**Hilcorp Alaska, LLC**

Post Office Box 244027
Anchorage, AK 99524-4027

3800 Centerpoint Drive
Suite 1400
Anchorage, AK 99503

Phone: 907/777-8300
Fax: 907/777-8301

March 22, 2017

Geoff Merrell
State On-Scene Coordinator
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, AK 99501

Re: Middle Ground Shoal Platform, Natural Gas Pipeline Release
Middle Ground Shoal Gas Leak Sampling and Monitoring Plan Summary Report
Sampling Period #1 ending 03/21/2017

Dear Mr. Merrell:

Hilcorp Alaska, LLC ("Hilcorp") submitted the Middle Ground Shoal Gas Leak Sampling and Monitoring Plan ("Plan") to the Department of Environmental Conservation ("Department") on March 8. 2017. Preliminary approval to implement the Plan was provided by the Department on March 10, 2017. As described in Section 3.2 of the Plan, Hilcorp is submitting this first weekly summary report to the Department.[1]

As reported below, the first round of water quality sampling showed a small and localized reduction in dissolved oxygen concentrations. The lowest dissolved oxygen reading observed was well above the water quality standard. The sampling also showed low dissolved methane concentrations consistent with the initial modeling estimates that Hilcorp provided to the Department on February 20, 2017. There has been no observed impact on fish, marine mammals, or other wildlife and this initial round of monitoring results indicates no such impacts are likely to occur.

**Background Sampling – Air Quality Update:**

On March 16, 2017, Hilcorp submitted background data to the Department that included field parameter measurements collected within the Cook Inlet between March 2 and March 7, 2017. The report referenced pending ambient air sample results for methane, carbon dioxide (CO2), and total volatile organic compounds (TVOC). Laboratory results for these ambient air samples are provided in Attachment A.

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1 In an effort to provide data to the Department as quickly as possible, a complete and thorough quality control evaluation has not been completed at this time. Hilcorp, with its consultants, will continue to evaluate data quality and will notify the Department of any significant issues as soon as possible.

Ambient air sample CO2 concentrations ranged between 396 - 409 ppmV, whereas methane concentrations ranged between 1.60 - 2.33 ppmV. These concentrations are consistent with known and expected background concentrations according to information published by Environmental Protection Agency (https://www.epa.gov/climate-indicators/climate-change-indicators-atmospheric-concentrations-greenhouse-gases).

Acetone was detected in three ambient air samples with concentrations ranging between 4.23 - 6.55 ppbV. Acetone is not a component of methane. Natural and anthropogenic sources of acetone can be as high as 6.9 ppb according to information published by the Center for Disease Control (https://www.atsdr.cdc.gov/toxprofiles/tp21-c5.pdf).

**Ice Monitoring:**

Hilcorp continues to monitor ice conditions in the area of the gas leak using helicopter overflights and platform observations. Observations are compared to the National Oceanic and Atmospheric Administration (NOAA) ice forecasts. Ice conditions are monitored daily as conditions allow and updates are provided to the Department via Situation Reports. Hilcorp anticipates ice conditions to continue to improve with forecasted warmer weather conditions.

**Fish and Wildlife Monitoring:**

On three dates (March 9, 17, and 20, 2017), one CISPRI protected species observer and one wildlife observer professional from International Bird Rescue conducted extended overflights of approximately 20 square miles surrounding the gas leak location (within a 5-mile diameter circle). Flight conditions and visibility were good during all flights. An additional overflight attempt was attempted on March 15, however, weather conditions did not allow for a helicopter flight. During the three successful fish and wildlife monitoring overflights no marine mammals, birds, or fishes were observed within the 20 square mile area. Wildlife observer reports are provided in Attachment B.

The next fish and wildlife monitoring events are planned for March 22, 29, and 31, 2017. Overflight dates for April will be determined at a later date. Fish and wildlife monitoring will continue for two weeks after completion of the pipeline repair.

**Water Quality Sampling:**

Water quality sampling was conducted on Saturday, March 18, and Sunday, March 19, 2017. The water quality buoy was successfully deployed four times in the area of the gas leak. The buoy was equipped with sensors at depths of 2, 7 and 12.5 meters below the water surface. GPS coordinates indicate the buoy traversed within 13 meters of the reported gas leak coordinates. The highest methane concentration detected was 0.15 mg/L (0.45%) at a depth of 7 meters below the surface. The lowest dissolved oxygen concentration was 7.8 mg/L at a depth of 12.5 meters below the surface. For reference, the State's most protective water quality standard for dissolved oxygen is 6 mg/L. No violations of water quality standards were identified.

Three four-gas meters were used to monitor air conditions continuously to establish a safe work zone during vessel-based sampling efforts. Lower Explosive Limit (LEL) readings from the meters did not exceed 0% during either sampling event.

A summary report and additional safety documentation for the water quality sampling efforts are provided in Attachment C. The next water quality sampling effort is planned to occur on Thursday, March 23, 2017, conditions permitting.

**Air/Water Interface Sampling:**

The air/water interface sampling equipment and specialists arrived in Nikiski, Alaska on March 21, 2017. The specialists have begun working to quickly assemble and calibrate the buoy for deployment. The first air/water interface buoy sampling effort is scheduled for Friday, March 24, 2017, conditions permitting.

**Acoustic Monitoring:**

Acoustic monitoring equipment has been ordered and is expected to arrive in Nikiski, Alaska by March 25, 2017. Monitoring efforts are scheduled for Sunday, March 26, 2017, conditions permitting.

If you have any questions or concerns regarding this letter, please feel free to contact either myself or the appropriate Hilcorp staff member as we continue to work with you on our ongoing response to this event.

Sincerely,

William G. Britt, Jr.
Environmental Manager

Attachments:

Attachment A: Background Sampling – Air Quality Update
Attachment B: Fish and Wildlife Monitoring Summary Report
Attachment C: Water Quality Sampling Summary Report

# ATTACHMENT A

# BACKGROUND SAMPLING – AIR QUALITY UPDATE

# Atmospheric Analysis & Consulting, Inc.

| | |
|---|---|
| CLIENT | : SLR International Corporation |
| PROJECT NAME | : Hilcorp Methane Pipeline Release |
| PROJECT NUMBER | : 105.00874.17021 |
| AAC PROJECT NO. | : 170309 |
| REPORT DATE | : 3/20/2017 |

On March 10, 2017, Atmospheric Analysis & Consulting, Inc. received six (6) Six-Liter Summa Canisters for Methane and Carbon Dioxide analysis by EPA 25. Upon receipt, the samples were assigned unique Laboratory ID numbers as follows:

| Client ID | Lab No. | Initial Pressure (mmHg) |
|---|---|---|
| B0 Field Blank | 170309-97418 | 3.1 |
| B1 | 170309-97419 | 737.3 |
| B2 | 170309-97420 | 631.9 |
| B3 | 170309-97421 | 669.8 |
| B4 | 170309-97422 | 609.5 |
| B5 | 170309-97423 | 598.1 |

All of the analyses mentioned above were performed in accordance with AAC's ISO/IEC 17025:2005 and NELAP approved Quality Assurance Plan. For detailed information pertaining to specific EPA, NCASI, ASTM and SCAQMD accreditations (Methods & Analytes), please visit our website at www.aaclab.com.

I certify that this data is technically accurate, complete, and in compliance with the terms and conditions of the contract. No problems were encountered during receiving, preparation, and/or analysis of these samples. The Laboratory Director or his/her designee, as verified by the following signature, has authorized release of the data contained in this hardcopy report.

If you have any questions or require further explanation of data results, please contact the undersigned.

Marcus Hueppe
Laboratory Director

This report consists of 4 pages.



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# Atmospheric Analysis & Consulting, Inc.

## *Laboratory Analysis Report*

**CLIENT** : **SLR International Corporation**
**PROJECT NO.** : **170309**
**MATRIX** : **AIR**

**SAMPLING DATE** : **03/07/2017**
**RECEIVING DATE** : **03/10/2017**
**ANALYSIS DATE** : **03/10-17/2017**
**REPORT DATE** : **03/20/2017**

### *Carbon Dioxide and Methane by EPA 25*

| Client ID | B0 Field Blank | B1 | B2 |
|---|---|---|---|
| AAC ID | 170309-97418 | 170309-97419 | 170309-97420 |
| Can Dilution Factor | 1.00 | 1.38 | 1.61 |
| Analyte | Result | Result | Result |
| $CH_4$ | < 1.0 ppmV | 2.0 ppmV | 1.7 ppmV |
| $CO_2$ | < 10.0 ppmV | 401 ppmV | 398 ppmV |

| Client ID | B3 | B4 | B5 |
|---|---|---|---|
| AAC ID | 170309-97421 | 170309-97422 | 170309-97423 |
| Can Dilution Factor | 1.53 | 1.67 | 1.75 |
| Analyte | Result | Result | Result |
| $CH_4$ | 1.8 ppmV | 2.3 ppmV | 1.6 ppmV |
| $CO_2$ | 409 ppmV | 402 ppmV | 396 ppmV |

*Sample Reporting Limit (SRL) is equal to Reporting Limit x Analysis Dil. Fac x Canister Dil. Fac*

Marcus Hueppe
Laboratory Director



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## *Quality Control/Quality Assurance Report*

| | | | |
|---|---|---|---|
| **Date Analyzed** | **: 03/10/2017** | **Instrument ID** | **: GCTCA#2** |
| **Analyst** | **: CNG** | **Calb Date** | **: 01/03/17** |
| **Units** | **: ppm** | **Reporting Limit** | **: 10 ppm** |

**I - Opening Continuing Calibration Verification - EPA 25Mod**

| AAC ID | Analyte | $CO_2$ | $CH_4$ | CO |
|---|---|---|---|---|
| CCV | Spike Conc | 214.4 | 214.2 | 212.0 |
| | Result | 219.9 | 221.5 | 219.0 |
| | % Rec * | 102.6 | 103.4 | 103.3 |

**II - Method Blank - EPA 25Mod**

| AAC ID | Analyte | $CO_2$ | $CH_4$ | CO |
|---|---|---|---|---|
| MB | Concentration | ND | ND | ND |

**III - Laboratory Control Spike & Duplicate - EPA 25Mod**

| AAC ID | Analyte | $CO_2$ | $CH_4$ | CO |
|---|---|---|---|---|
| Lab Control Standards | Sample Conc | 0.0 | 0.0 | 0.0 |
| | Spike Conc | 214.4 | 214.2 | 212.0 |
| | LCS Result | 214.0 | 212.8 | 211.1 |
| | LCSD Result | 215.7 | 216.4 | 213.7 |
| | LCS % Rec * | 99.8 | 99.3 | 99.6 |
| | LCSD % Rec * | 100.6 | 101.0 | 100.8 |
| | % RPD *** | 0.8 | 1.7 | 1.2 |

**IV - Closing Continuing Calibration Verification - EPA 25Mod**

| AAC ID | Analyte | $CO_2$ | $CH_4$ | CO |
|---|---|---|---|---|
| CCV | Spike Conc | 214.4 | 214.2 | 212.0 |
| | Result | 222.6 | 222.5 | 221.1 |
| | % Rec * | 103.8 | 103.9 | 104.3 |

** Must be 85-115%*

*** Must be 75-125%*

**** Must be < 25%*

*ND = Not Detected*

*<RL = less than Reporting Limit*

Marcus Hueppe
Laboratory Director



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SLR International Corporation
2700 Gambell St. Suite 200
Anchorage, AK 99503
Phone (907) 222-1112
Fax (907) 222-1113

#170309

Lab Project No: _____

Page 1 of 1

SLR

## Chain of Custody / Analysis Request Form

| Client Name | Project Name | Analysis Requsted | Send Report to: |
|---|---|---|---|
| SLR International Corporation | Hilcorp Methane Pipeline Release | | SLR International Corp. |
| Project Mgr (Print Name): Julie Hoffman | Project Number: 105.00874.17021 | | Attn: Brad Broker |
| Sampler's Name (Print Name): Matt Woods | Sampler's Signature: | | bbroker@slrconsulting.com |
| | | | Phone#: 907-264-6974 |

| Lab Sample No. | Date Sampled | Start Time | End Time | Sample ID / Description | Type / No. Containers | CO2 | CH4 | VOCs TO-15 | | | | Send Invoice to: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000830 | — | — | — | ~~B0~~ Field Blank | Summa / 1 | X | X | X | 97418 | | | |
| 000826 | 3/7/17 | 0944 | 1047 | B1 | Summa / 1 | X | X | X | 97419 | | | Attn: Brad Broker |
| 000828 | 3/7/17 | 1123 | 1223 | B2 | Summa / 1 | X | X | X | 97420 | | | bbroker@slrconsulting.com |
| 000849 | 3/7/17 | 1301 | 1350 | B3 | Summa / 1 | X | X | X | 97421 | | | P.O.#: 105.874.17021 |
| 000842 | 3/7/17 | 1414 | 1524 | B4 | Summa / 1 | X | X | X | 97422 | | | **Turnaround Time** |
| 000872 | 3/7/17 | 1614 | 1652 | B5 | Summa / 1 | X | X | X | 97423 | | | 24-HR _____ 5-Day _____ |
| — | — | — | not used | — | Summa / 1 | X | X | X | | | | 48-HR _____ Normal __X__ |
| | | | | | | | | | | | | Other (specify) _____ |

**Special Instructions / Remarks:**

**Please provide EDD.xls file with the emailed data report.**

| Relinquished By (Signature): | Relinquished By (Print Name): | Via Fed-Ex @ | Date / Time | Received By (Signature): | Received By (Print Name): |
|---|---|---|---|---|---|
| | Matt Woods | | 3/8/17 1327 | | |
| Relinquished By (Signature): | Relinquished By (Print Name): | Via Fed-Ex @ : | Date / Time | Received By (Signature): | Received By (Print Name): 3/8/17 0950 |

2x CANS (1x UNUSED) FEDEX
+
6x FLOWS

# Atmospheric Analysis & Consulting, Inc.

| | |
|---|---|
| CLIENT | : SLR International Corporation |
| PROJECT NAME | : Hilcorp Methane Pipeline Release |
| PROJECT NUMBER | : 105.00874.17021 |
| AAC PROJECT NO. | : 170309 |
| REPORT DATE | : 03/14/2017 |

On March 10, 2017, Atmospheric Analysis & Consulting, Inc. received six (6) Six-Liter Summa Canisters for Volatile Organic Compounds analysis by EPA method TO-15. Upon receipt each sample was assigned a unique Laboratory ID number as follows:

| Client ID | Lab ID | Return Pressure (mmHga) |
|---|---|---|
| B0 - Field Blank | 170309-97418 | 3.1 |
| B1 | 170309-97419 | 737.3 |
| B2 | 170309-97420 | 631.9 |
| B3 | 170309-97421 | 669.8 |
| B4 | 170309-97422 | 609.5 |
| B5 | 170309-97423 | 598.1 |

All of the analyses mentioned above were performed in accordance with AAC's ISO/IEC 17025:2005 and NELAP approved Quality Assurance Plan. For detailed information pertaining to specific EPA, NCASI, ASTM and SCAQMD accreditations (Methods & Analytes), please visit our website at www.aaclab.com.

I certify that this data is technically accurate, complete, and in compliance with the terms and conditions of the contract. No problems were encountered during receiving, preparation, and/or analysis of these samples. The Laboratory Director or his/her designee, as verified by the following signature, has authorized release of the data contained in this hardcopy report.

If you have any questions or require further explanation of data results, please contact the undersigned.

Marcus Hueppe
Laboratory Director

This report consists of 15 pages.



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# Atmospheric Analysis & Consulting, Inc.

## Laboratory Analysis Report

**CLIENT** : **SLR International Corporation**
**PROJECT NO** : **170309**
**MATRIX** : **AIR**
**UNITS** : **PPB (v/v)**

**DATE RECEIVED** : **03/10/2017**
**DATE REPORTED** : **03/14/2017**

### VOLATILE ORGANIC COMPOUNDS BY EPA TO-15

| *Client ID* | B0 - Field Blank | | | Sample Reporting Limit (SRL) (MRLxDF's) | B1 | | | Sample Reporting Limit (SRL) (MRLxDF's) | Method Reporting Limit (MRL) |
|---|---|---|---|---|---|---|---|---|---|
| *AAC ID* | 170309-97418 | | | | 170309-97419 | | | | |
| *Date Sampled* | NA | | | | 03/07/2017 | | | | |
| *Date Analyzed* | 03/13/2017 | | | | 03/13/2017 | | | | |
| *Can Dilution Factor* | 1.00 | | | | 1.38 | | | | |
| | **Result** | **Qualifier** | **Analysis DF** | | **Result** | **Qualifier** | **Analysis DF** | | |
| Chlorodifluoromethane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Propene | <SRL | U | 1.0 | 1.00 | <SRL | U | 1.0 | 1.38 | 1.0 |
| Dichlorodifluoromethane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Chloromethane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Dichlorotetrafluoroethane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Vinyl Chloride | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Methanol | <SRL | U | 1.0 | 5.00 | <SRL | U | 1.0 | 6.91 | 5.0 |
| 1,3-Butadiene | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Bromomethane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Chloroethane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Dichlorofluoromethane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Ethanol | <SRL | U | 1.0 | 2.00 | <SRL | U | 1.0 | 2.76 | 2.0 |
| Vinyl Bromide | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Acetone | <SRL | U | 1.0 | 2.00 | <SRL | U | 1.0 | 2.76 | 2.0 |
| Trichlorofluoromethane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| 2-Propanol (IPA) | <SRL | U | 1.0 | 2.00 | <SRL | U | 1.0 | 2.76 | 2.0 |
| Acrylonitrile | <SRL | U | 1.0 | 1.00 | <SRL | U | 1.0 | 1.38 | 1.0 |
| 1,1-Dichloroethene | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Methylene Chloride (DCM) | <SRL | U | 1.0 | 1.00 | <SRL | U | 1.0 | 1.38 | 1.0 |
| Allyl Chloride | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Carbon Disulfide | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Trichlorotrifluoroethane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| trans-1,2-Dichloroethene | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| 1,1-Dichloroethane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Methyl Tert Butyl Ether (MTBE) | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Vinyl Acetate | <SRL | U | 1.0 | 1.00 | <SRL | U | 1.0 | 1.38 | 1.0 |
| 2-Butanone (MEK) | <SRL | U | 1.0 | 1.00 | <SRL | U | 1.0 | 1.38 | 1.0 |
| cis-1,2-Dichloroethene | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Hexane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Chloroform | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Ethyl Acetate | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Tetrahydrofuran | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| 1,2-Dichloroethane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| 1,1,1-Trichloroethane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |



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# Atmospheric Analysis & Consulting, Inc.

## Laboratory Analysis Report

**CLIENT** : SLR International Corporation
**PROJECT NO** : 170309
**MATRIX** : AIR
**UNITS** : PPB (v/v)

**DATE RECEIVED** : 03/10/2017
**DATE REPORTED** : 03/14/2017

### VOLATILE ORGANIC COMPOUNDS BY EPA TO-15

| *Client ID* | B0 - Field Blank | | | Sample Reporting Limit (SRL) (MRLxDF's) | B1 | | | Sample Reporting Limit (SRL) (MRLxDF's) | Method Reporting Limit (MRL) |
|---|---|---|---|---|---|---|---|---|---|
| *AAC ID* | 170309-97418 | | | | 170309-97419 | | | | |
| *Date Sampled* | NA | | | | 03/07/2017 | | | | |
| *Date Analyzed* | 03/13/2017 | | | | 03/13/2017 | | | | |
| *Can Dilution Factor* | 1.00 | | | | 1.38 | | | | |
| | Result | Qualifier | Analysis DF | | Result | Qualifier | Analysis DF | | |
| Benzene | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Carbon Tetrachloride | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Cyclohexane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| 1,2-Dichloropropane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Bromodichloromethane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| 1,4-Dioxane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Trichloroethene (TCE) | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| 2,2,4-Trimethylpentane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Heptane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| cis-1,3-Dichloropropene | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| 4-Methyl-2-pentanone (MiBK) | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| trans-1,3-Dichloropropene | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| 1,1,2-Trichloroethane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Toluene | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| 2-Hexanone (MBK) | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Dibromochloromethane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| 1,2-Dibromoethane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Tetrachloroethene (PCE) | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Chlorobenzene | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Ethylbenzene | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| m & p-Xylenes | <SRL | U | 1.0 | 1.00 | <SRL | U | 1.0 | 1.38 | 1.0 |
| Bromoform | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Styrene | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| 1,1,2,2-Tetrachloroethane | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| o-Xylene | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| 4-Ethyltoluene | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| 1,3,5-Trimethylbenzene | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| 1,2,4-Trimethylbenzene | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Benzyl Chloride (a-Chlorotoluene) | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| 1,3-Dichlorobenzene | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| 1,4-Dichlorobenzene | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| 1,2-Dichlorobenzene | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| 1,2,4-Trichlorobenzene | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| Hexachlorobutadiene | <SRL | U | 1.0 | 0.50 | <SRL | U | 1.0 | 0.69 | 0.5 |
| BFB-Surrogate Std. % Recovery | 92% | | | | 92% | | | | 70-130% |

U - Compound was analyzed for, but was not detected at or above the SRL.

Marcus Hueppe
Laboratory Director



1534 Eastman Ave., Ste. A • Ventura, • CA 93003 www.aaclab.com • (805) 650-1642 • FAX (805) 650-1644

# Atmospheric Analysis & Consulting, Inc.

## Laboratory Analysis Report

**CLIENT** : SLR International Corporation
**PROJECT NO** : 170309
**MATRIX** : AIR
**UNITS** : PPB (v/v)

**DATE RECEIVED** : 03/10/2017
**DATE REPORTED** : 03/14/2017

### VOLATILE ORGANIC COMPOUNDS BY EPA TO-15

| *Client ID* | B2 | | | Sample Reporting Limit (SRL) (MRLxDF's) | B3 | | | Sample Reporting Limit (SRL) (MRLxDF's) | Method Reporting Limit (MRL) |
|---|---|---|---|---|---|---|---|---|---|
| *AAC ID* | 170309-97420 | | | | 170309-97421 | | | | |
| *Date Sampled* | 03/07/2017 | | | | 03/07/2017 | | | | |
| *Date Analyzed* | 03/13/2017 | | | | 03/13/2017 | | | | |
| *Can Dilution Factor* | 1.61 | | | | 1.53 | | | | |
| | Result | Qualifier | Analysis DF | | Result | Qualifier | Analysis DF | | |
| Chlorodifluoromethane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Propene | <SRL | U | 1.0 | 1.61 | <SRL | U | 1.0 | 1.53 | 1.0 |
| Dichlorodifluoromethane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Chloromethane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Dichlorotetrafluoroethane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Vinyl Chloride | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Methanol | <SRL | U | 1.0 | 8.05 | <SRL | U | 1.0 | 7.67 | 5.0 |
| 1,3-Butadiene | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Bromomethane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Chloroethane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Dichlorofluoromethane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Ethanol | <SRL | U | 1.0 | 3.22 | <SRL | U | 1.0 | 3.07 | 2.0 |
| Vinyl Bromide | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Acetone | <SRL | U | 1.0 | 3.22 | 5.63 | | 1.0 | 3.07 | 2.0 |
| Trichlorofluoromethane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| 2-Propanol (IPA) | <SRL | U | 1.0 | 3.22 | <SRL | U | 1.0 | 3.07 | 2.0 |
| Acrylonitrile | <SRL | U | 1.0 | 1.61 | <SRL | U | 1.0 | 1.53 | 1.0 |
| 1,1-Dichloroethene | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Methylene Chloride (DCM) | <SRL | U | 1.0 | 1.61 | <SRL | U | 1.0 | 1.53 | 1.0 |
| Allyl Chloride | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Carbon Disulfide | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Trichlorotrifluoroethane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| trans-1,2-Dichloroethene | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| 1,1-Dichloroethane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Methyl Tert Butyl Ether (MTBE) | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Vinyl Acetate | <SRL | U | 1.0 | 1.61 | <SRL | U | 1.0 | 1.53 | 1.0 |
| 2-Butanone (MEK) | <SRL | U | 1.0 | 1.61 | <SRL | U | 1.0 | 1.53 | 1.0 |
| cis-1,2-Dichloroethene | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Hexane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Chloroform | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Ethyl Acetate | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Tetrahydrofuran | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| 1,2-Dichloroethane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| 1,1,1-Trichloroethane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |



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## Laboratory Analysis Report

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**PROJECT NO** : 170309
**MATRIX** : AIR
**UNITS** : PPB (v/v)

**DATE RECEIVED** : 03/10/2017
**DATE REPORTED** : 03/14/2017

### VOLATILE ORGANIC COMPOUNDS BY EPA TO-15

| *Client ID* | B2 | | | Sample Reporting Limit (SRL) (MRLxDF's) | B3 | | | Sample Reporting Limit (SRL) (MRLxDF's) | Method Reporting Limit (MRL) |
|---|---|---|---|---|---|---|---|---|---|
| *AAC ID* | 170309-97420 | | | | 170309-97421 | | | | |
| *Date Sampled* | 03/07/2017 | | | | 03/07/2017 | | | | |
| *Date Analyzed* | 03/13/2017 | | | | 03/13/2017 | | | | |
| *Can Dilution Factor* | 1.61 | | | | 1.53 | | | | |
| | Result | Qualifier | Analysis DF | | Result | Qualifier | Analysis DF | | |
| Benzene | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Carbon Tetrachloride | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Cyclohexane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| 1,2-Dichloropropane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Bromodichloromethane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| 1,4-Dioxane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Trichloroethene (TCE) | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| 2,2,4-Trimethylpentane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Heptane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| cis-1,3-Dichloropropene | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| 4-Methyl-2-pentanone (MiBK) | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| trans-1,3-Dichloropropene | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| 1,1,2-Trichloroethane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Toluene | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| 2-Hexanone (MBK) | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Dibromochloromethane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| 1,2-Dibromoethane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Tetrachloroethene (PCE) | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Chlorobenzene | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Ethylbenzene | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| m & p-Xylenes | <SRL | U | 1.0 | 1.61 | <SRL | U | 1.0 | 1.53 | 1.0 |
| Bromoform | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Styrene | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| 1,1,2,2-Tetrachloroethane | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| o-Xylene | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| 4-Ethyltoluene | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| 1,3,5-Trimethylbenzene | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| 1,2,4-Trimethylbenzene | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Benzyl Chloride (a-Chlorotoluene) | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| 1,3-Dichlorobenzene | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| 1,4-Dichlorobenzene | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| 1,2-Dichlorobenzene | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| 1,2,4-Trichlorobenzene | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| Hexachlorobutadiene | <SRL | U | 1.0 | 0.81 | <SRL | U | 1.0 | 0.77 | 0.5 |
| BFB-Surrogate Std. % Recovery | 92% | | | | 93% | | | | 70-130% |

U - Compound was analyzed for, but was not detected at or above the SRL.

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Laboratory Director



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**MATRIX** : AIR
**UNITS** : PPB (v/v)

**DATE RECEIVED** : 03/10/2017
**DATE REPORTED** : 03/14/2017

### VOLATILE ORGANIC COMPOUNDS BY EPA TO-15

| *Client ID* | B4 | | | Sample Reporting Limit (SRL) (MRLxDF's) | B5 | | | Sample Reporting Limit (SRL) (MRLxDF's) | Method Reporting Limit (MRL) |
|---|---|---|---|---|---|---|---|---|---|
| *AAC ID* | 170309-97422 | | | | 170309-97423 | | | | |
| *Date Sampled* | 03/07/2017 | | | | 03/07/2017 | | | | |
| *Date Analyzed* | 03/13/2017 | | | | 03/13/2017 | | | | |
| *Can Dilution Factor* | 1.67 | | | | 1.75 | | | | |
| | Result | Qualifier | Analysis DF | | Result | Qualifier | Analysis DF | | |
| Chlorodifluoromethane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Propene | <SRL | U | 1.0 | 1.67 | <SRL | U | 1.0 | 1.75 | 1.0 |
| Dichlorodifluoromethane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Chloromethane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Dichlorotetrafluoroethane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Vinyl Chloride | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Methanol | <SRL | U | 1.0 | 8.33 | <SRL | U | 1.0 | 8.74 | 5.0 |
| 1,3-Butadiene | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Bromomethane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Chloroethane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Dichlorofluoromethane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Ethanol | <SRL | U | 1.0 | 3.33 | <SRL | U | 1.0 | 3.49 | 2.0 |
| Vinyl Bromide | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Acetone | 4.23 | | 1.0 | 3.33 | 6.55 | | 1.0 | 3.49 | 2.0 |
| Trichlorofluoromethane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| 2-Propanol (IPA) | <SRL | U | 1.0 | 3.33 | <SRL | U | 1.0 | 3.49 | 2.0 |
| Acrylonitrile | <SRL | U | 1.0 | 1.67 | <SRL | U | 1.0 | 1.75 | 1.0 |
| 1,1-Dichloroethene | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Methylene Chloride (DCM) | <SRL | U | 1.0 | 1.67 | <SRL | U | 1.0 | 1.75 | 1.0 |
| Allyl Chloride | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Carbon Disulfide | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Trichlorotrifluoroethane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| trans-1,2-Dichloroethene | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| 1,1-Dichloroethane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Methyl Tert Butyl Ether (MTBE) | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Vinyl Acetate | <SRL | U | 1.0 | 1.67 | <SRL | U | 1.0 | 1.75 | 1.0 |
| 2-Butanone (MEK) | <SRL | U | 1.0 | 1.67 | <SRL | U | 1.0 | 1.75 | 1.0 |
| cis-1,2-Dichloroethene | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Hexane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Chloroform | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Ethyl Acetate | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Tetrahydrofuran | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| 1,2-Dichloroethane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| 1,1,1-Trichloroethane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |



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**PROJECT NO** : 170309
**MATRIX** : AIR
**UNITS** : PPB (v/v)

**DATE RECEIVED** : 03/10/2017
**DATE REPORTED** : 03/14/2017

### VOLATILE ORGANIC COMPOUNDS BY EPA TO-15

| *Client ID* | B4 | | | Sample Reporting Limit (SRL) (MRLxDF's) | B5 | | | Sample Reporting Limit (SRL) (MRLxDF's) | Method Reporting Limit (MRL) |
|---|---|---|---|---|---|---|---|---|---|
| *AAC ID* | 170309-97422 | | | | 170309-97423 | | | | |
| *Date Sampled* | 03/07/2017 | | | | 03/07/2017 | | | | |
| *Date Analyzed* | 03/13/2017 | | | | 03/13/2017 | | | | |
| *Can Dilution Factor* | 1.67 | | | | 1.75 | | | | |
| | Result | Qualifier | Analysis DF | | Result | Qualifier | Analysis DF | | |
| Benzene | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Carbon Tetrachloride | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Cyclohexane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| 1,2-Dichloropropane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Bromodichloromethane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| 1,4-Dioxane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Trichloroethene (TCE) | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| 2,2,4-Trimethylpentane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Heptane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| cis-1,3-Dichloropropene | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| 4-Methyl-2-pentanone (MiBK) | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| trans-1,3-Dichloropropene | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| 1,1,2-Trichloroethane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Toluene | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| 2-Hexanone (MBK) | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Dibromochloromethane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| 1,2-Dibromoethane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Tetrachloroethene (PCE) | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Chlorobenzene | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Ethylbenzene | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| m & p-Xylenes | <SRL | U | 1.0 | 1.67 | <SRL | U | 1.0 | 1.75 | 1.0 |
| Bromoform | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Styrene | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| 1,1,2,2-Tetrachloroethane | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| o-Xylene | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| 4-Ethyltoluene | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| 1,3,5-Trimethylbenzene | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| 1,2,4-Trimethylbenzene | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Benzyl Chloride (a-Chlorotoluene) | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| 1,3-Dichlorobenzene | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| 1,4-Dichlorobenzene | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| 1,2-Dichlorobenzene | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| 1,2,4-Trichlorobenzene | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| Hexachlorobutadiene | <SRL | U | 1.0 | 0.83 | <SRL | U | 1.0 | 0.87 | 0.5 |
| BFB-Surrogate Std. % Recovery | 93% | | | | 90% | | | | 70-130% |

U - Compound was analyzed for, but was not detected at or above the SRL.

Marcus Hueppe
Laboratory Director



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**ANALYSIS DATE** : 03/13/2017 **INSTRUMENT ID** : GC/MS-03
**ANALYST** : JJG **CALIBRATION STD ID** : PS011817-01

**VOLATILE ORGANIC COMPOUNDS BY EPA METHOD TO-15**
Continuing Calibration Verification of the 01/16/2017 Calibration

| Compounds | Conc | Daily Conc | %REC* |
|---|---|---|---|
| 4-BFB (surrogate standard) | 10.00 | 10.15 | 102 |
| Chlorodifluoromethane | 10.40 | 11.39 | 110 |
| Propene | 10.90 | 11.18 | 103 |
| Dichlorodifluoromethane | 10.60 | 11.72 | 111 |
| Chloromethane | 10.30 | 10.83 | 105 |
| Dichlorotetrafluoroethane | 10.00 | 10.64 | 106 |
| Vinyl Chloride | 10.10 | 10.88 | 108 |
| Methanol | 19.00 | 24.26 | 128 |
| 1,3-Butadiene | 10.50 | 9.49 | 90 |
| Bromomethane | 10.00 | 9.39 | 94 |
| Chloroethane | 9.70 | 10.38 | 107 |
| Dichlorofluoromethane | 10.60 | 11.45 | 108 |
| Ethanol | 9.10 | 9.89 | 109 |
| Vinyl Bromide | 10.10 | 10.12 | 100 |
| Acetone | 10.60 | 8.82 | 83 |
| Trichlorofluoromethane | 10.40 | 10.56 | 102 |
| 2-Propanol (IPA) | 10.80 | 11.74 | 109 |
| Acrylonitrile | 11.50 | 11.68 | 102 |
| 1,1-Dichloroethene | 10.80 | 10.66 | 99 |
| Methylene Chloride (DCM) | 10.50 | 10.31 | 98 |
| Allyl Chloride | 11.00 | 11.78 | 107 |
| Carbon Disulfide | 10.00 | 11.06 | 111 |
| Trichlorotrifluoroethane | 10.70 | 10.79 | 101 |
| trans-1,2-Dichloroethene | 10.10 | 9.88 | 98 |
| 1,1-Dichloroethane | 10.50 | 10.62 | 101 |
| Methyl Tert Butyl Ether (MTBE) | 10.60 | 10.56 | 100 |
| Vinyl Acetate | 10.80 | 12.38 | 115 |
| 2-Butanone (MEK) | 10.60 | 10.84 | 102 |
| cis-1,2-Dichloroethene | 10.60 | 10.73 | 101 |
| Hexane | 10.50 | 10.11 | 96 |
| Chloroform | 10.90 | 11.25 | 103 |
| Ethyl Acetate | 10.90 | 12.20 | 112 |
| Tetrahydrofuran | 10.50 | 10.33 | 98 |
| 1,2-Dichloroethane | 10.60 | 11.06 | 104 |
| 1,1,1-Trichloroethane | 10.60 | 10.74 | 101 |



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**ANALYSIS DATE** : 03/13/2017 **INSTRUMENT ID** : GC/MS-03
**ANALYST** : JJG **CALIBRATION STD ID** : PS011817-01

**VOLATILE ORGANIC COMPOUNDS BY EPA METHOD TO-15**
Continuing Calibration Verification of the 01/16/2017 Calibration

| Compounds | Conc | Daily Conc | %REC* |
|---|---|---|---|
| Benzene | 10.40 | 10.34 | 99 |
| Carbon Tetrachloride | 10.80 | 11.49 | 106 |
| Cyclohexane | 10.50 | 9.93 | 95 |
| 1,2-Dichloropropane | 10.50 | 10.52 | 100 |
| Bromodichloromethane | 10.40 | 10.76 | 103 |
| 1,4-Dioxane | 10.40 | 9.97 | 96 |
| Trichloroethene (TCE) | 10.40 | 10.25 | 99 |
| 2,2,4-Trimethylpentane | 10.30 | 9.63 | 93 |
| Heptane | 10.40 | 10.13 | 97 |
| cis-1,3-Dichloropropene | 10.70 | 10.95 | 102 |
| 4-Methyl-2-pentanone (MiBK) | 10.00 | 9.82 | 98 |
| trans-1,3-Dichloropropene | 10.00 | 10.58 | 106 |
| 1,1,2-Trichloroethane | 10.40 | 10.32 | 99 |
| Toluene | 10.60 | 10.87 | 103 |
| 2-Hexanone (MBK) | 10.80 | 11.31 | 105 |
| Dibromochloromethane | 9.90 | 10.66 | 108 |
| 1,2-Dibromoethane | 10.40 | 10.61 | 102 |
| Tetrachloroethene (PCE) | 10.30 | 10.19 | 99 |
| Chlorobenzene | 10.50 | 10.41 | 99 |
| Ethylbenzene | 10.50 | 9.80 | 93 |
| m & p-Xylenes | 20.00 | 19.82 | 99 |
| Bromoform | 10.40 | 11.52 | 111 |
| Styrene | 10.30 | 10.20 | 99 |
| 1,1,2,2-Tetrachloroethane | 10.40 | 10.78 | 104 |
| o-Xylene | 10.40 | 9.70 | 93 |
| 4-Ethyltoluene | 10.00 | 10.03 | 100 |
| 1,3,5-Trimethylbenzene | 10.00 | 10.00 | 100 |
| 1,2,4-Trimethylbenzene | 9.90 | 9.85 | 99 |
| Benzyl Chloride (a-Chlorotoluene) | 9.60 | 9.42 | 98 |
| 1,3-Dichlorobenzene | 9.60 | 9.27 | 97 |
| 1,4-Dichlorobenzene | 9.80 | 9.33 | 95 |
| 1,2-Dichlorobenzene | 9.70 | 9.19 | 95 |
| 1,2,4-Trichlorobenzene | 8.80 | 8.16 | 93 |
| Hexachlorobutadiene | 9.30 | 9.03 | 97 |

* - %REC should be 70-130%

Marcus Hueppe
Laboratory Director



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## Quality Control/Quality Assurance Report

| | | | |
|---|---|---|---|
| **CLIENT ID** | **: Laboratory Control Spike** | **DATE ANALYZED** | **: 03/13/2017** |
| **AAC ID** | **: LCS/LCSD** | **DATE REPORTED** | **: 03/13/2017** |
| **MEDIA** | **: Air** | **UNITS** | **: ppbv** |

### TO-15 Laboratory Control Spike Recovery

| Compound | Sample Conc. | Spike Added | Spike Res | Dup Spike Res | Spike % Rec * | Spike Dup % Rec * | RPD** % |
|---|---|---|---|---|---|---|---|
| 1,1-Dichloroethene | 0.0 | 10.80 | 10.66 | 10.39 | 99 | 96 | 2.6 |
| Methylene Chloride (DCM) | 0.0 | 10.50 | 10.31 | 10.55 | 98 | 100 | 2.3 |
| Benzene | 0.0 | 10.40 | 10.34 | 10.21 | 99 | 98 | 1.3 |
| Trichloroethene (TCE) | 0.0 | 10.40 | 10.25 | 10.24 | 99 | 98 | 0.1 |
| Toluene | 0.0 | 10.60 | 10.87 | 10.75 | 103 | 101 | 1.1 |
| Tetrachloroethene (PCE) | 0.0 | 10.30 | 10.19 | 10.14 | 99 | 98 | 0.5 |
| Chlorobenzene | 0.0 | 10.50 | 10.41 | 10.41 | 99 | 99 | 0.0 |
| Ethylbenzene | 0.0 | 10.50 | 9.80 | 9.77 | 93 | 93 | 0.3 |
| m & p-Xylenes | 0.0 | 20.00 | 19.82 | 19.71 | 99 | 99 | 0.6 |
| o-Xylene | 0.0 | 10.40 | 9.70 | 9.68 | 93 | 93 | 0.2 |

* Must be 70-130%

** Must be < 25%

Marcus Hueppe
Laboratory Director



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## Method Blank Analysis Report

| | | | |
|---|---|---|---|
| **MATRIX** | **: AIR** | **ANALYSIS DATE** | **: 03/13/2017** |
| **UNITS** | **: ppbv** | **REPORT DATE** | **: 03/13/2017** |

**VOLATILE ORGANIC COMPOUNDS BY EPA TO-15**

| *Client ID* / *AAC ID* | Method Blank MB 031317 | RL |
|---|---|---|
| Chlorodifluoromethane | <RL | 0.5 |
| Propene | <RL | 1.0 |
| Dichlorodifluoromethane | <RL | 0.5 |
| Chloromethane | <RL | 0.5 |
| Dichlorotetrafluoroethane | <RL | 0.5 |
| Vinyl Chloride | <RL | 0.5 |
| Methanol | <RL | 5.0 |
| 1,3-Butadiene | <RL | 0.5 |
| Bromomethane | <RL | 0.5 |
| Chloroethane | <RL | 0.5 |
| Dichlorofluoromethane | <RL | 0.5 |
| Ethanol | <RL | 2.0 |
| Vinyl Bromide | <RL | 0.5 |
| Acetone | <RL | 2.0 |
| Trichlorofluoromethane | <RL | 0.5 |
| 2-Propanol (IPA) | <RL | 2.0 |
| Acrylonitrile | <RL | 1.0 |
| 1,1-Dichloroethene | <RL | 0.5 |
| Methylene Chloride (DCM) | <RL | 1.0 |
| Allyl Chloride | <RL | 0.5 |
| Carbon Disulfide | <RL | 0.5 |
| Trichlorotrifluoroethane | <RL | 0.5 |
| trans-1,2-Dichloroethene | <RL | 0.5 |
| 1,1-Dichloroethane | <RL | 0.5 |
| Methyl Tert Butyl Ether (MTBE) | <RL | 0.5 |
| Vinyl Acetate | <RL | 1.0 |
| 2-Butanone (MEK) | <RL | 1.0 |
| cis-1,2-Dichloroethene | <RL | 0.5 |
| Hexane | <RL | 0.5 |
| Chloroform | <RL | 0.5 |
| Ethyl Acetate | <RL | 0.5 |
| Tetrahydrofuran | <RL | 0.5 |
| 1,2-Dichloroethane | <RL | 0.5 |
| 1,1,1-Trichloroethane | <RL | 0.5 |
| Benzene | <RL | 0.5 |
| Carbon Tetrachloride | <RL | 0.5 |
| Cyclohexane | <RL | 0.5 |
| 1,2-Dichloropropane | <RL | 0.5 |
| Bromodichloromethane | <RL | 0.5 |
| 1,4-Dioxane | <RL | 0.5 |
| Trichloroethene (TCE) | <RL | 0.5 |
| 2,2,4-Trimethylpentane | <RL | 0.5 |
| Heptane | <RL | 0.5 |



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## Method Blank Analysis Report

| | | | |
|---|---|---|---|
| **MATRIX** | **: AIR** | **ANALYSIS DATE** | **: 03/13/2017** |
| **UNITS** | **: ppbv** | **REPORT DATE** | **: 03/13/2017** |

**VOLATILE ORGANIC COMPOUNDS BY EPA TO-15**

| *Client ID* / *AAC ID* | Method Blank MB 031317 | RL |
|---|---|---|
| cis-1,3-Dichloropropene | <RL | 0.5 |
| 4-Methyl-2-pentanone (MiBK) | <RL | 0.5 |
| trans-1,3-Dichloropropene | <RL | 0.5 |
| 1,1,2-Trichloroethane | <RL | 0.5 |
| Toluene | <RL | 0.5 |
| 2-Hexanone (MBK) | <RL | 0.5 |
| Dibromochloromethane | <RL | 0.5 |
| 1,2-Dibromoethane | <RL | 0.5 |
| Tetrachloroethene (PCE) | <RL | 0.5 |
| Chlorobenzene | <RL | 0.5 |
| Ethylbenzene | <RL | 0.5 |
| m & p-Xylenes | <RL | 1.0 |
| Bromoform | <RL | 0.5 |
| Styrene | <RL | 0.5 |
| 1,1,2,2-Tetrachloroethane | <RL | 0.5 |
| o-Xylene | <RL | 0.5 |
| 4-Ethyltoluene | <RL | 0.5 |
| 1,3,5-Trimethylbenzene | <RL | 0.5 |
| 1,2,4-Trimethylbenzene | <RL | 0.5 |
| Benzyl Chloride (a-Chlorotoluene) | <RL | 0.5 |
| 1,3-Dichlorobenzene | <RL | 0.5 |
| 1,4-Dichlorobenzene | <RL | 0.5 |
| 1,2-Dichlorobenzene | <RL | 0.5 |
| 1,2,4-Trichlorobenzene | <RL | 0.5 |
| Hexachlorobutadiene | <RL | 0.5 |
| **System Monitoring Compounds** | | |
| BFB-Surrogate Std. % Recovery | 95% | -- |

RL - Reporting Limit

Marcus Hueppe
Laboratory Director



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## Quality Control/Quality Assurance Report

| | | | |
|---|---|---|---|
| **AAC ID** | **: 170310-97424** | **DATE ANALYZED** | **: 03/13/2017** |
| **MATRIX** | **: Air** | **DATE REPORTED** | **: 03/13/2017** |
| | | **UNITS** | **: ppbv** |

### TO-15 Duplicate Analysis

| Compound | Sample Conc | Duplicate Conc | % RPD |
|---|---|---|---|
| Chlorodifluoromethane | <SRL | <SRL | 0.0 |
| Propene | <SRL | <SRL | 0.0 |
| Dichlorodifluoromethane | 0.64 | 0.64 | 0.0 |
| Chloromethane | 0.66 | 0.65 | 1.5 |
| Dichlorotetrafluoroethane | <SRL | <SRL | 0.0 |
| Vinyl Chloride | <SRL | <SRL | 0.0 |
| Methanol | <SRL | <SRL | 0.0 |
| 1,3-Butadiene | <SRL | <SRL | 0.0 |
| Bromomethane | <SRL | <SRL | 0.0 |
| Chloroethane | <SRL | <SRL | 0.0 |
| Dichlorofluoromethane | <SRL | <SRL | 0.0 |
| Ethanol | <SRL | <SRL | 0.0 |
| Vinyl Bromide | <SRL | <SRL | 0.0 |
| Acetone | <SRL | <SRL | 0.0 |
| Trichlorofluoromethane | <SRL | <SRL | 0.0 |
| 2-Propanol (IPA) | <SRL | <SRL | 0.0 |
| Acrylonitrile | <SRL | <SRL | 0.0 |
| 1,1-Dichloroethene | <SRL | <SRL | 0.0 |
| Methylene Chloride (DCM) | <SRL | <SRL | 0.0 |
| Allyl Chloride | <SRL | <SRL | 0.0 |
| Carbon Disulfide | <SRL | <SRL | 0.0 |
| Trichlorotrifluoroethane | <SRL | <SRL | 0.0 |
| trans-1,2-Dichloroethene | <SRL | <SRL | 0.0 |
| 1,1-Dichloroethane | <SRL | <SRL | 0.0 |
| Methyl Tert Butyl Ether (MTBE) | <SRL | <SRL | 0.0 |
| Vinyl Acetate | <SRL | <SRL | 0.0 |
| 2-Butanone (MEK) | <SRL | <SRL | 0.0 |
| cis-1,2-Dichloroethene | <SRL | <SRL | 0.0 |
| Hexane | <SRL | <SRL | 0.0 |
| Chloroform | <SRL | <SRL | 0.0 |
| Ethyl Acetate | <SRL | <SRL | 0.0 |
| Tetrahydrofuran | <SRL | <SRL | 0.0 |
| 1,2-Dichloroethane | <SRL | <SRL | 0.0 |
| 1,1,1-Trichloroethane | <SRL | <SRL | 0.0 |
| Benzene | <SRL | <SRL | 0.0 |
| Carbon Tetrachloride | <SRL | <SRL | 0.0 |



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## Quality Control/Quality Assurance Report

| | | | |
|---|---|---|---|
| **AAC ID** | **: 170310-97424** | **DATE ANALYZED** | **: 03/13/2017** |
| **MATRIX** | **: Air** | **DATE REPORTED** | **: 03/13/2017** |
| | | **UNITS** | **: ppbv** |

### TO-15 Duplicate Analysis

| Compound | Sample Conc | Duplicate Conc | % RPD |
|---|---|---|---|
| Cyclohexane | <SRL | <SRL | 0.0 |
| 1,2-Dichloropropane | <SRL | <SRL | 0.0 |
| Bromodichloromethane | <SRL | <SRL | 0.0 |
| 1,4-Dioxane | <SRL | <SRL | 0.0 |
| Trichloroethene (TCE) | <SRL | <SRL | 0.0 |
| 2,2,4-Trimethylpentane | <SRL | <SRL | 0.0 |
| Heptane | <SRL | <SRL | 0.0 |
| cis-1,3-Dichloropropene | <SRL | <SRL | 0.0 |
| 4-Methyl-2-pentanone (MiBK) | <SRL | <SRL | 0.0 |
| trans-1,3-Dichloropropene | <SRL | <SRL | 0.0 |
| 1,1,2-Trichloroethane | <SRL | <SRL | 0.0 |
| Toluene | <SRL | <SRL | 0.0 |
| 2-Hexanone (MBK) | <SRL | <SRL | 0.0 |
| Dibromochloromethane | <SRL | <SRL | 0.0 |
| 1,2-Dibromoethane | <SRL | <SRL | 0.0 |
| Tetrachloroethene (PCE) | <SRL | <SRL | 0.0 |
| Chlorobenzene | <SRL | <SRL | 0.0 |
| Ethylbenzene | <SRL | <SRL | 0.0 |
| m & p-Xylenes | <SRL | <SRL | 0.0 |
| Bromoform | <SRL | <SRL | 0.0 |
| Styrene | <SRL | <SRL | 0.0 |
| 1,1,2,2-Tetrachloroethane | <SRL | <SRL | 0.0 |
| o-Xylene | <SRL | <SRL | 0.0 |
| 4-Ethyltoluene | <SRL | <SRL | 0.0 |
| 1,3,5-Trimethylbenzene | <SRL | <SRL | 0.0 |
| 1,2,4-Trimethylbenzene | <SRL | <SRL | 0.0 |
| Benzyl Chloride (a-Chlorotoluene) | <SRL | <SRL | 0.0 |
| 1,3-Dichlorobenzene | <SRL | <SRL | 0.0 |
| 1,4-Dichlorobenzene | <SRL | <SRL | 0.0 |
| 1,2-Dichlorobenzene | <SRL | <SRL | 0.0 |
| 1,2,4-Trichlorobenzene | <SRL | <SRL | 0.0 |
| Hexachlorobutadiene | <SRL | <SRL | 0.0 |
| **System Monitoring Compounds** | | | |
| BFB-Surrogate Std. % Recovery | 94% | 95% | 1.5 |

SRL - Sample Reporting Limit

Marcus Hueppe
Laboratory Director



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SLR International Corporation
2700 Gambell St. Suite 200
Anchorage, AK 99503
Phone (907) 222-1112
Fax (907) 222-1113

#170309

Lab Project No: _____

Page 1 of 1

SLR

## Chain of Custody / Analysis Request Form

| Client Name | Project Name | Analysis Requested | | | | | | Send Report to: |
|---|---|---|---|---|---|---|---|---|
| SLR International Corporation | Hilcorp Methane Pipeline Release | | | | | | | SLR International Corp. |
| Project Mgr (Print Name) | Project Number | | | | | | | Attn: Brad Broker |
| Julie Hoffman | 105.00874.17021 | | | | | | | bbroker@slrconsulting.com |
| Sampler's Name (Print Name) | Sampler's Signature | | | | | | | Phone#: 907-264-6974 |
| Matt Woods | | | | | | | | |

| Lab Sample No. | Date Sampled | Start Time | End Time | Sample ID / Description | Type / No. Containers | CO2 | CH4 | VOCs TO-15 | | | | Send Invoice to: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000830 | — | — | — | ~~B0~~ Field Blank | Summa / 1 | X | X | X | 97418 | | | Attn: Brad Broker |
| 000826 | 3/7/17 | 0944 | 1047 | B1 | Summa / 1 | X | X | X | 97419 | | | bbroker@slrconsulting.com |
| 000828 | 3/7/17 | 1123 | 1223 | B2 | Summa / 1 | X | X | X | 97420 | | | P.O.#: 105.874.17021 |
| 000849 | 3/7/17 | 1301 | 1350 | B3 | Summa / 1 | X | X | X | 97421 | | | |
| 000842 | 3/7/17 | 1414 | 1524 | B4 | Summa / 1 | X | X | X | 97422 | | | **Turnaround Time** |
| 000872 | 3/7/17 | 1614 | 1652 | B5 | Summa / 1 | X | X | X | 97423 | | | 24-HR _____ 5-Day _____ |
| — | | | not used | | Summa / 1 | X | X | X | | | | 48-HR _____ Normal __X__ |
| | | | | | | | | | | | | Other (specify) _____ |

**Special Instructions / Remarks:**

**Please provide EDD.xls file with the emailed data report.**

| Relinquished By (Signature): | Relinquished By (Print Name): | Via Fed-Ex @ | Date / Time | Received By (Signature): | Received By (Print Name): |
|---|---|---|---|---|---|
| | Matt Woods | | 3/8/17 1327 | | |
| **Relinquished By (Signature):** | **Relinquished By (Print Name):** | **Via Fed-Ex @** | **Date / Time** | **Received By (Signature):** | **Received By (Print Name):** |
| | | : | | | 3/8/17 @950 |

2x CANS (1x UNUSED) FEDEX
+
6x FLOWS

# ATTACHMENT B

# FISH AND WILDLIFE MONITORING SUMMARY REPORT

# Hilcorp Cook Inlet Wildlife Survey Narratives

Thursday, March 9, 2017 Report
Michelle Bellizzi, Responder, IBR

On 3/9 14:30, a Wildlife Assessment team (Michelle Bellizzi/International Bird Rescue (avian), Brian Heath/Cispri (marine mammals)), surveyed via helicopter the site of the methane leak in Cook Inlet and the surrounding environs in a 5-mile radius around the leak site, working from the site in expanding concentric circles. The observation period lasted approximately one hour.

Along the shoreline of the Nikiski helipad, approximately 4 ravens, 2 magpies, and one bald eagle were observed.

No birds were observed over the open water or ice, including the site of the leak as well as within the 5-mile radius of the site. Also, no fish or marine mammals were observed.

Friday March 17, 2017 Report
Nancy Tankersley, Responder, IBR

I arrived at Ross Aviation at 11 am, and took Hilcorp charter from Anchorage to Kenai with a stop at Granite Point Terminal Facility, landing in Kenai about 1 pm. I landed at Hilcorp hanger and was shuttled to Kenai Airport for Avis rental car.

I arrived at OSK helipad at 2 pm. Met Wes Clark from CISPRI who is doing marine mammal observations on the same flights. We reviewed our flight plan and agreed on signals since he was the only one who would be able to communicate with the pilot on intercom.

Crystal Bauer, logistics coordinator, assisted with survival suit fitting and obtained data from Nikiski's NOAA weather station for our field data. We departed on the Bell 212 helicopter at 3:05 pm and conducted the wildlife survey around the leak area (see data forms, map, and photos attached). The pilot was Trevor Pierson and the co-pilot was Brock Nelson. Wes sat at the inside circling window and I saw at the outside circling window. The weather was ideal with clear visibility, diminishing wind, and calm seas. We were able to fly the entire survey of concentric circles around the leak site at 500 feet altitude, but no wildlife or gas bubbles were spotted. I was unable to ask the pilot what our flight speed was, but Crystal said it was likely 85 kts. (Wes and I thought it was less).

We landed about 4 pm and I returned the rental car to Kenai airport. I was shuttled back to Hilcorp hanger by Hilcorp staff. Adam McClure of Hilcorp verified that I was on the 7 am flight from Anchorage on Monday. I returned to Ross Aviation hangar in Anchorage at 5:40 pm.

<u>Survey Waypoints:</u>
Begin: 60.45.580 North, 151.17.869 West
End: 60.45. 868 North, 151.24.627 West

March 20, 2017 Report
Nancy Tankersley, Responder, IBR

I arrived at Ross Aviation at 6:30 am, and took Hilcorp charter from Anchorage to Kenai, landing in Kenai about 7:30 am. Because I forgot to pick up Hilcorp pool car key at Ross Aviation, I got approval from Beth Sharp to rent a car from the Kenai airport with my personal VISA.

I ate breakfast and arrived at OSK helipad at 9:15 am. Met Wes Clark from CISPRI who is doing marine mammal observations on the same flights. We were able to talk to the co-pilot briefly before the flight and agreed on 500' altitude and speed of about 85 knots in concentric circles around the leak site up to a radius of 5 miles from leak.

Crystal Bauer, logistics coordinator, gave me the Internet link to Nikiski point's weather station to use for our field data. We started the survey on the Bell 212 helicopter at 10:10 am (see data forms, map, and photos attached). Wes sat at the inside circling window and I saw at the outside circling window (counterclockwise circles). The weather was ideal with clear visibility, low wind, and calm seas. We were able to fly the entire survey around the leak site at 500 feet altitude, but no wildlife or gas bubbles were spotted.

We landed about 11:20 am and I checked the Nikiski weather station data. I called IBR with a brief update, and then ate lunch. I received GPS data from Wes Clark via email that afternoon for the 3/17 and 3/20 flights (see below). I finished the March 17 report and most of the March 20 report.

I looked for marine birds along the Kenai beach from 1400-15:30. I saw a small flock of Herring Gulls, a few Common Ravens, and 2 Bald Eagles. The closest area and date for marine bird sightings recorded on eBird was Anchor Point on 12 March 2017 (http://ebird.org/ebird/view/checklist/S35140460). Birds recorded include:

- 2 Steller's Eider
- 3 White-winged Scoter
- 1 Long-tailed Duck
- 1 Common Loon
- 1 Horned Grebe
- 1 Pigeon Guillemot
- 3 Mew Gull
- 6 Glaucous-winged Gull

I returned to Hilcorp hanger in Kenai by 5:00 pm and arrived at Ross Aviation hangar in Anchorage about 6:30 pm.

Survey waypoints:
Begin: 60.44.290 North, 151.18.699 West (leak site)
End: 60.50.287 North, 151.28.802 West (outside perimeter of search area)

| | Date | Bird Obs | Start Time | End Time | Slack Tide Time | Tide Loc | Approx Survey Speed kts | Approx Survey Alt (ft) | Approx Area Obs (sq mi) | % | Beaufort Sea State | Swell | Nikiski Weather Time | Air Temp (deg F) | Wind Speed kts | Wind Dir | Visib (mi) | Cloud Cover (%) | Precip (in) | Pilot | Marine Mammal Obs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3/9/2017 | *flight data sheet not completed for March 9, 2017* | | | | | | | | | | | | | | | | | | | |
| 2 | 3/17/2017 | NT | 1505 | 1550 | 1513 | Nik | 85 | 500 | 15 | <25 | 0 | 0 | 1415 | 18.5 | 6.8 | ENE | 100+ | 0 | 0 | TP | WC |
| 3 | 3/20/2017 | NT | 1010 | 1120 | 1028 | Nik | 85 | 500 | 20 | <25 | 0 | 0 | 1135 | 26.4 | 4.3 | NNW | 100+ | 5 | 0 | unk | WC |
| 4 | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | |

## Cook Inlet Operations - Protected Species Observer Effort Log

**Project ID:** PSO

**Name:** Brian Heath — **Initial:** bh

Wesley Clark — wtc

**Vessel Name:** Hilcorp Helo

**Effort Log Page #:** MMO-007

| Date MM/DD/YYYY | Observers' Initials | Start of watch | | | | End of watch | | | | Wind direction | Beaufort sea state | Swell (m) | Visibility (km) | Glare severity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Time | Latitude | Longitude | Depth (m) | Time | Latitude | Longitude | Depth (m) | | | | | |
| 03/09/2017 | bh | 1440 | 60° 46.9682 North | 151° 26.0797 West | Altitude 90m | 1540 | 60° 46.0858 North | 151° 20.5353 West | Altitude 90m | NE 26 Kph | Ø | Ø | 160 Km | |
| 03/17/17 | wtc | 1430 | 60° 45.580 North | 151° 17.869 WEST | ~~500~~ FT. | 1530 | 60° 45.868 NORTH | 151° 24.627 WEST | 500 FT | NE 6.5 Kn | Ø | Ø | unlimited | |
| 3/20/17 | wtc | 1015 | 60 44 290 NORTH | 151 18 699 WEST | 500 FT | 1115 | 60 50 287 NORTH | 151 28 802 WEST | 500 FT | ↓ 5 KTS, | Ø | Ø | UNLIMITED | |
| | | | | | | | | | | | | | | |
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# ATTACHMENT C

# WATER QUALITY SAMPLING SUMMARY REPORT

# Cook Inlet
# Methane Pipeline Leak Area
# Water Quality and Air/Water Interface Monitoring

## Weekly Report #1

Prepared by SLR International Corporation (SLR)
**Report Date: 3-22-2017**

## 1.0 OVERVIEW

The first water quality monitoring event was conducted from aboard the Offshore Service Vessel (OSV) Resolution using the approaches and methods described in the ADEC-approved Cook Inlet Alaska Methane Pipeline Leak Water Quality Sampling Plan (WQ Plan) on March 18 and 19, 2017. Safety of the vessel and crew was top priority during the monitoring activities. Work was performed during daylight hours and the sampling approaches allowed for the collection of data, while maintaining a safe distance from the methane release point (MRP). Air monitoring was performed for potential explosive vapors on board the vessel by a dedicated safety professional. The quantity and location of sampling events were determined by site and weather conditions. The data presented herein is preliminary, subject to further review and verification by SLR International Corporation (SLR).

As discussed in Section 2.2 of this report, the dissolved oxygen (DO) concentrations measured during this event did not exceed the Alaska Water Quality Standards (AWQS) as established in Title 18 Alaska Administrative Code (AAC), Chapter 75 (18 AAC 70).

## 2.0 WATER QUALITY MONITORING

### 2.1 Activities Completed

The water quality sampling was conducted on March 18 and 19, 2017. This was one day prior to neap tide which occurred on March 20, 2017. The field team consisted of two SLR and two Kinnetic Laboratories, Inc. (KLI) scientists (Bret Berglund, Matt Woods, Mark Savoie and Gary Lawley, respectively). The field team members (samplers) were Alaska Department of Environmental Conservation (ADEC) qualified samplers, per 18 Alaska Administrative Code 75.

The data collection activities followed the WQ Plan. The primary data collection method utilized a drifting instrumented buoy to obtain water quality parameters in the area of interest. The drifting buoy had multiple instruments suspended along a line at three depth intervals as depicted on Figure 1: The primary instruments are listed below:

- SeaBird Electronics, SBE 19 plus V2 SeaCAT - conductivity, depth, temperature (CTD), with DO, pH, and turbidity.

- Pro-Oceanus Mini Methane ($CH_4$) - Submersible $pCH_4$ sensor and datalogger,
- Pro-Oceanus Mini Carbon Dioxide ($CO_2$) - Submersible $pCO_2$ sensor and datalogger,
- PME MiniDOT– Dissolved Oxygen (DO) and temperature loggers,
- Garmin WAAS differential global positioning system (mounted on buoy and used to track the buoy's position during a monitoring transect).

Some modifications to the sampling methods outlined in the WQ Plan were made due to the site conditions, and the need to proceed cautiously during the first attempt to acquire data. March 18 was primarily a day of setup and experimentation, which consisted of incremental testing of the sampling equipment and methods, including techniques for deployment and retrieval of the buoy system.

- Ice conditions during the first event varied from approximately 3-4 tenths ice cover during the flood tide to 9-10 tenths cover during the latter part of the ebb tide. The heavier ice during the latter part of the ebb tide was found to impede the sampling effort particularly the deployment of the instrumented drift buoy. The least amount of ice was observed on the flood tide on March 19. Sampling and monitoring activities were responsive to these dynamic site conditions.
- On March 18 the vessel was initially used to deploy the CTD with the $CH_4$ and $CO_2$ sensor at a single depth, as the ice coverage was dense and there were concerns about being able to retrieve the buoy
- Air temperatures were varied between -4 and -11 ºC with water temperatures typically about -1.5 ºC, and icing of equipment was a concern. Due to the cold air temperatures, instrumentation occasionally iced up from the slush and frazil ice at the sea surface. The field team frequently removed ice from equipment between deployments. On at least one occasion, icing of the pump on the CTD resulted in poor readings of temperature, conductivity, pH, and DO.
- On a couple of occasions, some sensors failed to record data apparently due to switches accidentally turning off during deployment (CTD and $CO_2$).

Four buoy drifts (monitoring transects) were completed through the area surrounding the MRP, one on March 18 and three on March 19 at differing tidal stages. At the MRP site, the tide changes about 50 minutes after NOAA tidal predictions for the East Forelands area, and drifts were planned accordingly. The duration of each drift varied from approximately 25 to 120 minutes, depending upon the tidal flow. Plots of the drifts are illustrated in Figure 2 of Attachment A. During the four drifts, the closest distance the buoy passed near the MRP varied between approximately 13 and 190 meters. Table 1 of Attachment A provides a summary of the buoy deployments.

In addition, water samples for laboratory analysis were collected down current of the MRP at several depths (surface, middle and deep) using Niskin bottles at two sampling stations. The location of these sampling stations is shown on Figure 2 in Attachment A (distance from the two stations to the MRP was estimated to be 518 and 741 meters). A total of six primary samples, plus one sample duplicate and one matrix spike and matrix spike duplicate sample (MS/MSDS), were

collected and sent to the analytical laboratory (ALS Environmental in Simi Valley, California) for analysis of $CH_4$ and $CO_2$. Results are anticipated on March 28, and will be documented in a subsequent report.

A photograph log documenting the data collection methods and site conditions is included in Attachment A.

### 2.2 Summary of Results

Due to the short period between the monitoring event and initial reporting date, all of the data collected during the first sampling event has not been fully reviewed, analyzed and compiled for reporting. To date, data analysis and reporting has focused on the third drift conducted on March 19, which occurred during a tidal change (flood to ebb). This buoy track provides a good representation of the site conditions at and near slack water in close proximity to the MRP, one day prior to a neap tide. Thus, mixing and dilution effects would be anticipated to less than other periods.

During Drift #3 on March 19, the water quality buoy was deployed on the flood tide up current of MRP at 09:57, approximately 30 minutes before slack tide. It was retrieved at 11:55, approximately 2 hours later down current of the MRP on the ebb tide. Based on the buoy movement, the tide reversed at 10:35. During the drift, the buoy first passed north of the MRP, and then when the tide reversed it travelled south of the MRP. At its closest point, the buoy came within 13 meters of the estimated MRP, during the ebb flow.

Figure 3 in Attachment A provides a close-up of the buoy track with annotations indicating key events. A cross-section of the primary water quality parameters of interest (DO, $CH_4$ and $CO_2$) illustrating the concentrations recorded during the Drift #3 transects at multiple depths is provided in Figures 4-7 in Attachment A. Maximum and minimums are displayed on the cross sections. A summary of the results from the drift is provided below.

- Dissolved oxygen- The lowest DO values were recorded on the sensor deployed with the CTD at depth of 12.5 meters. DO started at a concentration of approximately 9.3 mg/L and decreased to a low of 7.8 mg/L, then rose back to 9.3 mg/L. The zone of depressed DO was on the order of 150 meters long. The buoy passed through this zone from 11:00 to 11:06, and the buoy was traveling at approximately 50 cm/sec at this time. The DO sensors at 7 and 2 meters had minimum detected DO concentrations of 11.88 and 11.64 mg/L, respectively.
- Dissolved Methane – The highest $CH_4$ was recorded on the sensor deployed at a depth of 7 meters. The $CH_4$ started at an initial measurement of 0.28% (0.10 mg/L). At 11:07am, after the buoy traveled approximately 70 meters past the MRP on the ebbing tide, the methane levels began to increase and reached a maximum value of 0.45% (0.15 mg/L). Concentrations decreased after that point, to 0.41% (0.14

mg/L) when the instrument was retrieved at 11:55, approximately 2,900 meters downgradient of the MRP.

- Dissolved carbon dioxide – The highest $CO_2$ concentration detected was 354 parts per million by volume (ppmv) recorded on the sensor deployed at 12 meters. Overall, the $CO_2$ concentrations showed little fluctuation during the drift.

The beginning of the zone of elevated $CH_4$ was approximately co-located with the zone of depressed DO. The instrument response time for the $CH_4$ is slower than the DO sensor, which would result in a slightly delayed detection of front edge of the plume with the $CH_4$ sensor.

The 18 AAC 70 Alaska Water Quality Standards for marine waters state the surface DO concentration in coastal waters may not be less than 6.0 mg/L for a depth of one meter except when natural conditions cause this value to be depressed. DO may not be reduced below 4 mg/L at any point beneath the surface. DO concentrations in estuaries and tidal tributaries may not be less than 5.0 mg/L except where natural conditions cause this value to be depressed. The lowest measured DO concentration during Drift #3 was above these water quality standards. A preliminary review of the other three buoy drifts (transects) conducted during this monitoring event under higher flow conditions did not identify any DO values lower than those recorded in Drift #3 on March 19, 2017, indicating there were no detected exceedances of the regulatory standard during this monitoring event. There are no 18 AAC 70 water quality standards for dissolved $CH_4$ or $CO_2$.

### 2.3 Activities Planned for the Next Sampling Event

The next water quality sampling event is planned for March 23, 2017. Planned activities include:

- Conducting deployments of the water quality buoy, with one deployment around the slack tide and one or more in flowing conditions. At least one of the drifts will be extended a further distance down current form the MRP (5-6 kilometers).
- Collecting water samples at closer distance down current from the MRP than the March 18, 2017 sample event.

These planned activities may need to be modified due to site conditions and logistics.

## 3.0 AIR/WATER INTERFACE MONITORING

The air/water interface buoy and technical specialists arrived in Nikiski on March 21, 2017. The first deployment of the buoy is scheduled for Friday, March 24, 2017, conditions permitting.

Attachment A:

# FIGURE 1: WATER QUALITY MONITORING BUOY SCHEMATIC (MARCH 18-19, 2017)


- PME MiniDOT dissolved oxygen (DO) and temperature logger: S/N 034835

2 Meters
Below Surface

Note: In addition, Air-Interface Buoy will contain a Pro-Oceanus Mini $CH_4$ sensor Submersible $pCH_4$ (partial pressure $CH_4$) sensor and datalogger (0-1% by volume range) for surface water measurements of $CH_4$.

- PME MiniDOT dissolved oxygen (DO) and temperature logger: S/N 066117
- Pro-Oceanus Mini $CH_4$ sensor Submersible $pCH_4$ (partial pressure $CH_4$) sensor and datalogger (0-100% by volume range): S/N 37-417-25
- Pro-Oceanus Mini $CO_2$ sensor Submersible $pCO_2$ sensor and datalogger: S/N 37-414-20

7 Meters
Below Surface

- Seabird SBE 19plus V2 SeaCAT profiling conductivity, temperature, and depth (CTD), with DO, pH, and turbidity.
- Pro-Oceanus Mini $CH_4$ sensor Submersible $pCH_4$ (partial pressure $CH_4$) sensor and datalogger (0-1% by volume measurement range): S/N 37-416-25
- Pro-Oceanus Mini $CO_2$ sensor Submersible $pCO_2$ sensor and datalogger: S/N 37-415-20

12.5 Meters
Below Surface

Base map referenced from National Oceanic and Atmospheric Administration (NOAA), Chart 16663, Alaska - South Coast, Cook Inlet, East Foreland to Anchorage (Scale 1:100,000).

Soundings in Fathoms (Fathoms and Feet to Eleven Fathoms at Mean Lower Low Water)

1 Fathom = 6 Feet = 1.8 Meters

Legend
- Methane Release Point
- Sample Locations
- 0318 BuoyTrack1
- 0319 BuoyTrack1
- 0319 BuoyTrack2
- 0319 BuoyTrack3
- 1000 Yard Restricted Zone
- Pipeline

GW02
GW01

Obstn

Pipeline Area

Tide current direction of buoy travel indicated at buoy transect retrieval location.

N

0 750 1,500 2,250 3,000

Meters

SLR

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY.
ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

Site: HILCORP ALASKA, LLC
METHANE PIPELINE LEAK
COOK INLET, ALASKA

Drawing: WATER QUALITY SAMPLE EVENT 1
BUOY TRACKS AND WATER SAMPLE LOCATIONS

| | | | |
|---|---|---|---|
| Drawing | March 2017 | Scale | 1:20,000 |
| File Name | Figure 2 Methane Release_Event1.mxd | Project No. | 105.00874.17015 |

Fig. No. 2

Base map referenced from National Oceanic and Atmospheric Administration (NOAA), Chart 16663, Alaska - South Coast, Cook Inlet, East Foreland to Anchorage (Scale 1:100,000).

Soundings in Fathoms (Fathoms and Feet to Eleven Fathoms at Mean Lower Low Water)

1 Fathom = 6 Feet = 1.8 Meters

Nearest position of buoy transect 13 meters from MRP on ebbing tide.

Position of buoy at slack tide, current direction change.

Buoy transect enters plume of elevated methane beginning approximately 40m downstream from MRP.

Buoy deployment location on incoming flood tide.

Tide current direction of buoy travel indicated at buoy transect retrieval location.

Legend

- 0319 BuoyTrack3
- Methane Release Point
- 1000 Yard Restricted Zone
- Pipeline

N

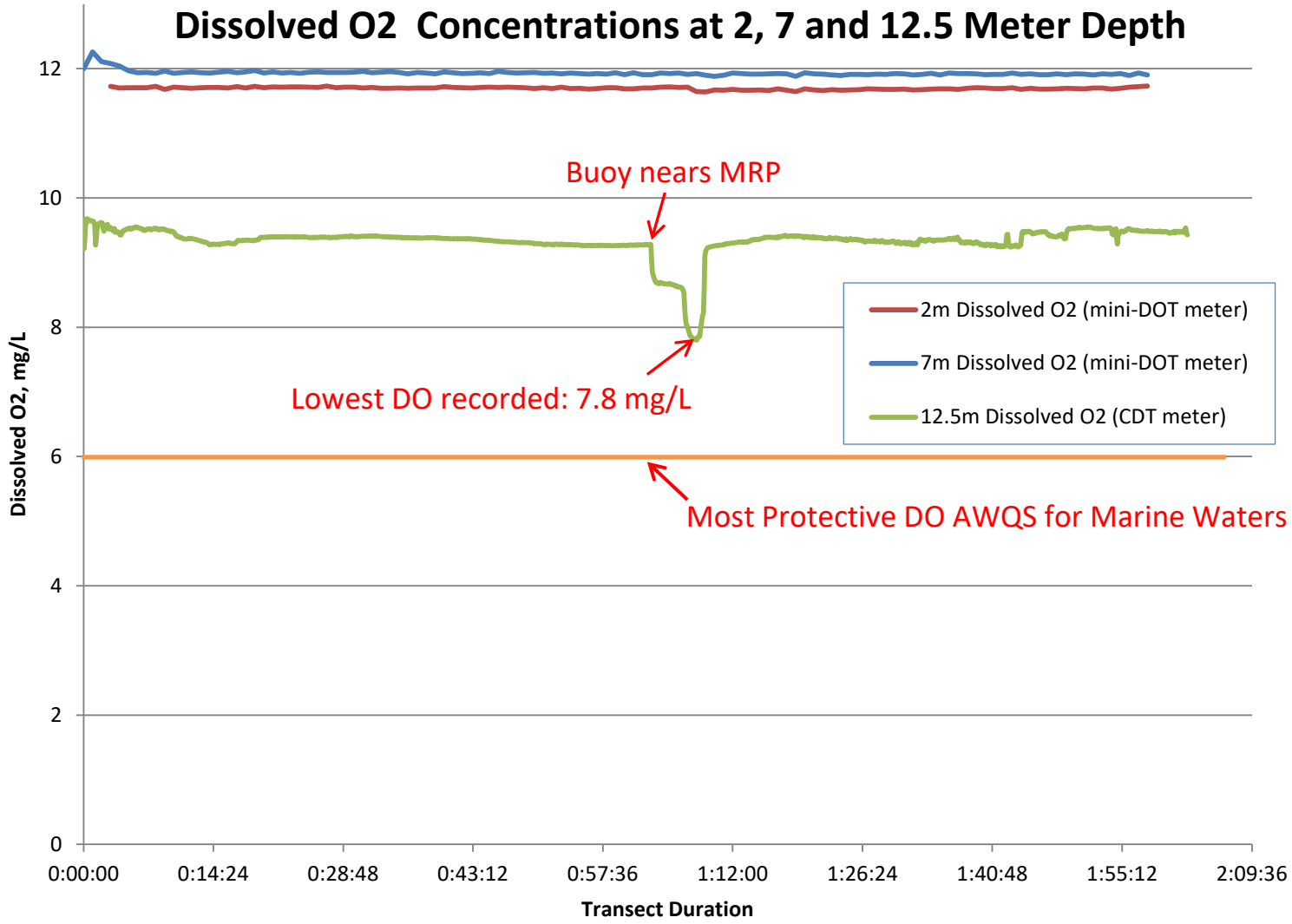
0 440 880 1,320 1,760

Meters

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY.
ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

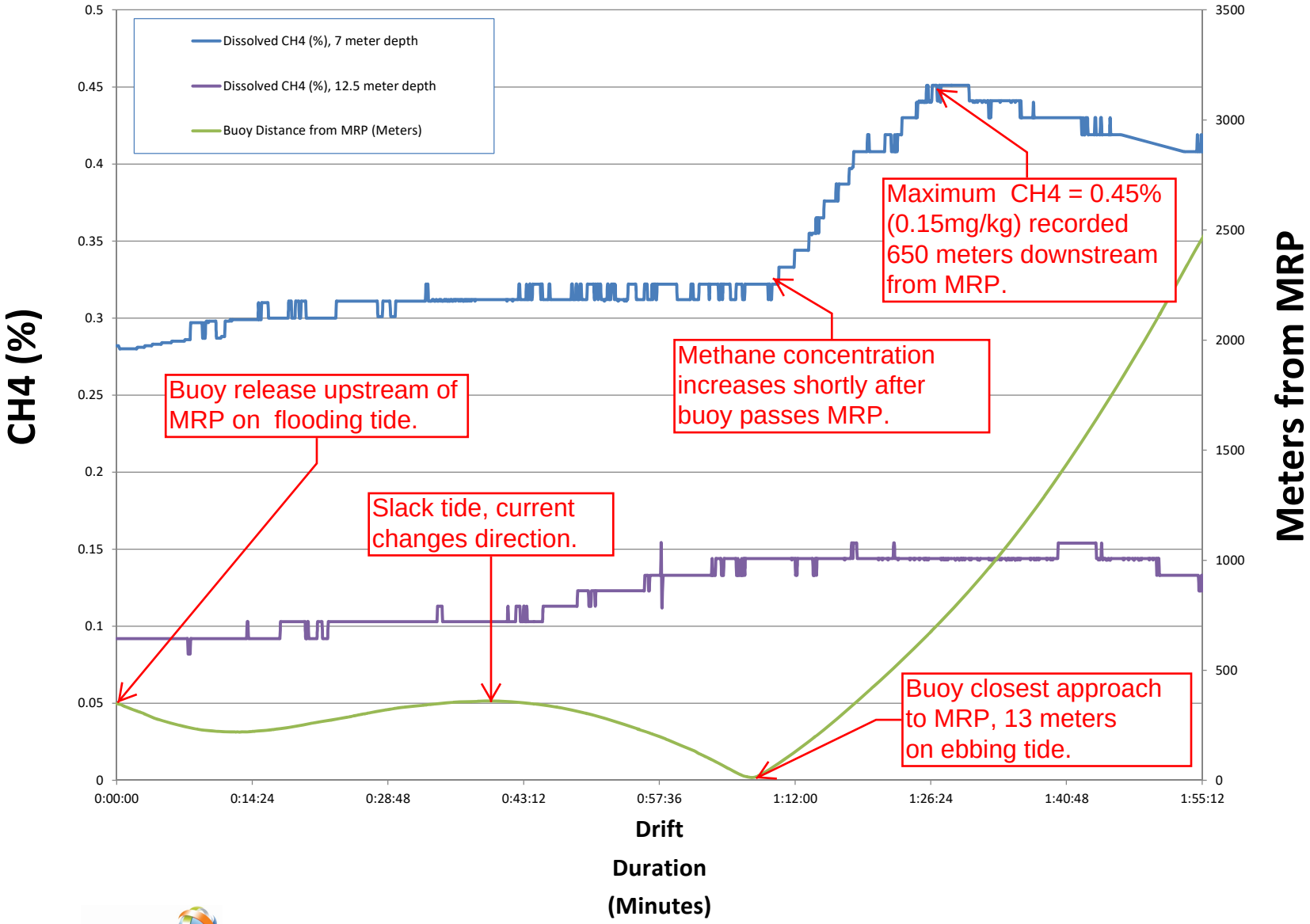
| | |
|---|---|
| Site | HILCORP ALASKA, LLC<br>METHANE PIPELINE LEAK<br>COOK INLET, ALASKA |
| Drawing | WATER QUALITY SAMPLE EVENT 1<br>BUOY TRACK 3 DETAILS |
| Drawing | March 2017 |
| Scale | 1:11,772.91 |
| File Name | Figure 3 Methane Release_Event1 t3.mxd |
| Project No. | 105.00874.17015 |
| Fig. No. | 3 |

## Figure 4: Buoy Drift #3, March 19, 2017
## Dissolved O2 Concentrations at 2, 7 and 12.5 Meter Depth



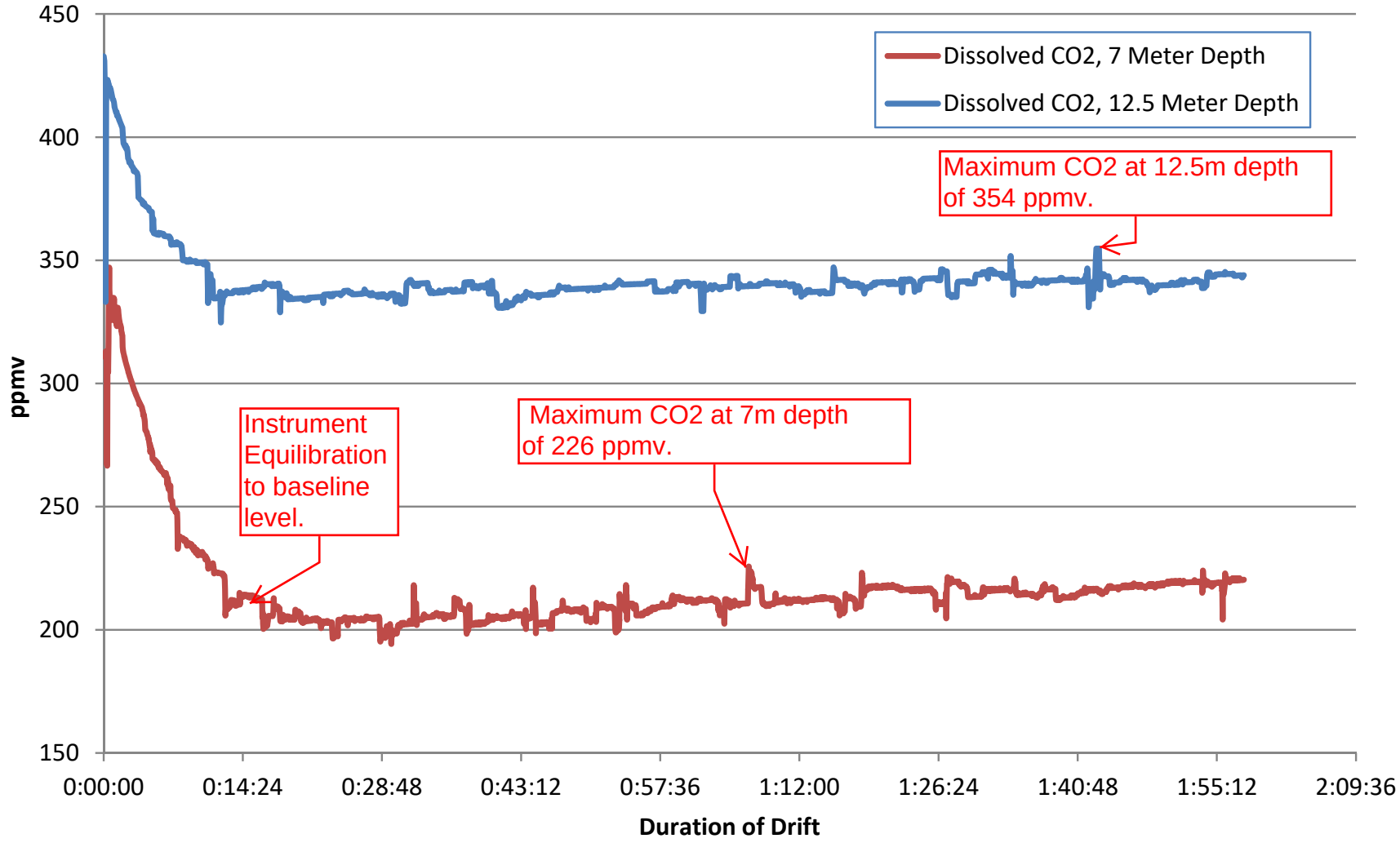

SLR

# Figure 5: Buoy Drift #3, March 19, 2017
# CH4 Concentrations at 7 and 12.5 Meter Depth with Buoy Distance from the MRP



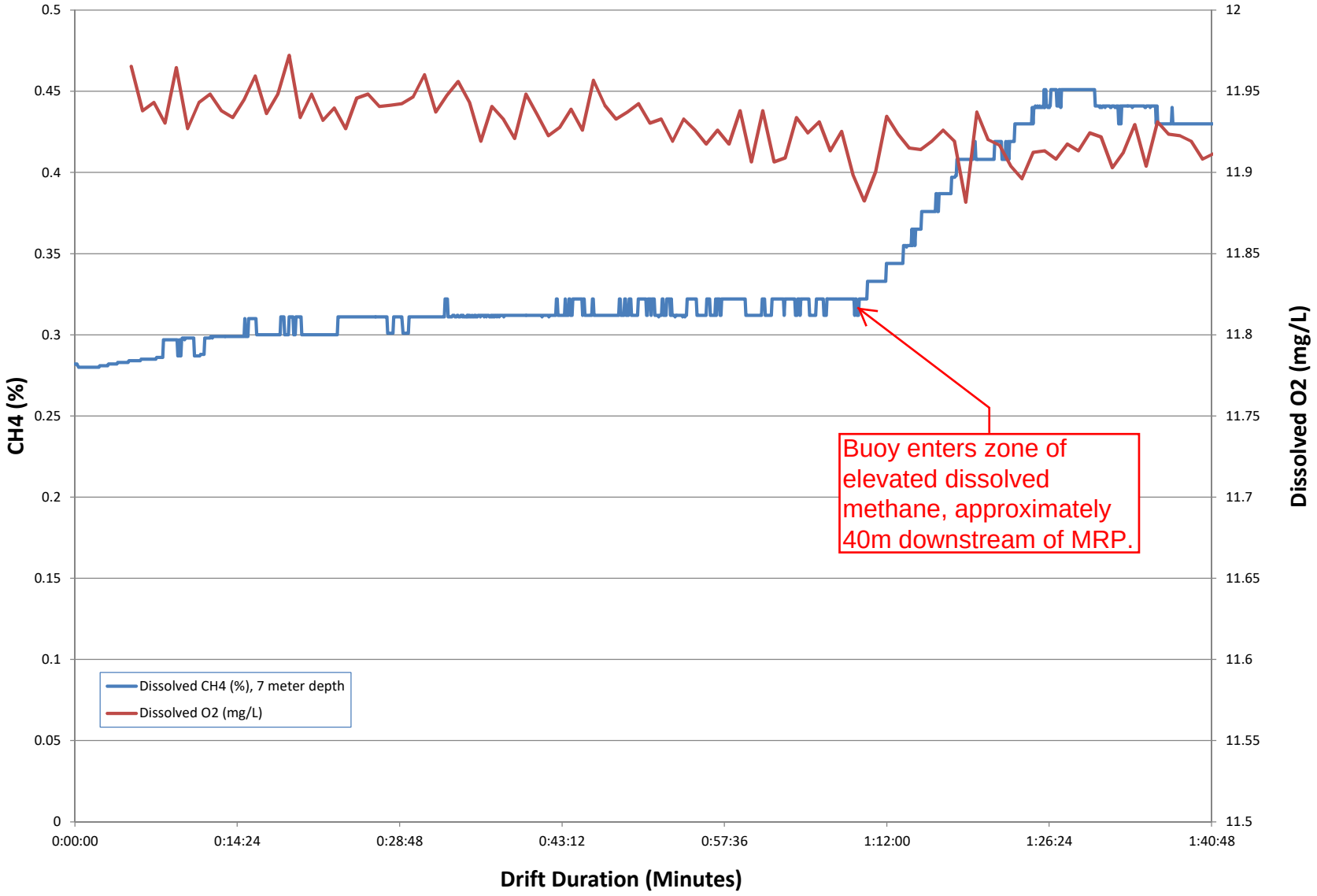

SLR

# Figure 6: Buoy Drift #3, March 19, 2017
# Dissolved CO2 Concentrations at 7 and 12.5 Meter Depth




SLR

**Figure 7: Buoy Drift #3 March 19, 2017**
**Dissolved CH4 andO2 Concentrations at 7 Meter Depth**
**Detailed Comparison of Results in Vicinity of the MRP**



## Table 1: Summary of Water Quality Buoy Drifts

| Buoy Type | Instrument(s) Depth (m) | | Drift Name | General Tide Description | Date | Release Time | Release Location | Retrieval Time | Retrieval Location | Drift Duration | Minimum Distance to MRP (m) | Wind (Knots/direction) | Wave Height (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Quality | Surface | 2 | D04-031817 | Ebb | 3/18/2017 | 14:50 | 60 46.622 N<br>151 25.718 W | 15:20 | 60 45.356 N<br>151 27.877 W | 0:30 | -- | calm | 0 |
| | Mid | 7 | | | | | | | | | | | |
| | Deep | 12.5 | | | | | | | | | | | |
| Water Quality | Surface | 2 | D01-031917 | Flood | 3/19/2017 | 8:15 | 60 46.37 N<br>151 26.239 W | 8:40 | 60 47.2 N<br>151 25.112 W | 0:25 | -- | 15, SSW | 0 |
| | Mid | 7 | | | | | | | | | | | |
| | Deep | 12.5 | | | | | | | | | | | |
| Water Quality | Surface | 2 | D02-031917 | Flood | 3/19/2017 | 9:08 | 60 46.35 N<br>151 25.878 W | 9:37 | 60 46.921 N<br>151 25.878 W | 0:29 | -- | 15, SSW | 0 |
| | Mid | 7 | | | | | | | | | | | |
| | Deep | 12.5 | | | | | | | | | | | |
| Water Quality | Surface | 2 | D03-031917 | Flood | 3/19/2017 | 9:55 | 60 45.527 N<br>151 23.097 W | 11:55 | 60 45.527 N<br>151 23.097 W | 2:00 | 12.95 | 15, SSW | 0.2 |
| | Mid | 7 | | | | | | | | | | | |
| | Deep | 12.5 | | | | | | | | | | | |

# Cook Inlet Water Quality Sampling Photo Log: Week 1
# 3-18-17 to 3-19-17

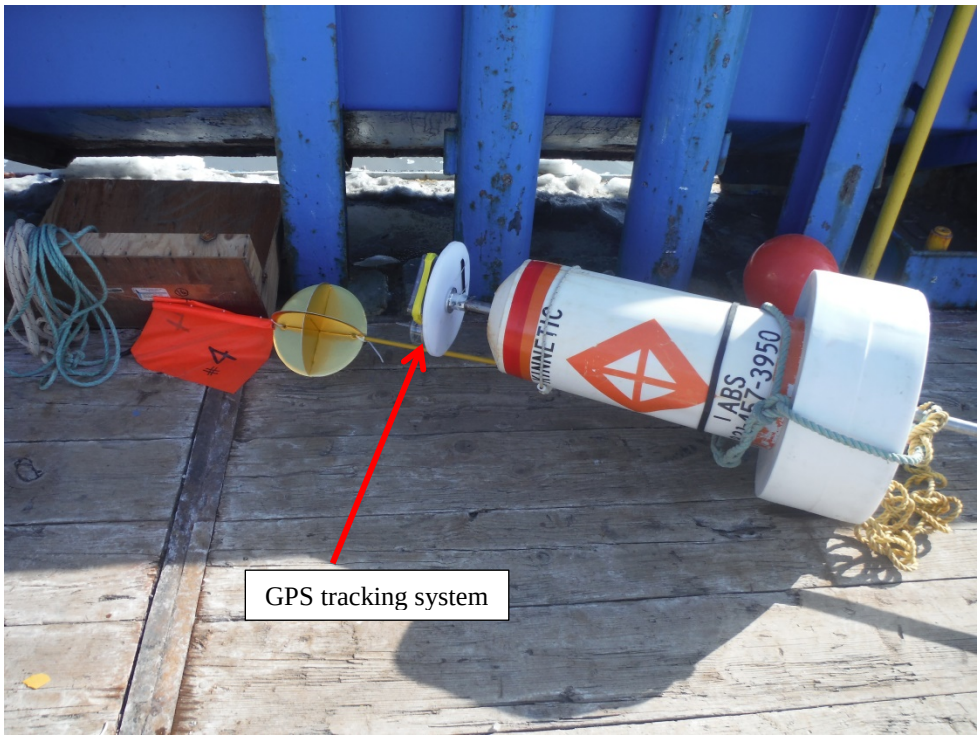



**Photo 1:** Water quality monitoring buoy prior to deployment.

**Date:** 3/18/2017

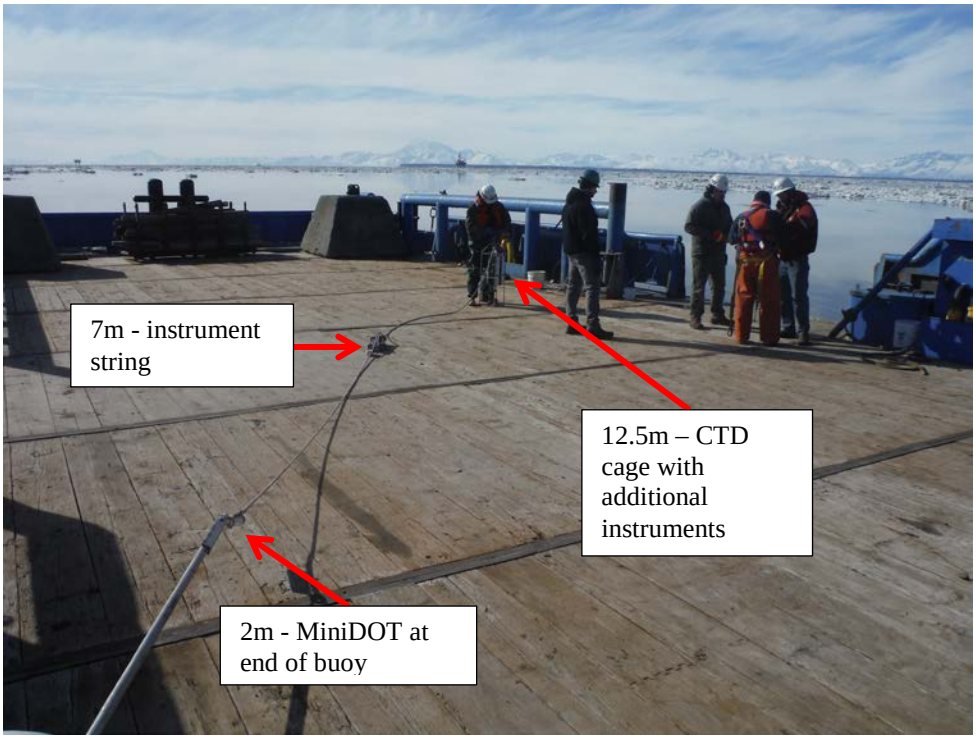



**Photo 2:** Instruments attached to the end of the water quality monitoring buoy.

**Date:** 3/18/2017

**Photo 3:** Close up of MiniDOT at the end of buoy, 2m.

**Date:** 3/18/2017

**Photo 4:** Close up of 7m instrument string which includes: MiniDOT, MiniCH4, and MiniC02

**Date:** 3/18/2017

**Photo 5:** Close up of CTD instrument cage at 12.5m which contains: Seabird SBE 19plus, MiniCH4, MiniCO2 **Date:** 3/18/17

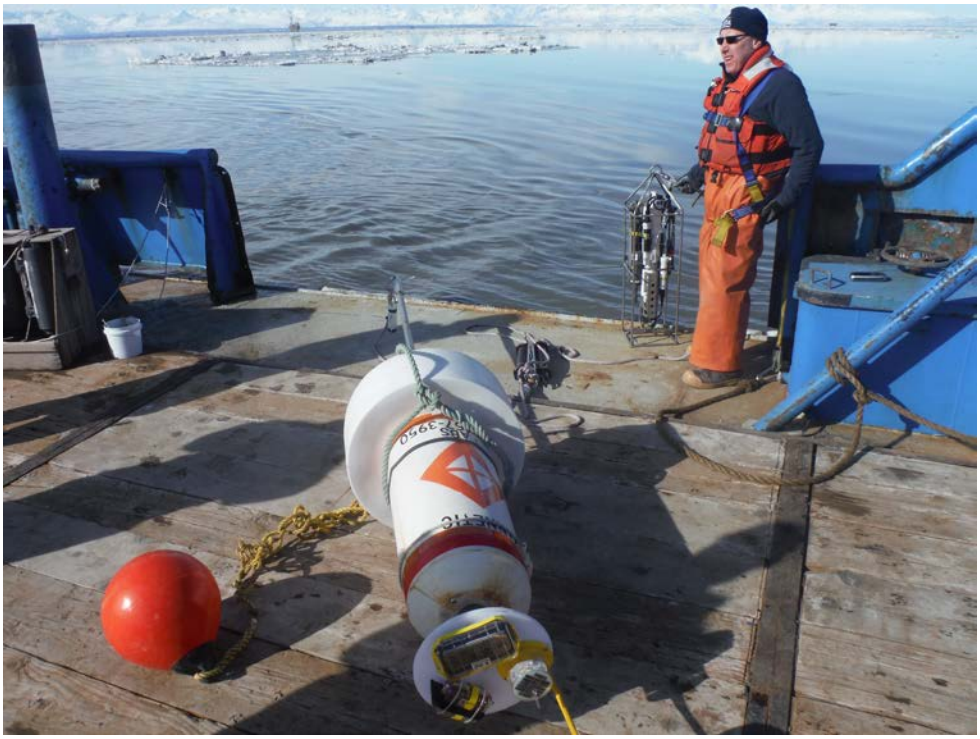


**Photo 6:** Water quality buoy staged for deployment. **Date:** 3/18/17

**Photo 7:** Buoy drifting after deployment. Note buoy in slush ice.

**Date:** 3/19/17

**Photo 8:** Recovery of buoy tagline with the use of boathook. Representation of heavier ice conditions on March 18th.

**Date:** 3/18/17

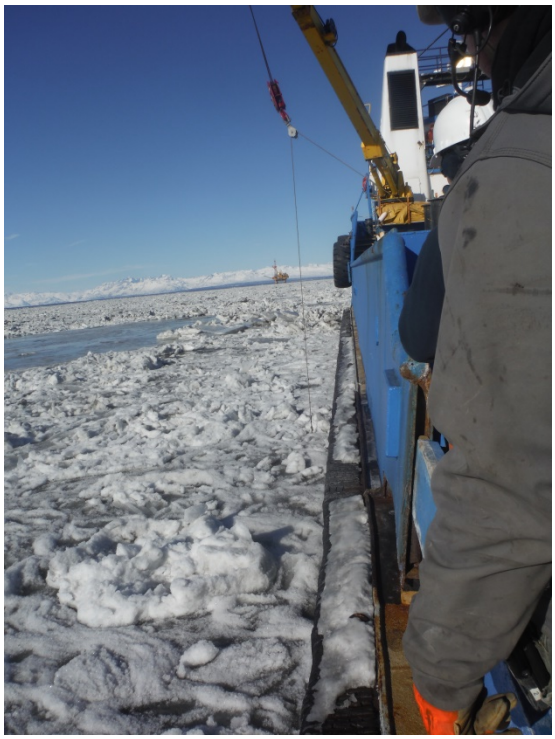


**Photo 9:** CTD being recovered through heavy ice after completion of vertical cast. **Date:** 3/18/17

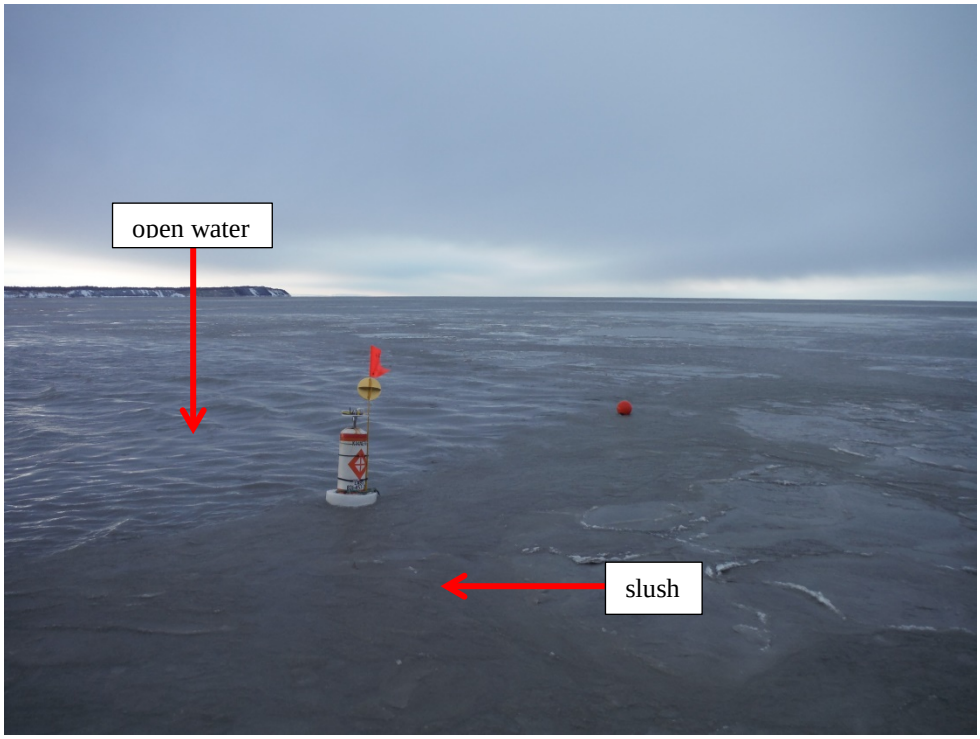



**Photo 10:** Typical conditions present during flood tide on March 19th. Note the slushy ice around the buoy **Date:** 3/19/17

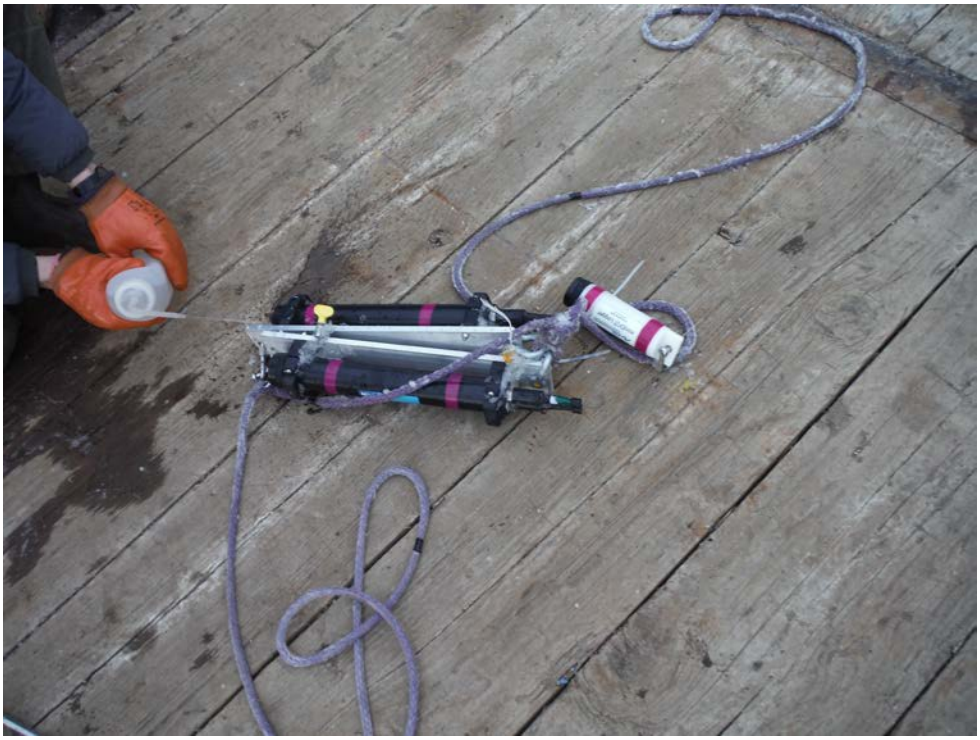


**Photo 11:** Example of rinsing instruments with warm water to remove any ice buildup before and after deployment. **Date:** 3/19/17

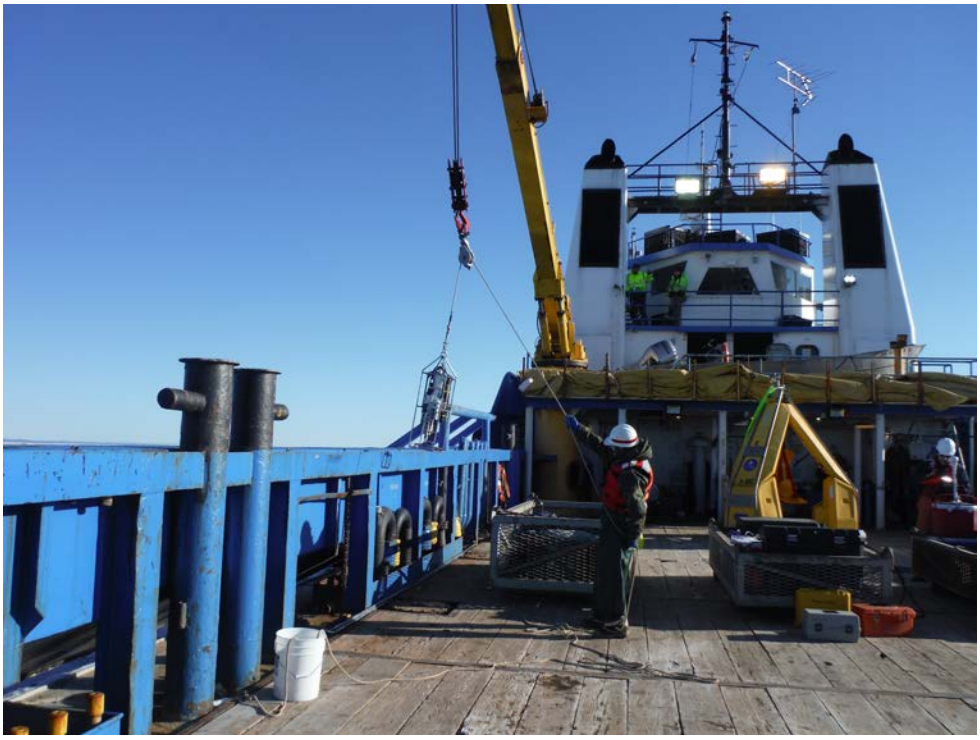


**Photo 12:** Using just the instrument cage to perform cast off the Resolution cage, the instruments were manually lowered to the desired depths. **Date:** 3/18/17

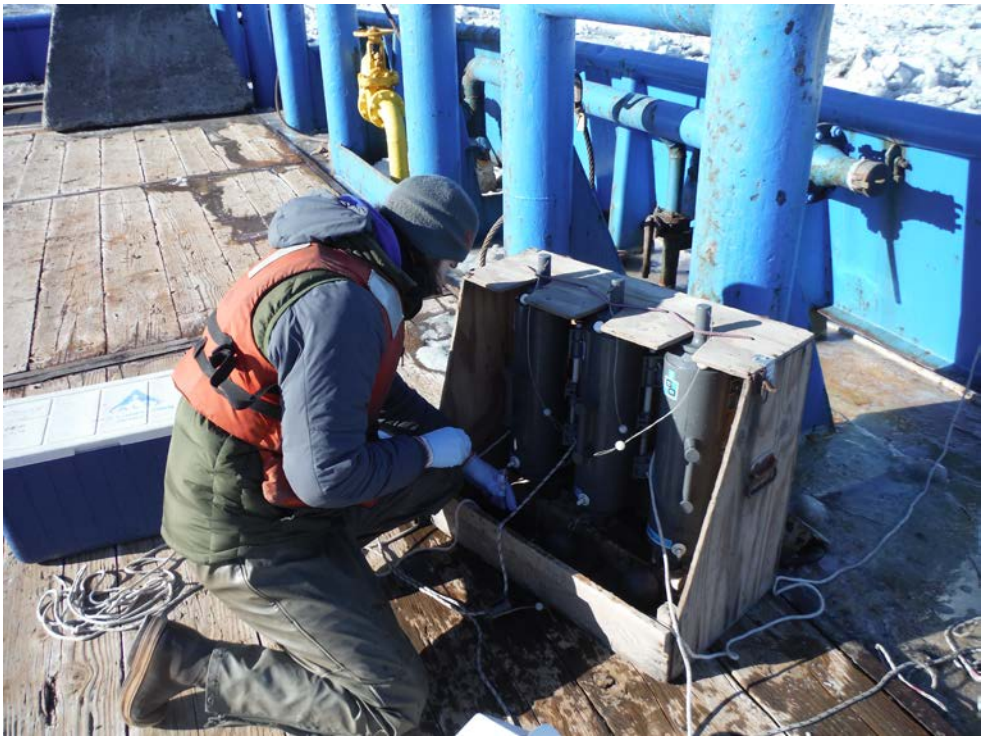


**Photo 13:** Collecting sample aliquots from Niskin bottles, which were lowered to 3 different depths (shallow, middle, and deep) from right to left). **Date:** 3/18/17

**Photo 14:** Heavy ice conditions present on March 18th preventing buoy deployment. **Date:** 3/18/17

# ADDITIONAL SAFETY DOCUMENTATION

# DAILY JOB REPORT

Directions: *Note problems encountered, RFI's, verbal communications with Client's representative, change order work performed.*
*Note any important events*
*Send a copy via fax to Nikiski office by 900 am.*

to

Report No. 1

Peak Job No. 23054 Date 3/18/2017

Job Name HSE support for water sampling for Gas Pipeline Leak

Work By PEAK:

The work performed by 1 PEAK employee (Jacob Nordwall) was to provide HSE support to the personnel obtaining water samples for the Hilcorp Pipeline Gas Leak. HSE support included: JSA, pre-job safety meeting, permit to work, continuous monitoring of three 4-gas meters and continuous safety support.

Work by Subcontractors:

Work performed by 4 subcontractors, was that of multiple water sampling by 2 SLR employees and 2 Kinnetic Labs employees.

Safety Topic/Injury's

JSA and permit to work were completed for this job. Copy of JSA/permit to work is attached with this daily job report.

Comments:

Time line of events for this job are attached in a word document to this daily job report.

Supervisor _____ Signature

| Subs | Trade | PEAK |
|---|---|---|
| No. of Men | | No. of Men |
| 2 | SLR Sampling | |
| 2 | Kinnetic Labs Sampling | |
| | HSE Support | 1 |
| | TOTAL | |
| | Equipment | |
| 3 | 4-gas meters (Hilcorp) | |

The follow is a list of events that took place for the Hilcorp pipeline gas leak water sampling on Saturday 3-18-2017:

**0930** – JSA and pre-job safety meeting completed

**0940** – Depart Port aboard the Resolution owned and operated by OMSI

**0945** – Weather noted: Clear skies, wind @ 1 knot, calm seas and temperature at 17*F. Ice conditions were favorable.

**1015** – Three 4-gas meters were taped to wooden mop handles and taped to the railings of the vessel. The height of all the gas meters ranged between 5'6" and 6'0". One was placed at the bow, one was placed 30 feet towards the rear on the portside of the vessel and one was placed mid-deck on the starboard side of the vessel. The monitors were turned on at this time.

**1100** – 500 meters to estimated leak with 0% LEL on gas meters.

**1115** – First sample taken at 750 meters with 0% LEL on gas meters.

**1134** – Second sample taken at 950 meters with 0% LEL on gas meters.

**1205** – Third sample taken at 750 meters with 0% LEL on gas meters.

**1245** – Fourth sample taken at 600 meters with 0% LEL on gas meters.

**1450** – Fifth sample taken at 260 meters with 0% LEL on gas meters. This was the first buoy sample attempt. Previous tests were obtained via the use of crane and sampling equipment being lowered into water next to vessel.

**1613** – Sixth sample taken at 500 meters with 0% LEL on gas meters.

**1625** – 4-gas meters turned off and vessel headed back to port.

**1652** – Arrived to port and close out of Permit to Work.

There were no injuries/incidents and safety was a focus for all personnel performing today's tasks. Proper use of safety toe boots, hard hats, gloves and fall protection were noted throughout all tasks. A focus on pinch points, crush-by/contact-by and overhead objects were a focus during rigging and work being performed via crane.

# Permit to Work (PTW) / Job Safety Analysis (JSA)

JSA's should be considered prior to any work. JSA's are mandatory for that require the use of Hilcorp Alaska's Permit to Work system.

**Emergency Contact Info**

Area controller: Rufus Mackin / Josh Crase
Safety: Leonard Dickerson 907-252-7855
~~Construction Rep~~ Environmental: Julieanna Orczewska 907-715-7060
Emergency Muster Area: Captain control room

DATE: 3-18-17 START TIME: 9:30 AM END TIME: 9:30 PM

FACILITY: N/A LOCATION / AREA: Cook Inlet

PROJECT DESCRIPTION: methane Pipeline Leak Water Quality Sampling

| GENERAL SAFETY CONSIDERATIONS | Y | N | N/A |
|---|---|---|---|
| Are Standard Operating Procedures available and being followed? | ✓ | | |
| Do personnel have proper tools/equipment for the job? | ✓ | | |
| Are tools/equipment in good condition/inspected? | ✓ | | |
| Is there a planned escape route? | ✓ | | |
| Are personnel aware of the location of First Aid supplies? | ✓ | | |
| Have the emergency notification procedures been covered with employees? | ✓ | | |
| Has Hilcorp EH&S been notified 72 hrs. prior to Confined Space Entry projects? | | | ✓ |
| Are all personnel trained/ certified to use equipment/ engage in task? | ✓ | | |
| Are all personnel donning appropriate PPE? | ✓ | | |
| Will this project create a hazard to others in the vicinity? | | | ✓ |
| Do all personnel understand correct incident/spill reporting? | ✓ | | |

## CONFINED SPACE ENTRY REQUIREMENTS:

The operations team and work team have evaluated the confined space and agree that none of the following conditions exist and a Confined Space Entry Permit is not required. Operations Lead or Permit Issuer Initials:____

1) The space does not contain any type of hazardous atmosphere.
2) The space does not have the potential to entrap or engulf an entrant.
3) The space does not contain any other serious safety or health hazard.

Additional Permits Required: ☐ Hot Work ☐ Confined Space Entry ☐ Isolation of Hazardous Energy ☐ Excavation & Trenching

## HAZARD-CONTROL INDEX (THIS LIST IS NOT EXHAUSTIVE)

**SLIPS/TRIPS/FALLS**
- ☑ Clean surfaces (housekeeping)
- ☑ Barricade – rails
- ☑ Focus on path
- ☐ Use alternate route
- ☐ Relocate equipment/project
- ☐ Examine scaffolding condition
- ☑ Examine handrail condition

**FALLS FROM ELEVATION (4'+)**
- ☐ Move work to ground level
- ☐ Ladder inspections
- ☐ Proper ladder material/placement
- ☑ Additional PPE (Fall Protection)

rails

**PINCH POINTS/SHARP OBJECTS**
- ☑ Proper guarding
- ☑ Proper body placement

**FIRE/EXPLOSION**
- ☐ Permitting
- ☑ Air testing/monitoring
- ☐ Remove combustible/flam materials
- ☐ Fire watch
- ☑ Fire extinguishers
- ☐ Additional PPE

**HIGH NOISE LEVELS**
- ☐ Relocate work
- ☐ Additional PPE (Hearing protection etc.)

**ENERGIZED EQUIPMENT**
- ☑ Guarding
- ☑ Proper body placement
- ☑ No loose clothing

**REPETITIVE MOTION**
- ☐ Proper technique/tools
- ☐ Ask for assistance
- ☐ Work/rest schedule

**PRESSURE**
- ☐ Communication
- ☐ Barricading
- ☐ Shielding
- ☐ Proper body placement
- ☐ Block & bleed protocol

**ELECTRICAL SHOCK**
- ☐ Testing
- ☑ Grounding
- ☑ Equipment shielding/condition
- ☐ GFCI's
- ☐ Examine electrical clearances

**LIFTING/PULLING/PUSHING**
- ☑ Utilize right tools for job
- ☑ Proper technique
- ☑ Smaller/lighter loads
- ☑ Examine path
- ☐ Use alternate route
- ☐ Work rest schedule

**LOCK-OUT/TAG-OUT CONDITIONS**
- ☐ Electrical isolation
- ☐ Pressure isolation
- ☐ Energized equipment isolation
- ☐ Fire/explosion isolation

**HAZARDOUS CHEMICALS**
- ☐ Consult MSDS
- ☐ Label/store containers correctly
- ☐ Spill prevention considered
- ☐ Additional PPE (Goggles etc.)

**ATMOSPHERIC**
- ☐ Respirators
- ☑ Testing/monitoring

WORK TEAM LEADER (print): Brett Berglund Signature: Brett Berglund

PERMIT APPROVER (print): Jacob Nordwall Signature:

AREA CONTROLLER (print): Rufus Mackin Signature: R. Mackin

Revalidation or Extension Time (4 Hour Max):

Permit Approver (print): _____ Time: _____

Signature _____

Close Out Signature:

Work Team Leader: Brett Berglund Time: 4:52 pm

Area Controller: Josh M Crase Time: 4:52 pm

HILCORP ALASKA, LLC: JOB SAFETY ANALYSIS (JSA)

| | JOB STEPS (Describe and number each step) | | POTENTIAL HAZARDS ASSOCIATED WITH EACH JOB STEP (Identify each hazard with a CAPITAL letter) | | CORRECTIVE ACTION(S) (Identify responsible person with initials) | |
|---|---|---|---|---|---|---|
| 1 | Travel to location, retrieval | A | Contact with sea ice falls overboard | a | proper handrails, pilot data NWS forecast data | |
| | of buoy, redeployment of buoy, | B | Heavy seas - slips, trips, falls Falls overboard, items moving | b | Proper handrails, secure items procedure for extreme weather | |
| | and travel to shore | | | b | Proper PPE on deck, non-slip foot wear. Captain discretion | capt |
| | | C | Heavy winds - slips, trips, falls wind burn, items moving | C | Handrails, secure items PPE, captain discretion | capt |
| | | D | Cold temps - frostbite, skin/eye irritation, hypothermia - cold exposure | d | Cold weather procedures warm clothing & PPE | |
| | | E | Dangerous atmosphere - contact with increased LEL % | e | Continuous monitoring of three 4-gas meters | |
| | | | | | | |
| | | | | | | |
| 2 | Rigging of Buoy | A | Pinch points, crushing, and cuts | a | Proper rigging techniques and protocol, PPE for job, identify | |
| | | | | a | Pinch points and keep personnel alerted. Communication, Proper | |
| | | | | a | equipment and inspection. Proper training. | |
| | | | | | | |
| | | | | | | |
| 3 | Lifting for buoy deployment | A | Moving or falling of overhead | a | use of boom or crane for lifting. Follow proper swp | |
| | retrieval & redeployment and | | material, over head lifting. crushing or struck-by | a | for operation of trained boom/crane operator. No working | |
| | or lifting of CTD cast | B | mechanical | a | under items being moved by boom/crane. PPE - gloves, steel | |
| | | | | b | toe boots and hard hats. Inspection of equipment & | |
| | | | | b | material prior to use. | |
| | | | | | | |

This JSA should be reviewed by everyone involved with the project. This JSA is not considered complete until everyone involved with the project signs below, along with any other contributing personnel. Should personnel need more space to complete the JSA, or if new hazards are presented due to changing conditions, an additional JSA form should be utilized and attached to these pages. Make notes on how the task can be performed in an even safer manner, and keep JSA's on file so that they may be referenced in the future should a similar project be conducted.

INVOLVED PERSONNEL SIGNATURES: