°22'17.9713"W		
Ellipsoidal	Height 0.00 ftUS		
Local Eastin	g 1394353.91 ftUS	0.16 ftUS	
Local Northi	ng 2435321.59 ftUS	0.04 ftUS	
Orthometric	Height 0.00 ftUS	0.00 ftUS	
WGS84 Latitu	de 60°39'32.3250"N		
WGS84 Longit	ude 151°22'18.0638"W		
Ellipsoidal	Height 1.48 ftUS		
Quality	0.68	0.05 ftUS	
Depth	0.00 ftUS	0.00 ftUS	
Heading	160.45°G	0.12°	
Line Navigation Da	ta	Point Navigation	Data
Line Name	N/A	Point Name	MB-15
Chainage	N/A	Easting	1394340.22 ftUS
Cross Track	N/A	Northing	2435316.53 ftUS
		Range	14.59 ftUS
		Bearing TO	249.72°G
Observations		FROM	69.72°G
Used 300 out	of 300		

### <u>Geodetic Parameters</u>

Geodetic Datum Ellipsoid Semi-Major Axis	NAD83 NSRS2007 GRS80 6378137.000				
Inverse Flattening	298.257222101				
Eccentricity^2	0.006694380	022901			
DX	1.0058m	RX	0.0000	arc	seconds
DY	-1.0516m	RY	0.0000	arc	seconds
DZ	-0.3048m	RZ	0.0000	arc	seconds
D Scale	0.0000ppm				
Rotation Convention +RZ	=-RLongitude				
Projection	Transverse Mercat	or			
Grid Name	Alaska Zone 4				
Latitude of Origin	54°00'00.0000"N				
Longitude of Origin	150°00'00.0000"W				
False Easting	1640416.667ftUS				
False Northing	0.000ftUS				
Convergence	- 1°11'44.7203"				
Calculation Mode	Grid				



#### Vessel

Vessel Name Project Name

Project Number AKLNG 150242
Offset Name MainVessel\_CRP

Sampling Started 05-Sep-2015 13:33:55 (UTC-07:00) Sampling Ended 05-Sep-2015 13:39:11 (UTC-07:00)

Comment DML 14.00m DWL 2.10m Deck level above MLLW 9.07m

# Results

		Mean	Standard Deviatio	on_	
	Local Latitude	60°39'28.6687"N		_	
	Local Longitude	151°22'30.9145"W			
	Ellipsoidal Heigh	t 0.00 ftUS			
	Local Easting	1393701.22 ftUS	0.19 ftUS		
	Local Northing	2434963.28 ftUS	0.15 ftUS		
	Orthometric Heigh	t 0.00 ftUS	0.00 ftUS		
	WGS84 Latitude	60°39'28.6628"N			
	WGS84 Longitude	151°22'31.0070"W			
	Ellipsoidal Heigh	t 1.48 ftUS			
	Quality	0.63	0.02 ftUS		
	Depth	0.00 ftUS	0.00 ftUS		
	Heading	157.45°G	0.14°		
Line	Navigation Data		Point Navigation	Data	
	Line Name	N/A	Point Name	BH MB16	
	Chainage	N/A	Easting	1393687.24	ftUS
	Cross Track	N/A	Northing	2434947.59	ftUS
			Range	21.02 ftUS	
			Bearing TO	221.68°G	
Obser	vations		FROM	41.68°G	
	Used 300 out of 3	00			

### <u>Geodetic Parameters</u>

Geodetic Datum Ellipsoid Semi-Major Axis	NAD83 NSRS2007 GRS80 6378137.000				
Inverse Flattening	298.257222101	0			
Eccentricity^2	0.006694380	022901			
DX	1.0058m	RX	0.0000	arc	seconds
DY	-1.0516m	RY	0.0000	arc	seconds
DZ	-0.3048m	RZ	0.0000	arc	seconds
D Scale	0.0000ppm				
Rotation Convention +RZ:	=-RLongitude				
Projection	Transverse Mercat	or			
Grid Name	Alaska Zone 4				
Latitude of Origin	54°00'00.0000"N				
Longitude of Origin	150°00'00.0000"W				
False Easting	1640416.667ftUS				
False Northing	0.000ftUS				
Convergence	- 1°11'55.9616"				
Calculation Mode	Grid				



#### Vessel

Vessel Name Project Name

Project Number AKLNG 150242
Offset Name MainVessel\_CRP

Sampling Started 18-Oct-2015 18:31:23 (UTC-07:00) Sampling Ended 18-Oct-2015 18:36:28 (UTC-07:00)

Comment DTM-19.00m DTW-3.40m at 17.30, Deck level above ML

LW-9.79m, MB-17, C1707, 18.10.15

# Results

Local Latitude Local Longitude Ellipsoidal Heigh		Standard Deviatio	<u>n</u>
_	1393023.58 ftUS	0.06 ftUS	
Local Northing	2434556.02 ftUS	0.09 ftUS	
Orthometric Heigh	t 0.00 ftUS	0.00 ftUS	
WGS84 Latitude	60°39'24.5131"N		
WGS84 Longitude	151°22'44.4293"W		
Ellipsoidal Heigh	t 1.48 ftUS		
Quality	0.65	0.04 ftUS	
Depth	0.00 ftUS	0.00 ftUS	
Heading	158.46°G	0.60°	
Line Navigation Data		Point Navigation	Data
Line Name	N/A	Point Name	MB-17
Chainage	N/A	Easting	1393025.61 ftUS
Cross Track	N/A	Northing	2434573.76 ftUS
		Range	17.85 ftUS
		Bearing TO	6.51°G
Observations		FROM	186.51°G
Used 300 out of 3	00		

Geodetic Datum Ellipsoid Semi-Major Axis Inverse Flattening Eccentricity^2	NAD83 NSRS2007 GRS80 6378137.000 298.25722210 0.00669438			
DX	1.0058m	RX	0.0000	arc seconds
DY	-1.0516m	RY	0.0000	arc seconds
DZ	-0.3048m	RZ	0.0000	arc seconds
D Scale	0.0000ppm			
Rotation Convention	+RZ=-RLongitude			
Projection	Transverse Merca	itor		
Grid Name	Alaska Zone 4			
Latitude of Origin	54°00'00.0000"N	I		
Longitude of Origin	150°00'00.0000"W	I		
False Easting	1640416.667ftUS			
False Northing	0.000ftUS	1		
Convergence	- 1°12'07.6147"			
Calculation Mode	Grid			



#### Vessel

Vessel Name SkateIIIA
Project Name AKLNG\_150242
Project Number AKLNG\_150242

Offset Name Rotary

Sampling Started 19-Sep-2015 18:09:39 (UTC-07:00) Sampling Ended 19-Sep-2015 18:14:45 (UTC-07:00)

Comment DTM-20.70m, DTW-6.00m at 17:00, Deck Level Above M

LLW-11.13m, MB-18, C1707, 19.09.15

# Results

		Mean	Standard Deviation	n
	Local Latitude	60°39'18.9884"N		_
	Local Longitude	151°22'46.3521"W		
	Ellipsoidal Heigh	t 0.00 ftUS		
	Local Easting	1392911.38 ftUS	0.03 ftUS	
	Local Northing	2433996.67 ftUS	0.04 ftUS	
	Orthometric Height	t 0.00 ftUS	0.00 ftUS	
	WGS84 Latitude	60°39'18.9825"N		
	WGS84 Longitude	151°22'46.4446"W		
	Ellipsoidal Heigh	t 1.48 ftUS		
	Quality	0.66	0.01 ftUS	
	Depth	0.00 ftUS	0.00 ftUS	
	Heading	162.25°G	0.12°	
Line	Navigation Data		Point Navigation	Data
	Line Name	N/A	Point Name	MB-18
	Chainage	N/A	Easting	1392917.38 ftUS
	Cross Track	N/A	Northing	2434011.19 ftUS
			Range	15.71 ftUS
			Bearing TO	22.44°G
Obser	vations		FROM	202.44°G
	Used 300 out of 3	00		

Geodetic Datum Ellipsoid Semi-Major Axis Inverse Flattening Eccentricity^2	NAD83 NSRS2007 GRS80 6378137.000 298.25722210 0.00669438		L	
DX	1.0058m	RX	0.0000	arc seconds
DY	-1.0516m	RY	0.0000	arc seconds
DZ	-0.3048m	RZ	0.0000	arc seconds
D Scale	0.0000ppm			
Rotation Convention	+RZ=-RLongitude			
Projection	Transverse Merca	ator		
Grid Name	Alaska Zone 4			
Latitude of Origin	54°00'00.0000"1	N .		
Longitude of Origin	150°00'00.0000"7	V		
False Easting	1640416.667ftUS	5		
False Northing	0.000ftUs	5		
Convergence	- 1°12'09.3064	ı		
Calculation Mode	Grid			



#### Vessel

Vessel Name

Project Name AKLNG\_150242
Project Number AKLNG\_150242
Offset Name MainVessel\_CRP

Sampling Started 09-Oct-2015 19:02:28 (UTC-07:00) Sampling Ended 09-Oct-2015 19:07:37 (UTC-07:00)

Comment DTM-18.80m, DTW-4.20m at 18.00, Deck Level Above M

LLW-8.83m, MB-19, C1707, 09.10.15

# Results

Local Latitude	<u>Mean</u> 60°39'30.7560"N	Standard Deviation	<u>on</u>
Local Longitude			
Ellipsoidal Heigh			
Local Easting		0.02 ftUS	
3			
3	2435188.42 ftUS		
Orthometric Heigh		0.00 ftUS	
WGS84 Latitude	60°39'30.7501"N		
WGS84 Longitude	151°22'43.6786"W		
Ellipsoidal Heigh	nt 1.48 ftUS		
Quality	0.67	0.03 ftUS	
Depth	0.00 ftUS	0.00 ftUS	
Heading	162.58°G	0.18°	
Line Navigation Data		Point Navigation	Data
Line Name	N/A	Point Name	MB-19
Chainage	N/A	Easting	1393073.66 ftUS
Cross Track	N/A	Northing	2435195.10 ftUS
	•	Range	6.71 ftUS
		Bearing TO	354.75°G
Observations		FROM	174.75°G
Used 300 out of 3	300		

Canadatia Datam	NIADO2 NIGD	G0007				
Geodetic Datum	NAD83 NSR	.52007				
Ellipsoid	GRS80					
Semi-Major Axis	6378137.0	00				
Inverse Flattening	298.2	57222101	0			
Eccentricity^2	0.0	06694380	022901			
DX	1.0058	m	RX	0.0000	arc	seconds
DY	-1.0516	m	RY	0.0000	arc	seconds
DZ	-0.3048	m	RZ	0.0000	arc	seconds
D Scale	0.0000	ppm				
Rotation Convention +RZ	=-RLongitu	.de				
Projection	Transvers	e Mercat	or			
Grid Name	Alaska Zo	ne 4				
Latitude of Origin	54°00'00	.0000"N				
Longitude of Origin	150°00'00	.0000"W				
False Easting	1640416.	667ftUS				
False Northing	0.	000ftUS				
Convergence	- 1°12'0	7.0337"				
Calculation Mode	Grid					



#### Vessel

Vessel Name Project Name

Project Number AKLNG 150242
Offset Name MainVessel\_CRP

Sampling Started 07-Sep-2015 11:13:27 (UTC-07:00) Sampling Ended 07-Sep-2015 11:18:32 (UTC-07:00)

Comment DML 10.8m DWL 4.8m Deck level above MLLWS 9.58m

# Results

	Mean		Standard Deviation	on	
Local Lati	tude 60°39	'23.8101"N		<del>_</del>	
Local Long	itude 151°22	'08.0104"W			
Ellipsoida	l Height	0.00 ftUS			
Local East	ing 13948	32.20 ftUS	0.03 ftUS		
Local Nort	hing 24344	46.22 ftUS	0.05 ftUS		
Orthometri	c Height	0.00 ftUS	0.00 ftUS		
WGS84 Lati	tude 60°39	'23.8043"N			
WGS84 Long	itude 151°22	'08.1029"W			
Ellipsoida	l Height	1.48 ftUS			
Quality		0.66	0.03 ftUS		
Depth		0.00 ftUS	0.00 ftUS		
Heading	1	53.40°G	0.14°		
Line Navigation	Data		Point Navigation	Data	
Line Name	N/A		Point Name	BH MB20	
Chainage	N/A		Easting	1394831.87	ftUS
Cross Trac	k N/A		Northing	2434446.37	ftUS
			Range	0.36 ftUS	
			Bearing TO	294.09°G	
Observations			FROM	114.09°G	
Used 300 o	ut of 300				

### <u>Geodetic Parameters</u>

Geodetic Datum Ellipsoid Semi-Major Axis Inverse Flattening Eccentricity^2	NAD83 NSRS2007 GRS80 6378137.000 298.2572221 0.0066943				
DX	1.0058m	RX	0.0000	arc secon	.ds
DY	-1.0516m	RY	0.0000	arc secon	.ds
DZ	-0.3048m	RZ	0.0000	arc secon	.ds
D Scale	0.000ppm				
Rotation Convention +R2	Z=-RLongitude				
Projection	Transverse Merc	cator			
Grid Name	Alaska Zone 4				
Latitude of Origin	54°00'00.0000"	N			
Longitude of Origin	150°00'00.0000"	W			
False Easting	1640416.667ftT	JS			
False Northing	0.000ftT	JS			
Convergence	- 1°11'35.9363	3 "			
Calculation Mode	Grid				



#### Vessel

Vessel Name

Project Name AKLNG\_150242
Project Number AKLNG\_150242
Offset Name MainVessel\_CRP

Sampling Started 16-Oct-2015 19:28:02 (UTC-07:00) Sampling Ended 16-Oct-2015 19:33:02 (UTC-07:00)

Comment DTM-15.60m, DTW-3.60m at 18.25, Deck Level Above M

LLW-9.75m, MB-21, C1707, 16.10.15

# Results

	Mean	Standard Deviati	on
Local Latit	ude 60°39'19.929	2 "N	<del></del>
Local Longi	tude 151°22'21.150	9 " W	
Ellipsoidal	Height 0.00 f	tus	
Local Easti	ng 1394169.18 f	tUS 0.03 ftUS	
Local North	ing 2434065.89 f	tUS 0.03 ftUS	
Orthometric	Height 0.00 f	tus 0.00 ftus	
WGS84 Latit	ude 60°39'19.923	4 "N	
WGS84 Longi	tude 151°22'21.243	4 " W	
Ellipsoidal	Height 1.48 f	tus	
Quality	0.71	0.03 ftUS	
Depth	0.00 f	tUS 0.00 ftUS	
Heading	159.24°G	0.25°	
Line Navigation D	ata	Point Navigation	. Data
Line Name	N/A	Point Name	MB-21
Chainage	N/A	Easting	1394178.87 ftUS
Cross Track	N/A	Northing	2434077.47 ftUS
		Range	15.09 ftUS
		Bearing TO	39.90°G
Observations		FROM	219.90°G
Used 300 ou	t of 300		

Geodetic Datum Ellipsoid Semi-Major Axis Inverse Flattening Eccentricity^2	NAD83 NSRS2007 GRS80 6378137.000 298.25722210 0.00669438	•	_	
DX	1.0058m	RX	0.0000	arc seconds
DY	-1.0516m	RY	0.0000	arc seconds
DZ	-0.3048m	RZ	0.0000	arc seconds
D Scale	0.000ppm			
Rotation Convention	+RZ=-RLongitude			
Projection	Transverse Merca	ator		
Grid Name	Alaska Zone 4			
Latitude of Origin	54°00'00.0000"1	J		
Longitude of Origin	150°00'00.0000"	V		
False Easting	1640416.667ftUS	3		
False Northing	0.000ftUS	3		
Convergence	- 1°11'47.3468'	1		
Calculation Mode	Grid			



#### Vessel

Vessel Name

Project Name AKLNG\_150242
Project Number AKLNG\_150242
Offset Name MainVessel\_CRP

Sampling Started 05-Oct-2015 14:47:50 (UTC-07:00) Sampling Ended 05-Oct-2015 14:52:55 (UTC-07:00)

Comment DTM-20.70m, DTW-3.70m at 12:30, Deck Level Above M

LLW-10.36m, MB-22, C1707, 05.10.15

# Results

		Mean		andard D	eviation	<u>1</u>	
Local	Latitude	60°39'12.8227"					
	Longitude						
	soidal Heigh						
Local	Easting	1392944.21 ftt	JS 0.	02 ftUS			
Local	Northing	2433369.77 ftt	JS 0.	03 ftUS			
Orthor	metric Heigh	t 0.00 ftT	JS 0.	00 ftUS			
WGS84	Latitude	60°39'12.8168"	'N				
WGS84	Longitude	151°22'45.5220"	'W				
Ellips	soidal Heigh	t 1.48 ftT	JS				
Qualit	ΣY	0.60	0.	00 ftUS			
Depth		0.00 ftt	JS 0.	00 ftUS			
Headi	ng	164.64°G	0.	16°			
Line Navigat	tion Data		Ро	int Navi	gation I	Data	
Line 1	Name	N/A	Ро	int Name		MB-22	
Chaina	age	N/A	Ea	sting		1392938.61	ftUS
Cross	Track	N/A	No	rthing		2433362.70	ftUS
			Ra	nge		9.01 ftUS	
			Ве	aring TO		218.40°G	
Observations	3			FR	MO	38.40°G	
Used 3	300 out of 3	00					

Geodetic Datum	NAD83 NS	RS2007				
Ellipsoid	GRS80					
Semi-Major Axis	6378137.	000				
Inverse Flattening	298.	257222101	0			
Eccentricity^2	0.	006694380	022901			
DX	1.005	8m	RX	0.0000	arc	seconds
DY	-1.051	бm	RY	0.0000	arc	seconds
DZ	-0.304	8m	RZ	0.0000	arc	seconds
D Scale	0.000	0ppm				
Rotation Convention	+RZ=-RLongit	ude				
Projection	Transver	se Mercato	or			
Grid Name	Alaska Z	one 4				
Latitude of Origin	54°00'0	0.0000"N				
Longitude of Origin	150°00'0	W"0000.0				
False Easting	1640416	.667ftUS				
False Northing	0	.000ftUS				
Convergence	- 1°12'	08.4294"				
Calculation Mode	Grid					



#### Vessel

Vessel Name

Project Name AKLNG\_150242
Project Number AKLNG\_150242
Offset Name MainVessel\_CRP

Sampling Started 12-Oct-2015 15:05:32 (UTC-07:00) Sampling Ended 12-Oct-2015 15:10:33 (UTC-07:00)

Comment DTM-15.60m, DTW-2.70m at 14.00, Deck Level Above M

LLW-6.71m, MB-23, C1707, 12.10.15

# Results

	Mean	Standard Deviation	on	
Local Latit	ude 60°39'16.370	03"N	_	
Local Longi	tude 151°22'34.217	74"W		
Ellipsoidal	Height 0.00 f	tus		
Local Eastin	ng 1393510.50 f	tus 0.04 ftus		
Local North:	ing 2433718.21 f	tus 0.03 ftus		
Orthometric	Height 0.00 f	tus 0.00 ftus		
WGS84 Latit	ude 60°39'16.364	!5"N		
WGS84 Longi	tude 151°22'34.309	99"W		
Ellipsoidal	Height 1.48 f	tus		
Quality	0.69	0.04 ftUS		
Depth	0.00 f	tus 0.00 ftus		
Heading	160.27°G	0.17°		
Line Navigation Da	ata	Point Navigation	Data	
Line Name	N/A	Point Name	MB-23	
Chainage	N/A	Easting	1393524.35	ftUS
Cross Track	•	Northing	2433705.68	ftUS
	·	Range	18.67 ftUS	
		Bearing TO	132.15°G	
Observations		FROM	312.15°G	
Used 300 out	t of 300			

Geodetic Datum Ellipsoid Semi-Major Axis Inverse Flattening	NAD83 NSRS20 GRS80 6378137.000 298.2572				
Eccentricity^2		94380022901			
DX	1.0058m	RX	0.0000	arc	seconds
DY	-1.0516m	RY	0.0000	arc	seconds
DZ	-0.3048m	RZ	0.0000	arc	seconds
D Scale	0.000ppm	l			
Rotation Convention -	+RZ=-RLongitude				
Projection	Transverse M	lercator			
Grid Name	Alaska Zone	4			
Latitude of Origin	54°00'00.00	00"N			
Longitude of Origin	150°00'00.00	00"W			
False Easting	1640416.667	ftUS			
False Northing	0.000	ftUS			
Convergence	- 1°11'58.6	965"			
Calculation Mode	Grid				



#### Vessel

Vessel Name

Project Name AKLNG\_150242
Project Number AKLNG\_150242
Offset Name MainVessel\_CRP

Sampling Started 27-Oct-2015 16:19:49 (UTC-07:00) Sampling Ended 27-Oct-2015 16:24:51 (UTC-07:00)

Comment DTM-15.00m DTW-4.60m at 15.20, Deck level above ML

LW-11.09m MB24,C1707, 27.10.15

# Results

Local Latitude		Standard Deviatio	<u>n</u>
Local Longitude			
Ellipsoidal Hei	_		
2	1395096.20 ftUS		
Local Northing	2433462.93 ftUS	0.03 ftUS	
Orthometric Hei	ght 0.00 ftUS	0.00 ftUS	
WGS84 Latitude	60°39'14.1769"N		
WGS84 Longitude	151°22'02.3967"W		
Ellipsoidal Hei	ght 1.48 ftUS		
Quality	0.59	0.01 ftUS	
Depth	0.00 ftUS	0.00 ftUS	
Heading	159.71°G	0.48°	
Line Navigation Data		Point Navigation	Data
Line Name	N/A	Point Name	MB-24
Chainage	N/A	Easting	1395107.66 ftUS
Cross Track	N/A	Northing	2433465.13 ftUS
		Range	11.67 ftUS
		Bearing TO	79.16°G
Observations		FROM	259.16°G
Used 300 out of	300		

Geodetic Datum Ellipsoid Semi-Major Axis Inverse Flattening Eccentricity^2	NAD83 NSRS20 GRS80 6378137.000 298.2572 0.0066			
DX	1.0058m	RX	0.0000	arc seconds
DY	-1.0516m	RY	0.0000	arc seconds
DZ	-0.3048m	RZ	0.0000	arc seconds
D Scale	0.0000ppm			
Rotation Convention +RZ	=-RLongitude			
Projection	Transverse M	ercator		
Grid Name	Alaska Zone	4		
Latitude of Origin	54°00'00.00	00"N		
Longitude of Origin	150°00'00.00	W"00		
False Easting	1640416.667	ftUS		
False Northing	0.000	ftUS		
Convergence	- 1°11'30.8	490"		
Calculation Mode	Grid			



#### Vessel

Vessel Name Project Name

Project Number AKLNG 150242
Offset Name MainVessel\_CRP

Sampling Started 09-Sep-2015 10:34:11 (UTC-07:00) Sampling Ended 09-Sep-2015 10:39:30 (UTC-07:00)

Comment DML 11.30m DWL 4.60m Deck level above MLLW 7.16m

# Results

		Mean	Standard Deviation	n	
	Local Latitude	60°39'11.6046"N		_	
	Local Longitude	151°22'10.8441"W			
	Ellipsoidal Heigh	t 0.00 ftUS			
	Local Easting	1394665.17 ftUS	0.10 ftUS		
	Local Northing	2433210.06 ftUS	0.03 ftUS		
	Orthometric Height	t 0.00 ftUS	0.00 ftUS		
	WGS84 Latitude	60°39'11.5988"N			
	WGS84 Longitude	151°22'10.9365"W			
	Ellipsoidal Height	t 1.48 ftUS			
	Quality	0.70	0.01 ftUS		
	Depth	0.00 ftUS	0.00 ftUS		
	Heading	157.30°G	0.10°		
Line	Navigation Data		Point Navigation	Data	
	Line Name	N/A	Point Name	MB-25	
	Chainage	N/A	Easting	1394670.52	ftUS
	Cross Track	N/A	Northing	2433207.30	ftUS
			Range	6.02 ftUS	
			Bearing TO	117.35°G	
Obser	vations		FROM	297.35°G	
	Used 300 out of 3	00			

### <u>Geodetic Parameters</u>

Geodetic Datum Ellipsoid Semi-Major Axis	NAD83 NSRS2007 GRS80 6378137.000				
Inverse Flattening	298.257222101				
Eccentricity^2	0.006694380	022901			
DX	1.0058m	RX	0.0000	arc	seconds
DY	-1.0516m	RY	0.0000	arc	seconds
DZ	-0.3048m	RZ	0.0000	arc	seconds
D Scale	0.0000ppm				
Rotation Convention +RZ	=-RLongitude				
Projection	Transverse Mercat	or			
Grid Name	Alaska Zone 4				
Latitude of Origin	54°00'00.0000"N				
Longitude of Origin	150°00'00.0000"W				
False Easting	1640416.667ftUS				
False Northing	0.000ftUS				
Convergence	- 1°11'38.2637"				
Calculation Mode	Grid				



#### Vessel

Vessel Name SkateIIIA

Project Name

Project Number AKLNG 150242

Offset Name CRP

Sampling Started 10-Sep-2015 18:57:13 (UTC-07:00) Sampling Ended 10-Sep-2015 19:02:20 (UTC-07:00)

Comment DML 16.10m : DWL 3.00m at 17:50 10/09/15

# Results

	Mean	Standard Deviation	n	
Local Latitude	60°39'07.8103"N		_	
Local Longitude	151°22'23.8044"W			
Ellipsoidal Heigh	t 0.00 ftUS			
Local Easting	1394011.25 ftUS	0.04 ftUS		
Local Northing	2432838.34 ftUS	0.03 ftUS		
Orthometric Heigh	t 0.00 ftUS	0.00 ftUS		
WGS84 Latitude	60°39'07.8044"N			
WGS84 Longitude	151°22'23.8969"W			
Ellipsoidal Heigh	t 1.48 ftUS			
Quality	0.71	0.03 ftUS		
Depth	0.00 ftUS	0.00 ftUS		
Heading	150.97°G	0.00°		
Line Navigation Data		Point Navigation	Data	
Line Name	N/A	Point Name	MB-26	
Chainage	N/A	Easting	1394011.46	ftUS
Cross Track	N/A	Northing	2432831.83	ftUS
		Range	6.52 ftUS	
		Bearing TO	178.17°G	
Observations		FROM	358.17°G	
Used 300 out of 3	00			

### <u>Geodetic Parameters</u>

Geodetic Datum Ellipsoid Semi-Major Axis Inverse Flattening	NAD83 NSRS2007 GRS80 6378137.000 298.2572221			
Eccentricity^2	0.006694380022901			
DX	1.0058m	RX	0.0000	arc seconds
DY	-1.0516m	RY	0.0000	arc seconds
DZ	-0.3048m	RZ	0.0000	arc seconds
D Scale	mqq0000.0			
Rotation Convention +R2	Z=-RLongitude			
Projection	Transverse Mercator			
Grid Name	Alaska Zone 4			
Latitude of Origin	54°00'00.0000"	N		
Longitude of Origin	150°00'00.0000"	W		
False Easting	1640416.667ftU	S		
False Northing	0.000ftU	S		
Convergence	- 1°11'49.5179	II .		
Calculation Mode	Grid			



#### Vessel

Vessel Name

Project Name AKLNG\_150242
Project Number AKLNG\_150242
Offset Name MainVessel\_CRP

Sampling Started 07-Oct-2015 16:55:31 (UTC-07:00) Sampling Ended 07-Oct-2015 17:00:33 (UTC-07:00)

Comment DTM-20.50m, DTW-3.00m at 15.55, Deck Level Above M

LLW-7.599m, MB-27, C1707, 07.10.15

### Results

	Mean	Standard Deviation	on
Local Latitude	60°39'04.0173"N		
Local Longitude	151°22'35.2821"W		
Ellipsoidal Hei	ght 0.00 ftUS		
Local Easting	1393431.18 ftUS	0.04 ftUS	
Local Northing	2432465.25 ftUS	0.03 ftUS	
Orthometric Hei	ght 0.00 ftUS	0.00 ftUS	
WGS84 Latitude	60°39'04.0114"N		
WGS84 Longitude	151°22'35.3745"W		
Ellipsoidal Hei	ght 1.48 ftUS		
Quality	0.66	0.01 ftUS	
Depth	0.00 ftUS	0.00 ftUS	
Heading	158.01°G	0.14°	
Line Navigation Data		Point Navigation	Data
Line Name	N/A	Point Name	MB-27
Chainage	N/A	Easting	1393423.99 ftUS
Cross Track	N/A	Northing	2432453.24 ftUS
		Range	14.00 ftUS
		Bearing TO	210.93°G
Observations		FROM	30.93°G
Used 300 out of	300		

Geodetic Datum Ellipsoid Semi-Major Axis Inverse Flattening Eccentricity^2	NAD83 NSRS2007 GRS80 6378137.000 298.257222103 0.006694380				
DX	1.0058m	RX	0.0000	arc	seconds
DY	-1.0516m	RY	0.0000	arc	seconds
DZ	-0.3048m	RZ	0.0000	arc	seconds
D Scale	0.000ppm				
Rotation Convention +RZ	=-RLongitude				
Projection	Transverse Mercat	tor			
Grid Name	Alaska Zone 4				
Latitude of Origin	54°00'00.0000"N				
Longitude of Origin	150°00'00.0000"W				
False Easting	1640416.667ftUS				
False Northing	0.000ftUS				
Convergence	- 1°11'59.4792"				
Calculation Mode	Grid				



#### Vessel

Vessel Name

Project Name AKLNG\_150242
Project Number AKLNG\_150242
Offset Name MainVessel\_CRP

Sampling Started 11-Oct-2015 14:43:44 (UTC-07:00) Sampling Ended 11-Oct-2015 14:48:46 (UTC-07:00)

Comment DTM-18.70m, DTW-5.70m at 13.40, Deck Level Above M

LLW-9.67m, MB-28, C1707, 11.10.15

### Results

	Mean		Standard Deviation	<u>on</u>	
Local Lati	tude 60°39	'51.8336"N			
Local Long	itude 151°22	'50.8183"W			
Ellipsoida	l Height	0.00 ftUS			
Local East	ing 13927	58.88 ftUS	0.04 ftUS		
Local Nort	hing 243733	35.77 ftUS	0.03 ftUS		
Orthometri	c Height	0.00 ftUS	0.00 ftUS		
WGS84 Lati	tude 60°39	'51.8277"N			
WGS84 Long	itude 151°22	'50.9108"W			
Ellipsoida	l Height	1.48 ftUS			
Quality		0.57	0.01 ftUS		
Depth		0.00 ftUS	0.00 ftUS		
Heading	15	54.35°G	0.13°		
Line Navigation	Data		Point Navigation	Data	
Line Name	N/A		Point Name	MB-28	
Chainage	N/A		Easting	1392748.76	ftUS
Cross Trac	k N/A		Northing	2437322.56	ftUS
			Range	16.64 ftUS	
			Bearing TO	217.46°G	
Observations			FROM	37.46°G	
Used 300 or	ut of 300				

Geodetic Datum Ellipsoid Semi-Major Axis Inverse Flattening Eccentricity^2	NAD83 NSRS2007 GRS80 6378137.000 298.25722210 0.00669438				
DX	1.0058m	RX	0.0000	arc	seconds
DY	-1.0516m	RY	0.0000	arc	seconds
DZ	-0.3048m	RZ	0.0000	arc	seconds
D Scale	mqq0000.0				
Rotation Convention +RZ	=-RLongitude				
Projection	Transverse Merca	ator			
Grid Name	Alaska Zone 4				
Latitude of Origin	54°00'00.0000"1	N			
Longitude of Origin	150°00'00.0000"V	M			
False Easting	1640416.667ftUS	S			
False Northing	0.000ftUS	S			
Convergence	- 1°12'13.5878'	"			
Calculation Mode	Grid				



#### Vessel

Vessel Name

Project Name AKLNG\_150242
Project Number AKLNG\_150242
Offset Name MainVessel\_CRP

Sampling Started 11-Sep-2015 08:09:39 (UTC-07:00) Sampling Ended 11-Sep-2015 08:14:42 (UTC-07:00)

Comment DML 15.10m, DWL 2.60m @ 06:30, Deck level above ML

LW 9.63m C1707 11/09/2015

### Results

Local Latitude Local Longitude		Standard Deviation	<u>n</u>
Ellipsoidal Heigh Local Easting		0.04 ftUS	
2	2431966.01 ftUS		
Orthometric Heigh		0.00 ftUS	
_	60°38'59.3182"N		
WGS84 Longitude	151°22'13.4978"W		
Ellipsoidal Heigh	it 1.48 ftUS		
Quality	0.65	0.04 ftUS	
Depth	0.00 ftUS	0.00 ftUS	
Heading	163.43°G	0.14°	
Line Navigation Data		Point Navigation	Data
Line Name	N/A	Point Name	MB-31
Chainage	N/A	Easting	1394510.01 ftUS
Cross Track	N/A	Northing	2431966.74 ftUS
		Range	1.69 ftUS
		Bearing TO	295.47°G
Observations		FROM	115.47°G
Used 300 out of 3	00		

Geodetic Datum Ellipsoid Semi-Major Axis	NAD83 NSRS2007 GRS80 6378137.000	,			
Inverse Flattening	298.257222	1010			
Eccentricity^2	0.006694	380022901			
DX	1.0058m	RX	0.0000	arc	seconds
DY	-1.0516m	RY	0.0000	arc	seconds
DZ	-0.3048m	RZ	0.0000	arc	seconds
D Scale	0.000ppm				
Rotation Convention +R2	Z=-RLongitude				
Projection	Transverse Mer	cator			
Grid Name	Alaska Zone 4				
Latitude of Origin	54°00'00.0000	)"N			
Longitude of Origin	150°00'00.0000	) " W			
False Easting	1640416.667ft	US			
False Northing	0.000ft	US			
Convergence	- 1°11'40.352	27 "			
Calculation Mode	Grid				



#### Vessel

Vessel Name Project Name

Project Number AKLNG 150242
Offset Name MainVessel\_CRP

Sampling Started 02-Nov-2015 17:14:43 (UTC-08:00) Sampling Ended 02-Nov-2015 17:19:52 (UTC-08:00)

Comment DTM-10.00m DTW-5.40m at 16.15, Deck level above ML

LW-7.45m, D4SD01, C1707, 02.12.15

### Results

	<u>I</u>	Mean	Standard Deviation	<u>on</u>	
Local I	Latitude -	60°39'21.1829"N		<del></del>	
Local I	Longitude 1	151°22'01.8995"W			
Ellipso	oidal Height	0.00 ftUS			
Local E	Easting	1395131.15 ftus	0.04 ftUS		
Local N	Northing	2434173.16 ftUS	0.06 ftUS		
Orthome	etric Height	0.00 ftUS	0.00 ftUS		
WGS84 I	Latitude	60°39'21.1770"N			
WGS84 I	Longitude 1	151°22'01.9919"W			
	oidal Height				
Quality	7	0.76	0.03 ftUS		
Depth		0.00 ftUS	0.00 ftUS		
Heading	a .	161.25°G	0.78°		
Line Navigati	on Data		Point Navigation	Data	
Line Na	ame 1	N/A	Point Name	D4SD01	
Chainag	ge 1	N/A	Easting	1395130.89	ftUS
Cross I	rack 1	N/A	Northing	2434161.70	ftUS
			Range	11.46 ftUS	
			Bearing TO	181.32°G	
Observations			FROM	1.32°G	
Used 30	00 out of 300	)			

Geodetic Datum Ellipsoid Semi-Major Axis Inverse Flattening Eccentricity^2	NAD83 NSRS2007 GRS80 6378137.000 298.2572221 0.0066943			
DX	1.0058m	RX	0.0000	arc second
DY	-1.0516m	RY	0.0000	arc second
DZ	-0.3048m	RZ	0.0000	arc second
D Scale	0.000ppm			
Rotation Convention +RZ	=-RLongitude			
Projection	Transverse Merc	ator		
Grid Name	Alaska Zone 4			
Latitude of Origin	54°00'00.0000"	N		
Longitude of Origin	150°00'00.0000"	W		
False Easting	1640416.667ftU	S		
False Northing	0.000ftU	S		
Convergence	- 1°11'30.5779	II .		
Calculation Mode	Grid			



#### Vessel

Vessel Name SkateIIIA

Project Name

Project Number AKLNG 150242

Offset Name Rotary

Sampling Started 03-Nov-2015 01:19:52 (UTC-08:00) Sampling Ended 03-Nov-2015 01:25:01 (UTC-08:00)

Comment DTM-10.10m DTW-4.60m at 00:15 Deck level above MLL

W-7.62m, D4SD01b, C1707, 03.11.15

### Results

	Mean	Standard Deviation	on	
Local Latitude	60°39'20.9104"N		<u> </u>	
Local Longitude	151°22'01.6328"W			
Ellipsoidal Heigh	t 0.00 ftUS			
	1395143.86 ftUS	0.05 ftUS		
Local Northing	2434145.23 ftUS	0.05 ftUS		
Orthometric Heigh		0.00 ftUS		
WGS84 Latitude				
WGS84 Longitude	151°22'01.7253"W			
Ellipsoidal Heigh				
Quality	0.71	0.03 ftUS		
Depth	0.00 ftUS	0.00 ftUS		
Heading	153.88°G	0.31°		
Line Navigation Data		Point Navigation	Data	
Line Name	N/A	Point Name	D4SD01	
Chainage	N/A	Easting	1395130.89	ftIIS
Cross Track	N/A	Northing	2434161.70	
	14/11	Range	20.97 ftUS	1000
		Bearing TO	321.78°G	
Observations		FROM	141.78°G	
Used 300 out of 30	00	111011		

GRS80 6378137 298	.000 .2572221010				
1.00	58m	RX	0.0000	arc	seconds
-1.05	16m	RY	0.0000	arc	seconds
-0.304	48m	RZ	0.0000	arc	seconds
0.000	00ppm				
-RLongit	tude				
Transver	rse Mercato	or			
Alaska 2	Zone 4				
54°00'	00.000"N				
150°00'	W"0000.00				
1640416	6.667ftUS				
(	0.000ftUS				
- 1°11	'30.3423"				
Grid					
	GRS80 6378137 298 0 1.009 -1.053 -0.300 0.000 E-RLongis Transves Alaska 3 54°00'0 150°00'0 1640410	6378137.000 298.2572221010 0.0066943800 1.0058m -1.0516m -0.3048m 0.0000ppmRLongitude Transverse Mercato Alaska Zone 4 54°00'00.0000"N 150°00'00.0000"W 1640416.667ftUS 0.000ftUS - 1°11'30.3423"	GRS80 6378137.000 298.2572221010 0.006694380022901 1.0058m RX -1.0516m RY -0.3048m RZ 0.0000ppmRLongitude Transverse Mercator Alaska Zone 4 54°00'00.0000"N 150°00'00.0000"W 1640416.667ftUS 0.000ftUS - 1°11'30.3423"	GRS80 6378137.000 298.2572221010 0.006694380022901 1.0058m RX 0.0000 -1.0516m RY 0.0000 -0.3048m RZ 0.0000 0.0000ppmRLongitude Transverse Mercator Alaska Zone 4 54°00'00.0000"N 150°00'00.0000"W 1640416.667ftUS 0.000ftUS - 1°11'30.3423"	GRS80 6378137.000 298.2572221010 0.006694380022901 1.0058m RX 0.0000 arc -1.0516m RY 0.0000 arc -0.3048m RZ 0.0000 arc 0.0000ppmRLongitude Transverse Mercator Alaska Zone 4 54°00'00.0000"N 150°00'00.0000"W 1640416.667ftUS 0.000ftUS - 1°11'30.3423"



#### Vessel

Vessel Name Project Name

Project Number AKLNG 150242
Offset Name MainVessel\_CRP

Sampling Started 04-Nov-2015 13:42:16 (UTC-08:00) Sampling Ended 04-Nov-2015 13:47:17 (UTC-08:00)

Comment DTM-10.40m DTW-1.40m at 12:40 Deck level above MLL

W-6.39m, D4SD01, C1707, 04.11.15

### Results

Local Latitude	Mean 60°39'20.0839"N	Standard Deviation	<u>on</u>	
Local Longitude				
Ellipsoidal Heigh	1394778.42 ftUS	0.04 ftUS		
3	2434068.89 ftUS			
Orthometric Heigh		0.00 ftUS		
WGS84 Latitude		0.00 1005		
	151°22'09.0239"W			
Ellipsoidal Heigh				
Quality	0.72	0.06 ftUS		
~ _		0.00 ftUS		
Depth				
Heading	159.37°G	0.28°		
Line Navigation Data		Point Navigation	Data	
Line Name	N/A	Point Name	D5SD01	
Chainage	N/A	Easting	1394787.06	ftUS
Cross Track	N/A	Northing	2434073.39	ftUS
		Range	9.74 ftUS	
		Bearing TO	62.49°G	
Observations		FROM	242.49°G	
Used 300 out of 3	300			

Geodetic Datum Ellipsoid Semi-Major Axis Inverse Flattening Eccentricity^2	GRS80 6378137 298	NSRS2007 7.000 8.257222101 0.006694380	-			
DX	1.00	)58m	RX	0.0000	arc	seconds
DY	-1.05	516m	RY	0.0000	arc	seconds
DZ	-0.30	)48m	RZ	0.0000	arc	seconds
D Scale	0.00	000ppm				
Rotation Convention +RZ	=-RLongi	tude				
Projection	Transve	erse Mercat	or			
Grid Name	Alaska	Zone 4				
Latitude of Origin	54°00	00.000"N				
Longitude of Origin	150°00	W"0000.00				
False Easting	164041	L6.667ftUS				
False Northing		0.000ftUS				
Convergence	- 1°11	L'36.6956"				
Calculation Mode	Grid					



#### Vessel

Vessel Name Project Name

Project Number AKLNG 150242
Offset Name MainVessel\_CRP

Sampling Started 04-Nov-2015 19:07:06 (UTC-08:00) Sampling Ended 04-Nov-2015 19:12:33 (UTC-08:00)

Comment DTM-10.50m DTW-4.90m at 18:05 Deck level above MLL

W-6.61m, D5SD01b, C1707, 04.11.15

### Results

		Mean	Standard Deviation	n
	Local Latitude	60°39'19.9623"N		_
	Local Longitude	151°22'09.1106"W		
	Ellipsoidal Heigh	t 0.00 ftUS		
	Local Easting	1394769.24 ftUS	0.03 ftUS	
	Local Northing	2434056.73 ftUS	0.03 ftUS	
	Orthometric Height	t 0.00 ftUS	0.00 ftUS	
	WGS84 Latitude	60°39'19.9565"N		
	WGS84 Longitude	151°22'09.2031"W		
	Ellipsoidal Heigh	t 1.48 ftUS		
	Quality	0.60	0.01 ftUS	
	Depth	0.00 ftUS	0.00 ftUS	
	Heading	170.08°G	0.37°	
Line	Navigation Data		Point Navigation	Data
	Line Name	N/A	Point Name	D5SD01
	Chainage	N/A	Easting	1394787.06 ftUS
	Cross Track	N/A	Northing	2434073.39 ftUS
			Range	24.40 ftUS
			Bearing TO	46.94°G
Obser	vations		FROM	226.94°G
	Used 300 out of 3	00		

Geodetic Datum Ellipsoid Semi-Major Axis Inverse Flattening Eccentricity^2			2901			
DX	1.0058m	R	X	0.0000	arc	seconds
DY	-1.0516m	R	Y	0.0000	arc	seconds
DZ	-0.3048m	R.	Z	0.0000	arc	seconds
D Scale	0.0000p	pm				
Rotation Convention +RZ	=-RLongitud	е				
Projection	Transverse	Mercator				
Grid Name	Alaska Zon	e 4				
Latitude of Origin	54°00'00.	0000"N				
Longitude of Origin	150°00'00.	W"0000				
False Easting	1640416.6	67ftUS				
False Northing	0.0	00ftUS				
Convergence	- 1°11'36	.8504"				
Calculation Mode	Grid					

Date &	Time:		ct: Alaska LN			al Investigati August		08:55	
Boreh	nole:	August 17,2019 9MB-06	2 desay	Boreh	nole:		of (	For Day	
Day Shift C	Observer	Jesse Greenwald 18	100 - 2055	Longit Night Shift & Shift	Observer .	Austin Fee	8,93ft 209	55-0855	
<b>Drilling Sta</b>	Cestina v	8/18/15 0110		Drilling En	id Time:	8/18/15	080		
		Outfall 001 - Ge	The state of the s	The second secon			the Seafloor	r	
			Drilling Fl	luid Losses (P	rior To Dis	charge)			
Di		uid Volumes		Day Shift			Night Shift	:	Total
		ed (gal):					3/0		370
		ning (gal):		0			77/0		370
Inadvert		st (gal) harges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	370
based on o	duration an	narges (gar). Estimate nd approximate flow rate on. ~180 gal max/event:	()	O C	O Event 3	Ó	O	O	0
THE RESERVE OF THE PERSON NAMED IN	THE RESERVE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN	st to Ground (gal):	91000 370	0					
			D	Orilling Fluid (	Discharges				
Results o	of Static	Start Time	e	End T	The second secon	Pass/Fail		Comments	
Sheen	Test	NA		NA	The second secon	NA	1	/A	
Discharge S	tart Time:	NA	Discharge	e End Time:		IA	Discharge D	Ouration (min.):	WA
Length of Casing (ft):	NA	Drilling Fluid Depth Below Top of Casing (ft):	MΑ	Length of Drill Fluid Col. (ft):	h)=f-g	Casing Dia. (in.):	NA	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup> 12- in. is 0.71 ft <sup>2</sup>	NA
Discl	harge Vo	ol. (gal.). ~200 gallons	s max:	R)			k = h	* j * 7.481 gal,	/ft <sup>3</sup>
Observa			Sheen (Y/N & Co	omments)		Floating Solids	Residue (Y/N 8	e, Deposits, Foan & Comments)	ı, Scum,
During Di	scharge		NA	400 <u>-0-0-0</u>			NA		
			Ou	tfall 002 - De	ck Drainag	zе			
	24-hr Ra	ainfall (in.)	0.28	Volume o	of Discharge	e Due to Rair		m)=1*1599.3 448	
		charge From Deck		Day Shift			Night Shift	A STATE OF THE PARTY OF THE PAR	Tota
	and approx	al.). Estimate based on eximate flow rate during	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	0
Total	THE RESERVE OF THE PERSON NAMED IN	hdowns. rainage Discharge (ga	al.) ~2570 g	al. max:	olemen.	448			
				Outfalls 00	1 & 002				
		Receiving Water Vis							
Slack V	Nater	Date & Time	Oily Sheen Det	tected in Visual S & Comments)	neen Test (Y/N	Floating Solids	s, Debris, Sludg Residue (Y/N 8	je, Deposits, Foan & Comments)	n, Scum,
1st Slack	( Water	8/17/15 20:54	IN			N			
2nd Slack	k Water	8/18/15 03:02	12			N			
3rd Slack	k Water								
4th Slack	k Water	NA				-			
V		Other O	bserations,	Non-Permit	ted Dischar	rges, or Comr	ments		
Drilli	ing fl	uid lost to	a form	nation (	ground,	).			e Josep

### Daily Visual Observation Form Rev. 2

APDES Permit No.: AK0062278 Project: Alaska LNG Marine Geotechnical Investigation Date & Time: to For Day Borehole: Borehole: Longitude: Northing Latitude: Night Shift Observer Day Shift Observer & Shift Time: & Shift Time: **Drilling End Time:** Drilling Start Time: ust 18,2015 Outfall 001 - Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor Drilling Fluid Losses (Prior To Discharge) Night Shift Total **Drilling Fluid Volumes** Day Shift 4490 1320 Created (gal): 0 Remaining (gal): 4.490 Lost (gal) Event 4 Event 5 Event 6 Event 1 Event 2 Event 3 Inadvertent Discharges (gal). Estimate based on duration and approximate flow rate during lost circulation. ~180 gal max/event: Drilling Fluid Lost to Ground (gal): **Drilling Fluid Discharges** Comments **End Time** Pass/Fail Results of Static Start Time Sheen Test Discharge Duration (min.): Discharge End Time: Discharge Start Time: Casing Area (ft2): Casing Dia. Length of Drilling Fluid Depth Below Length of Drill 7-in. is 0.27 ft<sup>2</sup> 12-Top of Casing (ft): Fluid Col. (ft): (in.): Casing (ft): in. is 0.71 ft<sup>2</sup> k = h \* i \* 7.481 gal/ftDischarge Vol. (gal.). ~200 gallons max: Floating Solids, Debris, Sludge, Deposits, Foam, Scum, or Oily Sheen (Y/N & Comments) Observations Residue (Y/N & Comments) **During Discharge** Outfall 002 - Deck Drainage Volume of Discharge Due to Rainfall (gal.) 24-hr Rainfall (in.) Night Shift Volume of Discharge From Deck Day Shift Total Washdown 5 Washdown 6 Washdown 2 Washdown 4 Washdown (gal.). Estimate based on Washdown 1 Washdown 3 duration and approximate flow rate during 0 washdowns. Total Deck Drainage Discharge (gal.) ~2570 gal. max: Outfalls 001 & 002 Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions) Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, or Slack Water Date & Time Residue (Y/N & Comments) & Comments) 1st Slack Water 2nd Slack Water 1508 3rd Slack Water 4th Slack Water Other Obserations, Non-Permitted Discharges, or Comments was advanced to formation lost to

Stop discharge upon obseration of oily sheen or residue not related to drill fluids or deck drainage and report to Project Regulatory Advisor, Claire Joseph. Note: Observations were made over a 24 hr period corresponding with personnel shift changes.

### Daily Visual Observation Form Rev. 2

APDES Permit No.: AK0062278 Project: Alaska LNG Marine Geotechnical Investigation Date & Time: 0855-2000 to Borehole: Borehole: North oy tatitude: Longitude: Eastings 1392864.19 Day Shift Observer Night Shift Observer Jesse Greenwold 0855-20:30 & Shift Time: & Shift Time: **Drilling Start Time:** Drilling End Time: Outfall 001 - Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor Drilling Fluid Losses (Prior To Discharge) **Drilling Fluid Volumes** Day Shift Night Shift Total Created (gal): 740 ga 740 Remaining (gal): 0 Lost (gal) 40 ana 740 Inadvertent Discharges (gal). Estimate Event 1 Event 2 Event 3 Event 4 Event 5 Event 6 based on duration and approximate flow rate during lost circulation. ~180 gal max/event: Drilling Fluid Lost to Ground (gal): Drilling Fluid Discharges Results of Static Start Time **End Time** Pass/Fail Comments **Sheen Test** Pass Shun/Slick Discharge Start Time: 14:25 Discharge End Time: 15:15 Discharge Duration (min.): Casing Area (ft<sup>2</sup>): Length of Drilling Fluid Depth Below Length of Drill Casing Dia. 25 7-in. is 0.27 ft2 12 0, 27 30 Casing (ft): Top of Casing (ft): Fluid Col. (ft): (in.): in. is 0.71 ft<sup>2</sup> Discharge Vol. (gal.). ~200 gallons max: 0.5 k = h \* i \* 7.481 gal/ftFloating Solids, Debris, Sludge, Deposits, Foam, Scum, or Oily Sheen (Y/N & Comments) Observations Residue (Y/N & Comments) **During Discharge** Outfall 002 - Deck Drainage 24-hr Rainfall (in.) Volume of Discharge Due to Rainfall (gal.) Volume of Discharge From Deck Day Shift Night Shift Total Washdown (gal.). Estimate based on Washdown 1 Washdown 2 Washdown 3 Washdown 4 Washdown 5 Washdown 6 duration and approximate flow rate during 10minxldgpm 20 washdowns. =1208ª Total Deck Drainage Discharge (gal.) ~2570 gal. max: Outfalls 001 & 002 Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions) Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scurn, or Slack Water Date & Time & Comments) Residue (Y/N & Comments) 1st Slack Water 2nd Slack Water 3rd Slack Water 4th Slack Water Other Obserations, Non-Permitted Discharges, or Comments See Daily Observation Form for MB-04 for second portion of 8/19-20/15.

Stop discharge upon obseration of oily sheen or residue not related to drill fluids or deck drainage and report to Project Regulatory Advisor, Claire Joseph.

Note: Observations were made over a 24 hr period corresponding with personnel shift changes.

## Daily Visual Observation Form Rev. 2 APDES Permit No.: AK0062278

	. Р	roject: Alaska LNO	6 Marine Geotechni	cal Investiga	ition		
Date & Time:	8/19/15	08:55	to	8/20/1	5	07:	20.
Borehole:	MB-04		Borehole:	2	of	3	For Day
Latitude: No	orthony: 2438	430.15 fx	Longitude: Ea	sting: 1391	719.5	7 ft	
Day Shift Observer & Shift Time:	Jesse Greenwald	0855-20120	Night Shift Observer & Shift Time:	Austin	ec_	20130 -	07/20
Drilling Start Time:	8/20/15	0405	Drilling End Time:	8/20/1	5	05145	
	-/- /			20. 10		_	

Outfall 001 - Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor Drilling Fluid Losses (Prior To Discharge) Night Shift Total **Drilling Fluid Volumes** Day Shift 264 264 Created (gal): 64 64 Remaining (gal): 200 Lost (gal) Event 5 Event 6 Event 3 Event 4 Inadvertent Discharges (gal). Estimate Event 1 Event 2 0 based on duration and approximate flow rate during lost circulation. ~180 gal max/event: Drilling Fluid Lost to Ground (gal): **Drilling Fluid Discharges End Time** Comments Start Time Pass/Fail Results of Static Sheen Test Discharge Start Time: NA Discharge End Time: Discharge Duration (min.): Casing Area (ft<sup>2</sup>): Length of Drill Casing Dia. Drilling Fluid Depth Below Length of 7-in. is 0.27 ft2 12-Fluid Col. (ft): (in.): Casing (ft): Top of Casing (ft): in. is 0.71 ft<sup>2</sup> k = h \* i \* 7.481 gal/ftDischarge Vol. (gal.). ~200 gallons max: Floating Solids, Debris, Sludge, Deposits, Foam, Scum, or Oily Sheen (Y/N & Comments) Observations Residue (Y/N & Comments) **During Discharge** NA Outfall 002 - Deck Drainage Volume of Discharge Due to Rainfall (gal.) 24-hr Rainfall (in.)

Night Shift Day Shift Volume of Discharge From Deck Total Washdown 2 Washdown 3 Washdown 4 Washdown 5 Washdown 6 Washdown 1 Washdown (gal.). Estimate based on 5m/12/2/2 duration and approximate flow rate during 60 60gal washdowns. Total Deck Drainage Discharge (gal.) ~2570 gal. max:

Outfalls 001 & 002

		Outlans out & ouz	
	Receiving Water \	/isual Observations - Daylight Slack	Water (Per NOAA current predictions)
Slack Water	Date & Time	Oily Sheen Detected in Visual Sheen Test (Y/N & Comments)	Floating Solids, Debris, Sludge, Deposits, Foam, Scum, o Residue (Y/N & Comments)
1st Slack Water	8/20/15 03:00	No -	No -
2nd Slack Water	8/29/15 09:03		
3rd Slack Water	9/24/15/1802		
4th Slack Water	8/295 E1105		
	Other	Obserations, Non-Permitted Discha	rges, or Comments
			of 8/19-20/15,
Stop discharge upon		or residue not related to drill fluids or deck dra ons were made over a 24 hr period correspondi	ninage and report to Project Regulatory Advisor, Claire Joseph.
	Note: Observati	ons were made over a 24 m period correspondi	ing with personner still analyses.

Date & Time:

## Daily Visual Observation Form Rev. 2 APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation

07:20

Boreh	4000	MB-04		Boreh			or /	For Day	
Latite	ide: No,	thing: 2438430.	15 +	Longit		ting: 1391	719.51	f+	HINTER OF
Day Shift (	Observer	1 / 11		Night Shift		A T	1917	0-07:00	
& Shift			7:20-19:	(0):		Mustin It		6:20	
Drilling Sta	art Time:	8/30/12 09:30		Drilling En		8/21/12		West and the second second	
		Outfall 001 - Ge					the Seafloor		
			Drilling Flu	uid Losses (P	rior To Disc	charge)			, and we will
D	rilling Flu	id Volumes		Day Shift			Night Shift		Total
	Create	ed (gal):	92	5		26	40		3565
		ing (gal):		0		2 \$	N		P) 700
		t (gal)	93	35		24	40		33 65
Inadvert	TO STREET, STR	narges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	0)
		d approximate flow rate		× = -			-		0
THE RESIDENCE OF THE PARTY OF T	NAMES AND ADDRESS OF THE OWNER, T	n. ~180 gal max/event:							
Drilling	Fluid Los	t to Ground (gal):	3365	THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER.					
			CONTRACTOR OF THE PARTY	rilling Fluid I	The second second				
Results of	of Static	Start Tim	e	End T	ime	Pass/Fail	THE RESERVE AND ADDRESS OF THE PARTY OF THE	Comments	
Sheen	Test	NA		MA	THE RESERVE THE PERSON NAMED IN	NA	M	1	
Discharge S	Start Time:	NA	Discharge	End Time:	N	Α	Discharge D	uration (min.):	NA
Length of	11	Drilling Fluid Depth Below	ε)	Length of Drill	h)=f-g	Casing Dia.	) A	Casing Area (ft <sup>2</sup> ):	
Casing (ft):	NA	Top of Casing (ft):	NA	Fluid Col. (ft):	NA	(in.):	NA	7-in. is 0.27 ft <sup>2</sup> 12- in. is 0.71 ft <sup>2</sup>	NA
Disa	l	1 (==1) x200 callon	a mau	k)	NA		le = h	* j * 7.481 gal/	/f+3
Disc	narge vo	l. (gal.). ~200 gallon	S IIIax.		/V /2)	Floating Solids		e, Deposits, Foan	
Observ	ations	Oily	Sheen (Y/N & Co	omments)		riodang conde	Residue (Y/N		
During D	ischarge		NA		/		NA		
			Out	tfall 002 - De	ck Drainag	e			
	24-hr Ra	ainfall (in.)	0	Volume o	of Discharge	e Due to Rai	nfall (gal.)	m)=l*1599.3	
Volum	The second second second	harge From Deck		Day Shift	***************************************		Night Shif		Total
		II.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	₃ Washdown 5	Washdown 6	Total
		ximate flow rate during	0	0	0	10 4 10 129	m 0	(2)	120
		ndowns.	11 - 2570		olemen 13	120			
Tota	I Deck Di	rainage Discharge (g	al.) ~25/0 g		100	O gallons			لرحسا
			101	Outfalls 00	Assessment of the latest of th	17-1			
		Receiving Water Vi		THE RESIDENCE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS N	AND THE RESIDENCE OF THE PARTY	the same of the same of the same of	THE RESERVE OF THE PARTY OF THE	e, Deposits, Foar	n Soum or
Slack	Water	Date & Time	Oily Sheen De	& Comments)	neen Test (1/N	Floating Solids	Residue (Y/N		ii, ocuiii, oi
1st Slac	k Water	8/20/15 10:38	N —			N-			
2nd Slad	ck Water	8/20/15 16129	N -		- V	N.			7.5
3rd Slac	ck Water	8/20/15 22:43	N -						
4th Slac	k Water	8/21/15 5:04	M -			N-			
		Other O	bserations,	Non-Permit	ted Dischar	ges, or Com	ments		
7" 0	asing	advanced to	26 h	1 due	to sand	dy soils	. Drilling	fluids	lost
to f	formati	on (ground).	THE REAL PROPERTY OF THE PARTY		Memory levels and the second				
Stop dis	charge upo	obseration of olly sheen o						atory Advisor, Clair	re Joseph
		Note: Observatio	ns were made o	ver a 24 hr perio	od correspondi	ng with personn	el shift changes.		

Borehole:  Latitude:  Day Shift Observer  & Shift Time:  Drilling Start Time:  \$\sigma_{\sigma} \text{S}	48-04 0438430.15	(20	to Boreho	ole:	3/22/15	07! of 2	For Day	
Latitude: MS  Day Shift Observer  & Shift Time: J. 6  Drilling Start Time: Z/S	0438436.15	<u>(1</u>		ole:	1	of 2	For Day	
Day Shift Observer & Shift Time:  Drilling Start Time: 2/3	1	(T				- 4		
& Shift Time: V. O			Longitu	-	E 139171	9,57 f		
Drilling Start Time: 8/8	reenwald 07:	00-19:20	Night Shift C & Shift T		AFRE	19:20 -	07:20	
			Drilling End	<del></del>	8/21/15	11:45		
	Outfall 001 - Ge		Smilling Elwid	e and Drill		he Seafloor		
	Outfall 001 - Ge	Deilling Elu	id Losses (P	rior To Disc	harge)	ine Seamoo.		
	1	Drining Flu	Day Shift	nor to bisc	narger	Night Shift	T	Total
Drilling Fluid Vo	THE RESERVE OF THE PERSON NAMED IN	751	Control of the last of the las		N.		3	320
Created (ga		321	the state of the state of the state of		N.		b	0
Remaining (		320			NA			1=0-0 320
Lost (gal	THE R. P. LEWIS CO., LANSING, MICH.		Event 2	Event 3	Event 4	Event 5	Event 6	1
Inadvertent Discharge based on duration and appr		Event 1			NA	NA	NA	0
during lost circulation. ~18		0	0	0	. 107	1// //	1977	
Drilling Fluid Lost to	Ground (gal):	320						union and a second
		Di	rilling Fluid (	Discharges				
Results of Static	Start Time		End T	ime	Pass/Fail	-	Comments	
Sheen Test	1507		1520		Pass	No slick/.	The second name of the second name of	
Discharge Start Time:	1525	Discharge	End Time:	1535 .		Discharge Du	ration (min.):	
	ng Fluid Depth Below Top of Casing (ft):	6	Length of Drill Fluid Col. (ft):	44	Casing Dia. (in.):	7 in.	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup> 12- in. is 0.71 ft <sup>2</sup>	0.27
Discharge Vol. (ga	al.). ~200 gallon	s max:	89				j * 7.481 gal/	
Observations	NAME OF TAXABLE PARTY OF TAXABLE PARTY.	Sheen (Y/N & Co	mments)		Floating Solids	, Debris, Sludge Residue (Y/N &	e, Deposits, Foam Comments)	, Scum, or
During Discharge //					N			
		Out	fall 002 - De	eck Drainag	e			
24-hr Rainfa	all (in.)	0	Volume	of Discharge	Due to Rai	nfall (gal.)	m)=1*1599.3	4
Volume of Discharg	The second second second		Day Shift			Night Shift		Total
Washdown (gal.).		Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	10101
duration and approximate		_		_				0
washdown		al ) ~2570 g	al may:	oj=m+n O	AND DESCRIPTION OF THE PERSON			
Total Deck Draina	age Discharge (g	al.) 2370 g	Outfalls 00	The second second second				- pr-show
Po	ceiving Water V	icual Ohcery	The second secon	The second secon	Water (Per NO	AA current predic	ctions)	
Ne.		Oily Sheen De	tected in Visual S	Sheen Test (Y/N	Floating Solid	s, Debris, Sludg	e, Deposits, Foar	n, Scum, o
Slack Water	Date & Time	Only Shineshies	& Comments)			Residue (Y/N	& Comments)	
1st Slack Water 8/	121/15 11:36	N -			N-			
2nd Slack Water &/	21/15 17:20	N			N-			
3rd Slack Water	Ling singl							
4th Slack Water								The second second
- CH CHOCK TT GCC	Other (	bserations.	Non-Permit	tted Discha	rges, or Com	ments		
usee sheet for 1	MB-12 F	or second	part of	day.				
41 3 24								
		or residue not r				THE RESERVE AND ADDRESS OF THE PARTY OF THE		or Proceedings of the Control of the

Date & Time:

Borehole:

Latitude:

Day Shift Observer

& Shift Time:

**Drilling Start Time:** 

### Daily Visual Observation Form Rev. 2 APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation to

Borehole:

Longitude:

Night Shift Observer

& Shift Time:

**Drilling End Time:** 

07:20

22:30

65 ft

07:20

06:45

For Day

8/22/15

E1393848.03

of

19:00

Created (gal):  Remaining (gal):  Lost (gal)  Inadvertent place (gal):  Lost (gal)  Inadvertent place (gal):  Inadvertent		Outfall 001 - Ge	otechnical	<b>Drilling Fluid</b>	ls and Drill	Cuttings at	the Seafloor		
Created (gal):  Remaining (gal):  Lost (gal)  Inadvertent Discharges (gal). Estimate based on duration and approximate flow rate during lost circulation. **180 gal max/event:  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharges  Results of Static Start Time:  Discharge Fluid Depth Below Top of Casing (ft):  Discharge Fluid Discharge Fluid Discharge Start Time:  Discharge Vol. (gal.). **200 gallons max:  Discharge Vol. (gal.). **200 gallons max:  Observations  During Discharge  Outfall 002 - Deck Drainage  Outfall 002 - Deck Drainage  Outfall 002 - Deck Drainage  Outfall 003 - Deck Drainage  Outfall 004 - Deck Drainage  Outfall 005 - Deck Drainage  Outfall 005 - Deck Drainage  Outfall 006 - Deck Drainage  Outfall 007 - Deck Drainage  Outfall 008 - Deck Draina			Drilling Fl	uid Losses (P	rior To Disc	charge)			
Remaining (gal):  Lost (gal)  Lost (gal)  Lost (gal)  Lost (gal)  NA  Sepan  Formula personance flow rate during lost circulation. **180 gal max/event:  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharges  Results of Static Sheen Test  Discharge Start Time:  Discharge End Time:  Discharge End Time:  Discharge Duration (min.):  Length of Casing (ft):  Discharge Form Deck Quity Sheen (Y/N & Comments)  Discharge Form Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) **2570 gal. max:  Outfall 002 - Deck Drainage  Receiving Water Visual Observated in Visual Sheen Test (V/N & Comments)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (V/N & Comments)  Oily Sheen Detected in Visual Sheen Test (V/N & Comments)  Oily Sheen Detected in Visual Sheen Test (V/N & Comments)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (V/N & Comments)  Oily Sheen Detected in Visual Sheen Test (V/N & Comments)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (V/N & Comments)  Oily Sheen Detected in Visual Sheen Test (V/N & Comments)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (V/N & Comments)  Oily Sheen Detected in Visual Sheen Test (V/N & Comments)  Oily Sheen Detected in Visual Sheen Test (V/N & Comments)  Oily Sheen Detected in Visual Sheen Test (V/N & Comments)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (V/N & Comments)  Oily Sheen Detected in Visual Sheen Test (V/N & Comments)	Drilling Flu	uid Volumes		Day Shift			Night Shift		Total
Lost (gal)   NA	Create	ed (gal):	^	/A		18500	701		1850
Inadvertent Discharges (gal). Estimate based on duration and approximate flow rate during lost circulation.—130 gal max/event:  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharges  Results of Static Start Time:  Discharge Start Time:  Length of Casing Start Time:  Length of Casing (ft):  Discharge Floating Fluid Depth Below Top of Casing (ft):  Discharge Vol. (gal.). ~200 gallons max:  Observations  During Discharge  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.). ~2570 gal. max:  Olify Sheen Peter Visual Observations - Daylight Slack Water Date & Time  Residue (Y/N & Comments)  Olify Sheen Peter Visual Observations - Daylight Slack Water Pate & Time  Olify Sheen Detected in Visual Sheen Test (V/N & Comments)  Provided Pate A Event 5 Event 6  PA NA	Remain	ing (gal):	٨	/A		0	gal		b) 0
based on duration and approximate flow rate during lost circulation. *180 gal max/event:  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharges  Results of Static Sheen Test  Discharge Start Time:  Discharge End Time: Discharge Duration (min.):  Length of Casing (ft): Drilling Fluid Depth Below Top of Casing (ft): Top of Casing (ft): Discharge Vol. (gal.). *200 gallons max:  Observations During Discharge  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) *2570 gal. max:  Outfall 001 & 002  Receiving Water Visual Observations - Daylight Slack Water Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N & Comments)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N & Comments)  Oily Sheen Detected in Visual Sheen Test (Y/N & Comments)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N & Comments)  Oily Sheen Detected in Visual Sheen Test (Y/N & Comments)  Oily Sheen Detected in Visual Sheen Test (Y/N & Comments)  Oily Sheen Detected in Visual Sheen Test (Y/N & Comments)  Oily Sheen Detected in Visual Sheen Test (Y/N & Comments)  Oily Sheen Detected in Visual Sheen Test (Y/N & Comments)  Oily Sheen Detected in Visual Sheen Test (Y/N & Comments)	Los	t (gal)	Λ.	/A		185	o gal	A COMMISSION OF THE PARTY OF TH	1850
Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharges  Results of Static Sheen Test  Discharge Start Time:  Length of Casing Fluid Depth Below Top of Casing (ft):  Drilling Fluid Depth Below Top of Drill Casing Dia.  North John Scharge Duration (min.):  Casing Dia.  Casing Dia	based on duration an	d approximate flow rate				Tr ye	1	.7	0
Results of Static Sheen Test Discharge Start Time: Discharge End Time: Discharge End Time: Discharge Start Time: Discharge Start Time: Discharge End Time: Discharge Duration (min.): Casing Area (ft): Top of Casing (ft): Discharge Vol. (gal.). ~200 gallons max:  Observations During Discharge  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~250 gal. max:  Outfall 001 & 002  Receiving Water Visual Observations - Daylight Slack Water   Date & Time   Oily Sheen Detected in Visual Sheen Test (V/N   Floating Solids, Debris, Sludge, Deposits, Foam, Scur Residue (Y/N & Comments)    Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Set MB 04, Volume of Discharge Due to Rainfall (gal.)  Washdown 1 Washdown 2 Washdown 3 Washdown 5 Washdown 6    Washdown 1 Washdown 2 Washdown 3 Washdown 5 Washdown 6    Washdown 1 Washdown 2 Washdown 3 Washdown 5 Washdown 6    Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time   Oily Sheen Detected in Visual Sheen Test (V/N   Floating Solids, Debris, Sludge, Deposits, Foam, Scur Residue (Y/N & Comments)	THE COURSE OF THE PARTY OF THE		185	Deal		0			
Sheen Test  Discharge Start Time:  Discharge End Time:  Discharge Duration (min.):  Length of Drilling Fluid Depth Below Top of Casing (ft):  Top of Casing (ft):  Discharge Vol. (gal.). ~200 gallons max:  Oily Sheen (Y/N & Comments)  Casing Dia. (in.):  Length of Drilling Fluid Col. (ft):  Fluid Col. (ft):  Floating Solids, Debris, Sludge, Deposits, Foam, Scur Residue (Y/N & Comments)  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck  Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (V/N Floating Solids, Debris, Sludge, Deposits, Foam, Scur Residue (Y/N & Comments)  Oily Sheen Detected in Visual Sheen Test (V/N Floating Solids, Debris, Sludge, Deposits, Foam, Scur Residue (Y/N & Comments)  Page 12 - Pag			E	rilling Fluid [	Discharges				
Sheen Test  Discharge Start Time:  Discharge End Time:  Discharge Duration (min.):  Length of Drilling Fluid Depth Below Top of Casing (ft):  Top of Casing (ft):  Discharge Vol. (gal.). ~200 gallons max:  Observations  During Discharge  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfall 001 & 002  Receiving Water Visual Observations - Daylight Slack Water Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Sour Residue (Y/N & Comments)  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Sala /	Results of Static	Start Time	e	End T	ime	Pass/Fail	3+3	Comments	
Discharge Start Time:  Length of Casing (ft):  Drilling Fluid Depth Below Top of Casing (ft):  Discharge Vol. (gal.). ~200 gallons max:  Observations During Discharge  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water Date & Time  Oily Sheen Time:  Discharge End Time:  Length of Dill Casing Dia. (a.in.):  Length of Dill Casing Dia. (in.):  Casing Dia. (in.):  Total Deck Drainage Discharge (y/N & Comments)  During Discharge Vol. (gal.). ~200 gallons max:  Outfall 002 - Deck Drainage  Outfall 002 - Deck Drainage  Outfall 003 - Deck Drainage  Night Shift  Vashdown 1 Washdown 3 Washdown 4 Washdown 5 Washdown 6  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N & Comments)  Floating Discharge Duration (min.):  Casing Area (t²):  7-in. is 0.27 tt² 12  in. is 0.71 tt²  7-in. is 0.27 tt²  7-in. is 0.27 tt²  12 in. is 0.71 tt²  12 in. is 0.71 tt²  13 in. is 0.71 tt²  14 in. is 0.71 tt²  15 in. is 0.71 tt²  16 in. is 0.71 tt²  17-in. is 0.27 tt²  17-in. is 0.27 tt²  17-in. is 0.27 tt²  17-in. is 0.27 tt²  18 in. is 0.71 tt²  19 in. is 0.71 tt²  19 in. is 0.71 tt²  19 in. is 0.71 tt²  10 in. is	Sheen Test					-			
Drilling Fluid Depth Below Top of Casing (ft):   Top of Casing (			Discharge	e End Time:			Discharge D	uration (min.):	-
Discharge Vol. (gal.). ~200 gallons max:  Observations  During Discharge  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time  Oily Sheen (Y/N & Comments)  Floating Solids, Debris, Sludge, Deposits, Foam, Scure Residue (Y/N & Comments)  To Washdown 1 Washdown 2 Washdown 3 Washdown 4 Washdown 5 Washdown 6  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scure Residue (Y/N & Comments)  A Comments)	The state of the s		<u>e</u> j	530	h)=f-g		1)	7-in. is 0.27 ft <sup>2</sup> 12-	23
Observations During Discharge  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scure Residue (Y/N & Comments)  Floating Solids, Debris, Sludge, Deposits, Foam, Scure Residue (Y/N & Comments)  Floating Solids, Debris, Sludge, Deposits, Foam, Scure Residue (Y/N & Comments)  Floating Solids, Debris, Sludge, Deposits, Foam, Scure Residue (Y/N & Comments)  Floating Solids, Debris, Sludge, Deposits, Foam, Scure Residue (Y/N & Comments)	Discharge Vo	ol. (gal.). ~200 gallon	s max:	k)			k = h	***************************************	/ft <sup>3</sup>
Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  See MB-04. Volume of Discharge Due to Rainfall (gal.)  Volume of Discharge From Deck  Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Sou & Comments)  2nd Slack Water 8/21/15 23:31  2nd Slack Water 8/21/15 23:31			*********	omments)	10 est 100	Floating Solids			ı, Scum, c
24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scu Residue (Y/N & Comments)  2nd Slack Water  2nd Slack Water  Zand Slack Water  Zand Slack Water	During Discharge					14-			
Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water  Date & Time  Oilly Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scu & Comments)  1st Slack Water  2nd Slack Water  Poly Machdown 1 Washdown 2 Washdown 3 Washdown 4 Washdown 5 Washdown 6 Washdown 6 Washdown 6 Washdown 6 Washdown 6 Washdown 7 Washdown 7 Washdown 7 Washdown 8 Washdown 8 Washdown 8 Washdown 8 Washdown 8 Washdown 9		· · · · · · · · · · · · · · · · · · ·	Ou	tfall 002 - De	ck Drainae	e			****
Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scu & Comments)  1st Slack Water  2nd Slack Water  Park J J S 23:31  A Comments  Day Shift  Washdown 1 Washdown 2 Washdown 3 Washdown 4 Washdown 5 Washdown 6  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Residue (Y/N & Comments)  1st Slack Water  2nd Slack Water  Park J J S 23:31  Park J S 24:45  Park J S 24:4	24-hr R:	ainfall (in.)	-	The second second second			nfall (gal.)	m=1*1599.3 See M	3-04
Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scu & Comments)  1st Slack Water 8/21/15 23:31  2nd Slack Water 8/21/15 05:59	Contract of the last of the la		300	Mariella Carlo Arrival Carlo C			PROPERTY AND ADDRESS OF THE PARTY.	Contractor for the sure of the	
duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scu & Comments)  1st Slack Water 8/21/15 23:31  2nd Slack Water 8/21/15 05:59			Washdown 1		Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
Coutfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scu & Comments)  1st Slack Water 8/21/15 23:31  2nd Slack Water 8/21/15 05:59  N  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Residue (Y/N & Comments)  V  2nd Slack Water 8/21/15 05:59	duration and appro was	ximate flow rate during ndowns.	12021			120gal	The second secon		360
Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scu & Comments)  1st Slack Water 8/21/15 23:31  2nd Slack Water 8/22/15 05:59	Total Deck D	rainage Discharge (g	al.) ~2570 g	THE RESERVE THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER.	200	O grafi			
Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scure & Comments)  1st Slack Water 8/21/15 23:31  2nd Slack Water 8/22/15 05:59    Water				The second secon	decision was a local decision of the local d			We have a work the means	
Slack Water         Date & Time         & Comments)         Residue (Y/N & Comments)           1st Slack Water         8/21/15 23:31         N         V           2nd Slack Water         8/22/15 05:59         N         N		Receiving Water Vi							0
2nd Slack Water 8/22/15 05:59 N W	Slack Water	The state of the s			heen Test (Y/N				n, Scum, o
2nd Slack Water 8/20/15 05:59 N - W	1st Slack Water	8/21/15 23:31	N-			/V~			
2nd Clade Water	2nd Slack Water		N-			N-			
STO STACK WATER	3rd Slack Water								
4th Slack Water	4th Slack Water						The second second		
Other Obserations, Non-Permitted Discharges, or Comments		Other O	bserations.	Non-Permit	ted Dischar	ges, or Com	ments		
*See sheet for MB-04 for first part of day. *7" (asing advanced to 11.1m. Drilling fluids lost to formation (ground).	*See sheet t	for MB-04 fo	or first	part of	day.		1	).	
Stop discharge upon obseration of oily sheen or residue not related to drill fluids or deck drainage and report to Project Regulatory Advisor, Claire Jose	Stop discharge upor			THE RESERVE OF THE PERSON NAMED IN COLUMN TWO	THE OWNER OF TAXABLE PARTY.	Married Street, Square, Square	The second second second	atory Advisor, Clai	e Joseph.
Note: Observations were made over a 24 hr period corresponding with personnel shift changes.		Note: Observation	ns were made o	over a 24 hr perio	d correspondi	ng with personne	el shift changes.		

Date & Tim	ne: * 8/22/15		ect: Alaska L		<b>Geotechnic</b> :o	al Investigat	tion	0700	
Borehole	: MB-12			Bore	hole:	1	of	For Day	7
Latitude:	100	7.78	38"N	Long	itude:	1510220	18.6477"	W.	
Day Shift Obser & Shift Time	: J. bruenwold		00-1900		t Observer t Time:	A. Fee	1900 -	0700	
Drilling Start Ti	me: 8/22/15	07	55	Drilling E	End Time:	062	5 8/23	115	
	Outfall 0	01 - G	eotechnical	<b>Drilling Flu</b>	ids and Dril	l Cuttings at	the Seafloo	r	
				luid Losses (					
Drillir	ng Fluid Volumes			Day Shift			Night Shift	1.7	Total
	reated (gal):			980		2	.640		3,620
Re	maining (gal):		care s	0			300		1300
	Lost (gal)		CALL STREET, SQUARE, S	180		2	340		3,326
	Discharges (gal). E		Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	d)
during lost circ	ion and approximate flo culation. ~180 gal max/e	w rate vent:	0	0	0	1	0	0	0
	d Lost to Ground (		e)=c-d 3, 3	320		2		,	
				rilling Fluid	Discharges				
Results of Sta	atic Sta	art Tim	THE RESERVE THE PERSON NAMED IN	End		Pass/Fail		Comments	
Sheen Tes	t 06	×43		0651		Pass	ARTESTA AND THE RESIDENCE OF THE PARTY OF TH	Slick/she	en :
Discharge Start T	ime: 0655		Discharge	e End Time:	0700			uration (min.):	
Length of asing (ft):	Drilling Fluid Dept		13	Length of Drill Fluid Col. (ft):	17)=1-g 40	Casing Dia. (in.):	7 M	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup> 12-	
Discharg	e Vol. (gal.). ~200	gallon	c may:	ri .	71	M. A		in. is 0.71 ft <sup>2</sup>	
Discriuig	C voi. (gai.). 200	-	-		81	Electing Colida		l∕j * 7.481 gal,	
Observation Ouring Discha		Oily	Sheen (Y/N & Co	omments)		r loating Solids	Residue (Y/N 8	e, Deposits, Foan & Comments)	n, Scum, or
7				fall 002 D	10.		- NO		
2/1-1	r Rainfall (in.)		000	fall 002 - De	The second second second	The state of the s		-1.161700 -	
and the second second second second	Discharge From D	ock			of Discharge	e Due to Rair	Control of the last of the las	m)=l*1599.3 O	
	(gal.). Estimate base	3	Washdown 1	Day Shift			Night Shift		Total
	pproximate flow rate du		10min/lagem	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	
	washdowns.		120 gral.			60 gal	120gel		300
Total Dec	k Drainage Discha	rge (ga	al.) ~2570 ga	THE RESERVE OF THE PERSON NAMED IN	o)=m+n 30	0			1.00
				Outfalls 00					32
	Receiving Wa	iter Vi	sual Observa	ations - Dayl	light Slack V	Vater (Per NOA	A current predic	tions)	
Slack Wate	r Date & Tir	me	Olly Sneen Det	ected in Visual SI & Comments)	heen Test (Y/N	Floating Solids	Debris, Sludge Residue (Y/N &	, Deposits, Foam	i, Scum, or
1st Slack Wa	ter 8/22/15 13	1:45	N -			N	reside (1714 B	Comments)	
nd Slack Wa		(,22	N -		_	1/		<u> </u>	
Brd Slack Wa	1 1.	0129	<u> </u>			1			, alla
Ith Slack Wa	01-71- 0	7.27	IV			100			-
FEIT SIGCK WA		har O	repretions !	Van Dannist	-15:-1			10 42 5 44	
7" Casing	advanced to			The same of the sa		ges, or Comn formation	THE PERSON NAMED IN COLUMN TWO		
Stop discharge	upon obseration of oily	sheen or	residue not rela	ated to drill fluid	s or deck drain	age and report to	Project Regulat	ory Advisor, Claire	Joseph.
	Note: Obs	ervation	s were made ov	er a 24 hr period	corresponding	with personnel	shift changes.	Annual Company	100

Date & Time: 8/23/15

### Daily Visual Observation Form Rev. 2

to

APDES Permit No.: AK0062278	
Project: Alaska LNG Marine Geotechnical Investigation	

bulei	noie.	MR-18		Bore	noie:		of 📈	For Day		
Latit	ude:	60.6613215°N	1	Longi	tude:	151.3745672°W				
Day Shift & Shift		J. Grenwald 07	100-1900	Night Shift & Shift		A. Fee	1900-	0700		
Drilling St	art Time:	Drilling Compl	eted	Drilling E	nd Time:					
		Outfall 001 - G	eotechnical	Drilling Flui	ds and Dril	Cuttings at	the Seafloo	r		
				luid Losses (I	Committee of the last of the l	THE RESERVE AND ADDRESS OF THE PARTY OF THE				
D	rilling Fl	uid Volumes		Day Shift			Night Shift	t	Total	
	THE RESERVE AND ADDRESS OF THE PARTY OF THE	ed (gal):						in the second second	21	
	Remair	ning (gal):		-		-		——————————————————————————————————————	b)(d	
- YA	Los	st (gal)		y	-				20192	
Inadvert	tent Disc	harges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	E)	
		nd approximate flow rate on. ~180 gal max/event:		The second second	***********					
Drilling	Fluid Lo	st to Ground (gal):	0.020				Control Control	Annual Control of the		
			C	rilling Fluid	Discharges					
Results o	of Static	Start Tim	e	End 7	Time	Pass/Fail	711	Comments		
Sheen	Test						Completed	provious day	1.	
Discharge S	Start Time:		Discharge	End Time:				Ouration (min.):	-	
Length of Casing (ft):	1)	Drilling Fluid Depth Below Top of Casing (ft):	£1	Length of Drill Fluid Col. (ft):	h)=f-g	Casing Dia. (in.):	1)	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup> 12-	The state of the s	
Disc	harge Vo	ol. (gal.). ~200 gallon	s max:	k)			k = h	in. is 0.71 ft <sup>2</sup> * j * 7.481 gal <sub>2</sub>	15,3	
	4 - 4 - 4	The second secon	Sheen (Y/N & Co			Floating Solids		e, Deposits, Foan	A STATE OF THE PARTY OF THE PAR	
Observ							Residue (Y/N &			
During Di	ischarge	Discharge rample	led prev	ious day,					_	
			Out	tfall 002 - De	ck Drainag	e			- Spills Samuel and	
	24-hr Ra	ainfall (in.)	0	Volume o	of Discharge	Due to Rain	nfall (gal.)	ml=i*1599.3		
Volum	e of Disc	harge From Deck		Day Shift			Night Shift	hatte and the same of the same		
		II.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total	
duration		kimate flow rate during		***************************************					2	
Total	WHEN PERSON NAMED IN COLUMN	ainage Discharge (g	al.) ~2570 g	al. max:	Giamin 🔿		L			
		0 . (8	7 8	Outfalls 00	1 & 002	The second of th				
		Receiving Water Vi	sual Observ	ations - Dayl	ight Slack V	Vater (Per NO	AA current predic	ctions)		
Slack V	Vater	Date & Time						e, Deposits, Foam	n, Scum, or	
1st Slack	-	8/23/15 07:06	./	& Comments)		۸/	Residue (Y/N 8	Comments)	_	
2nd Slaci		0/25/13 07.06	N			- / -				
3rd Slack		~			THE RESERVE					
4th Slack						*				
4th Slack	vater	Othor O		Non Demoits	- d D:d			-		
* Drillin	ny t d			Non-Permitt		THE RESERVE OF THE PERSON NAMED IN	THE RESERVE AND THE PERSON NAMED IN	- Mare only	y	
* She	,	R for day		ive to MI			81	,		
		obseration of oily sheen or	A CONTRACTOR OF THE PARTY OF TH		-		o Project Regula	tory Advisor Claire	e Joseph	
		Note: Observation	s were made ov	er a 24 hr period	l corresponding	with personnel	shift changes.	,, cioni	. эотория	
			12.00							

Date & Time:

Borehole:

Latitude:

Day Shift Observer

& Shift Time:

### Daily Visual Observation Form Rev. 2 APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation to

Borehole:

Longitude:

Night Shift Observer

& Shift Time:

For Day

of 151,3773987°W

0700

0700-1900

	Outfall 001 - Go	eotechnical	<b>Drilling Fluid</b>	ds and Drill	Cuttings at 1	the Seafloor		12.77
		Drilling Fl	uid Losses (F	rior To Dis	charge)			
Drilling Fl	uid Volumes		Day Shift			Night Shift		Total
Creat	ed (gal):	3	70		26.	40		3010
Remair	ning (gal):		0		50	Andrew Control of the		50
Los	st (gal)	3	70		259	0		2960
	harges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	2)
	nd approximate flow rate on. ~180 gal max/event:	0	0	0	0	0	0	40
Drilling Fluid Lo	st to Ground (gal):	2960	Annual Control of the					
			rilling Fluid I	Name and Address of the Owner, where the Person of the Per				
Results of Static	Start Tim	e	End T	Time	Pass/Fail		Comments	
Sheen Test		and the second s	of the same of the			Application and the second		
Discharge Start Time:		Discharge	e End Time:			Discharge D	uration (min.):	
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	Ε)	Length of Drill Fluid Col. (ft):	hist-g	Casing Dia.		Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup> 12 in. is 0.71 ft <sup>2</sup>	
Discharge Vo	ol. (gal.). ~200 gallon	s max:	Ki			k = h *	ij*7.481 gal	/ft <sup>3</sup>
Observations	T	Sheen (Y/N & C	omments)				e, Deposits, Foar	
During Discharge								
		Ou	tfall 002 - De	eck Drainag	e			
24-hr R	ainfall (in.)	See Sheet	Volume o	of Discharge	e Due to Rain	ıfall (gal.)	m131=1599.3 Lee+	1
Volume of Disc	harge From Deck		Day Shift			Night Shift		Total
duration and appro	al.). Estimate based on ximate flow rate during	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	144
THE RESERVE AND DESCRIPTION OF THE PERSON NAMED IN	ndowns. rainage Discharge (g		al. max:	ol=m+n )40				1111
Total Beek B	diridge biseriarge (8	011/ 25/08	Outfalls 00	The second second				
	Receiving Water Vi	isual Observ	THE RESIDENCE AND PERSONS ASSESSED.	and other transfer with a public	Water (Per NOA	A current predic	ctions)	
Slack Water	Date & Time				Floating Solids,		e, Deposits, Foar	m, Scum,
1st Slack Water	8/23/15 13:56	N		- F	N		_	
2nd Slack Water		10/			N			
3rd Slack Water	8/24/15 01:35	(A)			1			
4th Slack Water								
	Other O	bserations,	Non-Permitt	ted Dischar	ges, or Comn	nents		
					to forma	NAME AND ADDRESS OF TAXABLE PARTY.	und).	
* 7" Casing								
* Sheet 2/2	for day.			<del>,                                    </del>		roganji wilayerya		
* Sheet 2/3	for day, n obseration of oily sheen o	NAME AND ADDRESS OF TAXABLE PARTY.	DECEMBER PROPERTY AND ADDRESS OF THE PARTY.		THE RESERVE THE PERSON NAMED IN COLUMN 2 I	AND DESCRIPTION OF THE PERSON NAMED IN	itory Advisor, Clair	re Joseph.

Date & Time:

### Daily Visual Observation Form Rev. 2 APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation to 8/25/15

	Borehole: MB-08 Latitude: 60,6636734°N			Borel Longit	Control of the Contro	of   For Day 151.3773987 W			
Day Shift (		J. Greenwald o		Nicht Chift	Observer	A. Fee		0706	
& Shift Drilling Sta			745	& Shift Drilling Er	Vaccour.	8/25/15	0645		
		Outfall 001 - Ge		Drilling Fluid	ds and Drill		The second secon		
			Market Ma	uid Losses (F			the ocumeo.	- 26	
D	rilling Flu	uid Volumes		Day Shift			Night Shift		Total
	Create	ed (gal):	9	00			3000		3900
	Remain	ning (gal):	E (	0			100	-	b) 100
	THE RESERVE AND ADDRESS OF	t (gal)		00			2900		3800
based on	duration an	harges (gal). Estimate d approximate flow rate on. ~180 gal max/event:	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	0
		st to Ground (gal):	38	300 gal.					A
			THE RESERVOIS ASSESSMENT OF THE PERSON NAMED IN	rilling Fluid I					
Results o		Start Tim	e	End 7	ime	Pass/Fail		Comments	
Sheen	and the last of the last	- A-/-					NA		
Discharge S	Start Time:		Discharge	End Time:	The state of the s		Discharge D	uration (min.):	
Length of Casing (ft):		Drilling Fluid Depth Below Top of Casing (ft):	g)	Length of Drill Fluid Col. (ft):	h)=f-g	Casing Dia. (in.):	11	Casing Area (ft <sup>2</sup> ); 7-in. is 0.27 ft <sup>2</sup> 12 in. is 0.71 ft <sup>2</sup>	
Discl	harge Vo	ol. (gal.). ~200 gallon	s max:	N			k = h '	* j * 7.481 gal	/ft <sup>3</sup>
Observ	ations	Oily	Sheen (Y/N & Co	omments)		Floating Solids	, Debris, Sludge Residue (Y/N &	e, Deposits, Foar	n, Scum, or
	ischarge	N/	4			N	A	· Commonto)	
				tfall 002 - De	ck Drainag	The same of the sa			
	24-hr Ra	ainfall (in.)	0 0	_		Due to Rair	nfall (gal.)	ml=i*1599.3 🔿	
Volum	e of Disc	harge From Deck		Day Shift			Night Shift		Total
		II.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
duration		ximate flow rate during addowns.		_		180gm		-	180
Total	Deck Dr	ainage Discharge (g	al.) ~2570 g	al. max:	piemen 18	Ogral.			
				Outfalls 00	1 & 002	0			
		Receiving Water Vi	Name and Address of the Owner, where the Owner, which is the Owner, where the Owner, which is the Owner, where the Owner, which is the Owner	The second second second		AND DESCRIPTION OF THE PERSON NAMED IN COLUMN			
Slack V	Water	Date & Time	Oily Sheen Det	tected in Visual S & Comments)	heen Test (Y/N	Floating Solids	Residue (Y/N &	e, Deposits, Foar Comments)	n, Scum, or
1st Slack	k Water	8/24/15 68:17	N -	C Commency	~	N	Trodicae (Titte	- Commonto,	
2nd Slac	k Water	8/24/15 15:02	Ň		_	N			
3rd Slack		8/24/15 20:38	N -			N			*
4th Slack		8/25/15 02:50				N			
		Annual continues and the second second second second	bserations.	Non-Permitt	ed Dischar	ges, or Comr	ments		
Stop disc	harge upon	obseration of oily sheen o						itory Advisor, Clair	re Joseph.
		Note: Observation	is were made o	ver a 24 hr perio	d correspondin	g with personne	shift changes.		

Date & Time:

Borehole:

Latitude:

Day Shift Observer

### Daily Visual Observation Form Rev. Z APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation to

Borehole:

Longitude:

Night Shift Observer

0700

For Day

2

of

3773987°W

0700

ON

Day Shift Observer & Shift Time:	J. Greenwald	1700-1900	Night Shift & Shift		AFee	1900-07	100	_
Drilling Start Time:	8/25/15 0815		Drilling E	nd Time:	8/25/15	13:15		_
	Outfall 001 - G	eotechnical	<b>Drilling Flui</b>	ds and Dril	Cuttings at	the Seafloo	r	
		Drilling F	luid Losses (I	Prior To Dis	charge)			
Drilling Fl	uid Volumes		Day Shift			Night Shif	t	Total
Creat	ed (gal):	ō	190					- 290
	ning (gal):		0					p) O
	st (gal)	3	90					290
	harges (gal). Estimate and approximate flow rate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	0
	on. ~180 gal max/event:	0		0			0	
Drilling Fluid Lo	st to Ground (gal):	20						
		A STATE OF THE PARTY OF THE PAR	Orilling Fluid	THE RESERVE OF THE PERSON NAMED IN				
Results of Static	Start Tim	е	End 7		Pass/Fail		Comments	
Sheen Test	17:02		17:15	All Indiana	Pass	No shekt	West and the second second	
Discharge Start Time:	17:20	Discharge	e End Time:	17:30		Discharge [	Ouration (min.):	10
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	6	Length of Drill Fluid Col. (ft):	32	Casing Dia. (in.):	7	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup> 12- in. is 0.71 ft <sup>2</sup>	
Discharge Vo	ol. (gal.). ~200 gallon	s max:	65 90	1		k = h	* j * 7.481 gal	/ft <sup>3</sup>
Observations	Oily	Sheen (Y/N & C			Floating Solids	Residue (Y/N	e, Deposits, Foan	n, Scum, o
During Discharge	N				N	Trooledo (1717	a commonte)	
		Ou	tfall 002 - De	ck Drainag	re			
24-hr Ra	ainfall (in.)	0	_		e Due to Raii	nfall (gal.)	ml=l*1599.3	
Volume of Disc	harge From Deck		Day Shift			Night Shift	t	7.4.1
Washdown (ga	1.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
	kimate flow rate during ndowns.	5minxldgpm 60gral						60
A STATE OF THE OWNER, WHEN PARTY AND ADDRESS OF	ainage Discharge (g	And the second second second	al. max:	osemen 60	sal.			
			Outfalls 00		C.			
	Receiving Water Vi	sual Observ	ations - Day	light Slack \	Water (Per NO.	AA current predi	ctions)	
Slack Water	Date & Time	Oily Sheen De	tected in Visual S & Comments)	heen Test (Y/N	Floating Solids	, Debris, Sludg Residue (Y/N	e, Deposits, Foan & Comments)	n, Scum, o
1st Slack Water	8/25/15 09:22	N			N			
2nd Slack Water	8/25/15 1600	N -			1/			
3rd Slack Water	1800	10				****		
4th Slack Water			<del>V-1</del>					
The state of the s	Other O	hserations	Non-Permitt	ed Dischar	ges or Com	ments		
& Sheet Va fo		osci ations,	Non Termit	ed Dischar	5c3, 01 com	nenes		
Stop discharge upon	obseration of oily sheen o	r residue not re	lated to drill fluid	ds or deck drain	nage and report	to Project Regula	atory Advisor, Clair	e Joseph.
	Note: Observation	s were made o	ver a 24 hr perio	d correspondin	g with personne	shift changes.		
							PLAT	E B3-1

### Daily Visual Observation Form Rev. 2 APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation

Date &	Time:	8/25/15	0700	to	,	8/26/15		0708	
Borel		MB-09		Boreh		2	of )	For Day	
Latit			N	Longit	ude:	151,380	79069°	<b>₩</b>	
Day Shift		3. 17		Night Shift				200	
& Shift			100-1400	& Shift	A DOMEST	Afee	1900-0		
Drilling St	art Time:	8/25/15 213		Drilling En	(2)	8/26/15		530	ŧ
		Outfall 001 - Ge				THE RESERVE THE PERSON NAMED IN COLUMN 2 IS NOT THE OWNER.	the Seafloor	•	
			Drilling Fl	uid Losses (P	rior To Dis	charge)		RESTRICTION OF	
D	Description of the local division in the loc	uid Volumes		Day Shift			Night Shift		Total
		ed (gal):	11/4 -				900 9	2	900
		ning (gal):	NA				900 00	,	900
		t (gal)	N/A	F 10	E	E 4	-		700
		harges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	()
		d approximate flow rate n. ~180 gal max/event:	0	0	0	0	0		O
		st to Ground (gal):	6,404	900 991					
			D	rilling Fluid [	Discharges		mana vita		
Results	of Static	Start Tim	e	End T	ime	Pass/Fail		Comments	
Sheer	Test				_		NA		
Discharge S	Start Time:		Discharge	End Time:			Discharge D	uration (min.):	
Length of	TI.	Drilling Fluid Depth Below	z)	Length of Drill	h)=扩接	Casing Dia.		Casing Area (ft <sup>2</sup> ):	(3)
Casing (ft):		Top of Casing (ft):		Fluid Col. (ft):		(in.):	-	7-in. is 0.27 ft <sup>2</sup> 12- in. is 0.71 ft <sup>2</sup>	
Disc	harge Vo	ol. (gal.). ~200 gallon	s max:	k)			k = h 3	* j * 7.481 gal/	/ft <sup>3</sup>
						Floating Solids	, Debris, Sludge	e, Deposits, Foam	
Observ			Sheen (Y/N & Co	omments)			Residue (Y/N 8	k Comments)	
During D	ischarge	NA -				NA -			
***************************************			Out	tfall 002 - De	ck Drainag	e			20202 6 1
	24-hr Ra	ainfall (in.)	See MB-08	Volume o	of Discharge	e Due to Rair	nfall (gal.)	m)=1*1599,3 See M&	3-08
Volum	e of Disc	harge From Deck		Day Shift			Night Shift		Total
Wash	down (ga	al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
duration		ximate flow rate during	_			Snih x / 2gpm			60
Tota	1000-0-11	ndowns. rainage Discharge (g	al \ ~2570 g	al max.	clemen 60 s				Company Control Control
TOta	I Deck Di	amage Disenarge (6	ui./ 2370 B	Outfalls 00		FAL.	***************************************		
		Receiving Water Vi	sual Observ			Water (Per NO)	AA current predic	ctions)	
Slack	Water	Date & Time	Oily Sheen De	tected in Visual S	heen Test (Y/N	Floating Solids	, Debris, Sludg	e, Deposits, Foan	n, Scum, o
			7	& Comments)		17	Residue (Y/N	& Comments)	
	k Water	8/25/15 21:38	1/			AV-			
2nd Slac	k Water	8/26/15 03:41	N			N-			
3rd Slac	k Water								
4th Slac	k Water								
		Other O	bserations,	Non-Permitt	ted Dischar	ges, or Comr	ments		
xSheet i	old for ,	day.				El .			
Stop disc	charge upor	obseration of oily sheen o						atory Advisor, Clair	e Joseph.
		Note: Observation	ns were made o	ver a 24 hr perio	d correspondin	ng with personne	shift changes.		

Project: Alaska LNG Marine Geotechnical Investigation to

Date &	Time:	8/26/15 0	70 c)	to	)	8/29/1	5 0	700	
Borel	hole:	MB-09		Borel	nole:	1	of	For Day	E
Latit	ude:	60.66 249628	°N	Longit	tude:	151.3807	9069 06		0
Day Shift		4 2		Night Shift		A.Fee		740	
& Shift Drilling St			0700	& Shift Drilling Er		8/27/15	0515	700	ē.
Drinning St	are rinie.	makkadipati amidikalan makamanan makamanan aming menangan		•		distantian de la constitución de			ő
		Outfall 001 - Ge	WINDS OF THE PERSON NAMED IN COLUMN	THE RESERVE OF THE PERSON NAMED IN COLUMN 2 IS NOT THE PERSON NAME	THE RESERVE OF THE PERSON NAMED IN COLUMN 2 IS NOT THE PERSON NAME	AND RESIDENCE OF THE PARTY OF THE PARTY.	the Seafloor		
	willia - Cl	:dV-l	Drilling FI	uid Losses (F	rior to Dis	charge)	NU-L+ CLIG		7 1 1
D	AND RESIDENCE PROPERTY.	uid Volumes ed (gal):		Day Shift			Night Shift		Total
		ning (gal):					500		2640
		t (gal)			~	-	2140		3140
Inadvert	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	harges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	0110
		d approximate flow rate	-17	-0	A	A	0	4	0
THE RESERVE AND ADDRESS OF THE PERSON.		n. ~180 gal max/event:	0						
Drilling	Fluid Los	st to Ground (gal):		) gal	Discharges	um er war er de engel			
Results	of Ctatio	Start Tim		rilling Fluid I End T		Dace/Eail		Comments	
Sheer		Start IIII	е	Ena	illie	Pass/Fail	NA	Comments	
Discharge S	and the second second		Discharge	End Time:				uration (min.):	
	t)		E)		h)=f-g		i)	Casing Area (ft <sup>2</sup> ):	i)
Length of Casing (ft):	-	Drilling Fluid Depth Below Top of Casing (ft):	Married Control	Length of Drill Fluid Col. (ft):	-	Casing Dia. (in.):	-	7-in. is 0.27 ft <sup>2</sup>	
				, raid doi: (rej.		(,,,,,		12-in, is 0.71 ft <sup>2</sup>	rm 3
Disc	narge Vo	l. (gal.). ~200 gallon	s max:			Electing Solids		* j * 7.481 gal/ e, Deposits, Foar	
Observ	ations	Oily	Sheen (Y/N & Co	omments)		I loating Solius	Residue (Y/N 8		i, ocaiii, oi
During D	ischarge	NA -	_			NA -			
			Out	tfall 002 - De	ck Drainag				
	24-hr Ra	ninfall (in.)	0.01			e Due to Rair	nfall (gal.)	mi=1°1599.3 16 ga	
Volum		harge From Deck		Day Shift			Night Shift		-
		I.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
duration	200	kimate flow rate during			_	2			()
Total		downs. ainage Discharge (ga	al \ ~2570 g:	al may:	16	gal.			<u> </u>
1044	DCCK DI	amage Discharge (ge	2370 8	Outfalls 00		Zal,			Name of Street, or other Designation of Street, or other Desig
		Receiving Water Vi	sual Observ			Water (Per NO)	AA current predic	tions)	
Slack \	Water	Date & Time		ected in Visual S	MANDAL STREET, SALES	CONTRACTOR AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON ADDRESS OF THE PERSON ADDRESS OF THE PERS	, Debris, Sludge	e, Deposits, Foam	i, Scum, or
			^/	& Comments)		6/-	Residue (Y/N 8	& Comments)	
1st Slack		8/26 CO19	N			N/			- Hambir
2nd Slac		8/26 /660	//	Çon de la constitución de la con		N -		-	
3rd Slaci		8/26 2231	- N		THE PERSON NAMED IN COLUMN NAM	/V			
4th Slac	k Water	8/27 0434	N -			M servin			
		Other O	oserations,	Non-Permitt	ed Dischar	ges, or Comn	nents		
Stop disc	harge upon	obseration of oily sheen or		THE RESIDENCE OF THE PARTY OF T	Name and Address of the Owner, where	Approximate the second second second		tory Advisor, Claire	Joseph.
		Note: Observation	s were made or	ver a 24 hr period	d correspondin	g with personnel	shift changes.		

# Daily Visual Observation Form Rev. 2 APDES Permit No.: AK0062278

Date & Time	: 8/27/15	Ject: Alaska	LNG Marin	e Geotechi	nical Investig	ration		
Borehole:	MB-09	0700	_	to	8/28/1	ξ.	A =1	
Latitude:	60,66249628	7.0.4	Boi	rehole:	1	of i	0700	
Day Shift Observer				gitude:	151.380	79059 06	For Da	<u>y</u>
& Shift Time:	No Observer (See	Below)	Night Sh	ift Observer ift Time:				
Drilling Start Time:	Nobrilling			End Time:	No Obs	erver (See	Below),	_
	Outfall 001 - 0	Seotechnica			No Dr	illian		_
	Outfall 001 - 0	Drilling I	hid Lossos	(Deine To D	ill Cuttings a	t the Seaflo	or	
Drilling F	luid Volumes	1	luid Losses Day Shift	(Prior To Di	scharge)			
	ted (gal):		O O			Night Shi	ft	Total
Remai	ining (gal):		0		<u> </u>	0		0
	st (gal)		0			0		b) O
Inadvertent Disc	charges (gal). Estimate	Event 1	Event 2	T		0		Streets Streets
based on duration a	nd approximate flow rate		100	Event 3	Event 4	Event 5	Event 6	d)
Drilling Fluid Lo	on. ~180 gal max/event:	0	0	-0	0	0	0	0
Drining Fidia Lo	ost to Ground (gal):	0						
Results of Static	- Cl =		Prilling Fluid					
Sheen Test	Start Tim	ie	End	Time	Pass/Fail		Comments	
			No. of Contracts		-	NA -	gapener were the disconnection in a	
Discharge Start Time:		Discharge	e End Time:			Discharge [	Ouration (min.):	-
Length of	Drilling Fluid Depth Below	g)	Length of Drill	n)=f-g	Casing Dia.		Casing Area (ft <sup>2</sup> ):	))
Casing (ft):	Top of Casing (ft):		Fluid Col. (ft):		(in.):		7-in. is 0.27 ft <sup>2</sup> 12-	-
Discharge Vo	ol. (gal.). ~200 gallon	s may	II A				in. is 0.71 ft <sup>2</sup>	
			0		Floating Solida	k = h	* j * 7.481 gal/	ft <sup>3</sup>
Observations	THE RESERVE OF THE PARTY OF THE	Sheen (Y/N & Co	omments)		i loating Solids	Residue (Y/N	e, Deposits, Foam & Comments)	i, Scum, or
During Discharge	NA -				NA -			
		Out	fall 002 - De	sok Desinos				
24-hr Ra	ainfall (in.)	0,01		THE RESERVE OF THE PARTY OF THE	e Due to Rair	ofall (gal )	m]=(*1599,3	
THE RESERVE THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER.	harge From Deck	0,01	Day Shift	or Discharge	Due to Kaii	Night Shift	mis 1. T25.673 1 9	
VII. 1 1 1	.,	Wachdaum 1						Total
	11.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	2 15
wash	ndowns.	~						0
Total Deck Dr	rainage Discharge (ga	al.) ~2570 g:	al. max:	olemen 16 s	ral.			
			Outfalls 00					
	Receiving Water Vi							
Slack Water	Date & Time	Oily Sheen Det	ected in Visual S & Comments)	heen Test (Y/N	Floating Solids	, Debris, Sludg Residue (Y/N	e, Deposits, Foam & Comments)	i, Scum, or
1st Slack Water	8/27/15 11:04	No drilling	/ beservation	. Sec below.	See belo	w.J.	CONTRACTOR OF THE PARTY OF THE	
2nd Slack Water	8/27/15 17:33	0	(					
3rd Slack Water	8/27/15 23:18		1					
4th Slack Water	8/28/15 05:23		V		V			· Visited Life
	Other O	bserations,	Non-Permit	ted Dischar	ges, or Com	ments		
* No drilling o	perations or obs d due to weather	ervations -	for 8/27, 40ns.	115 0700	+0 8/28	1/15 0700	. Skate 3A	rig

Stop discharge upon obseration of oily sheen or residue not related to drill fluids or deck drainage and report to Project Regulatory Advisor, Claire Joseph.

Note: Observations were made over a 24 hr period corresponding with personnel shift changes.

### Daily Visual Observation Form Rev. 2

### APDES Permit No.: AK0062278

**Project: Alaska LNG Marine Geotechnical Investigation** 

Date & Time: 8	1 11-	Alaska Live	to	9	1/29/15	070	0	
	1/28/15 070		Boreho			of ]	For Day	
Borehole:		on/	Longitud		151,38079	069 ° W		
	60.66249628	10	Night Shift Ob	server	1 1		See Below)	
ay Shift Observer & Shift Time:	. Greenwald 071	00-1900	& Shift Tir	iie,	1 . 10	1205	Sel Delow	
orilling Start Time:	1/20/15 0700	2	Drilling End	-				
	Outfall 001 - Geo	otechnical D	rilling Fluids	and Drill C	uttings at tr	ie Seatiour		
		Drilling Flu	id Losses (Pr	ior To Disch	arge)	Night Shift		Total
Drilling Fluid	Volumes		Day Shift			Might Shirt	-	290
Created	(gal):		90				b	0
Remainir	ng (gal):		0				E	290
Lost	CONTRACTOR OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO	-	70	Event 3	Event 4	Event 5	Event 6	)
nadvertent Discha based on duration and a during lost circulation.	arges (gal). Estimate approximate flow rate ~180 gal max/event:	Event 1	Event 2	Event 3				
Drilling Fluid Lost	to Ground (gal):	290						
		D	rilling Fluid D	THE R. P. LEWIS CO., LANSING, MICH.	D=== (F=1)		Comments	
esults of Static	Start Time	e	End T	ime	Pass/Fail		nlslick	
Sheen Test	15,50		15/30	12100	Pass		ouration (min.):	10
Discharge Start Time:	12:50	Discharge	End Time:	13:00		1	Casing Area (ft <sup>2</sup> ):	i)
ength of asing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	9	Length of Drill Fluid Col. (ft):	46	Casing Dia. (in.):	7	7-in. is 0.27 ft <sup>2</sup> 12- in. is 0.71 ft <sup>2</sup>	
CONTROL OF THE PROPERTY OF THE PARTY OF THE	l. (gal.). ~200 gallon	s max:	93 gal			k = h	* j * 7.481 gal	n Scum
Discharge vo		Sheen (Y/N & C	U		Floating Solids	, Debris, Sludg Residue (Y/N	je, Deposits, Foan & Comments)	ii, ocuiii,
Observations					N			
During Discharge	N —				1			
		Ou	tfall 002 - De	eck Drainag	e Due to Dai	ofall (gal )	m)=i*1599.3 O	
24-hr Ra	ainfall (in.)	0		of Discharge	e Due to Rai	Night Shi	-	T T
Volume of Disc	harge From Deck		Day Shift	L	Washdown 4	Washdown 5	1	Tota
Washdown (ga	al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	washdown 4	Washdown		rol 1
	ximate flow rate during					-	1	MIN TO 10 MIN TO
		The state of the s	· Here	a transfer of				
wash	rainage Discharge (	gal.) ~2570	gal. max:	O Germen				
wash	rainage Discharge (		I DITTAILS U	01 & 002			Ballond	
wash	rainage Discharge (		Outrails of	01 & 002	Water (Per NO	DAA current pre	dictions)	am, Scum
wash	Receiving Water \ Date & Time		Outrails of	01 & 002 ylight Slack Sheen Test (Y/N	Water (Per NO		dictions) dge, Deposits, Foa N & Comments)	am, Scum
wash Total Deck Di	Receiving Water \ Date & Time		rvations - Day	01 & 002 ylight Slack Sheen Test (Y/N	Water (Per No			am, Scun
Total Deck Deck Deck Deck Deck Deck Deck Deck	Receiving Water \ Date & Time	Oily Sheen D	rvations - Day	01 & 002 ylight Slack Sheen Test (Y/N	Water (Per NO			am, Scum
Slack Water 1st Slack Water 2nd Slack Water	Receiving Water \ Date & Time 2/28/15 11:46 18/28/15 18:13	Oily Sheen D	rvations - Day	01 & 002 ylight Slack Sheen Test (Y/N	Water (Per No N Floating Solid N - N - See balo	Residue (Y/I		am, Scun
Slack Water 1st Slack Water 2nd Slack Water 3rd Slack Water	Receiving Water \ Date & Time  2/38/15 11:46  2/38/15 18:13  2/38/15 00:03	Oily Sheen D	etected in Visual & Comments)	01 & 002 ylight Slack Sheen Test (Y/N	N- See belon	Residue (Y/N		am, Scun
Slack Water 1st Slack Water 2nd Slack Water 3rd Slack Water 4th Slack Water	Receiving Water \ Date & Time 2/22/15 11:46 1 8/28/15 18:13 1 8/29/15 00:03 1 8/29/15 06:09	Oily Sheen D  N  Sae  See	etected in Visual & Comments)	01 & 002 ylight Slack Sheen Test (Y/N	N- See belon	Residue (Y/I	N & Comments)	
Slack Water  1st Slack Water  2nd Slack Water  3rd Slack Water  4th Slack Water	Receiving Water \ Date & Time 2/28/15 11:46 18/28/15 18:13 18/29/15 00:03 18/29/15 06:09 Other Dack +D ASRC Operations/observe	Visual Obser  Oily Sheen D  N  Sie k  See k  Obseration  quaystale  Hons dur	etected in Visual & Comments)  selow, selow, s, Non-Permit	o1 & 002 ylight Slack Sheen Test (Y/N	N See below See below riges, or Con a 2/15. Ris	Residue (Y/I	& Comments)	:00 to

## Daily Visual Observation Form Rev. 2 APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation

Borehole: Latitude: Day Shirt Deserver & Shirt Time: Drilling Start Time:  Outfall 001 - Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor  Drilling Fluid Volumes  Outfall 001 - Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor  Drilling Fluid Volumes  Outfall 001 - Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor  Drilling Fluid Volumes  Outfall 002 - Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor  Drilling Fluid Volumes  Outfall Outfall Cosses (Prior To Discharge)  Inadvertent Discharges (gal):  Lost (gal)  Inadvertent Discharges (gal):  Lost (gal)  Inadvertent Discharges (gal):  Lost (gal)  Inadvertent Discharges (gal):  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharges  Results of Static  Sheen Test  Inad Discharge End Time:  Discharge Start Time:  Discharge Fluid Discharges  Results of Static  Sheen Test  Inad Discharge Fluid Discharge End Time:  Discharge Buration (min.):  Inadia (min.):  Discharge Pool:  Casing (Min.):  Discharge Pool:  Outfall OO2 - Deck Drainage  24-hr Rainfall (in.)  Outfall OO2 - Deck Drainage  24-hr Rainfall (in.)  Outfall OO2 - Deck Drainage  And Discharge End Time:  Discharge From Deck  Washdown 1 Washdown 3 Washdown 4 Washdown 5 Washdown 6 Outfall OO3 & OO2  Outfall OO3 & OO2  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water  Discharge Discharge (gal.) "7570 gal. max:  Other Obserations, Non-Permitted Discharges, or Comments  Other Obserations, Non-Permitted Discharges, or Comments  Other Obserations of oilly sheen or residue not related to drill fluids or deck drainage and report to Projec	Date & Time:	8/29/15 07	100	to	_	8/30/15		700	R(
Latitude:  Day Shift Observer  8 Shift Time:  Outfall 001 - Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor  Drilling Fluid Volumes  Drilling Fluid Losses (Prior To Discharge)  Drilling Fluid Volumes  Created (gal):  Remaining (gal):  Lost (gal)  Inadvertent Discharges (gal), Estimate based on duration and approximate flow rate  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharges  Results of Static  Start Time  Discharge Flort Time:  Discharge Start Time:  Drilling Fluid Depth Below  Top of Casing (fit):  Discharge Start Time:  Discharge Vol. (gal.). "200 gallons max:  Observations  During Discharge  24-hr Rainfall (in.)  Volume of Discharge From Deck  Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage  Receiving Water Visual Observations - Daylight Slack Water (Per NoAA current predictions)  Slack Water  Slack Water  Pate Start Time  Outfall 001 - Deck Drainage  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NoAA current predictions)  Slack Water  Receiving Water Visual Observations - Daylight Slack Water (Per NoAA current predictions)  Slack Water  Residue (YN & Comments)  Start Flore  Slack Water  Residue (YN & Comments)  Start Flore  Residue (YN & Comments)  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NoAA current predictions)  Slack Water  Residue (YN & Comments)  Start Flore  Residue (YN & Comments)  Drilling Fluid Discharges, or Comments  Start Flore  Residue (YN & Comments)  Drilling Fluid Discharges, or Comments  NA  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NoAA current predictions)  Obtar Discharges, or Comments  NA  Outfall Sold & Outfall Sold & Outfall Sold & Outfall & Outfall & Outfall & Outfall & Outfall & Ou	Borehole:	ASRC anaysid	e	Boreh	ole:	0	of O	For Day	<u>(</u> )
Drilling Fluid Volumes  Outfall 001 - Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor  Drilling Fluid Volumes  Day Shift  Created (gal):  Lost (gal):  Lost (gal):  Lost (gal):  Lost (gal):  Lost (gal):  Drilling Fluid Losses (Prior To Discharge)  Night Shift  Total  Remaining (gal):  Lost (gal):  Lost (gal):  Lost (gal):  Drilling Fluid Lost (gal):  Lost (gal):  Lost (gal):  Drilling Fluid Discharges (gal): Event 1  Drilling Fluid Discharges  Event 2  Drilling Fluid Discharges  Event 3  Drilling Fluid Discharges  End Time  Pass/Fail  Comments  Discharge Start Time:  Discharge Duration (min.):  Casing Area (ft):  7an. 10.22 ft 12  7an. 10.27	Latitude:				-	F			
Drilling Start Time:  Outfall 001 - Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor  Drilling Fluid Volumes  Day Shift  Created (gal):  Remaining (gal):  Lost (gal)  Inadvertent Discharges (gal):  Lost (gal)  Inadvertent Discharges (gal):  Lost (gal)  Inadvertent Discharges (gal):  Lost (gal):  Drilling Fluid Losses (Prior To Discharge)  Night Shift  Total  Inadvertent Discharges (gal):  Lost (gal):  Inadvertent Discharges (gal):  Lost (gal):  Discharges (gal):  Drilling Fluid Discharges  Results of Static  Start Time:  Discharge Start Time:  Discharge Start Time:  Length of Drilling Fluid Discharges  Top of Casing (fit):  Discharge Start Time:  Discharge Start Tim	크레스크루 및 경영 및 및 및 및 및 및 및 및 및 및 및 및 및 및 및 및 및	Vand Miles	A700-1900			No Now	+ 5hif	ŧ.	
Drilling Fluid Volumes  Drilling Fluid Losses (Prior To Discharge)  Drilling Fluid Volumes  Day Shift  Created (gal):  Remaining (gal):  Lost (gal)  Inadvertent Discharges (gal): sumate based on duration and approximate flow rate during lost circulation. **280 gal max/event*  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharges  Results of Static Static Start Time:  Discharge Start Time:  Discharge For Test  Discharge For Time:  Discharge Discharge For Time:  Discharge For Time:  Discharge Dischar		7,	0700 1100	(ARXIMACONA)	riconosco:	No Jeil			B
Drilling Fluid Volumes  Day Shift  Night Shift  Total  Created (gal):  Remaining (gal):  Lost (gal)  Inadvertent Discharges (gal). Estimate based on duration and approximate flow rate during bischarge Volume of Discharge From Deck Washdown (gal.). 24-hr Rainfall (in.)  Outfall 002 - Deck Drainage  Doubscharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.). "2570 gal. max:  Outfall 002 - Deck Drainage  Outfall 003 - Deck Drainage  Total Deck Drainage Discharge (gal.). "2570 gal. max:  Outfall 003 - Deck Drainage  Outfall 003 - Deck Drainage  Outfall 004 - Deck Drainage  Outfall 005 - Deck Drainage  Outfall 005 - Deck Drainage  Outfall 006 - Deck Drainage  Outfall 007 - Deck Drainage  Outfall 008 - Deck Drainage  Outfall 008 - Deck Drainage  Outfall 009 - Deck	Drilling Start Time.	//	-1111						ě.
Drilling Fluid Volumes  Created (gal):  Remaining (gal):  Lost (gal)  Inadvertent Discharges (gal), Estimate based on duration and approximate flow rate during bost circular of Drilling Fluid Lost to Ground (gal):  Drilling Fluid Lost to Ground (gal):  NA  Discharge Start Time:  Sheen Test  Discharge Start Time:  Length of Drilling Fluid Depth Below Top of Casing (ft):  Discharge Vol. (gal.). "200 gallons max:  Observations  During Discharge  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdown.  Total Deck Drainage Discharge (gal.). "2570 gal. max:  Outfall 5002 - Deck Drainage  Receiving Water Visual Observations - Daylight Slack Water   Date & Time   Oily Sheen Detected in Visual Sheen Test (V/N & Comments)  Slack Water   Date & Time   Oily Sheen Detected in Visual Sheen Test (V/N & Comments)  Other Observations, Non-Permitted Discharges, or Comments		Outrail 001 - Ge	The second secon	THE RESERVE TO SHARE THE PARTY OF THE PARTY		A CONTRACTOR OF THE PARTY OF TH	ine Seamoon		
Created (gal):  Remaining (gal):  Lost (gal)  Inadvertent Discharges (gal). Estimate based on duration and approximate flow rate during lost circulation. 150 gal max/event:  WA  Drilling Fluid Lost to Ground (gal):  Pass/Fail  Comments  Sheen Test  Discharge End Time:  Discharge Fluid Depth Below  Top of Casing (ft):  Drilling Fluid Dot (ft):  Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)  During Discharge  24-hr Rainfall (in.)  Volume of Discharge From Deck  Washdown (gal.). Estimate based on duration and approximate flow rate during weshdowns.  Total Deck Drainage Discharge (gal.). "2570 gal. max:  Outfall 002 - Deck Drainage  24-hr Rainfall, Istimate based on duration and approximate flow rate during weshdowns.  Total Deck Drainage Discharge (gal.). "2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time  Oily Sheen Detected in Visual Sheen Test (V/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (V/N & Comments)  Slack Water Date & Time  Oily Sheen Detected in Visual Sheen Test (V/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (V/N & Comments)  Slack Water Date & Time  Oily Sheen Detected in Visual Sheen Test (V/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (V/N & Comments)  Slack Water Slad Sheen Test (V/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (V/N & Comments)  Slack Water Slad Sheen Test (V/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (V/N & Comments)  Slack Water Slad Sheen Test (V/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (V/N & Comments)  Other Obserations, Non-Permitted Discharges, or Comments  Other Obserations, Non-Permitted Discharges, or Comments	2 :11: 51	.1.7.1	Drilling Fit		TIOI TO DISC	liarge	Night Shift		Total
Remaining (gal):  Lost (gal)  Inadvertent Discharges (gal). Estimate based on duration and approximate flow rate during lost circulation. "180 gal max/event: Drilling Fluid Lost to Ground (gal):  Drilling Fluid Lost to Ground (gal):  Prilling Fluid Discharges  Results of Static Start Time: End Time: Pass/Fail Comments  Sheen Test  Discharge Start Time: Discharge End Time: Discharge Duration (min.):  Length of Top of Casing (ft): Fluid Col. (ft)							and the second second		i otai
Inadvertent Discharges (gal)   Estimate based on duration and approximate flow rate during lost circulation. **180 gal max/event:   NA			Amor a returned	NA			NA		b)
Inadvertent Discharges (gal). Estimate based on duration and approximate flow rate during lost circulation. **180 gal max/event.**  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharges  Results of Static Start Time:  Discharge Start Time:  Discharge End Time:  Discharge End Time:  Discharge End Time:  Discharge End Time:  Discharge Duration (min.):  Length of Drilling Fluid Depth Below Top of Casing (th:  Discharge Vol. (gal.). **200 gallons max:  Observations  During Discharge  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.). **2570 gal. max:  Outfall 002 - Deck Drainage  Receiving Water Visual Observations - Daylight Slack Water Slack Water Date & Time  Olly Sheen Detected in Visual Sheen Test (V/N Rounders)  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Slack Water Slack Start Rainage Discharge (gal.). **2570 gal. max:  Outfall Sol & Ooz  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Slack Water Rainage Discharge Start Rainage Discharges of Comments)  A See Below  Other Observations, Non-Permitted Discharges, or Comments  A See Below  Other Observations, Non-Permitted Discharges, or Comments  A See Below  Other Observations, Non-Permitted Discharges, or Comments		And the second state of th					40.000		2/mil-D
based on duration and approximate flow rate during Fluid Lost to Ground (gal):  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharges  Results of Static Start Time End Time Pass/Fail Comments  Discharge Start Time:  Discharge Find Time:  Length of Drilling Fluid Depth Below Top of Casing (ftc): Find Col. (ftc):  Find Col. (ftc):  Find Col. (ftc):  Find Col. (ftc):  Find Col. (ftc):  Find Col. (ftc):  Discharge Vol. (gal.). ~200 gallons max:  Observations  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Outfall 002 - Deck Drainage  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 02  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Floating Solids, Debris, Sludge, Deposits, Foam, Scum, on the Slack Water	transfer to the second		Event 1	Event 2	Event 3	Event /	Event 5	Event 6	aj
Drilling Fluid Lost to Ground (gal):  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharges  Results of Static Start Time End Time Pass/Fail Comments  Sheen Test N A  Discharge Start Time:  Length of Casing (ft):  Discharge Start Time:  Discharge Fluid Depth Below Top of Casing (ft):  Discharge Vol. (gal.). ~200 gallons max:  Discharge Vol. (gal.). ~200				Event 2	Events		Evento	EVENTO	
Results of Static Start Time End Time Pass/Fail Comments    Discharge Start Time   End Time   Pass/Fail   Comments		5/5/ S/ S/ S/ S/	NA		100	NA			
Results of Static Sheen Test    MA	Drilling Fluid Los	st to Ground (gal):	NA				OF THE PERSON NAMED IN		
Sheen Test  Discharge Start Time:  Discharge End Time:  Discharge Duration (min.):  Length of Casing (ft):  Discharge Vol. (gal.). "200 gallons max:  Observations During Discharge  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Outfall 002 - Deck Drainage  Outfall 003 - Deck Drainage  Outfall 004 - Deck Drainage  Outfall 005 - Deck Drainage  1			D	Name and Address of the Owner, where the Owner, which the	THE RESERVE OF THE PERSON NAMED IN				
Discharge Start Time:  Length of Casing (ft):  Discharge Vol. (gal.). ~200 gallons max:  Observations During Discharge  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfall 0018 & 002  Receiving Water Visual Observations - Daylight Slack Water   Date & Time   Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scurn, Residue (Y/N & Comments)  Slack Water   Date & Time   Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scurn, Residue (Y/N & Comments)  Slack Water   Date & Time   Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scurn, Residue (Y/N & Comments)  Slack Water   Date & Time   Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scurn, Residue (Y/N & Comments)  A See Below   S	Results of Static	Start Tim	е	End T	ime	Pass/Fail		Comments	
Length of Casing (ft):  Drilling Fluid Depth Below Top of Casing (ft):  Discharge Vol. (gal.). ~200 gallons max:  Observations  During Discharge  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfall Solds Water  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)  Washdown 1 Washdown 2 Washdown 3 Washdown 4 Washdown 5 Washdown 6  Outfall Solds Water (Per NOAA current predictions)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)  Washdown 1 Washdown 2 Washdown 3 Washdown 4 Washdown 5 Washdown 6  Outfall Solds Water (Per NOAA current predictions)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)  Washdown 1 Washdown 2 Washdown 3 Washdown 4 Washdown 5 Washdown 6  Outfall Solds Water (Per NOAA current predictions)  Slack Water  Date & Time  See Below  Other Obserations, Non-Permitted Discharges, or Comments  Washdown 4 Washdown 5 Washdown 6  Outfall Solds Water (Per NOAA current predictions)  See Below  Other Obserations, Non-Permitted Discharges, or Comments  Washdown 4 Washdown 6 Washdo	Sheen Test	NA		Property	_	aper	grander to the same	and the second second	
Length of Casing (ft):  Discharge Vol. (gal.). ~200 gallons max:  Observations During Discharge  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water  Ist Slack Water  Ist Slack Water  Ist Slack Water  Other Obserations, Non-Permitted Discharges, or Comments  Other Obserations, Non-Permitted Discharges, or Comments  Other Obserations, Non-Permitted Discharges, or Comments  Washdown of Discharges, Rig mand during washdown of Slack Water Rig Unparable See Below  Other Obserations, Non-Permitted Discharges, or Comments  Washdown of Discharge (gal.) ~2570 gal. max:  Other Obserations, Non-Permitted Discharges, or Comments  Washdown of Discharge Discharge (gal.) ~2570 gal. max:  Other Obserations, Non-Permitted Discharges, or Comments  Washdown of Discharge Discharge (gal.) ~2570 gal. max:  Other Obserations, Non-Permitted Discharges, or Comments  Washdown of Discharge Due to Rainfall (gal.) — Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Slack Water Slack Water Slack Water Residue (Y/N & Comments)  Other Obserations, Non-Permitted Discharges, or Comments  Other Obserations, Non-Permitted Discharges, or Comments	Discharge Start Time:		Discharge	End Time:			Discharge D		
Casing (ft):  Top of Casing (ft):  Discharge Vol. (gal.). ~200 gallons max:  Oily Sheen (Y/N & Comments)  Floating Solids, Debris, Sludge, Deposits, Foam, Scum, of Residue (Y/N & Comments)  Ploating Solids, Debris, Sludge, Deposits, Foam, Scum, of Residue (Y/N & Comments)  Ploating Solids, Debris, Sludge, Deposits, Foam, Scum, of Residue (Y/N & Comments)  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck  Washdown (gal.), Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)  Total Slack Water  Ploating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)  Slack Water  Pate Stack Water (Per NOAA current predictions)  Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)  Slack Water (Per NOAA current predictions)  Slack Water (Per NOAA current prediction	Length of	Drilling Fluid Depth Below	里)	Length of Drill	h)=f-g	Casing Dia.	i)		
Discharge Vol. (gal.). ~200 gallons max:  Observations During Discharge  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfall 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (V/N Floating Soilds, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)  Other Obserations, Non-Permitted Discharges, or Comments  Washdown 2 See Below Other Obserations, Non-Permitted Discharges, or Comments  Washdown 3 Washdown 4 Washdown 5 Washdown 6  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Residue (Y/N & Comments)  Other Obserations, Non-Permitted Discharges, or Comments  Washdown 1 Washdown 2 Washdown 3 Washdown 5 Washdown 6  Outfalls 001 & 002   Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Residue (Y/N & Comments)  No Daylight Slack Water (Per NOAA current predictions)  Residue (Y/N & Comments)  No Daylight Slack Water (Per NOAA current predictions)  Residue (Y/N & Comments)  No Daylight Slack Water (Per NOAA current predictions)  Residue (Y/N & Comments)  No Daylight Slack Water (Per NOAA current predictions)					No.	(in.):			
Observations During Discharge  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOA current predictions)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N & Comments)  Outfalls 001 & 002  Residue (Y/N & Comments)  Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Washdown 1 Washdown 2 Washdown 3 Washdown 4 Washdown 5 Washdown 6 Washdown 5 Washdown 6 Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOA current predictions)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)  N  2nd Slack Water  Ath Slack Water  Other Obserations, Non-Permitted Discharges, or Comments  Print Ask Quaryside due to Strong tides/ Currents, No drilling operations Riggment and Ask Quaryside due to Strong tides/ Currents, No drilling operations Riggment due to Strong tides/ Currents, No drilling operations Riggment due to Strong tides/ Currents, No drilling operations Riggment due to Strong tides/ Currents, No drilling operations Riggment due to Strong tides/ Currents, No drilling operations Riggment due to Strong tides/ Currents.	Discharge Vo	l (gal.) ~200 gallon	s max:	#)			k = h	Z NO STATE OF THE	/ft <sup>3</sup>
Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, & Comments)  1st Slack Water   Date & Time   Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)  3rd Slack Water   Right Innovation   See Below   See Below	-			ammants)		Floating Solids	, Debris, Sludg	e, Deposits, Foan	n, Scum, o
Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water  Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, & Comments)  1st Slack Water 2nd Slack Water 2 20 15 17:02  Ath Slack Water Ath Slack Water  Other Obserations, Non-Permitted Discharges, or Comments  Washdown 1 Washdown 2 Washdown 3 Washdown 4 Washdown 5 Washdown 6  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water  Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)  Washdown 1 Washdown 2 Washdown 3 Washdown 4 Washdown 5 Washdown 6  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water   Date & Time   Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)  Washdown 2 Washdown 3 Washdown 4 Washdown 5 Washdown 6  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  No Comments   Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)  Washdown 1 Washdown 2 Washdown 3 Washdown 4 Washdown 5 Washdown 6  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  No Comments   Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Sc	Observations	Olly	Sneen (17/N & Co	oninients)			Residue (Y/N 8	& Comments)	
Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (V/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)  1st Slack Water Rig Unmanual See Below See Below  Other Obserations, Non-Permitted Discharges, or Comments  **Rig at ASRC quayside due to Strong tides/currents, No drilling operations, Rig manual during daytime only for rowtile maintenance	During Discharge	NA -				NA -	name of the		
Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, & Comments)  1st Slack Water 8/29/15 1234 N Residue (Y/N & Comments)  3rd Slack Water Rig Unmanual See Below See Below  Other Obserations, Non-Permitted Discharges, or Comments  Washdown 1 Washdown 2 Washdown 4 Washdown 5 Washdown 6 Ook Washdown 1 Washdown 2 Washdown 4 Washdown 5 Washdown 6 Ook Washdown 1 Washdown 2 Washdown 4 Washdown 5 Washdown 6 Ook Washdown 1 Washdown 2 Washdown 4 Washdown 5 Washdown 6 Ook Washdown 1 Washdown 2 Washdown 4 Washdown 5 Washdown 6 Ook Washdown 1 Washdown 2 Washdown 4 Washdown 5 Washdown 6 Ook Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Residue (Y/N & Comments)  No See Below  Other Obserations, Non-Permitted Discharges, or Comments  Rig at ASRC quayside due to Strong tides Currents, No drilling operations, Rig manual during day time only for souther maintenance	L.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		Out	tfall 002 - De	ck Drainag	e			
Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, & Comments)  1st Slack Water Spalls 19:02 N Residue (Y/N & Comments)  3rd Slack Water Rig Unmanual See Below See Below  Other Obserations, Non-Permitted Discharges, or Comments  Washdown 1 Washdown 3 Washdown 4 Washdown 5 Washdown 6 Ook Washdown 4 Washdown 5 Washdown 6 Ook Washdown 1 Washdown 2 Washdown 4 Washdown 5 Washdown 6 Ook Washdown 4 Washdown 5 Washdown 6 Ook Washdown 1 Washdown 2 Washdown 4 Washdown 5 Washdown 6 Ook Washdown 1 Washdown 2 Washdown 4 Washdown 6 Ook Washdown 1 Washdown 2 Washdown 4 Washdown 5 Washdown 6 Ook Washdown 4 Washdown 5 Washdown 6 Ook Washdown 1 Washdown 2 Washdown 4 Washdown 5 Washdown 6 Ook Washdown 1 Washdown 2 Washdown 6 Ook Washdown 1 Washdown 1 Washdown 6 Ook Washdown 1 Washdown 2 Washdown 6 Ook Washdown 1 Washdown 1 Washdown 1 Washdown 6 Ook Washdown 1	24-hr Ra	ainfall (in.)	0	Volume o	of Discharge	e Due to Rair	nfall (gal.)	m=1*1599.3	
Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)  1st Slack Water 8/29/15 1/354 N	A STATE OF THE PARTY OF THE PAR			Day Shift			Night Shift	t	Total
Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)  1st Slack Water 8/29/15 1234 N Residue (Y/N & Comments)  3rd Slack Water 8/29/15 19:02 N See Below  4th Slack Water Rig Unmanuel See Below See Below  Other Obserations, Non-Permitted Discharges, or Comments  Whigh at ASRC quayside due to Strong tides/Currents, No drilling operations, Rig monded during day time only for routine maintenance		The second secon	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)  1st Slack Water 8/29/15 1234 N N Residue (Y/N & Comments)  3rd Slack Water Rig Unmarred See Below See Below  4th Slack Water Rig Unmarred See Below See Below  Other Obserations, Non-Permitted Discharges, or Comments  We Rig at ASRC quayside due to Strong tides/Currents, No drilling operations, Rig mound during day time only for rowtine maintenance			0	ZAN-00-1	and the second	warmen .	Martin Control		0
Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)  1st Slack Water 8/29/15 19:02 N Residue (Y/N & Comments)  3rd Slack Water Rig Unmarred See Below See Below  4th Slack Water Rig Unmarred See Below See Below  Other Obserations, Non-Permitted Discharges, or Comments  ** Rig at ASRC quayside due to strong tides/currents, No drilling operations, Rig mound during day time only for contine maintenance	Annual Control of the	and the second s	al \ ~2570 σ	al max:	ojamen 🔿		1000 A		
Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)  1st Slack Water 8/29/15 1234 N N Residue (Y/N & Comments)  3rd Slack Water Rig Unmarked See Below See Below  4th Slack Water Rig Unmarked See Below See Below  Other Obserations, Non-Permitted Discharges, or Comments  4 Rig at ASRC quayside due to Strong tides/currents, No drilling operations, Rig mound during day time only for routine maintenance	Total Deck Di	alliage Discharge (g	di.) 2570 g		NAME AND ADDRESS OF THE OWNER, WHEN	24			
Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, & Comments)  1st Slack Water 8/29/15 1234 N N Residue (Y/N & Comments)  2nd Slack Water 8/29/15 19:02 N See Below See Below See Below  4th Slack Water Rig Unmarried See Below See Below  Other Obserations, Non-Permitted Discharges, or Comments  4 Rig at ASRC quayside due to Strong tides/currents, No drilling operations, Rig mand during day time only for routine maintenance		Receiving Water V	isual Ohserv			Water (Per NO	AA current predi	ctions)	
1st Slack Water 8/29/15 1234 N  2nd Slack Water 8/29/15 19:02 N  3rd Slack Water Rig Unmarried See Below See Below  4th Slack Water Rig Unmarried See Below See Below  Other Obserations, Non-Permitted Discharges, or Comments  W Rig at ASRC quayside due to strong tides/currents. No drilling operations, Rig mound during day time only for routine maintenance		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Oily Sheen Det	tected in Visual S	heen Test (Y/N	Floating Solids	, Debris, Sludg	je, Deposits, Foar	m, Scum, o
2nd Slack Water 8/29/15 19:02 N  3rd Slack Water Rig Unmarried See Below See Below  4th Slack Water Rig Unmarried See Below See Below  Other Obserations, Non-Permitted Discharges, or Comments  ** Rig at ASRC quayside due to strong tides/currents. No drilling operations, Rig mound during day time only for routine maintenance	Slack Water	Date & Time		& Comments)			Residue (Y/N	& Comments)	
3rd Slack Water Rig Unmarried See Below See Below  4th Slack Water Rig Unmarried See Below See Below  Other Obserations, Non-Permitted Discharges, or Comments  # Rig at ASRC quayside due to strong tides/currents, No drilling operations, Rig mound during day time only for routine maintenance	1st Slack Water	8/29/15 1234	N -		-	N			
4th Slack Water Rig Unmanuel See Below See Below  Other Obserations, Non-Permitted Discharges, or Comments  Rig at ASRC quayside due to strong tides/currents. No drilling operations, Rig mound during day time only for routine maintenance	2nd Slack Water	8/29/15 19:02	N -			N			
4th Slack Water Rig Unmanuel See Below See Below Other Obserations, Non-Permitted Discharges, or Comments  # Rig at ASRC quayside due to strong tides/currents. No drilling operations, Rig mound during day time only for routine maintenance	3rd Slack Water	Rig Unmanned	See	Belo	r.d	See t	Below		
Other Obserations, Non-Permitted Discharges, or Comments  * Rig at ASRC quayside due to strong tides/currents. No drilling operations, Rig mound during day time only for routine maintenance	4th Slack Water	A	See	Below	/	See B	elow		
* Rig at ASRC quayside due to strong tides/currents. No drilling operations, Rig mound during day time only for routine maintenance		Other C	bserations,	Non-Permit	ted Dischar	ges, or Com	ments		
during day time only for routine maintenance	# 8 ac	27	o to str	ong tides/	currents.	No dril	ling opera	dions. Rio. n	normal
Stop discharge upon obseration of oily sheen or residue not related to drill fluids or deck drainage and report to Project Regulatory Advisor, Claire Joseph.	my at no	- quaysian an		1			0	8	
Stop discharge upon obseration of oily sheen or residue not related to drill fluids or deck drainage and report to Project Regulatory Advisor, Claire Joseph.	during day ti	all only for re	word mo	untchance				latami Adrilana Clat	leo Jaconh
Note: Observations were made over a 24 hr period corresponding with personnel shift changes.	Stop discharge upor	obseration of oily sheen	or residue not re	lated to drill flui	ds or deck drai	nage and report	to Project Regul	atory Advisor, Clai	re Joseph.
Note: Observations were fliate over a 24 in period corresponding with personner state changes.		Note: Observatio	nis were made o	ver a 24 iii peric	o correspondi	o mai personne	3		

D 0 T	1 1				al Investigati			
Date & Time: Borehole:	8/30/15 070	1	to Boreh		8/31/1	of A	6700	
Latitude:	ASRC quay	Side	. Borer Longit			OT O	For Day	
Day Shift Observer			Night Shift					
& Shift Time:	Rig unmanned S	ree below	& Shift	Time:	Rig un	married, S	see below.	
Drilling Start Time:	No drilling		Drilling Er	nd Time:	No drill	104		
	Outfall 001 - Ge	eotechnical	<b>Drilling Fluid</b>	ds and Drill	Cuttings at	the Seafloo	r	
		Drilling Fl	luid Losses (F	Prior To Dis	charge)			
the second state of the second	luid Volumes		Day Shift			Night Shift		Total
	ted (gal):		NA			NA		51
	ining (gal):							b)
	st (gal)							n)
	charges (gal). Estimate and approximate flow rate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	01
	ion. ~180 gal max/event:	NA	_		NA	9-11-11-11-11-11-11-11-11-11-11-11-11-11		
Drilling Fluid Lo	ost to Ground (gal):	e)=c-d NA						
		White the same of	rilling Fluid (	Harry Street,				
Results of Static		е	End T	Time	Pass/Fail		Comments	
Sheen Test	NA							
Discharge Start Time:		Discharge	e End Time:			Discharge D	Ouration (min.):	
Length of	Drilling Fluid Depth Below	6/	Length of Drill	n]=t-g	Casing Dia.	10	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup> 12-	11
Casing (ft):	Top of Casing (ft):		Fluid Col. (ft):		(in.):		in. is 0.71 ft <sup>2</sup>	
Discharge V	ol. (gal.). ~200 gallon	s max:	61			- Deliver Street Street Street	* j * 7.481 gal/	
Observations		Sheen (Y/N & Co	omments)			, Debris, Sludg Residue (Y/N	e, Deposits, Foam & Comments)	i, Scum, or
During Discharge	NA —				NA -			
1112-11111-11-11-11		principal and the state of	tfall 002 - De	THE RESERVE OF THE PARTY OF THE				
	tainfall (in.)	0.04	Charles and the State of the St	of Discharge	e Due to Rair		mi=i*1599.3 64;	gal
	charge From Deck		Day Shift			Night Shift		Total
10 1 10 10 10 10 10 10 10 10 10 10 10 10	(al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	
	oximate flow rate during shdowns.	0		-				
Total Deck D	rainage Discharge (ga	al.) ~2570 ga	al. max:	o)=m+n 6 4 g	(a).			
			Outfalls 00:					
	Receiving Water Vi	NAME AND ADDRESS OF TAXABLE PARTY.	AND DESCRIPTION OF THE PERSON NAMED IN COLUMN 1	THE RESIDENCE OF THE PARTY OF T	NAME AND ADDRESS OF THE OWNER, WHEN THE PARTY OF THE PART	The same of the sa	THE RESERVE OF THE PERSON NAMED IN COLUMN 2 IN COLUMN	
Slack Water	Date & Time	Oily Sheen Det	tected in Visual Sh & Comments)	neen Test (Y/N		, Debris, Sludg Residue (Y/N 8	e, Deposits, Foam & Comments)	, Scum, or
1st Slack Water	9/30/15 07:06	Rig unn	rannel See!	below.	Rig unn	ranned.	See below.	
2nd Slack Water	8/30/15 13:16	V	(					
3rd Slack Water	8/30/15 19:41							
4th Slack Water	8/31/15 01:38		V	100		V		- 1
	Other O	bserations,	Non-Permitt	ed Dischar	ges, or Comn	ments		
	SRC quayside du		ony tides,	Currents,	No deill	ing operation	was. Rig unn	nanned
	or crew rest day	* 1						
Stop discharge upor	n obseration of oily sheen or Note: Observation			- WWW.		CONTRACTOR SERVICE STATE OF THE SERVICE STATE OF TH	tory Advisor, Claire	: Joseph.

Data 9 Times	1 1		NG Marine G		I Investigati		N.	
Date & Time:	8/31/15 07	1	Borel	(m	7/1///	of 0	For Day	
Borehole: Latitude:	ASRC QUAYSIG	<u>u</u>	Longit	33=		OI U	101 Day	
Day Shift Observer	10 101-0	200	Night Shift	Observer	N/a N/a	11 01.61		
& Shift Time:	Jimmy Wilson O	100-1900	& Shift Drilling Er		No dri	kt Shift		
Drilling Start Time:	No drilling			1)-		Ming.		
	Outfall 001 - Go	The second second second	Action to the second	-/	The same of the sa	the Seafloor		
		Drilling Fl	uid Losses (F	Prior To Disc	charge)	All La Clafe		T 1 1
and the second s	uid Volumes		Day Shift			Night Shift		Total
	ed (gal):		VA			NA		b)
	ning (gal):							21m3-12
	st (gal)	5 14	F	F	Frank A	Front F	Fuont 6	0)
based on duration a	charges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	£
The state of the s	on. ~180 gal max/event: est to Ground (gal):	MA Power			W	<del></del>	- 1000 - 30-300 Y	
Drining Francisco	Se to Ground (Bar):	With the second second second	rilling Fluid	Discharges				
Results of Static	Start Tim	A STREET OF THE PERSON NAMED IN COLUMN 2 IS NOT THE PERSON NAMED I	End 7	The state of the s	Pass/Fail		Comments	
Sheen Test	NA							
Discharge Start Time:	19/1	Discharge	End Time:			Discharge D	uration (min.):	
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	(*)	Length of Drill Fluid Col. (ft):	njef-E	Casing Dia. (in.):	1)	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup> 12-	j) 
	ol. (gal.). ~200 gallon	c may:	(c)			k h 3	in. is 0.71 ft <sup>2</sup> ' j * 7.481 gal/	/f+ <sup>3</sup>
Observations	<del>7</del>	Sheen (Y/N & Co	omments)		Floating Solids		e, Deposits, Foan	
During Discharge	6.10				NA-	<u> </u>		
	INIH -							
	NA -	Out	tfall 002 - De	ck Drainag	e			
	INA	Out	Volume	and the second second	The second second	nfall (gal.)	m)=1*1599.3 O	
24-hr R	ainfall (in.)	Out	CONTRACTOR OF STREET	and the second second	e Due to Rair	nfall (gal.) Night Shift	0	Total
24-hr R Volume of Disc	ainfall (in.)	Out	Volume o	of Discharge	The second second		0	Total
24-hr R Volume of Disc Washdown (g	cainfall (in.) charge From Deck al.). Estimate based on oximate flow rate during	0	Volume of Day Shift	of Discharge	Due to Rair	Night Shift	0	Total
24-hr R Volume of Disc Washdown (g duration and appro was	cainfall (in.) charge From Deck al.). Estimate based on oximate flow rate during	Washdown 1	Volume of Day Shift Washdown 2	of Discharge Washdown 3	e Due to Rain Washdown 4	Night Shift	0	Total
24-hr R Volume of Disc Washdown (g duration and appro was	cainfall (in.) charge From Deck al.). Estimate based on oximate flow rate during	Washdown 1	Volume of Day Shift Washdown 2  al. max:	Washdown 3	e Due to Rain Washdown 4	Night Shift	0	Total
24-hr R Volume of Disc Washdown (g duration and appro was	cainfall (in.) charge From Deck al.). Estimate based on eximate flow rate during shdowns. rainage Discharge (g	Washdown 1  O  al.) ~2570 g	Volume of Day Shift Washdown 2 al. max: Outfalls 00	Washdown 3	Washdown 4	Night Shift Washdown 5	Washdown 6	Total
24-hr R Volume of Disc Washdown (g duration and appro was	cainfall (in.) charge From Deck al.). Estimate based on oximate flow rate during	Washdown 1  Cal.) ~2570 g  isual Observ	Volume of Day Shift Washdown 2 al. max: Outfalls 00 rations - Day	Washdown 3  Washdown 3  1 & 002  light Slack V	Washdown 4  Water (Per NO.)	Night Shift Washdown 5	Washdown 6  ctions) e, Deposits, Foan	0
24-hr R Volume of Disc Washdown (g duration and appro was Total Deck D	cainfall (in.) charge From Deck al.). Estimate based on eximate flow rate during shdowns. rainage Discharge (g  Receiving Water Vi  Date & Time	Washdown 1  al.) ~2570 g  isual Observ  Oily Sheen Det	Volume of Day Shift Washdown 2  al. max: Outfalls 00 rations - Day rected in Visual S	Washdown 3  Washdown 3  1 & 002  light Slack V	Washdown 4  Water (Per NO.)	Night Shift Washdown 5 AA current predic , Debris, Sludge	Washdown 6  ctions) e, Deposits, Foan	0
24-hr R Volume of Disc Washdown (g duration and appro was Total Deck D	cainfall (in.) charge From Deck al.). Estimate based on eximate flow rate during shdowns. rainage Discharge (g  Receiving Water V  Date & Time	Washdown 1  Cal.) ~2570 g  isual Observ	Volume of Day Shift Washdown 2  al. max: Outfalls 00 rations - Day rected in Visual S	Washdown 3  Washdown 3  1 & 002  light Slack V	Washdown 4  Water (Per NO.)	Night Shift Washdown 5 AA current predic , Debris, Sludge	Washdown 6  ctions) e, Deposits, Foan	0
24-hr R Volume of Disc Washdown (g duration and appro was Total Deck D  Slack Water  1st Slack Water 2nd Slack Water	rainfall (in.) charge From Deck al.). Estimate based on eximate flow rate during shdowns. rainage Discharge (g  Receiving Water V  Date & Time  8/31/15 07:54	Washdown 1  Cal.) ~2570 g  isual Observ  Oily Sheen Det	Volume of Day Shift Washdown 2  al. max: Outfalls 00 rations - Day tected in Visual S & Comments)	Washdown 3  Washdown 3  1 & 002  light Slack V heen Test (Y/N	Washdown 4  Water (Per NO) Floating Solids	Night Shift Washdown 5  AA current predicts, Debris, Sludge Residue (Y/N &	Washdown 6  stions) e, Deposits, Foan & Comments)	0
24-hr R Volume of Disc Washdown (g duration and appro was Total Deck D  Slack Water  1st Slack Water 2nd Slack Water 3rd Slack Water	ainfall (in.) charge From Deck al.). Estimate based on oximate flow rate during shdowns. rainage Discharge (g  Receiving Water V  Date & Time  8/31/15 07:54 8/31/15 13:59	Washdown 1 O al.) ~2570 g isual Observ Oily Sheen Det	Volume of Day Shift Washdown 2  al. max: Outfalls 00 vations - Day tected in Visual S & Comments)	Washdown 3  Washdown 3  1 & 002  light Slack V heen Test (Y/N	Washdown 4  Water (Per NO) Floating Solids	Night Shift Washdown 5  AA current predicts, Debris, Sludge Residue (Y/N 8	Washdown 6  etions) a, Deposits, Foan a Comments)	0
24-hr R Volume of Disc Washdown (g duration and appro was Total Deck D  Slack Water  1st Slack Water 2nd Slack Water	Receiving Water V	Washdown 1  Cal.) ~2570 g  isual Observ  Oily Sheen Det  N  Rig Unman	Volume of Day Shift Washdown 2  al. max: Outfalls 00 rations - Day rected in Visual Sected	Washdown 3  Washdown 3  1 & 002  light Slack V heen Test (Y/N	Washdown 4  Water (Per NO.) Floating Solids  N  Riguina	Night Shift Washdown 5  AA current predicts, Debris, Sludge Residue (Y/N &	Washdown 6  stions) e, Deposits, Foan & Comments)	0
24-hr R Volume of Disc Washdown (g duration and appro was Total Deck D  Slack Water  1st Slack Water 2nd Slack Water 3rd Slack Water 4th Slack Water	Receiving Water V  Date & Time  8/31/15 07:54  8/31/15 07:54  9/11/15 05:33  Other O	Washdown 1  Cal.) ~2570 g  isual Observ  Oily Sheen Det  N  Rig Unman  Rig Unman  Obserations,	Volume of Day Shift Washdown 2  al. max: Outfalls 00 vations - Day tected in Visual Sector Se	Washdown 3  1 & 002  light Slack V heen Test (Y/N)  Lower ted Discharge	Washdown 4  Water (Per No. Floating Solids  N  Rigumn  Rigumn  Rigumn  Res, or Comi	Night Shift Washdown 5  AA current predicts, Debris, Sludge Residue (Y/N 8	washdown 6  ctions) a, Deposits, Foan a Comments)  below,	n, Scum, or
24-hr R Volume of Disc Washdown (g duration and appro was Total Deck D  Slack Water  1st Slack Water 2nd Slack Water 3rd Slack Water 4th Slack Water	ainfall (in.) charge From Deck al.). Estimate based on eximate flow rate during shdowns. rainage Discharge (grainage	Washdown 1  Cal.) ~2570 g  isual Observ  Oily Sheen Det  N  Rig Unman  Rig Unman  Obserations,	Volume of Day Shift Washdown 2  al. max: Outfalls 00 vations - Day tected in Visual Sector Se	Washdown 3  1 & 002  light Slack V heen Test (Y/N)  Lower ted Discharge	Washdown 4  Water (Per No. Floating Solids  N  Rigumn  Rigumn  Rigumn  Res, or Comi	Night Shift Washdown 5  AA current predicts, Debris, Sludge Residue (Y/N 8	washdown 6  ctions) a, Deposits, Foan a Comments)  below,	n, Scum, or
24-hr R Volume of Disc Washdown (g duration and appro was Total Deck D  Slack Water  1st Slack Water 2nd Slack Water 3rd Slack Water 4th Slack Water	Receiving Water V  Date & Time  8/31/15 07:54  8/31/15 07:54  9/11/15 05:33  Other O	Washdown 1  O  (al.) ~2570 g  isual Observ  Oily Sheen Del  N  Rig Unman  Obserations,  and the control of the	Volume of Day Shift Washdown 2  al. max: Outfalls 00 rations - Day rected in Visual S & Comments)  A Comments  Non-Permit  The Action of the See by  Non-Permit  The Action of the See by  I and the See by  I alted to drill flui	Washdown 3  1 & 002  Iight Slack V heen Test (Y/N)  Lown  Lo	Washdown 4  Water (Per No. Floating Solids  Washdown 4  Water (Per No. Floating Solids  Washdown 4	Night Shift Washdown 5  AA current predicts, Debris, Sludge Residue (Y/N 8  manned, See ments  o peration  to Project Regula	Washdown 6  Stions)  e, Deposits, Foan  a Comments)  below,  below,  below,  solow,  s	n, Scum, or

Date & Time:	- / /		NG Marine (				2700	
Borehole:	9/1/15 07	06	- to Borel	bolo:	9/2/15	-	700 For Day	
Latitude:	ASRC quays	do	- Longi	NOTIFICAL PROPERTY.		of ()	For Day	
Day Shift Observer	Wall		Night Shift	Observer				
& Shift Time:	Jimmy Wilson	0700-1900	& Shift	Time:	No Nig	ha Shift		
Drilling Start Time:	No drilling.		Drilling E	nd Time:	No Nig	Ving.		
	Outfall 001 - G	eotechnical	Drilling Flui					
		Drilling F	luid Losses (I	Prior To Dis	charge)			
Drilling Fl	luid Volumes		Day Shift			Night Shift		Total
Creat	ted (gal):		NA /			NA		9)
Remai	ning (gal):				· ·			b)
Lo	st (gal)	The second secon						5198 <u>92</u>
	charges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	=)
	nd approximate flow rate on. ~180 gal max/event:	NA			NA			
	st to Ground (gal):	NA						
		And the same of the same of the same of	rilling Fluid	Discharges				
Results of Static	Start Tim	ie	End 7	Гіте	Pass/Fail		Comments	No. Western M. Co.
Sheen Test	NA							
Discharge Start Time:		Discharge	e End Time:			Discharge D	uration (min.):	
Length of	Drilling Fluid Depth Below	dis.	Length of Drill	hlaf-g	Casing Dia.	i)	Casing Area (ft <sup>2</sup> ):	i).
Casing (ft):	Top of Casing (ft):	-	Fluid Col. (ft):		(in.):	*	7-in. is 0.27 ft <sup>2</sup> 12- in. is 0.71 ft <sup>2</sup>	* Section of the
Discharge Vo	ol. (gal.). ~200 gallon	s max:	16)	_		k = h '	* j * 7.481 gal/	ft <sup>3</sup>
Observations	T	Sheen (Y/N & Co	omments)				e, Deposits, Foam	
During Discharge	NA -				NA -			
		Out	tfall 002 - De	ck Drainag				
24-hr R	ainfall (in.)	0	Victoria de la Calendario de la Calendar		e Due to Rair	nfall (gal.)	ml=i*1599.3	
Volume of Disc	charge From Deck		Day Shift			Night Shift	and the last of th	÷ 1
Washdown (ga	al.). Estimate based on	Washdown 1	Washdown 2					Total
duration and appro			*** don't do **** L	Washdown 3	Washdown 4	Washdown 5	Washdown 6	7.00/02/07/07
	ximate flow rate during	0		Washdown 3	Washdown 4	Washdown 5	Washdown 6	0
was	hdowns.			Diametric O		Washdown 5	Washdown 6	71
was	하다. 이번에는 마상사 내려가 어떻게 하죠?		al. max:	plameti O a	Washdown 4	Washdown 5	Washdown 6	71
was	hdowns. rainage Discharge (g	al.) ~2570 g	al. max: Outfalls 00	1 & 002	ral			71
was	hdowns.	al.) ~2570 g sual Observ	al. max: Outfalls 00 ations - Dayl	1 & 002	Vater (Per NOA	AA current predic	tions) e, Deposits, Foam	0
Total Deck D	Receiving Water Vi	al.) ~2570 g sual Observ	al. max: Outfalls 00 ations - Dayl	1 & 002	Vater (Per NOA	AA current predic , Debris, Sludge	tions) e, Deposits, Foam	0
Total Deck D	Receiving Water Vi	al.) ~2570 g sual Observ	al. max: Outfalls 00 ations - Dayl	1 & 002	Vater (Per NOA	AA current predic , Debris, Sludge	tions) e, Deposits, Foam	0
Total Deck Deck Deck Deck Water  Slack Water  1st Slack Water	Receiving Water Vi Date & Time 9/1/15 08:43	al.) ~2570 g sual Observ	al. max: Outfalls 00 ations - Dayl	1 & 002	Vater (Per NOA	AA current predic , Debris, Sludge	tions) e, Deposits, Foam a Comments)	0
Total Deck Do	Receiving Water Vi Date & Time  9/1/15 08:43  9/1/15 21:04	al.) ~2570 g sual Observ	al. max: Outfalls 00 ations - Dayl	1 & 002	Vater (Per NOA	AA current predic , Debris, Sludge	tions) e, Deposits, Foam	0
Slack Water  1st Slack Water 2nd Slack Water 3rd Slack Water	Receiving Water Vi  Date & Time  9/1/15 08:43  9/1/15 21:04  9/2/15 03:1/	sual Observ Oily Sheen Det	al. max: Outfalls 00 rations - Dayl rected in Visual SI & Comments)	1 & 002 light Slack V	Vater (Per NOA) Floating Solids  N Rig unn	AA current predic , Debris, Sludge Residue (Y/N &	tions) e, Deposits, Foam a Comments)	0
Slack Water  1st Slack Water 2nd Slack Water 3rd Slack Water 4th Slack Water	Receiving Water Vi  Date & Time  9/1/15 08:43  9/1/15 14:45  9/1/15 21:04  9/2/15 03:1/  Other O	sual Observ Oily Sheen Det  N Rigua,	al. max: Outfalls 00 ations - Dayl tected in Visual SI & Comments)  Comments	1 & 002 light Slack V heen Test (Y/N	Nater (Per NOA Floating Solids  N Rig unn ges, or Comn	AA current predic , Debris, Sludge Residue (Y/N &	e, Deposits, Foam a Comments)	, Scum, or
Slack Water  1st Slack Water  2nd Slack Water  3rd Slack Water  4th Slack Water	Receiving Water Vi  Date & Time  9/1/15 08:43  9/1/15 21:04  9/2/15 03:1/	sual Observ Oily Sheen Det  N Rigum bserations,	al. max: Outfalls 00 rations - Dayl rected in Visual Si & Comments)  Non-Permitt	1 & 002  light Slack V heen Test (Y/N  belov.	Nater (Per NOA Floating Solids  N Rig unn ges, or Comn	AA current predic , Debris, Sludge Residue (Y/N &	e, Deposits, Foam a Comments)	, Scum, or
Slack Water  1st Slack Water  2nd Slack Water  3rd Slack Water  4th Slack Water  4th Slack Water  Manned duri	Receiving Water Vi  Date & Time  9/1/15 08:43  9/1/15 14:45  9/1/15 21:04  9/2/15 03:1/  Other O	sual Observ Oily Sheen Det  N Rigun, bserations, to str for row residue not rel	al. max:  Outfalls 00 rations - Dayl rected in Visual SI & Comments)  Non-Permitt  any tide whine mai	1 & 002  light Slack V heen Test (Y/N  belov.  sed Discharges  Atomical Cl. ds or deck drain	Nater (Per NOA Floating Solids  N Rig unn  ges, or Comm	AA current predic , Debris, Sludge Residue (Y/N &	e, Deposits, Foam a Comments)	, Scum, or

Date & T	ime:	9/3/15 0700		NG Marine G		al Investigati		700	
Boreho		MB-15	A CAMPAGE AND A	Boreh		17711-	of I	For Day	
Latitud	19	the state of the s	//	Longit		151,37/6	5869°W		
Day Shift Ob & Shift Ti			-1900	Night Shift & Shift		A. Fee	1900-07	00	
Drilling Start		9/3/15 10:20		Drilling En	A STATE OF THE STA	9/4/15	06:30		
	4	Outfall 001 - Ge		Drilling Fluid	ds and Drill	Cuttings at	the Seafloor		
			And the second state of th	uid Losses (P		Activities and the last of the comment of the com-			
Dri	lling Flu	iid Volumes		Day Shift			Night Shift		Total
		ed (gal):	8	345		2	2640		3485
	-	ing (gal):	0.1	0			760		10 300
1 - 2		t (gal)	84		1		2340		3185
		narges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	
		n. ~180 gal max/event:							
Drilling F	luid Los	t to Ground (gal):	e =c-d-3 85	so)				9.740,7.160	
			Mary State and Committee Control of Control of	Prilling Fluid (	AND RESIDENCE OF THE PROPERTY OF THE PERSON NAMED IN				
Results of	COLUMN TOWN	Start Tim	e	End T	lime .	Pass/Fail	The second second second	Comments	
Sheen T			Di-sh-ser				NA	All and All an	
Discharge Sta	art Time:		Discharge	e End Time:	h)nf-g		Discharge D	Ouration (min.):  Casing Area (ft <sup>2</sup> ):	1)
Length of Casing (ft):	-	Drilling Fluid Depth Below Top of Casing (ft):	•	Length of Drill Fluid Col. (ft):		Casing Dia. (in.):		7-in. is 0.27 ft <sup>2</sup>	
Discha	arge Vo	l. (gal.). ~200 gallon	s max:	(c)				* j * 7.481 gal,	
Observation During Dis		Oily	Sheen (Y/N & Co	omments)		Floating Solids	Residue (Y/N 8	e, Deposits, Foan & Comments)	n, Scum, oi
			Ou	tfall 002 - De	eck Drainag	re -			
2	24-hr Ra	infall (in.)	0.74	Name and Address of the Owner, where the Owner, while the		e Due to Rair	nfall (gal.)	(n)=1°1599.3 [] 83;	201
Volume	of Disc	harge From Deck		Day Shift			Night Shift		
Washdo	own (ga	1.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
duration a	ACTUAL CAMPANTONIA	dimate flow rate during			-	10 X12 gp4		->	120
Total [	AND MAKES THE PROPERTY OF	downs. ainage Discharge (g	al.) ~2570 g	al. max:	olem+n 1303				Line
				Outfalls 00		921			
		Receiving Water Vi	sual Observ	ations - Day	light Slack \	Water (Per NO)	AA current predi	ctions)	
Slack W	ater	Date & Time	Oily Sheen Det	tected in Visual S & Comments)	heen Test (Y/N	Floating Solids	s, Debris, Sludg Residue (Y/N	e, Deposits, Foan & Comments)	n, Scum, o
1st Slack	Water	9/3/15 10:33	N -			N-			
2nd Slack	Water	9/3/15 16:25	N			N			
3rd Slack	Water	9/3/15 22:38	A!		production of the last of the	W-	CONTRACTOR OF STREET	No.	4.1
4th Slack	Water	9/4/15 04:55	1/1)-			A/-		Middle commence and the second	
		THE RESERVE THE PERSON NAMED IN	bserations,	Non-Permit	ted Dischar	ges, or Com	ments		
Stop disch	arge upon	obseration of oily sheen o	r residue not re	elated to drill flui	ids or deck drai	nage and report	to Project Regula	atory Advisor, Clair	re Joseph.
		Note: Observation			Compared and Advantage Advantage of the Land	Managara Marana and Arian Arian			-

Project: Alaska LNG Marine Geotechnical Investigation

Date & Time:	9/4/15 0700	t: Alaska LN	to	eotecimica	9/5/15		100	
-	MB-15		Boreh	ole:		of	For Day	
Latitude:	60.65898078°N		Longitu		151.37165869°W			
Day Shift Observer	3 97F		Night Shift (		Aifee 1900-0700			
& Shift Time:  Drilling Start Time:	3. Greenwald 0700	1-1900	& Shift T Drilling En		9/4/15	1150		
Drining Start Time.				-	and the state of the state of the state of			
	Outfall 001 - Ge	Otecnincal L	id Losses (P	rior To Disc	harge)	iic ocurrour		
Deilling Elu	id Volumes	Dillilling Fit	Day Shift	TION TO DISC	nurge)	Night Shift	1	Total
THE RESIDENCE OF THE PARTY OF T	ed (gal):	135	THE RESERVE AND ADDRESS OF THE PARTY OF THE					1320
	ing (gal):	0						p) O .
	t (gal)	132	0				. 10	-1320
THE RESIDENCE OF THE PARTY OF T	narges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	d)
based on duration and	d approximate flow rate							0
	n. ~180 gal max/event:	epec 1320						
Drilling Fluid Los	t to Ground (gal):		rilling Fluid [	Discharges				
Results of Static	Start Time	the same of the sa	End T	THE RESERVE AND PERSONS ASSESSED.	Pass/Fail		Comments	
Sheen Test	17:1/		17:15	CONTRACTOR OF THE PERSON NAMED IN	Pass	No slick	Sheen	
Discharge Start Time:	17:20	Discharge	End Time:	17:35		Name and Address of the Owner, where the Party of the Owner, where the Party of the Owner, where the Owner, which is the Owner,	uration (min.):	15
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	15	Length of Drill Fluid Col. (ft):	n)=1-8 25	Casing Dia. (in.):	7	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	0.27
			0 60 1			b − h	12-in. is 0.71 ft <sup>2</sup> i j * 7.481 gal,	/ft <sup>3</sup>
Discharge vo	l. (gal.). ~200 gallon	The state of the s	50 gal		Floating Solids	, Debris, Sludge	e, Deposits, Foan	n, Scum, c
Observations	Oily	Sheen (Y/N & Co	mments)			Residue (Y/N &		
During Discharge	N —				N-			
	L	Out	fall 002 - De	ck Drainag	e			
24-hr Ra	ainfall (in.)	0.12	Volume o	of Discharge	e Due to Rair	nfall (gal.)	mj=l*1599.3 / 92	
and the same of th	harge From Deck		Day Shift			Night Shift		Total
Washdown (ga	al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	1014
	ximate flow rate during	10min. x 12gpm		-	-			120
	ndowns. rainage Discharge (g	al \ ~2570 g	al. max:	01-m+n 312	And the second second second second	Marine		
Total Deck Di	amage Discharge (8	uii) 20.0 B	Outfalls 00					
	Receiving Water V	isual Observ	ations - Day	light Slack \	Water (Per NO.	AA current predi	ctions)	
Slack Water	Date & Time	Oily Sheen De	tected in Visual S & Comments)	Sheen Test (Y/N	Floating Solids	s, Debris, Sludg Residue (Y/N	e, Deposits, Foar	m, Scum,
1st Slack Water	19/4/15 11:05	N			N			
2nd Slack Water		N			N	Museum Colon Colon		
3rd Slack Water	111-11-1	1/			N		1	
4th Slack Water	111111	1			N			
THI SIGER TRACE!		bserations.	Non-Permit	ted Dischar	ges, or Com	ments		
					1			
The order of the state of the s								
	n obseration of oily sheen				j.dic		A d. 1 C. 1	loct

Date & Time:	NG Marine G		al Investigati 1/6/15						
Borehole:	9/5/15 070 0 MB-16		Borehole: Longitude:		of   For Da				
Latitude:	60.49/29686°N				151,37525403 °W				
Day Shift Observer	V = 3 = 14	0-1900	Night Shift & Shift		A.Fee 19	100-0700	a m tre lintre 5 -		
& Shift Time: Drilling Start Time:	9/5/15 12:00		Drilling Er	- International Control of the Contr	Million of the Control of the Contro	6:45		•	
State time.	Outfall 001 - Ge								
	Outlan 001 - O	THE RESERVE AND ADDRESS OF THE PARTY OF THE	uid Losses (F						
Drilling Flu	uid Volumes		Day Shift			Night Shift		Total	
	ed (gal):	95	0.			1900		2850	
Remair	ning (gal):					100		h) 100	
Los	t (gal)	95	0		1	1800		2750	
based on duration an	harges (gal). Estimate id approximate flow rate on. ~180 gal max/event:	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	0	
	st to Ground (gal):	2750							
			rilling Fluid	Discharges					
Results of Static	Start Tim	ie	End 1	Time	Pass/Fail		Comments		
Sheen Test				etheres meswernen		NA -			
Discharge Start Time:		Discharge	End Time:			Discharge D	uration (min.):		
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	(8)	Length of Drill Fluid Col. (ft):	h)=f-g	Casing Dia. (in.):	-	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup> 12-in. is 0.71 ft <sup>2</sup>	1)	
Discharge Vo	ol. (gal.). ~200 gallon	s max;	k)			k = h '	* j * .7.481 gal	/ft <sup>3</sup>	
Observations	Oily	Sheen (Y/N & Co	omments)		Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)				
During Discharge	NA -				NA-				
		Our	tfall 002 - De	ck Drainag	ge				
24-hr R	ainfall (in.)	0	Volume	of Discharge	e Due to Rair	ıfall (gal.)	m)=l*1599.3 O		
Volume of Disc	charge From Deck		Day Shift			Night Shift		Total	
	al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3		Washdown 5	Washdown 6	1.0.0.	
44	ximate flow rate during hdowns.	-		-	Sum XIZgm	-		60	
	rainage Discharge (g	al.) ~2570 g	al. max:	oimm+n 60 s	DOMESTIC OF THE PARTY OF THE PA			ero energy to the	
			Outfalls 00		O' - =van=con#ado=v=n				
	Receiving Water V								
Slack Water	Date & Time				//N Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)				
1st Slack Water	9/5/15 1237	N .			IN -				
2nd Slack Water	9/5/15 18:00	N-			N				
3rd Slack Water	9/6/15 00:28	N-			N-				
4th Slack Water	9/6/15: 07:03	N-			N-				
	Other C	bserations,	Non-Permit	ted Dischar	ges, or Com	ments			
	B- $\frac{1}{6}$ $\frac{9}{5}$ $\frac{15}{6}$ $\frac{11}{6}$ $\frac{11}{6}$	or residue not re	elated to drill flui	ds or deck drai	nage and report	to Project Regula			
	Note: Observatio	ns were made o	over a 24 hr perio	a correspondi	ng with personne	i snift changes.			

Date & Time:	1 1				al Investigati			
Borehole:	9/6/15 070 MQ-16	0	- Borel		9/7/15	For Day		
Latitude:	60.49129686 °	ΛΙ	Longi		151.375			
Day Shift Observer & Shift Time:		0-1900	Night Shift & Shift	Observer		1900 - 0		
Drilling Start Time:	9/6/15 07		Drilling E			9/7/15	7700	
	Outfall 001 - G		- Drilling Flui	ds and Dril				•
	Odtian ook d		luid Losses (F	THE RESERVE OF THE PARTY OF THE	THE RESERVE OF THE PARTY OF THE	the Seamou		
Drilling Fl	uid Volumes		Day Shift	1101 10 013	lininger	Night Shift		Total
THE RESERVE AND ADDRESS OF THE PARTY AND ADDRE	ed (gal):	30	060 gal			800		n)
Remai	ning (gal):		0	antina di Propositioni di Prop		0		b)
Los	st (gal)	30	60gal			800		c)=a-b
	charges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	d)
	nd approximate flow rate on. ~180 gal max/event:				-			
THE RESERVE THE PERSON NAMED IN COLUMN 2 I	st to Ground (gal):	emiva	<u> </u>				<u> </u>	
		D	rilling Fluid I	Discharges				
Results of Static	Start Tim		End 7	NAME OF TAXABLE PARTY.	Pass/Fail		Comments	
Sheen Test	0033		003	8	Pass	No shee	en observed	
Discharge Start Time:		Discharge	e End Time:			Discharge Duration (min.):		
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	15	Length of Drill Fluid Col. (ft):	10)=1-g 35	Casing Dia. (in.):	7	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup> 12-in. is 0.71 ft <sup>2</sup>	0.27
Discharge Vo	ol. (gal.). ~200 gallon	s max:	71	gal		k = h	* j * 7.481 gal,	/ft <sup>3</sup>
Observations	Oily	Sheen (Y/N & Co	Annual Control of the				e, Deposits, Foan	
During Discharge	N				N-			-
24 h= D	ninfall (in )	The second second	tfall 002 - De	The same of the last two days are not to the	the party was the state of the same of the same of	6 11 6 13	Col-Wieno 3	
THE RESIDENCE OF THE PARTY OF T	ainfall (in.) harge From Deck	0.37	CONTROL OF THE PARTY OF THE PAR	of Discharge	e Due to Rain	Action of the second	m]=1*1599.3 59Z	
	al.). Estimate based on	Washdown 1	Day Shift Washdown 2	Washdown 3	Washdown 4	Night Shift Washdown 5	Washdown 6	Total
	ximate flow rate during	15 min x / Sypm	Washdown 2	washuowh s	10 max 1250	Washdown 5	washdown 6	200
No. of the control of	ndowns.	180gul			12000	17.00		300
Total Deck Dr	rainage Discharge (g	al.) ~2570 ga	NAME OF TAXABLE PARTY.	diamen 892	2			
	B	LOI	Outfalls 00					
	Receiving Water Vi						tions) e, Deposits, Foan	
Slack Water	Date & Time	Only Sheeti Det	& Comments)	neen rest (1/N		Residue (Y/N &		n, Scum, or
1st Slack Water	9/6/15 0703	N			N-			
2nd Slack Water	9/6/15 13:51	N			N			
3rd Slack Water	9/6/15 19:35	M -			N			
4th Slack Water	9/7/15 01:39	N			N		and Communication of the Commu	
	Other O	bserations,	Non-Permitt	ed Dischar	ges, or Comm	nents		
Stop discharge upon	obseration of oily sheen o	r residue not rel	ated to drill fluid	ls or deck drain	nage and report to	o Project Regula	tory Advisor, Claire	Joseph.

Project: Alaska LNG Marine Geotechnical Investigation

Date & Time: 9/7/15 0700				to			070			
Boreho	-	MB-20		Boreh	1		of /	For Day	E 1 100	
Latitud		60.65661392°N	Longitude: Night Shift Observer			151.3688				
Day Shift Ob: & Shift Tir		). branvald 0700-1	900	& Shift 7		A.Fee 1	900-070	70		
Drilling Start	-	9/7/15 07:55		Drilling En	d Time:	9/8/15	06:40			
		Outfall 001 - Ged	ntechnical	Drilling Fluid	s and Drill	Cuttings at t	he Seafloor			
				uid Losses (P						
Dri	lling Flu	id Volumes		Day Shift			Night Shift	1000	Total	
	AND DESCRIPTION OF THE PERSON NAMED IN	d (gal):	10	03			2640		3643	
	Remain	ing (gal):		0			0		0 0	
	Lost	(gal)	THE RESERVE OF THE PERSONNEL PROPERTY.	03	-	-	2640		3643	
		narges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	0	
		approximate flow rate  n. ~180 gal max/event:				*				
STATE OF THE PERSON NAMED IN COLUMN TO STATE OF THE PERSO	100000	t to Ground (gal):	3643							
				rilling Fluid (	Discharges					
Results of	Static	Start Time		End T	ime	Pass/Fail		Comments		
Sheen T							NA -			
Discharge Sta	rt Time:		Discharge	End Time:			Discharge D	uration (min.):		
Length of		Drilling Fluid Depth Below	g)	Length of Drill	h)=f-g	Casing Dia.	1)	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	)	
Casing (ft):	-	Top of Casing (ft):		Fluid Col. (ft):		(in.):		12-in. is 0.71 ft <sup>2</sup>		
Disch	arge Vo	I. (gal.). ~200 gallons	max:	KI .		Market Rail Colonial Colonial	' k = h '	* j * 7.481 gal,	/ft <sup>3</sup>	
Observa	tions	Oily S	Sheen (Y/N & Co	omments)		Floating Solids	, Debris, Sludge Residue (Y/N 8	e, Deposits, Foan & Comments)	n, Scum,	
During Dis	charge	NA -	-			NA -		-		
- stop comprised			Out	tfall 002 - De	ck Drainag	e				
- 2	24-hr Ra	ninfall (in.)	<sup>ll</sup> O	Volume o	of Discharge	e Due to Rair		m)=1*1599.3 O		
Volume	of Disc	harge From Deck		Day Shift			Night Shift		Total	
		l.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	in)	
duration a	Sange Contrate	kimate flow rate during adowns.	<b></b>			120gal			150	
Total		ainage Discharge (ga	al.) ~2570 g	al. max:	(a)=m+n (a)	sal.				
10441		- U		Outfalls 00						
		Receiving Water Vi	sual Observ	ations - Day	light Slack \	Water (Per NO	AA current predi	ctions)		
Slack W	/ater	Date & Time	Oily Sheen De	tected in Visual S & Comments)	heen Test (Y/N	Floating Solids	s, Debris, Sludg Residue (Y/N	e, Deposits, Foar & Comments)	n, Scum,	
1st Slack	Water	9/7/15 08121	N			N				
2nd Slack	Water	9/7/15 15:02	N			N				
3rd Slack	Water	9/7/15 20:47	IN -			IN —				
4th Slack		9/8/15 02:49	N			IN-			Warsan .	
			bserations.	Non-Permit	ted Dischar	rges, or Comi	ments			
				1						
				7						
		n obseration of oily sheen o						Company of the Name of the Nam	- constructors	

Project: Alaska LNG Marine Geotechnical Investigation

Date & Time: 9/8/15 0700 to					9/9/15		700		
Borehole:	Borehole:		7 1	of	For Day				
Latitude:	60,656613920	N	Longitude:		151.3689				
Day Shift Observer & Shift Time:	J. breenweld 070	0-1900	Night Shift & Shift		A.Fee	1900-070	00 .		
Drilling Start Time:	Drilling complete				71.136		-		
	Outfall 001 - Ge	1 0 A A A		ds and Drill	Cuttings at	the Seafloor			
	Odital 001 G	· · · · · · · · · · · · · · · · · · ·	uid Losses (P	NAME AND ADDRESS OF TAXABLE PARTY.	THE RESERVE THE PARTY OF THE PA				
Drilling Flu	uid Volumes		Day Shift	A Second Standard		Night Shift		Total	
	ed (gal):		0					9 0	
Remain	ing (gal):		0					b)- O	
Los	t (gal)		0					d <sup>n-e-()</sup>	
	narges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Ø.	
	d approximate flow rate n. ~180 gal max/event:		,	-	-			0	
A STATE OF THE PROPERTY OF THE PARTY OF THE	st to Ground (gal):	elac-0 ()							
		D	rilling Fluid I	Discharges					
Results of Static	Start Tim	e	End 1	ime	Pass/Fail		Comments		
Sheen Test	09:05		09:10		Pass	No slick	sheen.		
Discharge Start Time:	09:40	Discharge	End Time:	09:50		Discharge D	uration (min.):	10	
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	21	Length of Drill Fluid Col. (ft):	24	Casing Dia. (in.):	. 7	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup> 12-in. is 0.71 ft <sup>2</sup>	0.27	
Discharge Vo	ol. (gal.). ~200 gallon	s max:	48 gral.	representation and the second		k = h	* j * 7.481 gal,	/ft <sup>3</sup>	
Observations	Sheen (Y/N & Co	Comments) Floating Solic			, Debris, Sludg Residue (Y/N &	e, Deposits, Foan & Comments)	n, Scum, or		
During Discharge	N				N				
		Out	tfall 002 - De	ck Drainag	e				
24-hr Ra	ainfall (in.)	0.66	Volume o	of Discharge	e Due to Rair	nfall (gal.)	mj=1*1599.3 105	6	
Volume of Disc	harge From Deck		Day Shift			Night Shift		Total	
1177	al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	TOLAI	
	ximate flow rate during ndowns.	1205al			-	-		120	
	rainage Discharge (g	al.) ~2570 g	al. max:	оння 117 (	5	Augustus and a second			
			Outfalls 00	1 & 002			2		
	Receiving Water Vi								
Slack Water	Date & Time	Oily Sheen De	tected in Visual S & Comments)	heen Test (Y/N	Floating Solids	s, Debris, Sludg Residue (Y/N	e, Deposits, Foar & Comments)	n, Scum, o	
1st Slack Water	9/8/15 69:33	N			IN-				
2nd Slack Water	9/8/15 16:03	IN			N				
3rd Slack Water	1/8/15 21:52	N			N-				
4th Slack Water	9/9/15 03:50	N -			IN -		_		
	The second secon	bserations.	Non-Permit	ted Dischar	ges, or Com	ments			
MB-20 drilling	g completed. Pa								
Stop discharge upor	obseration of oily sheen o						itory Advisor, Clair	e Joseph.	
	Note: Observation	ns were made o	ver a 24 hr perio	d correspondir	ng with personne	I shift changes.			

Date & Time:	9/9/15 070		NG Marine G		l Investigati	ion 07	00		
Borehole:	MB-25	Borel	Terre .	1/10/12	of )	For Day			
Latitude:	60, 65322350°N		Longit		151.36967	7892°W			
Day Shift Observer & Shift Time:	J. Greenwold o	700-1900	Night Shift & Shift	Time:	No Nigh	+ Shift Se	e below.		
Drilling Start Time:	9/9/15 09:25		Drilling E		9/9/15	16:50			
	Outfall 001 - Ge	AND REAL PROPERTY.	THE PERSON NAMED IN COLUMN TWO IS NOT	AND THE RESERVE OF THE PARTY OF	THE RESERVE OF THE PARTY OF THE	the Seafloor			
Drilling Eli	uid Volumes	Drilling Fil	uid Losses (F Day Shift	Prior To Disc	narge)	Night Shift	<del></del>	Total	
	ed (gal):	10	)56			TVIgnt State		1056	
	ning (gal):		0				-	b) O	
	t (gal)	11	)56				***************************************	1056	
The second secon	harges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	d)	
based on duration an	d approximate flow rate on. ~180 gal max/event:					-		0	
Drilling Fluid Los	st to Ground (gal):	1056	AND RESIDENCE AND PROPERTY OF THE PERSON NAMED IN COLUMN TWO PARTY.						
			rilling Fluid						
Results of Static	Start Tim	e	End 1	the Long Control of State of S	Pass/Fail	productive the state of the sta	Comments	Accordance to the second	
Sheen Test	16125		16:3	The state of the s	Pass	6% slick	The second secon		
Discharge Start Time:	16:30	Discharge	End Time:	16:35		Discharge D	uration (min.):	5	
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	5	Length of Drill Fluid Col. (ft):	50	Casing Dia. (in.):	7	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup> 12-in. is 0.71 ft <sup>2</sup>	0.27	
Discharge Vo	ol. (gal.). ~200 gallon	s max;	101 gal				* j * 7.481 gal/		
Observations During Discharge		Sheen (Y/N & Co	omments)		Floating Solids, Debris, Sludge, Deposits, Foam, Sci Residue (Y/N & Comments)				
During Discharge	IV —	Out	tfall 002 - De	ck Drainag	N —				
24-hr Ra	ainfall (in.)	0.07	THE RESERVE AND PARTY AND PERSONS ASSESSED.	No. of Concession, Name of Street, Str	Due to Rair	nfall (gal.)	m)=1*1599.3 112 50	1	
Volume of Disc	harge From Deck		Day Shift			Night Shift	Commission and a summary of the contract of th	SHOPPING TO SERVICE AND SERVIC	
Washdown (ga	al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total	
The same works and the same and a same and a same	ximate flow rate during								
AND THE RESERVE THE PARTY OF TH	ndowns. rainage Discharge (g	al.) ~2570 g	al. max:	ojemen 115	ral.		L	0	
	amage producting (8	2070 8	Outfalls 00		701.				
	Receiving Water Vi	sual Observ		THE RESERVE OF THE PARTY OF THE	Water (Per NO.	AA current predic	ctions)		
Slack Water	Date & Time	Oily Sheen Det	ected in Visual S & Comments)	heen Test (Y/N	Floating Solids	s, Debris, Sludg Residue (Y/N	e, Deposits, Foan & Comments)	n, Scum, or	
1st Slack Water	9/9/15 10:30	N -			N				
2nd Slack Water	19/9/15 16:54	N			N-				
3rd Slack Water	9/9/15 22:46	Ria Unm	annel See 6	elow.					
4th Slack Water	9/10/15 04:42	21		e kelow.	- 110				
	Other 0	bserations,			ges, or Com	ments			
* Riz unmanned	9/9/15 17:20 -	9/10/15 0	700 due	to wead	her.			244	
Stop discharge upor	obseration of oily sheen o	r residue not re	lated to drill flui	ds or deck drain	nage and report	to Project Regula	itory Advisor, Claire	e Joseph.	
	Note: Observation	ns were made o	ver a 24 hr perio	d correspondin	g with personne	I shift changes.		-	

Created (gal):  Remaining (gal):  Lost (gal)  Inadvertent Discharges (gal). Estimate based on duration and approximate flow rate during lost-drugs (fit):  Discharge Vol. (gal.). "200 gallons max:  Observations  Outfall 002 - Deck Drainage  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Outfall 002 - Deck Drainage  Outfall 002 - Deck Drainage  Outfall 003 - Day Shift  Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) "2570 gal. max:  Outfall 001 & Outfall 002  Receiving Water Visual Observations - Daylight Slack Water   Date & Time			Proje		ES Permit No		(Car 10)	lan.		
Borehole: Latitude: Day Shift Observer & Shift Time: Drilling Start Time: Drilling Fluid Volume  Drilling Fluid Notation and approximate flow rate during (fit): Drilling Fluid Lost to Ground (gal): Drilling Fluid Lost to Ground (gal)	2/.				1.0		ai investigat			
Latitude: Day Shift Observer A Shift Time: Drilling Fluid Volumes Drilling Fluid Discharges Remaining (gal): Drilling Fluid Lost (gal): Drilling Fluid Lost (gal): Drilling Fluid Lost (gal): Drilling Fluid Discharges Results of Static Start Time Drilling Fluid Discharges Drilling Fluid Discharges Drilling Fluid Depth Below Drilling Fluid Depth Bel				7.0	_	•				
Dutfall 001 - Geotechnical Drilling Fluids and Drill Cuttings at the Seaffloor  Drilling Fluid Volumes  Day Shift Time:  Drilling Fluid Volumes  Day Shift Diserver  Shift Diserver  Drilling Fluid Volumes  Day Shift  Created (gal):  Remaining (gal):  Lost (gal)  Inadvertent Discharges (gal). Estimate based on duration and approximate flow rate during lost circulation. **Allog almay/event:  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharges  Results of Static  Start Time:  Discharge Start Time:  Discharge Start Time:  Discharge Start Time:  Discharge Start Time:  O#50  Discharge Flort To Discharges  Results of Static  Start Time:  Discharge Start Time:  Discharge Start Time:  Discharge Start Time:  O#50  Discharge Flort Discharge Duration (fir):  To Casing Chi.  To Casing (fir):  To Casing Chi.  To Cas				Λ/	- Induction		15/37		1 Or Day	_
Drilling Fluid Losses (Prior To Discharge)   Drilling Fluid Losses (Prior To Discharge)			1 . 11		Night Shift	Observer	A Fee	a seed in Soliday of a large and the country	700	- 1
Durilling Fluid Losses (Prior To Discharge)  Drilling Fluid Volumes  Day Shift  Created (gal):  Remaining (gal):  Lost (gal)  Lost (gal)  Drilling Fluid Discharge (gal):  Event 1  Event 2  Event 3  Event 4  Event 5  Event 6  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharges  Results of Static  Sheen Test  Discharge Start Time:  Discharge Vol. (gal.), "200 gallons max:  During Discharge  Doutfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck  Washdown (gal.), Estimate based on duration and approximate flow rate during weathdowns.  Total Deck Drainage Discharge (gal.) "2570 gal. max:  Day Shift  Night Shift  Night Shift  Night Shift  Night Shift  Total Deck Drainage Discharge (gal.) "2570 gal. max:  Outfall 002 - Deck Drainage  Shack Water  Date & Time  Oliv Sheen Detected in Visual Sheen Test (V/N Floating Solids, Debris, Sludge, Deposits, Foam, Sour Residue (V/N & Comments)  Slack Water  Date & Time  Oliv Sheen Detected in Visual Sheen Test (V/N Floating Solids, Debris, Sludge, Deposits, Foam, Sour Residue (V/N & Comments)  Slack Water  Date & Time  Oliv Sheen Detected in Visual Sheen Test (V/N Floating Solids, Debris, Sludge, Deposits, Foam, Sour Residue (V/N & Comments)  Other Obserations, Non-Permitted Discharges, or Comments  Other Obserations, Non-Permitted Discharges, or Comments							9/11/15			_
Drilling Fluid Volumes  Drilling Fluid Volumes  Day Shift  Night Shift  Total Created (gal):  Remaining (gal):  Lost (gal)  Lost (gal)  Inadvertent Discharges (gal). Estimate during lost circulation. **180 gal max/event:  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharge Fluid Discharge Lost (gal):  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharge Fluid Discharge Lost (gal):  Drilling Fluid Lost (gal):  Drilling Fluid Discharge Lost (gal):  Drilling Fluid Lost (gal):  Drilling Fluid Discharge Lost (gal):  Drilling Fluid Lost (gal):  Drilling Fluid Discharge Lost (gal):  Drilling Fluid Lost (gal):  Drilling					Drilling Elvis	ds and Dril	Cuttings at			-
Drilling Fluid Volumes Created (gal):  Remaining (gal):  Lost (gal)  Doubt (gal):  Lost (gal):  Lost (gal):  Doubt (gal):  Lost (gal):  Doubt (gal):  Doubt (gal):  Drilling Fluid Discharges (gal). Estimate based on duration and approximate flow rate during to set circular (gal):  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharges  Results of Static Start Time:  Discharge Start Time:  Off Discharge Start Time:  Discharge Start Time:  Off Discharge Start Time:  Discharge Start Time:  Off Discharge Start Time:  Discharge Start Time:  Discharge Start Time:  Off Discharge Start Time:  Discharge Start Time:  Off Discharge Start Time:  Off Discharge Start Time:  Off Discharge Start Time:  Olischarge Due to Rainfall (gal.):  Night Shirt  Night Shirt  Night Shirt  Washdown 1  Washdown 1  Washdown 1  Washdown 2  Washdown 3  Washdown 4  Washdown 3  Washdown 4  Washdown 5  Washdown 6  Outfalls Ool 8  Outfall Ool 8  Outfall Ool 8  Out			Outlan 001 - Ge	CONTRACTOR OF THE PARTY OF THE	CONTRACTOR OF STREET	Name and Address of the Owner, where the Owner, which we can be a sufficient to the Owner, which we can be a suff	THE RESERVE AND PARTY OF THE PA	the Sealloo		
Created (gal): Remaining (gal):  Lost (gal)  Inadvertent Discharges (gal). Estimate based on duration and approximate flow rate during losc circulation. 120 gal max/event:  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharges  Results of Static Start Time End Time Pass/Fail Comments  Sheen Test Discharge start Time:  Odd Drilling Fluid Depth Below Top of Casing (ft):  Discharge Vol. (gal.). **200 gallons max:  Oliy Sheen (Y/N & Comments)  Discharge Vol. (gal.). **200 gallons max:  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Outfall 002 - Deck Drainage  Resciving Water Visual Observations Daylight Slack Water Date & Time  Outfall 001 & O02  Receiving Water Visual Observations Daylight Slack Water Pass August Machadown (gal.). 5 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	0	Orilling Fl	uid Volumes				1	Night Shif	t	Total
Remaining (gal):  Lost (gal) Inadvertent Discharges (gal) Estimate based on duration and approximate flow rate during plots circulation. "180 gal max/event:  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharges  Results of Static Start Time End Time Pass/Fail Comments  Sheen Test O450 Discharge End Time: O455 Discharge Duration (min.):  Empth of Top of Casing (ft):  Discharge Vol. (gal.). "200 gallons max: O450 Discharge Vol. (gal.). "200 gallons max: Floating Solids, Debirs, Sludge, Deposits, Foam, Sour Residue (Y/N & Comments)  Observations  During Discharge  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) "2570 gal. max: 32854  Outfall 001 & 002  Receiving Water Visual Observations - Daylight Slack Water Palo (15 17:34 Norments)  Day Shift Slack Water Outer Visual Observations - Daylight Slack Water Palo (15 17:34 Norments)  Other Observations, Non-Permitted Discharges, or Comments  Other Observations, Non-Permitted Discharges, or Comments		THE RESERVE OF THE PARTY OF THE		21	the same of the sa		<b></b>	And and the Residence of the second street of the s		2450
Inadvertent Discharges (gal). Estimate based on duration and approximate flow rate during bots circulation. **180 gala max/event:*  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharges  Results of Static Start Time: End Time Pass/Fail Comments  Sheen Test Discharge Start Time: O#50 Discharge End Time: O#55 Discharge Discharge Discharge Start Time: O#50 Discharge End Time: O#50 Discharge End Time: O#50 Discharge End Time: O#50 Discharge Discharge Start Time: O#50 Discharge End Time: O#50 Discharge Discharge Discharge Discharge Discharge End Time: O#50 Discharge Discharge Discharge Discharge End Time: O#50 Discharge Discharge Discharge Discharge End Time: O#50 Discharge End Time		the state of the s						0		6) 0
Inadvertent Discharges (gal). Estimate based on duration and approximate flow rate during tost circulation. **Play again max/event:**  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharges  Exemt 1 Event 2 Event 3 Event 4 Event 5 Event 6  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharges  End Time Pass/Fail Comments  Sheen Test  Discharge Start Time:  O#55  Discharge End Time:  O#55  Discharge For Time:  Discharge For Time:  Discharge For Time:  Discharge For Time:  Discharge Vol. (gal.). **200 gallons max:  Oily Sheen (Y/N & Comments)  Discharge Vol. (gal.). **200 gallons max:  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck  Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) **2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water   Date & Time   Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scur Residue (Y/N & Comments)  Slack Water   Date & Time   Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scur Residue (Y/N & Comments)  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water   Date & Time   Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scur Residue (Y/N & Comments)  Noutfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Outfalls 001 & 002  Author of Discharge Solids, Debris, Sludge, Deposits, Foam, Scur Residue (Y/N & Comments)  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Outfalls 001 & 002  Outfalls 001 & 002		Los	t (gal)	25	0	COURSE OF THE SAME		1200		2450
Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharges  Results of Static Start Time End Time Pass/Fail Comments  Sheen Test O443 Discharge End Time: O455 Discharge Duration (min.):  Length of Drilling Fluid Depth Below Top of Casing (ft): Top of Casing (ft):  Discharge Vol. (gal.). ~200 gallons max: Pluid Col. (ft): H8, Casing Dia. (in.):  Observations  During Discharge  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge Due to Rainfall (gal.). Might Shift Washdown (gal.). Estimate based on duration and approximate flow rate during weshdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max: Day Shift  Outfall 001 & 002  Receiving Water Visual Observations - Day light Slack Water Date & Time  Slack Water Date & Time  Other Obserations, Non-Permitted Discharges, or Comments  Other Obserations, Non-Permitted Discharges, or Comments	based on	duration an	d approximate flow rate	Event 1	Event 2	Event 3	Event 4	Contraction of the last of	Event 6	0
Results of Static Sheen Test OHGO Discharge Start Time: Sheen Test Discharge Start Time: Discharge Duration (min.): Start Time: Discharge Discharge Start Time: Discharge Duration (min.): Start Time: Discharge Discharge Start Time: Discharge Duration (min.): Start Time: Discharge Duration (min.): Start Time: Discharge Discharge Start Time: Discharge Duration (min.): Start Time: Duration (min.): Start Time: Discharge Duration (min.): Start Time:			AND DESCRIPTION OF THE PERSON	emie Duc						L
Results of Static Sheen Test Discharge Start Time: Discharge Start	Drining	, Flaid Lo.	st to Ground (gai).	And the second of the last of	NAME AND ADDRESS OF THE OWNER, WHEN PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERS	Discharges				
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Discharge Start Time:  O#50  Discharge End Time:  O#55  Discharge Duration (min.):  Length of Casing (h):  Discharge Vol. (gal.), ~200 gallons max:  Observations  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.), ~2570 gal, max:  Outfall 001 & 002  Receiving Water Visual Observations Ploys the Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scur Residue (Y/N & Comments)  Outfall 002 - Deck Drainage  Outfall 003 - Deck Drainage  Outfall 004 - Deck Drainage  Outfall 005 - Deck Drainage  Outfall 006 - Deck Drainage  Outfall 007 - Deck Drainage  Outfall 008 - Deck Drainage  Outfall 009 - Deck Drainage  Outfall 000 - Deck Drainage  Outf			The second little and	-	The same of the sa		de montantina de la companya del companya del companya de la companya del la companya de la comp	Ma	/ L	
Length of Casing (ft):    Casing Dia.   Casing Dia.   Casing Area (ft'):   T-in. is 0.27 ft' 12-in. is 0.71		and the party of the last of t	Commence of the Commence of th	Discharge	The second second	-	1000	The second second second	THE RESERVE OF THE PERSON NAMED IN COLUMN 2 IS NOT THE PERSON NAME	100
Discharge Vol. (gal.). ~200 gallons max:  Observations  During Discharge  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water Pate & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scur & Salack Water Pate & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scur & Salack Water Pate & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scur & Salack Water Pate & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scur & Comments)  Other Obserations, Non-Permitted Discharges, or Comments		0		1 70		Military and the second		i)	No. of the Assessment of the A	1)
Observations During Discharge  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time Oilly Sheen Detected in Visual Sheen Test (Y/N & Comments)  Night Shift Washdown 5 Washdown 6 Tot Washdown 5 Washdown 6 Tot Washdown 8 Washdown 9 Was	Casing (ft):		Top of Casing (ft):			48,1	100 700 100	7"	7-in. is 0.27 ft <sup>2</sup>	0.27
Observations During Discharge  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Sour Residue (Y/N & Comments)  A Comments  Passidue (Y/N & Comments)  Residue (Y/N & Comments)  Nashdown 1 Washdown 2 Washdown 3 Washdown 4 Washdown 5 Washdown 6  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Sour Residue (Y/N & Comments)  1st Slack Water  A Jol 5 17:34 N  Other Obserations, Non-Permitted Discharges, or Comments	Disc	harge Vo	ol. (gal.). ~200 gallon	s max:	97	gallons				
Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scur & Comments)  1st Slack Water 9/10/15 17:34 N Non-Permitted Discharges, or Comments  Other Obserations, Non-Permitted Discharges, or Comments				Sheen (Y/N & Co						n, Scum, o
24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scur Residue (Y/N & Comments)  1st Slack Water 9/10/15 17:34 N  Other Observations, Non-Permitted Discharges, or Comments	During D	ischarge	N		N-					
Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water  Date & Time  Oilly Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scur Residue (Y/N & Comments)  1st Slack Water  2nd Slack Water  2nd Slack Water  Other Obserations, Non-Permitted Discharges, or Comments				Out	tfall 002 - De	ck Drainag	e			
Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scur Residue (Y/N & Comments)  1st Slack Water 9/10/15 17:34 N  2nd Slack Water 9/10/15 23:39 N  Other Observations, Non-Permitted Discharges, or Comments		24-hr Ra	infall (in.)	0.13	Volume o	of Discharge	e Due to Rair	nfall (gal.)	m)=1*1599.3 208	1801
Washdown 3 Washdown 4 Washdown 5 Washdown 6					Day Shift			Night Shift		The state of the s
Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scur & Comments)  1st Slack Water 9/10/15 17:34 N N Residue (Y/N & Comments)  2nd Slack Water 9/10/15 17:34 N N N N N N N N N N N N N N N N N N N		The state of the s	15명 전 20년 1일 1일 12년 - 12년 1일	Washdown 1	Washdown 2	Washdown 3		Washdown 5	Washdown 6	Total
Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scur & Comments)  1st Slack Water 9/10/15 17:34 N N Residue (Y/N & Comments)  2nd Slack Water 9/10/15 17:34 N N Non-Permitted Discharges, or Comments	duration			_		*******				120
Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scur & Comments)  1st Slack Water 9/10/15 17:34 N N Noar Permitted Discharges, or Comments	Total	THE RESERVE THE PERSONNEL	THE RESERVE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER, OF THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER.	al.) ~2570 ga	al. max:	ol=m+n 3 28		The state of the s		
Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scur & Comments)  1st Slack Water 9/10/15 17:34 N N N N N N N N N N N N N N N N N N N					The State of the S		0			
Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Scur & Comments)  1st Slack Water 9/10/15 17:34 N N N N N N N N N N N N N N N N N N N			Receiving Water Vis	sual Observ	ations - Dayl	ight Slack V	Nater (Per NOA	AA current predi	ctions)	
2nd Slack Water 9/10/15 17:34 N - W - W - W - W - W - W - W - W - W -	Slack \	Water		Oily Sheen Det	tected in Visual Sh	neen Test (Y/N	Floating Solids	, Debris, Sludg	je, Deposits, Foan	n, Scum, o
2nd Slack Water 9/10/15 17:34 N N N N N N N N N N N N N N N N N N N	1st Slack	k Water	9/10/15 11:13	N-			N-			
3rd Slack Water 9/10/15 23:39 N A The Slack Water Other Obserations, Non-Permitted Discharges, or Comments	2nd Slac	k Water	- 1 1	N			N			
4th Slack Water Other Obserations, Non-Permitted Discharges, or Comments	3rd Slaci	k Water		IN .			1			-
Other Obserations, Non-Permitted Discharges, or Comments			110112 10112	17						Martin Company
			Other O	oserations.	Non-Permitt	ed Dischan	ges or Comn	nents		
Stop discharge upon obseration of oily sheen or residue not related to drill fluids or deck drainage and report to Project Regulatory Advisor, Claire Joseph										

				ES Permit No							
	harana ara		ct: Alaska L	NG Marine (	Geotechnic	al Investigat	ion				
	k Time:	9/10/15 0700	to to		9/11/15	2					
	hole:	MB-31		Borel		2	of Z	For Day			
	ude: Observer	60.649812250	N	Longi		-151.370	39036				
& Shift	Time:	Jesse Greening		Night Shift & Shift		Austin F	EE 1900	-0700			
Drilling St	tart Time:	09/11/2005 1	0500-	Drilling Er	nd Time:	9/11/15	070	0 -			
	Was die	Outfall 001 - Go	eotechnical	<b>Drilling Fluid</b>	ds and Drill	<b>Cuttings</b> at	the Seafloo	r			
				luid Losses (F							
C		uid Volumes		Day Shift			Night Shif	t	Total		
	THE RESERVE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN	ed (gal):	WAS TENNON TO			2	200		200		
		ning (gal):	-				0		b) O		
		t (gal)		y		THE RESERVE THE PROPERTY OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS	<i>90</i>		200		
		harges (gal). Estimate d approximate flow rate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6			
		n. ~180 gal max/event:		-	-	_			0		
Drilling	Fluid Los	st to Ground (gal):	200				The state of the s				
			C	rilling Fluid [	Discharges						
Results	of Static	Start Tim	e	End T	ime	Pass/Fail		Comments			
Sheen											
Discharge S	Start Time:		Discharge	End Time:			Discharge (	Ouration (min.):	****		
Length of	S)	Drilling Fluid Depth Below		Length of Drill	Renty	Casing Dia.		Casing Area (ft <sup>2</sup> ):	9		
Casing (ft):		Top of Casing (ft):		Fluid Col. (ft):	-	(in.):	go:martin	7-in. is 0.27 ft <sup>2</sup> 12-in. is 0.71 ft <sup>2</sup>			
Disc	harge Vo	l. (gal.). ~200 gallon:	s max:	N The second			k = h	*   * 7.481 gal/	/ft <sup>3</sup>		
Observ	ations	Oily	Sheen (Y/N & Co	omments)			, Debris, Sludg	e, Deposits, Foar			
	ischarge						Residue (Y/N & Comments)				
out in g D	ischarge	NA -				NA -					
			THE RESERVE THE PERSON NAMED IN	fall 002 - De	THE RESIDENCE	The Part of the Pa					
V/ I	COURS OF THE PARTY		See Sheet 1	A CONTRACTOR OF THE PARTY OF TH	f Discharge	Due to Rain	Marie and Marie and Street	m)=1°1599.3See SA	uet1		
		harge From Deck		Day Shift	-		Night Shift		Total		
	1000	l.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total		
duration		dimate flow rate during downs.			-				0		
Total	Deck Dr	ainage Discharge (ga	l.) ~2570 ga	al. max:	olemetr 6			CONTRACTOR OF THE STATE OF THE			
				Outfalls 00:	The state of the second control of the secon						
		Receiving Water Vis	ual Observ	ations - Dayli	ight Slack V	Vater (Per NOA	A current predic	ctions)			
Slack V	Water	Date & Time	Oily Sheen Detected in Visual Sheen Test (Y/N & Comments)			N Floating Solids, Debris, Sludge, Deposits, Foam, So Residue (Y/N & Comments)					
1st Slack	Water	9/11/15 05:26	N -			N					
2nd Slac	k Water										
3rd Slack	k Water	1 - 1						CONTRACTOR CONTRACTOR			
4th Slack	k Water							To recover a construction of the construction			
		Other O	serations.	Non-Permitte	ed Dischare	es, or Comm	ents		ASIBI COL		
Sheet	2/2										
		Drilling of MB-	31 this ob	oservation p	uriod,						
Stop disc	harge upon	obseration of oily sheen or	residue not rel	ated to drill fluid	s or deck drain	age and report to	o Project Regula	tory Advisor, Claire	Joseph.		
de Avante	Alexander de la companya de la comp	Note: Observation									

	Droject:	Alaska LNG	Marine Geot	echnical In	vestigation	0700		
	1		το	_ ()	12/15 of	2	For Day	
ate & Time: 9/1	113		Borehole		151.370390			
Borehole: M	8-31 8-31	7	Longitude	e:				
Latitude: 60  y Shift Observer			Night Shift Obs		Fee 190	0-0700		
& Shift Time:	r reenway	-1900	Drilling End Ti			5:50		
rilling Start Time: 9	11/12 0830		un Eluido	and Drill Cu	ittings at the	Seafloor		
	Outfall 001 - Geo	technical Dr	d Losses (Pric	or To Discha	arge)		<u> </u>	
		Drilling Flui	Day Shift	1		Night Shift		Total
Drilling Fluid	Volumes	The same of the sa						2300
Created (			00 -					2300
Remaining			00				- :6	d 200
Lost (g	al)	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	0
nadvertent Dischar	ges (gal). Estimate	Evencia			_	-		
based on duration and ap during lost circulation. ~	180 gal max/event:						A 20	
Drilling Fluid Lost t	o Ground (gal):	2300		incharges.				
Drining.		water the same of	illing Fluid D End Ti		Pass/Fail		Comments	
Results of Static	Start Tim	e		me	Pass	0% Stick	Sheen	-
Sheen Test	17:08		17:15	1717.0	1 4033	Discharge D	uration (min.):	10
Discharge Start Time:	17:20	Discharge	End Time:	17:30	- i - Di-		Casing Area (ft <sup>2</sup> ):	0.27
Length of D	rilling Fluid Depth Below Top of Casing (ft):	6	Length of Drill Fluid Col. (ft):	54	Casing Dia. (in.):	/	7-in. is 0.27 ft <sup>2</sup> 12-in. is 0.71 ft <sup>2</sup>	
Casing (ft):		ac may:	109 gal			k = h	* j * 7.481 ga	m Scum o
Discharge Vol.	(gal.). ~200 gallor	IIS IIIAA.			Floating Solids	Debris, Slude Residue (Y/N	ge, Deposits, Foa & Comments)	an, 000m,
Observations	Oil	y Sheen (Y/N & Co	omments)		7	Ticologo (****		
During Discharge	N/				N			
Daring	14	Ou	tfall 002 - De	ck Drainag	e		Intel®1599.36 a	1
	6-11 (in )	00.05	Volume	of Discharge	e Due to Rair	nfall (gal.)	m)=1*1599.380A	4
24-hr Rai	arge From Deck	0.00	Day Shift			Night Shi		Total
Volume of Discr	A setimate based on	Washdown 1	_	Washdown 3	Washdown 4	Washdown 5	Washdown o	nl nl
Washdown (gai	.). Estimate based on mate flow rate during		10000	-	-			0
100000000000000000000000000000000000000		1) - 2570	-al may:	ol-min 90 a	.1			
Total Deck Dra	ainage Discharge	(gal.) ~2570 (	Outfalls 00	01 & 002	A.L.			300000000000000000000000000000000000000
	Receiving Water	Viewal Obcor		Cala Clark	Water (Per NC	AA current pre	dictions)	
	Receiving Water	Visual Obser	etected in Visual	Sheen Test (Y/N	Floating Solid	s, Debris, Slu	dge, Deposits, Fo	am, Scum
Slack Water	Date & Time		& Comments)		N	Residue (Y/	N & Comments)	
1st Slack Water	9/11/15 11:49	N-			1.4			
2nd Slack Water	* 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				-			Tue parties a
3rd Slack Water	37275 0000		-					
4th Slack Water	1, 15 06708			Had Discha	rass or Com	ments		
	Other	r Obserations	, Non-Permi	tted Discha	iges, or con	monto		
#Sheet 1/2								
	obseration of oily shee							

		t: Alaska LN	IG Marine G	eotechnica	l Investigati			
Date & Time:	1/4/15 0700		to	52	9/12/15	0700 of 2	For Day	
Borehole:	MB-02		Boreh	MANAGEMENT .	12	277	FOI Day	ē
Latitude: Day Shift Observer	60.66965211°N		Longit Night Shift		151.38968	556 W		0.
& Shift Time:	J. breenwald 5700	-1900	& Shift		A.Fet 1900	1-0706	.,	E
Drilling Start Time:	2315 9/11/2	0/5	Drilling En	nd Time:				
	Outfall 001 - Ge	eotechnical	Drilling Fluid	s and Drill	Cuttings at	the Seafloor		-
		Drilling Flu	uid Losses (P	rior To Disc	charge)			
Drilling Flu	iid Volumes		Day Shift			Night Shift		Total
Create	ed (gal):		W/A			600		600
Remain	ing (gal):	-/	1/A			0		b) G
	t (gal)	/	V4		-	600		200
	narges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	0
	d approximate flow rate  n. ~180 gal max/event:	NA	NA	NA				
and the second s	t to Ground (gal):	600	management of the second					
		D	rilling Fluid (	Discharges				
Results of Static	Start Tim	е	End T	Time	Pass/Fail		Comments	
Sheen Test	NA		N/A		NA	- N	A	
Discharge Start Time:	NA	Discharge	End Time:	NA		Discharge D	uration (min.):	NA
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	NA	Length of Drill Fluid Col. (ft):	N/A	Casing Dia.	NA	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup> 12-in. is 0.71 ft <sup>2</sup>	$^{\circ}N/A$
Discharge Vo	l. (gal.). ~200 gallon	s max:	k)	N/A		k = h	* j * 7.481 gal	/ft <sup>3</sup>
Observations	Oily	Sheen (Y/N & Co	omments)		Floating Solids	Residue (Y/N 8	e, Deposits, Foar & Comments)	n, Scum, or
During Discharge	N/	A			1119	NA		
AND DESCRIPTION OF THE PROPERTY OF THE PROPERT		Out	fall 002 - De	THE RESERVE THE PARTY OF THE PA	THE RESERVE THE PERSON NAMED IN COLUMN			
	ainfall (in.)	"Sec Shet!	Name and Address of the Owner, where the Owner, which is	of Discharge	e Due to Raii	THE RESERVE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAME	m)=181,599.3 She	+1
Volume of Disc	harge From Deck		Day Shift			Night Shift		Total
10	al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3		Washdown 5	Washdown 6	
	ximate flow rate during ndowns.				5 minul 2gon			60
THE RESIDENCE OF THE PARTY OF T	rainage Discharge (g	al.) ~2570 g	al. max:	01=01+0 60g	THE RESERVE OF THE PARTY OF THE			
			Outfalls 00				51W-93-14-2-5,1110-39-2	
	Receiving Water V	isual Observ	ations - Day	light Slack \	Water (Per NO	AA current predi	ctions)	
Slack Water	Date & Time	Oily Sheen De	tected in Visual S & Comments)	Sheen Test (Y/N	Floating Solids	s, Debris, Sludg Residue (Y/N	e, Deposits, Foar & Comments)	m, Scum, or
1st Slack Water	9/11/15 18:09	IN	NAME OF TAXABLE PARTY.		N			: محمد بالزواد المحمد
2nd Slack Water	9/18/15 00:08	N-			N -			
3rd Slack Water	9/12/15 06:06	14-			IN -			
4th Slack Water					4 0 44 =			
	Other C	bserations,	Non-Permit	ted Dischar	ges, or Com	ments		
* shut a/a								
Stop discharge upor	n obseration of oily sheen o Note: Observation						atory Advisor, Clai	re Joseph.
The state of the s	ratie. Observatio	were made t	The period					

Created (gal): Remaining (gal): Lost (gal)  Lost (gal)  Lost (gal)  Lost (gal)  Lost (gal)  Lost (gal)  Event 1 Event 2 Event 3 Event 4 Event 5 Event 6  Based on duration and approximate flow rate during lost circulation. **T80 gal max/event:  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Discharges  Results of Static Sheen Test  Discharge Start Time:  Length of Casing (ft):  Discharge Start Time:  Length of Casing (ft):  Discharge Vol. (gal.). **200 gallons max:  Olly Sheen (Y/N & Comments)  Ploating Solids, Debris, Sludge, Deposits, Foam, Singer Start Time Sugal max/event:  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) **2570 gal. max:  Outfall 002 - Deck Drainage  Receiving Water Visual Observations Daylight Slack Water (Per NoAA current predictions)  Oliy Sheen Detected in Visual Sheen Test (V/N Floating Solids, Debris, Sludge, Deposits, Foam, Singesidue (Y/N & Comments)  Pour Slack Water Day Shift Night Slack Water (Per NoAA current predictions)  Oliy Sheen Detected in Visual Sheen Test (V/N Floating Solids, Debris, Sludge, Deposits, Foam, Singesidue (Y/N & Comments)  Slack Water  Date & Time  Oliy Sheen Detected in Visual Sheen Test (V/N Floating Solids, Debris, Sludge, Deposits, Foam, Singesidue (Y/N & Comments)  Oliy Sheen Detected in Visual Sheen Test (V/N Floating Solids, Debris, Sludge, Deposits, Foam, Singesidue (Y/N & Comments)	Date & Time:		00	to	· .	9/13/15	070		
Drilling Fluid Volumes  Event 1 Event 2 Event 3 Event 4 Event 5 Event 6 Floating Individual Volumes  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Lost to Ground (gal):  Drilling Fluid Debth Below  Discharge Start Time:  Discharge Start Time:  Drilling Fluid Debth Below  Top of Casing (ft):  Discharge Vol. (gal.). ~200 gallons max:  Discharge From Deck  Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Doutfall 002 - Deck Drainage  Day Shirt  Nashdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Durialis 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Fer NOAccurrent predictions)  Residue (Y/N & Comments)  Discharge Starting Solids, Debris, Sludge, Deposits, Foam, Sinesidue (Y/N & Comments)  Residue (Y/N & Comments)  Drilling Fluid Dobervations - Daylight Slack Water (Fer NOAccurrent predictions)  Receiving Water Visual Observations - Daylight Slack Water (Fer NOAccurrent predictions)  Receiving Water Visual Observations - Daylight Slack Water (Fer NOAccurrent predictions)  Receiving Water Visual Observations - Daylight Slack Water (Fer NOAccurrent predictions)  Residue (Y/N & Comments)									io
Results of Static Sheen Test   20   Discharge End Time:   Drilling Fluid Discharges Start Time:   Drilling Fluid Discharges Start Time:   Discharge St		60.649812250	N		(912-9900 months)	151.370	39036	2 W	pr' e
Drilling Fluid Lost (gal):		J. Greenwald 070	10-1900	= = = = = = = = = = = = = = = = = = = =		A. Fee	1900-07	700	
Drilling Fluid Volumes  Day Shift  Created (gal):  Remaining (gal):  Lost (gal)  Lost (gal)  Remaining Spart				Drilling En	nd Time:	9/12/15	11:55		10 107
Drilling Fluid Volumes Created (gal): Remaining (gal): So		Outfall 001 - Ge	eotechnical	<b>Drilling Fluid</b>	ds and Drill	Cuttings at	the Seafloo	r	
Created (gal): Remaining (gal): Lost (gal) Lost (gal)  Inadvertent Discharges (gal). Estimate based on duration and approximate flow rate during lost circulation. **T80 gal max/event:  Drilling Fluid Lost to Ground (gal):  So Fal.  Drilling Fluid Discharges  Results of Static Start Time End Time Pass/Fail Comments  Sheen Test So Fall Discharge End Time:  Length of TO Discharge Start Time:  Length of TO Discharge Start Time:  Length of TO Discharge Start Time:  Length of TO Discharge Form Discharge End Time:  Discharge Vol. (gal.). **200 gallons max:  Observations  During Discharge  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). **Extinate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.). **2570 gal. max:  Outfall 002 - Deck Drainage  Receiving Water Visual Observations - Daylight Slack Water (Per NoAA current predictions)  Oliy Sheen Detected in Visual Sheen Test (V/N) Floating Solids, Debris, Sludge, Deposits, Foam, SResidue (Y/N & Comments)  Residue (Y/N & Comments)  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NoAA current predictions)  Oliy Sheen Detected in Visual Sheen Test (V/N) Floating Solids, Debris, Sludge, Deposits, Foam, SResidue (Y/N & Comments)			Drilling Fl	uid Losses (P	rior To Disc	charge)			
Remaining (gal):  Lost (gal)  Lost (gal)  SSO  NA  SINA  Inadvertent Discharges (gal), Estimate based on duration and approximate flow rate during lost circulation. "180 gal max/event:  Drilling Fluid Lost to Ground (gal):  Start Time  Event 1 Event 2 Event 3 Event 4 Event 5 Event 6  NA  STATE Start	Drilling Fl	uid Volumes		Day Shift			Night Shift	t	Total
Lost (gal)   SSO	Creat	ed (gal):		850			NA		1850
Inadvertent Discharges (gal). Estimate based on duration and approximate flow rate during lost circulation. **180 gal max/event:  Drilling Fluid Lost to Ground (gal):  **Special Comments**  **Pass/Fail Comments**  Discharge Start Time End Time Pass/Fail Comments**  Discharge Start Time:  **Length of Casing (ft):  Discharge Fluid Double Below Top of Casing (ft):  Discharge Vol. (gal.). **200 gallons max:  Observations  During Discharge  **During Discharge**	Remair	ning (gal):							b) O
based on duration and approximate flow rate during lost circulation. **180 gal max/event:  Drilling Fluid Lost to Ground (gal):  **Specific Start Time End Time Pass/Fail Comments  Sheen Test   205   210   245   256   256    Discharge Start Time:   200   Discharge End Time:   220   Discharge Duration (min.):   (Casing Area (ft²):   7-4 in. s 0.27 ft²   2-1 in. s 0.71 ft²   2-1 in. s 0.	CONTRACTOR OF THE PARTY OF THE	A STATE OF THE PARTY OF THE PAR		And the local division in the local division			The second second	_	850
Prilling Fluid Lost to Ground (gal):    Drilling Fluid Discharges	based on duration ar	nd approximate flow rate	Event 1	Event 2	Event 3		Event 5	Event 6	0
Results of Static Sheen Test    205	www.marketekarloggeninalbercarlockennutennut		e = 25m	e d			Commission of Astronomy		
Results of Static Start Time End Time Pass/Fail Comments Sheen Test 205 210 PASS 0% Stack/Sheen  Discharge Start Time: 1210 Discharge End Time: 1220 Discharge Duration (min.): [( Length of Casing (ft): 70 Drilling Fluid Depth Below Top of Casing (ft): 30 Length of Drill Hold (in.): 7 Casing Area (ft²): 7-in. is 0.27 ft² 12-in. is 0.71 ft²  Discharge Vol. (gal.). ~200 gallons max: 2	Drining France Co	se to Ground (Sai).			Discharges				
Sheen Test  Discharge Start Time:  Discharge Start Time:  Discharge Start Time:  Discharge End Time:  Discharge End Time:  Discharge End Time:  Discharge Duration (min.):  Casing Area (ft²):  Top of Casing (ft):  Discharge Vol. (gal.). ~200 gallons max:  Discharge Vol. (gal.). ~200 gallons max:  Observations  During Discharge  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Outfall 002 - Deck Drainage  Day Shift  Day Shift  Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NoAA current predictions)  Residue (Y/N & Comments)  Residue, (Y/N & Comments)  Floating Solids, Debris, Sludge, Deposits, Foam, Single Shift  Washdown 1 Washdown 2 Washdown 3 Washdown 4 Washdown 5 Washdown 6  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NoAA current predictions)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Single Shide, Outparts, Sludge,	Results of Static	Start Tim	Name and Address of the Owner, where the Owner, which the	NAME AND POST OFFICE ADDRESS OF THE PERSON NAMED IN	and the latest and th	Pass/Fail		Comments	_
Discharge Start Time:  Length of Casing (ft):  Discharge Vol. (gal.). ~200 gallons max:  Observations  During Discharge  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfall 001 & 002  Receiving Water Visual Observations - Daylight Slack Water  Date & Time  Oliy Sheen Petected in Visual Sheen Test (V/N Recomments)  Discharge Duration (min.):  (Casing Dia. 7 Casing Dia. 7 (Final Dia. 12-in. is 0.27 ft² 7-in. is 0.27 f		AND DESCRIPTION OF THE PERSON	urannepe mo query-que ano lo qu	1210		and the second second second second second	0% Slick	15heen	
Discharge Vol. (gal.). ~200 gallons max:  Observations  During Discharge  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Printing Drial (in.):  Total Date & Time  Oily Sheen Printing Solids, Debris, Sludge, Deposits, Foam, Singht Shift  Washdown 1 Washdown 2 Washdown 3 Washdown 4 Washdown 5 Washdown 6  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (V/N Residue (Y/N & Comments))  Floating Dia.  7-in. is 0.27 ft² 12-in. is 0.71	Discharge Start Time:	The second secon	Discharge	CONTRACTOR OF PROPERTY OF	1550		Discharge I	Duration (min.):	10
Discharge Vol. (gal.). ~200 gallons max:  Observations  Oily Sheen (Y/N & Comments)  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Residue (Y/N & Comments)  Floating Solids, Debris, Sludge, Deposits, Foam, S Residue (Y/N & Comments)  Floating Solids, Debris, Sludge, Deposits, Foam, S Residue (Y/N & Comments)			30		7		7	7-in. is 0.27 ft <sup>2</sup>	0.27
Observations During Discharge  Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Residue (Y/N & Comments)  Floating Solids, Debris, Sludge, Deposits, Foam, Single (Per Noad Current predictions)  Residue (Y/N & Comments)  Floating Solids, Debris, Sludge, Deposits, Foam, Single (Per Noad Current predictions)  Outfalls 002 - Deck Drainage  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per Noad Current predictions)  Slack Water  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, Single (Y/N & Comments)	Discharge Vo	ol. (gal.). ~200 gallon	s max:	8 9 9 9			k = h		/ft <sup>3</sup>
Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge Prom Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water  Date & Time  Outfall 002 - Deck Drainage  Due to Rainfall (gal.)  Night Shift  Night Shift  Washdown 1  Washdown 3  Washdown 3  Washdown 4  Washdown 5  Washdown 5  Washdown 6  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, S Residue (Y/N & Comments)		_		-		Floating Solids	, Debris, Sludg	ge, Deposits, Foan	
Outfall 002 - Deck Drainage  24-hr Rainfall (in.)  Volume of Discharge Due to Rainfall (gal.)  Volume of Discharge From Deck  Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Residue (Y/N & Comments)							Residue (Y/N	& Comments)	
Volume of Discharge From Deck Vashdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, S Residue (Y/N & Comments)	Daring Discharge	IN				, v			
Volume of Discharge From Deck Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, S Residue (Y/N & Comments)				Name and Address of the Owner, where the Owner, which the	new particular and a second se	THE RESERVE AND PERSONS ASSESSMENT OF THE PERSON.		[m]- #150a3 5 17	
Washdown (gal.). Estimate based on duration and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, S Residue (Y/N & Comments)			0.14	Annual Company of the	of Discharge	Due to Rair	the same of the state of the same of the	AND DESCRIPTION OF THE PARTY OF	ral
Autorition and approximate flow rate during washdowns.  Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, S Residue (Y/N & Comments)		THE RESERVE OF THE PARTY OF THE	Mark days at			Mark Janes A			Total
Total Deck Drainage Discharge (gal.) ~2570 gal. max:  Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, S & Comments)  1 - Clark Water  A Clark Water	duration and appro	ximate flow rate during	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	0
Outfalls 001 & 002  Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)  Slack Water  Date & Time  Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, S Residue (Y/N & Comments)	Contract of the Contract of th	agrantig process and start at the same of	al.) ~2570 g	al. max:	0 = 224 g	al.		<del></del>	
Slack Water Date & Time Oily Sheen Detected in Visual Sheen Test (Y/N Floating Solids, Debris, Sludge, Deposits, Foam, S Residue (Y/N & Comments)				Activity for the Contract of t	DOMESTIC DESCRIPTION OF THE PARTY OF THE PAR				Avilla de la companya
Slack Water Date & Time & Comments) Residue (Y/N & Comments)		Receiving Water Vi	sual Observ	ations - Day	light Slack V	Water (Per NO)	AA current pred	ictions)	
1st Slack Water 14/1/16 18381 14	Slack Water	Date & Time	Oily Sheen De		heen Test (Y/N	Floating Solids			n, Scum, o
IIIIII IV	1st Slack Water	9/12/15 12:21	N -			N			
2nd Slack Water 1/12/15 18:41 N	2nd Slack Water	9/12/15 18:41	N -			N			
3rd Slack Water 4/13/15 00:43 N	3rd Slack Water	9/13/15 00:43	N		- 19 1,	N		_	Allers of the second
4th Slack Water 9/13/15 06:44 N	4th Slack Water	9/13/15 06:44	N			N			
Other Obserations, Non-Permitted Discharges, or Comments		Other O	bserations,	Non-Permit	ted Dischar	ges, or Comi	nents		
Stop discharge upon obseration of oily sheen or residue not related to drill fluids or deck drainage and report to Project Regulatory Advisor, Claire Joseph Observations, were made every a 24 by period corresponding with personnal shift sharger.	Stop discharge upor					ACTION AND DESCRIPTION OF THE PERSON OF THE	AND RESIDENCE OF THE PROPERTY	atory Advisor, Clair	e Joseph.
Note: Observations were made over a 24 hr period corresponding with personnel shift changes.		Note: Observation	ns were made o	ver a 24 nr perio	u correspondin	g with personne	snirt changes.		

#### Daily Visual Observation Form Rev. 3 APDES Permit No.: AK0062278

Date & Time:	9/14/15 0701	0	to		9/15/15	070		
Borehole:	ASRC Quayside		Boreho	ole:	Ö	of O	For Day	
Latitude:			Longitu	ıde:				
Day Shift Observer	T TILL	700-100%	Night Shift C & Shift T	bserver	Mark Broy	1900 -	0706	
& Shift Time:	Tony Fairway O. No Drilling, See	Ren.	Drilling End	-	No Deillin	STATE OF THE PARTY		
Drilling Start Time:	Outfall 001 - Ge		100	-		V .	Ke as we share the other time.	100
	Outfall 001 - Ge	Drilling Flu	id Losses (P	rior To Disc	harge)			
Drilling El	uid Volumes	Diming i	Day Shift			Night Shift		Total
	ed (gal):		MA		NA			_
	ning (gal):		NA	- Andrews	NA		1	-
	st (gal)	1	MA		NA			Sica <u>b</u>
	charges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	B)
based on duration ar	nd approximate flow rate on. ~180 gal max/event:	NA	~	-	NA			
	st to Ground (gal):	A M						
		The state of the s	rilling Fluid [	THE RESERVE TO SHARE THE PARTY OF THE PARTY			C	
Results of Static	Start Time	е	End T	ime	Pass/Fail	Auto-delicated the second	Comments	
Sheen Test		milion market				NA-	- display	-
Discharge Start Time:		Discharge	End Time:	N-1-		Discharge D	uration (min.): Casing Area (ft <sup>2</sup> ):	1
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	E)	Length of Drill Fluid Col. (ft):	h)=f-g	Casing Dia. (in.):		7-in. is 0.27 ft <sup>2</sup>	
The second secon	ol. (gal.). ~200 gallon:	s may.	k)		,	k = h 3	* j * 7.481 gal,	/ft <sup>3</sup>
Observations		Sheen (Y/N & Co	omments)		Floating Solids	, Debris, Sludge Residue (Y/N &	e, Deposits, Foan	n, Scum,
During Discharge	NA —				NA -		Value of a Linear Control of the Con	
	1077	Out	tfall 002 - De	ck Drainag	e			
24-hr F	Rainfall (in.)	10.21	Volume	of Discharge	e Due to Rair	nfall (gal.)	m)=1*1599-3369	4)
Charles and the second	charge From Deck		Day Shift			Night Shift		Tota
Washdown (g	gal.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	1000
duration and appr	oximate flow rate during						-	n)
	shdowns. Drainage Discharge (g	al 1 ~2570 g	al. max:	ojemen 3	36 gal			
TOTAL DECK L	oraniage biseria 6 (6	,	Outfalls 00	Several Company	0			
	Receiving Water V	isual Observ	vations - Day	light Slack	Water (Per NO.	AA current predi	ctions)	
Slack Water	Date & Time	Oily Sheen De	tected in Visual S & Comments)	Sheen Test (Y/N	Floating Solids	s, Debris, Sludo Residue (Y/N	je, Deposits, Foar	m, Scum,
1st Slack Wate	r 9/14/15 07:22	N -			N		,	
2nd Slack Wate		N			N			
3rd Slack Wate		N	and, diversity to the		N-			
4th Slack Wate		N -		-	N			
4th Slack Water		)bserations.	Non-Permit	ted Discha	rges, or Com	ments		
#Rig at AS	Re quayside du	And the Control of th	THE RESERVE OF THE PERSON NAMED IN COLUMN 2 IS NOT THE OWNER.					

		1 1	ct: Alaska LN		Geotechnica	al Investigati			
Date & T Boreho		9/15/15 070	0	to Boreh	51 says 11	9/16/15	of (C)	700	ė
Latitud		ASRC quayside		Longit			or O	For Day	
Day Shift Ob		1.2 11.5		Night Shift	CONTRACTOR OF THE PARTY OF THE	D,	1 <	1.1	
& Shift Ti			00-1900	& Shift		Kig unma			¢
Drilling Star	t time:		Below.	Drilling Er			ling. See		e.
		Outfall 001 - Ge	THE RESERVE OF THE PERSON NAMED IN		THE RESERVE AND PERSONS	The second second	the Seaflooi	•	
			Drilling Fl	uid Losses (P	rior To Disc	charge)			
Dri	A CONTRACTOR OF THE PARTY OF TH	uid Volumes		Day Shift			Night Shift		Total
Language Week		ed (gal):		NA			/A		6)
		ning (gal): et (gal)		NA			/A /A	***************************************	c)=a-b
Inadverte	The same of the same of	harges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	ď,
		d approximate flow rate		LVCIICE	Evenes	- //	Evenes	Licheo	
		on. ~180 gal max/event:	NA	-		NA			
Drilling F	luid Los	st to Ground (gal):	NA	.u. =1					
Results of	Charlia	Start Time	Contract of the Contract of th	rilling Fluid ( End T	NAME OF TAXABLE PARTY.	D/F-:I			
Sheen 7	CAL DI SCHOOL STONE CO.	Start Time	-	Ena i	ime	Pass/Fail	11.0	Comments	
Discharge Sta			Discharge	End Time:			Discharge D	ouration (min.):	
19	art mile.		e)		n)=f-g		i)	Casing Area (ft²):	
Length of Casing (ft):		Drilling Fluid Depth Below Top of Casing (ft):		Length of Drill Fluid Col. (ft):		Casing Dia. (in.):	-	7-in. is 0.27 ft <sup>2</sup>	***************************************
		Land of the same o		ridia coi. (it).		lui.j.		12-in. is 0.71 ft <sup>2</sup>	
Disch	arge Vo	ol. (gal.). ~200 gallons	s max:			Election Colide		* j * 7.481 gal/	
Observa			Sheen (Y/N & Co	mments)			Residue (Y/N	e, Deposits, Foam & Comments)	1, Scum, or
During Dis	charge	NA -		5 II aaa -		NA -			
	14 h = D =	:-f-!! /:- \	Manager and Assessment	fall 002 - De	Maria de la Companya	Color and product to the Party of the	6.11.4 . 1.5	Imi-151602.3	-
CHARLES AND A STATE OF THE PARTY OF THE PART	CHANGE OF THE REAL PROPERTY.	ainfall (in.) harge From Deck	0.29	THE RESERVE OF THE PERSON NAMED IN	of Discharge	e Due to Rain	THE REAL PROPERTY AND ADDRESS OF THE PARTY AND	m)=14848a/	
		al.): Estimate based on	Washdown 1	Day Shift Washdown 2	Washdown 3	Washdown 4	Night Shift Washdown 5	Washdown 6	Total
		ximate flow rate during	Washuowii I	washdown 2	Washdown 5	washuowh 4	washdown 5	washdown 6	n)
		ndowns.							
Total I	Deck Dr	rainage Discharge (ga	il.) ~2570 ga		oi=m=1 464	g-al,			
		Doseiving Water Vi	cual Observ	Outfalls 00	Administration of the last of	Natas is			
A1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		Receiving Water Vis	Oily Sheen Det	ected in Visual S	heen Test (Y/N	Vater (Per NOA	A current predic	ctions) e, Deposits, Foarr	Scum or
Slack W	ater	Date & Time		& Comments)			Residue (Y/N		1, Ocum, or
1st Slack	Water	9/15/15 08:02	N			N-			
2nd Slack	Water	1/15/15 14:03	N		1 1	N			
3rd Slack	Water	9/15/15 20:14	Riz manani	ned. See 5	clow.	Riguna	ranned. Se	e below.	
4th Slack	Water	9/16/15 02:29	- F- dallacing	\$			15	740	
			oserations,	Non-Permitt	ed Dischar	ges, or Comn	nents		
#Ring only,	at As	SPL due to we	THE RESERVE OF THE PERSON NAMED IN	The state of the s	The same of the same of the same of	THE PARTY OF THE P	and the same of the latest and the same of	ing daytin	ne
Stop discha	arge upon	obseration of oily sheen or	residue not rel	ated to drill fluid	s or deck drain	age and report to	o Project Regula	tory Advisor, Claire	a Joseph.
		Note: Observation							

	/16/15 0700 MB-06		to Borehole Longitud		1 0	1310W	For Day	
	60.66501117°N		Night Shift Ob:	server	Fee	1900 - 07	00	
y Shift Observer & Shift Time:	1. Greenwald 0700-	906	a diling End	Time:	9/17/15	0600		
illing Start Time:	9/16/15 16:10 Outfall 001 - Geot	echnical D	rilling Fluids	and Drill Cu	ittings at th	e Seatloor		
	Outrail 001 - Geo.	Drilling i idi	u Loss-	or To Discha	arge)	Night Shift		Total
Drilling Flu	id Volumes	The second secon	Day Shift		. 5	28		738
Create	d (gal):		10			Ö		738
Remain	ing (gal):	The second second second	0		52	28	Frant 6	100
Los	t (gal)	2	Event 2	Event 3	Event 4	Event 5	Event 6	
. Jumption on	harges (gal). Estimate	Event 1	EVERTE	_				
I in lost circulation	on. ~180 gal max/event: st to Ground (gal):	738	gal	V 1				
Drilling Fluid LO	St to 010011- (8-7	D	rilling Fluid I	Discharges	Pass/Fail		Comments	
Results of Static	Start Time		End 7	ime	1 435/1	NA -		
Sheen Test	The second second					Discharge	Duration (min.):	-
Discharge Start Time:		Discharg	e End Time:	injef-g	Casing Dia.	1)	Casing Area (ft <sup>2</sup> ) 7-in. is 0.27 ft <sup>2</sup>	
19	Drilling Fluid Depth Below	83	Length of Drill		(in.):		12-in is 0.71 ft	
Length of Casing (ft):	Top of Casing (ft):		Fluid Col. (ft):			k =	*   * 7.481 ga	I/ft
Discharge	/ol. (gal.). ~200 gallon	s max:	R)		Floating Solid	le Dehris, Sluc	ge, Deposits, For	am, Scum
Discharge	Oily	Sheen (Y/N &	Comments)		1 louing	Residue (Y/I	& Comments)	-
			- R191-107-138-149-149-1		- 4			
Observations					NA -			All residence in the last of t
Observations During Discharg		4	- 5 II 003 F	ook Drainas				
		THE RESERVE THE PARTY OF THE PA	utfall 002 - D	eck Drainag	e	ainfall (gal.)	m)=1*15994*645	ral
During Discharg	Rainfall (in.)	0.29	Volume	of Discharg	e	ainfall (gal.) Night Sh	ift	Tot
During Discharg 24-hr Volume of Di	Rainfall (in.)	00.29	Volume Day Shift	of Discharg	ge e Due to Ra	Night Si	ift	Tot
During Discharg  24-hr  Volume of Di  Washdown	Rainfall (in.) ischarge From Deck (gal.). Estimate based on	THE RESERVE THE PARTY OF THE PA	Volume Day Shift	of Discharg	ge e Due to Ra Washdown Sminkflage	Washdown	ift	Tot
24-hr Volume of Di Washdown	Rainfall (in.) ischarge From Deck (gal.). Estimate based on proximate flow rate during	Washdown	Volume Day Shift Washdown	of Discharg	e Due to Ra Washdown Smin X Rape Gogal	Washdown	ift	Tot
24-hr Volume of Di Washdown	Rainfall (in.) ischarge From Deck (gal.). Estimate based on proximate flow rate during	Washdown	Volume Day Shift Washdown gal. max:	Of Discharg  Washdown 3	ge e Due to Ra Washdown Sminkflage	Washdown	ift	Tot
24-hr Volume of Di Washdown	Rainfall (in.) ischarge From Deck (gal.). Estimate based on proximate flow rate during vashdowns. Drainage Discharge (	Washdown gal.) ~2570	Volume Day Shift Washdown  gal. max: Outfalls	Washdown 3  Washdown 3  Oo1 & 002	e Due to Ra Washdown Smin X flor Google 24 gra	Washdown	ift 5 Washdown 6	Tot
24-hr Volume of Di Washdown	Rainfall (in.) Ischarge From Deck (gal.). Estimate based on proximate flow rate during rashdowns. Drainage Discharge (	Washdown gal.) ~2570	Volume Day Shift Washdown  gal. max: Outfalls	Washdown 3  Washdown 3  Oo1 & 002	e Due to Ra Washdown Smin X flor Google 24 gra	Washdown  NOAA current pr	edictions)	Tot
24-hr Volume of Di Washdown	Rainfall (in.) ischarge From Deck (gal.). Estimate based on oroximate flow rate during rashdowns. Drainage Discharge (	Washdown gal.) ~2570	Volume Day Shift Washdown  gal. max: Outfalls	Washdown 3 Washdown 3 Washdown 3 Washdown 3 Washdown 3 Washdown 3	e Due to Ra Washdown Smin X flor Google 24 gra	Washdown  NOAA current pr	ift 5 Washdown 6	Tot
24-hr Volume of Di Washdown duration and app Total Deck	Rainfall (in.) Ischarge From Deck (gal.). Estimate based on proximate flow rate during washdowns.  Drainage Discharge (gate and the control of the control o	Washdown gal.) ~2570	Day Shift  Washdown  gal. max:  Outfalls of the control of the con	Washdown 3 Washdown 3 Washdown 3 Washdown 3 Washdown 3 Washdown 3	e Due to Ra Washdown Smin X flor Google 24 gra	Washdown  NOAA current pr	edictions)	Tot
24-hr Volume of Di Washdown duration and app w Total Deck	Rainfall (in.) ischarge From Deck (gal.). Estimate based on proximate flow rate during vashdowns. Drainage Discharge (including water)  Receiving Water (including water)  Date & Time  er 1/16/15 03:44	Washdown gal.) ~2570 /isual Obse	Day Shift  Washdown  gal. max:  Outfalls of the control of the con	Washdown 3 Washdown 3 Washdown 3 Washdown 3 Washdown 3 Washdown 3	e Due to Ra Washdown Smin X flor Google 24 gra	Washdown  NOAA current pr	edictions)	Tot
24-hr Volume of Di Washdown duration and app Total Deck Slack Water	Rainfall (in.) ischarge From Deck (gal.). Estimate based on oroximate flow rate during vashdowns. Drainage Discharge (including water)  Receiving Water \ Date & Time er \( 9/16/15 \) 03.44  ter \( 9/16/15 \) 14.40	Washdown gal.) ~2570 /isual Obse	Day Shift  Washdown  gal. max:  Outfalls of the control of the con	Washdown 3 Washdown 3 Washdown 3 Washdown 3 Washdown 3 Washdown 3	e Due to Ra Washdown Smin X flor Google 24 gra	Washdown  NOAA current pr	edictions)	Tot
24-hr Volume of Di Washdown duration and apr  ** Total Deck  Slack Water  1st Slack Water  2nd Slack Wat	Rainfall (in.) ischarge From Deck (gal.). Estimate based on proximate flow rate during trashdowns.  Drainage Discharge (including washdowns)  Receiving Water \ Date & Time er \( 9/16/15 \) 19:49 er \( 9/16/15 \) 30:48 er \( 9/17/15 \) 30:06	Washdown gal.) ~2570 /isual Obse	Day Shift  Washdown  gal. max:  Outfalls of the control of the con	of Discharg  Washdown 3  Washdown 3  Oo1 & OO2  Hylight Slack  Sheen Test (Y/II	Washdown Sminxffsp 60gol Water (Per N Floating So	NIGHT SI 4 Washdown NOAA current pr lids, Debris, Sl Residue (Y	edictions)	Tot

Date & Tin	ne.	9/18/15 076		NG Marine G		al Investigati 9/19/15	ion 07	20	
Borehole		MB-06		Boreh		111111111111111111111111111111111111111	of I	For Day	
Latitude	:	60,66501117 °A	J	Longit		151,383	791310W		
Day Shift Obse & Shift Time	erver e:	J. Greenwald 020		Night Shift & Shift		A. Fee	1900-07	96	ļ.
Drilling Start T	,	9/18/15 0730		Drilling Er	nd Time:	9/18/15	15:55		8
		Outfall 001 - G	eotechnical	<b>Drilling Fluid</b>	ds and Drill	Cuttings at	the Seafloor		
			Drilling Fl	uid Losses (P	rior To Dis	charge)			
Drilli	ng Flu	iid Volumes		Day Shift			Night Shift		Total
		ed (gal):	1600	0			200		1800
Re		ing (gal):	0	)			0		<sup>10</sup> O
la a di cata at	- CHENNISON	t (gal)	160	A STREET, SQUARE, SQUA			200		1800
based on dura	ition and	narges (gal). Estimate d approximate flow rate n. ~180 gal max/event:	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	0
Drilling Flu	id Los	t to Ground (gal):	1800						
				rilling Fluid I					
Results of S		Start Tim	ie	End T	THE RESIDENCE OF THE PERSON NAMED IN COLUMN 1	Pass/Fail	MANUFACTURE THE PARTY OF THE PA	Comments	
Sheen Te	-	0305		03/0	THE RESIDENCE OF THE PERSON NAMED IN COLUMN	Pass	STATE OF THE PERSON NAMED IN	lick/sheen	_
Discharge Start	Time:	0325	Discharge	End Time:	033	O	Discharge D	uration (min.):	5
Length of Casing (ft):	5	Drilling Fluid Depth Below Top of Casing (ft):	27	Length of Drill Fluid Col. (ft):	38	Casing Dia. (in.):	12"	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup> 12-in. is 0.71 ft <sup>2</sup>	0.71
Dischar	ge Vo	I. (gal.). ~200 gallon	ıs max:	303	)			* j.* 7.481 gal	
Observation			Sheen (Y/N & Co	omments)		Floating Solids	Residue (Y/N 8	e, Deposits, Foan & Comments)	n, Scum, or
During Disci	laige	N				10-			
			AND DESCRIPTION OF THE PERSONS NAMED IN COLUMN	tfall 002 - De	THE RESERVE OF THE PERSON NAMED IN	THE RESERVE OF THE PARTY OF			
		infall (in.)	0	AND DESCRIPTION OF THE PARTY OF	of Discharge	Due to Rair	STREET, STREET	m)=l*1599.3 O	-
		harge From Deck		Day Shift	r		Night Shift		Total
		l.). Estimate based on simate flow rate during	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	0)
	wash	downs.	60 gal.	120 gal,					180
Total De	eck Dr	ainage Discharge (g	al.) ~2570 g	Name and Address of the Owner, where the Owner, which is the Owne	180				
		D		Outfalls 00	CONTRACTOR OF THE PARTY OF THE				
Slack Wat	ter	Receiving Water V	Name and Address of the Owner, where the Owner, which is the Owner,	NAMES OF TAXABLE PARTY OF TAXABLE PARTY.	AND REAL PROPERTY AND REAL PROPERTY.	AND RESIDENCE PROPERTY	with the same of t	e, Deposits, Foan	n, Scum, or
1st Slack W	ater	9/18/15 10:17	N			N -		personal file	
2nd Slack W	/ater	9/18/15 16:05	N			N			
3rd Slack W	/ater	9/18/15 22:06	111			N-			Walter III
4th Slack W	/ater	9/19/15 04:27	111-			N			_
			bserations,	Non-Permitt	ed Dischar	ges, or Comr	nents		
Stop discharg	ge upon	obseration of oily sheen o	or residue not re	lated to drill fluid	ds or deck drain	nage and report t	to Project Regula	tory Advisor, Clair	e Joseph.
		Note: Observation	ns were made o	ver a 24 hr period	correspondin	g with personne	snitt changes.	in the second second second	

Date & Time:	9/23/15 070		IG Marine G		Il Investigati	on 070	0	
10 to	ASRC Quayside		Boreh	nole:	0	of G	For Day	
Latitude:			Longit	ude:	-			
Day Shift Observer	J. Greenwald of	700-1904	Night Shift & Shift		Ris Unni			
& Shift Time: Drilling Start Time:	No Drilling	700-1906	Drilling Er		No Di	Drillia		
	Outfall 001 - Ge					the Seefles		
	Outlan out - Ge	the same of the sa	uid Losses (P	NAME OF TAXABLE PARTY.	THE RESERVE AND ADDRESS OF THE PARTY OF THE	the Jeanou	atore aware to the state of the	
Drilling Flu	uid Volumes	Dilling ()	Day Shift	7101 10 0130	onunge)	Night Shift		Total
	ed (gal):							NA
	ning (gal):							b) NA
Los	t (gal)							A M
	harges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	d) A
	d approximate flow rate n. ~180 gal max/event:		+	-	-	-		NA
	st to Ground (gal):	EJ=C-B NJA		Annual Control of the			Angeletinesel sintemmonth to 1740	
		NATIONAL PROPERTY OF THE PROPE	rilling Fluid I	Discharges				
Results of Static	Start Tim	ie	End 1	Γime	Pass/Fail		Comments	
Sheen Test						MA-		
Discharge Start Time:		Discharge	End Time:		11-7-1-2-5111-1111-1111-1111-1111	Discharge D	ouration (min.):	-
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	(8)	Length of Drill Fluid Col. (ft):	h)=f-g	Casing Dia. (in.):	0	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	i)
Discharge Vo	k) .		MARKET MARKET MARK	k = h	* j * 7.481 gal,	/ft <sup>3</sup>		
Observations	Water Superior State Superior	Sheen (Y/N & Co	omments)		Floating Solids		e, Deposits, Foan	
During Discharge	NA				NA-			AND THE RESERVE TO A STATE OF THE STATE OF T
		Out	tfall 002 - De	eck Drainag	The second secon			Michigan
24-hr Ra	ainfall (in.)	0	PROGRAMME PROPERTY.	THE RESERVE THE PERSON NAMED IN	e Due to Rair	nfall (gal.)	m)=1*1599.30g«1	
	harge From Deck		Day Shift			Night Shift		<b>T.</b> 1
Washdown (ga	al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
1 11 A STATE OF THE STATE OF TH	ximate flow rate during							°) ()
	ndowns. rainage Discharge (g	al ) ~2570 ø	al max:	mo gal.	L	L	I was the same of	man polynomia programina
Total Deck Di	amage bioenarge (8	2010 8	Outfalls 00	nine was regularized and the state of				-
	Receiving Water V	isual Observ	ations - Day	light Slack \	Water (Per NO	AA current predi	ctions)	
Slack Water	Date & Time	The second secon	NAME OF TAXABLE PARTY.	A STATE OF THE PARTY OF THE PAR	AND RESIDENCE OF THE PROPERTY OF THE PARTY O	and the second because the second control decree	e, Deposits, Foan	n, Scum, o
1st Slack Water	1/23/15 08:46	N			N -			
2nd Slack Water	9/23/15 15:27	N			N-		10-22-23-3-40-360-361	
3rd Slack Water	9/23/15 21:10	Ris	unmanned	)	Rig. W	nn anned		
4th Slack Water	9/24/15 03:17	0	3		0	2		A FAUL CARROL III.
		bserations,	Non-Permit	ted Dischar	ges, or Com	ments		
only.	-quayside due +	THE RESERVE OF THE PARTY OF THE		THE PERSON NAMED IN COLUMN NAM	The same of the sa		during day	trine

Date & Time:	9/24/15 0700	)	to	)	9/25/15	070	0	
Borehole:	ASRC Quaysi	de	Borel	nole:	0	of O	For Day	
Latitude:			Longit					
Day Shift Observer & Shift Time:	T. Fairway 07	00-1900	Night Shift & Shift		D	0		
Drilling Start Time:	No Dalla		Drilling Er	9	Rig unm	lina		
	Outfall 001 - Ge	U				0	·	
	041,411,002,0		uid Losses (F	THE RESIDENCE OF THE PARTY OF T	THE RESIDENCE OF THE PARTY OF T	ane deamoo.		
Drilling Fl	uid Volumes		Day Shift			Night Shift		Total
Creat	ed (gal):				-			NA
Remai	ning (gal):						-4, -4,0	10 NA
Los	st (gal)							OPANA
	harges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	0
	nd approximate flow rate on. ~180 gal max/event:	-		alaysia.		-	-112"	NA
	st to Ground (gal):	e3=6+6 MA		Actual and the Annual A	Marie Company of the			
		D	rilling Fluid I	Discharges				
Results of Static	Start Tim	e	End 1	ime	Pass/Fail		Comments	*****
Sheen Test						NA -		
Discharge Start Time:	annual an	Discharge	End Time:			Discharge D	uration (min.):	-
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	8)	Length of Drill Fluid Col. (ft):	h)=f-g	Casing Dia. (in.):	i)	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	)) 
Discharge Vo	ol. (gal.). ~200 gallon	s max:	kΣ			k = h	* j * 7.481 gal,	/ft <sup>3</sup>
	T	Sheen (Y/N & Co	mments)		Floating Solids	, Debris, Sludg	e, Deposits, Foan	
Observations During Discharge	The second secon	5/10C/1 (1) 14 C/	initiones,			Residue (Y/N	& Comments)	
During Discharge	NA -				NA -		CONTROL DE	Mariolica Maria Annia
		Out	fall 002 - De	ck Drainag	e			
THE RESIDENCE OF THE PARTY OF T	ainfall (in.)	0 0	CONTRACTOR OF THE PROPERTY OF THE PARTY OF T	of Discharge	e Due to Rain	nfall (gal.)	m)-1-10 gal	
	charge From Deck		Day Shift			Night Shift		Total
	al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
- Automotive and an account of the second	ximate flow rate during hdowns.	-	-	-	AMERICAN			Ó
	rainage Discharge (g	al.) ~2570 g	al many	A TO A POST OF A	Anne and delication and a series of	AND DESCRIPTION OF THE PARTY OF	ACCUPATION AND ADDRESS OF THE PARTY OF THE P	
	411199 19911919 19		ai. max.	DEM OF A				
			Outfalls 00	1 & 002	d.			
	Receiving Water Vi	sual Observ	Outfalls 00 ations - Dayl	1 & 002 ight Slack V				
Slack Water		sual Observ	Outfalls 00 ations - Dayl	1 & 002 ight Slack V		, Debris, Sludg	e, Deposits, Foan	n, Scum, d
Slack Water 1st Slack Water	Receiving Water Vi	sual Observ	Outfalls 00 ations - Dayl ected in Visual S	1 & 002 ight Slack V			e, Deposits, Foan	n, Scum, d
-	Receiving Water Vi	sual Observ	Outfalls 00 ations - Dayl ected in Visual S	1 & 002 ight Slack V		, Debris, Sludg	e, Deposits, Foan	n, Scum, d
1st Slack Water	Receiving Water Vi  Date & Time  1/24/15 01:45  9/24/15 16:17	sual Observ	Outfalls 00 ations - Dayl tected in Visual S & Comments)	1 & 002 ight Slack V	Floating Solids	i, Debris, Sludg Residue (Y/N	e, Deposits, Foan	n, Scum, d
1st Slack Water 2nd Slack Water	Receiving Water Vi  Date & Time  1/24/15 09:45  9/24/15 16:17  9/24/15 22:05	sual Observ	Outfalls 00 ations - Dayl ected in Visual S	1 & 002 ight Slack V	Floating Solids	, Debris, Sludg	e, Deposits, Foan	n, Scum, d
1st Slack Water 2nd Slack Water 3rd Slack Water	Receiving Water Vi  Date & Time  1/24/15 01:45  9/24/15 16:17  1/24/15 22:05  1/25/15 04:14	sual Observ Oily Sheen Del N — N — Rig	Outfalls 00 ations - Dayl sected in Visual S & Comments)	1 & 002 light Slack V heen Test (Y/N	Floating Solids	i, Debris, Sludg Residue (Y/N i unmanned,	e, Deposits, Foan	n, Scum, d
1st Slack Water 2nd Slack Water 3rd Slack Water 4th Slack Water	Receiving Water Vi  Date & Time  1/24/15 01:45  9/24/15 16:17  9/24/15 22:05  9/25/15 04:14  Other O	sual Observ Oily Sheen Def	Outfalls 00 ations - Dayl sected in Visual S & Comments)  unmanned  Non-Permitte	1 & 002 light Slack \\ heen Test (Y/N	Floating Solids  N  Right  ges, or Comm	n Debris, Sludg Residue (Y/N a unmanned, d ments	e, Deposits, Foan & Comments)	
1st Slack Water 2nd Slack Water 3rd Slack Water 4th Slack Water **Rig at ASF day time	Receiving Water Vi  Date & Time  1/24/15 09:45  9/24/15 16:17  1/24/15 22:05  1/25/15 04:14  Other O	sual Observ Oily Sheen Del N R R bserations,	Outfalls 00 ations - Dayl sected in Visual S & Comments)  unmanned  Non-Permitt	1 & 002 light Slack V heen Test (Y/N	Plag uses, or Commoperations.	n Debris, Sludg Residue (Y/N)	e, Deposits, Foan & Comments)	

Date & Time	: 9/25/15 0700		to	)	al Investigati 9/26/15	0700		
Borehole:	ASKC Quayside		Borel	nole:	0	of O	For Day	
Latitude:		550	Longit	tude:			ALPEC STREET, SALES STREET, SA	
Day Shift Observe & Shift Time:	T. Foirway O	700 miego	Night Shift & Shift		₽		3 W 1 W 1 W 1 W 1 W 1 W 1 W 1 W 1 W 1 W	
Drilling Start Time			Drilling Er		No	Drilling	*	
	Outfall 001 - G	7	Drilling Fluir	ds and Drill		- 0	,	
	Outlier out o	MATERIAL PROPERTY AND ADDRESS OF THE PERSON NAMED IN	uid Losses (F	THE RESERVE OF THE PARTY OF THE	THE PARTY OF THE P	the seamon		
Drilling	Fluid Volumes		Day Shift			Night Shift		Total
	ated (gal):						*****	NA
Rem	aining (gal):							b) NA
	ost (gal)							AMeet
	ischarges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	d)
	and approximate flow rate ation. ~180 gal max/event:			-				NA
	Lost to Ground (gal):	erce NA			L		I	
		Company of the Compan	rilling Fluid I	Discharges				
Results of Stat	ic Start Tim	AND AND PERSONAL PROPERTY AND ADDRESS OF THE PER	End 1	AND DESCRIPTION OF THE PARTY OF	Pass/Fail		Comments	
Sheen Test					The second secon	NA	Copyright Control of the Copyright C	
Discharge Start Tim	ne:	Discharge	End Time:			Discharge D	uration (min.):	
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	E)	Length of Drill Fluid Col. (ft):	hj=f-g	Casing Dia.	0	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	)
Discharge	Vol. (gal.). ~200 gallor	c may:	(4)			l. l.		(s. 3
					Floating Solids	CONTRACTOR OF THE PARTY OF THE	* j * 7.481 gal/ e, Deposits, Foam	ACCOUNT OF THE PARTY OF THE PAR
Observations	,	Sheen (Y/N & Co	omments)		3	Residue (Y/N		, Count, or
During Dischar	ge NA				NA -			
		Ou	fall 002 - De	ck Drainag	e			
24-hr	Rainfall (in.)	0	Volume o	of Discharge	e Due to Rair	fall (gal.)	m)=1-1099.3 al.	and the same and the same
Volume of D	ischarge From Deck	and the second second	Day Shift			Night Shift	A CONTRACTOR OF THE PROPERTY OF	+
Washdown	(gal.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
	proximate flow rate during vashdowns.				~	-		0
THE RESIDENCE OF THE PARTY OF T		Company of the state of the sta	Carama sanaganan and anno anno a		1		Personal and the San Annual Company	
Total Deck	Drainage Discharge (g	al.) ~2570 g	al. max:	o)=m+n () @-	al.			
Total Deck	Drainage Discharge (g	al.) ~2570 g	al. max: Outfalls 00	AND DESCRIPTION OF THE PERSON	al, s		154 h	
Total Deck	Drainage Discharge (g Receiving Water V		Outfalls 00	1 & 002		AA current predic	ctions)	
Total Deck	Receiving Water V	sual Observ	Outfalls 00 ations - Dayl ected in Visual SI	<b>1 &amp; 002</b> light Slack \	Water (Per NO)	, Debris, Sludg	e, Deposits, Foam	n, Scum, or
	Receiving Water V	sual Observ	Outfalls 00 ations - Dayl	<b>1 &amp; 002</b> light Slack \	Water (Per NO)		e, Deposits, Foam	n, Scum, or
Slack Water	Receiving Water V	sual Observ	Outfalls 00 ations - Dayl ected in Visual SI	<b>1 &amp; 002</b> light Slack \	Water (Per NO)	, Debris, Sludg	e, Deposits, Foam	ı, Scum, or
Slack Water 1st Slack Wate 2nd Slack Wat	Receiving Water V  Date & Time  er 9/25/15 10:35  er 9/25/15 17:00	Sual Observ Oily Sheen Del	Outfalls 00 ations - Dayl ected in Visual SI & Comments)	<b>1 &amp; 002</b> light Slack \	Water (Per NO) Floating Solids N	, Debris, Sludg Residue (Y/N a	e, Deposits, Foam	n, Scum, or
Slack Water  1st Slack Wate  2nd Slack Wate  3rd Slack Wate	Receiving Water V  Date & Time  or 9/25/15 10:35  or 9/25/15 17:00  or 9/25/15 22:55	Sual Observ Oily Sheen Del	Outfalls 00 ations - Dayl ected in Visual SI	<b>1 &amp; 002</b> light Slack \	Water (Per NO) Floating Solids N	, Debris, Sludg	e, Deposits, Foam	ı, Scum, or
Slack Water 1st Slack Wate 2nd Slack Wat	Receiving Water Vinder & Time  er 9/25/15 10:35  er 9/25/15 17:00  er 9/25/15 22:55  er 9/26/15 05:06	sual Observ Oily Sheen Del N N Rig	Outfalls 00 ations - Dayl ected in Visual Si & Comments)	1 & 002 ight Slack \ heen Test (Y/N	Water (Per NO) Floating Solids  N  Reg. un	, Debris, Sludg Residue (Y/N a	e, Deposits, Foam	n, Scum, or
Slack Water  1st Slack Wate  2nd Slack Wate  3rd Slack Wate  4th Slack Wate	Receiving Water V  Date & Time  er 9/25/15 10:35  er 9/25/15 17:00  er 9/25/15 22:55  er 9/26/15 05:06  Other O	sual Observ Oily Sheen Del N Rig	Outfalls 00 ations - Dayl ected in Visual Si & Comments)  Annance Non-Permitt	1 & 002 ight Slack \ heen Test (Y/N	Water (Per NO) Floating Solids N	, Debris, Sludg Residue (Y/N a	e, Deposits, Foan & Comments)	n, Scum, or
Slack Water  1st Slack Wate  2nd Slack Wat  3rd Slack Wat  4th Slack Wate  4th Slack Wate	Receiving Water V  Date & Time  er 9/25/15 10:35  er 9/25/15 17:00  er 9/25/15 22:55  er 9/26/15 05:06  Other O	Sual Observed Oily Sheen Del	Outfalls 00 ations - Dayl ected in Visual St & Comments)  Annuanted  Non-Permitt  ather, No d	1 & 002 ight Slack \heen Test (Y/N	Nater (Per NO) Floating Solids N N Reg un ges, or Comm	Debris, Sludg Residue (Y/N a mannel), ments Rig manne	e, Deposits, Foam & Comments)  d during d	ay Hara

### Daily Visual Observation Form Rev. 4 APDES Permit No : AK0062278

Data 8	t Time:				Geotechnic	al Investigat	ion	700	
	hole:	ASAC QUAY		-	o hole:	10121	of O	For Day	<del>.</del>
Latit			2100		itude:	البر)	OI -	roi Day	
Day Shift & Shift		Sam Pant		Night Shif	t Observer	rig u	inmanne	)	-
Drilling St		no drilli	nei	Control Metal Control	t Time: End Time:		rilling	[ 	-
		Outfall 001 - G	<del>U</del>				- 0	······································	-
			THE RESIDENCE OF THE PARTY OF T	uid Losses (	CONTRACTOR AND PERSONS ASSESSMENT	THE RESIDENCE OF THE PARTY OF T	the Jeanoo		775341576
D	rilling Fl	uid Volumes		Day Shift			Night Shift	,	Total
	Creat	ed (gal):		-			_		Alu e
		ning (gal):		_			_		b) N/A
		st (gal)		-	Section 1				AIN
based on	duration ar	harges (gal). Estimate approximate flow rate on. ~180 gal max/event:	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	NIA
	THE RESERVE OF THE PARTY OF	st to Ground (gal):	e)ec-d N/A	L				L	
			-	rilling Fluid	Discharges				
Results o	of Static	Start Tim	THE RESERVE AND ADDRESS OF THE PARTY OF THE	A STREET, SQUARE, SQUA	Time	Pass/Fail		Comments	
Sheen	Test	_			-	NIA	N/A		
Discharge Start Time: —			Discharge End Time:		-	American de la companya del la companya de la compa	Discharge Duration (min.):		
Length of Casing (ft):	-	Drilling Fluid Depth Below Top of Casing (ft):	8)	Length of Drill Fluid Col. (ft):	h)=f-g	Casing Dia. (in.):	The same	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	[]
Disc	harge Vo	ol. (gal.). ~200 gallon	s max:	k)			V = 6	* j * 7.481 gal	15.3
			Sheen (Y/N & Co	mments)		Floating Solids		e, Deposits, Foan	
Observ During D				minents)			Residue (Y/N		
			Out	fall 002 - De	eck Drainag	e			
	24-hr Ra	ainfall (in.)		Volume	of Discharge	Due to Rair	nfall (gal.)	(m)=1*1599.3 O.O	0
Volum	e of Disc	harge From Deck		Day Shift			Night Shift	the same of the same of the same of	
	and the second second	l.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
duration		ximate flow rate during	-	-		Joan	- Liverban	100	n) 🚙
Total	Deck Dr	ainage Discharge (g	al.) ~2570 ga	al. max:	o)=m+n	0		-	
				<b>Outfalls 00</b>	The second secon				
		Receiving Water Vi	sual Observ	ations - Day	light Slack V	Vater (Per NOA	AA current predic	tions)	
Slack V	Water	Date & Time	Oily Sheen Det	ected in Visual S & Comments)	heen Test (Y/N	Floating Solids	, Debris, Sludg Residue (Y/N &	e, Deposits, Foan	n, Scum, or
1st Slack	Water	9/30/2015 0823		N			N	a commonto)	
2nd Slack	k Water	9130/2015 1421		N			N		
3rd Slack	k Water	9/30/206 2028	ria	unman	ned	( ic	CI I INVA	anned	
4th Slack	Water	10/1/2015 0245	rigi	unman	ned		Th.	manned	
		Other O	oserations, I	Non-Permitt	ed Dischar	ges, or Comn	-	Trocking of	
Riga	-	irc quayside						ig manne	<sup>2</sup> d

#### Daily Visual Observation Form Rev. 4

APDES Permit No.: AK0062278

Date & Time:		t: Alaska LN	NG Marine G		Investigation	on 015 070	00	
Borehole:	ASRC Quays		Boreh			of Ø	For Day	
Latitude:		1015	Longit	.ude:				
Day Shift Observer & Shift Time:	Sam Pan	t	Night Shift ( & Shift 1		riq u	inmanne	2 de	
Drilling Start Time:	no drillin	9	Drilling En	id Time:				
	Outfall 001 - Ge	otechnical	Drilling Fluid	ds and Drill	Cuttings at t	he Seafloor		
			uid Losses (P	The second secon	THE RESERVE THE PERSON NAMED IN COLUMN 1			
Drilling Flu	uid Volumes		Day Shift			Night Shift		Total
Create	ed (gal):		_					NIA
	ing (gal):		_		-	- interest		D) M/A
and the second s	t (gal)	lemine property and the second	-					e)=0*M/A
	harges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	NIA
	d approximate flow rate n. ~180 gal max/event:	-	-		relat	D49	~	37773
	st to Ground (gal):	ejizc-ti	AIA					
		CONTRACTOR OF THE PARTY OF THE	rilling Fluid [	Discharges				
Results of Static	Start Time	Albeidyles et al. 1997	End T	NAME OF TAXABLE PARTY OF TAXABLE PARTY.	Pass/Fail		Comments	
Sheen Test		-	-		NIA	NIH		
Discharge Start Time:	apare,	Discharge End Time:				Discharge Duration (min.):		-
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	g) —	Length of Drill Fluid Col. (ft):	h)=f-g	Casing Dia. (in.):	-	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	) -
Discharge Vo	ol. (gal.). ~200 gallon:	s max:	(s) N	A		k = h *	j * 7.481 gal/	/ft <sup>3</sup>
Observations	T	Sheen (Y/N & Co	omments)			A CONTRACTOR OF THE PARTY OF TH	e, Deposits, Foar	
During Discharge								
		Out	tfall 002 - De	eck Drainag	ge		y a superior de la companya de la co	
24-hr Ra	ainfall (in.)	0.0	Volume o	of Discharge	e Due to Rain	nfall (gal.)	mi=i*1599.3 O·C	)
Volume of Disc	charge From Deck		Day Shift			Night Shift	-	Total
	al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	
	ximate flow rate during hdowns.	-	-	-		-	nee	M/A
	rainage Discharge (g	al.) ~2570 g	al. max:	ojem+n	0.0			
			Outfalls 00	1 & 002				
	Receiving Water Vi	sual Observ	rations - Day	light Slack	Water (Per NO/	AA current predic	ctions)	
Slack Water	Date & Time	Oily Sheen Det	etected in Visual S & Comments)	heen Test (Y/N	Floating Solids	Residue (Y/N	e, Deposits, Foan & Comments)	n, Scum, or
1st Slack Water	10/1/2015 0916	N		Taxana and a second	N	1		
2nd Slack Water	10/1/2015 1511	N			N	\		
3rd Slack Water	10/1/2015 2114	rig	y unmant	ned	tig	unwanne	2d	
	1112012		];			17		
		bserations,	Non-Permit	ted Dischar	rges, or Comr	ments		
Rig at during		only.	THE STATE OF THE S				g manne	
Stop discharge upor	n obseration of oily sheen o				inage and report t ng with personne		atory Advisor, Clair	e Joseph.

## Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation

Date & Time:	0700 2/10/20	15	t	0	7700 i	3/10/2015	5	
Borehole:	MB-13			hole:	1	of /	For Day	
Latitude:	1393201.18 7		Long	itude:	2,435	831.40 1		•
Day Shift Observer & Shift Time:	San Pant 0900	2/10/2015	The state of the s	t Observer t Time:	Austra Fo		2/10/2015	
Drilling Start Time:	1530 2/10/		-	Ind Time:	070	00 200	12015	- "
	Outfall 001 - G	CONTRACTOR OF THE PROPERTY OF	Drilling Flui	ids and Dril			With the Party of	
		Drilling F	luid Losses (	Prior To Dis	charge)	the Seanoo		
Drilling F	luid Volumes		Day Shift		1	Night Shif	t	Total
Creat	ted (gal):	The state of the s	-			1056		a) 1056
Remai	ning (gal):			THE STATE OF THE S				b) _
Lo	st (gal)		=		/	056	<del></del>	997056
	charges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	d)
	nd approximate flow rate on. ~180 gal max/event:					-	600 T T T T T T T T T T T T T T T T T T	1056
	ost to Ground (gal):	elec-d 10	156	<u> </u>				
	(8-1)	A STATE OF THE PARTY OF THE PAR	rilling Fluid	Discharges				
Results of Static	Start Tim	The state of the s	End	Company of the Compan	Pass/Fail		Comments	
Sheen Test	_	to della minima de la companya de la		_	NA	-	comments	THE OWNER OF THE PERSON
Discharge Start Time:		Discharge	End Time:			Discharge D	Duration (min.):	
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	8)	Length of Drill Fluid Col. (ft):	h)=l-g	Casing Dia.	0 - 1	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	) -
Discharge V	ol. (gal.). ~200 gallor	is may:	ic)		L	1 1	-	15.3
W	The state of the s				Floating Solids		* j * 7.481 gal, e, Deposits, Foan	
Observations		Sheen (Y/N & Co	omments)	****		Residue (Y/N		., Ocam, or
During Discharge						-		
		Our	fall 002 - De	ck Drainag	e			THE RESERVE OF THE PARTY OF
24-hr R	ainfall (in.)	0.41	Volume o	of Discharge	Due to Rair	nfall (gal.)	m)=1*1599.3 655. 7	7
Volume of Disc	charge From Deck		Day Shift			Night Shift	0,000	
	al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
	iximate flow rate during hdowns.	_			5 mys 2 12 pm 1			60
THE RESERVE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER, THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER.	rainage Discharge (g	al.) ~2570 g	al. max:	oJemen	715.799	\		WO.
	3 10		Outfalls 00	1 & 002	113:10-0			
	Receiving Water Vi	sual Observ	ations - Dayl	light Slack V	Vater (Per NO/	AA current predic	tions)	
Slack Water	Date & Time	Oily Sheen Det	ected in Visual SI & Comments)	heen Test (Y/N	Floating Solids	, Debris, Sludge	e, Deposits, Foam	, Scum, or
1st Slack Water	2/10/2015 1012	1	a comments)		No	Residue (Y/N 8	x Comments)	
2nd Slack Water		N -			11 =	e and the second second		
3rd Slack Water	2/10/2015 2204	N _			1			
4th Slack Water		W -			10 -			
		Land of the land o	Non-Permitt	ed Dischar	ges, or Comn	nonto		
terna arabi ar	Other O	osciations,	Mon-rennitt	ed Dischar	ges, or Comn	nents		

## Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

Date 8	& Time:	0700 3/10/2	015	to	)	0700	4/10/20	015	
Bore	hole:	MB-13		Boreh	nole:	1	of 1	For Day	= 1
	tude:	60.660301	1	Longit	NEW COLUMN CO.	151.3	37810W		
	Observer t Time:	Sam Pant 0700-1		Night Shift & Shift		Austin	ee/Eduard	oPalido 1900	-0700
	tart Time:	0730 3/10/20	15	Drilling Er		2300	3/10/20	515	
		Outfall 001 - Ge	otechnical	Drilling Fluid	ds and Drill	Cuttings at 1	the Seafloor		
			Drilling Fl	uid Losses (P	rior To Disc	charge)			
	Orilling Flu	uid Volumes		Day Shift			Night Shift		Total
		ed (gal):		1200			528 9	10	8)
		ning (gal):		0		7 161	U		b)
	Name and Address of the Owner, where the Party of the Par	t (gal)		1200					c)+a-b
		harges (gal). Estimate d approximate flow rate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	
during l	ost circulatio	n. ~180 gal max/event:	_						
Drilling	g Fluid Los	st to Ground (gal):	igned					****	
			THE RESERVE THE PARTY NAMED IN	rilling Fluid I	SECURITY SEC				
	of Static	Start Tim		End T	INCOMES AND DESCRIPTION OF THE PARTY OF THE	Pass/Fail	The state of the s	Comments	
SECTION AND DESCRIPTION AND DE	n Test	0531 hr	CANADA AND CONTRACTOR	0548	NAME OF TAXABLE PARTY.	PASS	NO SHEEN	And the second second	SENT
Discharge	Start Time:	0600	Discharge	End Time:	06011 h)=f-g		Discharge D	uration (min.):	1
Length of Casing (ft):	52	Drilling Fluid Depth Below Top of Casing (ft):	22	Length of Drill Fluid Col. (ft):	30	Casing Dia. (in.):	711	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	0.27
Disc	charge Vo	ol. (gal.). ~200 gallon	s max:	10	0/		k=h	* j * 7.481 gal,	/ft <sup>3</sup>
Obser	vations	Oily	Sheen (Y/N & Co	omments)		Floating Solids	, Debris, Sludg Residue (Y/N 8	e, Deposits, Foan & Comments)	n, Scum, or
During [	Discharge	V 1	N	CHARLES AND		1/	- N		
			Out	tfall 002 - De	ck Drainag	e			
	24-hr Ra	ainfall (in.)	0.59	Volume o	of Discharge	e Due to Rair	nfall (gal.)	m)=1*1599.3 <b>743</b> .5	5
Volun	ne of Disc	harge From Deck		Day Shift			Night Shift		Total
	ALCOHOL: NOTE:	al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3		Washdown 5	Washdown 6	1000
duratio		ximate flow rate during ndowns.	_	-	10minxlighm = 120gal	120 gml			m)
Tota	An improved the publishment	rainage Discharge (g	al.) ~2570 g	al. max:	oj=m+d	1123.59		lease and the second	
				Outfalls 00	1 & 002				
		Receiving Water Vi							
_	Water	Date & Time	Oily Sheen Del	tected in Visual S & Comments)	heen Test (Y/N	Floating Solids	Residue (Y/N	e, Deposits, Foar & Comments)	n, Scum, or
1st Slav	k Water	13/10/2015 11/2		N			N		
2nd Sla	ck Water	3/10/2015 1700		M -			N		
3rd State	ck Water	3/10/2015 2259	N-			N-			
4th Sla	ck Water	4/10/2015 0527	N-			N —			
		Other O	bserations,	Non-Permitt	ted Dischar	ges, or Comr	ments		
4				200					
Stop di	scharge upoi	obseration of oily sheen o		Name and Address of the Owner, where the Owner, which the Owner, where the Owner, which the		THE RESERVE OF THE PERSON NAMED IN	THE RESERVE OF THE PERSON	atory Advisor, Clair	e Joseph.
		Note: Observation	ns were made o	ver a 24 hr perio	d corresponding	ig with personne	I shift changes.		

Date & Time:

Borehole:

#### Daily Visual Observation Form Rev. 4

4/10/2015

#### APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation

to

Borehole:

Borehole:	MB-13		Borel	nole:	1	of 1	For Day	
Latitude:	60.6603°N		Longit		151.378	s/en		
Day Shift Observer & Shift Time:	Sam 7ant 60700-19	100)	Night Shift & Shift		Austin Fee	/Eduardo	Polido (1900.	-0700)
<b>Drilling Start Time:</b>	no drilling		Drilling Er	nd Time:	no di	rilling		
	Outfall 001 - G	eotechnical	<b>Drilling Fluid</b>	ds and Drill	Cuttings at	the Seafloo	•	
			luid Losses (P		THE DWINGSTRATES THE PERSON NAMED IN			
Drilling	Fluid Volumes		Day Shift			Night Shift	•	Total
	ated (gal):		132			100		232
	aining (gal):		-0			0		p] 🔘
Participation of the Property of the Antique State of the	ost (gal)		132			100		232
	scharges (gal). Estimate and approximate flow rate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	
	tion. ~180 gal max/event:	-		_	-	-	-	-
Drilling Fluid L	ost to Ground (gal):	23	and the second second second second					
			Prilling Fluid [					
Results of Stati	c Start Tim	е	End T	ime	Pass/Fail		Comments	
Sheen Test								
Discharge Start Time	):	Discharge	e End Time:	William I		Discharge D	uration (min.):	_
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):		Length of Drill Fluid Col. (ft):	h)=Fg	Casing Dia. (in.):		Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	etten.
Discharge \	√ol. (gal.). ~200 gallon	s max:	k)	_		k=h	* j * 7.481 gal,	/ft <sup>3</sup>
Observations	Oily	Sheen (Y/N & Co	omments)		Floating Solids	The state of the s	e, Deposits, Foan	manage of the base of the same
During Discharg	e .	+						
		Our	tfall 002 - De	ck Drainag	e			<del>Vizina de la c</del>
24-hr	Rainfall (in.)	0.01	quadratic property and a second	THE RESERVE AND ADDRESS OF THE PARTY.	Due to Rair	fall (gal.)	m)=#1599.3 1 5.91	a2
THE RESIDENCE OF THE PARTY OF T	scharge From Deck		Day Shift			Night Shift	Charles and Charles and Charles and Charles	
	gal.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
	roximate flow rate during ashdowns.	-	= 180 god	n) —	_	_	-	180
THE RESERVE TO SHARE THE PARTY OF THE PARTY	Drainage Discharge (g	al.) ~2570 g	A CONTRACTOR OF THE PROPERTY AND ADDRESS OF	ој=т+п 19	6		L	
	<u> </u>	9	Outfalls 00:					
	Receiving Water Vi	sual Observ	ations - Dayl	ight Slack V	Vater (Per NO/	AA current predic	tions)	
Slack Water	Date & Time	Oily Sheen Det		neen Test (Y/N	Floating Solids		e, Deposits, Foan	ı, Scum, o
1st Slack Wate	r 04/10/2015 1219		& Comments)			Residue (Y/N 8	k Comments)	
2nd Slack Wate	The second secon		N			11/		
3rd Slack Wate						1.4		
4th Slack Wate			N			N		
4th Slack Wate		hannations	Non Downsite	ad Disabas		- N		
	Other O	oserations,	Non-Permitt	ed Dischar	ges, or Comn	nents		
Stop discharge up	on obseration of oily sheen o	r residue not re	lated to drill fluid	s or deck drain	age and report t	o Project Regula	tory Advisor, Claire	Joseph.
	Note: Observation	is were made o	ver a 24 hr period	corresponding	g with personnel	shift changes.		

#### Daily Visual Observation Form Rev. 4

APDES Permit No.: AK0062278 Project: Alaska LNG Marine Geotechnical Investigation 0700 10/6/2015 10/5/2015 0700 to Date & Time: For Day Borehole: Borehole: MB-13/MB-22 151.37810W 60.6603 ON Longitude: Latitude: Night Shift Observer Eduardo Pulido 1900-0708 Sam Pant 0700-1400 Day Shift Observer & Shift Time: & Shift Time: 0700 10/6/205 No drilling a+MB+13. MB-22: 1320 loks Prilling End Time: **Drilling Start Time:** Outfall 001 - Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor Drilling Fluid Losses (Prior To Discharge) Night Shift Total Day Shift **Drilling Fluid Volumes** 1162 6.34 528 Created (gal): 0 0 Remaining (gal): 1162 34 528 Lost (gal) Event 6 Event 4 Event 5 Event 2 Event 3 Inadvertent Discharges (gal). Estimate Event 1 based on duration and approximate flow rate during lost circulation. ~180 gal max/event: 1162 Drilling Fluid Lost to Ground (gal): **Drilling Fluid Discharges** Comments Pass/Fail **End Time** Start Time Results of Static Sheen Test Discharge Duration (min.): Discharge End Time: Discharge Start Time: Casing Area (ft<sup>2</sup>): Casing Dia. Length of Drill **Drilling Fluid Depth Below** Length of (in.): 7-in. is 0.27 ft2 Fluid Col. (ft): Casing (ft): Top of Casing (ft): k = h \* i \* 7.481 gal/ftDischarge Vol. (gal.). ~200 gallons max: Floating Solids, Debris, Sludge, Deposits, Foam, Scum, or Oily Sheen (Y/N & Comments) Residue (Y/N & Comments) Observations **During Discharge** Outfall 002 - Deck Drainage Volume of Discharge Due to Rainfall (gal.) 24-hr Rainfall (in.) Night Shift Volume of Discharge From Deck Day Shift Total Washdown 5 Washdown 6 Washdown 4 Washdown 2 Washdown 3 Washdown 1 Washdown (gal.). Estimate based on 10minx/2gpm = 120991 120 duration and approximate flow rate during washdowns. Total Deck Drainage Discharge (gal.) ~2570 gal. max: 901 Outfalls 001 & 002 Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions) Oily Sheen Detected in Visual Sheen Test (Y/N | Floating Solids, Debris, Sludge, Deposits, Foam, Scum, or Date & Time Residue (Y/N & Comments) Slack Water & Comments) M 1st Slack Water 10/5/2015 1328 2nd Slack Water 10/5/2015 1914 3rd Slack Water 4th Slack Water Other Obserations, Non-Permitted Discharges, or Comments MB-13. Jack down at MB-13 and Moved to MB-22 No drilling/discharge at at 12:00 hrs. All observations reported above pertinent to MB-22

#### Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

Date & Time:			NG Marine (	Seotechnic	al Investigat	-	700	~
Borehole:	NB-22		Borel		10/7/2	of 1	For Day	-
Latitude:	60.65356186	.°W	Longi		121-3			-
Day Shift Observer & Shift Time:		700-1900	Night Shift & Shift	Observer	Educardo	0		700
Drilling Start Time:	10/6/2015 07	00	Drilling E		10/7/20		<del></del>	•
	Outfall 001 - G	eotechnical	Drilling Flui	ds and Drill			r	<del>-</del>
		THE RESERVE OF THE PARTY OF THE	uid Losses (F	A STATE OF THE PARTY OF THE PAR	THE RESERVE AND ADDRESS OF THE PARTY OF THE			
Drilling F	luid Volumes		Day Shift			Night Shif	t	Total
	ted (gal):		1109		-	2112		3221
The state of the s	ning (gal):		0			0		b) O
	st (gal)		1109			2112	·	324
based on duration a	charges (gal). Estimate nd approximate flow rate on. ~180 gal max/event:	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	0
	ost to Ground (gal):	e)=c-á 3	221 201	L.	L	L	<u> </u>	
			rilling Fluid	Discharges				
Results of Static	Start Tim		End 7	THE RESERVE AND PERSONS.	Pass/Fail		Comments	
Sheen Test								
Discharge Start Time:		Discharge	e End Time:			Discharge I	Duration (min.):	6:
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	(1)	Length of Drill Fluid Col. (ft):	h)=f g	Casing Dia. (in.):	1	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	1)
Discharge V	ol. (gal.). ~200 gallon	s max:	k)			k = h	* j * 7.481 gal	/f+ <sup>3</sup>
Observations	The second second	Sheen (Y/N & Co	omments)		Floating Solids		e, Deposits, Foan	and the second section of
During Discharge				V-Miles (III-M-WALL	<	ricaidde (1771)	a comments)	
		Our	tfall 002 - De	ck Drainag	e			
24-hr R	ainfall (in.)	0.05	Volume o	of Discharge	Due to Rair	nfall (gal.)	ml=1*1599.3 80/	nal
Volume of Disc	charge From Deck		Day Shift			Night Shift	And the second second second second	
	al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
was	oximate flow rate during hdowns.		-	= 60 gal	The state of the s	_	120 MINX 12gpm	180
Total Deck D	rainage Discharge (g	al.) ~2570 g	The second secon	oj≃m+n	260 9	al		
	Danabila - Moto - M	and Observe	Outfalls 00	Name and Address of the Owner, where the Owner, which is the Owner, where the Owner, where the Owner, where the Owner, where the Owner, which is the Owner, which i				
a	Receiving Water Vi						ctions) e, Deposits, Foan	n Scum c
Slack Water	Date & Time		& Comments)		r rouning condo	Residue (Y/N		ii, ocuiii, o
1st Slack Water	10/6/2015 0750		Υ		N			
2nd Slack Water	10/6/2015 1433	1	1		N			
3rd Slack Water	10/6/2015 2024	<b>\</b>	1		N	/		
4th Slack Water			-					
	Other O	bserations,	Non-Permitt	ed Dischar	ges, or Comn	nents ·		

Date & Time:

Borehole:

Day Shift Observer

& Shift Time:

Drilling Start Time:

Latitude: MRD 60

## Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation

MB-27: 60.65115

1800 hr

Sam Pant 0700-1900

10/7/2015

**Drilling Fluid Volumes** 

to Borehole:

Night Shift Observer

& Shift Time:

Drilling End Time:

Outfall 001 - Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor
Drilling Fluid Losses (Prior To Discharge)

Day Shift

0700

Night Shift

1900-0700

For Day

151.376467250 N

Total

8/2015

Longitude: MRD: 151.37 9285970 W MR-27:

Eduardo Pulido

of

Create	ed (gal):					1500		1300
Remair	ning (gal):			*		0		0
Los	t (gal)					1500		1500
Inadvertent Disc	harges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	di
	d approximate flow rate on. ~180 gal max/event:	_	-	1-j	9		-	
Drilling Fluid Lo:	st to Ground (gal):	e3#c-d	15	THE RESIDENCE OF THE PROPERTY OF THE PERSON				
		D	rilling Fluid I	Discharges				
Results of Static	Start Tim	e	End	Time	Pass/Fail		Comments	
Sheen Test	10:55	eos CIL Azmini Cincin	11:10		Pass	No sli	cklseen	
Discharge Start Time:	11:20	Discharge	e End Time:	11:2	1	Discharge D	ouration (min.):	1.0
Length of Casing (ft): 69 ft	Drilling Fluid Depth Below Top of Casing (ft):	2:0 ft	Length of Drill Fluid Col. (ft):	49 Ft	Casing Dia. (in.):	7"	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	0.271
Discharge Vo	ol. (gal.). ~200 gallon	s max:	99	gal		k = h	* j * 7.481 gal	/ft <sup>3</sup>
Observations	Oily	Sheen (Y/N & Co	omments)			, Debris, Sludg Residue (Y/N	e, Deposits, Foan & Comments)	n, Scum,
During Discharge		N			N			
		Out	tfall 002 - De	eck Drainag	е			
24-hr R	ainfall (in.)	0.35	Volume o	of Discharge	Due to Rain	nfall (gal.)	m)=1*1599.3 56C	2901
Volume of Disc	charge From Deck	Day Shift				Night Shif		Tota
Washdown (ga	al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	1014
CONTRACTOR OF CONTRACTOR STATES AND	ximate flow rate during hdowns.	-	- \	-		- "	5mn = 128pm 60 gal	60
THE RESIDENCE OF THE PARTY OF T	rainage Discharge (g	al.) ~2570 g		STATE OF THE OWNER, STATE	2099			
			Outfalls 00	SAME DAY OF THE PERSON NAMED IN COLUMN 2 I	U			
	Receiving Water V							
Slack Water	Date & Time	Oily Sheen De	tected in Visual S & Comments)	Sheen Test (Y/N	Floating Solids	Residue (Y/N	je, Deposits, Foar & Comments)	n, Scum,
1st Slack Water	10/7/2015 0858		M			N		
2nd Slack Water			N	ON THE	1	4		
3rd Slack Water			N			N		
4th Slack Water			N			N		
	Other C	bserations,	Non-Permit	ted Dischar	ges, or Comr	ments		
Moved	to barehol Sheen tost	CONTRACTOR STATE OF THE PARTY O	THE RESERVE OF THE PARTY OF THE		Mark Control of the C		5.	reted
Static				THE RESIDENCE OF THE PARTY OF T	NAME OF TAXABLE PARTY.	THE RESIDENCE OF THE PERSONS ASSESSMENT	AND DESCRIPTIONS OF THE PARTY O	and the second
	n obseration of oily sheen o			AND DESCRIPTION OF THE PERSON	The state of the s		atory Advisor, Clair	re Joseph.

## Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

Date & Time: Borehole:	Oct 8,2015 C	00 FC	to		ai investigati	9.2015	0700	
porenoie:	MB-27		Boreh		1	of 1	For Day	
Latitude:	60.651115920	N	Longit	Managara a	151.376	467250		
Day Shift Observer	Sam Pant 07		Night Shift	Observer	Eduardo			900
& Shift Time: Drilling Start Time:			& Shift Drilling Er	- Carriera	Fair was		) (-100 c	,,,
Drining Start Time:	00+8,2015 0	A CANADA AND A CAN	•					
	Outfall 001 - Ge	THE RESERVE AND ADDRESS OF THE PARTY OF THE	of the same of the same of the same of the		A STREET, STRE	the Seafloor		
Drilling Eli	uid Volumes	Drining Fi	luid Losses (P Day Shift	TIOF TO DISC	criargej	Night Shift		Total
THE RESIDENCE OF THE PARTY OF T	ed (gal):	1	056		Name and Party of the Owner, where	1321		2377
	ning (gal):		_			0		b) 6
	t (gal)	10	056	and the said of the said of the said		1321		2377
AND THE RESERVE OF THE PARTY OF	harges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	ਗੈ
	d approximate flow rate	-		_				0
наштин каштаты ойга үч Түргөүн түшүн айрын башыштарын такка	on. ~180 gal max/event: st to Ground (gal):	ejet-á	2377 9	al	L			
Drining ridio 200	ze to Ground (gai).	i c	Orilling Fluid I	Discharges				
Results of Static	Start Tim		End 1	And the Contract of the Local Division in which the last of the la	Pass/Fail		Comments	
Sheen Test			_				Telescope de la companya del companya de la companya del companya de la companya	
Discharge Start Time:		Discharg	e End Time:			Discharge D	uration (min.):	ATTACHE CONTRACTOR
Length of	Drilling Fluid Depth Below	E)	Length of Drill	h)=l-g	Casing Dia.	0	Casing Area (ft <sup>2</sup> ):	1)
Casing (ft):	Top of Casing (ft):		Fluid Col. (ft):		(in.):		7-in. is 0.27 ft <sup>2</sup>	
Discharge Vo	ol. (gal.). ~200 gallon	ns max:	k)			k = h 3	* j * 7.481 gal,	/ft <sup>3</sup>
	The state of the s	Sheen (Y/N & C	Comments)	Average March 1997	Floating Solids	, Debris, Sludge	e, Deposits, Foan	The second second
Observations					<b></b>	Residue (Y/N 8	& Comments)	
During Discharge								
		National State of the last of	tfall 002 - De		THE RESERVE OF THE PERSON NAMED IN			*****
Marie Constitution of the	ainfall (in.)	0.01	en a martinismismismismismismismismismismismismismi	of Discharge	e Due to Rair	Alexandra de la companya de la comp	mi=1*1599.3 / 6 A	91
	charge From Deck		Day Shift			Night Shift		Total
	al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	2
duration and appro wash	ximate flow rate during ndowns.		-	= 120 gal	-		10 min x 17gpin	240
Total Deck Dr	rainage Discharge (g	al.) ~2570 g	al. max:	a)=m+n 2	560		0	
			Outfalls 00	Marine Marine State Control	U			
	Receiving Water Vi							
Slack Water	Date & Time	Oily Sheen De	etected in Visual S & Comments)	heen Test (Y/N	Floating Solids	Residue (Y/N 8	e, Deposits, Foar & Comments)	n, Scum,
1st Slack Water	10/8/2015 0953		N		September 1985 and the second second second	N		
2nd Slack Water	<del>                                     </del>		N			N		
	<del>                                     </del>		N			N		
3rd Slack Water	10/9 b 05 0415		N'			14		
3rd Slack Water 4th Slack Water			Non-Permitt	ted Dischar	ges or Comr	nents		
2nd Slack Water	198/2015 1617	-		ted Dischar	ges, or Comr	N		AND DESCRIPTION OF THE PERSON

## Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

Date & Time:	Oct 9,2015 07	00	to	)	Oct 10.	2015 079	20	
Borehole:	MB-27/MB-19		Borel	nole:	1	of 1	For Day	
Latitude:	60.65/1592°N/60.6		√ Longit	ude:	151.37646	725°W/1	51.3787739	12°W
Day Shift Observer	Sam Part 0200-		Night Shift				1900-07	
& Shift Time: Drilling Start Time:		7	& Shift Drilling Er	one constant		ohrs		
	2145 hrs of nodniting of Outfall 001 - Ge	18-27)	Drilling Elvis	de and Drill	Cuttings at	the Seeflee	<del></del>	
	Outlan OOI - Ge		uid Losses (F			the Jeanoon		
Drilling F	luid Volumes	Diming i.	Day Shift	101 10 010	and ge/	Night Shift		Total
	ted (gal):		0			660 .		660
	ining (gal):		0			0	Consider the state of	10
	ost (gal)		0		AND THE STATE OF T	660		660
Inadvertent Dis	charges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	d
	and approximate flow rate	-	-	_	<b>—</b> .	_	10115	660
THE RESERVE THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO I	tion. ~180 gal max/event: ost to Ground (gal):	(e)=;-d	66D a					
Drining Fidia E	ost to divana (gai).	D	rilling Fluid					
Results of Statio	Start Tim	NAME OF TAXABLE PARTY.	End 7		Pass/Fail		Comments	
Sheen Test	11:58		12:0	Name and Address of the Owner, where the Owner, which we can be a sufficient to the Own	Pass	-	lickIshee	. 1.
Discharge Start Time		Discharge	End Time:		2:31		uration (min.):	1
()	Drilling Chaid Dooth Roley	15	Length of Drill	h)=f-ig	Casing Dia.	ų —	Casing Area (ft²):	107
Casing (ft): 68	Top of Casing (ft):	10	Fluid Col. (ft):	53	(in.):	+	7-in. is 0.27 ft <sup>2</sup>	0.27
Discharge \	/ol. (gal.). ~200 gallon	s max:	1 (	7 gal		Control of the Contro	* j * 7.481 gal/	
Observations	Oily	Sheen (Y/N & Co	omments)		Floating Solids	, Debris, Sludg Residue (Y/N 8	e, Deposits, Foam & Comments)	n, Scum, or
<b>During Discharg</b>	e	N.				N		
							The second second second	
	<u> </u>	Out	tfall 002 - De	ck Drainag	е			
24-hr l	Rainfall (in.)	Out	THE RESERVE THE PERSON NAMED IN	Married World Street, or other Designation of the last	<b>e</b> Due to Rair	nfall (gal.)	m)=P15993 O	
The second section is a second section of the second section is a second section of the second section of the second section is a second section of the section of the section of the second section of the	Rainfall (in.) scharge From Deck		THE RESERVE THE PERSON NAMED IN	Married World Street, or other Designation of the last	Charles III and Charles	nfall (gal.) Night Shift	m)=P1599.3 O	Total
Volume of Dis Washdown (g	scharge From Deck gal.). Estimate based on		Volume o	Married World Street, or other Designation of the last	Charles III and Charles		Washdown 6	Total
Volume of Dis Washdown (g duration and appl	scharge From Deck gal.). Estimate based on oximate flow rate during	0	Volume of Day Shift	of Discharge	Due to Rair	Night Shift	Washdown 6	120
Volume of Dis Washdown (g duration and appr wa	scharge From Deck gal.). Estimate based on roximate flow rate during ishdowns.	Washdown 1	Volume of Day Shift Washdown 2	of Discharge Washdown 3	Washdown 4	Night Shift	Washdown 6	120
Volume of Dis Washdown (g duration and appr wa	scharge From Deck gal.). Estimate based on oximate flow rate during	Washdown 1	Volume of Day Shift Washdown 2	Washdown 3	Washdown 4	Night Shift	Washdown 6	120
Volume of Dis Washdown (g duration and approved wa	scharge From Deck gal.). Estimate based on roximate flow rate during ishdowns.	Washdown 1 - al.) ~2570 ga	Volume of Day Shift Washdown 2 al. max: Outfalls 00	Washdown 3	Washdown 4	Night Shift Washdown 5	Washdown 6 10 min x 12 gpm = 12 ogau	120
Volume of Dis Washdown (g duration and approved wa	scharge From Deck gal.). Estimate based on oximate flow rate during ishdowns. Drainage Discharge (ga	Washdown 1 - al.) ~2570 ga	Volume of Day Shift Washdown 2  al. max: Outfalls 00 ations - Day	Washdown 3  - 120 9  1 & 002  ight Slack V	Washdown 4  Washdown 4  Water (Per NOA	Night Shift Washdown 5	Washdown 6  10 min x 12ppm = 12 ogau  ctions) e, Deposits, Foam	120
Volume of Dis Washdown (g duration and app wa Total Deck I	scharge From Deck gal.). Estimate based on roximate flow rate during schdowns. Drainage Discharge (ga Receiving Water Vi Date & Time	Washdown 1 - al.) ~2570 ga	Volume of Day Shift Washdown 2  al. max: Outfalls 00 ations - Daylected in Visual S	Washdown 3  - 120 9  1 & 002  ight Slack V	Washdown 4  Washdown 4  Water (Per NOA	Night Shift Washdown 5  AA current predict, Debris, Sludg	Washdown 6  10 min x 12ppm = 12 ogau  ctions) e, Deposits, Foam	120
Volume of Dis Washdown (g duration and approved Total Deck I Slack Water	scharge From Deck gal.). Estimate based on roximate flow rate during schdowns. Drainage Discharge (ga Receiving Water Vi Date & Time	Washdown 1 - al.) ~2570 ga	Volume of Day Shift Washdown 2  al. max: Outfalls 00 ations - Daylected in Visual Si & Comments)	Washdown 3  - 120 9  1 & 002  ight Slack V	Washdown 4  Washdown 4  Water (Per NOA	Night Shift Washdown 5  AA current predict, Debris, Sludg Residue (Y/N a	Washdown 6  10 min x 12ppm = 12 ogau  ctions) e, Deposits, Foam	120
Volume of Dis Washdown (g duration and appr wa Total Deck I  Slack Water 1st Slack Water 2nd Slack Water	Receiving Water Vi Date & Time  10/4/205 1635	Washdown 1 - al.) ~2570 ga	Volume of Day Shift Washdown 2  al. max: Outfalls 00 ations - Daylected in Visual Si & Comments)	Washdown 3  - 120 9  1 & 002  ight Slack V	Washdown 4  Washdown 4  Water (Per NOA	Night Shift Washdown 5  AA current predict, Debris, Sludg Residue (Y/N a	Washdown 6  10 min x 12ppm = 12 ogau  ctions) e, Deposits, Foam	120
Volume of Dis Washdown (g duration and approved Total Deck I  Slack Water  1st Slack Water  2nd Slack Wate  3rd Slack Wate	Receiving Water Vi	Washdown 1 - al.) ~2570 ga	Volume of Day Shift Washdown 2	Washdown 3  - 120 9  1 & 002  ight Slack V	Washdown 4  Washdown 4  Water (Per NOA	Night Shift Washdown 5  AA current predict, Debris, Sludg Residue (Y/N &	Washdown 6  10 min x 12ppm = 12 ogau  ctions) e, Deposits, Foam	120
Volume of Dis Washdown (g duration and approved Total Deck I  Slack Water  1st Slack Water  2nd Slack Wate  3rd Slack Wate	Receiving Water Vi Date & Time  10/19/2015 2338  10/19/2015 0500	Washdown 1  al.) ~2570 gasual Observ Oily Sheen Det	Volume of Day Shift Washdown 2	Washdown 3  - 120 9  1 & 002  ight Slack V heen Test (Y/N	Washdown 4  Washdown 4  Water (Per NOA Floating Solids	Night Shift Washdown 5  AA current predict, Debris, Sludg Residue (Y/N &	Washdown 6  10 min x 12ppm = 12 ogau  ctions) e, Deposits, Foam	120
Volume of Dis Washdown ( duration and approved Total Deck I  Slack Water  1st Slack Water  2nd Slack Wate  3rd Slack Wate  4th Slack Wate	Receiving Water Vi Date & Time  10/9/20/5 1635  10/19/20/5 0500  Other O	Washdown 1  al.) ~2570 gasual Observ Oily Sheen Det	Volume of Day Shift Washdown 2  al. max: Outfalls 00 ations - Daylected in Visual Si & Comments)  N  N  N  Non-Permitt	Washdown 3  - 126 9  1 & 002  ight Slack V heen Test (Y/N)	Washdown 4  Water (Per NO) Floating Solids  ges, or Comm	Night Shift Washdown 5  AA current predict, Debris, Sludg Residue (Y/N a	Washdown 6  I O min x 12gpm = 12 ogas  ctions) e, Deposits, Foam & Comments)	, Scum, or
Volume of Dis Washdown (g duration and appr wa Total Deck I  Slack Water  1st Slack Water  2nd Slack Wate  3rd Slack Wate  4th Slack Wate	Receiving Water Vi Date & Time  10/19/2015 2338  10/19/2015 0500	Washdown 1  al.) ~2570 gasual Observ Oily Sheen Det bserations,	Volume of Day Shift Washdown 2  al. max: Outfalls 00 ations - Daylected in Visual Si & Comments)  N  N  N  Non-Permitte	Washdown 3	Washdown 4  Washdown 4  Water (Per NOA Floating Solids  ges, or Comm	Night Shift Washdown 5  AA current predict, Debris, Sludg Residue (Y/N and N)  N  N  N  N  N  N  N  N  N  N  N  N	Washdown 6  I O min x 12gpm = 12 ogas  ctions) e, Deposits, Foam & Comments)	, Scum, or
Volume of Dis Washdown (g duration and appr Washdown Stack II  Slack Water  1st Slack Water  2nd Slack Water  3rd Slack Water  4th Slack Water  No drill Then mo	Receiving Water Vi Date & Time  10/19/2015 2338  10/10/2015 0500  Other O	Washdown 1  al.) ~2570 gasual Observ Oily Sheen Det  bserations, Pulled a	Volume of Day Shift Washdown 2  al. max: Outfalls 00 ations - Daylected in Visual State Comments)  N  N  N  N  Non-Permitter Cacing Cac	Washdown 3  - 120 S  1 & 002  ight Slack V heen Test (Y/N)	Washdown 4  Washdown 4  Water (Per NOA Floating Solids  ges, or Comm	Night Shift Washdown 5  AA current predict, Debris, Sludg Residue (Y/N or N)  N  N  N  N  N  N  N  Comple	Washdown 6  I O min x 12 ppm = 12 ogar  ctions) e, Deposits, Foam & Comments)	(20)

## Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

	oनoo			I Investigati		100	
				OC1 11) 6			
	350 M	To the state of th	CONSCIONAL ST	151.27			×
		Night Shift	t Observer				0700
		el				-	. ,
77							3.85
	Britains sharp build by the property of	THE RESERVE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER.	No serior series and profits they be seen	PARTY AND DESCRIPTION OF THE PARTY AND DESCRI	the Seamoon		
Fluid Volumes		THE RESERVE THE PERSON NAMED IN			Night Shift		Total
		1003		112	Participate of the participation of the participati		2192
ining (gal):		0					b) 0
ost (gal)		1003			89		2192
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	ф ·
		-	-		11-11		-
The state of the s	6945-0	2192	ral			L	
	D	rilling Fluid	Discharges				
Start Tim		Annual Control of the	Name and Address of the Owner, where the Parket	Pass/Fail		Comments	
0638	No. of the last of	065	400	PASS	NO 540	K / SHEEN	C STATE OF COLUMN
0705	Discharge	End Time:	0706		Discharge D	State and administrative experience of the state of	1
Drilling Fluid Depth Below Top of Casing (ft):	1,6	Length of Drill Fluid Col. (ft):	47	Casing Dia. (in.):	7	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	0-27
/ol. (gal.). ~200 gallor	A STATE OF THE STA	95	gal		k = h	* i * 7.481 gal.	/ft <sup>3</sup>
Oily	Sheen (Y/N & Co	omments)			, Debris, Sludg	e, Deposits, Foan	
e	N				M	Land Indian	
Mext e de	Out	fall 002 - D	eck Drainag	е	The second second		
Rainfall (in.)	0.64	Volume	of Discharge	Due to Rain	fall (gal.)	ml=1*1599# 07 d	4 001
scharge From Deck		Day Shift			NAME AND ADDRESS OF THE OWNER, WHEN PERSON ADDRESS OF THE OWNER, WHEN PERSON AND ADDRESS OF THE OWNER, WHEN	AND REAL PROPERTY.	. 0
gal.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
roximate flow rate during ashdowns.		-	5minx12gpm -60gal		, —		60
						the state of the s	
	al.) ~2570 ga	al. max:	oj=m+n	1.084	gal		
Drainage Discharge (g	al.) ~2570 ga	al. max: Outfalls 00	oj=n/en	1.084	gal	· · · · · · · · · · · · · · · · · · ·	
Orainage Discharge (g	isual Observ	Outfalls 00 ations - Day	1 & 002 light Slack V	Vater (Per NOA	A current predic	tions)	
	isual Observ	Outfalls 00 ations - Day	1 & 002 light Slack V	Vater (Per NOA Floating Solids	A current predic	e, Deposits, Foan	n, Scum, or
Orainage Discharge (g Receiving Water V	isual Observ	Outfalls 00 ations - Day ected in Visual S	1 & 002 light Slack V	Vater (Per NOA Floating Solids	A current predic , Debris, Sludg	e, Deposits, Foan	n, Soum, or
Receiving Water V	isual Observ	Outfalls 00 ations - Day ected in Visual S & Comments)	1 & 002 light Slack V	Vater (Per NOA Floating Solids	A current predic , Debris, Sludg Residue (Y/N &	e, Deposits, Foan	ı, Scum, or
Receiving Water V Date & Time	isual Observ	Outfalls 00 ations - Day ected in Visual S & Comments)	1 & 002 light Slack V	Vater (Per NOA Floating Solids	A current predic , Debris, Sludg Residue (Y/N &	e, Deposits, Foan	n, Scum, or
Receiving Water V Date & Time  Toliolis 112  Toliolis 1728	isual Observ	Outfalls 00 ations - Day tected in Visual S & Comments)	1 & 002 light Slack V	Vater (Per NOA Floating Solids	A current predic , Debris, Sludg Residue (Y/N &	e, Deposits, Foan	n, Scum, or
	Sam Pant 0700- Oct 10, 2015  Outfall 001 - G  Fluid Volumes ated (gal): aining (gal): ost (gal) scharges (gal). Estimate and approximate flow rate tion. ~180 gal max/event: ost to Ground (gal):  C Start Tim 0 6 3 8  Drilling Fluid Depth Below Top of Casing (ft):  Vol. (gal.). ~200 gallon Oily ge  Rainfall (in.) scharge From Deck gal.). Estimate based on	MR-19 60.6585 4333 N  Sam Pant 0700-1900  Outfall 001 - Geotechnical  Drilling Fl  Fluid Volumes  ated (gal): aining (gal): ost (gal)  scharges (gal). Estimate and approximate flow rate tion. ~180 gal max/event: ost to Ground (gal):  C Start Time  0638  Drilling Fluid Depth Below Top of Casing (ft):  Vol. (gal.). ~200 gallons max:  Oily Sheen (Y/N & Cote ge  Out  Rainfall (in.) Scharge From Deck gal.). Estimate based on  Washdown 1	Bore  Longing Sam Pant 0700-1900  Outfall 001 - Geotechnical Drilling Fluid  Drilling Fluid Losses ( Fluid Volumes  and approximate flow rate tion. ~180 gal max/event:  Ost to Ground (gal):  Drilling Fluid  C Start Time  Drilling Fluid  C Start Time  Drilling Fluid Depth Below Top of Casing (ft):  Vol. (gal.). ~200 gallons max:  Outfall 002 - De  Rainfall (in.)  Scharge From Deck  gal.). Estimate based on  Washdown 1  Washdown 2	Borehole: Longitude: Night Shift Observer & Shift Time: Drilling Fluid Losses (Prior To Disc Fluid Volumes Day Shift Drilling (gal): Drilling Fluid Losses (Prior To Disc Start Time Drilling Fluid Discharges C Start Time Drilling Fluid Discharges Drilling Fluid Doscharges Drilling Fluid Doscharges Drilling Fluid Depth Below Top of Casing (ft):  Wol. (gal.). ~200 gallons max:  Dutfall 002 - Deck Drainag Rainfall (in.)  Dutfall 002 - Deck Drainag Rainfall (in.)  Scharge From Deck Grant Time Day Shift Washdown 1 Washdown 2 Washdown 2 Washdown 2 Washdown 3	Borehole: Longitude: Night Shift Observer & Shift Time: Oct 10 2015 0 7 3 0 Drilling Fluids and Drill Cuttings at 1  Drilling Fluid Losses (Prior To Discharge)  Fluid Volumes  Day Shift  Dost (gal): Dost (gal) Dost (gal) Dost (gal): D	Borehole: Longitude: Night Shift Observer & Shift Time: OCT (1, 2015 OO  Outfall 001 - Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor Drilling Fluid Losses (Prior To Discharge)  Fluid Volumes Day Shift Night Shift Shift Observer & Shift Time: OCT (1, 2015 OO  Outfall 001 - Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor Drilling Fluid Losses (Prior To Discharge)  Fluid Volumes Day Shift Night Shift Shift Observer & Shift Time: OCT (1, 2015 OO  O	Borehole:   Of   For Day   Solid   Sol

			DES Permit N					
Date & Time:	Oct 115 07	ject: Alaska	LNG Marine	Geotechni	ical Investiga			
Borehole:				to	- OCF		700	_
Latitude:	MB-19/MB-28	1/11/2007		hole:	1	of	For Day	
Day Shift Observer	60.60x54337N /6			itude: ft Observer	151.378773	92°W/151.	38078286	·W
& Shift Time:	Sam Pant Otas			t Time:	Eduardo	Pulido	1900-0700	
Drilling Start Time:	10/11/15 1745 h		-	End Time:	10/12/		ohrs	-
Thomas and the same	Outfall 001 - (	Geotechnica	l Drilling Flui	ids and Dri	II Cuttings at	the Seafloo	or	
		Drilling F	luid Losses (	Prior To Di	scharge)		ur we also be to be	
The second secon	luid Volumes		Day Shift	300		Night Shif	ft	Total
	ted (gal):		0			661		661
	ining (gal): ost (gal)	<del></del>	0			Ö		b) O
	charges (gal). Estimate		0	Ţ		661		661
based on duration a	and approximate flow rate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Ø)
during lost circulat	ion. ~180 gal max/event:	_		-	_	ندا	_	- "
Drilling Fluid Lo	ost to Ground (gal):	61=4-0	66	1901			<u> </u>	L
		ı I	Orilling Fluid	Discharges				
Results of Static			End 7		Pass/Fail		Comments	
Sheen Test	0140	7	0155	5	PASS	NO 9	LICK / SHEE	2
Discharge Start Time:	0230	Discharge	e End Time:	0231		Discharge (	Duration (min.):	1
Length of Casing (ft): 63	Drilling Fluid Depth Belov Top of Casing (ft):	19	Length of Drill Fluid Col. (ft):	44	Casing Dia. (in.):	7	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	0.27
Discharge Ve	ol. (gal.). ~200 gallor	ns max:	9	gaal		k = h	* j * 7.481 gal/	1543
Observations	Oily	Sheen (Y/N & Co		- Car	Floating Solids	Debris, Sludg	e, Deposits, Foam	Scum or
During Discharge						Residue (Y/N &	& Comments)	,, , ,
- S - Total ge		N			1	V		
		The state of the s	fall 002 - De	ck Drainag	e			
	ainfall (in.)	0.01	Volume o	f Discharge	e Due to Rain	fall (gal.)	mid-1599.3 16 go	7
	harge From Deck		Day Shift			Night Shift		
duration and approx	al.). Estimate based on ximate flow rate during	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
wash	ndowns.	-	-	-	-		5min - 12gom -	60
Total Deck Dr	ainage Discharge (g	al.) ~2570 ga	ıl. max:	o)=mien	76 901		@U (ga)	
			Outfalls 001		0			
	Receiving Water Vi	sual Observa	ations - Dayli	ght Slack V	Vater (Per NOA)	A current predict	tions)	
Slack Water	Date & Time	Oily Sheen Dete	ected in Visual Sho & Comments)	een Test (Y/N	Floating Solids,	Debris, Sludge Residue (Y/N &	e, Deposits, Foam,	Scum, or
1st Slack Water	16/11/205 1146		N			N		
nd Slack Water	10/11/KO15 1800		N		110000000	N		
ard Slack Water	10/12/2015 0013		N			N		
Ith Slack Water	10/12/2015 0621		N			N	tion	
	Other O	oserations, N	lon-Permitte	d Discharg	es, or Comm	ents		
	lat MB-28	B-19. M at 12:	loved to	MB-2	8 prom	MB-19.		
Stop discharge upon	obseration of oily sheen or	residue not rela	ted to drill fluids	or deck draina	ge and report to	Project Regulate	ory Advisor. Claire I	oseph.
	Note: Observation	s were made ove	er a 24 hr period o	corresponding	with personnel sl	nift changes.		

Latitud Day Shift Ol	ole: <u>1</u> de: <u>6</u>	18-28/MB-23 0.664398210N/		Boreho Longitu Night Shift C	ıde: 1	5138078	The second secon	For Day 1900-0700	hn
& Shift Ti		lan Pant 0700-	-1900 hr	& Shift T	-			1100-0100	
<b>Drilling Star</b>	rt Time:	1030 Ms		Drilling End	_	0700	Jw6		
	+ 1	Outfall 001 - Geo	technical (	Orilling Fluid	s and Drill (	Cuttings at tr	ie Seatioor		
			Drilling Flu	id Losses (Pi	rior To Discl	harge)	Night Shift		Total
Dr	THE RESERVE AND ADDRESS OF THE PERSON NAMED IN	d Volumes		Day Shift	-	A STATE OF THE PARTY OF THE PAR	925		925
	Created	The state of the s					0		0
	Remaini	The state of the s		0			925	2 94	925
	Lost		Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	
based on d	duration and	arges (gal). Estimate approximate flow rate .~180 gal max/event:	- Event 1	_	1016	_			0
		t to Ground (gal):	GPC S	925	THE RESERVE AND ADDRESS OF THE PARTY OF				
			D	rilling Fluid [	THE RESERVE THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER.			Commonto	
Results o	f Static	Start Time	2	End T	ime	Pass/Fail		Comments	
Sheen	Test					\	District D	uration (min.):	
Discharge S	tart Time:		Discharge	End Time:	hjet-g		Discharge D	MANAGEMENT OF THE PARTY OF THE	1)
Length of Casing (ft):	_	Drilling Fluid Depth Below Top of Casing (ft):	2)	Length of Drill Fluid Col. (ft):		Casing Dia. (in.):		Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	
Disc	harge Vo	l. (gal.). ~200 gallons	s max:	k)				* j * 7.481 gal,	
Observ			Sheen (Y/N & C	omments)		Floating Solids	, Debris, Sludg Residue (Y/N /	e, Deposits, Foan & Comments)	n, Scum,
During D	ischarge								-
			Ou	tfall 002 - D	The second liverage and the se	The second secon	C 11 ( - 1 )	m)=1*1599.3	
		infall (in.)	0.00	STATE OF THE PERSON NAMED IN COLUMN 2 IN C	of Discharge	e Due to Rair			T
Volum		harge From Deck	La Day Tie	Day Shift	I 1.1 2	Mark daws A	Night Shift Washdown 5	Washdown 6	Total
		II.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 3	TOMIN X 1291	0 191
Wash	A CONTRACTOR CONTRACTOR		_	1		-		120	120
Wash	n and appro wash	ndowns.	Secretaria de la composição de la compos			Accompany of the last of the l			
Wash	wash	ndowns.	l al.) ~2570 g	gal. max:	oir-m+n	121) 90		polesky southware by	-
Wash	wash	ndowns. rainage Discharge (g		Outfalls 0	01 & 002	U			
Wash	wash	ndowns.	isual Ohser	Outfalls 0	01 & 002	Water (Per NO	AA current pred	ictions)	m. Scum,
Wash duration Tota	wash	ndowns. rainage Discharge (g	isual Ohser	Outfalls 0	01 & 002	Water (Per NO	s. Debris, Sludg	ictions) ge, Deposits, Foa & Comments)	m, Scum,
Wash duration Tota Slack	wash al Deck Dr Water	rainage Discharge (g Receiving Water V	isual Ohser	Outfalls 00 vations - Day etected in Visual	01 & 002 /light Slack Sheen Test (Y/N)	Water (Per NO	s. Debris, Sludg	ge, Deposits, roa	m, Scum,
Wash duration Tota Slack 1st Slack	wash al Deck Dr Water ck Water	Receiving Water V	isual Ohser	Outfalls 00 vations - Day etected in Visual & Comments)	01 & 002 /light Slack Sheen Test (Y/N)	Water (Per NO	s. Debris, Sludg	ge, Deposits, roa	m, Scum,
Wash duration Tota Slack 1st Slack 2nd Slace	wash al Deck Dr Water ck Water ck Water	Receiving Water V Date & Time  10/12/15 1221 10/12/15 1831	isual Ohser	Outfalls 00 vations - Day etected in Visual & Comments	01 & 002 /light Slack Sheen Test (Y/N)	Water (Per NO	s. Debris, Sludg	ge, Deposits, roa	m, Scum
Vash duration Tota Slack 1st Slac 2nd Slac 3rd Slac	wash al Deck Dr Water ck Water ck Water	Receiving Water V Date & Time 10/12/15 1221 10/12/15 1831 10/13/15 0048	isual Ohser	Outfalls 00 vations - Day etected in Visual & Comments)	01 & 002 /light Slack Sheen Test (Y/N)	Water (Per NO	Residue (Y/N	ge, Deposits, roa	m, Scum,
Slack 1st Slac 2nd Slac 3rd Slac 4th Slac	wash al Deck Dr Water ck Water ck Water ck Water	Receiving Water V  Date & Time  10/12/15 12-21 10/13/15 0048	Obserations	Outfalls 06 vations - Day etected in Visual & Comments) N N Non-Permi	01 & 002 /light Slack Sheen Test (Y/N)	Water (Per NO Floating Solids	Residue (Y/N	& Comments)	m, Scum
Slack 1st Slac 2nd Slac 3rd Slac 4th Slac	wash al Deck Dr Water ck Water ck Water ck Water	Receiving Water V Date & Time 10/12/15 1221 10/12/15 1831 10/13/15 0048	Obserations	Outfalls 06 vations - Day etected in Visual & Comments) N N Non-Permi	01 & 002 /light Slack Sheen Test (Y/N)	Water (Per NO Floating Solids	Residue (Y/N	& Comments)	m, Scum

Date & Time: Borehole:	Oct 13,205 0		And the second s		I Investigati			
		700	. to		OC+ 14,		700	
	MB -23		Boreh	-		of (	For Day	
Latitude:	60.654547319	4	Longit	A STATE OF THE STA	151.376	171500	W	
Day Shift Observer & Shift Time:	Sampant 0300-10	100	Night Shift & Shift		Educardo	Audidos C	1900-070	00
Drilling Start Time:	OC+ 13, 2015 67	30	Drilling Er	nd Time:	0700			
	Outfall 001 - Ge	eotechnical	Drilling Fluid	ds and Drill	Cuttings at 1	the Seafloo	,	
		Drilling Fl	uid Losses (P	rior To Disc	charge)			
Drilling	Fluid Volumes		Day Shift			Night Shif	t	Total
	ated (gal):		630			925		#155S
	aining (gal):		0			0		6) 0
Contract of the last of the la	ost (gal)		630			925		1550
	scharges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	[0]
	and approximate flow rate ation. ~180 gal max/event:			_				
	ost to Ground (gal):	EInc-f)	222					
			rilling Fluid I	Discharges				
Results of Stati	ic Start Tim	е	End T	ime	Pass/Fail		Comments	
Sheen Test					-			
Discharge Start Tim	e: —	Discharge	e End Time:		_	Discharge I	Duration (min.):	_
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	s)	Length of Drill Fluid Col. (ft):	h)≃f-g —	Casing Dia. (in.):	-	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	()
Discharge	Vol. (gal.). ~200 gallon	s max:	10			k = h	* j * 7.481 gal,	/ft <sup>3</sup>
Observations		Sheen (Y/N & C	omments)				e, Deposits, Foan	
During Dischar	ge	-				Name of the last o		
		Ou	tfall 002 - De	ck Drainag	е			
24-hr	Rainfall (in.)	0.03	Volume o	of Discharge	Due to Rain	fall (gal.)	ml=1*1599.3 48	gal
Volume of D	ischarge From Deck		Day Shift			Night Shif	t	Total
Washdown	(gal.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
A SECONDARY OF THE PROPERTY OF THE PARTY OF	proximate flow rate during ashdowns.	-	_	120gal		-	5mm x 129pm	180
THE RESERVE THE PERSON NAMED IN COLUMN 2	Drainage Discharge (g	al.) ~2570 g	al. max:	o)=m+n	7280	al	2 3631	
		-	Outfalls 00	1 & 002	0		<del></del>	
	Receiving Water Vi							
Slack Water	Date & Time	Oily Sheen De	tected in Visual Si & Comments)	heen Test (Y/N	Floating Solids	, Debris, Sludç Residue (Y/N	e, Deposits, Foan & Comments)	n, Scum,
1st Slack Wate	er 10/13/16 0701		N		7		n =	
2nd Slack Wat	er 10/13/15 1258		N		1	V	Nelson Son William Son Senting	
	er 10/13/15 1904		N	THE STATE OF THE S	Λ	J	The same of the same of	i i
3rd Slack Water	11/1/16 1107		N		^	1	The state of the s	
3rd Slack Wate 4th Slack Wate	er 10/14/15 0123							

Note: Observations were made over a 24 hr period corresponding with personnel shift changes.

1 Standard Standard	Time:	Oct 142015 0	700	to		al Investigation	1015 0	700	
Boreh		MR-23	- 051	Borel	100 Sept. 100 Se	15 07.	of \	For Day	
Latitue Day Shift O		60.65454	+3101A	Longit Night Shift	1 -	151.3+6	1715001	W	
& Shift T		Spant 0700 -	-1900	& Shift		E. Puli	10 190	00-0700	
Drilling Star	rt Time:	OC+14,2015 C	730	Drilling Er	nd Time:	0/15/15 06	45		
		Outfall 001 - Ge	otechnical	Drilling Fluid	s and Drill	Cuttings at t	he Seafloor		
			Drilling Fl	uid Losses (P	rior To Disc	charge)			
Dr		uid Volumes		Day Shift			Night Shift		Total
4 P		ed (gal):		660			793		1,453
		ning (gal):		(-0			793		1-11/62
Innduarte	STREET, SQUARE, SQUARE	t (gal)	Frent 1	660	Firent 3	Frent A	mark and a second	1,453	
		harges (gal). Estimate d approximate flow rate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	
during los	t circulatio	n. ~180 gal max/event:			_				COURSE OF THE CO
Drilling F	luid Los	st to Ground (gal):	el=C-U	CONTRACTOR OF THE PROPERTY OF	sal				de contraction
			OCUMENTAL SERVICE AND ADDRESS OF THE PARTY O	rilling Fluid	(The party of the party)				
Results of	COMPACTOR STANCES	Start Tim	6	End T	ime	Pass/Fail	at Management and a second	Comments	
Sheen							Discharge Duration (min.):		
Discharge St	art Time:		Discharge	End Time:	h)»f-g		Discharge D	Ouration (min.):	
Length of Casing (ft):		Drilling Fluid Depth Below Top of Casing (ft):		Length of Drill Fluid Col. (ft):	10.00	Casing Dia. (in.):	_	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	_
Disch	arge Vo	ol. (gal.). ~200 gallon	s max:	K)			k = h	* j * 7.481 gal/	ft <sup>3</sup>
		The second second second second second	**************************************	ammonts)			Debris, Sludg	e, Deposits, Foam	
Observa		Oily	Sheen (Y/N & Co	Jililients)			Residue (Y/N	& Comments)	
Observa During Dis		Oily	Sheen (Y/N & Co				Hesiaue (Y/N	& Comments)	
		Oily		tfall 002 - De	ck Drainag		Residue (Y/N	- Commens)	
During Dis	scharge	oily ainfall (in.)		tfall 002 - De				m)=1°1599.3 1/2 6/2	7
During Dis	scharge 24-hr Ra		Out	tfall 002 - De		e		mj=1°1599.3 1/b 5.0	Total
During Dis : Volume Washd	24-hr Ra of Disc	sinfall (in.) harge From Deck al.). Estimate based on	Out	tfall 002 - De	of Discharge Washdown 3	e	fall (gal.)	mj=1°1599.3 1/b 5.0	Total
During Dis : Volume Washd	24-hr Ra of Disc own (ga	ainfall (in.) harge From Deck ll.). Estimate based on kimate flow rate during	Out	tfall 002 - De Volume o Day Shift	Washdown 3	e Due to Rain Washdown 4	fall (gal.) Night Shift	Washdown 6	
Volume Washd	24-hr Ra of Disc own (ga and appro- wash	sinfall (in.) harge From Deck al.). Estimate based on	Out    Out   Washdown 1	Volume of Day Shift Washdown 2	of Discharge Washdown 3	e Due to Rain Washdown 4	fall (gal.) Night Shift	m)=1°1599.3	Total
Volume Washd	24-hr Ra of Disc own (ga and appro- wash	ninfall (in.) harge From Deck al.). Estimate based on kimate flow rate during andowns.	Out    Out   Washdown 1	Volume of Day Shift Washdown 2	Washdown 3	e Due to Rain Washdown 4	fall (gal.) Night Shift	Washdown 6	
Volume Washd	24-hr Ra of Disc own (ga and appro- wash	ninfall (in.) harge From Deck al.). Estimate based on kimate flow rate during andowns.	Out Washdown 1  al.) ~2570 gassual Observ	Volume of Day Shift Washdown 2 al. max: Outfalls 00 rations - Day	Washdown 3  10 × 12 gpm  10 × 1	e Due to Rain Washdown 4  — 196 Qal Water (Per NOA	fall (gal.) Night Shift Washdown 5	Washdown 6   SX 12 gym 60 gu 1	180
Volume Washd	24-hr Ra of Disc own (ga and appro- wash Deck Dr	einfall (in.) harge From Deck al.). Estimate based on kimate flow rate during ndowns. rainage Discharge (ga	Out Washdown 1  al.) ~2570 gassual Observ	Volume of Day Shift Washdown 2 al. max: Outfalls 00 rations - Day	Washdown 3  10 × 12 gpm  10 × 1	e Due to Rain Washdown 4  Washdown 4  Water (Per NOA) Floating Solids,	fall (gal.) Night Shift Washdown 5	Washdown 6  SX 12 gym 60 gu 1  ctions)	180
Volume Washd duration	24-hr Ra e of Disc own (ga and approx wash Deck Dr	einfall (in.) harge From Deck al.). Estimate based on kimate flow rate during hdowns. rainage Discharge (go	Out Washdown 1  al.) ~2570 gassual Observ	Volume of Day Shift Washdown 2 al. max: Outfalls 00 rations - Day	Washdown 3  10 × 12 gpm  10 × 1	e Due to Rain Washdown 4  Washdown 4  Water (Per NOA) Floating Solids,	fall (gal.) Night Shift Washdown 5  A current predic	Washdown 6  SX 12 gym 60 gu 1  ctions)	180
Volume Washd duration Total	24-hr Ra of Disc own (ga and appro- wast Deck Dr	einfall (in.) harge From Deck al.). Estimate based on kimate flow rate during ndowns. rainage Discharge (ga Receiving Water Vi Date & Time	Out Washdown 1  al.) ~2570 gassual Observ	Volume of Day Shift Washdown 2 al. max: Outfalls 00 rations - Day	Washdown 3  10 × 12 gpm  10 × 1	e Due to Rain Washdown 4  Washdown 4  Water (Per NOA) Floating Solids,	fall (gal.) Night Shift Washdown 5  A current predic	Washdown 6  SX 12 gym 60 gu 1  ctions)	180
Volume Washd duration Total Slack W	24-hr Ra e of Disc own (ga and approx wash Deck Dr Vater Water	ainfall (in.) harge From Deck al.). Estimate based on kimate flow rate during adowns. rainage Discharge (ga Receiving Water Vi Date & Time	Out Washdown 1  al.) ~2570 gassual Observ	Volume of Day Shift Washdown 2 al. max: Outfalls 00 rations - Day	Washdown 3  10 × 12 gpm  10 × 1	e Due to Rain Washdown 4  Washdown 4  Water (Per NOA) Floating Solids,	fall (gal.) Night Shift Washdown 5  A current predia, Debris, Sludg Residue (Y/N	Washdown 6  SX 12 gym 60 gu 1  ctions)	180
Volume Washd duration Total Slack W 1st Slack 2nd Slack	24-hr Ra of Disc own (ga and appro wash Deck Dr  /ater  Water  Water  Water	sinfall (in.) harge From Deck al.). Estimate based on kimate flow rate during adowns. rainage Discharge (ga Receiving Water Vi Date & Time	Out Washdown 1  al.) ~2570 gassual Observ	Volume of Day Shift Washdown 2 al. max: Outfalls 00 rations - Day	Washdown 3  10 × 12 gpm  10 × 1	e Due to Rain Washdown 4  Washdown 4  Water (Per NOA) Floating Solids,	fall (gal.) Night Shift Washdown 5  A current predia, Debris, Sludg Residue (Y/N	Washdown 6  SX 12 gym 60 gu 1  ctions)	180

Date & Time:

Borehole:

#### Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation 0700

to

Borehole:

Latitude:		60.6545473	I'ON	Longi	tude:	151.376	171500	W	f
Day Shift Obser & Shift Time:	A STATE OF	S. Pant 0700-10	100	Night Shift & Shift			10 1900.		
Drilling Start Tir	-	DH 5, 2015, 0		Drilling Er			330		
		Outfall 001 - Ge		Drilling Flui	ds and Drill	-			
			and a supplemental	uid Losses (F	Name and Address of the Owner, where the Party of the Owner, where the Owner, which is the Owner, w	NAME OF TAXABLE PARTY.			
Drillin	ng Flu	id Volumes		Day Shift			Night Shift		Total
C	reate	d (gal):		2007		-	397		2904
Re	maini	ing (gal):		0			0	August 1	0 0
	and purchase the control of	(gal)	•	2007			397		2404
based on durat	ion and	larges (gal). Estimate l approximate flow rate n. ~180 gal max/event:	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	(d)
		t to Ground (gal):	RD+C-D	24.	14 pal	Q1, 19, 0	1 1/2		
			D	rilling Fluid	Discharges				
Results of St	atic	Start Tim	e	End	Гime	Pass/Fail	P	Comments	arrantification and an arrantification
Sheen Tes	st [					1			
Discharge Start T	Γime:		Discharge	End Time:		/ 0000	Discharge D	uration (min.):	
Length of Casing (ft):	1	Drilling Fluid Depth Below Top of Casing (ft):	g)	Length of Drill Fluid Col. (ft):	h)=1-g	Casing Dia. (in.):		Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	) ——
Discharg	ge Vol	l. (gal.). ~200 gallon	s max:	k)		L	k = h	* j * 7.481 gal	/ft <sup>3</sup>
Observatio			Sheen (Y/N & Co	omments)		Floating Solids	and the same of th	e, Deposits, Foan	
<b>During Discha</b>	arge	· ·							
			Out	fall 002 - De	ck Drainag	ie .		-	
24-	hr Ra	infall (in.)	0.05		THE RESERVE OF THE PARTY OF THE	e Due to Rair	nfall (gal.)	m)=1*1599.3/00	
	-	narge From Deck	Day Shift				Night Shift	Contract of the Contract of	
Washdow	n (gal	l.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
duration and	73 75 55 55 55	imate flow rate during	-		10m/mx12g		-	10mile * 12gp	240
Total Dec	307	downs. ainage Discharge (ga	al.) ~2570 g	al max:	0)=83+8	340	gal	1100	
			, 20,08	Outfalls 00	1 & 002	-10	O a		
		Receiving Water Vi	sual Observ	THE RESERVE OF THE PARTY OF THE		Nater (Per NO)	AA current predic	ctions)	
Slack Wate	The same of	Date & Time						e, Deposits, Foar	n, Scum, or
1st Slack Wa	ater	10/15/15 0825		N		N			- 7
2nd Slack W	ater	10/15/15 1417		N		N			
3rd Slack Wa	ater	10/15/15 2015		N		N			
4th Slack Wa	ater	10/16/150237		N		N			
		Other O	bserations,	Non-Permitt	ted Dischar	ges, or Comr	nents		
Stop discharge	e upon	obseration of oily sheen o	r residue not rel	ated to drill fluid	ds or deck drain	nage and report t	o Project Regula	tory Advisor, Clair	e Joseph.
		Note: Observation	is were made o	ver a 24 hr perio	d correspondin	g with personnel	shift changes.		

For Day

#### Daily Visual Observation Form Rev. 4

APDES Permit No.: AK0062278 Project: Alaska LNG Marine Geotechnical Investigation OCF 17 2015 0700 Oct 16, 2015 0700 to Date & Time: Borehole: MR-23/MR-21 Borehole: 60.65454731°N/60.65553589°N Longitude: Latitude: Night Shift Observer Day Shift Observer S.Pamt 0700-1900 & Shift Time: & Shift Time: 1650 Drilling End Time: Drilling Start Time: Outfall 001 - Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor Drilling Fluid Losses (Prior To Discharge) Night Shift Total Day Shift **Drilling Fluid Volumes** 778 528 250 Created (gal): 0 0 Remaining (gal): 0 7778 528 Lost (gal) Event 6 Event 2 Event 4 Event 5 Event 3 Inadvertent Discharges (gal). Estimate Event 1 0 based on duration and approximate flow rate during lost circulation. ~180 gal max/event: 778 Drilling Fluid Lost to Ground (gal): **Drilling Fluid Discharges** Comments Pass/Fail **End Time** Start Time Results of Static slick sheen 10:48 Pass NO 10:30 Sheen Test Discharge Duration (min.): 1 min Discharge End Time: 11:05 Discharge Start Time: 11:04 Casing Area (ft2): Casing Dia. Length of Drill **Drilling Fluid Depth Below** Length of 53 3 40 (in.): 7-in. is 0.27 ft2 Fluid Col. (ft): Top of Casing (ft): Casing (ft): gal k = h \* i \* 7.481 gal/ftDischarge Vol. (gal.). ~200 gallons max: Floating Solids, Debris, Sludge, Deposits, Foam, Scum, or Oily Sheen (Y/N & Comments) Residue (Y/N & Comments) Observations **During Discharge** Outfall 002 - Deck Drainage Volume of Discharge Due to Rainfall (gal.) 0.22 24-hr Rainfall (in.) Night Shift Volume of Discharge From Deck Day Shift Total Washdown 5 Washdown 6 Washdown 3 Washdown 2 Washdown 4 Washdown (gal.). Estimate based on Washdown 1 IOMIN X 129P duration and approximate flow rate during 240 12090 washdowns. Total Deck Drainage Discharge (gal.) ~2570 gal. max: 50 Outfalls 001 & 002 Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions) Oily Sheen Detected in Visual Sheen Test (Y/N | Floating Solids, Debris, Sludge, Deposits, Foam, Scum, or Slack Water Date & Time Residue (Y/N & Comments) & Comments) 1st Slack Water 10/16/15 0911 N 10/16/5 1459 2nd Slack Water N N 10/16/15 2054 N 3rd Slack Water 10/17/15 0317 4th Slack Water Other Obserations, Non-Permitted Discharges, or Comments No drilling at MB-23. Moved from MB-23 to MB-21 Arrive at MB-21 Stop discharge upon obseration of oily sheen or residue not related to drill fluids or deck drainage and report to Project Regulatory Advisor, Claire Joseph.

Note: Observations were made over a 24 hr period corresponding with personnel shift changes.

## Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation

Date & Time:	OCT 17.2015 0700	to	9C+18,2015 0700
Borehole:	MB-21	Borehole:	\ of \ For Day
Latitude:	60.65553589°N	Longitude:	151.37254192°W
Day Shift Observer & Shift Time:	S. Part 0700-1900	Night Shift Observer & Shift Time:	E-Pulido 1900-0700
Drilling Start Time:	00+17,2015 0730	Drilling End Time:	2140
	Outfall 001 - Geotechnical	Drilling Fluids and Dri	ill Cuttings at the Seafloor

-		Outrall OUT - Ge	otecnnical	Drilling Fluid	is and Dri	ii Cuttings at	the Seamoo	)[	
			Drilling F	luid Losses (P	rior To Di	scharge)			
D	rilling Flu	uid Volumes		Day Shift			Night Shif	t	Total
	Create	ed (gal):	528			1-	159		
		ing (gal):	. 0			0	- At an and	687	
		t (gal)	528			159		687	
Inadvert	ent Discl	narges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	
	sed on duration and approximate flow rate uring lost circulation. ~180 gal max/event:		No.	emin.	-	-			0
Drilling	Fluid Los	st to Ground (gal):	DAD D	687 g	al				
				Orilling Fluid I	Discharges				
Results o	of Static	Start Time	e End Time		Pass/Fail		Comments		
Sheen	Test	0340	03.		2	P455	NO SHOW / SHE		
Discharge S	start Time:	0410	Discharg	e End Time:	041	1	Control and Street Control of the Co	Duration (min.):	1
Length of Casing (ft):	53	Drilling Fluid Depth Below Top of Casing (ft):	31	Length of Drill Fluid Col. (ft):	12-22	Casing Dia. (in.):	7"	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	0.27
Disc	harge Vo	ol. (gal.). ~200 gallons	max:	9 44.9	Had		k = h	* j * 7.481 gal	/ft <sup>3</sup>
Observations Oily		Oily S	heen (Y/N & C	Comments)		Floating Solids		ge, Deposits, Foar & Comments)	n, Scum, c
During D	ischarge		N				N		

Outfall 002 - Deck Drainage

24-hr Rainfall (in.)	0-2	Volume	of Discharge	m=125993 320 gal			
Volume of Discharge From Deck	Day Shift Night Shift					Total	
Washdown (gal.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
duration and approximate flow rate during washdowns.		-	10min x 12gp	n	-	SMNX 12gpn 6004	180
Total Deck Drainage Discharge (g	(al.) ~2570 ga	al. max:	CI=m+n	500	301	ŋ,	

Outfalls 001 & 002

Slack Water	Date & Time	Oily Sheen Detected in Visual Sheen Test (Y/N & Comments)	Floating Solids, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)
1st Slack Water	10/17/15 0959	N	N
2nd Slack Water	10/17/15 1543	N	N
3rd Slack Water	10/17/15 2136	N	N
4th Slack Water	10/18/15 0359	N	N S S S
	Other (	Obserations, Non-Permitted Dischar	ges, or Comments
Stop discharge upon	observation of ally sheen	or recidue not related to drill fluide or dock drain	nage and report to Project Regulatory Advisor, Claire Joseph.

Date & Time:

## Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

Boreh Latitu Day Shift C	ıde:	MB-21/MB-17 6065553589°N/6	0.6568108	Boreh  Night Shift	tude:	1 of 1 For Day 151.37254192°W/151.37898244°W E. Puli do 1900-0700 ctig,2050855				
& Shift Drilling Sta	Time:	S. Pant 0700-10 act 18,2015 17.		& Shift Drilling Er	Time:					
		Outfall 001 - Ge	otechnical	Drilling Fluid	v = -	The partial of the same with the	(45-9)19 (27-18-6-5-18-18-18-18-18-18-18-18-18-18-18-18-18-			
			Drilling Fl	uid Losses (F	rior To Disc	charge)				
Di	AND RESIDENCE PROPERTY.	uid Volumes		Day Shift			Night Shift		Total	
		ed (gal):		132			529		661	
Charles Airc State Australia	Commence of the last of the la	ning (gal):		0			529		0) 0	
Inadvort	THE RESERVE OF THE PERSON NAMED IN	t (gal) harges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	nan importance anno postero meneral ma	Frank C	661	
based on o	duration an	d approximate flow rate on. ~180 gal max/event:	- Event 1	event 2	- Event 3	event 4	Event 5	Event 6	0	
Drilling	Fluid Los	st to Ground (gal):	60=C-0;	66	1991					
			- NAME AND ADDRESS OF THE OWNER, THE PARTY OF THE PARTY O	rilling Fluid I						
Results o	(5 m. 8 m. 5 m.	Start Tim	e	End 7	ime	Pass/Fail		Comments		
Sheen				400		_				
Discharge S	tart Time:		Discharge	End Time:			Discharge D	uration (min.):		
Length of Casing (ft):		Drilling Fluid Depth Below Top of Casing (ft):		Length of Drill Fluid Col. (ft):	nia-A	Casing Dia. (in.):	-	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	_	
Discl	harge Vo	ol. (gal.). ~200 gallon	s max:	()			k=h	* j * 7.481 gal/	/ft <sup>3</sup>	
Observa	Interested to the Local of	T	Sheen (Y/N & Co	omments)		Floating Solids		e, Deposits, Foan		
During Di	ischarge		-				-		TENEND PRODUCTION	
-			Out	tfall 002 - De	ck Drainag	е				
	24-hr Ra	ainfall (in.)	0.41	A STATE OF THE PERSON NAMED IN	at the same of the same of the same	Due to Rair	nfall (gal.)	656		
Volume	e of Disc	harge From Deck	47	Day Shift		Night Shift				
Washo	down (ga	al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total	
duration		ximate flow rate during	*	-	-	+	-	5 MID X 1298m	60	
Total		ainage Discharge (g	al.) ~2570 g	al. max:	oj=m+is	71699				
		3	, ,	Outfalls 00	1 & 002	0			<del></del>	
		Receiving Water Vi								
Slack V	Vater	Date & Time	Oily Sheen Del	tected in Visual S & Comments)	heen Test (Y/N	Floating Solids	, Debris, Sludg Residue (Y/N	e, Deposits, Foan & Comments)	n, Scum, or	
1st Slack	Water	10/18/15 1051		N			M	3 33 11 11 11 11 11 11 11 11 11 11 11 11		
2nd Slaci	k Water	10/18/15 1631		N			N			
3rd Slack	k Water	10/18/15 22:23		N			N	- W W W W W W W W W W W W W W W W W W W		
4th Slack	And the second second	10/19/15 0448		N		74.77	N			
		decidence of the same of the s	bserations.		ted Dischar	ges, or Comr	ments			
No	MB-1	illing at 1	A STATE OF THE PERSON NAMED IN	moved	THE RESERVE OF THE PERSON NAMED IN	Communication of the Communica		3-21. Arn	ved	
Stop disc	harge upon	obseration of oily sheen o Note: Observation		Commence of the Commence of th	Mark Company of the C		A STATE OF THE PARTY OF THE PAR	ntory Advisor, Claire	a Joseph.	

### Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation 0700 act 20, 2015 Date & Time: to Borehole: MR-17 Borehole: of For Day Latitude: Longitude: 440W 60.656810810N 151.378982 **Night Shift Observer** Day Shift Observer appl ward Loads I Dulida 1900-0701

& Shift Time: Drilling Start Time:		S.Pant 0-100	Annual Control of the	& Shift	10	E-Pu	-	1,40 1900-0700 ), 2015 0700		
Drilling Sta	art Time:	oct 19,2015 0		Drilling E						
		Outfall 001 - Ge	THE RESERVE OF THE PARTY NAMED IN	THE RESIDENCE OF THE PARTY OF T	AND RESIDENCE AND RESIDENCE		the Seafloo	<u>r</u>		
			Drilling Fl	uid Losses (F	Prior To Dis	charge)				
D	West of the second	uid Volumes		Day Shift			Night Shif	t	Total	
	The Party of the P	ed (gal):		1064			528		1597	
	Remain	ning (gal):		0			0		b) O	
	Los	t (gal)		1064			528		1592	
Inadvert	Inadvertent Discharges (gal). Estimate			Event 2	Event 3	Event 4	Event 5	Event 6	e.	
	based on duration and approximate flow rate during lost circulation. ~180 gal max/event:		-	-	_			-	0	
Drilling	Fluid Los	st to Ground (gal):	erca.	1592						
			D	rilling Fluid	Discharges					
Results o	of Static	Start Time	9	End	Time	Pass/Fail		Comments		
Sheen	Test	_								
Discharge S	Start Time:		Discharge	End Time:			Discharge I	Ouration (min.):	- Commission of the last	
Length of Casing (ft):		Drilling Fluid Depth Below Top of Casing (ft):	g)	Length of Drill Fluid Col. (ft):	h)=1-g	Casing Dia. (in.):	1).	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>		
Disc	harge Vo	ol. (gal.). ~200 gallons	max:	0			k = h	* j * 7.481 gal/	ft <sup>3</sup>	
Observ	ations	Oily S	Sheen (Y/N & Co	omments)			ds, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)			
During Di	ischarge		aurest aurest personnel transcription				-		conditional East	
			Out	tfall 002 - De	eck Drainag	e				
	24-hr Ra	ainfall (in.)	0	Volume	of Discharge	e Due to Rair	fall (gal.)	mil=l*1598.3 <i>O</i>		
Volum	e of Disc	harge From Deck		Day Shift		and the second second second second	Night Shif	t		
Wash	down (ga	1.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total	
	and approx	ximate flow rate during adowns.	-	-	= 120 gal	-	***	SMM x 12gpm	180	
Total	Deck Dr	ainage Discharge (ga	al.) ~2570 g	OTHER DESIGNATION OF THE PERSON NAMED IN COLUMN TWO	G=m+n		180 gal			
ACCUMALIZACIONAL SEC				Outfalls 00	1 & 002		U			
		Receiving Water Vi	sual Observ	ations - Day	light Slack \	Nater (Per NO	AA current pred	ictions)		

Oily Sheen Detected in Visual Sheen Test (Y/N | Floating Solids, Debris, Sludge, Deposits, Foam, Scum, or Slack Water Date & Time & Comments) Residue (Y/N & Comments) 1st Slack Water M M 1148 M M 2nd Slack Water 1725 N N 3rd Slack Water 2319 N 0548 4th Slack Water Other Obserations, Non-Permitted Discharges, or Comments

Date & 1		00+ 20,2015 0		Alaska LNG Marine Geotechnica  () () to  Borehole:			Oct 21 2015 0700			
Boreho	-samoen	MR-17	101	Borer Longit		101070	98244			
Day Shift Ol		60.6568108		Night Shift	1.4			0.00		
& Shift T	ime:		-1900	& Shift	20-03-03-03-03-03-03-03-03-03-03-03-03-03	E. Pulido 1900-0700				
Drilling Star	rt Time:	OC+ 20, 2015	6730	Drilling Er	nd Time:	Oct 20,	2015 1	7:45	ž.	
		Outfall 001 - Ge	Color College Control of	MARKET STREET,	THE RESERVE OF THE PARTY OF THE	and the second second second	the Seafloor			
			Drilling Fl	uid Losses (P	rior To Disc	harge)				
Dr		uid Volumes	-	Day Shift			Night Shift		Total	
	Secretary of the last of the l	ed (gal):		2193			-0_		2193	
		ning (gal):	-	0			0		2193	
Inadvanta	CONTRACTOR STATEMENT OF THE	t (gal)	Frank 1	2193	Cuant 2	Frant 4				
		narges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	m		
		n. ~180 gal max/event:		-	-	7	_		0	
Drilling F	Fluid Los	st to Ground (gal):	e)=c-d			Marine and Commission				
				rilling Fluid I						
Results of		Start Tim	e	End T		Pass/Fail	THE RESIDENCE OF THE PARTY OF T	Comments		
Sheen Test 0425		учения принципальной принце	044	A CONTRACTOR OF THE PARTY OF TH	PASS	PROPERTY AND PERSONS ASSESSED.	10 SHEEN ISLI			
Discharge St	art Time:	0455	Discharge	End Time:	0456	/	Discharge D	uration (min.):	Imm	
Length of Casing (ft):	65	Drilling Fluid Depth Below Top of Casing (ft):	18	Length of Drill Fluid Col. (ft):	47	Casing Dia. (in.):	7	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	0.27	
Disch	narge Vo	l. (gal.). ~200 gallon	s max:	0 1	(aa)	0.12	k = h	* i * 7.481 gal	/ft <sup>3</sup>	
Observa			Sheen (Y/N & Co	Comments) Floating				e, Deposits, Foar		
- pa	charge		N				N			
During Dis	Scribinge							Maria Carlos de Santos Maria (1980) (1980)	nis photos and a	
During Dis	Scriarge		Out	fall 002 - De	ck Drainag	P				
			Out	tfall 002 - De	THE RESERVE THE PERSON NAMED IN	Control of the latest state of the latest stat	nfall (gal.)	m=015093		
	24-hr Ra	infall (in.)	and the second second second second	Volume o	THE RESERVE THE PERSON NAMED IN	e Due to Rair	TOTAL PROPERTY OF THE PARTY OF	mr=(*1519.3 <i>O</i>		
Volume	24-hr Ra	ainfall (in.) harge From Deck	and the second second second second	PRINCIPAL PROPERTY OF THE PERSON NAMED IN PORTY OF THE PERSON NAMED IN POR	THE RESERVE THE PERSON NAMED IN	Control of the latest state of the latest stat	nfall (gal.) Night Shift Washdown 5	m = 1/1589.3 O	Tota	
Volume Washd	24-hr Ra e of Disc lown (ga and appro	infall (in.)	0	Volume of Day Shift Washdown 2	of Discharge Washdown 3	Due to Rair	Night Shift	1	Total	
Volume Washd	24-hr Ra e of Disc lown (ga and appro wash	ainfall (in.) harge From Deck Il.). Estimate based on kimate flow rate during	Washdown 1	Volume of Day Shift Washdown 2	of Discharge Washdown 3	Due to Rair	Night Shift Washdown 5	1		
Volume Washd	24-hr Ra e of Disc lown (ga and appro wash	ainfall (in.) harge From Deck ll.). Estimate based on kimate flow rate during ndowns.	Washdown 1	Volume of Day Shift Washdown 2	Washdown 3	Washdown 4	Night Shift Washdown 5	1	Total	
Volume Washd	24-hr Ra e of Disc lown (ga and appro wash	ainfall (in.) harge From Deck ll.). Estimate based on kimate flow rate during ndowns.	Washdown 1  — al.) ~2570 g	Volume of Day Shift Washdown 2 6000000000000000000000000000000000000	Washdown 3 120gul 120gul 120gul 120gul 14002 light Slack V	Washdown 4  / 80  Vater (Per NO)	Night Shift Washdown 5	Washdown 6	180	
Volume Washd	24-hr Ra e of Disc lown (ga and appro- wash Deck Dr	ainfall (in.) harge From Deck al.). Estimate based on kimate flow rate during ndowns. rainage Discharge (g	Washdown 1  — al.) ~2570 g	Volume of Day Shift Washdown 2 6000000000000000000000000000000000000	Washdown 3 120gul 120gul 120gul 120gul 14002 light Slack V	Washdown 4  / 80  Vater (Per NO)	Night Shift Washdown 5	Washdown 6  ctions)  e, Deposits, Foal	180	
Volume Washd duration	24-hr Ra e of Disc lown (ga and appro- wash Deck Dr	ainfall (in.) harge From Deck al.). Estimate based on kimate flow rate during adowns. rainage Discharge (g	Washdown 1  — al.) ~2570 g	Volume of Day Shift Washdown 2  al. max: Outfalls 00 rations - Day rected in Visual S	Washdown 3 120gul 120gul 120gul 120gul 14002 light Slack V	Washdown 4  / 80  Vater (Per NO)	Night Shift Washdown 5  —  AA current predict, Debris, Sludg Residue (Y/N	Washdown 6  ctions)  e, Deposits, Foal	180	
Volume Washd duration Total	24-hr Rae of Discolown (ga and approximately Wash Deck Dr	harge From Deck II.). Estimate based on kimate flow rate during adowns. Tainage Discharge (g  Receiving Water Vi  Date & Time	Washdown 1  — al.) ~2570 g	Volume of Day Shift Washdown 2 60900 al. max: Outfalls 00 ations - Day tected in Visual S & Comments)	Washdown 3 120gul 120gul 120gul 120gul 14002 light Slack V	Washdown 4  / 80  Vater (Per No.) Floating Solids	Night Shift Washdown 5  AA current predict, Debris, Sludg Residue (Y/N	Washdown 6  ctions)  e, Deposits, Foal	180	
Volume Washd duration Total Slack W	24-hr Ra e of Disc lown (ga and approx wash Deck Dr Vater Water	ainfall (in.) harge From Deck al.). Estimate based on kimate flow rate during adowns. rainage Discharge (g  Receiving Water Vi  Date & Time  10/20/15 17251	Washdown 1  — al.) ~2570 g	Volume of Day Shift Washdown 2  Shift Washdown 2  al. max: Outfalls 00 ations - Day rected in Visual S & Comments)	Washdown 3 120gul 120gul 120gul 120gul 14002 light Slack V	Washdown 4  / 80  Vater (Per No.) Floating Solids	Night Shift Washdown 5  AA current predict, Debris, Sludg Residue (Y/N	Washdown 6  ctions)  e, Deposits, Foal	180	
Volume Washd duration Total Slack W 1st Slack 2nd Slack	24-hr Rae of Discolown (galand approximately Deck Dr.  Vater  Water  Water  Water  Water	ainfall (in.) harge From Deck al.). Estimate based on kimate flow rate during adowns. rainage Discharge (grainage Discharge Vince & Time	Washdown 1  — al.) ~2570 g	Volume of Day Shift Washdown 2  Shift Washdown 2  al. max: Outfalls 00 ations - Day rected in Visual S & Comments)	Washdown 3 120gul 120gul 120gul 120gul 14002 light Slack V	Washdown 4  / 80  Vater (Per NO) Floating Solids	Night Shift Washdown 5  AA current predict, Debris, Sludg Residue (Y/N	Washdown 6  ctions)  e, Deposits, Foal	180	

**Drilling Fluid Volumes** 

Created (gal):

Remaining (gal):

Lost (gal)

Date & Time:

Latitude:

Borehole:

Day Shift Observer

& Shift Time:

**Drilling Start Time:** 

00+21,2015 0700

S-Pant 0700-1900

0421,2015 14:50

60.65681081°N /60.65939000°N Longitude:

MB-17/MB-14

#### Daily Visual Observation Form Rev. 4

#### APDES Permit No.: AK0062278 Project: Alaska LNG Marine Geotechnical Investigation

to

Borehole:

Night Shift Observer

& Shift Time:

Drilling End Time:

Outfall 001 - Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor Drilling Fluid Losses (Prior To Discharge)

Day Shift

370

370

oct 22,2015 070

151.3789 & 2440W/151.38159110W

E.Pulido 1900-0700

Night Shift

660

Total

1030

0 1020

Inadvertent Discharges (gal). Estimate Event 1 Event 2 Event 3 Event 4 Event 5 Event 6 based on duration and approximate flow rate during lost circulation. ~180 gal max/event: Drilling Fluid Lost to Ground (gal): **Drilling Fluid Discharges** Results of Static **End Time** Comments Start Time Pass/Fail Sheen Test Discharge Duration (min.): Discharge Start Time: Discharge End Time: Casing Area (ft2): **Drilling Fluid Depth Below** Length of Drill Casing Dia. Length of Fluid Col. (ft): Casing (ft): Top of Casing (ft): (in.): 7-in. is 0.27 ft2 Discharge Vol. (gal.). ~200 gallons max:  $k = h * i * 7.481 \text{ gal/ft}^2$ Floating Solids, Debris, Sludge, Deposits, Foam, Scum, or Oily Sheen (Y/N & Comments) Observations Residue (Y/N & Comments) **During Discharge** Outfall 002 - Deck Drainage Volume of Discharge Due to Rainfall (gal.) 24-hr Rainfall (in.) Volume of Discharge From Deck Day Shift Night Shift Total Washdown 2 Washdown 5 Washdown 3 Washdown 4 Washdown 6 Washdown (gal.). Estimate based on Washdown 1 SMIN X 12gp duration and approximate flow rate during VRO = 120gal washdowns. TXO Total Deck Drainage Discharge (gal.) ~2570 gal. max: Outfalls 001 & 002 Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions) Oily Sheen Detected in Visual Sheen Test (Y/N | Floating Solids, Debris, Sludge, Deposits, Foam, Scum, or Slack Water Date & Time Residue (Y/N & Comments) & Comments) 1st Slack Water N N 2nd Slack Water 10/22/15 0143 3rd Slack Water 4th Slack Water Other Obserations, Non-Permitted Discharges, or Comments Hodrilling at MB-17. Moved to MB-14 From MB-17. Arrived at MB-14 at 12:45 Stop discharge upon obseration of oily sheen or residue not related to drill fluids or deck drainage and report to Project Regulatory Advisor, Claire Joseph. Note: Observations were made over a 24 hr period corresponding with personnel shift changes.

4th Slack Water

923/100253

#### Daily Visual Observation Form Rev. 4

APDES Permit No.: AK0062278 Project: Alaska LNG Marine Geotechnical Investigation Date & Time: to Borehole: Borehole: For Day 0.65939000°N Latitude: 151.38159111°W Longitude: Day Shift Observer Night Shift Observer 1900-07011 0700-1900 & Shift Time: & Shift Time: **Drilling Start Time:** Oct 22, 2015 Drilling End Time: Outfall 001 - Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor Drilling Fluid Losses (Prior To Discharge) **Drilling Fluid Volumes** Day Shift Night Shift Total Created (gal): 740 1005 Remaining (gal): 0 741 1000 Lost (gal) Inadvertent Discharges (gal). Estimate Event 1 Event 2 Event 3 Event 4 Event 5 Event 6 based on duration and approximate flow rate 0 during lost circulation, ~180 gal max/event: Drilling Fluid Lost to Ground (gal): **Drilling Fluid Discharges Results of Static** Start Time **End Time** Pass/Fail Comments Sheen Test PASS Discharge Start Time: Discharge End Time: 042 Discharge Duration (min.): MIN Length of Drilling Fluid Depth Below Length of Drill Casing Dia. Casing Area (ft2): 0.27 51 Fluid Col. (ft): Casing (ft): Top of Casing (ft): (in.): 7-in. is 0.27 ft<sup>2</sup> 103 Discharge Vol. (gal.). ~200 gallons max: aa k = h \* i \* 7.481 gal/ftFloating Solids, Debris, Sludge, Deposits, Foam, Scum, or Oily Sheen (Y/N & Comments) Observations Residue (Y/N & Comments) **During Discharge** Outfall 002 - Deck Drainage 24-hr Rainfall (in.) Volume of Discharge Due to Rainfall (gal.) Volume of Discharge From Deck Day Shift Night Shift Total Washdown (gal.). Estimate based on Washdown 1 Washdown 2 Washdown 3 Washdown 4 Washdown 5 Washdown 6 duration and approximate flow rate during 5minx12gp 120 200 washdowns. Total Deck Drainage Discharge (gal.) ~2570 gal. max: Outfalls 001 & 002 Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions) Oily Sheen Detected in Visual Sheen Test (Y/N | Floating Solids, Debris, Sludge, Deposits, Foam, Scum, or Slack Water Date & Time & Comments) Residue (Y/N & Comments) 1st Slack Water 150806 M 2nd Slack Water M M 3rd Slack Water N N 11= 2040

Stop discharge upon obseration of oily sheen or residue not related to drill fluids or deck drainage and report to Project Regulatory Advisor, Claire Joseph. Note: Observations were made over a 24 hr period corresponding with personnel shift changes.

Other Obserations, Non-Permitted Discharges, or Comments

N

#### Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

Date & Time:	Oct 23,2015 0700	to			5 0700
Borehole:	MB-14/MR-3	Borehole:	ı	of 1	For Day
Latitude:	60-65939000°N/60.6516		151.38159	1110W/1	151.38317767°W
Day Shift Observer & Shift Time:	S. Pant 0700-1900	Night Shift Observer & Shift Time:	E. Pulido	1900	0-0700
Drilling Start Time:	OC+ 23, 2015	Drilling End Time:	06	30	OCT 24 2015
	Outfall 001 - Geotechnic	al Drilling Fluids and Dr	ill Cuttings at 1	the Seaf	loor
	D 1111	clill (n: - n			distribution of the line half-the group and ARS

	-	Outrail 001 - Ge	otecninca	Drilling Fluid	us and Dri	ii Cuttings at	the Seation	r				
			Drilling F	luid Losses (F	Prior To Di	scharge)						
D	rilling Fl	uid Volumes		Day Shift	100		Night Shif	t	Total			
	Creat	ed (gal):	211				528					
(10 m)	Remair	ning (gal):	Ó			h la	0		739			
	Lost (gal)			211			528		739			
Inadvert	ent Disc	harges (gal). Estimate	Event 1						d)			
	based on duration and approximate flow rate during lost circulation. ~180 gal max/event:			-	-		-	-	0			
Drilling	Fluid Lo	st to Ground (gal):	ei=c-ti	73999								
	menen sinda			Orilling Fluid I	Discharges							
Results o	f Static	Start Time	e End Time			Pass/Fail	****	Comments				
Sheen	Test		_									
Discharge St	tart Time:		Discharg	e End Time:			Discharge	Duration (min.):				
Length of Casing (ft):	1	Drilling Fluid Depth Below Top of Casing (ft):	-	Length of Drill Fluid Col. (ft):	h)=f-g	Casing Dia. (in.):	1)	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	1)			
Disch	narge Vo	ol. (gal.). ~200 gallons	max:	k)			k = h	* j * 7.481 gal	/ft³			
Observations			heen (Y/N & C	comments)				ge, Deposits, Foar & Comments)	n, Scum, d			
During Di	scharge	-					representation of the last of					

Outfall 002 - Deck Drainage 24-hr Rainfall (in.) Volume of Discharge Due to Rainfall (gal.) Volume of Discharge From Deck Day Shift Night Shift Total Washdown (gal.). Estimate based on Washdown 1 Washdown 2 Washdown 3 Washdown 5 Washdown 6 Washdown 4 duration and approximate flow rate during 120 washdowns. 120991 Total Deck Drainage Discharge (gal.) ~2570 gal. max: Outfalls 001 9 002

Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)											
Slack Water	Date & Time		Oily Sheen Detected in Visual Sheen Test (Y/N & Comments)	Floating Solids, Debris, Sludge, Deposits, Foam, Scum, or Residue (Y/N & Comments)							
1st Slack Water	10/23/15 0	908	N	N							
2nd Slack Water	10/23/15 19	538	N	N							
3rd Slack Water	10/23/15 2	138	N	N							
4th Slack Water	10/24/15 03	355	N	N							

Other Obserations, Non-Permitted Discharges, or Comments From MB-14.

### Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

			IG Marine G		I Investigation	on 2015 0	700	
Date & Time:	oct 24, 2015	UFOU	to		001 23,	of /	For Day	
Borehole:	MB-3	ao NI	Boreh Longit	ACCESSED TO	151.30	317767		
Latitude: Day Shift Observer	60.6516681		Make Chife					
& Shift Time:		10- 1500	- Commente		rigi M			
Drilling Start Time:	Oct 24,2015,07	30	Drilling En	id Time:	no			
	Outfall 001 - Ge					he Seafloor		
		Drilling Fl	uid Losses (P	rior To Disc	harge)			
Drilling Flo	uid Volumes		Day Shift			Night Shift		Total
Create	ed (gal):		580			-		5 80
Remair	ning (gal):		0					0
and the second of the second o	t (gal)		580					280
	harges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	_
	d approximate flow rate on. ~180 gal max/event:	-	_	-	-	-	-	П
A STATE OF THE PROPERTY OF THE	st to Ground (gal):	(SAC-0	580 90	u	and the same of th	477/2009/AB - 1102-912-9-1. 4881		
-118		D	rilling Fluid I	THE RESIDENCE IN COLUMN 2 IN COLUMN 2				
Results of Static	Start Tim				Pass/Fail	Comments		
Sheen Test								menune-kmyan
Discharge Start Time:		Discharge	End Time:			Discharge D	uration (min.):	
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	B)	Length of Drill Fluid Col. (ft):	A)=f-g	Casing Dia. (in.):	_	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	_
Discharge Vo	ol. (gal.). ~200 gallon	s max:	(c)			k=h	* j * 7.481 gal/	′ft³
Observations	T	Sheen (Y/N & Comments)			Floating Solids, Debris, Sludge, Deposits, Foam, Residue (Y/N & Comments)			
During Discharge		_			_			
		Ou	tfall 002 - De	eck Drainag	e			
24-hr R	ainfall (in.)	6.28	Volume o	of Discharge	e Due to Rair	nfall (gal.)	maer 1599.3 448	
Volume of Disc	charge From Deck		Day Shift			Night Shift		Total
Washdown (g	al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
[]	eximate flow rate during	-	= 120 gay	m —	-	-	-	
	<sub>hdowns.</sub> rainage Discharge (g	al 1~2570 g	The state of the s		68 gal	1	100	
TOTAL DECK D	i amage Discharge (g	ui.j 2310 g	Outfalls 00	Annual and a second participation of the second	2-2001			
Expression and the	Receiving Water V	isual Ohsen	THE RESERVE OF THE PARTY OF THE		Nater (Per NO.	AA current predi	ctions)	
Clark Markey	1					s, Debris, Sludg	e, Deposits, Foar	n, Scum, or
Slack Water	Date & Time		& Comments)			Residue (Y/N	& Comments)	
1st Slack Water	10/24/15 1003		N			N		
2nd Slack Water	10/24/15 1625	rig i	unmanne	d	r	ig unma	nned	
3rd Slack Water	10/24/152231		.,	Van Hallo be a territoria		)1		
4th Slack Water	10/25/15 0450		11			17		water and the second

Other Obserations, Non-Permitted Discharges, or Comments

Fatigue days off for marine drilling Crew from

oct 24,2015 15:00 to oct 26,2015 15:00

# Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

Date & Time: Oct 25, 2015 0700 Project: Alaska LNG Marine Geotechnical Investigation

Borehole: Latitude: Day Shift Observe & Shift Time:	rig unmanned		to Borehole: Longitude: Night Shift Observer & Shift Time: Drilling End Time:		151.3		0700   For Di	ау	
Drilling Start Time	" hadrilling	rig unmanned							
	Outfall 001 -	Geotechnic	eotechnical Drilling Fluids and Dri			no aniling			
		Drilling	Fluid Losses	(Prior To D	ischarea'	at the Seaflo	or		
Drilling	Drilling Fluid Losses (Prior To D Day Shift			The state of the s					
Created (gal):					Night Shift			Tota	
Remaining (gal): Lost (gal)								b) -	
Inadvertent Discharges (gal). Estimate								.j=a-tj	
based on duration and approximate flow rate		Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	-	
during lost circulation. 180 gal max/event:  Drilling Fluid Lost to Ground (gal):				-			-	-	
Erining Fluid L	ost to Ground (gal):	REC S	-						
Results of Statio	Ct		Drilling Fluid	Discharges					
Sheen Test Start Tir		me End T		Time	Pass/Fail	Comments			
Discharge Start Time:		Discharge End Time:							
Length of	Drilling Clubb Day 1 - 1			No.		Discharge Duration (min.):			
Casing (ft):	Drilling Fluid Depth Belov Top of Casing (ft):		Length of Drill Fluid Col. (ft):	n)=f-g	Casing Dia. (in.):		Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	Ü	
Discharge V	ol. (gal.). ~200 gallor	ns max:	9			1 1	A STATE OF THE PARTY OF THE PAR		
Observations	Sheen (Y/N & Comments)			k = h * j * 7.481 gal/ft <sup>3</sup> Floating Solids, Debris, Sludge, Deposits, Foam, Scum, or					
During Discharge	- 1				Residue (Y/N & Comments)				
241.5		Ou	tfall 002 - De	ck Drainag	e	-		-	
	ainfall (in.)				e Due to Rainfall (gal.)				
Volume of Discharge From Deck Washdown (gal.). Estimate based on			Day Shift		Night Shift		7-00		
duration and approximate flow rate during		Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total	
washdowns.			-		The state of the s	-		a)	
Total Deck Dr	rainage Discharge (ga	al.) ~2570 ga	al. max:	pj=m+n	0.00				
			Outfalls 00:						
	Receiving Water Vi	sual Observ	ations - Dayl	ight Slack V	Vater (Per NO	AA current predic	tions)		
Slack Water	Date & Time	Oily Sheen Detected in Visual Sheen Test (Y/N   F & Comments)			Floating Solids, Debris, Sludge, Deposits, Foam, Scum, or				
1st Slack Water	10/25/15 1053	rig unmanned			Residue (Y/N & Comments)				
2nd Slack Water	10/25/15 1709	17			· q civacinea				
3rd Slack Water	The second secon	1/			*/				
4th Slack Water		'y			*/				
	Other Ol	oserations. I	Von-Permitte	ed Dischare	es or Comp				
Fa	oct 24, 20	OFF F	or mar	ine d	villing 26,2015	crew 15:00	from		
	obseration of oily sheen or								
	Note: Observation	s were made ov	er a 24 hr period	corresponding	with personnel	shift changes.	bry Advisor, Claire	Joseph.	
					STATE OF				

### Daily Visual Observation Form Rev. 4

### APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation
OC+ 26, 2015 0700 to 0C+ 27, 2015 0700

Date &	Time:	OCT 26,2015 0700		to	)	04	- 27,20	15 0700			
Bore	hole:	MB-3	The state of the s	Borel	nole:	1	of	For Day			
Latit		60.651668190	N	Longi		151.38	317767				
Day Shift & Shift		S.Pant 1500	- 1900	Night Shift & Shift		THE RESERVE OF THE PARTY OF THE	- Indiana - Indi	0-0700			
	art Time:		5:00	Drilling E		THE CHARLES WHEN CONTRACTOR THE PARTY	so hrs	120			
		Outfall 001 - Ge		- Drilling Fluid	ds and Dril	-		r			
			THE RESERVE AND ADDRESS OF THE PARTY OF THE	luid Losses (F	AND DESCRIPTION OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUM	Telephone and the second secon	the ocumbo	America (Caraca)			
D	rilling Flo	uid Volumes		Day Shift			Total				
	Creat	ed (gal):		215		-	Night Shif		400		
	Remair	ning (gal):		0			0		b) O		
	Los	st (gal)		215			185		400		
		harges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	d I		
		nd approximate flow rate on. ~180 gal max/event:	_						0		
		st to Ground (gal):	MIRC B	Action of the second							
			C	rilling Fluid I	Discharges						
Results o	of Static	Start Tim	e	End T	ime	Pass/Fail		Comments			
Sheer											
Discharge 5	scharge Start Time:		Discharge	e End Time:			Discharge [	Ouration (min.):			
Length of Casing (ft):	_	Drilling Fluid Depth Below Top of Casing (ft):	gl	Length of Drill Fluid Col. (ft):	h)=f-g	Casing Dia.	0	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	)		
Disc	Discharge Vol. (gal.). ~200 gallons max:					A CONTRACTOR OF THE PARTY OF TH	k = h	k = h * j * 7.481 gal/ft <sup>3</sup> Debris, Sludge, Deposits, Foam, Scum,			
Observ			Sheen (Y/N & Co	omments)		Floating Solids		e, Deposits, Foam			
During D	ischarge										
			Out	tfall 002 - De	ck Drainag	re					
	24-hr Ra	ainfall (in.)	0	THE RESERVE THE PERSON NAMED IN	with the second	e Due to Rair	nfall (gal.)	mi=f*15993			
Volum	e of Disc	harge From Deck		Day Shift			Night Shift				
		II.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total		
duration		kimate flow rate during addowns.	_			_		10 MINK 12gpm	120		
Total		ainage Discharge (ga	il.) ~2570 g	al. max:	penin	190	anl	120 991	1-0		
				Outfalls 00	1 & 002	10	U	-			
		Receiving Water Vis	sual Observ	ations - Dayl	ight Slack V	Nater (Per NO	AA current predi	ctions)			
Slack \	Nater	Date & Time				Floating Solids		e, Deposits, Foam	, Scum, or		
1st Slack	(Water	10/26/15 1141		rig unn	nanned	ti	ig unma	anned			
2nd Slac	k Water	10/26/15 1752		N			N				
3rd Slaci	k Water	10/23/15 0007		N			N	7			
4th Slaci	1th Slack Water 10/27/15 0632			N			N				
		Other Ol	oserations,	Non-Permitt	ed Dischar	ges, or Comn	nents				
		days Off 2									
		Note: Observation						tory advisor, Claire	Joseph.		

Date & Time:

Borehole:

# Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation to At 22 201

Borehole:

Latitude: Day Shift Observer	60.65166819°11/60.6		Night Shift			-	51.36730675	W
& Shift Time:	5. Paint 0700-10		& Shift			1900-0	2700	
Drilling Start Time:	0 C+ 27,2015	15:10	Drilling E	nd Time:	K+28, 0 61	15		
	Outfall 001 - Ge	otechnical	<b>Drilling Fluid</b>	ds and Drill	Cuttings at	the Seafloor		
		Drilling Fl	uid Losses (F	Prior To Disc	charge)			
Drilling Fl	uid Volumes		Day Shift			Night Shift		Total
	ed (gal):		449			225		674
Remaii	ning (gal):		0			0		0
	st (gal)		+49			275		674
	harges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	1
	nd approximate flow rate on. ~180 gal max/event:	_	-	-	_	-		0
от при при мусти при в настрании при при при при при при при при при п	st to Ground (gal):	erca	674	aal			<u> </u>	
Vagaras e mas a la		D	rilling Fluid					
Results of Static	Start Tim	CONTRACTOR AND ADDRESS OF THE PARTY OF THE PARTY.	End 7	NAME OF TAXABLE PARTY.	Pass/Fail		Comments	
Sheen Test	085		0828	Mark Control of the last of th	Pass	STATE OF THE OWNER, WHEN THE PARTY OF THE PA	ick/shee	n
Discharge Start Time:	08:59	Discharge	End Time:	09:0	Designation of the last of the	NAMES OF TAXABLE PARTY.	uration (min.):	1
Length of Casing (ft): 53	Drilling Fluid Depth Below Top of Casing (ft):	23	Length of Drill Fluid Col. (ft):	30	Casing Dia. (in.):	7	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	0.27
Discharge Vo	ol. (gal.). ~200 gallon	s max:	61	gal		k = h	* j * 7.481 gal/	ft <sup>3</sup>
Observations	Oily	Sheen (Y/N & Co			Floating Solids	, Debris, Sludg	e, Deposits, Foam	
During Discharge		N	d	entral province		Residue (Y/N 8	s Comments)	r ir rannov, austus pa
		Out	tfall 002 - De	ck Drainag	e			
24-hr R	ainfall (in.)	1 ()	Control of the last of the las	THE RESERVE OF THE PERSON NAMED IN	Due to Rair	fall (gal )	m1=1*1599.7()	
CONTRACTOR OF THE PARTY OF THE	charge From Deck		Day Shift	or bischarge	. Duc to Ruii	Night Shift		
	al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
duration and appro	iximate flow rate during	-	-	Tominx 12gpn =12 0ga/		_	5MW2 1299m	180
	rainage Discharge (ga	al.) ~2570 ga	al. max:	determination that the party of	308 Jal	dellaring with some six union of	And the second second	
			Outfalls 00	1 & 002	U		Market of Comment of Committee	
	Receiving Water Vi	sual Observ	ations - Day	light Slack V	Vater (Per NO)	AA current predic	ctions)	
Slack Water	Date & Time						e, Deposits, Foan	ı, Scum, oı
1st Slack Water	10/27/15 1229		N			N		Micros Company
2nd Slack Water	10/27/15 1835		N			N	THE RESERVE OF THE RESERVE OF	Witness State Committee
3rd Slack Water			N	- X To	Committee of the commit	N		***************************************
4th Slack Water								
	Other O	oserations,	Non-Permitt	ted Dischar	ges, or Comr	nents		
No MB-	drilling at N	THE PERSON NAMED IN			Name and Address of the Owner, where the Party of the Par	CHARLES AND THE PLANTAGE	rrived at	
Stop discharge upor	n obseration of oily sheen o		THE RESERVE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN			NAME OF TAXABLE PARTY.	tory Advisor, Claire	Joseph.
	Note: Observation	s were made o	ver a 24 hr perio	a corresponding	g with personnel	shift changes.		

For Day

Date & Time:

Borehole:

### Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation

to

Borehole: Latitude: Day Shift Observer & Shift Time: Drilling Start Time:	MB-24 60.6539396 S.Pant 0700 0428,20156	1900	Longi Night Shift & Shift	hole: tude: t Observer : Time: nd Time:	E. Puli		For Day *W 0-0700 15: 50	-
	Outfall 001 - G	eotechnica	Drilling Flui	ds and Drill	Cuttings at	the Seafloo	r	
		Drilling F	luid Losses (I	Prior To Dis	charge)			
The second secon	luid Volumes		Day Shift			Night Shif	t	Total
	ted (gal):		1057			-		1057
	ining (gal):		0					b) 🛆
The second secon	st (gal) charges (gal). Estimate	A STATE OF THE PERSON NAMED IN COLUMN 1	057	T =				1057
based on duration a	nd approximate flow rate ion. ~180 gal max/event:	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	0
	ost to Ground (gal):	инед .	1057	gal	The second second second			
			Prilling Fluid	Discharges				
Results of Statio	Start Tim		End 7	CONTRACTOR OF THE PARTY OF THE	Pass/Fail	VACUATION AND ADDRESS OF	Comments	
Sheen Test	1730	)	17	40	Pass	NO 511	ck/sheen	)
Discharge Start Time:		Discharg	e End Time:			Discharge [	Ouration (min.):	
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	s) [ [	Length of Drill Fluid Col. (ft):	n)=tg 39	Casing Dia. (in.):	7	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	0.27
Discharge V	ol. (gal.). ~200 gallon	s max:	A			k=h	* j * 7.481 gal	/ft <sup>3</sup>
Observations	Oily	Sheen (Y/N & C	omments)		Floating Solids	, Debris, Sludg	e, Deposits, Foan	
During Discharge		N				Residue (Y/N	& Comments)	
Married State of the State of t		Our	tfall 002 - De	ck Drainag	P			W-40
24-hr R	ainfall (in.)	0.01	PARTY AND DESCRIPTION OF THE PARTY AND PARTY.	CALCAL MANAGEMENT AND ADDRESS.	distance of the latest service of	fall (gal )	mi=15993 S. 9	07
Commence of the second	charge From Deck		Day Shift	T b locital ge	Duc to Run	to Rainfall (gal.) Night Shift		
Washdown (g	al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
duration and appro was	oximate flow rate during hdowns.			Sminx12gpm =60gal			_	60991
Total Deck D	rainage Discharge (ga	ıl.) ~2570 g		girann	75.993	894		
			Outfalls 00					
	Receiving Water Vi	sual Observ	ations - Dayl	ight Slack V	Vater (Per NOA	A current predic	ctions)	
Slack Water	Date & Time	Ony Sheen De	& Comments)	neen Test (Y/N		, Debris, Sludg Residue (Y/N &	e, Deposits, Foan & Comments)	n, Scum, or
1st Slack Water	10/28/15 0722		N			N		
2nd Slack Water	the second secon		N		AT TO STATE HOME TO STATE OF	4		
3rd Slack Water			4			N		
4th Slack Water	10/28/15 0141		N		<del> </del>	N	· · · · · · · · · · · · · · · · · · ·	
	Other Ol	serations,	Non-Permitt	ed Discharg	es, or Comn	nents		
Aqu	rifer influer	Approximately and the second s	THE RESERVE OF THE PARTY OF THE	Mark Control of the C	The second second second			
Stop discharge upon	n obseration of oily sheen or Note: Observation	residue not rel s were made o	ated to drill fluid er a 24 hr period	s or deck drain corresponding	age and report to with personnel	o Project Regula shift changes.	tory Advisor, Claire	Joseph.

# Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

2-1-0	· · · · · · · · · · · · · · · · · · ·	The second secon	ct: Alaska LN			al Investigation	41, 44	700			
Date & Borel		Oct 29,2015 07 MB-24	.00	to Boreh		0 ct 30,	of 1	For Day			
Latit		60.653939679	J	Longit	CCOMMANA.	151.3673		TOTOGY			
Day Shift	Observer	S. Pant 0700-1		Night Shift	Observer	1906-0		. Pulido			
& Shift	: Time: tart Time:	NO drilling		& Shift Drilling En	- ACT AND WAR		illing-				
Dinning Se	idit inne,	Marine Mile Special Control of the C	0				0				
		Outfall 001 - Ge	THE RESERVE THE PARTY OF THE PA	uid Losses (P	deputies on management of the special	NAME OF TAXABLE PARTY OF TAXABLE PARTY.	the Sealioui				
D	Orilling Flo	uid Volumes	Oliming in	Day Shift	TION TO DIS	Citarge)	Night Shift		Total		
	and the second second	ed (gal):		O			0		O		
		ning (gal):							b) _		
	THE RESERVE THE PARTY OF THE PA	st (gal)		0			0		O		
		harges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	(d)		
		nd approximate flow rate on. ~180 gal max/event:	~	-	-		I	proc.			
STATE OF THE PARTY	The state of the s	st to Ground (gal):	10°CC	0		Annual Comments		Assessment of the second			
			D	rilling Fluid [	Discharges						
Results	of Static	Start Time	e	End T	īme	Pass/Fail		Comments			
Sheer	Sheen Test -						-				
Discharge :	Start Time:	-	Discharge End Time:				Discharge D	Discharge Duration (min.):			
Length of Casing (ft):	4)	Drilling Fluid Depth Below Top of Casing (ft):	Length of Drill Fluid Col. (ft):			Casing Dia. (in.):	0	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	-		
Disc	harge Vo	ol. (gal.). ~200 gallon:	s max:	()			k=h	* j * 7.481 gal/	ft <sup>3</sup>		
	vations	T	Sheen (Y/N & Co	omments)			, Debris, Sludg	e, Deposits, Foam			
	vations Discharge		-	marries (and transfer and and		-	Residue (Y/N & Comments)				
and the plant of the same	strometos sekto	A THE STATE OF THE	Out	tfall 002 - De	ck Drainag	ge					
	24-hr R	ainfall (in.)	0.00	Volume o	of Discharge	e Due to Rain	nfall (gal.)	mH=15983 <b>0</b>			
Volum	ne of Disc	charge From Deck		Day Shift			Night Shift		Total		
	250	al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	rotar		
duration		ximate flow rate during hdowns.	-	-	-	-	-	-	-		
Tota	THE RESERVE THE PERSON NAMED IN	rainage Discharge (ga	al.) ~2570 g	al. max:	DISMHI	0					
				Outfalls 00	1 & 002						
		Receiving Water Vi					AND THE PROPERTY OF THE PARTY O	And the second s			
Slack	Water	Date & Time	Oily Sheen Det	tected in Visual SI & Comments)	heen Test (Y/N		, Debris, Sludg Residue (Y/N	ge, Deposits, Foam & Comments)	ı, Scum, or		
1st Slac	k Water	10/29/15 0814		N			N				
2nd Slac	ck Water	10/29/15 1406	- Anna Caranta Company	N	T. E.	ı	7				
3rd Slac	k Water	10/29/15 2006		N			N	www.watenesscarce-com-to-sca			
4th Slack Water 10/39/15 0229				N			N				
		Other O	bserations,	Non-Permitt	ed Dischar	ges, or Comn	nents				
		Aquifer inf	luena	ed disch	narge	= 110 6	gal				
Cton dia	alanaa uu	n obseration of ally sheen o	r rociduo not ro	lated to drill flui	de or dock drain	nage and report t	to Project Pegul	aton Advisor Claire	losoph		

Note: Observations were made over a 24 hr period corresponding with personnel shift changes.

# Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation
Date & Time: Oct 30, 2015 0700 to oct 31, 2

oct 31,2015 0700

Latit		60.6539396	70N	_ Borel Longi		151.36	of 1 730675	For Day	6
Day Shift & Shift		J. Wilson O	NO TO THE OWNER OF THE OWNER OWNE	Night Shift	Observer			1900-070	()
Drilling St	ALL SERVICES ALL	No drilling		& Shift Drilling E			drilling		
		Outfall 001 - Go	eotechnical	Drilling Fluid	ds and Drill				Ė
			and the second second second second	uid Losses (F	A STATE OF THE PARTY OF THE PAR	and the second second second second	the seamon		
D	rilling Flu	uid Volumes		Day Shift			Night Shift		Total
	Creat	ed (gal):		AND THE RESERVE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUM			-10		4 -
	Remair	ning (gal):		#4			-	dinteriore in this is a single	b) 🕳
	Market and the second second	t (gal)					in.		umum 🕶
		harges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	8
		d approximate flow rate on. ~180 gal max/event:	_	-	-		-	_	-
		st to Ground (gal):	Purpa	<u></u>				L	
		(8-1)	E	rilling Fluid	Discharges				
Results	of Static	Start Tim	The second second second second	End 7	THE RESERVE OF THE PARTY OF THE	Pass/Fail		Comments	
Sheen	Test						Series P		- Columbia Con
Discharge S	Start Time:		Discharge	End Time:	-	-	Discharge D	Ouration (min.):	
Length of	9)	Drilling Fluid Depth Below	E)	Length of Drill	h)=f-g	Casing Dia.	1)	Casing Area (ft <sup>2</sup> ):	J)
Casing (ft):		Top of Casing (ft):		Fluid Col. (ft):		(in.):		7-in. is 0.27 ft <sup>2</sup>	Man.
Disc	harge Vo	l. (gal.). ~200 gallon	s max:	4)	-		k = h	* j * 7.481 gal/	/ft <sup>3</sup>
Observ	Observations Oily Sheen (Y/N &			omments)		Floating Solids	, Debris, Sludg Residue (Y/N 8	e, Deposits, Foam & Comments)	ı, Scum, or
During D	ischarge		MEST	A SECTION OF THE SECT		-	The state of the s		
	Waller and the same of the sam		Ou	tfall 002 - De	ck Drainag	e			
	24-hr Ra	ainfall (in.)	0.34	AND RESIDENCE OF THE PARTY OF T		Due to Rair	nfall (gal.)	m=*1599.3 543	76
Volum	THE RESIDENCE OF THE PARTY OF T	harge From Deck		Day Shift			Night Shift	Annual Control of the	
		I.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
duration		kimate flow rate during	-		-		-	-	_
Tota		ainage Discharge (ga	al.) ~2570 g	al. max:	dismed 54	3.76			
				Outfalls 00	1 & 002				
		Receiving Water Vi							
Slack \	Water	Date & Time	Oily Sheen Det	tected in Visual SI & Comments)	heen Test (Y/N	Floating Solids	Residue (Y/N &	e, Deposits, Foam & Comments)	i, Scum, or
1st Slack	k Water	10/30/15 0906		2			N		
2nd Slac	k Water	10/30/15 1457		N		and the second s	N	- Contract of the Contract of	
3rd Slaci	k Water	10/30/15 2054		N	***************************************		Ν		
4th Slack	k Water	10/31/15 8318		N			N		
		Other O	bserations,	Non-Permitt	ed Discharg	ges, or Comr	nents		
								PORTAL MANAGEMENT OF STREET	
Stop dice	harga unas	obseration of oily sheen o	r residue not re	ated to drill fluit	de or dock due!-	ago and second	o Project Paral	tom Advisor Mar	Jan1
Stop uist	a.ge upon	Note: Observation						tory Advisor, Claire	Joseph.

### Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

500 N 100 N			G Marine G		Investigation	.015, 07	00	
Date & Time:	04 3,2015, 0	100	to Boreh	-		of	For Day	
Borehole: Latitude:	MB-24 6065393967	ON	Longitu			7306750		
Day Shift Observer	S. Pant 0700		Night Shift C	Observer			00-07-00	
& Shift Time: Drilling Start Time:	No drilling		& Shift T Drilling En	- DANIEL COLOR	Name of the last o	o drilling		
Drining Start raine.	Outfall 001 - Ge			-		***************************************	0	
	Outtail out - de	Drilling Flu	uid Losses (P	rior To Disch	harge)			
Drilling Flu	uid Volumes	Dame 8	Day Shift	T		Night Shift		Total
	ed (gal):						e pai	
The state of the s	ning (gal):		-			_	D	)
	st (gal)		-					. and -
Inadvertent Disc	harges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	
	nd approximate flow rate on. ~180 gal max/event:	-		-		-		
	st to Ground (gal):	еўнс-а	C					
		D	rilling Fluid [	Discharges				
Results of Static	Start Tim	e	End T	ime	Pass/Fail	(	Comments	
Sheen Test			-		_			
Discharge Start Time:	-	Discharge	End Time:	-		Discharge Duration (min.):		-
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	s) 	Length of Drill Fluid Col. (ft):	n)=r-g	Casing Dia. (in.):		Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	
Discharge V	ol. (gal.). ~200 gallon	is max:	4)	_		k = h *	'j * 7.481 gal/	/ft <sup>3</sup>
Observations	The second secon	Sheen (Y/N & Co	omments)			, Debris, Sludge Residue (Y/N 8	e, Deposits, Foam k Comments)	i, Scum, or
During Discharge	,				-		-	
		Out	tfall 002 - De	THE RESERVE THE PERSON NAMED IN	NAME OF TAXABLE PARTY.		m = 1599.3	
24-hr R	Rainfall (in.)	0 -	And the second second	of Discharge	Due to Rain	THE RESERVE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAME	-	
Volume of Dis	charge From Deck		Day Shift			Night Shift	Washdown 6	Total
Volume of Discharge From Deck		Washdown 1	Washdown 2				I IMPOCHETOWN M	Manager and American
Washdown (gal.). Estimate based on duration and approximate flow rate during				Washdown 3	Washdown 4	Washdown 5	Washdown o	n) ( Maral
duration and appro		5min 212gpm = 60 801		-		Washdown 5	Washdown o	m60gal
duration and appro was	oximate flow rate during	5min 212gpm - 60 801	gal. max:	 a)=m+n 6	Washdown 4	Washdown 5	Washiowhite	n) 60gal
duration and appro was	oximate flow rate during shdowns. Orainage Discharge (g	5min 2129pm = 60 801 gal.) ~2570 g	gal. max:		- So gal			n)60gal
duration and appro was	oximate flow rate during shdowns.	5min x13pm = 60 gal.) ~2570 g	gal. max: Outfalls 00	ol=m+n 6 01 & 002 rlight Slack \	SO glad Water (Per NO)	AA current predic	ctions)	
duration and appro was	oximate flow rate during shdowns. Orainage Discharge (g	5min x13pm = 60 gal.) ~2570 g	gal. max: Outfalls 00	oj=m+n 6 01 & 002 rlight Slack V	SO glad Water (Per NO)	AA current predic	ctions) e, Deposits, Foar	
duration and approved was	oximate flow rate during shdowns.  Drainage Discharge (g  Receiving Water V  Date & Time	5min x13pm = 60 gal.) ~2570 g	gal. max: Outfalls 00 vations - Day	oj=m+n 6 01 & 002 rlight Slack V	SO glad Water (Per NO)	AA current predic s, Debris, Sludg	ctions) e, Deposits, Foar	
duration and approved was Total Deck D	oximate flow rate during shdowns.  Orainage Discharge (government of the control	5min x13pm = 60 gal.) ~2570 g	gal. max: Outfalls 00 vations - Day	oj=m+n 6 01 & 002 rlight Slack V	SO glad Water (Per NO)	AA current predic s, Debris, Sludg Residue (Y/N	ctions) e, Deposits, Foar	
duration and approved was Total Deck D  Slack Water  1st Slack Water	Receiving Water V  Date & Time  10/31/15 1549	5min x13pm = 60 gal.) ~2570 g	gal. max: Outfalls 00 vations - Day exected in Visual 9 & Comments)	oj=m+n 6 01 & 002 rlight Slack V	SO glad Water (Per NO)	AA current predicts, Debris, Sludg Residue (Y/N	ctions) e, Deposits, Foar	
Slack Water  1st Slack Water  2nd Slack Water	Oximate flow rate during shdowns.  Orainage Discharge (government of the control	Smin xi App Gal.) ~2570 g Visual Observ Oily Sheen De	gal. max: Outfalls 00 vations - Day etected in Visual S & Comments)	oj=m+n 6 01 & 002 vlight Slack \ Sheen Test (Y/N	SO glad Water (Per NO)	AA current predicts, Debris, Sludg Residue (Y/N a	ctions) e, Deposits, Foar	

# Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation

Date & Time:	Nov 1, 2015	ATOO	NG Marine G		Nov 2, 2	A CONTRACTOR OF THE PARTY OF TH	00	
Borehole:	MB-24	21	Boreh		1	of I	For Day	
Latitude:	60.6539396	FON	Longit		151.36	730675		
Day Shift Observer & Shift Time:		0-1900	Night Shift & Shift		E. puup			
Drilling Start Time:	15:15-15:52: 16	-		C. California and C. Californi		D 1900 -	0700	
	Outfall 001 - Ge			-				
	Outlan out - Go	neg under tipp men des propriete des comme de la c	uid Losses (P	AND THE RESIDENCE OF THE PARTY	Marine and Annual Contract of the State of t	the Seamoon		
Drilling Flu	uid Volumes	Diming Cit	Day Shift	TIOI TO DILL	marger	Night Shift		Total
	ed (gal):		205		-		= 205	
	ning (gal):					_		b) 0
	st (gal)		205			0		205
	harges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	9
	nd approximate flow rate	~	_			.—	-	0
ACCOUNT OF THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER.	on. ~180 gal max/event: st to Ground (gal):	19995		205	sal			
2,,,,,,		D	rilling Fluid (	Discharges	7			
Results of Static	Start Tim	THE RESIDENCE OF THE PERSON NAMED IN	End T	THE RESIDENCE OF THE PERSON NAMED IN COLUMN 2 IS NOT THE OWNER.	Pass/Fail		Comments	
Sheen Test			_	_				
Discharge Start Time:		Discharge	End Time:			Discharge D	Ouration (min.):	
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	81	Length of Drill Fluid Col. (ft):	n)=f-g 	Casing Dia. (in.):	J	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	j)
Discharge Vo	ol. (gal.). ~200 gallon	is max:	3()			k = h	* j * 7.481 gal/	/ft <sup>3</sup>
		Sheen (Y/N & Co			Floating Solids	Annual Control of the	e, Deposits, Foam	The second second
Observations		Sheen (1) it a co	Amments)			Residue (Y/N 8	3 Comments)	Ser success
During Discharge								
		Out	tfall 002 - De	eck Drainag	е			
A STATE OF THE PARTY OF THE PAR	ainfall (in.)	0	Volume o	of Discharge	Due to Rain	nfall (gal.)	511-F-15960	
	charge From Deck		Day Shift			Night Shift		Total
	al.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
duration and approx wash	ximate flow rate during	5 minxizgpm	-	5 minx 12gpm -60 gal	-	-		120
	rainage Discharge (g		al. max:	\$1F10+0	120 91	pl	Laurence Symptomical	
			Outfalls 00	1 & 002	0			
	Receiving Water Vi							
Slack Water	Date & Time	Oily Sheen Det	tected in Visual SI & Comments)	heen Test (Y/N		s, Debris, Sludge Residue (Y/N &	e, Deposits, Foam & Comments)	ı, Scum, or
1st Slack Water	11/1/15 0956		N			N	With the second	
2nd Slack Water	11/1/15 1543		N			N		
3rd Slack Water	11/15 2136	1	N	WILLIAM WALL		N		
4th Slack Water	11/2/15 0403		N			N		
	Other O	bserations, I	Non-Permit	ted Dischar	ges, or Comr	nents		
Ston discharge upor	n obseration of oily sheen o	or residue not re'	lated to drill flui	ds or deck drain	page and report f	o Project Regula	story Advisor, Clairy	a loseph.

Note: Observations were made over a 24 hr period corresponding with personnel shift changes.

### Daily Visual Observation Form Rev. 4

APDES Permit No.: AK0062278 Project: Alaska LNG Marine Geotechnical Investigation

Date &	Date & Time: NOV 2, 2015 670		5 6700	to	)	NO.	V 3.2015	0700	
Bore	hole:	185-4B		Borel	nole:	2	of 2_	For Day	*
Latit		60.6558080	140 N	Longi	tude: -	151-36	7120220V	V	£
Day Shift & Shift		spant 070	0-1900	Night Shift & Shift		E. Pul	ido 1900	0700	5
Drilling St	art Time:	NOV 3,2015	0130	Drilling E		Nov 3	,2015 0	635	
		Outfall 001 - G	eotechnical	<b>Drilling Fluid</b>	ds and Drill	Cuttings at	the Seafloo	r	8
			Drilling Fl	luid Losses (F	Prior To Dis	charge)			
E	rilling Fl	uid Volumes		Day Shift			Night Shift		Total
		ed (gal):		<u> </u>				150	
		ning (gal):					0		h) O
	THE RESERVE TO SHARE THE PARTY OF THE PARTY	t (gal)					150		150
		harges (gal). Estimate approximate flow rate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	
		on. ~180 gal max/event:		_	-			II Isaaca	0
Drilling	Fluid Lo	st to Ground (gal):		150 90	rl				
				rilling Fluid I					
Results o		Start Tim		End T		Pass/Fail		Comments	
Sheen		0625	>	063		Pass	No s	slick/she	2 M
Discharge S	Start Time:	0700	(s)		07	01	Discharge D	uration (min.):	1
Length of Casing (ft):	36	Drilling Fluid Depth Below Top of Casing (ft):	20	Length of Drill Fluid Col. (ft):	16	Casing Dia. (in.):	7	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	0.27
Disc	harge Vo	l. (gal.). ~200 gallon	s max:	3	2 gal		k = h	* j * 7.481 gal/	'ft <sup>3</sup>
Observ	ations	Oily	Sheen (Y/N & Co			Floating Solids	and the same of th	e, Deposits, Foam	The same of the sa
Ouring D	ischarge		N	H					
			Out	fall 002 - De	ck Drainag	e			
	24-hr Ra	infall (in.)	0	Volume o	f Discharge	Due to Rain	ıfall (gal.)	-15-15-15-15 C)	
		harge From Deck		Day Shift	Manager and the second		Night Shift		Total
		l.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	TOTAL
duration	and approx wash	kimate flow rate during	mare.	-	new .	-	-	ann .	-
Total		ainage Discharge (ga	al.) ~2570 ga	al. max:	35000	٥			
				Outfalls 00:	1 & 002				
		Receiving Water Vi	sual Observa	ations - Dayli	ight Slack V	Vater (Per NOA	A current predic	tions)	
Slack V		Date & Time	Oily Sheen Det	ected in Visual Sh & Comments)	een Test (Y/N		, Debris, Sludge Residue (Y/N 8	e, Deposits, Foam. & Comments)	, Scum, or
1st Slack	Water	11/2/15 1106		И			14		
2nd Slac	k Water	11/2/15 1649		Н	ě.		И		
3rd Slack	3rd Slack Water 11/2/15 2246			N		TRUTSTAL HER SASSA	N		
4th Slack	Water	11/3/15 0510		И			N		
Other Obserations, Non-					ed Discharg	ges, or Comm	nents		
Moved to DS-48 Trom				DS-44	n. Jack	c down	at Ds-	4A at	
	2310, NOV 2, and avri			ve and discharge	Jack up	at DS-L	1B at	0000, NOV	3
Stop disc	harge upon	obseration of oily sheen or							

Note: Observations were made over a 24 hr period corresponding with personnel shift changes.

washdowns.

# Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation Nov 3,2015 Nov 4, 2015 0000 0700 Date & Time: to Borehole: DS-48 Borehole: For Day Latitude: 60.655R1844°N Longitude: 151.367120220 Day Shift Observer Night Shift Observer na umanned rig unmanned & Shift Time: & Shift Time: Drilling Start Time: no drilling Drilling End Time: Outfall 001 - Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor Drilling Fluid Losses (Prior To Discharge) **Drilling Fluid Volumes** Day Shift Night Shift Total Created (gal): Remaining (gal): Lost (gal) Inadvertent Discharges (gal). Estimate Event 1 Event 2 Event 3 Event 4 Event 5 Event 6 based on duration and approximate flow rate during lost circulation. ~180 gal max/event: Drilling Fluid Lost to Ground (gal): **Drilling Fluid Discharges** Results of Static Start Time **End Time** Pass/Fail Comments Sheen Test Discharge Start Time: Discharge End Time: Discharge Duration (min.): Length of Drilling Fluid Depth Below Length of Drill Casing Dia. Casing Area (ft2): Casing (ft): Top of Casing (ft): Fluid Col. (ft): (in.): 7-in. is 0.27 ft2 Discharge Vol. (gal.). ~200 gallons max:  $k = h * j * 7.481 \text{ gal/ft}^{\circ}$ Floating Solids, Debris, Sludge, Deposits, Foam, Scum, or Oily Sheen (Y/N & Comments) Observations Residue (Y/N & Comments) **During Discharge** Outfall 002 - Deck Drainage 24-hr Rainfall (in.) 0.04 Volume of Discharge Due to Rainfall (gal.) Volume of Discharge From Deck Day Shift Night Shift Total Washdown (gal.). Estimate based on Washdown 1 Washdown 2 Washdown 3 Washdown 4 Washdown 5 Washdown 6 duration and approximate flow rate during

## Total Deck Drainage Discharge (gal.) ~2570 gal. max: Outfalls 001 & 002

64

ga

	Receiving Water Visual Observations - Daylight Slack Water (Per NOAA current predictions)										
Slack Water	Date & Time		Floating Solids, Debris, Sludge, Deposits, Foam, Scum, o Residue (Y/N & Comments)								
1st Slack Water	11/03/15 1206	rig unmanned	rig unmanned								
2nd Slack Water	11/03/15 1752	rig unmanned	rig unmounted								
3rd Slack Water	11/03/15 2351	rig unmanned	ng unmained								
4th Slack Water	11/04/15 0613	rig unmanned	rig unmounted								
A STATE OF THE WELL OF STATE	Other C	bearations Non Bormittad Discharg									

Other Obserations, Non-Permitted Discharges, or Comments

Stop discharge upon obseration of oily sheen or residue not related to drill fluids or deck drainage and report to Project Regulatory Advisor, Claire Joseph.

Note: Observations were made over a 24 hr period corresponding with personnel shift changes.

# Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

Date & Time:         Nov 4, 2015           Borehole:         DS-4R/DS-SA           Latitude:         66.65580844°N			to Borel 78% <sup>™</sup> Longil	nole: tude:	1	5,2015 of 2 022°W/15	0700 For Day	to W
Day Shift Observer & Shift Time: Drilling Start Time:	S-Pant 0700 Nov 4,2015		Night Shift & Shift Drilling Er	Time:	EPULIO Nov 4,	10 1900	-0700	
	Outfall 001 - Ge	and the second second second second				the Seafloor		
Deilling Ele	uid Volumes	Drilling FI	uid Losses (F Day Shift	TIOT TO DISC	narge	Night Shift		Total
THE RESERVE OF THE PARTY OF THE	ed (gal):				***************************************	- Might Shift		O
	ning (gal):		0			_		b) O
	t (gal)		0			F		0
based on duration an	harges (gal). Estimate d approximate flow rate on. ~180 gal max/event:	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	-
	st to Ground (gal):		0	(1)	efer page	20F2 P	er discharge	during
		C	rilling Fluid	Discharges				
Results of Static	Start Time	the state of the law and publication	End 1		Pass/Fail		Comments	
Sheen Test	16:10		16	:20	Pass	NOSI	ick/sheer	$\wedge$
Discharge Start Time: 16:40		Discharge	e End Time:	16:4	II .	Discharge D	uration (min.):	1
Length of Casing (ft):	Drilling Fluid Depth Below Top of Casing (ft):	14	Length of Drill Fluid Col. (ft):	h)=f.g 22	Casing Dia. (in.):	7	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	0.27
Discharge Vo	ol. (gal.). ~200 gallon:	s max:	4	4 gal		k = h	* j * 7.481 gal/	/ft <sup>3</sup>
Observations		Sheen (Y/N & C	MARSHAR INCOME WHEN			, Debris, Sludg Residue (Y/N 8	e, Deposits, Foan & Comments)	n, Scum, or
During Discharge		N				N		
		Ou	tfall 002 - De	ck Drainag	e			
24-hr Ra	ainfall (in.)		Volume o	of Discharge	Due to Rain	ıfall (gal.)	miertifus a	
	harge From Deck		Day Shift			Night Shift		Total
duration and approx	al.). Estimate based on ximate flow rate during ndowns.	Washdown 1 10 minx 12gp =120 gal	Washdown 2	Washdown 3 IOmin XI 19pm = 1209a1	Washdown 4	Washdown 5	Washdown 6	-
Control of the Contro	rainage Discharge (ga	Appropriate control of the second	al. max:		ogal			
			Outfalls 00	1 & 002		300000000000000000000000000000000000000		
	Receiving Water Vi	sual Observ	ations - Day	light Slack V	Water (Per NO/	AA current predic	ctions)	
Slack Water	Date & Time	Oily Sheen De	tected in Visual S & Comments)	heen Test (Y/N	Floating Solids	, Debris, Sludg Residue (Y/N a	e, Deposits, Foan & Comments)	n, Scum, or
1st Slack Water	11/4/15 1252		N			N		
2nd Slack Water	11/4/15 1850		N	******		N		
3rd Slack Water	11/5/15 0047		N		N			
4th Slack Water								
	Other O	bserations,	Non-Permitt	ted Dischar	ges, or Comn	nents		
CONTRACTOR CONTRACTOR SERVICE AND ADDRESS OF THE PROPERTY OF T	rilling at D 509 DS-SB obseration of ally sheen on	S-48 M Page Lime r residue not re	oved to.  2 of 2 talogo. A	DS-SA TO FOR di Jovs, to ds or deck drain	om DS-4 scharge 6700, No nage and report t	B. Arrive abserved by No o Project Regula		

# Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

Date &	Time:		O700	to iviarine d		Nov 5, 2		164			
Boreh		D1-5B		Borel	nole:	2	of 2	For Day	Ċ		
Latitu	ude:	60.655545	1080N	Longit	tude:	151.3	6919739	o W	e o		
Day Shift (		S. Pant 0700		Night Shift			10 1900-		8		
& Shift Drilling Sta		NOV 4,2015		& Shift Drilling Er		NOV4, 2012		PRINCE WEEK WILLIAM	5		
J. 1111.19	are miner	Outfall 001 - Ge							ii.		
		Odtidii 001 ° 00	Contract of the Contract of th	uid Losses (F		CONTRACTOR OF STREET	the ocurron				
D	rilling Flu	uid Volumes		Day Shift			Night Shift		Total		
	Create	ed (gal):		-			_				
	Remair	ning (gal):		-					(b)		
***************************************	Los	t (gal)							100-1		
		harges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6			
		d approximate flow rate	_	_	-		-	-	0		
The second of the second of		n. ~180 gal max/event: st to Ground (gal):			991						
Diming	Traia Lo.	or to Ground (gar):	E	rilling Fluid I	NAMED AND POST OF THE PARTY OF						
Results o	of Static	Start Time	AND RESIDENCE OF STREET	End 7	THE RESERVE OF THE PERSON NAMED IN	Pass/Fail		Comments			
`Sheen	STATE OF THE PARTY	22.53	the second second second	231	And the local designation of the local designa	MASS	NO SU		_		
	Discharge Start Time: 2325		Discharge	e End Time:	23:	26	Name and Address of the Owner, where the Owner, which is the Owner, which the Owner, which is	uration (min.):	1		
Length of asing (ft):	lf .	Drilling Fluid Depth Below Top of Casing (ft):	10	Length of Drill Fluid Col. (ft):	h)=f-g /	Casing Dia. (in.):	7	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	0.27		
Discl	harge Vo	ol. (gal.). ~200 gallons	s may:	2	001		k = h	7-in. is 0.27 ft <sup>2</sup> j * 7.481 gal/ft <sup>3</sup> Deposits, Foam, Scum, c			
Observ		Parising and the second	Sheen (Y/N & Co		141	Floating Solids	-	e, Deposits, Foan	The second second		
Ouring Di	ischarge		N				N	on the second se			
			Ou	tfall 002 - De	ck Drainag	e					
	24-hr Ra	ainfall (in.)	Ô			e Due to Rair	fall (gal.)	o(m*3596,5 O			
Volume		harge From Deck		Day Shift			Night Shift				
Washo	down (ga	II.). Estimate based on	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total		
	and approx	kimate flow rate during	_		_	_	_	10x 12gpm	120		
Total	- THE RESIDENCE OF THE PARTY OF	ainage Discharge (ga	1 \ ~2570 a	al may:	ψ;=rit+ri	20 0	_	100			
TOtal	Deck Di	alliage Discharge (go	11.) 2370 8	Outfalls 00	1 & 002	co gar					
		Receiving Water Vis	sual Observ		process and the second	Nater (Per NO)	A current predic	tions)			
Slack V	Vater	Date & Time				the state of the s	AND DESCRIPTION OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUM	e, Deposits, Foan	n, Scum, or		
1st Slack	Water	11/4/15 1252		Ν		N					
2nd Slaci	k Water	11/4/5 1850		Ν	******	N	- Harasta wa a sayan annin a	<del></del>			
Brd Slack Water 11/5/17 0047				N		N	ſ				
4th Slack											
		Other Ol	oserations,	Non-Permitt	ed Dischar	ges, or Comn	nents				
		see page	of for	2 Feb 4,000-	discho	orge ob. DS-SA	servation	in dusin	đ		
Stop disc	harge upon	obseration of oily sheen or	and the same of th		AND DESCRIPTION OF THE PERSON NAMED IN COLUMN 1			Name and Address of the Owner, where	-		
Proposition by Salar		Note: Observation									

			APD	DES Permit N	lo.: AK0062	2278					
Date 8	& Time:	Nov 5 2015	ect: Alaska	LNG Marine				4740			
	ehole:	Nov 5,2015 DS-5B	0700	_	to ehole:	Nov	6,2015	0700	_		
Latit	tude:	60.6555450	N 68		itude:	101.0	of <u>1</u>	For Day	<u> </u>		
	t Observer t Time:	rig unma		Night Shif	ft Observer		NA WAS		<u></u>		
	t rime: start Time:	no derillin	The state of the s		t Time; End Time;	ri	0	anned	_		
			0				o drill	ing	-		
		Outfall 001 - G	Drilling F	luid Losses (I	Prior To Dis	charge)	the Seatloo	r	N. Hallestie		
	Orilling F	luid Volumes	T	Day Shift	THO TO DIS	Night Shift			Latel		
		ted (gal):		-			Total				
		ning (gal):		No.			_		b)		
In a di		st (gal)		_			-		c)=a-b=		
based on	tent Disc	charges (gal). Estimate nd approximate flow rate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	d)		
during lo	ost circulati	on. ~180 gal max/event:	_	_	-	-		-	]_		
Drilling	Fluid Lo	st to Ground (gal):	e]=c-d	O							
				Orilling Fluid I	Discharges						
Results		Start Tim	ie	End T	Гime	Pass/Fail		Comments			
The second second	Sheen Test charge Start Time:		_		-	-	-				
Discharge S	start Time:		Discharge	e End Time:	-	_	Discharge [	Duration (min.):	-		
Length of Casing (ft):	_	Drilling Fluid Depth Below Top of Casing (ft):		Length of Drill Fluid Col. (ft):	h)=f-g	Casing Dia. (in.):	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>		J4		
Disc	harge Vo	ol. (gal.). ~200 gallon	s max:	40			k = h	* j * 7.481 gal,	/£+3		
Observ	ations ischarge		Sheen (Y/N & Co	omments)		Floating Solids,	ds, Debris, Sludge, Deposits, Foam, Scum, Residue (Y/N & Comments)				
ourning Di	ischarge		-				-				
			Out	tfall 002 - De	ck Drainag	е					
		ainfall (in.)	0.2	Volume o	f Discharge	Due to Rain	fall (gal.)	ml-1*1599.3 32	0		
		harge From Deck		Day Shift			Night Shift		T-1-1		
duration	and approx	I.). Estimate based on kimate flow rate during	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total		
	wash	downs.	-	-	-	-	-	_	<sup>n)</sup> —		
Total	Deck Dr	ainage Discharge (ga	al.) ~2570 ga		a)=m+n 3:	20901					
		Describing Mr. Vo.	1.01	Outfalls 001	L & 002						
Clast. M		Receiving Water Vis	Oily Sheen Det	ations - Dayli	ght Slack W	Vater (Per NOA)	A current predic	tions)			
Slack W		Date & Time	Ony Sheen Dete	& Comments)	een rest (Y/N)	Floating Solids,	Debris, Sludge Residue (Y/N &	e, Deposits, Foam	, Scum, or		
Lst Slack		NOV 5, 2015 0714	r	ig unma	rnnea		- 10	manned			
nd Slack	Water	NOV 5,2015 1355		1)				risellinea			
rd Slack		Nov 5,205 1958		1,			٠,				
th Slack	Water	Nov 6,2015 0159		11			17				
		Other Ob	serations, N	Non-Permitte	d Discharg	es, or Comm	ents				
		ock and dem	er to innobilize.	nprove Pig u	for Jack	ed. No	be able				
Stop discha	arge upon o	obseration of oily sheen or	residue not rela	ted to drill fluids	or deck draina	ge and report to	Project Regulate	ory Advisor, Claire	Joseph.		
		Note: Observations	were made over	er a 24 hr period o	corresponding	with personnel sl	hift changes.	, sidir C	350,011.		

Date & Time:

### Daily Visual Observation Form Rev. 4 APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation NOV 6, 2015 0700

NOV 7, 2015

0700

Borehole:	DS-5B/d0	ockside a	L ASRC Bore		1	of :	, For Da	У
Latitude: Day Shift Observer	60.65554508°		and the second s	gitude:	151.36	91973901	N/dockside	e
& Shift Time:	demobing	crewor	Night Shi	ft Observer ft Time:	demobi	na creu	only	
Drilling Start Time:	_ no derilli	ng	- A	End Time:	no			<del></del>
	Outfall 001 - G	ieotechnica	– I Drilling Flu	ids and Dri	ill Cuttings at			_
		Drilling F	luid Losses (	Prior To Di	scharge)	the Seallo	OI	
Drilling Fl	luid Volumes		Day Shift	(, , , , , , , , , , , , , , , , , , ,	T T	Night Sh	ift	Total
Creat	ted (gal):		h		1	- Trigite Sil		a) _
	ning (gal):		-			_		b)
	st (gal)		None			No.		c)=a-b_
Inadvertent Disc	charges (gal). Estimate	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	d)
during lost circulation	nd approximate flow rate on. ~180 gal max/event:		-	_	-			-
	est to Ground (gal):	e)=c-d	7					
		A Company of	Orilling Fluid	Discharges				
Results of Static	Start Tim			Time	Pass/Fail		Commonto	
Sheen Test	-			Time	rass/rail		Comments	
Discharge Start Time:	-	Discharge	End Time:			Discharge	Duration (min.):	1
Length of	Drilling Fluid Depth Below	g)		h)=f-g		Discharge	Duration (min.):	-
Casing (ft):	Top of Casing (ft):	_	Length of Drill Fluid Col. (ft):	-	Casing Dia. (in.):	_	Casing Area (ft <sup>2</sup> ): 7-in. is 0.27 ft <sup>2</sup>	_
Discharge Vo	ol. (gal.). ~200 gallon	s max:	k)	_		k = h	* j * 7.481 gal	/f+3
Observations	Oily	Sheen (Y/N & Co	omments)		Floating Solids	, Debris, Slud	ge, Deposits, Foar	
During Discharge						Residue (Y/N	& Comments)	
0		_						
241 -		Out	fall 002 - De	THE RESERVE OF THE PARTY OF THE				
	ainfall (in.)	0.0		of Discharge	e Due to Rain	nfall (gal.)	m)=[*1599.3 O	
	harge From Deck		Day Shift			Night Shif	t	T
duration and approx	l.). Estimate based on imate flow rate during	Washdown 1	Washdown 2	Washdown 3	Washdown 4	Washdown 5	Washdown 6	Total
	downs.	_		uz-	_	Non-	_	m)
Total Deck Dra	ainage Discharge (ga	ıl.) ~2570 ga	ıl. max:	Q)=m+n	0			L.,
			Outfalls 00:	1 & 002				
	Receiving Water Vis	ual Observa	ations - Dayli	ight Slack V	Vater (Per NOA	A current predi	ctions)	
Slack Water	Date & Time	Oily Sheen Dete	ected in Visual Sh & Comments)	neen Test (Y/N	Floating Solids,	Debris, Sludg Residue (Y/N	e, Deposits, Foam	n, Scum, or
1st Slack Water	Nov 6-205 0809	den	nub crewi	only		1		
2nd Slack Water	Nov62015, 1439		Fie	- /			crew only	
3rd Slack Water	NOV6,2015 2050						/	
	NOV 72015 0254	<i>P</i> 9						
	the second secon	corations N		ID: I		* ,	N.	
Jack	UP IPT+ Has	Incretio	25 20 00	01 00	ges, or Comm	0 0 0 1 1 10	d out Asi	RC
docks	10:25.	I will a	co ore	MODILLEI	VICE TON WE	C113		
OCCES	obseration of oily sheen or	residue not rela	ted to drill fluids	or deck drains	ade and toward to	Project Parel		-

### Static Sheen Test (EPA Method 1617) Reporting Form & Instructions

Project: Alaska LNG Marine Geotechnical Invest	P7 / 1 / 2 / 1 /	
Borehole: MB-05 Test #: of Original Test Retest  Latitude: Northing: 2 4 3 79 28.93 4 Longitude: Easting: 139 286 4, 19 f4  Test Results: Passed Failed Comments:	Test Operator: J. Great	w xld
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled "Static Sheen Test Container."	Completed?	
Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed?  Yes  No	14:03
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Inlet water temperature.	Completed?	
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.	Completed? W Yes No	
Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test container. Discard the pipette.	Time of Introduction: Must be <1 hour after Collection.	14:10
Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp	Start Time of Observations: Must be <1 hour after Introduction	14:17
if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Initial Percentage of Surface Covered By Sheen:	0%: Test Passed, Proceed to Step 7. <50%: Proceed to Step 6. >50%: Test Failed, Proceed to Step 8.
	Observations: No sheen/s	lick,
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If	End Time of Observations: Must be <1 hour after introduction.	14:25
sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	<50%: Test Passed, Proceed to Step 7. >50%: Test Failed, Proceed to Step 8.
	Observations: No sheen /slick	
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed?	
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed?	M

### Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2

Borehole: MB-04 Test #: of	Date: 8/21/15 Test Operator: J. Green	nwald
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled "Static Sheen Test Container."	Completed? Wes No	
Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed? Yes No	1500
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Inlet water temperature.	Completed? MYes No	
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.	Completed?	
Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test container. Discard the pipette.	Time of Introduction: Must be <1 hour after Collection.	1505
Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp	Start Time of Observations: Must be <1 hour after Introduction.	1507
if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Initial Percentage of Surface Covered By Sheen:	0%: Test Passed, Proceed to Step 7. <50%: Proceed to Step 6. >50%: Test Failed, Proceed to Step 8.
	Observations: No slick/sheen.	
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If	End Time of Observations: Must be <1 hour after Introduction.	1520
sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	<50%: Test Passed, Proceed to Step 7. >50%: Test Failed, Proceed to Step 8.
	Observations: No slick/sheen.	
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed? Wes No	
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed? ☐ Yes ☐ No	NA

# Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2

Project: Alaska LNG Marine Geotechnical Investignation  Borehole: MB-1 Test #:	pation Date: 8/23/15 Test Operator: Austin f	ee
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled	Completed? Yes No	
No. 11 Character Container II	Completed?   ✓ Yes   No	
Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Time of Collection:	06:40
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook	Completed?	
Inlet water temperature.	Completed? Yes No	
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket. Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test	Time of Introduction: Must be <1 hour after Collection.	06:42
container. Discard the pipette.  Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure	Start Time of Observations:  Must be <1 hour after Introduction.	06:43
adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Initial Percentage of Surface Covered By Sheen:	0%: Test Passed, Proceed to Step 7. <50%: Proceed to Step 6. >50%: Test Failed, Proceed to Step 8.
	Observations: No slick/	'sheen
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains	End Time of Observations: Must be <1 hour after Introduction.	06:51
Step 6: If sheer of slick is \$30% of the surface, defining fluids before end of one hour observation window. If \$50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	<50%: Test Passed, Proceed to Step 7. >50%: Test Failed, Proceed to Step 8.
	Observations: No slick/sheen	
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner.  Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed? <b>( a</b> Yes □ No	
Wash all equipment with soap and water. Triple rinse and dilow to air dry. Discard test fluids and liner. Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed? Yes No	

# Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2 APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation Date: 8/25/15 Borehole: MB -08 Test #: Original Test Retest Test Operator: J. Greenwall Latitude: -60.66367342 °N Longitude: 15/.3773987°W Test Results: Passed Failed Comments: Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled ■ Yes □ No Completed? "Static Sheen Test Container." Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker. ₩ Yes No Completed? 16:55 Time of Collection: Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 Myes No inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Completed? Inlet water temperature. Yes No Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket. Completed? Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm 17:00 Time of Introduction: below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test Must be <1 hour after Collection. container. Discard the pipette. Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure Start Time of Observations: 17:02 Must be <1 hour after introduction. adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp 0%: Test Passed, if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, Proceed to Step 7. visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or <50%: Proceed to Initial Percentage of Surface iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or Step 6. Covered By Sheen: >50%: Test Failed, slick. Proceed to Step 8. Observations: No stick/sheen Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains End Time of Observations: 17:15 Must be <1 hour after Introduction. <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If <50%: Test Passed, sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8. Proceed to Step 7. Final Percentage of Surface Area >50%: Test Failed, Covered By Sheen: Proceed to Step 8. Observations: No slick/sheen Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Yes No Completed? Wash all equipment with soap and water. Triple rinse and allow to air dry. Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. ☐ Yes ☐ No Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, Completed? and retest the drilling fluid until the test passes. Record each test on new sheet.

## Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2

APDES Permit No.: AK0062278 Project: Alaska LNG Marine Geotechnical Investigation Borehole: MB-09 Test #: of | M Original Test Retest Test Operator: J. Greenwall Latitude: 60,662 49628 °N Longitude: 151.38079069°W Test Results: M Passed | Failed Comments: Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled ■Yes □ No Completed? "Static Sheen Test Container." Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker. Completed? Yes No 12:15 Time of Collection: Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 W Yes No Completed? inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Inlet water temperature. Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket. ₩ Yes No Completed? Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container  $1\,\mathrm{cm}$ 12:19 Time of Introduction: below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test Must be <1 hour after Collection. container. Discard the pipette. Step 5; Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure Start Time of Observations: 12:20 Must be <1 hour after Introduction. adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp 0%: Test Passed, if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, Proceed to Step 7. visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or <50%: Proceed to Initial Percentage of Surface iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or Step 6. Covered By Sheen: >50%: Test Failed, slick. Proceed to Step 8. Observations: No sheen/slick. Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains End Time of Observations: 12:30 Must be <1 hour after Introduction. <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If <50%: Test Passed, sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8. Final Percentage of Surface Area Proceed to Step 7. Covered By Sheen: >50%: Test Failed, Proceed to Step 8. Observations: No shien/slick Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. ₩ Yes □ No Completed? Wash all equipment with soap and water. Triple rinse and allow to air dry. Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner.

Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole,

and retest the drilling fluid until the test passes. Record each test on new sheet.

☐ Yes ☐ No

Completed?

#### Static Sheen Test (EPA Method 1617) Reporting Form & Instructions New 2

### APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation Borehole: MB-15 Test #: Ø Original Test ☐ Retest Test Operator: J. Greenwald Longitude: 151.37/658690W Latitude: 60.65898078°N Comments: Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled Yes □ No Completed? "Static Sheen Test Container." Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker. Completed? W Yes No 17:05 Time of Collection: Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 W Yes No inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Completed? Inlet water temperature. Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket. Completed? Yes No Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm 17:10 Time of Introduction: below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test Must be <1 hour after Collection. container. Discard the pipette. Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure Start Time of Observations: 17:1 Must be <1 hour after Introduction. adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp 0%: Test Passed, if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, Proceed to Step 7. visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or Initial Percentage of Surface <50%: Proceed to iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or Covered By Sheen: slick. >50%: Test Failed, Proceed to Step 8 Observations: No slick/sheen Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains End Time of Observations: Must be <1 hour after introduction. <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If <50%: Test Passed, sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8: Proceed to Step 7. Final Percentage of Surface Area Covered By Sheen: >50%: Test Failed, Proceed to Step 8. Observations: Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Completed? Wash all equipment with soap and water. Triple rinse and allow to air dry. Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Yes No Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, Completed? and retest the drilling fluid until the test passes. Record each test on new sheet.

### Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 3

Borehole: MB-16 Test #: 1 of 1 Project: Alaska LNG Marine Geotechnical Invest  Latitude: 60.49129686 °N Longitude: 151.37525403°W  Test Results: Passed   Failed Comments: No sheen observed; Test passed procedure.	Date: 7 September Test Operator: Austin Fa		
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled "Static Sheen Test Container."	Completed? Yes 🗆 No		
Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed?		
	Time of Collection:	0030	
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Inlet water temperature.	Completed? Yes No		
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.	Completed? ✓ Yes ☐ No		
Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test container. Discard the pipette.	Time of Introduction: Must be <1 hour after Collection.	0033	
Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp	Start Time of Observations: Must be<1 hour after Introduction.	0033	
if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Initial Percentage of Surface Covered By Sheen:	0%: Test Passed, Proceed to Step 7. <50%: Proceed to Step 6. >50%: Test Failed, Proceed to Step 8.	
	Observations: Nosheen observed		
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If	End Time of Observations: Must be <1 hour after Introduction.	0038	
sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	<50%: Test Passed, Proceed to Step 7.  >50%: Test Failed, Proceed to Step 8.	
	Observations: No sheen observed		
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed? ✓ Yes ☐ No		
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed? Yes No		

# Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2 APDES Permit No.: AK0062278

Borehole: MB-20 Test #: of @ Original Test Retest	Date: 9/8/15	
Latitude: 60.65661392° N Longitude: 151.36889178° W  Test Results: Passed □ Failed Comments: No slick/sheen.	Test Operator: J. Green	wald
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled "Static Sheen Test Container."	Completed?	
Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed? Yes No Time of Collection:	0900
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Inlet water temperature.	Completed?	
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.	Completed?	
Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test container. Discard the pipette.	Time of Introduction: Must be <1 hour after Collection.	09:04
Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp	Start Time of Observations: Must be <1 hour after Introduction.	09:05
if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Initial Percentage of Surface Covered By Sheen:	0%: Test Passed, Proceed to Step 7. <50%: Proceed to Step 6. >50%: Test Failed, Proceed to Step 8.
	Observations: Noslick/shen.	
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If	End Time of Observations: Must be <1 hour after Introduction.	09:10
sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	<50%: Test Passed, Proceed to Step 7. >50%: Test Failed, Proceed to Step 8.
	Observations: No slick/sheen,	
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed? ☑ Yes ☐ No	
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed? Yes No	

#### Static Sheen Test (EPA Method 1617) Reporting Form & Instructions

### APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation Borehole: MB-25 Test #: \_\_\_\_ of \_\_\_ Ø Original Test ☐ Retest Latitude: 60. 65322350°N Longitude: 151,369678920W Comments: Test Results: Passed Failed Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled Yes No Completed? "Static Sheen Test Container." Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker. Completed? ₩ Yes No 16:20 Time of Collection: Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 W Yes No inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Completed? inlet water temperature. Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket. Yes No Completed? Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm 16:24 Time of Introduction: below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test Must be <1 hour after Collection. container. Discard the pipette. Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure Start Time of Observations: 16:25 Must be <1 hour after Introduction. adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp 0%: Test Passed, if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, Proceed to Step 7. visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or Initial Percentage of Surface <50%: Proceed to iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or Covered By Sheen: >50%: Test Failed, slick. Proceed to Step 8. Observations: No slick/sheen. Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains Fnd Time of Observations: 16:30 Must be <1 hour after introduction. <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If <50%: Test Passed, Proceed to Step 7. sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8. Final Percentage of Surface Area >50%: Test Failed, Covered By Sheen: Proceed to Step 8. Observations: No slick/sheen. Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Yes No Completed? Wash all equipment with soap and water. Triple rinse and allow to air dry. Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. ☐ Yes ☐ No Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, Completed? and retest the drilling fluid until the test passes. Record each test on new sheet.

### Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2

Borehole: MB-26 Test #: of of Project: Alaska LNG Marine Geotechnical Invest  Borehole: MB-26 Test #: of of Project: Alaska LNG Marine Geotechnical Invest  Latitude: 60.65216953°N Longitude: 151.37327906°N  Test Results: Passed  Failed Comments:	Date: 9/11/2015 Test Operator: Austra	FEE
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled "Static Sheen Test Container."	Completed? ✓ Yes □ No	
Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed? Yes No	0440
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Inlet water temperature.	Completed? Yes No	
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.	Completed? Yes No	
Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test container. Discard the pipette.	Time of Introduction: Must be <1 hour after Collection.	0442
Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp	Start Time of Observations: Must be <1 hour after introduction.	0443
if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Initial Percentage of Surface Covered By Sheen:	0%: Test Passed, Proceed to Step 7. <50%: Proceed to Step 6. >50%: Test Failed, Proceed to Step 8.
	Observations: No Sleen	orslick
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If	End Time of Observations: Must be <1 hour after Introduction.	2448
sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	<50%: Test Passed, Proceed to Step 7. >50%: Test Failed, Proceed to Step 8.
	Observations: No Scen ordick	
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed? <b>Ø</b> Yes □ No	
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed? Yes No	

# Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2 APDES Permit No.: AK0062278

reject: Alecka ING Marine Contachnical Investigation

Project: Alaska LNG Marine Geotechnical Invest	igation , ,	
Borehole: MB-3 Test #: of @ Original Test Retest	Date: 9/11/15	
Latitude: 60,64981225°N Longitude: 151,37039036	Test Operator: J. Greenwald	
Test Results:  Passed  Failed  Comments:		Mark
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled "Static Sheen Test Container."	Completed?	
Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed?	
	Time of Collection:	17:05
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Inlet water temperature.	Completed? W Yes No	
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.	Completed? 🛮 Yes 🗆 No	
Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test container. Discard the pipette.	Time of Introduction: Must be <1 hour after Collection.	17:07
Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp	Start Time of Observations: Must be <1 hour after Introduction.	17:08
if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Initial Percentage of Surface Covered By Sheen:	0%: Test Passed, Proceed to Step 7. <50%: Proceed to Step 6. >50%: Test Failed, Proceed to Step 8.
	Observations: No slick/she	
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If	End Time of Observations: . Must be <1 hour after introduction.	17:15
sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	<50%: Test Passed, Proceed to Step 7. >50%: Test Failed, Proceed to Step 8.
	Observations: No slick/sheen,	
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed?	
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed? Yes No	

# Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2 APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investi	igation	
Borehole: MB-02 Test #: of of @ Original Test  Retest	Date: 9/12/15	
Latitude: 60.64981225°N Longitude: 151,37039036°W	Test Operator: 1. Green	Jd
Test Results: Passed Failed Comments:		
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled "Static Sheen Test Container."	Completed? ■ Yes □ No	
Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed? 🛮 Yes 🗌 No	
	Time of Collection:	1157
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Inlet water temperature.	Completed? ₩ Yes □ No	
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.	Completed?  Yes  No	
Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test container. Discard the pipette.	Time of Introduction: Must be <1 hour after Collection.	1901
Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp	Start Time of Observations: Must be <1 hour after introduction.	1205
if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Initial Percentage of Surface Covered By Sheen:	0%: Test Passed, Proceed to Step 7. <50%: Proceed to Step 6. >50%: Test Failed, Proceed to Step 8.
	Observations: No slick/shee.	n.
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If	End Time of Observations: Must be <1 hour after Introduction.	1210
sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	50%: Test Passed, Proceed to Step 7. >50%: Test Failed, Proceed to Step 8.
	Observations: No slick / sheen.	
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed? 💆 Yes 🗆 No	
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed?	A STATE OF THE STA

# Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2 APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical investi	Date: 9/19/2015	
Borehole: MB-06 Test #: of @ Original Test ☐ Retest  Latitude: 60.6650117°N Longitude: 151.38379131° W  Test Results: M Passed ☐ Failed Comments:	Test Operator: Austin Fe	55
Test results. A rassed 15 railed		
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled "Static Sheen Test Container."	Completed? ✓ Yes □ No	
Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed? Yes No	9 1346
Step 2. have the utili dew obtains 250 mm to 500 mm to	Time of Collection: 0300	
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Inlet water temperature.	Completed? Yes No	
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.	Completed?	
Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test container. Discard the pipette.	Time of Introduction: Must be <1 hour after Collection.	0305
Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure	Start Time of Observations: Must be <1 hour after Introduction.	0306
adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Initial Percentage of Surface Covered By Sheen:	0%: Test Passed, Proceed to Step 7. <50%: Proceed to Step 6. >50%: Test Failed, Proceed to Step 8.
	Observations: No Slicky	Ishean
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains	End Time of Observations:  Must be <1 hour after Introduction.	03/0
<50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	Proceed to Step 7.  >50%: Test Passed, Proceed to Step 7.  Proceed to Step 8.
	Observations:	/sleen
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed?   ✓ Yes □ No	
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed? Yes No	

# Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2 APDES Permit No.: AK0062278

Borehole: MB-18 Test #: of Doriginal Test □ Retest  Latitude: 60.65527456°N Longitude: 151.37954225°N  Test Results: Passed □ Failed Comments:	Date: 9/21/15 Test Operator: J. Green	wald
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled "Static Sheen Test Container."	Completed?	
Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed? W Yes No	1740
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Inlet water temperature.	Completed?	
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.	Completed?	
Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test container. Discard the pipette.	Time of Introduction:  Must be <1 hour after Collection.	1743
Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp	Start Time of Observations: Must be <1 hour after Introduction.	1745
if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Initial Percentage of Surface Covered By Sheen:	0%: Test Passed, Proceed to Step 7. 50%: Proceed to Step 6. >50%: Test Failed, Proceed to Step 8.
	Observations: No slick	/sheen
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If	End Time of Observations: Must be <1 hour after Introduction.	1750
sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	<50%: Test Passed, Proceed to Step 7. >50%: Test Failed, Proceed to Step 8.
	Observations: No slick/	sheen.
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed? ■ Yes □ No	
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed? Yes No	

# Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2 APDES Permit No.: AK0062278

Borehole: MB-13 Test #: / of 1	Date: OCT 3 201 Test Operator: E PUL	
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled "Static Sheen Test Container."	Completed? 🖾 Yes 🗀 No	
Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed? Yes No	T
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook inlet water temperature.	Completed? ☐ Yes ☐ No	
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.	Completed? Yes No	
Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test container. Discard the pipette.	Time of Introduction:  Must be <1 hour after Collection.	0530 hrs
Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp	Start Time of Observations: Must be <1 hour after Introduction.	0531 hrs
if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity,	Initial Percentage of Surface Covered By Sheen:	% O%: Test Passed, Proceed to Step 7. <50%: Proceed to Step 6. >50%: Test Failed, Proceed to Step 8.
	Observations: N/A	
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If	End Time of Observations: Must be <1 hour after Introduction.	0540
sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	<50%: Test Passed, Proceed to Step 7.  50%: Test Failed, Proceed to Step 8.
	Observations: No sheed/slice	ck
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed? ☐ Yes ☐ No	
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed? Yes No	

### Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2

### APDES Permit No.: AK0062278

Borehole: MS 22 Test #: 1 of 1	Date: OCT 7 2015 Test Operator: Scim	Pant /
Test Results:   □ Failed Comments:	7.5	
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled "Static Sheen Test Container."	Completed? Yes 🗆 No	
Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed? Yes No	10:55
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Inlet water temperature.	Completed? ☐ Yes ☐ No	
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.  Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test	Completed?	11:00
container. Discard the pipette.  Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure	Must be <1 hour after Collection.  Start Time of Observations:	
adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp	Must be <1 hour after Introduction.	11:04 0%: Test Passed,
iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Initial Percentage of Surface Covered By Sheen:	Proceed to Step 7. 50%: Fest Fasset, Proceed to Step 7. 50%: Proceed to Step 6. >50%: Test Failed, Proceed to Step 8.
	Observations:	sheen
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If	End Time of Observations: Must be <1 hour after introduction.	11:10
sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	<50%: Test Passed, Proceed to Step 7. >50%: Test Failed, Proceed to Step 8.
	Observations: NO Slick/Sh	een
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed? ☑ Yes ☐ No	
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed? ☐ Yes ☐ No	

### Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2

Project: Alaska LNG Marine Geotechnical Investi	gation	
Borehole: M-27 Test #: of Original Test Retest	Date: 0CT 9 20	15
Latitude: 60.65111592°N Longitude: 151.37646725° W	Test Operator:Sam_	pant
Test Results: Passed  Failed Comments:		
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled "Static Sheen Test Container."	Completed?	
Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed? ☐ Yes ☐ No	
	Time of Collection:	11:55
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Inlet water temperature.	Completed? ☑Yes ☐ No	
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.	Completed?	Name of the second
Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test container. Discard the pipette.	Time of Introduction: Must be <1 hour after Collection.	11:58
Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp	Start Time of Observations: Must be <1 hour after Introduction.	12:00
if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Initial Percentage of Surface Covered By Sheen:	%: Test Passed, Proceed to Step 7. <50%: Proceed to Step 6. >50%: Test Failed, Proceed to Step 8.
	Observations:  NO SLICE / SHEE	ΞN
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If	End Time of Observations: Must be <1 hour after Introduction.	12:08
sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	% Proceed to Step 7.  >50%: Test Passed, Proceed to Step 7.  >50%: Test Failed, Proceed to Step 8.
*	Observations:  NO SLICE (S	SHEEN
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed?	
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed? ☐ Yes ☐ No	

# Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2 APDES Permit No.: AK0062278

Al- I- ISIG Starter Control in Investigation

Borehole: MB-19 Test #: / of / Original Test  Retest Latitude: 60.65854333N Longitude: 151.37877392° W	Date: OCT 11 2015 Test Operator: EDV 4200	PULIDO
Test Results: Passed   Failed   Comments:   N/A		
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled "Static Sheen Test Container."	Completed? ☐ Yes ☐ No	
Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed? ☐ Yes ☐ No	
Step 2. Have the drift drew obtains a look that to soo that to soo that the soon is a look to be soon to be so	Time of Collection:	0638
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook inlet water temperature.	Completed? ☐ Yes ☐ No	
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.	Completed? Yes No	
Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test container. Discard the pipette.	Time of Introduction: Must be <1 hour after Collection.	0645
Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp	Start Time of Observations: Must be <1 hour after Introduction.	0649
if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Initial Percentage of Surface Covered By Sheen:	0%: Test Passed, Proceed to Step 7. <50%: Proceed to Step 6.  >50%: Test Failed, Proceed to Step 8.
	Observations: NO SULL	LSMEEN
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If	End Time of Observations: Must be <1 hour after Introduction.	06 SY
sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	50%: Test Passed, Proceed to Step 7. >50%: Test Failed, Proceed to Step 8.
	Observations: NO SLEEK SM	reen.
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed? ☐ Yes ☐ No	
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed?	

### Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2

### APDES Permit No.: AK0062278

Borehole: MB-28 Test #: I of I Foriginal Test Retest  Latitude: 60.65859333°N Longitude: 151.37877392°W  Test Results: Fassed   Failed Comments: NO SUCC SUEEN	Date: OCT 12 2 Test Operator: Epuanno	
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled "Static Sheen Test Container."	Completed? Yes No	
Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed? Yes No	
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Inlet water temperature.	Time of Collection:  Completed? ☐ Yes ☐ No	0140
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.  Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm	Completed? ☐ Yes ☐ No	2//
below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test container. Discard the pipette.	Time of introduction: Must be <1 hour after Collection.	0145
Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp	Start Time of Observations: Must be <1 hour after Introduction.	0149
if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Initial Percentage of Surface Covered By Sheen:	%: Test Passed, Proceed to Step 7. 50%: Proceed to Step 6. >50%: Test Failed, Proceed to Step 8.
	Observations:  NO SUICH / SU	MEEN
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If	End Time of Observations:  Must be <1 hour after introduction.	0155
sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	% Proceed to Step 7.  >50%: Test Passed, Proceed to Step 7.  >50%: Test Failed, Proceed to Step 8.
	Observations: NO SUCK/SU	IEEN
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed?	
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed?	
		PI ΔTF R4-10

# Static Sheen Test (EPA Method 1617) Reporting Form & Instructions APDES Permit No.: AK0062278

Borehole: MB-23 Test #: 1 of 1 Woriginal Test Retest  Latitude: 60.654547310N Longitude: 151,376171500W  Test Results: Passed   Failed Comments: No Slick of Sheen Observed	Date: OCT 16,2015 Test Operator: S. Pan	t
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled "Static Sheen Test Container."	Completed? Yes No	•
Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed? Ves No	
	Time of Collection:	10:30
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Inlet water temperature.	Completed? ✓ Yes ☐ No	
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.	Completed? Yes No	
Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test container. Discard the pipette.	Time of Introduction: Must be <1 hour after Collection.	10:35
Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp	Start Time of Observations: Must be <1 hour after Introduction.	10:38
if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Initial Percentage of Surface Covered By Sheen:	0%: Test Passed, Proceed to Step 7. <50%: Proceed to Step 6. >50%: Test Failed, Proceed to Step 8.
	Observations: No Slick/sheem	
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If	End Time of Observations: Must be <1 hour after Introduction.	10:48
sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	50%: Test Passed, Proceed to Step 7. >50%: Test Failed, Proceed to Step 8.
	Observations: No Slick/	sheen
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed? ✓ Yes ☐ No	
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed? Yes No	

### Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2 APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investi	gation	
Borehole: MB-21 Test #: / of / Original Test Retest Latitude: 60.6553589°N Longitude: 151.37254192°W  Test Results: Passed   Failed Comments: MO SHEEN SHUL	Date: OCT 18 201. Test Operator: EDUARNO	
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled	Completed? ☐ Yes ☐ No	
"Static Sheen Test Container "		
Static Sheef rest container.  Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed? Yes No Time of Collection:	0340
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook inlet water temperature.	Completed? ☐ Yes ☐ No	
Stop 4: Fill a 25-mL disposable pinette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.	Completed? ☐ Yes ☐ No	
Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test	Time of Introduction:  Must be <1 hour after Collection.	0352
container. Discard the pipette.  Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure	Start Time of Observations: Must be <1 hour after introduction.	0354
adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Initial Percentage of Surface Covered By Sheen:	%: Test Passed, Proceed to Step 7. <50%: Proceed to Step 6.  >50%: Test Failed, Proceed to Step 8.
	Observations:  NO SUEEN [	sual
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains	End Time of Observations:  Must be <1 hour after Introduction.	0357
<50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	% Proceed to Step 7.  >50%: Test Passed, Proceed to Step 7.  >50%: Test Failed, Proceed to Step 8.
	Observations:  NO SUEEN / SO	uce
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed? Yes No	
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed? ☐ Yes ☐ No	
		DLATE D4 04

# Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2 APDES Permit No.: AK0062278

Borehole: MB-17 Test #: / of / Priginal Test Retest Longitude: 60-65681081°N Longitude: 151.3789 8244° W  Test Results: Passed Pailed Comments: NO SHEE SHUKE	Date: OLT 21 2015 Test Operator: EDVA 200	O PULINO
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled	Completed? Yes No	
"Static Sheen Test Container."  Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed? Yes No Time of Collection:	0925
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Inlet water temperature.	Completed? ☐ Yes ☐ No	
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.	Completed? Yes No	
Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test container. Discard the pipette.	Time of Introduction:  Must be <1 hour after Collection.	0438
Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure	Start Time of Observations: Must be <1 hourafter Introduction.	0440
adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Initial Percentage of Surface Covered By Sheen:	0%:Test Passed, Proceed to Step 7. <50%: Proceed to Step 6.  >50%: Test Failed, Proceed to Step 8.
	Observations: NO SHEEN (S	ruce
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains	End Time of Observations: Must be <1 hour after introduction.	0442
<50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	% Proceed to Step 7.  >50%: Test Passed, Proceed to Step 7.  >50%: Test Failed, Proceed to Step 8.
	Observations:  NO SUEEN / 3	чен
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed? Yes No	
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed? 🔲 Yes 🔲 No	

### Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2

Project: Alaska LNG Marine Geotechnical Investi	igation	_
Borehole: MB-14 Test #: of Boriginal Test  Retest  Latitude: 60.659390000N Longitude: 151.38 1911 10W  Test Results: Passed Failed Comments: NO MEEN / MAN	Date: OCT 23 2015 Test Operator: ENUALM	the state of the s
Test Results. Passed Falled Confinents. No Meter State		
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled "Static Sheen Test Container."	Completed? ☐ Yes ☐ No	
Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed? Yes No	
	Time of Collection:	0328
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Inlet water temperature.	Completed?	
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.	Completed? ☐ Yes ☐ No	
Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test container. Discard the pipette.	Time of Introduction: Must be <1 hour after Collection.	0331
Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Start Time of Observations: Must be <1 hour after Introduction.	0333
	Initial Percentage of Surface Covered By Sheen:	%: Test Passed, Proceed to Step 7.  50%: Proceed to Step 6.  50%: Proceed to Step 8.
	Observations: NO SUEEN	/ sace
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If	End Time of Observations: Must be<1 hour after introduction.	
sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	<50%: Test Passed, Proceed to Step 7. >50%: Test Failed, Proceed to Step 8.
	Observations: 0341	
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed? Ver ☐ No	
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed?	

### Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2

Borehole: MB-3 Test #: 1 of 1 Original Test Retest	Date: 0 Ct 2+, 2013	
Latitude: 60.65166819°N Longitude: 151.38317767°W	Test Operator: S. Pant	
Test Results: Passed   Failed   Comments: No slick Isnaer		
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled "Static Sheen Test Container."	Completed? ☐ Yes ☐ No	
Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed? ☐ Yes ☐ No	
	Time of Collection:	0815
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Inlet water temperature.	Completed? Yes No	
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.	Completed? Yes No	
Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test	Time of Introduction: Must be <1 hour after Collection.	0818
Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp	Start Time of Observations: Must be <1 hour after introduction.	0820
if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Initial Percentage of Surface Covered By Sheen:	0%: Test Passed, Proceed to Step 7.  50%: Proceed to Step 6.  >50%: Test Failed, Proceed to Step 8.
	Observations: NO Stick	/sheen
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If	End Time of Observations: Must be <1 hour after Introduction.	0828
sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	< 50%: Test Passed, Proceed to Step 7. > 50%: Test Passed, Proceed to Step 8.
	Observations:	klsheen
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed? ☐ Yes ☐ No	
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed?	

### Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2

APDES Permit No.: AK0062278

Borehole: VB 29 Test #: Of Original Test Retest	Date: 48, 2013	>
Latitude: 60.653939670N Longitude:  51.36730675°W	Test Operator:S_Pe	ant.
Test Results: Passed Pailed Comments: No Stick/Sheen		
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled "Static Sheen Test Container."	Completed? ☐ Ŷes ☐ No	
Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed? ☐ Yes ☐ No	
	Time of Collection:	1730
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Inlet water temperature.	Completed? ☐ Yes ☐ No	
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.	Completed? ✓ Yes ☐ No	
Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test container. Discard the pipette.	Time of Introduction: Must be <1 hour after Collection.	1732
Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp	Start Time of Observations: Must be <1 hour after Introduction.	1733
if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Initial Percentage of Surface Covered By Sheen:	0%: Test Passed, Proceed to Step 7. <50%: Proceed to Step 6. >50%: Test Failed, Proceed to Step 8.
	Observations:	k/sheen
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If	End Time of Observations: Must be <1 hour after Introduction.	1740
sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	<50%: Test Passed, Proceed to Step 7. >50%: Test Failed, Proceed to Step 8.
	Observations: NO Slice	k/sheen
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed? ✓ Yes ☐ No	
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed?	
		PLATE B4-25

and retest the drilling fluid until the test passes. Record each test on new sheet.

### Static Sheen Test (EPA Method 1617) Reporting Form & Instructions

APDES Permit No.: AK0062278 Project: Alaska LNG Marine Geotechnical Investigation NOV 2 2015 Borehole: DS-4A Original Test Retest Longitude: 151.36719431° W Test Operator: E, PULIDO Test Results: Passed Failed Comments: NM SUFFN Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled Yes No Completed? "Static Sheen Test Container." Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker. Completed? Tyes I No 2215 Time of Collection: Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 Yes I No inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Completed? Inlet water temperature. Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket. Yes No Completed? Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm 22 19 below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test Time of Introduction: Must be <1 hour after Collection. container. Discard the pipette. Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure Start Time of Observations: 2221 adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp Must be <1 hour after Introduction. 6: Test Passed, if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity. Proceed to Step 7. visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or Initial Percentage of Surface <50%: Proceed to iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or Covered By Sheen: slick. >50%: Test Failed, Proceed to Step 8 Observations: NO SUEEN SLICK Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains End Time of Observations: 2230 <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If Must be <1 hour after Introduction. sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8. ₹50%: Test Passed, Final Percentage of Surface Area Proceed to Step 7. Covered By Sheen: >50%: Test Failed, Proceed to Step 8 Observations: Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. U Yes □ No Completed? Wash all equipment with soap and water. Triple rinse and allow to air dry. Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, Completed? Yes No

### Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2

APDES Permit No.: AK0062278

Project: Alaska LNG Marine Geotechnical Investigation NOV 3, 2015 Borehole: DS- 4B Test #: 1 of 1 ✓ Original Test ☐ Retest Longitude: 151. 36712022°W Latitude: 60.655808440 N No slick/sheen Comments: Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled Yes No Completed? "Static Sheen Test Container," Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker. Completed? Yes No 0625 Time of Collection: Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 Yes No inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Completed? Inlet water temperature. Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket. Yes ☐ No Completed? Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm 0626 Time of Introduction: below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test Must be <1 hour after Collection. container. Discard the pipette. 0627 Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure Start Time of Observations: Must be <1 hour after Introduction. a dequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp 0%: Test Passed, if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, Proceed to Step 7. visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or Initial Percentage of Surface <50%: Proceed to iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or Step 6. Covered By Sheen: >50%: Test Failed, slick. Proceed to Step 8. Observations: No stick/sheem Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains End Time of Observations: 0635 Must be <1 hour after Introduction. <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If 50%: Test Passed, sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8. Proceed to Step 7. Final Percentage of Surface Area >50%: Test Failed, Covered By Sheen: Proceed to Step 8. Observations: No slick/sheen Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Ves No Completed? Wash all equipment with soap and water. Triple rinse and allow to air dry. Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. ☐ Yes ☐ No Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, Completed? and retest the drilling fluid until the test passes. Record each test on new sheet.

# Static Sheen Test (EPA Method 1617) Reporting Form & Instructions Rev. 2 APDES Permit No.: AK0062278

Borehole: N-SA Test #: 1 of 1 Original Test Retest Latitude: 60.65557886°N Longitude: 151-36914764°W  Test Results: Passed   Failed Comments: NO Sick Cheen	Date: New 4,2015 Test Operator: 8129 M	
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled "Static Sheen Test Container."	Completed?	
Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed? Yes No Time of Collection:	16:10
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Inlet water temperature.	Completed?	
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.	Completed? -☐Yes ☐ No	
Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test container. Discard the pipette.	Time of Introduction: Must be <1 hour after Collection.	16:11
Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp	Start Time of Observations: Must be <1 hour after Introduction.	16:12
if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Initial Percentage of Surface Covered By Sheen:	0%: Test Passed, Proceed to Step 7. < 50%: Proceed to Step 6. > 50%: Test Failed, Proceed to Step 8.
	Observations: No slick/she	en
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If	End Time of Observations: Must be <1 hour after Introduction.	16:20
sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	Final Percentage of Surface Area Covered By Sheen:	50%: Test Passed, Proceed to Step 7.  50%: Test Passed, Proceed to Step 8.
	Observations: NO Slic	le/sheen
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed? ☐ Yes ☐ No	
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed? Yes No	

### Static Sheen Test (EPA Method 1617) Reporting Form & Instructions

Project: Alaska LNG Marine Geotechnical Invest	igation	
Borehole: DS-SB Test #: / of / Original Test Retest  Latitude: 60.6555 (1508° W Longitude: 151.36919739° N  Test Results: Passed   Failed Comments: M SUCY SAEIN	Date: NOV 4 20(S Test Operator: E. PO	1100
Step 1: After completion of drilling and sampling, place a new, unused liner (plastic trash bag) into the bucket labeled "Static Sheen Test Container."	Completed?	
Step 2: Have the drill crew obtain a 200 mL to 500 mL sample of drilling fluid from the mud pit using the 1 L beaker.	Completed? Ves No	2255
Step 3: Use the bucket with attached line to retrieve seawater for use in the test. Fill the test container to within 0.5 inch of the top of the container. Proceed without delay to ensure the test water temperature remains close to Cook Inlet water temperature.	Completed?	6033
Step 4: Fill a 25-mL disposable pipette with the drilling fluid in the 1 L beaker and discharge into a soil waste bucket.	Completed? Yes No	
Then measure a 15-mL sample of the drilling fluid for the test. Introduce the drilling fluid to the test container 1 cm below the water surface. Use the pipette to distribute the drilling fluid homogeneously throughout the test container. Discard the pipette.	Time of Introduction: Must be <1 hour after Collection.	2302
Step 5: Observe the test container at viewing angles of approximately 60° and 30° from the horizontal. Ensure adequate fluorescent light is positioned above and directed over the entire surface of the test container. Use a lamp	Start Time of Observations: Must be <1 hour after Introduction.	2304
if necessary. Observe for patches, streaks, or sheets of "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container. A slick may lack color, a sheen, or iridescence. Do not disturb the surface of the test container in any manner that reduces the size of any sheen or slick.	Initial Percentage of Surface Covered By Sheen:  Observations:	%: Test Passed, Proceed to Step 7. <50%: Proceed to Step 6.  >50%: Test Failed, Proceed to Step 8.
	NO SUCK	
Step 6: If sheen or slick is <50% of the surface, continue observing for just under one hour. If the sheen remains <50%, the test passed. Proceed to Step 7 and discharge drilling fluids before end of one hour observation window. If sheen increases to >50% of the test surface at any time, the test failed and should be stopped. Proceed to Step 8.	End Time of Observations:  Must be <1 hour after Introduction.  Final Percentage of Surface Area Covered By Sheen:	230 9 Proceed to Step 7.
	Observations:  NO SUCE SUE	Proceed to Step 8.
Step 7: Indicate above that the test passed. Proceed with discharge of drilling fluids. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse and allow to air dry.	Completed? Yes No	
Step 8: Indicate above that the test failed. Discharge of drilling fluids is not permitted. Discard test fluids and liner. Wash all equipment with soap and water. Triple rinse with fresh water and allow to air dry. Continue flushing hole, and retest the drilling fluid until the test passes. Record each test on new sheet.	Completed? Yes No	