| | DOCKET NO. CP17000 | DOC NO: USAKE-PT-SRREG-00- |
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| | RESOURCE REPORT NO. 3 | 000006-000 |
| Alaska LNG | APPENDIX L | April 14, 2017 |
| Project | Part 3 of 10 | REVISION: 0 |
| | Public | |

Part 3 of 10 of Appendix L of Resource Report No. 3

PUBLIC

APPENDIX L.3 2013 STREAM FISH INVESTIGATIONS FIELD STUDY PROTOCOLS AND EXECUTION PLAN (USAKE-UR-SPFLD-00-0001)

Concept Information Confidential

Alaska LNG

2013 Stream Fish Investigations Field Study Protocols and Execution Plan

USAKE-UR-SPFLD-00-0001

| Rev | Rev date | Description | Prepared By | Checked By | Endorsed By | Approved By |
|-----|----------|------------------------|----------------|---------------|----------------|----------------|
| 0 | 6.20.13 | Issued for Information | VW | | | |
| 1 | 10.28.13 | Issued for Information | | | | |
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REVISION MODIFICATION LOG

| Revision | Section | Description |
|----------|---------|-------------------------------------------------------------------------------------------|
| 1 | Global | Changed project name, description, and related references to reflect project name change. |
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ACRONYMS AND ABBREVIATIONS

| ADF&G | Alaska Department of Fish and Game |
|-------------|-----------------------------------------|
| ANS | Alaska North Slope |
| GIS | Geographic Information System |
| GPS | Global Positioning System |
| GTP | Gas Treatment Plant |
| JSA | Job Safety Analysis |
| LNG | liquefied natural gas |
| MLBV | mainline block valve |
| PBU | Prudhoe Bay Unit |
| PT Pipeline | Point Thomson Gas Transmission Pipeline |
| PTU | Point Thomson Unit |
| QA/QC | Quality Assurance/Quality Control |
| ROW | right-of-way |
| U.S. | United States |
| | |

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1. PROJECT DESCRIPTION

Please see Project Description at the beginning of this Resource Report.





Figure 1-2013 Summer Survey Area

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2. INTRODUCTION

Alaska LNG is proposing to conduct field surveys in 2013 to characterize fish presence and habitat at streams and rivers crossed by the proposed alignment. The identification of resident and anadromous fish streams is required to determine Alaska Department of Fish and Game (ADF&G) regulatory authority under Alaska Statute 16.05.841 and 871. All anadromous fish streams in the project area are also subject to the Essential Fish Habitat provisions of the Magnuson-Stevens Fishery Conservation and Management Act. Results of this field survey will facilitate the eventual evaluation of project-related direct, indirect, and cumulative impacts under the National Environmental Policy Act and other permits, including the United States (U.S.) Army Corps of Engineers Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act.

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3. OBJECTIVES

The primary objective of the 2013 Alaska LNG fish stream surveys is to identify all resident and/or anadromous fish streams affected by the Project footprint. Secondary objectives include:

- Identify specific stream crossing sites with critical fish habitat (spawning and high-value rearing habitat);
- Collect water quality parameters important to fish; and
- Describe streambed and stream channel morphology at each surveyed stream crossing site.

The data collected during the stream surveys will also assist in developing recommendations for Project footprint adjustments to avoid critical fish habitat and be used to develop stream crossing mitigation measures for specific stream crossing sites. Results from this study will be provided to ADF&G, other fisheries agencies, and the National Environmental Policy Act (NEPA) process to assist in overall Project permitting and in developing future stream fish surveys sampling strategies.

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4. METHODS

Stream surveys will be conducted by experienced field crews consisting of a Field Crew Chief fisheries biologist, a field crew technician – fisheries technician, and a Geographic Information System (GIS) technician. Field Crew Chiefs will be individuals that have demonstrated the ability to work safely and efficiently on previous stream surveys. All field crew members conducting fish sampling activities will meet ADF&G training criteria and will comply with all fish collection permit stipulations and safety requirements.

Field crews will access stream crossing sites by existing highways and secondary roads where possible. A helicopter may be required to access stream crossings sites where the alignment diverges from the existing road system and vehicular access or access on foot is not practical.

At all identified stream crossing sites to be surveyed in 2013, each field team will sample fish, record habitat characteristics, and measure water quality parameters on a hardcopy datasheet (**Appendix A**) and an electronic data form that will be developed for the project. The number of stream crossing sites sampled per day will vary depending on the distance between sites, distance of sampling sites from access points, the size of the streams sampled, and the sampling techniques employed. A detailed Fish Stream Survey gear list is included in **Appendix B**.

A Global Positioning System (GPS) unit will be used to locate each stream crossing site and to document sampling locations. The GPS data entry protocol will commit to one standard format (i.e., NAD 83) to ensure the consistency and completeness of data collection at each stream crossing site.

Immediately after arriving at the stream crossing site, an initial assessment of the stream reach will be conducted. This initial assessment will include an attempt to observe adult and juvenile fish with the aid of polarized sunglasses. Field crews will photograph each stream crossing location from both banks, and also photograph views of the stream reach upstream and downstream of the crossing site.

After completing the initial assessment of the proposed stream crossing site, a site-specific sampling strategy will be developed. The sampling strategy will consider water depth, water velocity, substrate composition, and other factors to ensure fish sampling is conducted safely and efficiently. The necessary sampling effort at each stream crossing will be determined by the fisheries biologist.

Fish Sampling

The goal of the fish sampling strategy is to ensure adequate effort is made, and appropriate sampling techniques are used, to capture fish species inhabiting the area. Fish sampling will only be performed on streams where adequate fisheries data is lacking or incomplete.

To minimize stress, all captured fish will be removed from the water for the shortest duration of time practical and held in a bucket for processing. All captured fish will be positively identified to species, measured to the nearest millimeter fork length from the tip of the snout to the fork in the tail, and released near the point of capture. Dichotomous fish keys will be used to assist in positively identifying fish species. Representative photographs of common fish species and fish not positively identified will be taken. These samples and photographs will be sent to subject matter experts for confirmation of species identification.

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Electrofishing

Electrofishing will be the preferred method of field sampling in most wadeable streams. Electrofishing has been determined to be the most efficient single method for fish sampling within a stream reach (U.S. Environmental Protection Agency 2008). In streams with low conductivity (micro Siemens per centimeter), such as those on the North Slope, alternative sampling techniques may be required to optimize sampling efficiencies.

Electrofishing will not be conducted in areas where adult salmon, adult trout, or adult char are observed (2010 ADF&G Fish Resource Permit stipulations). Electrofishing will be conducted along a sample stream reach equal to approximately 40 times the mean channel width, or roughly one meander length (Fitzpatrick et al. 1998; and Buckwalter 2008). Crews will attempt to include at least two examples each of two different habitat types (riffles, pools, and runs) in the sample reach.

Field crews will collect fish using a battery-powered Smith-Root Backpack Electrofisher (Model LR20B), a small dip net, and a bucket for holding the fish after capture. Electrofishing will begin at the downstream end of the sample stream reach and move upstream. Electrofishing effort will be conducted using protocols implemented by ADF&G (Buckwalter et al. 2008). Electrofishing will be conducted from bank to bank to ensure all channel and habitat types are sampled. Crews will avoid herding fish by electrofishing intermittently. After a continuous 5-10 second electrofishing pulse, crews will advance upstream before continuing. This sampling strategy will continue for no more than 30 minutes total sampling time, with a cumulative electrofishing total of no less than 300 seconds (button time) per reach. All captured fish will be dipped from the water as soon as possible and placed into a bucket to minimize exposure to the electrical field.

At each sampling site, electrofishing will be immediately stopped if:

- Adult salmon, adult trout, or adult char are observed or captured;
- Large numbers (greater than 40) of juvenile fish have been captured;
- Stunned fish fail to recover quickly in the holding bucket; and
- Any instance of greater than 10 percent sampling mortality occurs.

Electrofishing will not be attempted in large, non-wadeable streams and rivers.

Minnow Trapping

Field crews will use minnow traps for sampling a broad range of fish species in a variety of stream habitats. The use of minnow traps is a common and effective sampling method for both juvenile fish and smaller fish species. Minnow traps will be baited, in accordance with ADF&G requirements, with cured salmon roe or salmon roe treated with a 1/100 Betadine solution. Minnow traps will be placed from the stream bank and remain in the water overnight. Minnow traps will be pulled from the site at the completion of sampling. Parameters to be recorded include: The total time set, type of habitat, and species and numbers captured.

Each deployed minnow trap will be secured to a fixed object, such as a branch or shrub, to ensure the minnow trap is not lost. All minnow traps will be labeled in accordance with ADF&G requirements and removed upon completion of sampling.

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Seining

A 3 by 1.2 meter seine, referred to as a "common sense" seine, with 6.4 millimeter mesh size, will be used to capture fish by enclosing and/or encircling them. The bottom of the seine net has a lead line to keep the net on the stream substrate, while the top of the net has a float line or floats to keep the seine at the water surface. The fish captured will be removed from the seine and transferred to a collection bucket for processing.

Seining protocols will be based on the judgment of the fisheries biologist. Seining will be conducted in slow-moving streams and in shallow pool habitats. Seining efforts will be limited to survey sites where other sampling protocols are relatively inefficient, and/or used to complement electrofishing collections. Typically, seining will be performed after electrofishing has been completed. Seining protocols generally require hauling the net through a stream reach, herding fish toward the center of the net, and then dragging the net to shore. Fish caught in the net are dipped out, identified to species, measured, and released. The time spent seining, percent of reach sampled, and the total area of the stream sampled by the net is recorded along with stream habitat parameters.

Fyke Nets

Fyke nets may be used at sites where other sampling techniques have been ineffective. Fyke nets may be placed across slow moving streams to capture fish moving through the sampling reach overnight. They are generally placed so the wings of the net steer upstream migrating fish into a collection area. Fyke nets are expected to be used sparingly, but may be effective on the slow-moving streams of the North Slope where alternative sampling techniques are unsuccessful. Typically, fyke nets are set with one wing on shore and the other staked a short distance offshore. Sampling effort is recorded as the amount of time the net is set. The species caught, size, and number are recorded for each set. Care must be taken if non-target wildlife are caught in the net, such as loons, otters, or beavers.

Angling

Angling, or hook-and-line sampling, may be conducted on larger streams where other techniques are not practical, and could be limited to survey sites where other sampling protocols are not used. Angling may also be used where water depth and/or stream currents make it hazardous to seine, or where stream banks are too steep for placement of minnow traps. The length of time spent angling, bait used, species captured, and size of each fish will be recorded. To eliminate any misperceptions of sport fishing, angling will not occur if local residents are present.

Visual Observation

Prior to conducting any fisheries sampling, visual observations will be conducted using polarized sunglasses. If adult salmon, adult trout or adult char are observed, electrofishing will not be conducted and other fish sampling techniques will be employed.

Habitat and Water Quality

Baseline water quality data and physical habitat data will be collected at each stream crossing site to assess habitat conditions. Water quality parameters will include water temperature, pH, dissolved oxygen (DO), conductivity, and oxidation reduction potential. Water quality measurements will be collected in the field with a Yellow Spring Instruments Model 556 water quality meter. The water quality meters will be calibrated on a daily basis and dissolved oxygen

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membranes will be inspected weekly. Membranes will be cleaned and replaced as necessary. Water quality data will be checked for values within expected ranges during the Quality Assurance /Quality Control (QA/QC) process. Physical characteristics of the stream or river site, such as channel width, depth, aquatic habitats, substrate, and riparian vegetation, will also be recorded.

Data Recording and Processing

All fish stream survey data collected will be recorded on hard copy field data forms and entered into an electronic data form that will be developed for the project. The electronic data files will include the GPS location of the stream reach, electronic data sheets, site photos, sketches and field notes. The field data will be uploaded to a project website through an Internet connection or by a satellite link.

Data Quality Assurance/Quality Control

The Fisheries Technical Lead will conduct a quality assessment during the first week of the deployment. The assessment will verify data quality and consistency and will provide an opportunity for any problems to be corrected immediately.

It is the responsibility of each crew member to collect complete, accurate, and clear data. This requires all equipment and gear to be calibrated, maintained, and repaired as needed to ensure the highest level of data quality. Water quality meters will be calibrated and inspected daily. The Field Crew Manager will be responsible for providing all necessary replacement gear and equipment to keep the crew functioning while in the field.

Before leaving each sampling site, the Crew Chief will review the hardcopy data sheets. The Fisheries Field Form QA/QC Checklist (**Appendix C**) will be completed prior to leaving the field site. All field data will also be reviewed and compared each evening prior to transmittal. These files will be sent to the data management staff in Anchorage via internet for review by a subject matter expert. Detailed field QA/QC procedures will be outlined in the 2013 Field Data Management Plan.

5. FIELD STUDIES EXECUTION

Crew Composition

Stream Fisheries Investigations field crews will be composed of the following:

- Field Crew Chief- Fisheries Biologist.
- Field Crew Technician- Fisheries Technician
- GIS Technician
- Bear Guard/Field Safety Officer

A Field Crew Manager will accompany field crews to all lodging locations. The Field Crew Manager will provide logistics support and serve as a field crew alternate.

Field Sampling Strategy

Twenty field targets will need to be surveyed in 2013. These field targets represent 20 streams where data is lacking and therefore require fisheries investigations and characterization. Several streams intersect the Project footprint in multiple locations and therefore may require multiple sampling events. The figures in **Appendix D** illustrate the Stream Fisheries Investigations study areas. A more detailed review of the field target locations will determine if there is a need for additional sampling.

Table 1 outlines the preliminary 2013 Stream Fisheries Investigations Program field deployment schedule. One Stream Fisheries Investigations field crew will work from Point Thomson to Prudhoe Bay, and then south to Livengood. This deployment schedule assumes one field crew averaging two field target surveys per day. A stand down day will be taken every eighth day. Field surveys between Point Thomson and Prudhoe Bay will be by helicopter transport. Dates are subject to change. **Appendix E** contains a detailed march chart that identifies the sites that are planned to be surveyed by the fish crew each day of deployment. Any departures from this schedule must be coordinated with the Field Crew Manager.

| Table 1. Stream Fisheries Investigations Deployment Summary | | | | | | | | |
|-------------------------------------------------------------|-----------------------|---------------|-------------------------------------------------------------------------------|--|--|--|--|--|
| Work Segment | Dates | Field Targets | Lodging | | | | | |
| Prudhoe Bay – Pt. Thomson | July 27 - 28 | 1 | Deadhorse. Five rooms/1 night. | | | | | |
| Atigun Pass – Prudhoe Bay | July 28 – August 4 | 13 | Deadhorse. Five rooms/8 nights. Stand down day on Aug 2. | | | | | |
| Prospect Creek – Atigun Pass | August 5 - 7 | 3 | Coldfoot. Five rooms/3 nights. | | | | | |
| Livengood – Prospect Creek | August 7 - 9 | 3 | Yukon Crossing. Five rooms/3 nights. Crews demobilize to Fairbanks August 10. | | | | | |

Permits and Approvals

The Stream Fisheries Field Crew will be provided a copy of all permits and approvals required to conduct field surveys. The field crew is responsible for understanding and abiding by permit conditions. Permits and approvals include:

• Alyeska Pipeline Service Letter of Non-Objection;

- Bureau of Land Management Casual Use Permit;
- Alaska Department of Transportation and Public Facilities Access Permit;
- North Slope Borough Land Management and Development Permit and Science Permits;
- BP Exploration (Alaska), Inc. (BPXA) Letter of Non-objection;
- ADF&G, Title 16 Fish Habitat Permit or Approval (ADF&G will need to review all low water crossings, and will then determine whether or not a permit is necessary.); and
- ADF&G, Fish Resource Permit (collection permit).

The ADF&G Fish Resource Permit is required to conduct fish surveys, in addition to a valid Alaska fishing license. Under the terms of this permit, only personnel identified on the permit application will be authorized to perform collection activities. A copy of the permit will be carried by all fish teams while conducting fish surveys. ADF&G has 30 days to review and approve or deny the permit application.

Two field study reports are required as part of the ADF&G Fish Resource Permit requirements. These include:

- ADF&G Collections Report: This report, using a template provided by ADF&G, will include species, numbers, dates, locations of collection, disposition, and, if applicable, sex, age and breeding condition and lengths and weights of fish. It must also include the date/time the local biologist was contacted for final authorization to carry out collection activities. This report is due within 60 days of the permit expiration date.
- ADF&G Completions Report: This report requires an abstract, Project background, description of sampling methods, field data and data analysis. Data from such reports are considered public information. This report is due within six months of the permit expiration date.

Field Safety

Safety of Project personnel and the public is of the highest importance and will not be compromised for any reason. The Project will develop and distribute a comprehensive Project Safety and Security Plan, including protocols and procedures designed to ensure the safety of all Project staff and the public. In turn, it is expected that Project personnel will understand and adhere to all Project safety processes and protocols, and demonstrate a personal commitment to the safe performance of work at all times. Specific Job Safety Analysis (JSAs) developed for fish stream studies are included in **Appendix F**.

Project-specific training covering safety and security will be required for all personnel performing field work on the Project. Training will occur prior to deployment and will be scheduled in consultation with Project staff.

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APPENDIX A: FISH FIELD SURVEY FORM

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Fish Survey Streams Data Form

| SITE DESCRIPTION | | | | | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------|-------------|------|--------------------------|
| Date: | Date: Investigators: | | | т | Team N | am No.: Feature ID: | | | ID: |
| Stream Name: | | | Stream ID: | | | Stream listed in Anadromous | | adro | mous Fish Catalog (Y/N): |
| Milepost: | | Hwy Milepost: | | | | | TAPS Mil | lepo | st: |
| Latitude: | | | | Longitude: | : | | | | |
| Logbook No.: | Logbook Pag | e No.: | | Pic No(s): | | | | | |
| US @ CL | DS @ CL | | | RB to LB@ | CL | | | | LB to RB@ CL |
| Additional | Additional | | | Pic No.: Additional | | | | | Additional |
| Pic No.: | Pic No.: | | | Pic No.: | | | | | Pic No.: |
| PHYSICAL/ CHEMICAL ATTRIBUTES | | | | | | | | | |
| Weather (Describe): | | | | Precipitation | n (Desc | ribe): | | | |
| Water Temperature (°C): | | Air Tempera | ture (°C): | | рН | : | | Dis | ssolved Oxygen (mg/l): |
| Specific Conductance(µS/cm): | | Turbidity (N | TU): | | Col | lor: | | OF | RP (mV): |
| Ambient Conductance(µS/cm): | | Odor: | | | She | een (Y/N): | | La | st date of Calibration: |
| Wetted Width (m): | | Thalweg | g Depth @ C | CL (m): | | | Large | e Wo | ody Debris Count: |
| Riparian Veg at 0-5 m at LB: Grass/Sedge (%) Shrubs (%) Trees (%) Diameter DBH Flow Type: PerennialSeason | iparian Veg at 0-5 m at LB: Riparian Veg at 0-5 m at RB: Stream Substrate: Aquatic Habita Grass/Sedge (%) Grass/Sedge Organics Sand Ba Trees (%) Grass/Sedge (%) Mud Ba Diameter DBH Shrubs (%) Sand (%) Riffles Diameter DBH Trees (%) Gravel (%) Riffles Diameter DBH Diameter DBH Boulders(%) Boulders(%) Boulders(%) Boulders(%) Boulders(%) Boulders(%) | | i tats Bar Bar Bar S s rcut Banks | 5 | Large Woody Debris Overhanging vegetation Contiguous Wetlands Emergent Plants Submerged Plants | | | | |
| STREAM PROFILE: Cross Sectional a NORTH: STREAM PROFILE: Plan View (includ NORTH: | t Crossing (include | riparian vegetati centerline, dista | nces from c | enterline, pho | oto loc | , substrate | e, and aqua | ions | by gear type and ROW) |
| l | | | | | | | | | |

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| METHODS ATTRIBUTES | s | | | | | | | | |
|----------------------------------|-------------|---------------------------------|------------------|--------------------------------|-------------------------|------------------------|-------------------------|--------------|----------------------------------|
| Minnow Traps (Y/N): | | Hook and Line (Y/N) |): | Beach Seine (Y/N) | : | Fyke Net (| Y/N): | | Hoop Net (Y/N): |
| No. of Minnow Traps S | et: | Date & Time in: (mm/dd/yyyy) | | Date &Time in: (mm/dd/yyyy) | | Date & Tin (mm/dd/y | me in: Dat yyyy) (mr | | Date & Time in: (mm/dd/yyyy) |
| Date & Time in: (mm/dd/yyyy) | | No. of lines in water | r: | No. of passes: | | Date & Tin (mm/dd/y | ne out: yyy) | | Date & Time out: (mm/dd/yyyy) |
| Date & Time out: (mm/dd/yyyy) | | Time lines in water: | | Reach Length (m) | : | | | | |
| ELECTROFISHING ATTR | RIBUTES | | | | | | | | |
| EF (Y/N): | EF Start Ti | me: | EF End Time: | | EF Time (see | conds): | | EF Rea | ach Length (m): |
| Duty Cycle: | | Frequency (Hz) : | | Waveform: | | Sampling I | Efficiency (% | 6 of sam | ple reach): |
| Current (A): | | Volts (V): | | Power (W): | | | | | (amp x volts) |
| FISH OBSERVATIONS | | | | | | | | | |
| Gear Type | Speci | es | Total Length (mr | n) | Life Stage (Juvenile | e or Adult) | Dispositio (Dead or | on Alive) | Picture No. |
| | | | | | | | | | |
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| NOTES (any additional | informatio | ו) | | | | | | | |
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Field Crew Chief: _____

Field Scientist/Technician: _____

Technical Lead: _____

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APPENDIX B: FISHERIES FIELD EQUIPMENT LIST

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| Equipment | No. Needed | Notes |
|-------------------------------------------------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Electrofishing Unit | 1 | Smith-Root LR 20 or Smith-Root LR 24. |
| Batteries for Electrofishing Unit | 3 | |
| Battery Charger for Electrofishing Unit | 2 | |
| 6' 2 Section Fiberglass Pole (for Electrofishing) | 2 | 2 section poles and telescoping poles. The telescoping poles need to be fiberglass for safety. |
| Insulated tear drop dip net (for Electrofishing) | 2 | Small and medium. |
| 11" adjustable aluminum | 2 | |
| Rattail electrode | 2 | |
| Insulated Lineman Rubber Gloves (for Electrofishing) | 3 | |
| PEDs | 2 | |
| AFD | - | |
| Water Quality Meter | 1 | YSI Model 556 or preferred model |
| Hach Model 2100P Turbidity | 1 | The meters that can be calibrated before every use |
| Extra batteries (for turbidity) | 2 | |
| Color Test Kit Model C0-1 | 2 | |
| Colibration solutions for all water | 1 | Water quality parameters collected include: water |
| quality instruments | | temp, air temp, pH, Dissolved Oxygen, Specific Conductivity, Ambient Conductivity, ORP, Turbidity, and Color. pH solutions needed include pH 4, 7, and 10. DO may need a special solution this year. Turbidity meters that are calibrated before every use are better than on a daily basis |
| Air thermometers | 1 | Only if water quality meter doesn't capture. Not glass would be preferred. |
| Minnow Traps | 20 | 20 per team |
| Cured salmon roe | * | *depends on how many minnow traps set |
| Cooler (for storing salmon roe) | 1 | 5-day coolers with wheels and handles |
| Tags (for minnow traps) | 20 | Laminated small index cards, or something similar but sturdier would be better. Holes need to be punched into card so can be tied to trap line. |
| Thin parachute cord or something similar (for minnow traps) | | For securing set traps to bank |
| Beach Seine with ¼" mesh | 1 | The 10' lighter one is more useable. 1/8" mesh would be better if possible |
| Fyke or Hoop Net with ¼" mesh | 1 | 1/8" mesh would be better if possible |
| Stakes and rebar for securing fyke and hoop nets | 6 | 6 for each team |
| Sledge (for securing fyke and hoop nets) | 1 | |
| Essence Elite Fly Fishing Outfits | 2 | Another option would be to have 1 Fly Fishing Rod Kit for each team and one nice Reel Fishing Kit for each team. Each team needs 2 rods of some sort and having the combo of fly and reel fishing would be |

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| Equipment | No. | Notes |
|-------------------------------|----------|-----------------------------------------------------|
| | Needed | best |
| Fishing line lures weights | 2 | 2 sets for each team dependent on type of rod |
| hooks and bobs | 2 | provided |
| Collapsible buckets | 2 | 2 per team. Need to be sturdy enough when filled so |
| | - | that it is safe to hold fish and will not collapse |
| Bucket buddies | 2 | Or something similar so can carry bucket while |
| | | electrofishing hands-free |
| Small aquarium net | 1 | 1 per team |
| Measuring board | 1 | For measuring juvenile fish—circular with ends work |
| | | best. |
| Cloth measuring tape | 1 | For measuring adult fish |
| Whirly bags | 20 | For taking samples |
| Alcohol | 1 bottle | For taking samples |
| Alka seltzer tabs | 1 box | |
| Collapsible yard stick | 1 | For collecting water depth |
| Retractable measuring tape | | For measuring water width—best if has nail and loop |
| | | at end so can secure on one bank |
| Fertilizer spray bottles | 2 | For sanitizing gear between sites |
| Betadyne | 1 bottle | For sanitizing gear between sites |
| Backpack frame | 1 | For carrying gear |
| Bungee cords | 2 | For securing gear to backpack frame |
| Water proof bags | 2 | Various sizes |
| Water proof gun bag | 1 | For seine and electrofishing poles |
| Tote boxes | 2 | For holding fish gear and waders in trucks. Need to |
| | | be small enough to fit on helicopter |
| Small crescent wrench | 1 | To fit the electrode ring screw |
| Leatherman | 2 | 2 per team |
| Parachute cord | 1 roll | Extra for each team |
| Rite in the Rain Notebook and | 1 | 1 per team per month and extra pens |
| pens | | |
| Vvaterproof digital camera | 1 | 1 for each team |
| Flagging tape | 1 | PINK |
| Polarized sunglasses | 8 | 2 per person |
| Zin look hare | 1 | Multiple sizes |
| Zip lock bags | 2 | |
| Garbage bags | 1 | |
| Hand sanitizer | 1 | |
| Cliphoard | 2 | |
| | 2 | |
| Exite Datteries | ∠ 1 | |
| Duct topo | 1 | |
| Tarp | 2 | 2 por toom |
| ιαιμ | 2 | |

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APPENDIX C: FISHERIES FIELD FORM QA/QC CHECKLIST

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This form is to be completed before leaving the field site.

 Feature ID:_____
 FT #_____
 Date:_____

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- □ Was ADF&G contacted before conducting any work in this area?
- □ Site Description complete? (Every cell must have entry or N/A)
- □ Were all photos taken and labeled correctly?

2. Physical/Chemical Attributes

- □ Calibration performed prior to sampling?
- Deprivation Physical/Chemical attributes complete? (Every cell must have entry or N/A)
- □ Water quality data within expected ranges?
 - □ pH: 4.0 10.0
 - □ NTU: 0 3000
 - □ DO (mg/L): 1.0 15.0
 - DO (% saturation): 75- 100
 - □ Temp.: 1.0 19.0
 - □ Specific Conductance: 20 1500
- □ If outside expected ranges, was sample re-taken?
- □ Are units correct?

3. Stream Profile

- □ Stream profile view sketch included?
- □ Stream profile view captures water depth and wetted width?
- □ Stream profile view captures where efforts were made to capture fish?
- □ Plan view sketch included?

4. Methods Attributes

- □ Methods attributes complete? (Every cell must have entry or N/A)
- □ Were methods used adequate (explanation needed if no methods selected)?

5. Electrofishing Attributes

- □ Electrofishing attributes complete? (Every cell must have entry or N/A)
- □ Are units correct?

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□ Are spawning/rearing answers consistent with fish observations?

6. Fish Observations

- □ Are all fish captured/observed recorded in the Fish Observation table?
- □ Are units correct? (Fork Length (mm))
- □ Were adequate photos taken of fish captured? (Take a photo if in doubt)
- □ Were any specimens preserved?

7. General

- □ Feature ID and Field Target # are consistent on data forms, logbook entries, photos, and maps?
- All additional data in logbook captured on data form and additional photos noted?
- □ Were all additional comments on stream habitat, etc. recorded on data form?
- □ Was any gear missing/damaged for this survey or did you have any problems that should require resampling of this stream for an adequate survey effort?

By signing below, I verify that all field data for this site has been verified for accuracy and completeness.

| Х | X |
|-----------------------------|-----------|
| Fisheries Biologist (print) | Signature |
| | |
| | |
| Х | Х |
| Field Crew Chief (print) | Signature |

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APPENDIX D: FIELD TARGET MAPS



| Manage of | — Dalton Highway | | | | | | | | | |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------|-------|----------------|--------------------------|---------|------|------------|----------------|
| 0-010-04 | ALASKA LNG | TCS | | | 2013 | ALASKA FISH FIELD TAP | | IONS | | |
| SCUNG SUC | NOTES: Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG have assume an Isihility to any other note for any corresponding on the data was drawing. This may must be interfoldied | oex TCS | MOJECTION AK ALB | NAD83 | CONTRACTOR NO. | URS ALAS | ка | | MAP NUMBER | ⁸⁶⁶ |
| A38216 | at full scale (100%) in order for the scale to remain correct. | - | 1:1,400,0 | 00 07 | Feb 2014 | 226221163 | 11 X 17 | | | |

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APPENDIX E: MARCH CHART

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March Chart for Fish Stream Surveys

| | Team # | Proposed Dates | Field Target # | Pipeline Milepost * | Latitude | Longitude | Distance from Hwy (mi) | Distance from TAPS (mi) | Distance from Camp (mi) | Method of Access (Pedestrian/ Vehicular/ Helicopter) | Land Owner | Access Road | Notes on Access to Parcel | Spread | Lodging |
|----|-----------|-------------------|-------------------|---------------------------|---------------|-------------|---------------------------------|----------------------------------|----------------------------------|------------------------------------------------------------------|---------------|----------------|------------------------------------|---------|-----------|
| | F51 | 6/19/2013 | Travel to | Fairbanks | | | | | | | | | | | Fairbanks |
| | F51 | 6/20/2013 | Training in | n Fairbank | S | | | | | | | | | | Fairbanks |
| | F51 | 6/21/2013 | Training in | n Fairbank | S | | | | | | | | | | Fairbanks |
| | F51 | 6/22/2013 | Training in | n Fairbank | S | | | | | | | | | | Fairbanks |
| | F51 | 6/23/2013 | Training in | n Fairbank | S | | | | | | | | | | Fairbanks |
| | F51 | 7/27/2013 | Travel to | Deadhorse | e for any cre | w members n | ot on Lak | e Survey | | T | | | | | Deadhorse |
| 1 | F51 | 7/28/2013 | PT054 | PT 28.5 | 70.15224 | -147.42476 | NA | NA | 24.2 | Helicopter | | | | PB - PT | Deadhorse |
| 2 | F51 | 7/28/2013 | AL55 | 94.7 | 69.04582 | -148.85351 | 0.8 | NA | 83.7 | Vehicle | | | | AP - PB | Deadhorse |
| 3 | F51 | 7/29/2013 | AL57 | 99.8 | 68.97728 | -148.88881 | 1.14 | 1.08 | 87.7 | Vehicle | | | | AP - PB | Deadhorse |
| 4 | F51 | 7/29/2013 | AL57.1 | 99.9 | 68.97641 | -148.88931 | 1.13 | 1.07 | 87.7 | Vehicle | | | | AP - PB | Deadhorse |
| 5 | F51 | 7/30/2013 | AL58 | 101.1 | 68.95828 | -148.89263 | 0.62 | 0.56 | 89 | Vehicle | | | | AP - PB | Deadhorse |
| 6 | F51 | 7/30/2013 | AL61 | 103.5 | 68.92547 | -148.89730 | 1 | 0.47 | 91 | Vehicle | | | | AP - PB | Deadhorse |
| 7 | F51 | 7/31/2013 | AL67 | 107.6 | 68.86916 | -148.88080 | 0.63 | 0.51 | 94.8 | Vehicle | | | | AP - PB | Deadhorse |
| 8 | F51 | 7/31/2013 | AL68 | 108 | 68.86194 | -148.87362 | 0.7 | 0.49 | 95.3 | Vehicle | | | | AP - PB | Deadhorse |
| 9 | F51 | 8/1/2013 | AL70 | 109.3 | 68.84350 | -148.85988 | 0.9 | 0.71 | 97.3 | Vehicle | | | | AP - PB | Deadhorse |
| 10 | F51 | 8/1/2013 | AL70.3 | 122.2 | 68.69574 | -149.07928 | 0.31 | 0.16 | 109.9 | Vehicle | | | | AP - PB | Deadhorse |
| | F51 | 8/2/2013 | Stand dov | vn day | | | | | | | | | | | Deadhorse |
| 11 | F51 | 8/3/2013 | AL70.4 | 125.5 | 68.67677 | -149.18835 | 0.03 | NA | 113.2 | Vehicle | | | | AP - PB | Deadhorse |
| 12 | F51 | 8/3/2013 | AL70.6 | 126.8 | 68.66740 | -149.23773 | 0.03 | NA | 114.6 | Vehicle | | | | AP - PB | Deadhorse |
| 13 | F51 | 8/4/2013 | AL70.8 | 128.8 | 68.65119 | -149.30622 | 0.03 | NA | 116.7 | Vehicle | | | | AP - PB | Deadhorse |
| 14 | F51 | 8/4/2013 | AL131.1A | 164.8 | 68.22260 | -149.40916 | 0.05 | NA | 153.4 | Vehicle | | | | AP - PB | Deadhorse |
| | F51 | 8/5/2013 | Travel to | Coldfoot | | | | | | | | | | | Coldfoot |

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| | Team # | Proposed Dates | Field Target # | Pipeline Milepost * | Latitude | Longitude | Distance from Hwy (mi) | Distance from TAPS (mi) | Distance from Camp (mi) | Method of Access (Pedestrian/ Vehicular/ Helicopter) | Land Owner | Access Road | Notes on Access to Parcel | Spread | Lodging |
|----|-----------------------------------|-------------------|-------------------|---------------------------|----------|------------|---------------------------------|----------------------------------|----------------------------------|------------------------------------------------------------------|---------------|----------------|------------------------------------|---------|----------------|
| 15 | F51 | 8/6/2013 | AL241 | 280.9 | 66.81870 | -150.62810 | 0.85 | 0.75 | 35.8 | Vehicle | | | | PC - AP | Coldfoot |
| 16 | F51 | 8/6/2013 | AL242 | 281.5 | 66.81176 | -150.63254 | 1.08 | 0.9 | 36.4 | Vehicle | | | | PC - AP | Coldfoot |
| 17 | F51 | 8/7/2013 | AL243 | 282.2 | 66.80420 | -150.64427 | 0.8 | 0.65 | 37.1 | Vehicle | | | | PC - AP | Coldfoot |
| 18 | F51 | 8/7/2013 | AL245.1 | 284.3 | 66.77437 | -150.66561 | 0.65 | 0.33 | 39.5 | Vehicle | | | | LI - PC | Coldfoot |
| | F51 | 8/8/2013 | Travel to ' | Yukon Cro | ssing | | | | | | | | | | Yukon Crossing |
| 19 | F51 | 8/9/2013 | AL259 | 312.9 | 66.40962 | -150.55202 | 0.1 | NA | 45.4 | Vehicle | | | | LI - PC | Yukon Crossing |
| 20 | F51 | 8/9/2013 | AL260 | 313.1 | 66.40616 | -150.54156 | 0.1 | NA | 45 | Vehicle | | | | LI - PC | Yukon Crossing |
| | F51 8/10/2013 Travel to Fairbanks | | | | | | | Fairbanks | | | | | | | |

* Mileposts along the Prudhoe Bay to Point Thomson route displayed with PT.

LI = Livengood

PC = Prospect Creek

AP = Atigun Pass

PB = Prudhoe Bay

PT = Pt. Thomson

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APPENDIX F: JOB SAFETY ANALYSIS

Job Safety Analysis – Alaska LNG Field Studies 2013

Work Around Water – Fish Stream Investigations

JSAs are living documents that identify potential hazards, and provide written safe work procedures to avoid the hazards. JSA are reviewed and discussed prior to, throughout, and after work to identify hazards or changing work conditions to assess adequacy of mitigation procedures. The continued refinement of job safety is a responsibility shared by all who participate in work activities specific to the JSA.

Field Crew Chiefs are to ensure that the entire crew shares the burden of carrying equipment and alternating which equipment is carried to their respective survey sites. This will reduce strain and potential injuries.

| Project Number/Name: | LNG/26221163 |
|---------------------------------------------------|------------------------------------------|
| Job/Task Description (What am I about to do?): | Conduct fish stream field investigations |

| | Task: Fish Stream Surveys | | | | | |
|------------------------------------------------|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
| Major Job Steps (What am I about to do?) | Hazards and Consequences (What could go wrong?) | Requirements to Eliminate or Reduce Hazards (What could be done to make it safer?) | | | | |
| Remote field work | Loss of contact during field work | Obtain and maintain reliable contact information for all team members. Verify employees have appropriate qualifications and training. | | | | |
| | Emergency management problems | Review Emergency Response procedures Discuss reporting procedures (report all incidents immediately) For each route and destination, know hospital locations Confirm weather and fire forecast prior to departure Review requirements for driving on project business Daily vehicle inspection Seat belts must be worn by all occupants Minimize distractions to driver (conversations, music, etc.) – driver may not use a cell phone while operating vehicle Headlights on at all times Speed limits adhered to at all times Rules for overtaking or being passed on the road Minimize speed and exercise caution when driving of slick muddy roadways when watered for road maintenance. Avoid standing on gravel roadway prism when vehicles are passing due to thrown debris (ie., gravel) | | | | |

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| Task: Fish Stream Surveys | | | | | |
|------------------------------------------------|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
| Major Job Steps (What am I about to do?) | Hazards and Consequences (What could go wrong?) | Requirements to Eliminate or Reduce Hazards (What could be done to make it safer?) | | | |
| | (weathered-in) with delay in response | At least two persons trained in first aid / Cardiopulmonary Resuscitation. Survival equipment and supplies must accompany the crew at all times. Required minimum survival equipment to be carried by each crew member: • Personal medication and eyewear; • Lunch plus extra food; • Water; • Sunblock cream; and • Extra clothing. Equipment to be carried and shared by each crew at remote locations: • First aid kit; • Field guides and maps; • Compass; • Global Positioning System (GPS) unit; • Binoculars; • Communication equipment; • Insect repellent and/or bug jackets; • Mirror; • Knife; and • Whistle. If helicopter leaves crew, an emergency duffel will be left at drop-off with: • Wilderness First Aid Kit; • Four-season tent; • "Space" blankets (one per person); • Water purification tablets; • Extra food (stored in bear canister); • Waterproof matches; • Rope; • Flashlight; • Extra batteries; and • Plastic bags. | | | |
| Long days in field | Fatigue, cold exposure, weather variability | Limit work shifts to account for hours associated with travel (12 hours). Take adequate rests if feeling exerted. Drink water. For walking activity, minimum of ½-liter per hour. Be observant of indications of cold stress or heat injury symptoms (shivering, numbness, disorientation, tiredness, dizziness, headache, and fatigue). If noticed or felt, notify others immediately. Workers should be prepared for both hot and cold stress situations. Wear appropriate clothing for the weather conditions. | | | |

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| | Task: Fish Stream Surveys | | | | | |
|------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
| Major Job Steps (What am I about to do?) | Hazards and Consequences (What could go wrong?) | Requirements to Eliminate or Reduce Hazards (What could be done to make it safer?) | | | | |
| | | Warm up when chilled. Take breaks to warm-up as appropriate for the conditions. Stay dry: change wet clothing. | | | | |
| Attire | Exposure to sun, rain, temperature extremes | Stay dry; change wet clothing. Stay dry; change wet clothing. Suspend work in extreme conditions including but no limited to: temperature, wind chill less than -20 degree Fahrenheit or precipitation which poses potential for hypothermia; lightning, and poor visibility. Required minimum attire: A water-resistant outer layer to protect against th wind and allow some ventilation. A middle layer of wool or synthetic fabric to insulate against body heat loss while permitting body moisture to evaporate. An inner layer of synthetic weave Footgear that is impervious and insulated with extra tough soles to protect against cold, wet, an walking hazards Recommended: sunglasses and brimmed hard h High visibility vest and safety glasses at all times Working near water: Personal flotation device (PFD) for working from boats Working near noise: Hearing protection Any possibility of hunters in the area | | | | |
| Walking and wading along shoreline and in shallow water | Slip and trips on rocks or soil | Wear high-traction footwear and full coverage abrasion-resistant clothing. Do not step on slippery rocks. Maneuver carefully and slowly as to not to lose balance. Shoreline sampling and wading must be conducted with a buddy at all times. When wading in muddy bottoms, always place and retrieve footing vertically, avoiding twisting motions of upper body and knees. | | | | |
| | Drowning (shoreline locations) | Assess hazards at each location: slope of shoreline, stability of footing, flow velocity or proximity to high flow sections of the river (steep shores, boulders, woody debris, clay substrates and areas in or near high flow velocity should be avoided). If bank or shoreline drops off steeply and work is above, immediately adjacent to, or within 6 feet of water that is more than 3 feet deep, or water where a drowning hazard exists (e.g., fast-moving stream, water body with soft bottom creating entrapment hazard), a PFD must be worn and a life-saving boat with trained operator must be immediately | | | | |

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|------------------------------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
| Major Job Steps (What am I about to do?) | Hazards and Consequences (What could go wrong?) | Requirements to Eliminate or Reduce Hazards (What could be done to make it safer?) | | | |
| | | available. | | | |
| Walking/hiking | Slips/Trips/Falls | Maintain continuous situational awareness at all times. Move at a prudent pace. Look ahead, concentrate on your path, don't move in a direction where you're not looking. Stop to view or talk. Choose a route that is clear of obstacles and hazards. Do not step in areas that may have hidden hazards (holes covered by grass, water etc.) – use a walking stick to probe areas not previously traversed Always wear required footwear. Maintain good housekeeping in Field Camp and at field work sites | | | |
| Working over or within 6 feet of water which is more than 3-feet- deep | Drowning or hypothermia due to falling in the water | Strict buddy system when working near or over water, with buddy located in the immediate area. USCG approved flotation required when working from boat or floating helicopter on a lake more than 20 feet from shore Type III PFD required when working within 6 feet of water more than 3-feet-deep. Crew members must carry spare set of clothing into the field if working near water. Safety equipment on inflatable boats will include: Alternate means of propulsion (oars or paddles); Air horn and / or rescue whistle; Two-way communication system with shore crew; Waterproof flashlight; Bailer; Duct tape; and Rescue rope in throw bag. | | | |
| Using sharp hand tools | Cut by blade or sharp edge | With the exception of ceramic blade knives used for tubing, fixed open blade knives are not generally allowed. Always wear leather work gloves when using a cutting tool Inspect bladed tools for damage or defects before use. Receive proper training in tool use. Only use tool for the task it was designed for. | | | |
| Helicopter | Noise, physical, | Always adhere to mandatory pre-flight safety | | | |
| Transport | equipment damage | protocols provided by pilots for all passengers. Hearing protection (ear plugs) is required at all | | | |

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| Task: Fish Stream Surveys | | | | |
|------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Major Job Steps (What am I about to do?) | Hazards and Consequences (What could go wrong?) | Requirements to Eliminate or Reduce Hazards (What could be done to make it safer?) | | |
| Material Handling | Cuts and abrasions | times when helicopter is operating. Always secure loose and light items on ground surfaces (including clothing) to prevent airborne or shifting materials from rotor wash. Always place field gear well outside the potential influence of rotor wash. Fully secure all loose lines or tethers (minnow traps or fishing gear prior to loading helicopter. Wear work gloves to prevent cuts and abrasions | | |
| | | from sharp or pointed vegetation and when moving materials. | | |
| | Back and muscle strains | Backpack - ideally not to exceed 35 pounds (maximum 50 pounds). Get help donning packs. Prohibit individual lifting of large, heavy or cumbersome items. Get help lifting crates, bins and equipment. Practice proper lifting technique. Use material handling/lifting equipment if possible. The Crew Chief will approve all manual loads as appropriate for the terrain, distance, and individual team member's capacity. Tools/materials may be carried in the hands for short distances only on clear established paths. Walk entire length of travel path for adequate assessment prior to load transport. All attempts will be made to not carry materials in the hands when traversing cross-country. | | |
| Wildlife | Encounters with bears and other large wildlife Mosquitoes, flies and | Control of food and food wastes (wrapped and dispose of properly). Observation of any tracks. Stay in groups of two minimum when hiking or moving across the site or in the adjacent areas. Strict adherence to the buddy system is required for all activities outside Field Camp Noise is an effective measure for wildlife avoidance; therefore constant conversation should be maintained. Periodic use of a whistle is also an effective means of avoiding wildlife and warning other crew members when an animal is sited. If a bear is encountered, leave the area. Don't panic. | | |
| | other biting insects | Ose near nets and/or insect repellent when mosquitoes or other biting insects are present. Insect repellent containing DEET should be applied only to clothing and should not be applied directly to the skin. | | |
| Prepare for | Working without proper | • PFD required while electrofishing – no exceptions. | | |

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|------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Major Job Steps (What am I about to do?) | Hazards and Consequences (What could go wrong?) | Requirements to Eliminate or Reduce Hazards (What could be done to make it safer?) | | |
| electrofishing | equipment and training | All crew members will wear safety-toed composite chest or hip waders to insulate the wearer from electric shock. Breathable waders are not allowed for electrofishing. Steel-toed safety waders are prohibited. Footwear will be equipped with non-slipped safety soles. All crew members (shockers and netters) must wear lineman's gloves. Extra dry clothing is required; change clothes if they become wet. Backpacks will have quick-release belt and shoulder straps. All crew members must be trained or thoroughly oriented on site prior to start of operations. The on-off switch must be readily accessible. All equipment must be equipped with a tilt switch that opens the circuit if the operator falls. Electrode handles will be constructed of a nonconductive material and long enough to avoid hand contact with water and include an immersion sensor. | | |
| Electrofishing | Electric shock | Crew communications will be reviewed daily Electrofishing will not be conducted in water deeper than hip height Gloves and waders must be visually inspected for punctures before each use and will be replaced or repaired if tears or punctures are evident. All external wiring, cables, and connectors will be visually inspected for physical damage or corrosion daily before each use. The mechanical operation of safety switches will be conducted daily prior to energizing the equipment. Manual switches activating the anode may not be bypassed or taped down. All equipment must be turned off before making any connections or replacing parts, or performing repairs. No unprotected part of the body may make contact with the water when electrofishing equipment is operating. Do not touch metallic part of electrode. Electrodes will never be energized unless immersed in water. | | |
| Emergency preparedness | Not having emergency equipment or | An AED will be on site At least two AED-trained personnel will be present | | |

| Alaska LNG | STREAM FISH INVESTIGATIONS FIELD STUDY PROTOCOLS AND EXECUTION PLAN | USAKE-UR-SPFLD-00-0001 October 2013 Revision: 1 |
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| Task: Fish Stream Surveys | | | | |
|----------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Major Job Steps (What am I about to do?) | Hazards and Consequences (What could go wrong?) | Requirements to Eliminate or Reduce Hazards (What could be done to make it safer?) | | |
| | procedures, leading to greater severity of shock injuries | at all times during electrofishing. Training will be on the specific AED used in the field. If anyone falls, the operation will stop immediately. Wet clothes must be changed immediately. If water enters waders or gloves, stop work, don dry clothing, and patch or replace insulated garments as necessary. If a crew member is shocked: Switch off electrodes; Switch off emergency on / off stop; Remove electrodes from water; Administer first aid; Loss of consciousness always requires evaluation by a doctor. Incidents and Near Misses will be reported and analyzed for root cause. Corrective action will be implemented prior to resuming operations. | | |
| Staff briefed on JSA (What have I done to communicate the hazards?): | | | | |
| Field Crew Chief | | | | |
| Field Crew Technician | | | | |
| GIS Technician | | | | |
| Bear Guard | | | | |
| Analysis Prepared | By: | Date: | | |