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April 19, 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 #5 ending 04/18/2017

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 fifth weekly summary report to the Department.

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. Please note that all data presented in this report is preliminary and should be considered as such until a quality control evaluation is completed. Hilcorp will continue to evaluate data quality and will notify the Department of any significant issues as soon as possible.

Pipeline repair efforts are currently underway and the temporary clamp was successfully installed on April 13, 2017. The permanent clamp was placed on the pipeline today (4/19) and installation is anticipated to be completed within the next 1-2 days.

Ice Monitoring:

As indicated in daily situation reports, recent ice observations have consistently indicated 0-1 tenth ice coverage. With forecasted warmer weather conditions, Hilcorp submitted an Amendment to the Plan on April 17, 2017 to stop daily ice monitoring efforts. The Amendment was accepted by the Department on April 18, 2017.

Fish and Wildlife Monitoring:

On April 12, one CISPRI protected species observer and one wildlife observer professional from International Bird Rescue conducted an extended overflight of approximately 20 square miles surrounding the gas leak location (within a 5-mile diameter circle). The helicopter was able to fly at approximately

300-400 feet altitude. To avoid incidental harassment of marine mammals, altitude would have been increased to 1500 feet, but only in the case where marine mammals were spotted. Flight circles were approximately 0.5 miles apart. Flight conditions and visibility were good during the flight and no marine mammals, birds, or fishes were observed within the 20 square mile area. Wildlife observer reports are provided in Attachment A.

The next fish and wildlife monitoring events are planned for today (April 19), and Friday, April 21, 2017. Remaining flights in April will target Wednesdays and Fridays. Wildlife monitoring will continue for two weeks following the temporary repair of the pipeline.

Water Quality Sampling:

The water quality buoy was successfully deployed two times on April 12, 2017, one day after a neap tide. To prevent interference with active pipeline repair operations, water quality buoy drifts avoided the immediate area of the gas leak. The buoy was equipped with sensors to monitor temperature, pH, salinity, ORP, conductivity, relative conductivity, and concentrations of dissolved oxygen and methane. During Sampling Period #5, the buoy was tethered to the deck to allow for periodic adjustment of the buoy's travel path. This method of deployment reduced the depth of the instruments in the water column to 1.5, 6.5, and 11.5 meters below the water surface.

Drifts #1 and #2 passed 61 meters and 223 meters from the gas release, respectively. Water quality sampling during Sampling Period #5 showed limited variability in dissolved oxygen, methane, and carbon dioxide concentrations. The lowest dissolved oxygen reading observed (11.43 mg/L) was well above the water quality standard specified under 18 AAC 70 for marine waters. The highest methane concentration observed was 0.12 mg/L at 6.5 meters below the water surface. No violations of state water quality standards were identified.

A summary report and additional safety documentation for the water quality sampling efforts are provided in Attachment B. The next water quality sampling effort is planned to occur today (April 19), conditions permitting

Air/Water Interface Sampling:

Air/Water Interface Sampling was conducted on April 12, 2017. To prevent interference with active pipeline repair operations, water quality buoy drifts avoided the immediate area of the gas leak. The air/water interface buoy was equipped with sensors to monitor concentrations of carbon dioxide and oxygen at the air/water interface. The air/water interface buoy was also equipped with sensors to monitor dissolved methane, temperature, conductivity, dissolved oxygen, and salinity in water at a depth of 1.5 to 1.75 meters below the water surface.

Four drifts with the air/water interface buoy were completed at differing tidal stages. GPS coordinates indicate the buoy traversed as close as 37 meters from the reported leak coordinates. The maximum methane concentration detected at the air/water interface during Sampling Period #5 was 187 ppm. For

reference, a methane concentration of 10,000 ppm has previously been identified as having no toxic effects in mammals.[1]

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

The performance of the replacement dissolved methane sensor was evaluated during the April 12, 2017 Air/Water Interface Sampling Event (Sampling Event #3) and used to evaluate data obtained during Sampling Event #1. A summary report and additional safety documentation for the water quality sampling efforts are provided in Attachment B.

Acoustic Monitoring:

Acoustic monitoring described in the Plan was conducted previously on Sunday March, 27, 2017. A second acoustic monitoring effort was initiated on April 7, 2017 to measure underwater sound pressure levels from the use of a CaviBlaster® during pipeline repair operations. Prior to beginning repair operations, Autonomous Multichannel Acoustic Recorders (AMARs) were placed on the seafloor at two fixed distances from the leak location. The AMARs have been continuously recording acoustic data in the Cook Inlet with ice coverage ranging between 0-1 tenth since deployment. The CaviBlaster® is currently planned to be used in the next 1 - 2 days. Following CaviBlaster® use, the AMARs will be recovered and data obtained will be reported to the Department.

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: Fish and Wildlife Monitoring Summary Report
Attachment B: Water Quality Sampling Summary Report

[1] Animals exposed to methane at 10,000 ppm showed no toxic effects, and there is no potential for systemic toxicity in mammals [NRC (National Research Council). 1984. a. Emergency and Continuous Exposure Limits for Selected Airborne Contaminants, Vol. 1. Washington, DC: National Academy Press].

ATTACHMENT A

FISH AND WILDLIFE MONITORING SUMMARY REPORT

April 12, 2017 Report
Hilcorp Cook Inlet Wildlife Surveys
By Wildlife Observer, Responder, IBR

I arrived at Ross Aviation at 6:30 am, and took Hilcorp charter from Anchorage to Kenai, landing in Kenai about 7:00 am. I confirmed my return flight with Adam, and picked up a Hilcorp pool car at the Kenai hangar. Weather was sunny and calm, with the appearance of little ice in the inlet at outgoing tide.

I ate breakfast, and checked for any recent relevant bird sightings in the upper Cook Inlet area from eBird.org and the AK Birding listserv (none). Spring migration is beginning.

I visited the Kenai River mouth area from 10:15-10:30 am during outgoing tide, and observed hundreds of gulls and a few Bald Eagles. No marine birds spotted. At 11-11:15 am I checked the Nikishka Beach Rd dock, but no marine birds were spotted.

I arrived at OSK helipad about 11:20 am. I met the Spill Tech from CISPRI who was the marine mammal observer on the same flight. We conducted the heli survey at 12:25 pm until 1:20 pm based on predicted slack tide of 12:37 pm, but the actual slack tide was about 1:40 pm.

We were able to fly about 380' ASL because the volume of methane leaking has diminished. There was very little ice floating in the survey area, but more in the center of the inlet. I sat on the outside circling window as we made clockwise circles around the leak (which was marked with a buoy). The outer ending GPS point (west side) was 60°46.0531' N, 151°31.6763' W (taken by CISPRI MMO). Visibility was very good. Afterwards, we landed on the Monopod briefly, and then another inlet platform to the southwest. No marine life was observed on any overflight segments.

I departed Kenai at 3 pm on the Twin Otter, and arrived at Ross Aviation hangar in Anchorage about 4 pm after a stop at the Beluga facility.

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	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)	% Open Water	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	Comments
1	3/9/2017	*flight data sheet not completed for March 9, 2017*																				
2	3/17/2017	IBR	1505	1550	1513	Nik	85	500	15	<25	0	0	1415	18.5	6.8	ENE	100+	0	0	TP	CISPRI PSO	No wildlife observed
3	3/20/2017	IBR	1010	1120	1028	Nik	85	500	20	<25	0	0	1135	26.4	4.3	NNW	100+	5	0	unk	CISPRI PSO	No wildlife observed
4	3/22/2017	IBR	1305	1400	1311	Nik	85	500	20	25-50	0	0	1413	31.3	2.5	ESE	100+	0	0	Joe	CISPRI PSO	No wildlife observed. Approx. 20% open water around leak site. Slight swell seen under ice near leak per WC.
5	3/31/2017	IBR	1445	1538	1437	Nik	85	350	see GPS	25-50	2	<1	1430	31.3	15.2	ENE	50+	100	0	Joe	CISPRI PSO	1 gull and 1 raven seen by PSO and Pilot in survey area.
6	4/5/2017	IBR	1315	1410	1303	Nik	60-70	300-400	see GPS	>75	2	1	1215	35.2	8.7	ENE	50+	100	0	TP	CISPRI PSO	No wildlife observed
7	4/7/2017	IBR	1505	1605	1515	Nik	60	360	see GPS	99	2	1	1617	37.2	3.3	NNE	100+	50	0	TP	CISPRI PSO	One flying gull in survey area.
8	4/12/2017	IBR	1225	1320	see narra-tive	Nik	78	380	see GPS	99	0	0	1145	39.7	6.1	WNW	100+	0	0	TP	CISPRI PSO	No wildlife observed

Cook Inlet Operations - Protected Species Observer Effort Log

Project ID: PSO Hilcorp

Name: Protected Species Observer **Initial:** PSO **Vessel Name:** Hilcorp Helo

Protected Species Observer PSO **Effort Log Page #:** MMO-009

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)					
04/05/17	PSO	1300	N. 60° 44.409'	W. 151° 18.546	Alt 300-400'	1400	N. 60° 48.545'	W. 151° 29.042'	Alt 300-400'	0.7 knots	ϕ	ϕ	unlimited	none
04/07/17	PSO	1500	N. 60° 44.330'	W. 151° 18.649'	Alt 523'	1356	N. 60° 47.943'	W. 151° 31.893	Alt 365'		ϕ	ϕ	unlimited	none
04/12/2017	PSO	1215	60° 45.118' N	151° 20.566W	ALT 380'	1310	60° 46.053'N	151° 31.676'W	ALT 380	WNW @ 6.1 KNT	ϕ	ϕ	UNLIMITED	NONE

Photograph Log

Photos were taken the vicinity of the leak with a view of Platform A. Flight circles are approximately 0.5 miles apart. The still water has been conducive to detecting flight or dive movements of wildlife.

ATTACHMENT B

WATER QUALITY SAMPLING SUMMARY REPORT

Cook Inlet Methane Pipeline Leak Area

Water Quality and Air/Water Interface Monitoring

Weekly Report #5

Prepared by SLR International Corporation (SLR)

Report Date: 4-19-2017

1.0 OVERVIEW

The fifth water quality monitoring event and third air/water interface sampling event was conducted from aboard the Offshore Service Vessel (OSV) Resolution during this reporting period using the approaches and methods described in the ADEC-approved plan (SLR 2017a and b).

Safety of the vessel and crew was top priority during the monitoring activities. 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).

The revised location of the methane leak provided by Hilcorp prior to the first monitoring event on March 18 was used for the purposes of monitoring and reporting. This revised location and corresponding water depth is:

- Latitude 151°26'01.84"W, Longitude 60°46'35.68"N
- Easting1384137.82, Northing: 2478537.39
- Water Depth (MLLW) = 21.18 meters (69.51 feet)

This location is referred to as the Methane Release Point (MRP). Initial estimates of the leak rate ranged from 203 to 300 thousand cubic feet per day (MCFD). On March 13, Hilcorp reduced the pressure in the line and reported the gas flow rate from the leak was 193 to 215 MCFD. On March 25, 2017, the leak rate was further reduced to 85 to 115 MCFD. On April 10, the flow rate was further reduced to a reported rate of 78 to 108 MCFD. On April 13, one day after the monitoring event discussed in this report, the leak was stopped by applying a temporary clamp over the hole in the gas line.

As discussed in Section 2.2 of this report, based on the preliminary data review completed to date, the dissolved oxygen (DO) concentrations measured during this event and the previous events did not violate 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

Water quality monitoring and sampling was conducted on April 12, 2017, one day after a neap tide event on April 11. The monitoring period covered portions of an ebb and flood tide. The NOAA tide predictions at the nearby East Forelands area predicted a low tide at 13:03 with height of -0.43 meters below mean lower low water (MLLW) on April 12. 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 field team consisted of one SLR and one Kinnetic Laboratories, Inc. (KLI) scientist. 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 Water Quality Cook Inlet Alaska Methane Pipeline Leak Water Quality Sampling Plan (WQ Plan), (SLR 2017a). 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 (2, 7 and 12.5 meters) as depicted on Figure 1. The primary instruments are listed below:

- SeaBird Electronics, SBE 19 plus V2 SeaCAT- conductivity, depth, temperature (CTD), with dissolved oxygen (DO), pH, and turbidity.
- Pro-Oceanus Mini Methane
- Pro-Oceanus Mini Carbon Dioxide
- PME MiniDOT
- Garmin WAAS differential global positioning system (mounted on buoy and used to track the buoy's position during a monitoring transect)

Reported instrument depths below the water surface (bws) are based on length of line from the bottom of the buoy to the instrument(s). The buoy drifted with the current so the instrument string maintained a near vertical position during deployment. This was verified by review of the depth reading obtained by the CTD, which was located at the end of the line. As with Week 4, during Week 5 the buoy was tethered to the deck of the boat, allowing for periodic adjustment of the buoy's travel path throughout the drift to better intercept the MRP. This method of deployment raised the buoy 0.5 meters above the water surface, and thus reduced the depth of the instruments in the water column a similar amount. Monitoring depths for this reporting period were approximately 1.5, 6.5, and 11.5 meters bws. A summary of the parameters measured by each instrument and frequency is provided in Attachment A, Table A-1.

During event 5, the site conditions impacted the activities completed as well as the collection of data, as noted below:

- On April 12, a dive crew was conducting repair work on the pipeline, primarily around slack tide. The MRP area needed to be avoided by other vessels when divers were working. In addition, two buoys were tethered to the pipeline 5 feet in either direction of the leak to mark its location. Consequently, water quality buoy drifts had to avoid the immediate area to prevent the multiple buoy lines from becoming entangled.

- Ice conditions during the fifth event varied from approximately 0-1 tenths ice cover, with generally little ice across the inlet except in isolated swaths. Ice coverage was even less during the flood tide (around 2-5 pm AKDT).
- Air temperatures varied between 2 and 10 ºC with water temperatures typically about -0.3 ºC, and icing of equipment was a concern.
- The replacement DO sensor installed on the SeaBird CTD system during Week 4 continued to operate satisfactorily.
- MiniCH4 and MiniCO2 sensors at the deeper (approximately 12 meter) depth were mounted with the membrane facing the water's surface as precautionary measure to prevent gas bubbles from the MRP becoming trapped within the enclosure surrounding the membrane. Prior to the Week 4 event, these sensors had been mounted with the membrane facing toward the seafloor.

Two water quality buoy drifts (monitoring transects) were completed through the area surrounding the MRP on April 12 at differing tidal stages. The duration of each water quality buoy drift varied from approximately 29 to 50 minutes. Drift #1 occurred during the ebb tide. The buoy was deployed approximately 1,500 meters up current of the MRP and was allowed to drift down current approximately 6,367 meters, with periodic adjustment using the vessel to guide it safely past the MRP. The buoy passed within 61 meters of the MRP about nine minutes into the drift. Drift #2 occurred during the flood tide. The drift began approximately 1,200 meters up current of the MRP, and the buoy drifted down current a total of 3,614 meters. The buoy passed within 223 meters of the MRP about 7.5 minutes into the drift. Attachment A, Figure A-2e illustrates the path of the two buoy drifts. Table A-2 in Attachment A provides a summary of the buoy deployments. In general, the Week 5 buoy drifts passed a farther distance from the MRP than previous weeks so as not interfere with the active repair activities.

No CTD casts were performed during Week 5.

No water samples for laboratory analysis were collected during week 5.

A photograph log documenting the data collection methods and site conditions during Week 5 is included in Attachment A.

2.2 Summary of Results

2.2.1 Buoy Transects-Week 5

Data plots for the primary parameters of interest (DO, CH_4 and CO_2) for the water quality buoy drifts completed on April 12 are provided on Figures A-8.1 and A-8.2 in Attachment A.

- Dissolved Oxygen- The lowest DO value recorded after the sensor had time to stabilize and pass the MRP was 11.49 mg/L during Drift #1 and 11.43 mg/L during Drift #2. There was no significant drop in DO concentrations recorded by the sensors as they passed the MRP (Attachment A, Figures A-8.1a and A-8.2a).

- Dissolved Methane: The maximum CH_4 concentration recorded for Drift #1 was 0.087 mg/L at the 6.5 meter depth, and 0.12 mg/L at the 6.5 meter depth during Drift #2. The recorded

CH_4 concentrations did not show a noticeable (sharp) increase as the sensors passed the MRP, (Attachment A, Figure A-8.1b and A-8.2b). During Drift #1, the CH_4 concentration showed a gradual rise, but overall remained about 0.02 mg/L less than concentrations recorded during Drifts #2. This rise may have been a reflection of the sensor equilibrating with the water conditions. Overall, the recorded CH_4 concentrations were in the lower range of concentrations measured to date during the project.

- Dissolved Carbon Dioxide - CO_2 concentrations recorded during Drifts #1 and #2 did not show any sharp upward fluctuation as the buoy passed the MRP (Figure A-8.1c and Figure A-8.2c in Attachment A). The recorded concentrations tended to increase slightly during the first 20 minutes of each drift, presumably as the instrument equilibrated with the water conditions. The measured concentrations were between 0.8 and 1.2 mg/L which is consistent with the values recorded each week during the project.

As during previous weeks, the lowest DO concentration measured during both drifts was well above the most stringent regulatory limit for DO in marine waters established in 18 AAC 70. 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.

2.2.4 Laboratory Results

There were no new laboratory sample results received for dissolved CH_4 and CO_2 this reporting period. All results for samples collected to date have been previously reported. The next water sampling event is planned for the week of April 24, the final planned week of monitoring.

2.3 Activities Planned for the Next Sampling Event

The next water quality sampling event is planned for April 17, 2017. Planned activities include:

- Conducting deployments of the water quality buoy at varied tidal conditions, with deployments under flowing conditions.

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

3.0 AIR/WATER INTERFACE MONITORING

3.1 Activities Completed

The Air / Water Interface sampling was conducted on April 12, 2017. The dissolved CH_4 sensor was replaced prior to loading the buoy onto the boat for departure. The field team consisted of one SLR scientist. Prior to sampling, the sensor calibration and integrity was assessed to verify acceptable performance. Sensors were found to be responding appropriately. Performance of the replacement dissolved CH_4 was closely monitored throughout the subsequent sampling events to confirm acceptable behavior and determine the potential validity of previously recorded dissolved CH_4 concentrations.

The data collection activities followed the Air / Water Interface Sampling Plan. The primary data collection method utilized a drifting instrumented buoy to obtain Air / Water quality parameters in the area of interest. The primary instruments are listed below and shown on Figure B1: Air / Water Interface Buoy Schematic:

- RKI Instruments S2 LEL Transmitter / Detector – collects data every minute
- RKI Instruments S2 LEL Methane (CH_4) Transmitter / Detector – collects data every minute
- RKI Instruments S2 Carbon Dioxide (CO_2) Transmitter / Detector – collects data every minute
- RKI Instruments S2 Oxygen (O_2) Transmitter / Detector – collects data every minute
- Pro-Oceanus Mini Methane (CH_4) - Submersible pCH_4 sensor and datalogger – collects data every minute
- In-Situ AquaTroll ® 600 Multiparameter Sonde – Water temperature, conductivity, dissolved oxygen, salinity – collects data every minute
- Garmin WAAS differential global positioning system (mounted on buoy and used to track the buoy's position during a monitoring transect) – collects data every minute.

Conditions during the buoy launches were:

- All of the buoy launches were conducted during periods where the launch and transect areas contained zero ice. During the fourth buoy launch ice was approaching the area and the buoy was removed before it arrived.
- Air temperature varied between 5 and 10 ºC.
- Water temperatures were approximately -0.1 ºC.
- Winds were calm.

Four buoy drifts (monitoring transects) were completed through the area surrounding the MRP at differing tidal stages. The duration of each drift varied from approximately 10 to 60 minutes, depending upon the tidal flow. Plots of the drifts are illustrated on Figure B4 Air / Water Interface Sampling Events, Buoy Tracks April 12, 2017 in Attachment B. During the drifts, the closest distance the buoy passed near the MRP varied between approximately 37 and 242 meters. Table B14 Summary of Air / Water Interface Buoy Drifts April 12, 2017 in Attachment B provides a summary of the buoy deployments.

3.2 Preliminary Summary of Results

3.2.1 Event 1 Data Update

While deployed during the April 12, 2017 launch, performance of the replacement dissolved CH_4 sensor was monitored closely. Data obtained by the sensor was consistently below the detectable lower limit of the sensor. After completion of the fourth buoy launch, the buoy was held directly above the bubbles at the surface where the highest observed ambient CH_4 concentrations were observed. The sensor responded to the localized ambient CH_4 concentrations proving that the sensor was functioning correctly. The response was slow and consistent with manufacturer provided sensor specifications that indicate an 8 minute sensor equilibration period. Dissolved CH_4 data obtained during Event 1 demonstrated several "spikes" in concentrations that were contrary to this slow equilibration period. It was therefore determined that those spikes were likely associated with damage to the originally installed sensor and those data were invalidated. The final, validated results for Event 1 are provided in Attachment B as Tables B2 through B7.

3.2.2 Event 2 Data Update

Event 2 data were reviewed and finalized without changes. The final, validated results for Event 2 are provided in Attachment B as Tables B9 through B13.

3.2.3 Event 3 Data

Due to the short period between the monitoring event and initial reporting date, all of the data collected during this sampling event has not been fully reviewed, analyzed and validated for reporting. A brief description of each buoy deployment is provided, followed by a general discussion of the preliminary results.

During Drift #1 the Air / Water Interface buoy was deployed at 11:17 on the ebb tide up current of MRP. It was retrieved approximately 62 minutes later down current of the MRP. During the drift, the buoy passed southeast of the MRP. At its closest point, the buoy came within 37 meters of the estimated MRP. CH_4 was detected in most of the launch observations. Those detections are described in section 3.2.4 below. Table B15 in Attachment B provides a summary of measurements obtained during the buoy deployment.

During Drift #2 the Air / Water Interface buoy was deployed at 13:00 on the ebb tide up current of MRP. It was retrieved approximately 29 minutes later down current of the MRP. During the drift, the buoy passed southeast of the MRP. At its closest point, the buoy came within 65 meters of the estimated MRP. Table B16 in Attachment B provides a summary of measurements obtained during the buoy deployment.

During Drift #3 the Air / Water Interface buoy was deployed at 15:29 after the pipeline repair dive team had evacuated the area. The launch was during flood tide. It was retrieved approximately 37 minutes later down current of the MRP. During the drift, the buoy passed southeast of the MRP. At its closest point, the buoy came within 68 meters of the estimated MRP. Table B17 in Attachment B provides a summary of measurements obtained during the buoy deployment.

During Drift #4 the Air / Water Interface buoy was deployed at 16:28 during flood tide and held via the boat crane in the area where bubbles were observed on the surface to the northeast of the MRP. The purpose of Drift #4 was to collect data from various points of changing CH_4 and CO_2 concentrations and confirm the ability of all sensors (primarily the replacement dissolved CH_4 sensor) to measure parameters of interest. Although below the lower detectable limit of the dissolved CH_4 sensor, the sensor responded to relatively high CH_4 concentrations when held just above the water in the area of maximum observed CH_4 in air. CH_4 in air was detected at concentrations ranging from 55 ppm to 187 ppm over a range of 242 to 339 meters away from the MRP. Maximum CH_4 in air concentrations were measured at 187 ppm at approximately 294 to 333 meters from the MRP. Discussion of dissolved CH_4 results and sensor performance is provided in section 3.2.1 Event 1 Data update. Table B18 in Attachment B provides a summary of measurements obtained during the buoy deployment.

3.2.4 Event 3 Data – Discussion of Preliminary Results

As noted in the Event 2 report, the CH_4 sensor is known to be very sensitive to changes in ambient temperature. However, despite implementing the corrective procedure to zero the sensor prior to each launch, data obtained on the first buoy launch demonstrated drift and erratic CH_4 concentrations. Concentrations of CH_4 recorded during the first drift (1.6 miles) ranged from below the detectable limit to 110 ppm. Historical monitoring and atmospheric conditions at the time of the launch suggest CH_4 detections over that distance are highly improbable.

Discussions with the field team identified that the buoy had likely not been fully acclimated to ambient and water temperature conditions prior to the first launch. The buoy was removed from storage where temperatures were estimated to be approximately 25 °C and transported on the boat deck for approximately 1 hour to the first launch point where ambient temperatures were approximately 5 °C. However the buoy was in the sun and in an area on the deck where temperatures could have been warmer than the °5 C recording. Once launched, the buoy was placed in water with a temperature of approximately 0 °C.

Trends in the data observed for the first launch showed a gradual drift over time in temperature, specific conductance, and salinity measurements that are not expected during a short one hour drift period. However, measurements obtained from the CH_4 in air sensor showed erratic changes in concentration throughout the drift with no consistent trend. The first 10 minutes of drift 1 are suspected to be impacted by boat exhaust because the boat remained close to the buoy. However, even when those measurements are excluded from consideration, no trend in CH_4 in air measurements is evident in the data.

The erratic CH_4 in air observations are suspected to be the result of the known sensitivity of the sensor to temperature changes combined with the concentrations being very near the sensor's lower detectable range. The effect of gradual cooling of the buoy itself, combined with the known drift in the sensor zero over time are suspected to be the cause of the erratic CH_4 in air concentrations. Observations recorded for drift 1 CH_4 in air are included in Table B15; however, they are not believed to be valid, representative concentrations of ambient CH_4. Prior to any future

launches, the air / water interface buoy will be allowed to acclimate in the water for at least 1 full hour prior to deployment to reduce the likelihood of similar impacts.

Actual air measurements obtained for LEL and carbon dioxide (CO_2) revealed results below the sensitivity of the sensors (lower limit of detection, LDL). Sensors for these parameters were originally selected to ensure quantitative measurement of potentially high concentrations associated with sampling directly at the MRP. Consistent with previous sampling, the actual observations were considerably lower than initial expectations even when sampling directly at the MRP. All measurements below the LDL for these parameters are reported as less than the parameter-specific LDL.

- LEL: The LEL sensor was optimized after the March 26, 2017 deployment and the LDL was adjusted to 1%. LEL results indicate methane concentrations are below 1% (equates to 5,000 ppm CH_4), providing evidence of a safe work environment.
- CO_2: The LDL for CO_2 is 0.1% or 1,000 ppm. Established global background CO_2 concentrations are expected to be approximately 400 ppm. The current sensor provides the ability to characterize significant increases in CO_2 concentrations. No adjustment to the CO_2 sensor is planned.

3.3 Activities Planned for the Next Sampling Event

The next Air / Water interface sampling event is planned for April 25, 2017. Planned activities include allowing at least 2 hours of in-water time for the Air / Water Interface buoy to acclimate to water and ambient temperature conditions prior to recording valid launch data. Procedures used to re-zero the CH_4 in air sensor prior to each drift will be continued.

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

REFERENCES

SLR International Corporation (SLR). 2017a Water Quality Sampling Plan. Cook Inlet Alaska Methane Pipeline Leak, March 2017.

SLR. 2017b. Air/Interface Sampling Plan. Cook Inlet Alaska Methane Pipeline Leak, March 2017

ATTACHMENT A:

PHOTOGRAPH LOG:
Water Quality and Air/Water Interface Photograph Log (April 12, 2017)

TABLES:
Table A-1: Water Quality Buoy Instrumentation Summary, April 12, 2017
Table A-2: Summary of Water Quality Buoy Drifts

FIGURES:
Figure A-1: Water Quality Monitoring Buoy Schematic (April 12, 2017)
Figure A-2e: Water Quality Monitoring Week 5 (April 12, 2017), Buoy Drift Tracks

Week 5 Data Plots:
Figure A-8.1a: Buoy Drift #1, April 12, 2017, Dissolved Oxygen
Figure A-8.1b: Buoy Drift #1, April 12, 2017, Dissolved Methane
Figure A-8.1c: Buoy Drift #1, April 12, 2107, Dissolved Carbon Dioxide
Figure A-8.2a: Buoy Drift #2, April 12, 2017, Dissolved Oxygen
Figure A-8.2b: Buoy Drift #2, April 12, 2017, Dissolved Methane
Figure A-8.2c: Buoy Drift #2, April 12, 2017, Dissolved Carbon Dioxide

Cook Inlet Water Quality and Air/Water Interface Sampling Photo Log: Week 5 4-12-17

Photo 1: Water Quality Buoy tethered to boat during Drift #1. Note the light ice conditions, relative to past weeks.

Date: 4/12/2017

Date: 4/12/2017

Photo 2: Water Quality Buoy tethered to boat during Drift #1. Water is clear of ice near boat but band of ice visible in the distance.

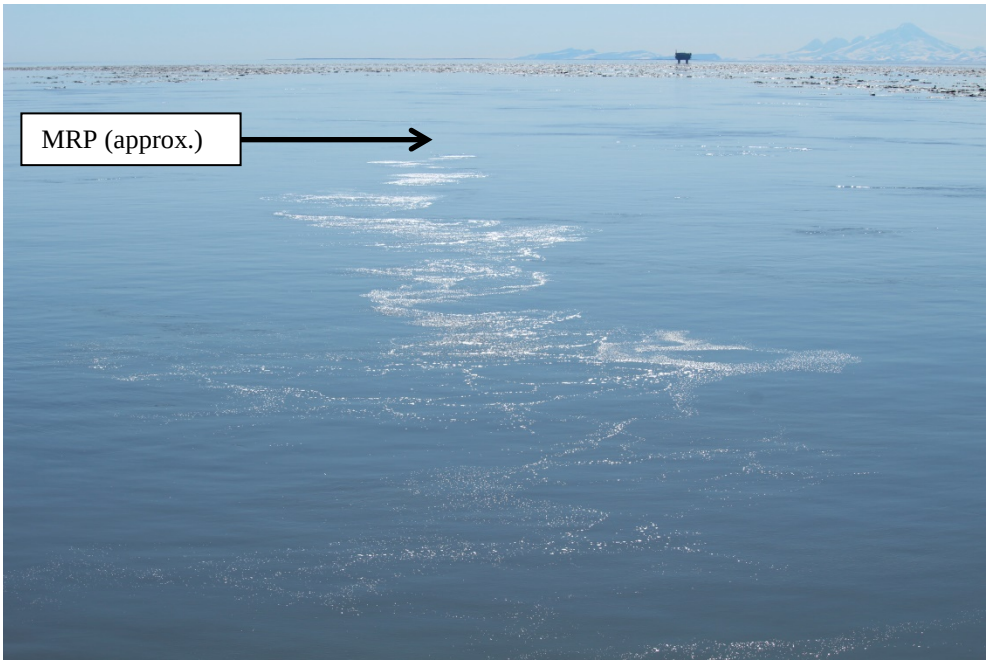


Photo 3: After Water Quality Buoy Drift #2 was completed at approximately 16:00, the Resolution held position downstream of the MRP for air interface buoy sampling. A trail of bubbles is visible on the water surface due to very calm conditions. **Date:** 4/12/2017

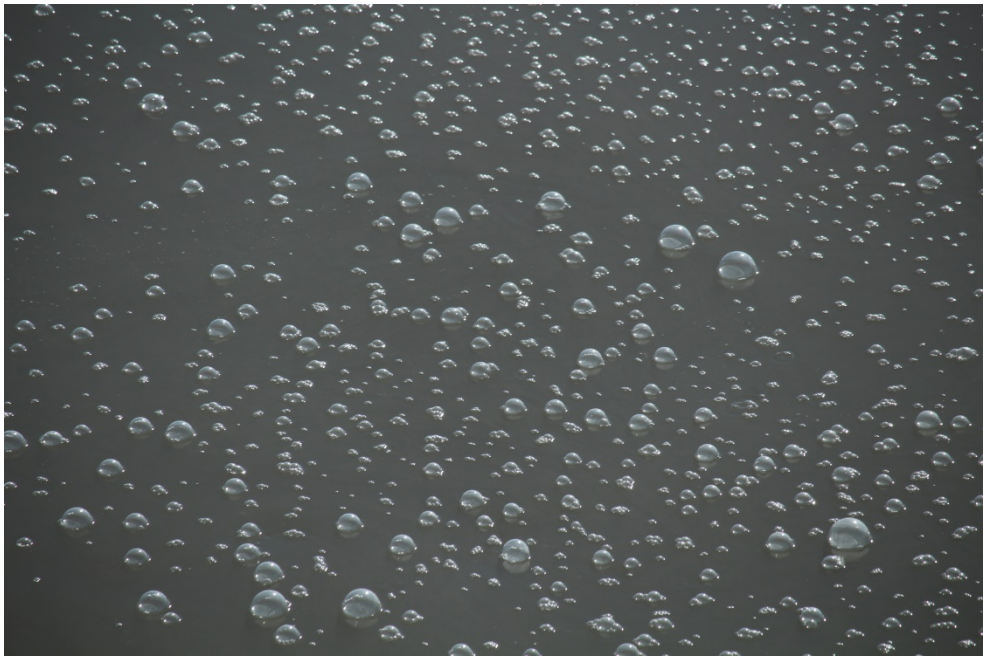


Photo 4: Close-up of bubbles on the water surface at 16:37 immediately down current from MRP. The bubbles in the photo are approximately 1 to 4 centimeter in size. **Date:** 4/12/2017

Table A-1: Water Quality Instrumentation Buoy Summary

Instrument Name	Parameters Measured	Measurement Unit	Measurement Frequency	Frequency Reported, Plotted on Data Analysis Figures	Notes
PME MiniDOT	Temperature	degrees Celsius (ºC)	Once per minute	Once per minute	Unable to record at higher frequencies
	Dissolved Oxygen	milligrams per liter (mg/L)			
Pro-Oceanus MiniCO2	Partial pressure of CO2 in detector	Parts per million by volume (ppmv)	Once per 4 seconds	Once per 4 seconds	Note this is measured as a gaseous phase concentration, which is then converted to the surrounding aqueous concentrations.
	Detector total pressure	millibars			
	Detector temperature	degrees Celsius (ºC)			
Pro-Oceanus MiniCH4 (two instruments utilized, with differing ranges 0-1% and 0-100%)	Partial pressure of CH4 in detector	Volume ratio (%)	Once per 4 seconds	Once per 4 seconds	Note this is measured as a gaseous phase concentration, which is then converted to the surrounding aqueous concentrations.
	Detector total pressure	millibars			
	Detector temperature	degrees Celsius			
Seabird SBE 19plus V3 SeaCat	Depth	meters (M)	1 per 1/4 second	Once per 4 seconds	Collected data is average to 4 second reporting frequency
	Pressure	decibar (dm)			
	Conductivity	Siemens per meter (S/m)			
	Temperature	degrees Celsius (ºC)			
	pH	Negative of the base 10 logarithm of the molar concentration of hydrogen			
	Optical backscatter (OBS)	Nephelometric Turbidity Units (NTU)			
	Dissolved Oxygen	milligrams per liter (mg/L)			
Garmin WAAS	Position	Latitude and longitude	Once per 2 seconds	Once per 2 seconds	

Table A-2: Summary of Water Quality Buoy Drifts

Buoy Type	Instrument(s) Depth (m)		Drift Name	General Tide Description	Proximity to Spring or Neap Tide[1]	Daily Tidal Range (High-Low) (m)[1]	Date	Release Location			Retrieval Location			Drift Duration (hr:min)	Start of Data Collection (hr:min: sec)[2]	End of Data Collection[2]	Duration of Data Collection[2]	Total Drift Distance (m)[2]	Average Veolcity (km/hr)[2]	Minimum Distance to MRP (m)	Drift Elapsed Time at Minimum Distace to MRP (hh:mm:ss)	Wind (Knots/direction)	Wave Height (m)	Comments
Water Quality	Surface	7	D01-031817	Ebb	2 days before neap tide event	4.75	3/18/2017	60	46.622	N	60	45.356	N	0:30	14:52:20	15:09:55	0:17:35	1766	6.1	185.9	0:01:55	calm	0	CO2 sensor at 12.5 m unintentionally shut off, no data
	Mid	7						151	25.718	W	151	27.877	W											
	Deep	12.5																						
Water Quality	Surface	2	D01-031917	Flood		3.84	3/19/2017	60	46.37	N	60	47.2	N	0:25	8:15:45	8:45:55	0:30:10	1930	3.8	44.9	0:05:10	15, SSW	0	
	Mid	7						151	26.239	W	151	25.112	W											
	Deep	12.5																						
Water Quality	Surface	2	D02-031917	Flood			3/19/2017	60	46.35	N	60	46.921	N	0:29	9:09:40	9:36:55	0:27:15	901	2.0	165.8	0:14:40	15, SSW	0	SeaBird DO sensor stopped recording after 5 minutes, potential icing
	Mid	7						151	25.878	W	151	25.878	W											
	Deep	12.5																						
Water Quality	Surface	2	D03-031917	Flood/Slack/Ebb		--	3/19/2017	60	45.527	N	60	45.527	N	2:00	9:58:00	11:57:30	1:59:30	3684	1.9	9.4	1:05:45	15, SSW	0.2	
	Mid	7						151	23.097	W	151	23.097	W											
	Deep	12.5																						
Water Quality	Surface	2	D01-032317	Flood	3 days after neap tide event	3.08	3/23/2017	60	46.565	N	60	47.479	N	0:23	12:09:50	12:29:30	0:19:40	1675	5.1	71.2	0:00:05	0.4 SSW	0	SeaBird DO sensor clogged with ice, no 12.5 meter DO data
	Mid	7						151	25.995	W	151	24.660	W											
	Deep	12.5																						
Water Quality	Surface	2	D02-032317	Flood			3/23/2017	60	46.393	N	60	47.755	N	0:47	13:10:40	13:54:55	0:44:15	3521	4.8	3.9	0:05:15	Calm	0	SeaBird DO sensor clogged with ice, no 12.5 meter DO data
	Mid	7						151	26.33	W	151	26.248	W											
	Deep	12.5																						
Water Quality	Surface	2	D03-032317	Flood/Slack/Ebb		--	3/23/2017	60	46.781	N	60	46.537	N	0:57	15:29:55	16:24:30	0:54:35	675	0.36 (flood Tide) / 1.44 (Ebb Tide)	165.5	0:50:35	Calm	0	
	Mid	7						151	25.884	W	151	26.248	W											
	Deep	12.5																						
Water Quality	Surface	2	D04-032317	Ebb		4.33	3/23/2017	60	46.695	N	60	45.403	N	0:47	16:31:35	17:18:55	0:47:20	3037	3.9	2.6	0:04:45	Calm	0	
	Mid	7						151	25.870	W	151	27.936	W											
	Deep	12.5																						
Water Quality	Surface	2	D01-032917	Ebb	1 day after spring tide event	8.35	3/29/2017	60	46.725	N	60	44.322	N	0:40	11:07:24	11:45:36	0:38:12	5193	8.2	145.7	0:02:28	11, SW	0	Water pump for SeaBrid DO sensor clogged, no 12.5 m DO data
	Mid	7						151	25.624	W	151	29.507	W											
	Deep	12.5																						
Water Quality	Surface	2	D02-032917	Flood		7.86	3/29/2017	60	46.216	N	60	49.189	N	0:54	15:54:32	16:46:56	0:52:24	6962	8.0	142.7	0:05:32	Calm	0	Water pump for SeaBrid DO sensor clogged, no 12.5 m DO data
	Mid	7						151	26.734	W	151	21.302	W											
	Deep	12.5																						
Water Quality	Surface	0.8	D01-040517	Flood	1 day after neap tide event	3.57	4/5/2017	60	46.618	N	60	46.654	N	0:20	13:26:48	13:48:08	0:21:20	793	2.5	67.8	0:08:00	5-10, SSW	0.5	
	Mid	5.8						151	26.228	W	151	25.531	W											
	Deep	11.3																						
Water Quality	Surface	0.8	D01-04057	Flood/Slack/Ebb		--	4/5/2017	60	46.546	N	60	46.361	N	0:57	13:55:32	14:52:40	0:57:08	1094	0.72 (flood Tide) / 1.08 (Ebb Tide)	10.4	0:18:28	5-10, SSW	0.5	
	Mid	5.8						151	26.247	W	151	26.350	W											
	Deep	11.3																						
Water Quality	Surface	1.5	D01-041217	Ebb	1 day after spring tide event	7.29	4/12/2017	60	47.025	N	60	44.665	N	0:50	11:21:08	12:09:20	0:48:12	6367	7.9	61.1	0:09:12	Calm	0	
	Mid	6.5						151	25.319	W	151	29.450	W											
	Deep	12																						
Water Quality	Surface	1.5	D02-041217	Flood		6.98	4/12/2017	60	46.071	N	60	47.572	N	0:29	15:31:36	15:57:32	0:25:56	3614	7.4	222.9	0:07:32	Calm	0	
	Mid	6.5						151	25.526	W	151	25.366	W											
	Deep	12																						

Notes:

1 - Tidal information is from NOAA Tide Predictions for East Foreland. StationId:TWC1989

2-These times and corresponding statistics correspond to when the buoy instrument sensors reached deployment depth based on the CTD depth reading (12.5 meters) and when the instruments began to be retrieved at the end of the drift. This time interval corresponds to the time interval plotted on the figures.

FIGURE 1: WATER QUALITY MONITORING BUOY SCHEMATIC
(MARCH 23, 29 and APRIL 5, 12, 2017)

2 Meters
Below Surface

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

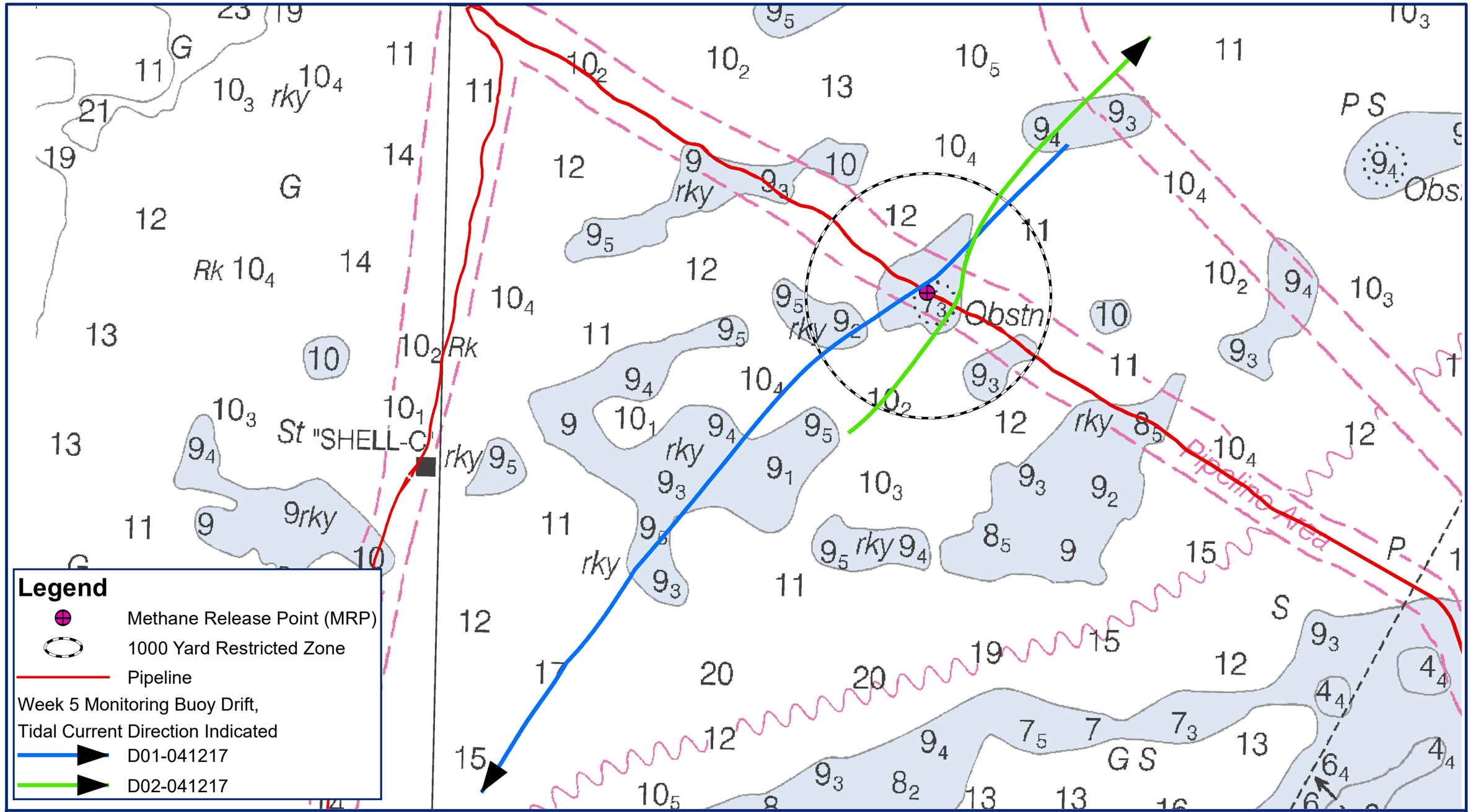
Note: In addition, Air-Interface Buoy will contain a Pro-Oceanus Mini CH_4 sensor Submersible pCH_4 (partial pressure CH_4) sensor and datalogger (0-1% by volume range) for surface water measurements of CH_4.

7 Meters
Below Surface

- 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

12.5 Meters
Below Surface

- PME MiniDOT dissolved oxygen (DO) and temperature logger: S/N 327723
- 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



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

0 500 1,000 1,500 2,000 2,500 3,000

Meters

N

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

SLR

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

Drawing: WATER QUALITY MONITORING WEEK 5 (APRIL 12, 2017)
BOUY DRIFT TRACKS

Drawing Date April 2017	Scale 1:27,625.01	Fig. No. A-2e
File Name Figure A2e Methane Release_Event5.mxd	Project No. 105.00874.17015	

Figure A-8.1a: Buoy Drift #1, April 12, 2017
Dissolved Oxygen Measurements at 1.5, 6.5, 11.5 and 12 Meters Depth
Flood Tide

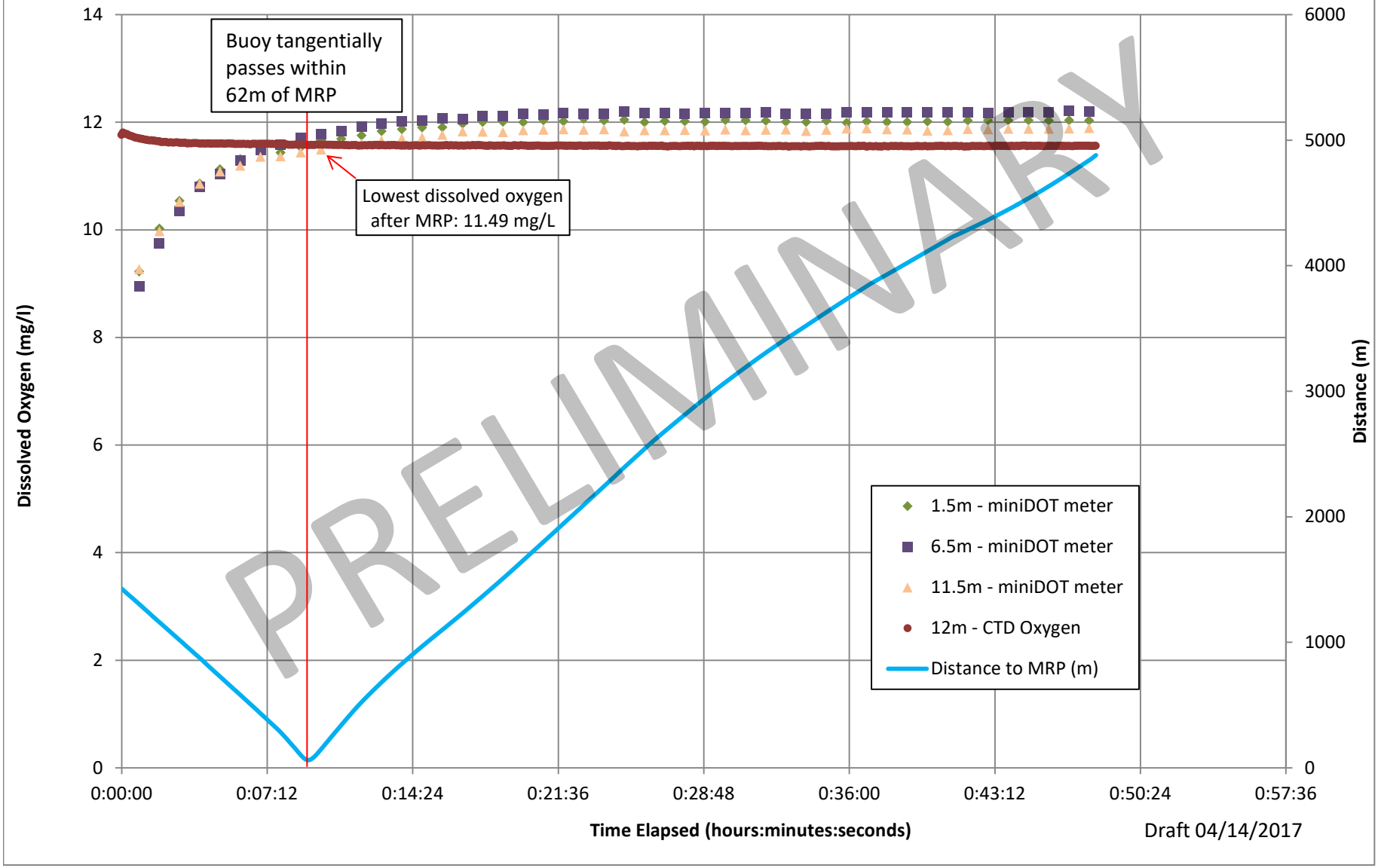
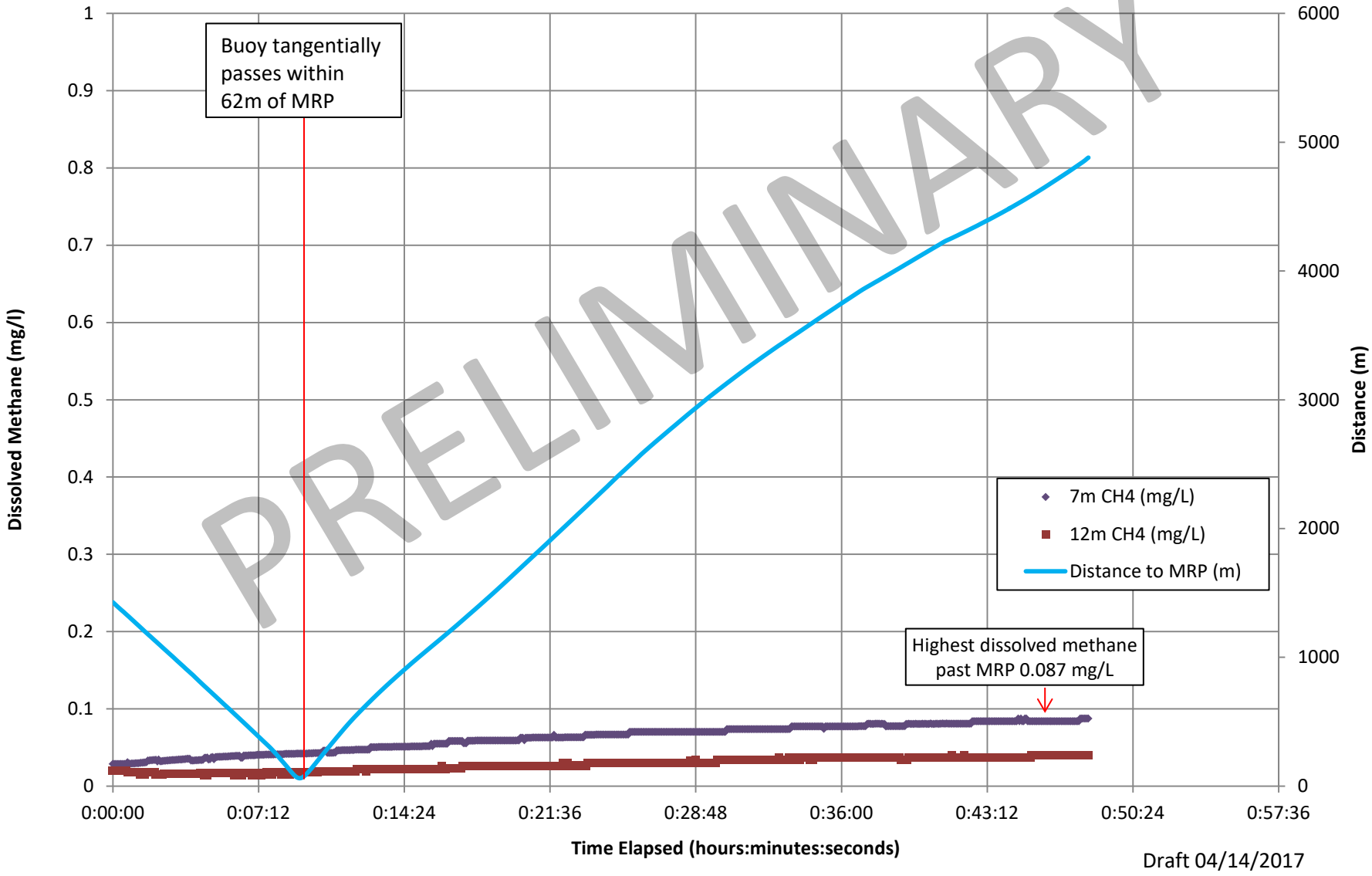


Figure A-8.1b: Buoy Drift #1, April 12, 2017
Dissolved Methane Measurements at 6.5 and 12 Meters Depth
Flood Tide



Draft 04/14/2017

Figure A-8.1c: Buoy Drift #1, April 12, 2017
Dissolved Carbon Dioxide Measurements at 6.5 and 12 Meters Depth
Flood Tide

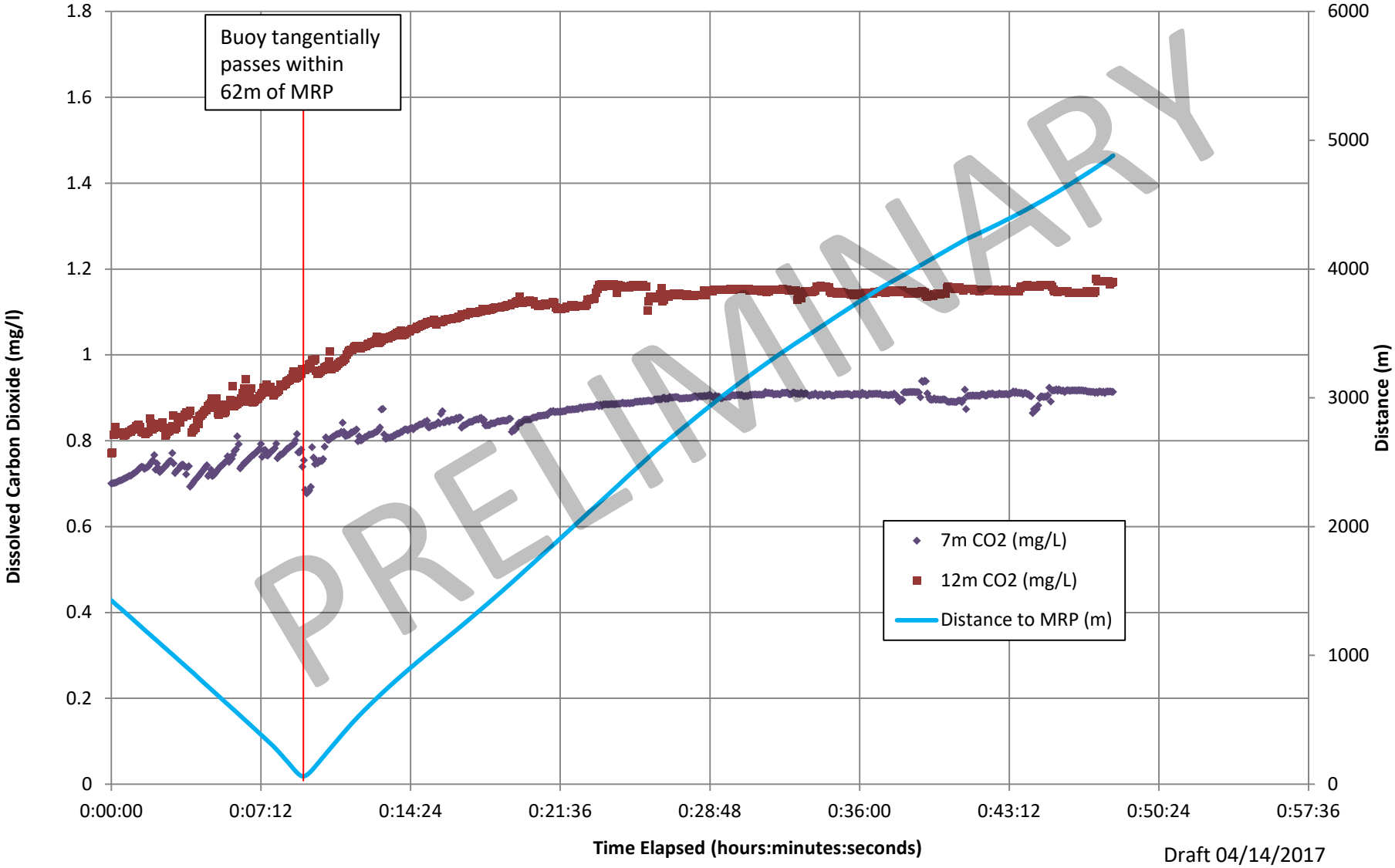


Figure A-8.2a: Buoy Drift #2, April 12, 2017
Dissolved Oxygen Measurements at 1.5, 6.5, 11.5 and 12 Meters Depth
Flood Tide

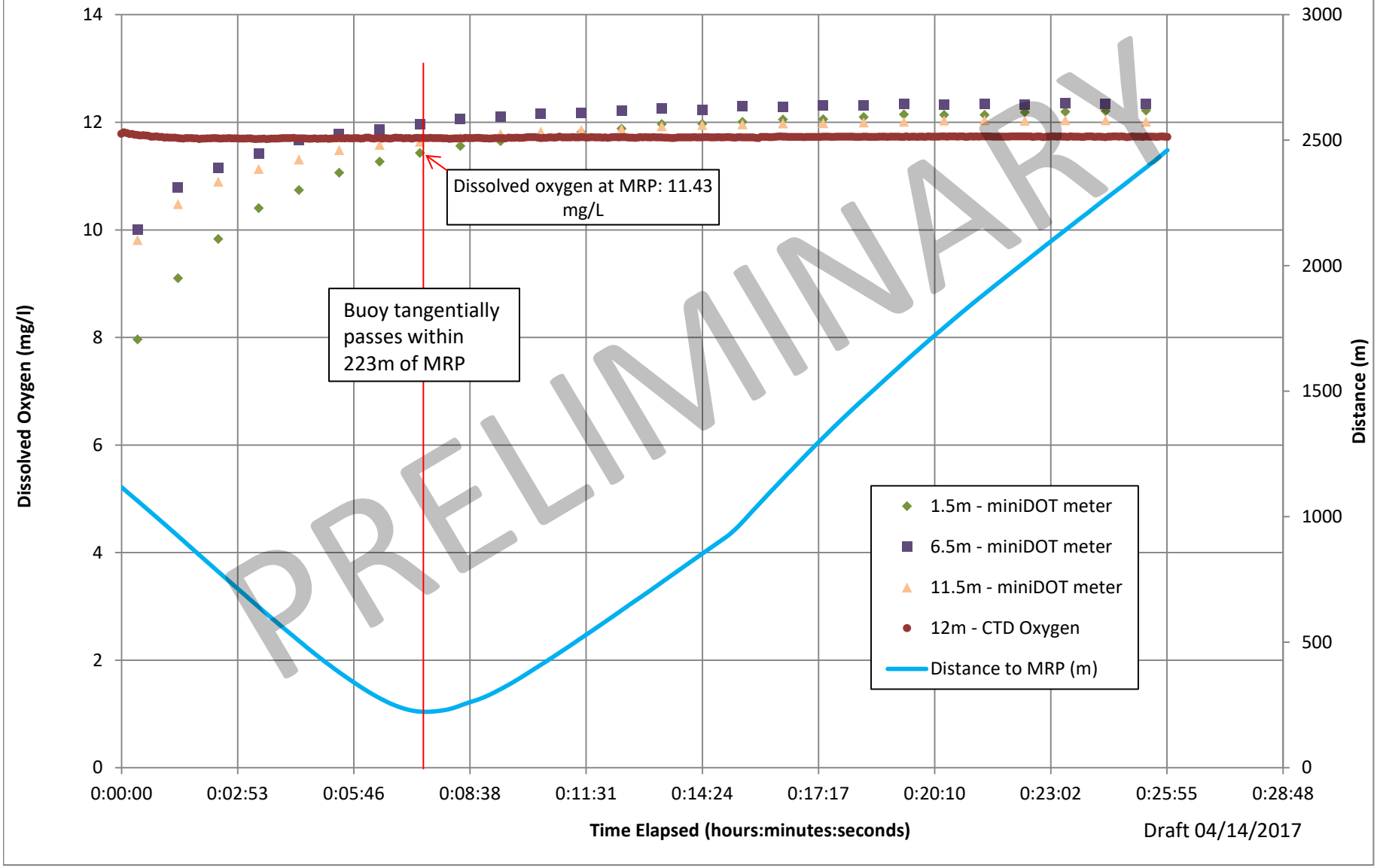
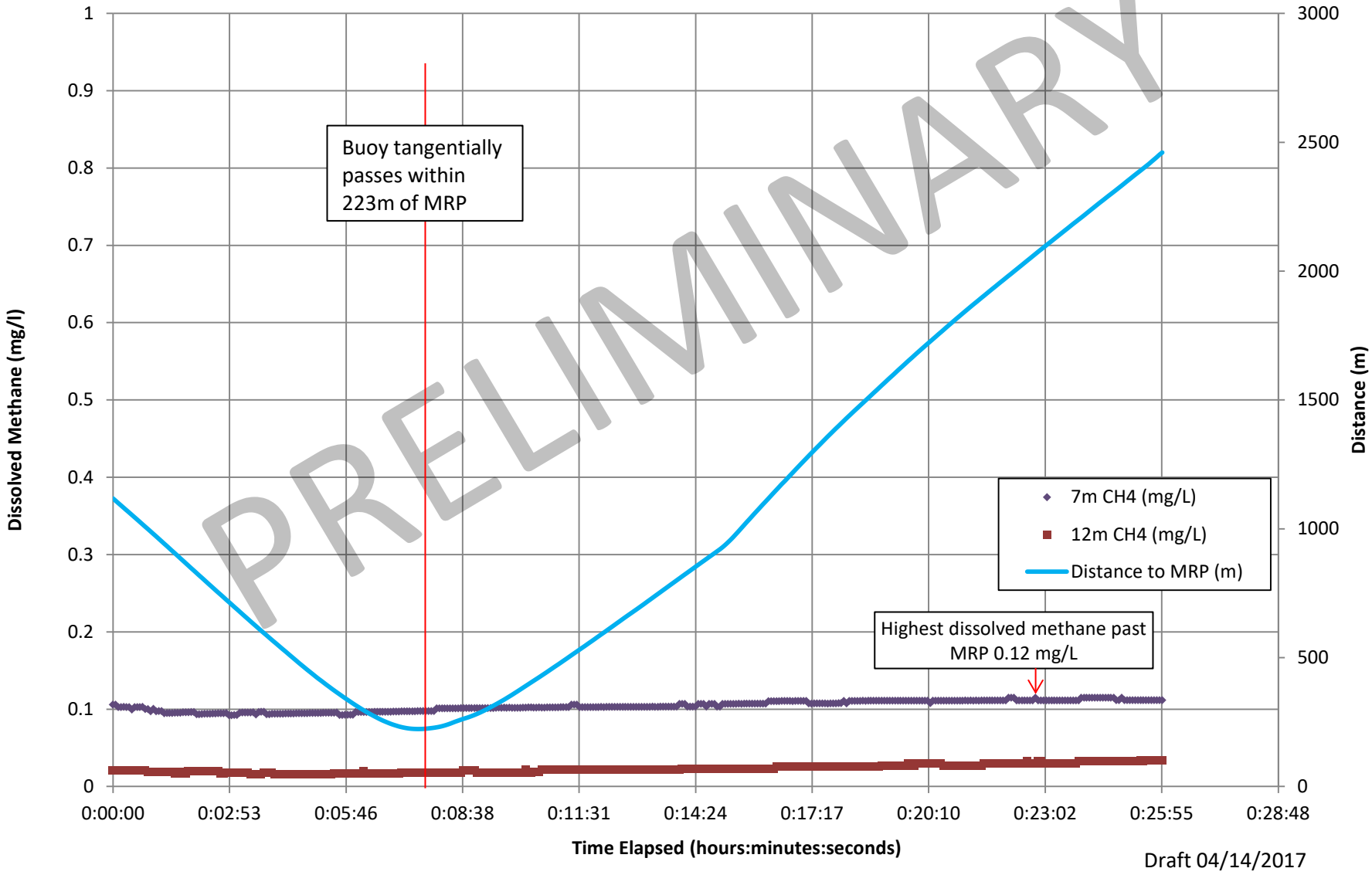
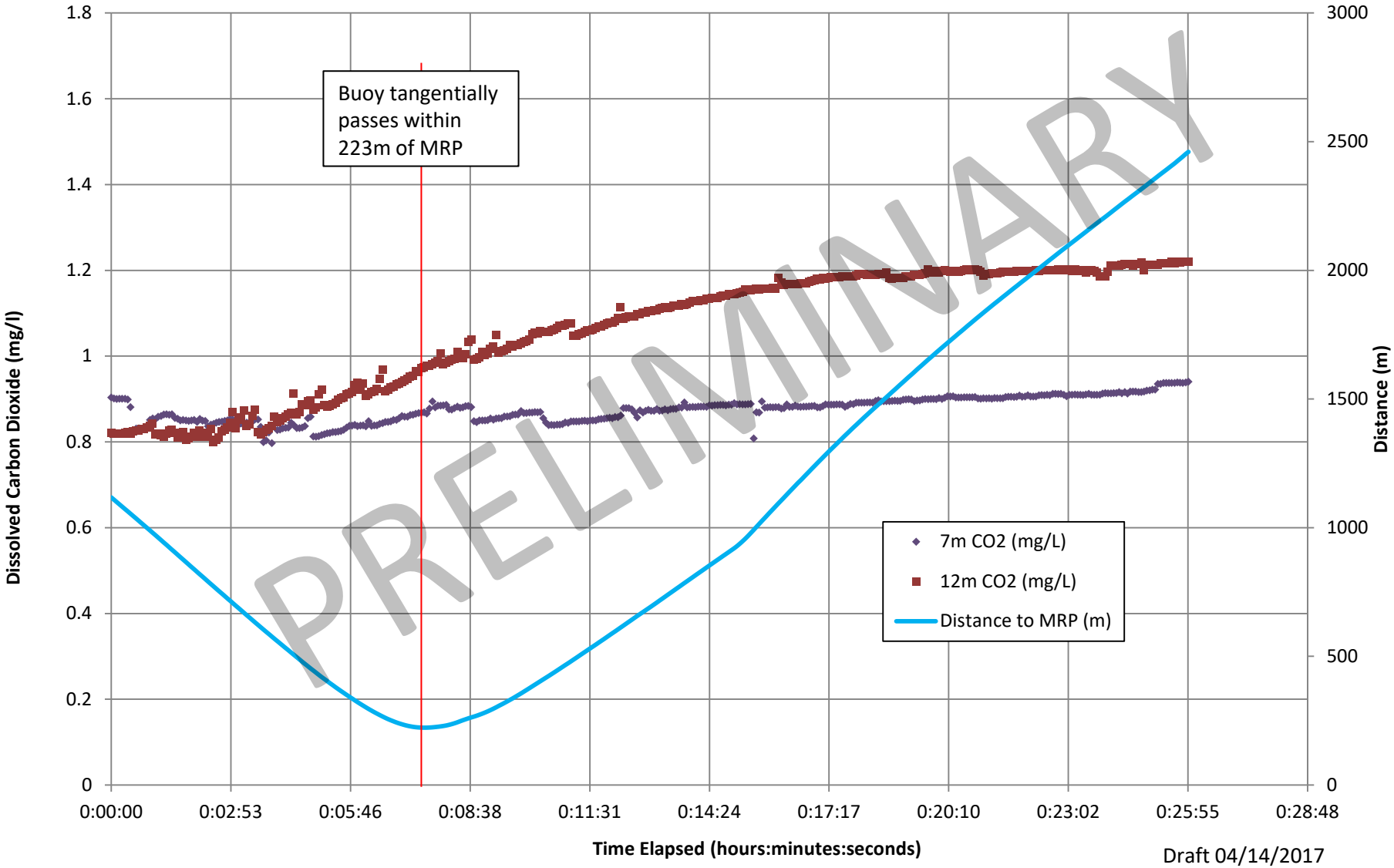


Figure A-8.2b: Buoy Drift #2, April 12, 2017
Dissolved Methane Measurements at 6.5 and 12 Meters Depth
Flood Tide



Draft 04/14/2017

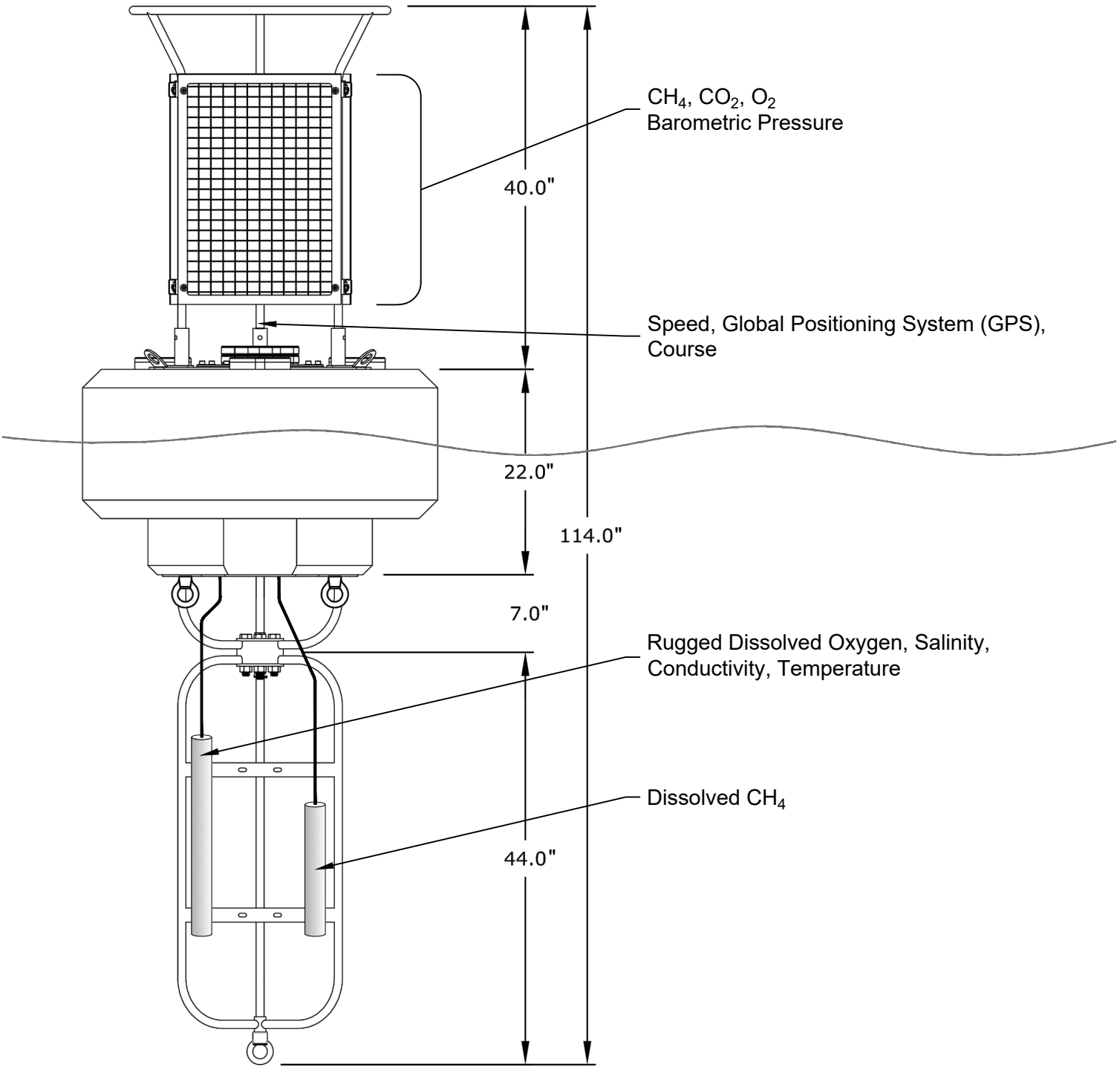
Figure A-8.2c: Buoy Drift #2, April 12, 2017
Dissolved Carbon Dioxide Measurements at 6.5 and 12 Meters Depth
Flood Tide



Draft 04/14/2017

ATTACHMENT B:

FIGURE B1: AIR / WATER INTERFACE BUOY SCHEMATIC



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
- 1000 Yard Restricted Zone
- Pipeline

Buoy Track, Arrow Indicates Current Direction at Retrieval

- 3/24/17 Launch#1
- 3/24/17 Launch#2
- 3/24/17 Launch#3
- 3/24/17 Launch#4
- 3/24/17 Launch#5
- 3/26/17 Launch#1

Obstn

"SHELL-C"

Pipeline Area

N

0 500 1,000 1,500 2,000 2,500 3,000

Meters

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	Air / Water Interface Sample Event 1 Air / Water Interface Buoy Tracks
Drawing	April 2017
Scale	1:20,000
Fig. No.	B2
File Name	Figure B2 AirInterface_Event1 .mxd
Project No.	105.00874.17015

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 (MRP)
- 3/29/2017 Drift #1
- 3/29/2017 Drift #2
- 3/29/2017 Drift #3
- 3/29/2017 Drift #4
- 3/29/2017 Drift #5
- 1000 Yard Restricted Zone
- Pipeline

N

0 250 500 750 1,000 1,250

Meters

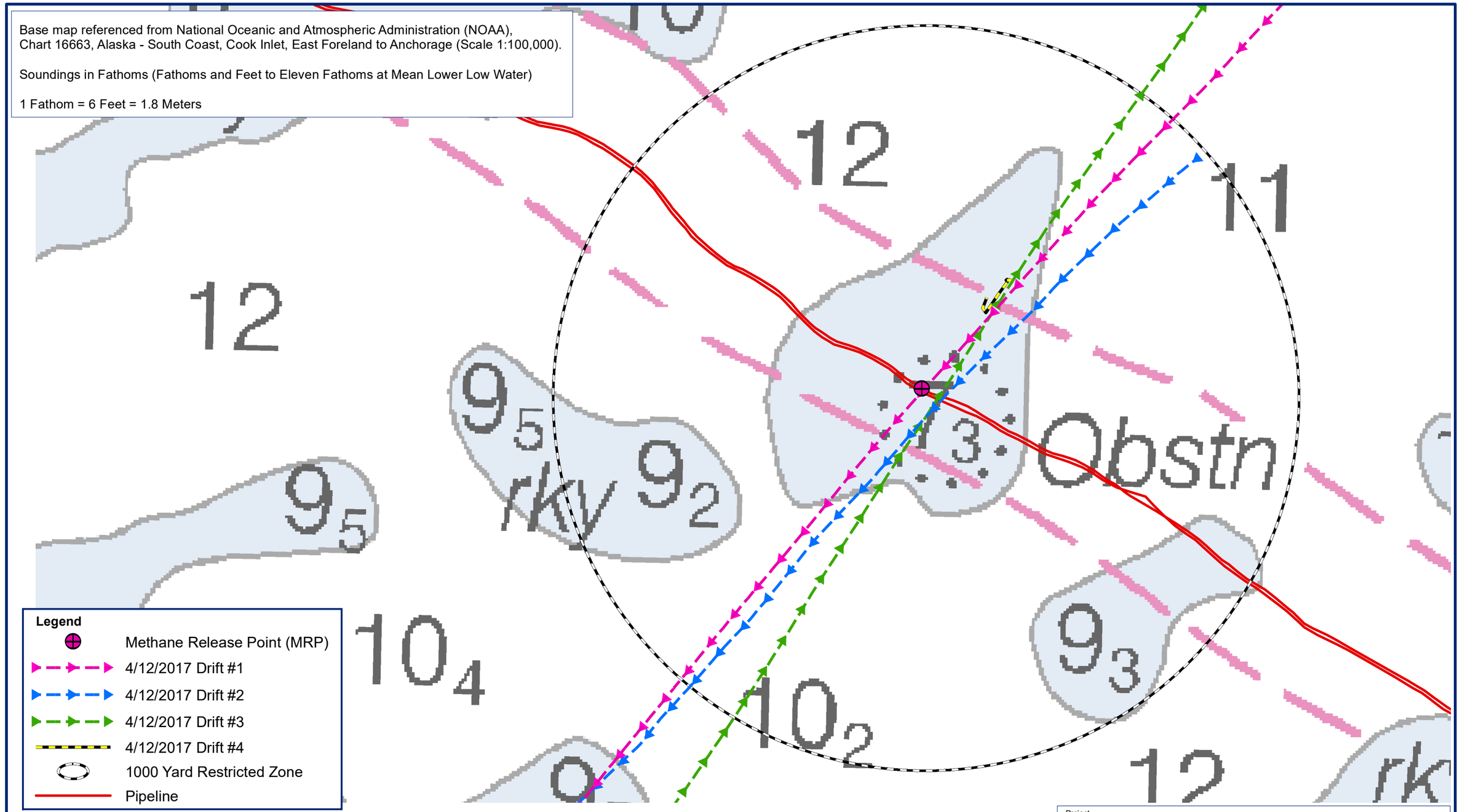
THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY.
ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

Project	HILCORP ALASKA, LLC METHANE PIPELINE LEAK COOK INLET, ALASKA
Drawing	AIR / WATER INTERFACE SAMPLE EVENT 2 AIR / WATER INTERFACE BUOY TRACKS
Drawing Date: April 2017	Scale: 1:9,000
File Name: Figure B3 AirInterface_Event2 .mxd	Project No.: 105.00874.17015
Fig. No.	B3

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 (MRP)
- 4/12/2017 Drift #1
- 4/12/2017 Drift #2
- 4/12/2017 Drift #3
- 4/12/2017 Drift #4
- 1000 Yard Restricted Zone
- Pipeline

N

0 250 500 750 1,000 1,250

Meters

SLR

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

Project	HILCORP ALASKA, LLC METHANE PIPELINE LEAK COOK INLET, ALASKA
Drawing	AIR / WATER SAMPLING EVENTS BUOY TRACKS APRIL 12, 2017
Drawing Date: April 2017	Scale: 1:9,000
File Name: Figure B4 AirInterface_Event3.mxd	Project No.: 105.00874.17015
Fig. No.: B4	

Table B1: Summary for Air / Water Interface Buoy Drifts

Buoy Type	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)
Air / Water	D01-032417	Flood	3/24/2017	13:21	60 46.176 N 151 26.504 W	13:41	60 47.032 N 151 25.496 W	0:20	61	calm	0
Air / Water	D02-032417	Flood	3/24/2017	14:05	60 46.169 N 151 26.435 W	14:26	60 47.23 N 151 25.214 W	0:21	138	calm	0
Air / Water	D03-032417	Flood	3/24/2017	14:48	60 46.22 N 151 26.41 W	15:15	60 47.024 N 151 25.243 W	0:27	89	calm	0
Air / Water	D04-032417	End of flood/Slack	3/24/2017	15:30	60 46.64 N 151 25.971 W	16:22	60 46.893 N 151 25.738 W	0:52	15	calm	0
Air / Water	D05-032417	Slack/Start of Ebb	3/24/2017	16:50	60 46.734 N 151 25.848 W	17:47	60 45.756 N 151 27.71 W	0:57	74	calm	0
Air / Water	D01-032617	Ebb	3/26/2017	10:35	60 47.099 N 151 25.169 W	11:24	60 44.995 N 151 28.954 W	0:49	100	5, SSW	0

Table B2: Validated Buoy Drift 1 March 24, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 1: Friday, 3/24/2017													
3/24/2017 13:21	60.769603, -151.444732	-0.96	12.34	41404	24.45	<0.1	<10,000	<0.1%	20.910	<2%	30.98	5.98	975.2
3/24/2017 13:22	60.770301, -151.443923	-1.06	12.32	41655	24.58	<0.1	<10,000	<0.1%	20.910	<2%	31.33	5.33	886.9
3/24/2017 13:23	60.771038, -151.443038	-1.24	12.38	41932	24.72	<0.1	<10,000	<0.1%	20.910	<2%	32.77	5.42	792.9
3/24/2017 13:24	60.771747, -151.442138	-1.25	12.36	41916	24.70	<0.1	<10,000	<0.1%	20.910	<2%	33.22	5.72	701.0
3/24/2017 13:25	60.772468, -151.441192	-1.27	12.35	41977	24.74	<0.1	<10,000	<0.1%	20.910	<2%	34.17	6.00	606.6
3/24/2017 13:26	60.773155, -151.440216	-1.28	12.36	41991	24.74	<0.1	<10,000	<0.1%	20.880	<2%	33.54	5.74	514.3
3/24/2017 13:27	60.773845, -151.439239	-1.3	12.35	42020	24.76	<0.1	<10,000	<0.1%	20.910	<2%	34.04	5.96	422.1
3/24/2017 13:28	60.774551, -151.438217	-1.31	12.35	42072	24.79	<0.1	<10,000	<0.1%	20.910	<2%	36.19	6.05	327.3
3/24/2017 13:29	60.775253, -151.437179	-1.34	12.36	42118	24.81	<0.1	<10,000	<0.1%	20.880	<2%	37.67	6.07	233.4
3/24/2017 13:30	60.775989, -151.436035	-1.33	12.36	42123	24.82	<0.1	<10,000	<0.1%	20.941	<2%	37.02	6.31	135.8
3/24/2017 13:31	60.776744, -151.434921	-1.33	12.35	42099	24.80	<0.1	<10,000	<0.1%	20.910	<2%	34.27	6.57	61.3
3/24/2017 13:32	60.777519, -151.433837	-1.36	NR	42112	24.80	<0.1	<10,000	<0.1%	20.880	<2%	33.11	6.05	104.7
3/24/2017 13:33	60.778244, -151.432861	-1.37	12.36	42114	24.80	<0.1	<10,000	<0.1%	20.941	<2%	35.78	5.88	192.8
3/24/2017 13:34	60.77898, -151.431808	-1.37	12.36	42115	24.80	<0.1	<10,000	<0.1%	20.910	<2%	34.83	6.13	289.1
3/24/2017 13:35	60.779731, -151.430786	-1.39	12.37	42138	24.81	<0.1	<10,000	<0.1%	20.880	<2%	NR	NR	388.0
3/24/2017 13:36	60.780475, -151.429779	-1.37	12.37	42082	24.78	<0.1	<10,000	<0.1%	20.910	<2%	34.47	6.03	486.3
3/24/2017 13:37	60.781211, -151.428787	-1.39	12.37	42100	24.79	<0.1	<10,000	<0.1%	20.910	<2%	33.76	5.96	583.8
3/24/2017 13:38	60.781936, -151.427795	-1.38	12.37	42086	24.78	<0.1	<10,000	<0.1%	20.910	<2%	34.26	5.85	680.3
3/24/2017 13:39	60.782634, -151.426788	-1.4	12.35	42464	25.02	<0.1	<10,000	<0.1%	20.910	<2%	35.67	5.75	774.8
3/24/2017 13:40	60.783195, -151.425979	-1.4	12.31	43176	25.48	<0.1	<10,000	<0.1%	20.910	<2%	38.58	5.33	850.7
3/24/2017 13:41	60.783863, -151.424942	-1.4	12.32	42993	25.36	<0.1	<10,000	<0.1%	20.910	<2%	36.15	5.31	943.3

NR – Instrument did not record a reading at this time interval

Table B3: Validated Buoy Drift 2 March 24, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 2: Friday, 3/24/2017													
3/24/2017 14:05	60.769489, -151.440582	-1	12.32	43328	25.68	<0.1	<10,000	<0.1%	20.910	<2%	34.16	6.61	869.0
3/24/2017 14:06	60.770187, -151.439666	-1.1	12.34	43639	25.85	<0.1	<10,000	<0.1%	20.910	<2%	33.31	5.79	777.8
3/24/2017 14:07	60.770896, -151.438827	-1.2	12.28	44621	26.46	<0.1	<10,000	<0.1%	20.910	<2%	30.40	5.59	687.3
3/24/2017 14:08	60.771625, -151.437896	-1.22	12.29	43810	25.93	<0.1	<10,000	<0.1%	20.910	<2%	36.08	5.55	593.1
3/24/2017 14:09	60.772308, -151.43695	-1.25	12.26	44151	26.14	<0.1	<10,000	<0.1%	20.910	<2%	34.69	5.63	503.9
3/24/2017 14:10	60.773002, -151.435974	-1.28	12.34	42874	25.31	<0.1	<10,000	<0.1%	20.910	<2%	34.58	5.63	414.1
3/24/2017 14:11	60.773681, -151.434997	-1.33	12.29	43963	26.00	<0.1	<10,000	<0.1%	20.910	<2%	NR	NR	328.2
3/24/2017 14:12	60.774368, -151.434005	-1.33	12.28	43995	26.02	<0.1	<10,000	<0.1%	20.910	<2%	36.70	5.64	245.9
3/24/2017 14:13	60.775035, -151.433029	-1.36	12.28	44009	26.03	<0.1	<10,000	<0.1%	20.910	<2%	36.33	5.68	177.2
3/24/2017 14:14	60.775726, -151.432006	-1.34	12.27	44007	26.03	<0.1	<10,000	<0.1%	20.910	<2%	36.11	5.72	137.6
3/24/2017 14:15	60.776435, -151.430953	-1.33	12.27	44002	26.03	<0.1	<10,000	<0.1%	20.910	<2%	34.85	5.81	157.8
3/24/2017 14:16	60.777153, -151.429946	-1.34	12.27	43983	26.01	<0.1	<10,000	<0.1%	20.910	<2%	34.52	5.96	221.1
3/24/2017 14:17	60.777877, -151.428924	-1.36	12.28	44059	26.06	<0.1	<10,000	<0.1%	20.910	<2%	36.35	5.85	303.7
3/24/2017 14:18	60.778591, -151.427886	-1.35	12.27	44021	26.03	<0.1	<10,000	<0.1%	20.910	<2%	36.16	5.77	393.4
3/24/2017 14:19	60.779254, -151.426895	-1.36	12.26	44036	26.04	<0.1	<10,000	<0.1%	20.910	<2%	37.09	5.48	480.5
3/24/2017 14:20	60.779907, -151.425903	-1.36	12.27	44042	26.04	<0.1	<10,000	<0.1%	20.910	<2%	36.50	5.44	568.3
3/24/2017 14:21	60.780551, -151.424911	-1.37	12.27	44034	26.04	<0.1	<10,000	<0.1%	20.910	<2%	36.57	5.50	656.1
3/24/2017 14:22	60.78123, -151.423934	-1.37	12.27	44050	26.05	<0.1	<10,000	<0.1%	20.910	<2%	37.04	5.59	746.4
3/24/2017 14:23	60.781875, -151.422943	-1.39	12.27	44042	26.04	<0.1	<10,000	<0.1%	20.910	<2%	38.10	5.27	835.0
3/24/2017 14:24	60.782501, -151.421981	-1.39	12.26	44049	26.04	<0.1	<10,000	<0.1%	20.910	<2%	37.87	5.16	921.2
3/24/2017 14:25	60.783084, -151.421005	-1.39	12.28	43998	26.01	<0.1	<10,000	<0.1%	20.910	<2%	40.76	5.16	1004.6
3/24/2017 14:26	60.783718, -151.420242	-1.41	12.27	44322	26.21	<0.1	<10,000	<0.1%	20.910	<2%	25.61	3.90	1084.3

NR – Instrument did not record a reading at this time interval

Table B4: Validated Buoy Drift 3 March 24, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 3: Friday, 3/24/2017													
3/24/2017 14:48	60.770336, -151.44017	-0.85	12.18	44435	26.43	<0.1	<10,000	<0.1%	20.910	<2%	35.90	3.03	774.4
3/24/2017 14:49	60.770877, -151.439575	-0.97	12.21	44746	26.61	<0.1	<10,000	<0.1%	20.910	<2%	23.89	4.25	706.2
3/24/2017 14:50	60.771358, -151.438995	-1.09	12.22	44951	26.71	<0.1	<10,000	<0.1%	20.910	<2%	33.67	3.72	644.3
3/24/2017 14:51	60.771854, -151.438385	-1.1	12.21	45041	26.76	<0.1	<10,000	<0.1%	20.910	<2%	33.69	3.83	580.3
3/24/2017 14:52	60.772361, -151.437728	-1.16	12.22	45162	26.82	<0.1	<10,000	<0.1%	20.910	<2%	32.18	3.92	514.1
3/24/2017 14:53	60.772853, -151.437042	-1.21	12.22	45229	26.86	<0.1	<10,000	<0.1%	20.910	<2%	33.08	3.98	449.1
3/24/2017 14:54	60.773342, -151.43637	-1.21	12.21	45260	26.87	Invalid	<10,000	<0.1%	20.910	<2%	35.51	4.01	385.1
3/24/2017 14:55	60.773841, -151.435653	-1.23	12.22	45333	26.92	<0.1	<10,000	<0.1%	20.910	<2%	34.34	4.16	319.8
3/24/2017 14:56	60.774356, -151.434936	-1.26	12.21	45557	27.05	<0.1	<10,000	<0.1%	20.910	<2%	32.57	4.12	254.1
3/24/2017 14:57	60.774883, -151.434234	-1.27	12.20	45601	27.08	<0.1	<10,000	<0.1%	20.910	<2%	32.29	4.24	189.6
3/24/2017 14:58	60.775432, -151.433517	-1.27	12.20	45615	27.09	<0.1	<10,000	<0.1%	20.910	<2%	32.91	4.35	128.6
3/24/2017 14:59	60.775959, -151.4328	-1.29	12.24	45123	26.76	<0.1	<10,000	<0.1%	20.910	<2%	33.13	4.40	89.2
3/24/2017 15:00	60.7765, -151.432022	-1.29	12.29	45136	26.77	<0.1	<10,000	<0.1%	20.910	<2%	34.38	4.42	99.3
3/24/2017 15:01	60.777019, -151.431304	-1.31	12.29	45156	26.78	<0.1	<10,000	<0.1%	20.910	<2%	33.36	4.33	146.4
3/24/2017 15:02	60.777553, -151.430526	-1.31	12.29	45185	26.80	<0.1	<10,000	<0.1%	20.910	<2%	33.91	4.38	210.3
3/24/2017 15:03	60.778095, -151.429763	-1.32	12.31	45216	26.81	<0.1	<10,000	<0.1%	20.910	<2%	34.38	4.37	278.5
3/24/2017 15:04	60.77864, -151.429016	-1.31	12.30	45240	26.83	<0.1	<10,000	<0.1%	20.910	<2%	32.74	4.38	348.3
3/24/2017 15:05	60.779163, -151.428283	-1.33	12.30	45300	26.87	<0.1	<10,000	<0.1%	20.910	<2%	33.44	4.27	416.9
3/24/2017 15:06	60.779663, -151.427566	-1.34	12.30	45337	26.89	<0.1	<10,000	<0.1%	20.910	<2%	35.42	4.05	483.6
3/24/2017 15:07	60.780132, -151.426834	-1.33	12.29	45293	26.86	<0.1	<10,000	<0.1%	20.910	<2%	NR	NR	548.7
3/24/2017 15:08	60.78059, -151.426086	-1.35	12.30	45343	26.89	<0.1	<10,000	<0.1%	20.910	<2%	38.05	4.09	613.6
3/24/2017 15:09	60.781051, -151.425308	-1.36	12.28	45352	26.89	<0.1	<10,000	<0.1%	20.910	<2%	39.66	4.11	679.8
3/24/2017 15:10	60.781509, -151.42456	-1.35	12.30	45357	26.90	<0.1	<10,000	<0.1%	20.910	<2%	37.53	4.03	744.8

NR – Instrument did not record a reading at this time interval
Invalid – Original measurement determined to be the result of sensor damage and not a valid concentration observation

Table B4: Validated Buoy Drift 3 March 24, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
3/24/2017 15:11	60.781982, -151.423797	-1.35	12.31	45371	26.91	<0.1	<10,000	<0.1%	20.910	<2%	38.50	4.18	811.6
3/24/2017 15:12	60.782447, -151.423004	-1.35	12.30	45387	26.92	<0.1	<10,000	<0.1%	20.880	<2%	40.95	3.92	878.8
3/24/2017 15:13	60.782882, -151.422241	-1.35	12.28	45412	26.93	<0.1	<10,000	<0.1%	20.910	<2%	41.63	3.90	942.5
3/24/2017 15:14	60.783317, -151.421478	-1.36	12.27	45434	26.95	<0.1	<10,000	<0.1%	20.910	<2%	40.58	3.81	1006.1
3/24/2017 15:15	60.783729, -151.420715	-1.36	12.26	45431	26.94	<0.1	<10,000	<0.1%	20.910	<2%	44.48	3.50	1067.9

NR – Instrument did not record a reading at this time interval
Invalid – Original measurement determined to be the result of sensor damage and not a valid concentration observation

Table B5: Validated Buoy Drift 4 March 24, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 4: Friday, 3/24/2017													
3/24/2017 15:30	60.777332, -151.432846	-0.89	12.24	43797	26.01	<0.1	<10,000	<0.1%	20.910	<2%	104.69	1.51	99.9
3/24/2017 15:31	60.777484, -151.432678	-1.11	12.19	45194	26.86	<0.1	<10,000	<0.1%	20.910	<2%	44.23	1.03	119.0
3/24/2017 15:32	60.777545, -151.4328	-1.16	12.18	45294	26.91	<0.1	<10,000	<0.1%	20.910	<2%	44.23	0.64	121.6
3/24/2017 15:33	60.777469, -151.432846	-1.23	12.17	45499	27.02	<0.1	<10,000	<0.1%	20.910	<2%	44.23	0.57	113.0
3/24/2017 15:34	60.777446, -151.432769	-1.26	12.16	45818	27.22	<0.1	<10,000	<0.1%	20.910	<2%	44.23	0.72	112.8
3/24/2017 15:35	60.777557, -151.432662	-1.27	12.16	45758	27.18	<0.1	<10,000	<0.1%	20.910	<2%	44.23	0.70	126.4
3/24/2017 15:36	60.777488, -151.432785	-1.29	12.16	45794	27.20	<0.1	<10,000	<0.1%	20.910	<2%	44.23	1.07	116.4
3/24/2017 15:37	60.77732, -151.432907	-1.28	12.15	45871	27.25	Invalid	<10,000	<0.1%	20.910	<2%	NR	NR	97.0
3/24/2017 15:38	60.777206, -151.433105	-1.3	12.14	45989	27.32	Invalid	<10,000	<0.1%	20.910	<2%	44.23	1.77	80.6
3/24/2017 15:39	60.776988, -151.4337	-1.31	12.18	46144	27.42	Invalid	<10,000	<0.1%	20.910	<2%	256.34	2.01	46.3
3/24/2017 15:40	60.776977, -151.434127	-1.32	12.16	46142	27.42	Invalid	<10,000	<0.1%	20.910	<2%	256.34	1.05	47.0
3/24/2017 15:41	60.77705, -151.434371	-1.3	12.16	46141	27.42	<0.1	<10,000	<0.1%	20.910	<2%	256.34	0.85	59.8
3/24/2017 15:42	60.777164, -151.434356	-1.3	12.16	46191	27.45	<0.1	<10,000	<0.1%	20.910	<2%	256.34	1.14	70.9
3/24/2017 15:43	60.777286, -151.434066	-1.31	12.17	46208	27.46	<0.1	<10,000	<0.1%	20.910	<2%	256.34	2.03	79.7
3/24/2017 15:44	60.777225, -151.433456	-1.28	12.15	46201	27.47	<0.1	<10,000	<0.1%	20.910	<2%	108.51	1.94	75.0
3/24/2017 15:45	60.777034, -151.433227	-1.32	12.11	46262	27.49	Invalid	<10,000	<0.1%	20.880	<2%	108.51	1.27	60.8
3/24/2017 15:46	60.776988, -151.433502	-1.29	12.14	46333	27.55	<0.1	<10,000	<0.1%	20.849	<2%	108.51	0.57	49.3
3/24/2017 15:47	60.776897, -151.433532	-1.33	12.18	45734	27.15	<0.1	<10,000	<0.1%	20.880	<2%	188.21	1.46	39.3
3/24/2017 15:48	60.776706, -151.433746	-1.32	12.15	46398	27.58	<0.1	<10,000	<0.1%	20.910	<2%	188.21	0.57	15.2
3/24/2017 15:49	60.776847, -151.43367	-1.29	12.14	46350	27.56	<0.1	<10,000	<0.1%	20.910	<2%	10.71	1.31	31.4
3/24/2017 15:50	60.777019, -151.433502	-1.3	12.12	46378	27.58	<0.1	<10,000	<0.1%	20.910	<2%	10.71	1.64	52.5
3/24/2017 15:51	60.777229, -151.433242	-1.34	12.08	46946	27.93	<0.1	<10,000	<0.1%	20.910	<2%	10.71	1.75	79.5
3/24/2017 15:52	60.777416, -151.432937	-1.34	12.09	46939	27.93	<0.1	<10,000	<0.1%	20.910	<2%	10.71	1.87	105.4

NR – Instrument did not record a reading at this time interval

Invalid – Original measurement determined to be the result of sensor damage and not a valid concentration observation

-- Buoy was removed from the water and repositioned.

Table B5: Validated Buoy Drift 4 March 24, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
3/24/2017 15:53	60.777618, -151.432586	--	--	--	--	--	<10,000	<0.1%	20.910	<2%	35.88	2.20	134.3
3/24/2017 15:54	60.777713, -151.432403	--	--	--	--	--	<10,000	<0.1%	20.910	<2%	37.21	0.75	148.5
3/24/2017 15:55	60.77721, -151.433258	--	--	--	--	--	<10,000	<0.1%	20.818	<2%	217.16	6.27	77.2
3/24/2017 15:56	60.776569, -151.434097	--	--	--	--	--	<10,000	<0.1%	20.880	<2%	214.30	4.40	13.7
3/24/2017 15:57	60.776092, -151.434799	-1.24	12.30	46466	27.65	<0.1	<10,000	<0.1%	20.880	<2%	221.93	2.35	74.9
3/24/2017 15:58	60.775981, -151.435043	-1.24	12.20	46592	27.73	<0.1	<10,000	<0.1%	20.880	<2%	22.22	1.50	92.9
3/24/2017 15:59	60.7761, -151.435012	-1.28	12.18	46615	27.73	<0.1	<10,000	<0.1%	20.910	<2%	356.75	0.88	82.7
3/24/2017 16:00	60.776336, -151.434646	-1.3	12.15	46614	27.73	<0.1	<10,000	<0.1%	20.880	<2%	26.76	2.18	51.2
3/24/2017 16:01	60.776615, -151.43431	-1.3	12.16	46629	27.74	<0.1	<10,000	<0.1%	20.910	<2%	30.40	2.33	25.6
3/24/2017 16:02	60.776901, -151.43399	-1.31	12.14	46646	27.75	<0.1	<10,000	<0.1%	20.910	<2%	28.88	2.18	36.8
3/24/2017 16:03	60.777183, -151.433685	-1.32	12.14	46674	27.76	<0.1	<10,000	<0.1%	20.910	<2%	27.32	2.09	67.9
3/24/2017 16:04	60.777442, -151.433395	-1.32	12.14	46682	27.77	<0.1	<10,000	<0.1%	20.910	<2%	27.04	2.07	99.1
3/24/2017 16:05	60.777702, -151.433105	-1.32	12.15	46722	27.79	<0.1	<10,000	<0.1%	20.910	<2%	27.04	2.03	131.3
3/24/2017 16:06	60.778034, -151.432785	NR	NR	NR	NR	NR	NR	NR	NR	NR	27.04	1.94	171.8
3/24/2017 16:07	60.778289, -151.432556	-1.33	12.13	46716	27.79	<0.1	<10,000	<0.1%	20.880	<2%	27.04	2.01	202.7
3/24/2017 16:08	60.778545, -151.432296	-1.33	12.13	46730	27.80	<0.1	<10,000	<0.1%	20.910	<2%	27.04	2.01	234.4
3/24/2017 16:09	60.778804, -151.432037	NR	NR	NR	NR	<0.1	<10,000	<0.1%	20.941	<2%	27.04	2.01	266.3
3/24/2017 16:10	60.779067, -151.431777	-1.32	12.12	46735	27.80	<0.1	<10,000	<0.1%	20.910	<2%	27.04	2.03	298.7
3/24/2017 16:11	60.779418, -151.431472	-1.32	12.11	46759	27.82	<0.1	<10,000	<0.1%	20.910	<2%	27.04	1.87	341.1
3/24/2017 16:12	60.779659, -151.431274	-1.33	12.12	46788	27.83	NR	<10,000	<0.1%	20.910	<2%	27.04	1.87	370.0
3/24/2017 16:13	60.779865, -151.431091	NR	NR	NR	NR	<0.1	NR	NR	NR	NR	27.04	1.79	394.9
3/24/2017 16:14	60.780036, -151.430923	-1.21	12.13	46804	27.88	NR	<10,000	<0.1%	20.910	<2%	27.04	1.74	416.0
3/24/2017 16:15	60.780319, -151.430587	-1.22	12.11	46649	27.77	NR	<10,000	<0.1%	20.910	<2%	27.04	1.64	452.1
3/24/2017 16:16	60.780513, -151.430343	-1.27	12.13	46776	27.84	<0.1	<10,000	<0.1%	20.910	<2%	27.04	1.59	477.1

NR – Instrument did not record a reading at this time interval

Invalid – Original measurement determined to be the result of sensor damage and not a valid concentration observation

-- Buoy was removed from the water and repositioned.

Table B5: Validated Buoy Drift 4 March 24, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
3/24/2017 16:17	60.780693, -151.430099	-1.26	12.11	46707	27.80	<0.1	<10,000	<0.1%	20.910	<2%	27.04	1.53	500.8
3/24/2017 16:18	60.780864, -151.429885	NR	NR	NR	NR	<0.1	<10,000	<0.1%	20.910	<2%	27.04	1.55	522.9
3/24/2017 16:19	60.781013, -151.429718	-1.28	12.12	46774	27.84	<0.1	<10,000	<0.1%	20.910	<2%	27.04	1.48	541.7
3/24/2017 16:20	60.781192, -151.429519	-1.28	12.11	46802	27.86	<0.1	<10,000	<0.1%	20.910	<2%	27.04	1.40	564.3
3/24/2017 16:21	60.781372, -151.42929	-1.27	12.11	46826	27.88	<0.1	<10,000	<0.1%	20.910	<2%	27.04	1.51	587.7
3/24/2017 16:22	60.781547, -151.42897	-1.3	12.13	46798	27.85	<0.1	<10,000	<0.1%	20.910	<2%	61.78	2.44	612.7

NR – Instrument did not record a reading at this time interval
Invalid – Original measurement determined to be the result of sensor damage and not a valid concentration observation
-- Buoy was removed from the water and repositioned.

Table B6: Validated Buoy Drift 5 March 24, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 5: Friday, 3/24/2017													
3/24/2017 16:50	60.778907, -151.430801	-0.16	11.93	44026	26.34	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.35	307.2
3/24/2017 16:51	60.778987, -151.430786	NR	NR	NR	NR	NR	<10,000	<0.1%	20.910	<2%	239.22	1.01	315.2
3/24/2017 16:52	60.778915, -151.430969	-0.93	12.14	45962	27.41	<0.1	<10,000	<0.1%	20.910	<2%	NR	NR	303.2
3/24/2017 16:53	60.778835, -151.431121	-0.98	12.10	46071	27.47	<0.1	<10,000	<0.1%	20.910	<2%	239.22	0.85	291.3
3/24/2017 16:54	60.778728, -151.431289	-1.09	12.12	46287	27.58	<0.1	<10,000	<0.1%	20.910	<2%	239.22	0.77	276.4
3/24/2017 16:55	60.778629, -151.431472	-1.14	12.11	46419	27.65	<0.1	<10,000	<0.1%	20.910	<2%	239.22	0.83	261.9
3/24/2017 16:56	60.77853, -151.431671	-1.16	12.13	46498	27.69	<0.1	<10,000	<0.1%	20.910	<2%	239.22	0.92	247.1
3/24/2017 16:57	60.778419, -151.431869	-1.18	12.11	46537	27.71	<0.1	<10,000	<0.1%	20.910	<2%	239.22	0.87	231.1
3/24/2017 16:58	60.778316, -151.432083	-1.21	12.13	46590	27.74	<0.1	<10,000	<0.1%	20.910	<2%	239.22	0.98	215.7
3/24/2017 16:59	60.778198, -151.432342	-1.23	12.11	46756	27.84	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.16	197.8
3/24/2017 17:00	60.778076, -151.432632	-1.25	12.12	46761	27.84	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.22	179.1
3/24/2017 17:01	60.777935, -151.432937	-1.26	12.13	46767	27.84	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.31	158.8
3/24/2017 17:02	60.777801, -151.433258	NR	12.15	46804	27.87	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.37	139.7
3/24/2017 17:03	60.777645, -151.433578	-1.25	12.13	46804	27.87	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.48	119.6
3/24/2017 17:04	60.777473, -151.433914	-1.24	12.11	46853	27.90	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.44	99.6
3/24/2017 17:05	60.777313, -151.434265	-1.25	12.12	46835	27.88	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.66	84.9
3/24/2017 17:06	60.777126, -151.434631	-1.27	12.12	46874	27.91	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.68	74.4
3/24/2017 17:07	60.77695, -151.435012	-1.27	12.12	46852	27.89	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.79	75.7
3/24/2017 17:08	60.776767, -151.435424	-1.27	NR	NR	NR	NR	<10,000	<0.1%	20.910	<2%	239.22	1.66	88.3
3/24/2017 17:09	60.776569, -151.435806	-1.26	12.12	46874	27.91	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.77	106.5
3/24/2017 17:10	60.776371, -151.436203	-1.27	12.12	46884	27.91	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.87	130.1
3/24/2017 17:11	60.776165, -151.436645	-1.27	12.12	46894	27.92	<0.1	<10,000	<0.1%	20.910	<2%	239.22	2.00	158.8
3/24/2017 17:12	60.775947, -151.437133	-1.28	12.12	46897	27.92	<0.1	<10,000	<0.1%	20.910	<2%	227.70	2.09	191.8

NR – Instrument did not record a reading at this time interval

Table B6: Validated Buoy Drift 5 March 24, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
3/24/2017 17:13	60.77573, -151.437622	-1.29	12.13	46858	27.89	<0.1	<10,000	<0.1%	20.910	<2%	228.38	2.16	225.7
3/24/2017 17:14	60.775508, -151.43814	-1.3	12.13	46903	27.92	<0.1	<10,000	<0.1%	20.880	<2%	226.79	2.18	261.8
3/24/2017 17:15	60.775283, -151.43869	-1.28	12.11	46936	27.94	<0.1	<10,000	<0.1%	20.910	<2%	228.51	2.35	299.9
3/24/2017 17:16	60.775047, -151.439224	-1.3	12.13	46903	27.92	<0.1	<10,000	<0.1%	20.910	<2%	226.96	2.48	338.1
3/24/2017 17:17	60.774803, -151.439788	-1.29	12.13	46904	27.92	<0.1	<10,000	<0.1%	20.880	<2%	227.80	2.50	378.3
3/24/2017 17:18	60.774532, -151.440383	-1.3	12.13	46952	27.95	<0.1	<10,000	<0.1%	20.880	<2%	226.14	2.53	421.6
3/24/2017 17:19	60.774261, -151.440963	-1.27	12.12	46966	27.97	<0.1	<10,000	<0.1%	20.880	<2%	225.83	2.51	464.5
3/24/2017 17:20	60.77399, -151.441543	-1.27	12.12	46951	27.96	<0.1	<10,000	<0.1%	20.880	<2%	224.20	2.44	507.5
3/24/2017 17:21	60.773715, -151.442108	-1.26	12.12	46981	27.98	<0.1	<10,000	<0.1%	20.910	<2%	224.84	2.55	550.1
3/24/2017 17:22	60.773426, -151.442733	-1.22	12.12	46998	28.00	<0.1	<10,000	<0.1%	20.910	<2%	225.20	2.68	596.4
3/24/2017 17:23	60.773132, -151.443344	-1.31	12.13	46930	27.93	<0.1	<10,000	<0.1%	20.910	<2%	221.34	2.48	642.5
3/24/2017 17:24	60.772834, -151.443954	-1.29	12.13	46970	27.96	<0.1	<10,000	<0.1%	20.880	<2%	223.32	2.72	688.9
3/24/2017 17:25	60.772518, -151.444595	-1.3	12.12	46953	27.95	<0.1	<10,000	<0.1%	20.880	<2%	224.80	2.77	737.9
3/24/2017 17:26	60.772201, -151.445251	-1.28	12.13	46958	27.96	<0.1	<10,000	<0.1%	20.880	<2%	224.08	3.01	787.7
3/24/2017 17:27	60.771873, -151.445907	-1.27	12.13	46984	27.98	<0.1	<10,000	<0.1%	20.910	<2%	224.42	3.01	838.2
3/24/2017 17:28	60.77153, -151.446563	-1.26	12.12	46970	27.97	<0.1	<10,000	<0.1%	20.941	<2%	222.30	3.16	889.9
3/24/2017 17:29	60.770973, -151.447586	-1.24	12.12	46983	27.99	<0.1	<10,000	<0.1%	20.880	<2%	220.25	3.22	972.2
3/24/2017 17:30	60.770793, -151.447906	-1.24	NR	NR	NR	NR	NR	NR	NR	NR	220.98	3.18	998.4
3/24/2017 17:31	60.77042, -151.448623	-1.24	12.12	46980	27.98	<0.1	<10,000	<0.1%	20.910	<2%	223.41	3.57	1054.9
3/24/2017 17:32	60.770034, -151.44934	-1.23	12.12	46994	27.99	<0.1	<10,000	<0.1%	20.910	<2%	222.85	3.48	1112.4
3/24/2017 17:33	60.769638, -151.450088	-1.23	12.12	46976	27.99	<0.1	<10,000	<0.1%	20.910	<2%	221.62	3.57	1171.9
3/24/2017 17:34	60.769237, -151.450851	-1.23	12.12	46982	27.99	<0.1	<10,000	<0.1%	20.910	<2%	221.40	3.81	1232.5
3/24/2017 17:35	60.768795, -151.45166	-1.22	12.12	46994	28.00	<0.1	<10,000	<0.1%	20.910	<2%	221.85	3.98	1298.0
3/24/2017 17:36	60.768341, -151.452468	-1.21	12.11	47026	28.02	<0.1	<10,000	<0.1%	20.910	<2%	218.27	4.03	1364.4

NR – Instrument did not record a reading at this time interval

Table B6: Validated Buoy Drift 5 March 24, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
3/24/2017 17:37	60.767871, -151.453262	-1.22	12.12	47005	28.01	<0.1	<10,000	<0.1%	20.910	<2%	219.18	4.01	1431.4
3/24/2017 17:38	60.767395, -151.454055	-1.24	12.12	47006	28.01	<0.1	<10,000	<0.1%	20.910	<2%	219.44	4.07	1499.0
3/24/2017 17:39	60.766914, -151.454849	-1.23	12.12	47005	28.00	<0.1	<10,000	<0.1%	20.910	<2%	218.23	4.29	1567.0
3/24/2017 17:40	60.766426, -151.455688	-1.25	12.12	47018	28.01	<0.1	<10,000	<0.1%	20.910	<2%	219.03	4.12	1637.4
3/24/2017 17:41	60.765914, -151.456527	-1.26	12.11	46989	27.99	<0.1	<10,000	<0.1%	20.910	<2%	218.31	4.35	1709.7
3/24/2017 17:42	60.765399, -151.457366	-1.24	12.12	47060	28.03	<0.1	<10,000	<0.1%	20.880	<2%	218.81	4.48	1782.3
3/24/2017 17:43	60.764862, -151.458221	-1.24	12.11	47013	28.01	<0.1	<10,000	<0.1%	20.910	<2%	216.26	4.24	1857.3
3/24/2017 17:44	60.764316, -151.459091	-1.24	12.12	47058	28.03	<0.1	<10,000	<0.1%	20.880	<2%	219.70	4.92	1933.5
3/24/2017 17:45	60.763767, -151.459976	-1.26	12.12	47079	28.05	<0.1	<10,000	<0.1%	20.880	<2%	217.31	4.35	2010.7
3/24/2017 17:46	60.763195, -151.460861	-1.25	12.12	47116	28.07	<0.1	<10,000	<0.1%	20.910	<2%	NR	NR	2089.7
3/24/2017 17:47	60.762599, -151.461837	-1.25	12.10	47051	28.03	<0.1	<10,000	<0.1%	20.880	<2%	226.29	5.75	2174.2

NR – Instrument did not record a reading at this time interval

Table B7: Validated Buoy Drift 1 March 26, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 1: Sunday, 3/26/2017													
3/26/2017 9:35	60.78498, -151.419479	-1.13	12.51	46194	27.50	<0.1	<10,000	<0.1%	20.925	<2%	224.04	7.13	1217.0
3/26/2017 9:36	60.784172, -151.421005	-1.23	12.34	45987	27.34	<0.1	<10,000	<0.1%	20.925	<2%	223.41	7.22	1095.0
3/26/2017 9:37	60.78339, -151.422607	-1.23	12.32	44970	26.68	<0.1	<10,000	<0.1%	20.925	<2%	224.58	7.14	972.6
3/26/2017 9:38	60.782615, -151.424148	-1.27	12.32	44756	26.53	Invalid	<10,000	<0.1%	20.925	<2%	224.14	7.16	853.1
3/26/2017 9:39	60.781826, -151.425674	-1.3	12.26	44753	26.52	Invalid	<10,000	<0.1%	20.925	<2%	223.60	7.16	733.0
3/26/2017 9:40	60.781024, -151.427215	-1.31	12.25	44601	26.42	<0.1	<10,000	<0.1%	20.925	<2%	222.22	7.35	611.5
3/26/2017 9:41	60.7802, -151.428771	-1.32	12.27	44455	26.32	<0.1	<10,000	<0.1%	20.925	<2%	223.62	7.16	488.0
3/26/2017 9:42	60.779373, -151.430404	-1.35	12.27	44400	26.28	<0.1	<10,000	<0.1%	20.925	<2%	223.62	7.77	362.6
3/26/2017 9:43	60.778606, -151.431991	-1.36	12.26	44299	26.21	<0.1	<10,000	<0.1%	20.925	<2%	226.95	7.11	247.0
3/26/2017 9:44	60.777801, -151.433547	-1.37	NR	NR	NR	<0.1	<10,000	<0.1%	20.894	<2%	225.28	7.11	137.0
3/26/2017 9:45	60.776706, -151.435668	-1.37	12.31	43535	25.72	<0.1	<10,000	<0.1%	20.894	<2%	220.84	7.33	100.0
3/26/2017 9:46	60.775844, -151.437194	-1.39	12.34	43113	25.44	<0.1	NR	NR	NR	NR	222.89	7.57	199.3
3/26/2017 9:47	60.775054, -151.438812	-1.39	12.28	44300	26.20	<0.1	<10,000	<0.1%	20.894	<2%	225.07	7.16	318.5
3/26/2017 9:48	60.774295, -151.440383	NR	NR	44276	26.19	<0.1	<10,000	<0.1%	20.925	<2%	226.38	7.37	436.4
3/26/2017 9:49	60.773483, -151.442016	-1.4	12.43	41793	24.59	<0.1	<10,000	<0.1%	20.925	<2%	223.23	7.46	561.5
3/26/2017 9:50	60.772659, -151.443527	-1.4	12.48	41751	24.56	<0.1	<10,000	<0.1%	20.925	<2%	222.81	7.20	682.8
3/26/2017 9:51	60.771842, -151.444992	NR	NR	NR	NR	<0.1	<10,000	<0.1%	20.925	<2%	220.33	7.09	802.3
3/26/2017 9:52	60.771018, -151.446426	-1.4	12.48	41700	24.53	<0.1	<10,000	<0.1%	20.925	<2%	221.11	7.24	921.4
3/26/2017 9:53	60.770191, -151.447921	-1.41	12.48	41726	24.54	<0.1	<10,000	<0.1%	20.925	<2%	223.01	7.01	1043.3
3/26/2017 9:54	60.769443, -151.449325	NR	NR	NR	NR	<0.1	<10,000	<0.1%	20.925	<2%	NR	NR	1155.9
3/26/2017 9:55	60.768684, -151.450714	-1.42	12.47	41588	24.45	<0.1	<10,000	<0.1%	20.894	<2%	221.85	6.68	1268.7
3/26/2017 9:56	60.767936, -151.452117	-1.42	12.47	41528	24.41	<0.1	<10,000	<0.1%	20.925	<2%	221.73	6.61	1381.3
3/26/2017 9:57	60.767181, -151.45346	-1.42	12.47	41358	24.30	NR	<10,000	<0.1%	20.925	<2%	219.51	6.63	1492.1

NR – Instrument did not record a reading at this time interval
Invalid – Original measurement determined to be the result of sensor damage and not a valid concentration observation

Table B7: Validated Buoy Drift 1 March 26, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
3/26/2017 9:58	60.766391, -151.454772	-1.42	12.47	41205	24.20	<0.1	<10,000	<0.1%	20.925	<2%	218.86	6.72	1604.5
3/26/2017 9:59	60.765575, -151.4561	-1.43	NR	NR	NR	<0.1	<10,000	<0.1%	20.925	<2%	218.89	7.03	1719.7
3/26/2017 10:00	60.764789, -151.457427	-1.43	12.47	NR	NR	<0.1	<10,000	<0.1%	20.925	<2%	219.46	6.61	1832.6
3/26/2017 10:01	60.764019, -151.458709	NR	12.47	41060	24.11	Invalid	<10,000	<0.1%	20.925	<2%	218.25	6.64	1942.5
3/26/2017 10:02	60.763225, -151.460006	-1.43	12.48	41039	24.10	<0.1	<10,000	<0.1%	20.894	<2%	218.79	6.53	2055.0
3/26/2017 10:03	60.762454, -151.461257	NR	NR	NR	NR	<0.1	<10,000	<0.1%	20.925	<2%	219.00	6.44	2163.9
3/26/2017 10:04	60.761199, -151.463394	NR	NR	NR	NR	Invalid	<10,000	<0.1%	20.925	<2%	220.65	6.46	2345.1
3/26/2017 10:05	60.760314, -151.46495	-1.43	12.48	40951	24.04	Invalid	<10,000	<0.1%	20.894	<2%	219.99	6.33	2474.7
3/26/2017 10:06	60.759578, -151.466201	-1.43	12.48	40936	24.03	<0.1	<10,000	<0.1%	20.925	<2%	NR	NR	2580.9
3/26/2017 10:07	60.758842, -151.467453	NR	NR	NR	NR	<0.1	<10,000	<0.1%	20.925	<2%	219.95	6.25	2687.2
3/26/2017 10:08	60.758148, -151.468627	-1.43	12.49	40934	24.03	Invalid	<10,000	<0.1%	20.925	<2%	218.23	5.83	2787.1
3/26/2017 10:09	60.757442, -151.469726	-1.44	12.47	40927	24.02	<0.1	<10,000	<0.1%	20.894	<2%	217.39	5.79	2885.3
3/26/2017 10:10	60.756748, -151.470855	-1.44	12.47	40959	24.04	<0.1	<10,000	<0.1%	20.894	<2%	219.42	5.72	2983.7
3/26/2017 10:11	60.756088, -151.471939	-1.44	12.47	40913	24.01	<0.1	<10,000	<0.1%	20.894	<2%	218.20	5.42	3077.6
3/26/2017 10:12	60.755424, -151.472991	-1.44	12.48	40871	23.99	<0.1	<10,000	<0.1%	20.925	<2%	218.27	5.27	3170.7
3/26/2017 10:13	60.75489, -151.473968	-1.44	12.48	40880	23.99	<0.1	<10,000	<0.1%	20.894	<2%	224.15	4.42	3250.3
3/26/2017 10:14	60.754409, -151.474914	-1.44	12.48	40634	23.83	<0.1	<10,000	<0.1%	20.925	<2%	223.46	4.35	3324.5
3/26/2017 10:15	60.753852, -151.475784	-1.44	12.48	40631	23.83	<0.1	<10,000	<0.1%	20.894	<2%	219.97	4.55	3402.1
3/26/2017 10:16	60.753326, -151.476715	-1.44	12.48	40575	23.80	<0.1	<10,000	<0.1%	20.925	<2%	223.52	4.40	3479.4
3/26/2017 10:17	60.752853, -151.477691	-1.44	12.50	40417	23.70	<0.1	<10,000	<0.1%	20.894	<2%	224.96	4.42	3554.0
3/26/2017 10:18	60.752365, -151.478591	-1.44	12.48	40496	23.75	Invalid	<10,000	<0.1%	20.925	<2%	219.62	4.16	3627.1
3/26/2017 10:19	60.751865, -151.479293	-1.44	12.46	41074	24.12	Invalid	<10,000	<0.1%	20.894	<2%	203.95	3.51	3693.9
3/26/2017 10:20	60.751346, -151.47998	-1.44	12.47	40945	24.03	<0.1	<10,000	<0.1%	20.894	<2%	211.13	3.98	3761.8
3/26/2017 10:21	60.75085, -151.480789	-1.45	12.49	40840	23.96	<0.1	<10,000	<0.1%	20.925	<2%	223.99	4.14	3832.2

NR – Instrument did not record a reading at this time interval
Invalid – Original measurement determined to be the result of sensor damage and not a valid concentration observation

Table B7: Validated Buoy Drift 1 March 26, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
3/26/2017 10:22	60.750408, -151.481689	-1.45	12.83	34920	20.21	<0.1	<10,000	<0.1%	20.925	<2%	224.76	4.05	3901.5
3/26/2017 10:23	60.749916, -151.482574	-1.45	12.51	40931	24.02	<0.1	<10,000	<0.1%	20.925	<2%	222.70	4.18	3974.3

NR – Instrument did not record a reading at this time interval
Invalid – Original measurement determined to be the result of sensor damage and not a valid concentration observation

Table B8: Summary for Air / Water Interface Buoy Drifts March 29, 2017

Buoy Type	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)
Air / Water	D01-032917	Ebb	3/29/2017	12:32	60 46.823 N 151 25.37 W	12:53	60 45.751 N 151 27.264 W	0:21	148	12, SW	0
Air / Water	D02-032917	Ebb	3/29/2017	13:09	60 46.593 N 151 25.945 W	13:27	60 45.791 N 151 27.265 W	0:18	78	9, SW	0
Air / Water	D03-032917	End of Ebb/Slack	3/29/2017	13:47	60 46.588 N 151 25.926 W	14:48	60 46.609 N 151 25.97 W	1:01	17	3, SW	0
Air / Water	D04-032917	End of Slack/Flood	3/29/2017	15:25	60 46.432 N 151 26.378 W	15:36	60 46.976 N 151 25.618 W	0:11	114	Calm	0
Air / Water	D05-032917	Flood	3/29/2017	15:53	60 46.204 N 151 26.731 W	16:41	60 48.936 N 151 21.968 W	0:48	159	Calm	0

Table B9: Validated Buoy Drift 1 March 29, 2017

VALIDATED Data for March 29, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 1 - Wednesday 3/29/2017													
3/29/2017 12:32	60.780391, -151.422836	-0.86	12.17	44019	26.16	ERR	< 20	< 0.1	20.925	< 1	228.69	8.00	733
3/29/2017 12:33	60.77964, -151.424438	-1.02	12.23	44332	26.32	ERR	< 20	< 0.1	20.925	< 1	222.25	7.16	614
3/29/2017 12:34	60.778877, -151.426025	-1.08	12.22	44452	26.39	ERR	< 20	< 0.1	20.925	< 1	222.07	7.98	495
3/29/2017 12:35	60.778011, -151.427703	-1.15	12.24	44587	26.45	ERR	< 20	< 0.1	20.925	< 1	225.15	7.68	369
3/29/2017 12:36	60.777156, -151.429397	-1.18	12.24	44644	26.48	ERR	< 20	< 0.1	20.925	< 1	222.75	7.66	250
3/29/2017 12:37	60.776275, -151.430984	-1.19	12.23	44672	26.50	ERR	< 20	< 0.1	20.925	< 1	219.94	7.90	159
3/29/2017 12:38	60.775405, -151.432556	-1.25	12.26	44735	26.52	ERR	< 20	< 0.1	20.925	< 1	221.67	7.51	148
3/29/2017 12:39	60.774528, -151.434188	-1.24	12.22	44746	26.53	ERR	< 20	< 0.1	20.925	< 1	221.15	8.00	229
3/29/2017 12:40	60.773616, -151.435791	-1.26	12.24	44811	26.57	ERR	< 20	< 0.1	20.925	< 1	220.72	7.74	346
3/29/2017 12:41	60.772781, -151.437438	-1.27	12.23	44828	26.58	ERR	< 20	< 0.1	20.925	< 1	222.89	7.57	465
3/29/2017 12:42	60.771911, -151.439071	-1.28	12.24	44837	26.58	ERR	< 20	< 0.1	20.925	< 1	221.71	7.68	591
3/29/2017 12:43	60.771083, -151.440521	-1.3	12.25	44873	26.60	ERR	< 20	< 0.1	20.925	< 1	220.16	7.25	710
3/29/2017 12:44	60.770278, -151.441925	-1.31	12.26	44910	26.62	ERR	< 20	< 0.1	20.925	< 1	220.89	7.18	826
3/29/2017 12:45	60.769428, -151.443313	-1.31	12.25	44887	26.61	ERR	< 20	< 0.1	20.925	< 1	217.88	6.98	947
3/29/2017 12:46	60.768596, -151.444702	-1.31	12.25	44904	26.62	ERR	< 20	< 0.1	20.925	< 1	220.82	7.25	1065
3/29/2017 12:47	60.767738, -151.446151	-1.3	12.25	44924	26.63	ERR	< 20	< 0.1	20.925	< 1	220.07	7.38	1188
3/29/2017 12:48	60.766876, -151.44757	-1.32	12.25	44960	26.65	ERR	< 20	< 0.1	20.925	< 1	219.46	7.31	1311
3/29/2017 12:49	60.766033, -151.448989	-1.32	12.25	44989	26.67	ERR	< 20	< 0.1	20.925	< 1	219.91	7.24	1432
3/29/2017 12:50	60.765144, -151.450378	-1.32	12.25	45020	26.69	ERR	< 20	< 0.1	20.925	< 1	215.96	7.48	1556
3/29/2017 12:51	60.764247, -151.451751	-1.34	12.24	45078	26.72	ERR	< 20	< 0.1	20.925	< 1	215.48	7.24	1681
3/29/2017 12:52	60.763385, -151.453094	-1.33	12.23	45074	26.72	ERR	< 20	< 0.1	20.925	< 1	217.74	7.03	1801
3/29/2017 12:53	60.762512, -151.454406	-1.34	12.26	45066	26.71	ERR	< 20	< 0.1	20.925	< 1	214.65	7.03	1921

ERR – Sensor malfunction confirmed. No valid data was collected.

Table B10: Validated Buoy Drift 2 March 29, 2017

VALIDATED Data for March 29, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 2 - Wednesday 3/29/2017													
3/29/2017 13:09	60.776546, -151.432418	-0.97	12.12	45590	27.15	ERR	< 20	< 0.1	20.925	< 1	213.61	6.37	78
3/29/2017 13:10	60.775684, -151.43367	-1.1	12.17	45873	27.30	ERR	< 20	< 0.1	20.925	< 1	212.56	7.57	100
3/29/2017 13:11	60.774784, -151.43486	-1.18	12.20	46050	27.40	ERR	< 20	< 0.1	20.925	< 1	216.26	7.00	207
3/29/2017 13:12	60.774032, -151.436111	-1.21	12.19	46095	27.42	ERR	< 20	< 0.1	20.925	< 1	217.44	6.33	309
3/29/2017 13:13	60.773262, -151.437362	-1.23	12.19	46134	27.44	ERR	< 20	< 0.1	20.925	< 1	220.30	6.85	415
3/29/2017 13:14	60.772518, -151.438598	-1.24	12.18	46181	27.47	ERR	< 20	< 0.1	20.925	< 1	217.64	6.31	520
3/29/2017 13:15	60.771755, -151.439849	-1.26	12.19	46210	27.48	ERR	< 20	< 0.1	20.925	< 1	219.11	6.14	627
3/29/2017 13:16	60.771007, -151.441131	-1.26	12.19	46104	27.41	ERR	< 20	< 0.1	20.925	< 1	220.54	6.35	735
3/29/2017 13:17	60.770267, -151.442428	-1.27	12.19	46240	27.49	ERR	< 20	< 0.1	20.925	< 1	220.75	6.42	842
3/29/2017 13:18	60.769489, -151.44374	-1.28	12.18	46261	27.51	ERR	< 20	< 0.1	20.925	< 1	218.96	6.64	954
3/29/2017 13:19	60.768741, -151.444992	-1.28	12.20	46281	27.52	ERR	< 20	< 0.1	20.925	< 1	218.74	6.24	1061
3/29/2017 13:20	60.768013, -151.446197	-1.29	12.19	46311	27.54	ERR	< 20	< 0.1	20.925	< 1	220.26	5.85	1165
3/29/2017 13:21	60.767311, -151.447341	-1.3	12.19	46303	27.53	ERR	< 20	< 0.1	20.925	< 1	217.43	5.88	1264
3/29/2017 13:22	60.766624, -151.448501	-1.3	12.19	46303	27.53	ERR	< 20	< 0.1	20.925	< 1	219.44	5.92	1363
3/29/2017 13:23	60.765941, -151.449691	-1.3	12.19	46310	27.53	ERR	< 20	< 0.1	20.925	< 1	219.80	5.83	1462
3/29/2017 13:24	60.765232, -151.450912	-1.31	12.19	46322	27.54	ERR	< 20	< 0.1	20.925	< 1	221.10	6.09	1565
3/29/2017 13:25	60.764541, -151.452087	-1.31	12.20	46297	27.52	ERR	< 20	< 0.1	20.925	< 1	220.13	5.85	1665
3/29/2017 13:26	60.763866, -151.453277	-1.32	12.18	46351	27.55	ERR	< 20	< 0.1	20.925	< 1	220.08	5.75	1764
3/29/2017 13:27	60.763187, -151.454421	-1.32	12.19	46335	27.54	ERR	< 20	< 0.1	20.925	< 1	216.78	5.85	1861

ERR – Sensor malfunction confirmed. No valid data was collected.

Table B11: Validated Buoy Drift 3 March 29, 2017

VALIDATED Data for March 29, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 3 - Wednesday 3/29/2017													
3/29/2017 13:47	60.77647, -151.432098	-1.07	12.67	37406	21.86	ERR	< 20	< 0.1	20.925	< 1	235.92	3.31	96
3/29/2017 13:48	60.776161, -151.432968	-1.16	12.70	37664	22.01	ERR	< 20	< 0.1	20.925	< 1	232.82	3.44	66
3/29/2017 13:49	60.77584, -151.433883	-1.2	12.72	37746	22.05	ERR	< 20	< 0.1	20.925	< 1	232.67	3.57	82
3/29/2017 13:50	60.775512, -151.434799	--	--	--	--	--	< 20	< 0.1	20.925	< 1	237.62	3.50	129
3/29/2017 13:51	60.775409, -151.436798	--	--	--	--	--	< 20	< 0.1	20.925	< 1	243.10	10.46	206
3/29/2017 13:52	60.774108, -151.438293	-0.21	12.02	42660	25.44	ERR	< 20	< 0.1	20.925	< 1	172.17	8.16	366
3/29/2017 13:53	60.774314, -151.436874	-0.26	11.92	41969	24.98	ERR	< 20	< 0.1	20.925	< 1	21.09	10.33	301
3/29/2017 13:54	60.775943, -151.435287	-0.04	11.98	42002	25.05	ERR	< 20	< 0.1	20.925	< 1	43.13	10.11	105
3/29/2017 13:55	60.776336, -151.434265	0.22	11.93	42493	25.43	ERR	44	< 0.1	20.925	< 1	117.58	1.40	35
3/29/2017 13:56	60.775653, -151.433456	0.36	11.78	41376	24.73	ERR	< 20	< 0.1	20.925	< 1	175.67	10.05	105
3/29/2017 13:57	60.774459, -151.435668	0.69	11.57	41233	24.71	ERR	< 20	< 0.1	20.925	< 1	256.62	9.79	256
3/29/2017 13:58	60.774562, -151.437561	1.14	11.45	40885	24.57	ERR	43	< 0.1	20.925	< 1	305.72	4.51	302
3/29/2017 13:59	60.774944, -151.437805	0.97	11.64	41063	24.65	ERR	43	< 0.1	20.925	< 1	47.00	2.61	281
3/29/2017 14:00	60.775321, -151.43692	1.17	11.66	40912	24.60	ERR	42	< 0.1	20.925	< 1	42.39	4.25	218
3/29/2017 14:01	60.775733, -151.43637	1.34	11.56	41459	24.99	ERR	42	< 0.1	20.925	< 1	30.65	2.18	166
3/29/2017 14:02	60.77597, -151.435806	1.52	11.58	40724	24.54	ERR	42	< 0.1	20.925	< 1	56.11	2.94	126
3/29/2017 14:03	60.776027, -151.435165	1.51	11.52	41272	24.90	ERR	< 20	< 0.1	20.925	< 1	88.03	1.83	94
3/29/2017 14:04	60.77592, -151.435119	1.48	11.57	40420	24.33	ERR	< 20	< 0.1	20.925	< 1	88.03	0.00	101
3/29/2017 14:05	60.77602, -151.435058	1.39	11.48	41212	24.84	ERR	< 20	< 0.1	20.925	< 1	88.03	0.64	90
3/29/2017 14:06	60.776107, -151.435043	1.53	11.50	40331	24.28	ERR	41	< 0.1	20.925	< 1	88.03	0.94	84
3/29/2017 14:07	60.776241, -151.434936	0.9	12.19	31564	18.50	ERR	41	< 0.1	20.925	< 1	60.51	0.51	70
3/29/2017 14:08	60.776252, -151.434768	1.28	12.11	31061	18.23	ERR	40	< 0.1	20.925	< 1	55.79	2.44	62
3/29/2017 14:09	60.77626, -151.434661	1.3	12.12	31427	18.47	ERR	< 20	< 0.1	20.925	< 1	91.12	0.42	57
3/29/2017 14:10	60.776279, -151.43457	1.39	12.11	31062	18.25	ERR	< 20	< 0.1	20.925	< 1	75.16	0.37	52

-- Buoy was removed from the water and repositioned.

ERR – Sensor malfunction confirmed. No valid data was collected.

Table B11: Validated Buoy Drift 3 March 29, 2017

VALIDATED Data for March 29, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
3/29/2017 14:11	60.776374, -151.434509	1.34	12.00	31461	18.50	ERR	40	< 0.1	20.925	< 1	75.16	0.79	43
3/29/2017 14:12	60.776428, -151.434585	1.27	12.08	31919	18.78	ERR	39	< 0.1	20.925	< 1	75.16	0.88	44
3/29/2017 14:13	60.77647, -151.434631	1.32	12.06	31437	18.48	ERR	39	< 0.1	20.925	< 1	75.16	0.85	44
3/29/2017 14:14	60.776603, -151.434494	1.54	12.04	31749	18.71	ERR	39	< 0.1	20.925	< 1	75.16	1.37	35
3/29/2017 14:15	60.776725, -151.434341	1.69	12.00	31981	18.88	ERR	< 20	< 0.1	20.925	< 1	75.16	0.27	32
3/29/2017 14:16	60.776668, -151.434234	1.82	12.00	31699	18.72	ERR	60	< 0.1	20.925	< 1	75.16	0.66	23
3/29/2017 14:17	60.776477, -151.434082	1.95	11.87	31503	18.61	ERR	115	< 0.1	20.925	< 1	153.91	1.83	17
3/29/2017 14:18	60.776222, -151.434066	2.18	11.88	31203	18.45	ERR	60	< 0.1	20.925	< 1	153.91	1.94	41
3/29/2017 14:19	60.77597, -151.434219	2.4	11.70	31394	18.60	ERR	37	< 0.1	20.925	< 1	209.15	1.48	71
3/29/2017 14:20	60.77584, -151.434448	2.46	11.54	31296	18.54	ERR	37	< 0.1	20.925	< 1	209.15	0.94	88
3/29/2017 14:21	60.775848, -151.434616	2.67	11.53	30974	18.36	ERR	37	< 0.1	20.925	< 1	209.15	1.75	91
3/29/2017 14:22	60.776084, -151.434738	2.56	11.53	31423	18.64	ERR	36	< 0.1	20.925	< 1	209.15	2.05	73
3/29/2017 14:23	60.776275, -151.434906	2.5	11.58	31475	18.67	ERR	36	< 0.1	20.925	< 1	209.15	1.25	67
3/29/2017 14:24	60.776428, -151.434951	2.7	11.47	31529	18.73	ERR	57	< 0.1	20.925	< 1	209.15	1.24	62
3/29/2017 14:25	60.776565, -151.435028	2.9	11.37	31341	18.63	ERR	57	< 0.1	20.925	< 1	209.15	1.29	64
3/29/2017 14:26	60.776683, -151.434509	3.26	11.21	31014	18.46	ERR	90	< 0.1	20.925	< 1	69.39	2.09	38
3/29/2017 14:27	60.776741, -151.434112	-0.29	12.22	35413	20.75	ERR	34	< 0.1	20.894	< 1	56.74	0.74	23
3/29/2017 14:28	60.776813, -151.434188	-0.93	12.53	36575	21.36	ERR	56	< 0.1	20.925	< 1	56.74	0.98	32
3/29/2017 14:29	60.776958, -151.4346	-1.05	12.62	36833	21.50	ERR	56	< 0.1	20.925	< 1	301.34	1.59	59
3/29/2017 14:30	60.776943, -151.434387	-1.13	12.15	45121	26.81	ERR	55	< 0.1	20.925	< 1	301.34	0.96	50
3/29/2017 14:31	60.776885, -151.434005	-1.17	12.16	45183	26.83	ERR	88	< 0.1	20.925	< 1	137.32	1.05	35
3/29/2017 14:32	60.776935, -151.433746	-1.14	12.13	45172	26.84	ERR	76	< 0.1	20.925	< 1	137.32	0.90	40
3/29/2017 14:33	60.777061, -151.433654	-1.17	12.17	45180	26.83	ERR	54	< 0.1	20.925	< 1	137.32	1.05	55
3/29/2017 14:34	60.777221, -151.433532	-1.19	12.18	45206	26.85	ERR	87	< 0.1	20.925	< 1	137.32	1.61	73
3/29/2017 14:35	60.777492, -151.433486	--	--	--	--	--	31	< 0.1	20.925	< 1	336.42	2.53	103

-- Buoy was removed from the water and repositioned.

ERR – Sensor malfunction confirmed. No valid data was collected.

Table B11: Validated Buoy Drift 3 March 29, 2017

VALIDATED Data for March 29, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
3/29/2017 14:36	60.777454, -151.43341	--	--	--	--	--	< 20	< 0.1	20.925	< 1	238.12	0.94	100
3/29/2017 14:37	60.777202, -151.433609	--	--	--	--	--	< 20	< 0.1	20.925	< 1	181.06	2.22	71
3/29/2017 14:38	60.776901, -151.433792	-1.14	12.18	45459	27.02	ERR	30	< 0.1	20.925	< 1	141.07	1.07	36
3/29/2017 14:39	60.777088, -151.433715	-1.24	12.21	45617	27.10	ERR	< 20	< 0.1	20.925	< 1	141.07	1.90	57
3/29/2017 14:40	60.777023, -151.433822	--	--	--	--	--	< 20	< 0.1	20.925	< 1	240.12	1.25	50
3/29/2017 14:41	60.77713, -151.433959	--	--	--	--	--	< 20	< 0.1	20.925	< 1	345.29	1.12	62
3/29/2017 14:42	60.777229, -151.434051	--	--	--	--	--	< 20	< 0.1	20.925	< 1	333.54	0.62	73
3/29/2017 14:43	60.777423, -151.43402	--	--	--	--	--	< 20	< 0.1	20.925	< 1	333.54	1.88	94
3/29/2017 14:44	60.777736, -151.433944	--	--	--	--	--	< 20	< 0.1	20.925	< 1	6.01	0.79	129
3/29/2017 14:45	60.777339, -151.433624	--	--	--	--	--	< 20	< 0.1	20.925	< 1	154.06	1.98	85
3/29/2017 14:46	60.777248, -151.433349	--	--	--	--	--	82	< 0.1	20.925	< 1	154.06	0.92	79
3/29/2017 14:47	60.777381, -151.433059	--	--	--	--	--	< 20	< 0.1	20.925	< 1	38.37	2.14	99
3/29/2017 14:48	60.777618, -151.43283	--	--	--	--	--	26	< 0.1	20.925	< 1	33.13	1.51	128

-- Buoy was removed from the water and repositioned.
ERR – Sensor malfunction confirmed. No valid data was collected.

Table B12: Validated Buoy Drift 4 March 29, 2017

VALIDATED Data for March 29, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 4 - Wednesday 3/29/2017													
3/29/2017 15:25	60.77386, -151.439636	-1.23	12.32	45430	26.98	ERR	< 20	< 0.1	20.925	< 1	22.72	4.31	436
3/29/2017 15:26	60.774444, -151.43901	-1.24	12.27	45476	27.01	ERR	< 20	< 0.1	20.925	< 1	30.07	4.92	367
3/29/2017 15:27	60.775108, -151.43814	-1.13	12.29	45634	27.14	ERR	< 20	< 0.1	20.925	< 1	30.52	5.00	285
3/29/2017 15:28	60.77584, -151.437164	-1.23	12.26	45524	27.04	ERR	< 20	< 0.1	20.894	< 1	35.09	6.22	198
3/29/2017 15:29	60.776641, -151.436019	-1.24	12.25	45581	27.07	ERR	33	< 0.1	20.925	< 1	33.92	7.00	118
3/29/2017 15:30	60.777496, -151.434768	-1.25	12.24	45565	27.06	ERR	NR	< 0.1	NR	NR	36.71	7.22	114
3/29/2017 15:31	60.778369, -151.433486	-1.26	12.26	45554	27.05	ERR	< 20	< 0.1	20.925	< 1	36.14	7.51	200
3/29/2017 15:32	60.779258, -151.432174	-1.27	12.25	45573	27.06	ERR	< 20	< 0.1	20.925	< 1	36.15	7.48	311
3/29/2017 15:33	60.780166, -151.430892	-1.27	12.25	45554	27.05	ERR	< 20	< 0.1	20.925	< 1	33.39	7.35	430
3/29/2017 15:34	60.781063, -151.429626	-1.27	12.25	45561	27.05	ERR	< 20	< 0.1	20.925	< 1	34.00	7.64	549
3/29/2017 15:35	60.782001, -151.428314	-1.28	12.25	45558	27.05	ERR	31	< 0.1	20.925	< 1	35.45	7.64	674
3/29/2017 15:36	60.782939, -151.426971	-1.27	12.24	45571	27.06	ERR	< 20	< 0.1	20.925	< 1	35.76	7.74	800

NR – Instrument did not record a reading at this time interval.
ERR – Sensor malfunction confirmed. No valid data was collected.
Orange Highlights – Measurement suspected to be influenced by boat exhaust.

Table B13: Validated Buoy Drift 5 March 29, 2017

VALIDATED Data for March 29, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 5 - Wednesday 3/29/2017													
3/29/2017 15:53	60.770069, -151.44551	-1.26	12.18	47338	28.21	ERR	< 20	< 0.1	20.925	< 1	36.83	6.11	962
3/29/2017 15:54	60.770812, -151.44432	-1.28	12.15	47321	28.20	ERR	< 20	< 0.1	20.894	< 1	32.83	7.83	857
3/29/2017 15:55	60.771831, -151.44313	-1.29	12.15	47424	28.26	ERR	< 20	< 0.1	20.894	< 1	29.63	9.53	730
3/29/2017 15:56	60.772987, -151.441772	-1.29	12.13	47460	28.28	ERR	< 20	< 0.1	20.894	< 1	29.90	9.01	587
3/29/2017 15:57	60.774135, -151.440414	-1.3	12.13	47515	28.32	ERR	< 20	< 0.1	20.925	< 1	31.50	9.29	448
3/29/2017 15:58	60.775321, -151.438919	-1.31	12.13	47542	28.33	ERR	< 20	< 0.1	20.925	< 1	32.95	9.66	309
3/29/2017 15:59	60.776523, -151.437347	-1.3	12.13	47569	28.35	ERR	< 20	< 0.1	20.925	< 1	33.71	9.94	190
3/29/2017 16:00	60.777683, -151.435699	-1.31	12.11	47580	28.36	ERR	< 20	< 0.1	20.925	< 1	38.34	9.53	159
3/29/2017 16:01	60.778846, -151.433929	-1.31	12.10	47622	28.38	ERR	< 20	< 0.1	20.925	< 1	35.82	9.68	252
3/29/2017 16:02	60.78004, -151.432159	-1.31	12.11	47599	28.37	ERR	< 20	< 0.1	20.894	< 1	35.00	10.01	396
3/29/2017 16:03	60.781204, -151.43048	-1.3	12.10	47630	28.39	ERR	< 20	< 0.1	20.894	< 1	35.00	9.33	546
3/29/2017 16:04	60.78231, -151.428771	-1.31	12.10	47622	28.38	ERR	< 20	< 0.1	20.925	< 1	38.04	9.61	694
3/29/2017 16:05	60.783405, -151.42694	-1.31	12.10	47624	28.38	ERR	< 20	< 0.1	20.925	< 1	39.03	9.77	846
3/29/2017 16:06	60.784534, -151.425094	-1.31	12.10	47617	28.38	ERR	< 20	< 0.1	20.925	< 1	39.22	9.88	1004
3/29/2017 16:07	60.785667, -151.423202	-1.31	12.10	47572	28.35	ERR	< 20	< 0.1	20.925	< 1	39.22	9.88	1164
3/29/2017 16:08	60.7868, -151.42134	-1.31	12.10	47619	28.38	ERR	< 20	< 0.1	20.894	< 1	39.70	9.55	1324
3/29/2017 16:09	60.787883, -151.419464	-1.31	12.11	47562	28.34	ERR	< 20	< 0.1	20.925	< 1	39.69	9.74	1479
3/29/2017 16:10	60.788967, -151.417602	-1.31	12.10	47521	28.32	ERR	< 20	< 0.1	20.894	< 1	41.10	9.29	1635
3/29/2017 16:11	60.789997, -151.415725	-1.31	12.10	47532	28.32	ERR	< 20	< 0.1	20.894	< 1	42.35	9.46	1787
3/29/2017 16:12	60.79103, -151.413787	-1.31	12.10	47531	28.32	ERR	< 20	< 0.1	20.894	< 1	40.69	9.22	1941
3/29/2017 16:13	60.792045, -151.411865	-1.31	12.11	47447	28.27	ERR	< 20	< 0.1	20.894	< 1	43.15	8.72	2093
3/29/2017 16:14	60.793025, -151.41014	-1.31	12.11	47442	28.27	ERR	NR	< 0.1	NR	NR	39.14	8.57	2236
3/29/2017 16:15	60.794036, -151.408416	-1.31	12.11	47445	28.27	ERR	NR	< 0.1	NR	NR	40.80	8.68	2381
3/29/2017 16:16	60.794963, -151.406799	-1.31	12.12	47393	28.23	ERR	< 20	< 0.1	20.925	< 1	38.73	8.27	2516
3/29/2017 16:17	60.795932, -151.405273	-1.31	12.11	47396	28.24	ERR	< 20	< 0.1	20.894	< 1	37.37	8.46	2652

NR – Instrument did not record a reading at this time interval.
ERR – Sensor malfunction confirmed. No valid data was collected.

Table B13: Validated Buoy Drift 5 March 29, 2017

VALIDATED Data for March 29, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
3/29/2017 16:18	60.796928, -151.403594	-1.31	12.11	47498	28.30	ERR	< 20	< 0.1	20.925	< 1	41.31	8.74	2795
3/29/2017 16:19	60.797882, -151.401809	-1.31	12.10	47407	28.24	ERR	< 20	< 0.1	20.925	< 1	43.02	8.57	2938
3/29/2017 16:20	60.798805, -151.400039	-1.32	12.11	47399	28.24	ERR	< 20	< 0.1	20.894	< 1	42.87	8.48	3078
3/29/2017 16:21	60.799713, -151.398254	-1.31	12.11	47298	28.17	ERR	< 20	< 0.1	20.894	< 1	44.64	8.09	3216
3/29/2017 16:22	60.800529, -151.396499	-1.31	12.11	47176	28.09	ERR	< 20	< 0.1	20.894	< 1	49.28	8.20	3346
3/29/2017 16:23	60.801368, -151.394668	-1.3	12.13	46992	27.97	ERR	< 20	< 0.1	20.925	< 1	43.28	8.33	3481
3/29/2017 16:24	60.802261, -151.393096	-1.3	12.14	46980	27.97	ERR	< 20	< 0.1	20.894	< 1	39.33	7.77	3611
3/29/2017 16:25	60.80315, -151.391677	-1.31	12.14	47035	28.00	ERR	< 20	< 0.1	20.925	< 1	42.74	7.37	3737
3/29/2017 16:26	60.803981, -151.390136	-1.31	12.12	47159	28.08	ERR	< 20	< 0.1	20.894	< 1	40.78	7.74	3861
3/29/2017 16:27	60.804862, -151.388565	-1.31	12.13	47086	28.03	ERR	< 20	< 0.1	20.894	< 1	40.85	7.94	3990
3/29/2017 16:28	60.805751, -151.386993	-1.31	12.13	47053	28.01	ERR	< 20	< 0.1	20.894	< 1	41.75	7.96	4121
3/29/2017 16:29	60.806606, -151.385391	-1.31	12.12	47171	28.09	ERR	< 20	< 0.1	20.894	< 1	41.46	7.79	4249
3/29/2017 16:30	60.807449, -151.383819	-1.31	12.13	46956	27.95	ERR	< 20	< 0.1	20.925	< 1	41.89	7.68	4376
3/29/2017 16:31	60.808292, -151.382247	-1.31	12.14	47042	28.00	ERR	< 20	< 0.1	20.894	< 1	43.01	7.72	4502
3/29/2017 16:32	60.809123, -151.38063	-1.31	12.14	47035	28.00	ERR	< 20	< 0.1	20.925	< 1	43.42	7.68	4629
3/29/2017 16:33	60.809921, -151.378997	-1.31	12.15	46891	27.91	ERR	< 20	< 0.1	20.925	< 1	44.43	7.57	4753
3/29/2017 16:34	60.81068, -151.37738	-1.31	12.15	46856	27.88	ERR	< 20	< 0.1	20.894	< 1	45.58	7.33	4874
3/29/2017 16:35	60.811416, -151.375793	-1.31	12.15	46832	27.87	ERR	< 20	< 0.1	20.894	< 1	47.29	7.18	4992
3/29/2017 16:36	60.812168, -151.374114	-1.31	12.15	46896	27.91	ERR	< 20	< 0.1	20.925	< 1	46.92	7.64	5114
3/29/2017 16:37	60.812923, -151.372467	-1.31	12.15	46884	27.90	ERR	< 20	< 0.1	20.894	< 1	47.23	7.46	5236
3/29/2017 16:38	60.813655, -151.370803	-1.31	12.14	46970	27.96	ERR	< 20	< 0.1	20.894	< 1	47.35	7.33	5356
3/29/2017 16:39	60.814292, -151.369201	-1.31	12.13	46981	27.96	ERR	< 20	< 0.1	20.925	< 1	52.01	6.79	5466
3/29/2017 16:40	60.814945, -151.367523	-1.31	12.15	46812	27.85	ERR	< 20	< 0.1	20.894	< 1	47.44	6.94	5580
3/29/2017 16:41	60.815601, -151.366134	-1.32	12.15	46797	27.84	ERR	< 20	< 0.1	20.925	< 1	44.03	7.20	5685

NR – Instrument did not record a reading at this time interval.
ERR – Sensor malfunction confirmed. No valid data was collected.

Table B14 : Summary for Air / Water Interface Buoy Drifts April 12, 2017

Buoy Type	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)
Air / Water	D01-041217	Ebb	4/12/2017	11:17	60 47.326 N 151 24.644 W	12:19	60 44.052 N 151 30.185 W	1:02	37	Calm	0
Air / Water	D02-041217	Ebb	4/12/2017	13:00	60 46.906 N 151 25.304 W	13:29	60 45.903 N 151 27.200 W	0:29	65	Calm	0
Air / Water	D03-041217	Flood	4/12/2017	15:29	60 45.978 N 151 26.763 W	16:06	60 48.035 N 151 23.865 W	0:37	68	Calm	0
Air / Water	D04-041217	Flood	4/12/2017	16:28	60 46.740 N 151 25.808 W	16:38	60 46.717 N 151 25.863 W	0:10	242	Calm	0

Table B15: Preliminary Buoy Drift 1 April 12, 2017

PRELIMINARY Data for April 12, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 1 - Wednesday 4/12/2017													
4/12/17 11:17 AM	60.788768, -151.410736	0.93	11.39	45064	27.29	<0.1	55 [1]	< 0.1	20.955	< 1	237.29	7.51	1846
4/12/17 11:18 AM	60.788051, -151.412628	0.64	11.66	44933	27.13	<0.1	88 [1]	< 0.1	20.955	< 1	230.92	8.11	1718
4/12/17 11:19 AM	60.787147, -151.414337	0.45	11.73	45081	27.18	<0.1	88 [1]	< 0.1	20.955	< 1	225.44	8.33	1582
4/12/17 11:20 AM	60.786209, -151.416137	0.34	11.77	45092	27.17	<0.1	33 [1]	< 0.1	20.955	< 1	222.77	8.48	1439
4/12/17 11:21 AM	60.785305, -151.417846	0.25	11.80	45161	27.19	<0.1	<20 [1]	< 0.1	20.955	< 1	222.24	8.05	1302
4/12/17 11:22 AM	60.784404, -151.419509	0.15	11.83	45210	27.20	<0.1	<20 [1]	< 0.1	20.986	< 1	222.71	7.74	1167
4/12/17 11:23 AM	60.783504, -151.421127	0.12	11.85	45074	27.10	<0.1	<20 [1]	< 0.1	20.955	< 1	221.97	7.83	1034
4/12/17 11:24 AM	60.782623, -151.422836	0.08	11.86	45266	27.22	<0.1	55 [1]	< 0.1	20.955	< 1	224.41	8.16	899
4/12/17 11:25 AM	60.781707, -151.424606	0.04	11.85	45302	27.23	<0.1	66 [1]	< 0.1	20.955	< 1	220.31	8.48	759
4/12/17 11:26 AM	60.78075, -151.426406	0.05	11.85	45449	27.33	<0.1	<20 [1]	< 0.1	20.955	< 1	222.01	8.35	615
4/12/17 11:27 AM	60.779743, -151.428176	0.00	11.86	45681	27.47	<0.1	33 [1]	< 0.1	20.925	< 1	220.94	8.61	467
4/12/17 11:28 AM	60.778778, -151.429885	-0.04	11.86	45794	27.53	<0.1	55 [1]	< 0.1	20.925	< 1	220.72	8.44	326
4/12/17 11:29 AM	60.777767, -151.43164	-0.06	11.85	45904	27.60	<0.1	<20	< 0.1	20.925	< 1	221.16	8.57	178
4/12/17 11:30 AM	60.776802, -151.433349	-0.06	11.85	45896	27.60	<0.1	<20	< 0.1	20.925	< 1	221.63	8.50	37
4/12/17 11:31 AM	60.775821, -151.435058	-0.06	11.85	45938	27.62	<0.1	110 [2]	< 0.1	20.925	< 1	219.65	8.24	107
4/12/17 11:32 AM	60.774845, -151.436676	-0.09	11.87	45967	27.64	<0.1	<20 [2]	< 0.1	20.925	< 1	218.91	8.33	246
4/12/17 11:33 AM	60.773838, -151.438278	-0.12	11.89	46011	27.66	<0.1	33 [2]	< 0.1	20.925	< 1	217.27	8.48	388
4/12/17 11:34 AM	60.772823, -151.439926	-0.10	11.88	46003	27.66	<0.1	<20 [2]	< 0.1	20.925	< 1	218.69	8.55	532
4/12/17 11:35 AM	60.771827, -151.441574	-0.11	11.87	46039	27.68	<0.1	<20 [2]	< 0.1	20.925	< 1	220.04	8.31	675
4/12/17 11:36 AM	60.770843, -151.443176	-0.14	11.88	46087	27.70	<0.1	<20 [2]	< 0.1	20.925	< 1	217.12	8.18	814
4/12/17 11:37 AM	60.769855, -151.444747	-0.14	11.88	46117	27.72	<0.1	<20 [2]	< 0.1	20.925	< 1	217.18	8.18	953
4/12/17 11:38 AM	60.768886, -151.446289	-0.16	11.88	46115	27.71	<0.1	<20 [2]	< 0.1	20.925	< 1	218.47	8.18	1090

[1] Boat remained close to the buoy. Measurements suspected to be impacted by boat exhaust.

[2] Erratic sensor performance and measurements suspected to be related to insufficient acclimation to ambient temperature conditions.

Table B15: Preliminary Buoy Drift 1 April 12, 2017

PRELIMINARY Data for April 12, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
4/12/17 11:39 AM	60.767887, -151.447875	-0.17	11.90	46147	27.73	<0.1	33 [2]	< 0.1	20.925	< 1	216.48	8.11	1230
4/12/17 11:40 AM	60.766906, -151.449417	-0.16	11.88	46119	27.72	<0.1	33 [2]	< 0.1	20.925	< 1	217.60	8.33	1368
4/12/17 11:41 AM	60.765884, -151.451004	-0.16	11.90	46176	27.75	<0.1	<20 [2]	< 0.1	20.894	< 1	216.57	8.46	1510
4/12/17 11:42 AM	60.764846, -151.45259	-0.16	11.88	46614	28.04	<0.1	<20 [2]	< 0.1	20.925	< 1	217.24	8.42	1654
4/12/17 11:43 AM	60.763835, -151.454162	-0.18	11.92	46612	28.04	<0.1	33 [2]	< 0.1	20.925	< 1	216.42	8.09	1795
4/12/17 11:44 AM	60.762828, -151.455642	-0.18	11.93	46659	28.07	<0.1	33 [2]	< 0.1	20.925	< 1	215.40	8.25	1933
4/12/17 11:45 AM	60.761779, -151.457153	-0.19	11.91	46738	28.12	<0.1	<20 [2]	< 0.1	20.925	< 1	214.45	8.46	2076
4/12/17 11:46 AM	60.760704, -151.458648	-0.18	11.97	45803	27.50	<0.1	<20 [2]	< 0.1	20.925	< 1	214.41	8.50	2220
4/12/17 11:47 AM	60.759654, -151.460144	-0.19	11.96	45812	27.51	<0.1	<20 [2]	< 0.1	20.925	< 1	214.42	8.42	2362
4/12/17 11:48 AM	60.758598, -151.461624	-0.19	11.95	45820	27.51	<0.1	<20 [2]	< 0.1	20.925	< 1	214.94	8.70	2504
4/12/17 11:49 AM	60.757549, -151.463134	-0.19	11.96	45862	27.54	<0.1	55 [2]	< 0.1	20.925	< 1	214.60	8.38	2647
4/12/17 11:50 AM	60.756507, -151.464523	-0.19	11.95	45878	27.55	<0.1	77 [2]	< 0.1	20.925	< 1	212.19	7.81	2785
4/12/17 11:51 AM	60.755516, -151.46585	-0.19	11.95	45850	27.53	<0.1	88 [2]	< 0.1	20.925	< 1	214.78	7.63	2916
4/12/17 11:52 AM	60.754562, -151.467193	-0.20	11.95	45877	27.55	<0.1	66 [2]	< 0.1	20.925	< 1	214.82	7.33	3045
4/12/17 11:53 AM	60.753704, -151.468536	-0.21	11.94	45866	27.54	<0.1	110 [2]	< 0.1	20.925	< 1	219.41	7.00	3165
4/12/17 11:54 AM	60.752971, -151.469879	-0.20	11.94	45867	27.54	<0.1	77 [2]	< 0.1	20.925	< 1	221.20	6.00	3274
4/12/17 11:55 AM	60.752285, -151.47116	-0.20	11.93	45867	27.54	<0.1	66 [2]	< 0.1	20.925	< 1	222.55	6.05	3376
4/12/17 11:56 AM	60.751609, -151.472427	-0.20	11.92	45878	27.55	<0.1	55 [2]	< 0.1	20.894	< 1	221.93	6.16	3478
4/12/17 11:57 AM	60.750907, -151.473693	-0.20	11.94	45884	27.55	<0.1	55 [2]	< 0.1	20.925	< 1	220.83	6.07	3582
4/12/17 11:58 AM	60.750217, -151.47496	-0.20	11.92	45984	27.62	<0.1	55 [2]	< 0.1	20.925	< 1	223.09	6.00	3684
4/12/17 11:59 AM	60.749507, -151.476226	-0.20	11.92	45990	27.62	<0.1	77 [2]	< 0.1	20.925	< 1	221.53	6.38	3789
4/12/17 12:00 PM	60.748813, -151.4776	-0.20	11.92	46031	27.65	<0.1	55 [2]	< 0.1	20.925	< 1	225.01	5.94	3895
4/12/17 12:01 PM	60.748142, -151.479003	-0.20	11.92	46012	27.64	<0.1	66 [2]	< 0.1	20.925	< 1	223.56	6.46	4001
4/12/17 12:02 PM	60.747451, -151.480407	-0.20	11.92	46032	27.65	<0.1	22 [2]	< 0.1	20.925	< 1	222.44	6.53	4108
4/12/17 12:03 PM	60.746753, -151.481781	-0.20	11.91	46061	27.67	<0.1	33 [2]	< 0.1	20.925	< 1	224.28	6.44	4216

[1] Boat remained close to the buoy. Measurements suspected to be impacted by boat exhaust.

[2] Erratic sensor performance and measurements suspected to be related to insufficient acclimation to ambient temperature conditions.

Table B15: Preliminary Buoy Drift 1 April 12, 2017

PRELIMINARY Data for April 12, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
4/12/17 12:04 PM	60.746044, -151.483169	-0.21	11.91	46072	27.67	<0.1	88 [(2)]	< 0.1	20.986	< 1	223.81	6.55	4324
4/12/17 12:05 PM	60.745319, -151.484603	-0.21	11.92	46083	27.68	<0.1	77 [(2)]	< 0.1	20.925	< 1	223.27	6.72	4436
4/12/17 12:06 PM	60.744579, -151.485961	-0.21	11.92	46082	27.68	<0.1	110 [(2)]	< 0.1	20.925	< 1	221.25	6.35	4546
4/12/17 12:07 PM	60.743862, -151.487243	-0.21	11.92	46115	27.70	<0.1	44 [(2)]	< 0.1	20.925	< 1	220.94	6.29	4652
4/12/17 12:08 PM	60.743122, -151.488525	-0.21	11.91	46129	27.71	<0.1	33 [(2)]	< 0.1	20.894	< 1	219.66	6.48	4760
4/12/17 12:09 PM	60.742362, -151.489791	-0.21	11.90	46043	27.65	<0.1	55 [(2)]	< 0.1	20.925	< 1	218.38	6.44	4868
4/12/17 12:10 PM	60.741615, -151.491119	-0.21	11.92	46060	27.66	<0.1	55 [(2)]	< 0.1	20.925	< 1	221.58	6.66	4978
4/12/17 12:11 PM	60.740833, -151.492477	-0.21	11.91	46078	27.68	<0.1	<20 [(2)]	< 0.1	20.925	< 1	219.95	6.88	5092
4/12/17 12:12 PM	60.740028, -151.493835	-0.21	11.91	46071	27.67	<0.1	<20 [(2)]	< 0.1	20.925	< 1	219.05	6.90	5208
4/12/17 12:13 PM	60.739219, -151.495162	-0.21	11.91	46092	27.69	<0.1	33 [(2)]	< 0.1	20.986	< 1	218.93	6.75	5324
4/12/17 12:14 PM	60.738407, -151.49652	-0.21	11.91	46086	27.68	<0.1	88 [(2)]	< 0.1	20.925	< 1	219.18	6.88	5440
4/12/17 12:15 PM	60.737586, -151.497848	-0.21	11.91	46123	27.71	<0.1	110 [(2)]	< 0.1	20.925	< 1	217.78	6.96	5557
4/12/17 12:16 PM	60.73677, -151.49913	-0.20	11.90	46147	27.72	<0.1	110 [(2)]	< 0.1	20.925	< 1	217.77	6.87	5671
4/12/17 12:17 PM	60.735939, -151.500503	-0.21	11.90	46151	27.73	<0.1	77 [(2)]	< 0.1	20.925	< 1	218.38	7.14	5790
4/12/17 12:18 PM	60.735092, -151.501861	-0.21	11.91	46117	27.70	<0.1	55 [(2)]	< 0.1	21.017	< 1	215.61	7.16	5909
4/12/17 12:19 PM	60.734199, -151.503082	-0.21	11.92	46055	27.66	<0.1	55 [(2)]	< 0.1	20.955	< 1	216.13	7.13	6028

[(1)] Boat remained close to the buoy. Measurements suspected to be impacted by boat exhaust.

[(2)] Erratic sensor performance and measurements suspected to be related to insufficient acclimation to ambient temperature conditions.

Table B16: Preliminary Buoy Drift 2 April 12, 2017

PRELIMINARY Data for April 12, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 2 - Wednesday 4/12/2017													
4/12/17 1:00 PM	60.781761, -151.421737	1.29	11.04	42800	25.86	<0.1	22 (1)	< 0.1	21.017	< 1	56.14	1.51	874
4/12/17 1:01 PM	60.781452, -151.4225	0.44	11.72	44330	26.69	<0.1	<20	< 0.1	20.955	< 1	222.76	4.64	820
4/12/17 1:02 PM	60.780906, -151.423706	0.24	11.84	44725	26.90	<0.1	<20	< 0.1	20.955	< 1	228.93	6.07	731
4/12/17 1:03 PM	60.780334, -151.425064	0.14	NR	44927	27.01	<0.1	<20	< 0.1	20.955	< 1	226.05	5.50	634
4/12/17 1:04 PM	60.779685, -151.426376	0.15	11.86	44960	27.03	<0.1	<20	< 0.1	20.955	< 1	226.61	6.11	533
4/12/17 1:05 PM	60.779048, -151.427673	0.02	11.89	45152	27.13	<0.1	<20	< 0.1	20.955	< 1	224.56	5.70	433
4/12/17 1:06 PM	60.778388, -151.428863	-0.03	11.91	45256	27.18	<0.1	<20	< 0.1	20.955	< 1	220.31	6.05	337
4/12/17 1:07 PM	60.777755, -151.430145	-0.09	11.94	45336	27.22	<0.1	<20	< 0.1	20.955	< 1	227.20	5.85	240
4/12/17 1:08 PM	60.777141, -151.431427	-0.13	11.96	45416	27.26	<0.1	53	< 0.1	20.955	< 1	223.40	5.74	145
4/12/17 1:09 PM	60.776504, -151.432662	-0.16	11.97	45464	27.29	<0.1	74	< 0.1	20.925	< 1	221.98	6.24	65
4/12/17 1:10 PM	60.77584, -151.433868	-0.21	11.98	45542	27.32	<0.1	72	< 0.1	20.925	< 1	220.26	5.92	82
4/12/17 1:11 PM	60.775177, -151.434982	-0.18	11.96	45534	27.33	<0.1	60	< 0.1	20.925	< 1	218.56	5.63	168
4/12/17 1:12 PM	60.774528, -151.43608	-0.20	11.97	45563	27.34	<0.1	91	< 0.1	20.955	< 1	222.53	5.64	258
4/12/17 1:13 PM	60.773895, -151.437255	-0.22	11.97	45584	27.35	<0.1	90	< 0.1	20.925	< 1	221.90	5.74	351
4/12/17 1:14 PM	60.773239, -151.438461	-0.22	11.98	45610	27.37	<0.1	88	< 0.1	20.955	< 1	220.30	6.07	448
4/12/17 1:15 PM	60.772583, -151.439498	-0.23	11.99	45636	27.38	<0.1	32	< 0.1	20.925	< 1	216.70	5.88	540
4/12/17 1:16 PM	60.771961, -151.440475	-0.25	11.97	45672	27.40	<0.1	30	< 0.1	20.925	< 1	214.84	5.18	627
4/12/17 1:17 PM	60.77132, -151.441528	-0.26	11.97	45707	27.42	<0.1	<20	< 0.1	20.925	< 1	220.85	5.13	718
4/12/17 1:18 PM	60.770751, -151.442581	-0.28	12.00	45711	27.42	<0.1	27	< 0.1	20.955	< 1	219.43	5.09	803
4/12/17 1:19 PM	60.770156, -151.443572	-0.29	12.00	45735	27.43	<0.1	48	< 0.1	20.925	< 1	216.93	5.11	888
4/12/17 1:20 PM	60.769599, -151.444549	-0.30	11.99	45792	27.47	<0.1	24	< 0.1	20.925	< 1	230.52	5.05	969
4/12/17 1:21 PM	60.769149, -151.445358	-0.31	11.98	45785	27.46	<0.1	23	< 0.1	20.955	< 1	219.62	4.14	1036

(1) Boat remained close to the buoy. Measurements suspected to be impacted by boat exhaust.

NR – Measurement not recorded

Table B16: Preliminary Buoy Drift 2 April 12, 2017

PRELIMINARY Data for April 12, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
4/12/17 1:22 PM	60.768604, -151.446197	-0.33	11.99	45789	27.46	<0.1	21	< 0.1	20.925	< 1	224.53	4.11	1112
4/12/17 1:23 PM	60.768115, -151.447204	-0.31	11.99	45833	27.49	<0.1	<20	< 0.1	20.955	< 1	223.05	4.72	1188
4/12/17 1:24 PM	60.767616, -151.448226	-0.31	12.00	45789	27.46	<0.1	<20	< 0.1	20.925	< 1	226.19	4.70	1266
4/12/17 1:25 PM	60.767116, -151.449279	-0.33	12.01	45839	27.49	<0.1	<20	< 0.1	20.894	< 1	225.59	4.94	1345
4/12/17 1:26 PM	60.766666, -151.450347	-0.33	12.00	45858	27.50	<0.1	<20	< 0.1	20.925	< 1	229.88	4.79	1420
4/12/17 1:27 PM	60.766201, -151.451538	-0.33	11.99	45834	27.48	<0.1	<20	< 0.1	20.925	< 1	230.32	4.83	1501
4/12/17 1:28 PM	60.765586, -151.452468	-0.31	11.99	45811	27.47	<0.1	<20	< 0.1	20.925	< 1	208.97	5.11	1586
4/12/17 1:29 PM	60.765048, -151.453338	-0.32	12.00	45799	27.46	<0.1	<20	< 0.1	20.925	< 1	221.67	4.77	1662

(1) Boat remained close to the buoy. Measurements suspected to be impacted by boat exhaust.

NR – Measurement not recorded

Table B17: Preliminary Buoy Drift 3 April 12, 2017

PRELIMINARY Data for April 12, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 3 - Wednesday 4/12/2017													
4/12/17 3:29 PM	60.766288, -151.446044	0.58	11.69	43658	26.28	<0.1	<20	< 0.1	20.955	< 1	47.98	6.42	1322
4/12/17 3:30 PM	60.767078, -151.4449	0.34	11.83	44065	26.49	<0.1	<20	< 0.1	20.955	< 1	36.93	6.81	1215
4/12/17 3:31 PM	60.767974, -151.443664	0.24	11.87	44433	26.71	<0.1	<20	< 0.1	20.955	< 1	31.96	7.85	1095
4/12/17 3:32 PM	60.768959, -151.442352	0.15	11.91	44628	26.81	<0.1	<20	< 0.1	20.986	< 1	33.16	7.68	965
4/12/17 3:33 PM	60.769966, -151.441085	0.10	11.92	44706	26.85	<0.1	<20	< 0.1	20.986	< 1	31.53	8.05	834
4/12/17 3:34 PM	60.770973, -151.439849	0.05	11.93	44755	26.87	<0.1	<20	< 0.1	20.986	< 1	31.86	7.92	703
4/12/17 3:35 PM	60.772003, -151.438629	-0.03	11.96	44818	26.89	<0.1	<20	< 0.1	20.955	< 1	30.88	8.27	571
4/12/17 3:36 PM	60.772994, -151.437393	-0.03	11.95	44858	26.92	<0.1	<20	< 0.1	20.986	< 1	29.90	7.88	443
4/12/17 3:37 PM	60.774013, -151.436111	-0.06	11.97	44894	26.94	<0.1	<20	< 0.1	20.955	< 1	31.05	7.98	311
4/12/17 3:38 PM	60.775016, -151.434875	-0.06	11.97	44929	26.96	<0.1	<20	< 0.1	20.986	< 1	31.39	7.74	182
4/12/17 3:39 PM	60.775978, -151.433639	-0.09	11.97	44940	26.96	<0.1	<20	< 0.1	20.986	< 1	34.52	7.87	68
4/12/17 3:40 PM	60.776985, -151.432342	-0.11	11.99	44988	26.99	<0.1	<20	< 0.1	20.986	< 1	31.69	7.90	93
4/12/17 3:41 PM	60.778018, -151.431091	-0.12	11.99	45014	27.00	<0.1	<20	< 0.1	20.955	< 1	30.23	8.31	219
4/12/17 3:42 PM	60.779067, -151.429794	-0.13	11.97	45222	27.13	<0.1	<20	< 0.1	20.986	< 1	31.90	8.29	353
4/12/17 3:43 PM	60.780097, -151.428497	-0.12	12.01	45240	27.15	<0.1	<20	< 0.1	20.986	< 1	31.78	8.14	487
4/12/17 3:44 PM	60.781089, -151.427169	-0.14	12.01	45268	27.16	<0.1	<20	< 0.1	20.986	< 1	33.75	8.01	619
4/12/17 3:45 PM	60.782081, -151.425796	-0.14	12.02	45287	27.18	<0.1	<20	< 0.1	20.986	< 1	34.67	8.22	752
4/12/17 3:46 PM	60.783069, -151.424407	-0.12	12.01	45269	27.17	<0.1	<20	< 0.1	20.986	< 1	35.33	8.00	885
4/12/17 3:47 PM	60.784034, -151.423034	-0.16	12.01	45288	27.17	<0.1	<20	< 0.1	20.986	< 1	32.93	7.94	1016
4/12/17 3:48 PM	60.785007, -151.421737	-0.16	12.01	45244	27.14	<0.1	<20	< 0.1	20.955	< 1	34.17	7.66	1145
4/12/17 3:49 PM	60.785942, -151.420425	-0.18	12.01	45233	27.13	<0.1	<20	< 0.1	20.986	< 1	34.49	7.59	1271
4/12/17 3:50 PM	60.786907, -151.419113	-0.19	12.01	45255	27.14	<0.1	<20	< 0.1	20.955	< 1	34.05	7.77	1399

Table B17: Preliminary Buoy Drift 3 April 12, 2017

PRELIMINARY Data for April 12, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
4/12/17 3:51 PM	60.787868, -151.417816	-0.19	12.02	45278	27.16	<0.1	<20	< 0.1	20.986	< 1	33.13	7.81	1527
4/12/17 3:52 PM	60.788833, -151.416534	-0.18	12.01	45281	27.16	<0.1	<20	< 0.1	20.986	< 1	35.22	7.70	1655
4/12/17 3:53 PM	60.78973, -151.415237	-0.17	12.01	45293	27.17	<0.1	<20	< 0.1	20.986	< 1	35.25	7.31	1777
4/12/17 3:54 PM	60.790607, -151.41394	-0.19	12.01	45292	27.16	<0.1	<20	< 0.1	20.986	< 1	34.80	7.25	1897
4/12/17 3:55 PM	60.791442, -151.412658	-0.21	12.03	45289	27.16	<0.1	<20	< 0.1	20.986	< 1	40.01	6.79	2013
4/12/17 3:56 PM	60.792251, -151.411361	-0.21	12.03	45313	27.17	<0.1	<20	< 0.1	20.986	< 1	37.02	7.09	2127
4/12/17 3:57 PM	60.793075, -151.41014	-0.20	12.03	45317	27.18	<0.1	<20	< 0.1	20.986	< 1	37.75	6.70	2240
4/12/17 3:58 PM	60.793876, -151.408874	-0.20	12.02	45316	27.18	<0.1	<20	< 0.1	20.955	< 1	39.04	6.77	2353
4/12/17 3:59 PM	60.794689, -151.407562	-0.20	12.01	45337	27.19	<0.1	<20	< 0.1	20.986	< 1	38.30	7.14	2467
4/12/17 4:00 PM	60.79552, -151.406204	-0.20	12.03	45340	27.19	<0.1	<20	< 0.1	20.986	< 1	40.03	7.29	2585
4/12/17 4:01 PM	60.796348, -151.40483	-0.21	12.03	45332	27.19	<0.1	<20	< 0.1	20.986	< 1	39.54	7.22	2704
4/12/17 4:02 PM	60.797206, -151.403442	-0.21	12.02	45328	27.18	<0.1	<20	< 0.1	20.986	< 1	37.92	7.25	2825
4/12/17 4:03 PM	60.798042, -151.402069	-0.21	12.02	45334	27.19	<0.1	<20	< 0.1	20.986	< 1	39.57	7.22	2944
4/12/17 4:04 PM	60.798866, -151.40068	-0.22	12.03	45321	27.18	<0.1	<20	< 0.1	20.955	< 1	39.03	7.22	3062
4/12/17 4:05 PM	60.79969, -151.399276	-0.23	12.01	45391	27.22	<0.1	<20	< 0.1	20.986	< 1	41.09	7.53	3181
4/12/17 4:06 PM	60.800582, -151.39775	-0.23	12.02	45392	27.22	<0.1	<20	< 0.1	20.986	< 1	42.82	8.46	3310

Table B18: Preliminary Buoy Drift 4 April 12, 2017

PRELIMINARY Data for April 12, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 4 - Wednesday 4/12/2017													
4/12/17 4:28 PM	60.779006, -151.43013	0.58	11.62	46275	28.01	<0.1	132	< 0.1	20.986	< 1	245.02	0.38	337
4/12/17 4:29 PM	60.779003, -151.430084	0.35	11.77	46772	28.28	<0.1	132	< 0.1	20.955	< 1	245.02	0.59	338
4/12/17 4:30 PM	60.779003, -151.429992	0.25	11.80	46962	28.38	<0.1	132	< 0.1	20.955	< 1	245.02	0.37	341
4/12/17 4:31 PM	60.779003, -151.430099	0.21	11.82	46983	28.38	<0.1	165	< 0.1	20.955	< 1	245.02	0.51	338
4/12/17 4:32 PM	60.778999, -151.430191	0.16	11.81	47185	28.50	<0.1	165	< 0.1	20.955	< 1	245.02	0.09	334
4/12/17 4:33 PM	60.779026, -151.43013	0.14	11.82	47243	28.54	<0.1	165	< 0.1	20.955	< 1	245.02	0.01	339
4/12/17 4:34 PM	60.778961, -151.43013	0.13	12.02	43691	26.19	<0.1	187	< 0.1	20.955	< 1	245.02	0.53	333
4/12/17 4:35 PM	60.778675, -151.430541	0.12	11.84	46660	28.15	<0.1	187	< 0.1	20.986	< 1	216.87	3.72	294
4/12/17 4:36 PM	60.778278, -151.43106	0.11	11.81	47402	28.63	<0.1	154	< 0.1	20.955	< 1	212.06	1.46	242
4/12/17 4:37 PM	60.778373, -151.431213	0.10	11.79	47452	28.67	<0.1	165	< 0.1	20.986	< 1	212.06	1.87	245
4/12/17 4:38 PM	60.77861, -151.431045	0.10	11.79	47500	28.70	<0.1	55	< 0.1	20.986	< 1	19.18	2.05	272

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. 6

Peak Job No. 23054 Date 4/12/2017

Job Name HSE support for water sampling for Gas Pipeline Leak

Work By PEAK:

The work performed by 1 PEAK employee (*Safety Professional*) 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 2 subcontractors, was that of water sampling by 2 SLR employee and 1 Kinetic Lab 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. Discussed weather conditions with the recent precipitation.

Comments:

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

Supervisor *Safety Professional* Signature

Subs	Trade	PEAK
No. of Men		No. of Men
2	SLR	
1	Kinetic Lab	
	Peak HSE	1
	TOTAL	
Equipment		
3	4-gas meters (Hilcorp)	

The follow is a list of events that took place for the Hilcorp pipeline gas leak air water interface sampling and acoustic testing on Sunday 4-12-2017:

0900 – JSA and pre-job safety meeting completed

0950 – Depart Port aboard the Resolution owned and operated by OMSI

0950 – Weather noted: Clear, wind at 2 knots, calm seas and temperature at 50* F. Ice conditions were very clear.

1000– 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 towards the front deck 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.

1120 – First water sample and air water interface buoy with 0% LEL on gas meters. (side of vessel and buoy)

1301 – Second air water interface buoy with 0% LEL on gas meters. (buoy)

1330 – Meters turned off and waiting for 90 minutes for dive team to work on pipe.

1500 – Meters turned back on

1530 – Third water sample and air water interface buoy with 0% LEL on gas meters. (buoy)

1630 – Monitors off and headed back to port.

1700 – 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, gloves and life vests were noted throughout all tasks.

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: Vessel Captain
Safety: Hilcorp Safety Professional
Environmental / ~~Construction Rep.~~: Hilcorp Environmental Specialist
Emergency Muster Area: Deck of vessel

DATE: 4-12-17 START TIME: 0900 END TIME: 2100

FACILITY: N/A LOCATION / AREA: Cook Inlet MSGS

PROJECT DESCRIPTION: methane pipeline leak water sampling & water air interface

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
- ☑ 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)

☑ hand 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): Environmental Sampler Signature: Environmental Sampler

PERMIT APPROVER (print): Safety Professional Signature: Safety Professional

AREA CONTROLLER (print): Vessel Captain Signature: Vessel Captain

Revalidation or Extension Time (4 Hour Max):

Permit Approver (print): _____ Time: _____

Signature _____

Close Out Signature:

Work Team Leader: Environmental Sampler Time: 1700

Area Controller: Vessel Captain Time: 1700

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	A	Possible sea ice falls, items moving	a	Handrails keep items stowed	gr
	retrieval & redeployment	B	Heavy seas - slips, trips, falls fall overboard, items moving	b	Handrails, secure items life vests	gr
	of equip. Travel to port					
		C	Heavy wind - slips, trips, fall wind burn, items moving	C	Hand rails, secure item captain discretion	gr Capt
		D	Possible cool temps - frostbite skin/eye irritation, could exposure	d	warm clothing	gr
		E	Dangerous atmosphere - contact w/ increased LEL%	e	continuous monitoring of three 4-gas meters	gr
2	Rigging of equipment	A	Pinch point, crushing, cuts	a	rigging procedures, hard hat, gloves, steel toe boots	gr
				a	identify pinch points, communication	gr
				a	trained to use, inspect material	gr
3	Lifting of equipment	A	Falls, slips, trips	a	keep clear path, life vest fall protection	gr
	for deployment and	B	moving & falling of overhead material, crush/struck-by	b	use crane for heavy equip no working under overhead	gr
	retrieval			b	items. Hard hat and steel toe, communication	gr
		C	mechanical	c	deck hands on crane. inspect for use	gr
4	Be mindfull of dive team					

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:

Environmental Sampler

Safety Professional

Environmental Sampler

Environmental Sampler