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May 3, 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 #7 ending 05/02/2017

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 seventh 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.

Ice Monitoring:

Hilcorp regularly monitored ice conditions in the area of the gas leak using helicopter overflights and platform observations as conditions allowed. Observations were compared to the National Oceanic and Atmospheric Administration (NOAA) ice forecasts and provided to the Department via Situation Reports.

On April 17, 2017, Hilcorp submitted an Amendment to the Department to stop daily ice monitoring efforts due to warmer temperatures. The Amendment was accepted by the Department on April 18, 2017. Ice monitoring activities described in the Plan are considered complete.

Fish and Wildlife Monitoring:

On April 26, April 28, and May 1, one Cook Inlet Spill Prevention & Response, Inc. (CISPRI) protected species observer and one wildlife observer professional from International Bird Rescue conducted extended overflights of approximately 20 square miles surrounding the gas leak location (within a 5-mile

diameter circle). 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 near the helicopter. Flight circles were approximately 0.5 miles apart. Flight conditions and visibility were good during all flights. Various bird species were observed within the 20 square mile area and marine mammals were observed outside the 20 square mile area.

Wildlife observer reports are provided in Attachment A. The last fish and wildlife monitoring event is scheduled for today (5/3), conditions permitting. Observer reports from the last monitoring effort will be submitted to the Department as part of the final weekly summary report on May 10, 2016.

Water Quality Sampling:

The water quality buoy was successfully deployed three times on April 25, 2017. 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 #7, 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, 6.5, and 11.5 meters below the water surface.

Drifts passed between 27.9 and 202 meters from the gas release site. Water quality sampling during Sampling Period #7 showed limited variability in dissolved oxygen, methane, and carbon dioxide concentrations. The lowest dissolved oxygen reading observed (11.55 mg/L) was well above the water quality standard specified under 18 AAC 70 for marine waters. The highest methane concentration observed was 0.107 mg/L at 6 meters below the water surface. No violations of state water quality standards were identified.

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%.

A summary report and additional safety documentation for the water quality sampling efforts are provided in Attachment B. The final weekly water quality sampling effort occurred yesterday (5/2). Data is currently being downloaded and evaluated and will be submitted to the Department as part of the final weekly summary report on May 10, 2016. Field activities associated with water quality sampling described in the Plan are considered complete.

Air/Water Interface Sampling:

The final monthly air/water interface sampling effort occurred yesterday (5/2). Data is currently being downloaded and evaluated and will be submitted to the Department as part of the final weekly summary report on May 10, 2016. Field activities associated with air/water interface sampling described in the Plan are considered complete.

Acoustic Monitoring:

Acoustic monitoring described in the Plan was conducted previously on Sunday March, 27, 2017. A second acoustic monitoring effort using Autonomous Multichannel Acoustic Recorders (AMARs) was

conducted between April 7, 2017 and April 22, 2017. On April 17, 2017, Hilcorp submitted an Amendment to the Department to submit this additional acoustic monitoring data as part of the Plan. The Amendment was accepted by the Department on April 18, 2017. Field activities associated with acoustic monitoring described in the Plan are considered complete. Acoustic data is currently being evaluated and will be submitted to the Department as soon as it is available.

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,

FOR William G. Britt, Jr.
Environmental Manager

Attachments:

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

ATTACHMENT A

FISH AND WILDLIFE MONITORING SUMMARY REPORT

April 26, 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 Hilcorp logistics, and picked up a Hilcorp pool car at the Kenai hangar. Weather was cloudy with sprinkles, with no ice in the inlet.

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

From eBird.org:

Location Anchor Point--Anchor River Mouth, Kenai Peninsula County, Alaska, US

Sun Apr 23, 2017 2:15 PM

Duration:
2 hour(s)
Observers:
Wildlife Observer

Marine Bird Species Seen:

X Surf Scoter
X White-winged Scoter
X Black Scoter
X Common Loon
X Bald Eagle
X Black-legged Kittiwake
X Herring Gull
X Glaucous-winged Gull
X Glaucous Gull

.
I visited CISPRI briefly during their spill drill, then arrived at OSK helipad about 10 am with PSO, from CISPRI. We arrived earlier than scheduled due to logistical coordinator's request. We conducted the wildlife survey from 10:34-11:34 am during outgoing tide (slack tide was predicted at 11:42 am). There was no ice in the survey area, and the seas were calm with good visibility (see photo).

I sat on the outside circling window as we made clockwise circles around the leak site. The outer ending GPS point (west side) was 60° 52.1954 N, 151°24.8575 W (taken by CISPRI PSO

who mentioned that these were a different coordinate system--?). I saw 1 gull near the dock, 1 gull sitting on a gravel island in the middle of the inlet, 2 large light-colored shorebirds (?) that flushed off some floating debris, and a raven flying past the helicopter. The pilots remarked on seeing some birds, but they were not identified. CISPRI PSO did not report any additional birds seen from the inside circling window.

I visited the Kenai River mouth area about 1 pm during low tide, and observed hundreds of gulls and a few Bald Eagles near the coast. I also made a stop at the Kenai Flats wildlife observation platform but no other species of marine birds were spotted.

I departed Kenai at 5 pm on the Twin Otter, and arrived at Ross Aviation hangar in Anchorage about 5:30 pm.

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April 28, 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 Hilcorp logistics, and picked up a Hilcorp pool car at the Kenai hangar. Weather was partly cloudy, with no ice in the inlet.

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

I visited the Kenai River mouth about 9 am during outgoing tide, and saw hundreds of gulls and three bald eagles, but no other marine birds.

I worked at the CISPRI office to check website data and to draft reports. I arrived at OSK helipad about 12 noon with CISPRI PSO. Due to logistical request, we conducted the wildlife survey from 12:45-1:45 pm. Slack tide was predicted at 1:10 pm but actually started at 1:35 pm. There was no ice in the survey area, and the seas were calm with good visibility (see photo).

I sat on the outside circling window as we made clockwise circles around the leak site. The outer ending GPS point (west side) was 60°48.7129N, 151°34.7360W (taken by CISPRI PSO). I saw a flock of tan shorebirds (about 20) flying over the water about ½ mile south of the A Platform, and 1 gull flying over west over a gravel bar in the center of the inlet. CISPRI PSO observed additional birds seen from the inside circling window, including 1 gull flying east, 2 black and white birds flying SE (possibly White-winged Scoters after he saw them in bird field guide), 1 white and gray gull-type bird hovering over a gravel bar (likely Arctic Tern), and 1 adult Bald Eagle.

Hilcorp logistics coordinator at OSK helipad, reported that a colleague had seen a pod (about 7) belugas near the OSK dock on April 26 in the afternoon.

I departed Kenai at 4:30 pm on the Twin Otter, and arrived at Ross Aviation hangar in Anchorage about 5 pm.

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May 1, 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 Hilcorp logistics, and picked up a Hilcorp pool car at the Kenai hangar. Weather was mostly cloudy, with no ice in the inlet.

I ate breakfast, and checked for any updated marine bird sightings in the upper Cook Inlet area from eBird.org (see below) and the AK Birding listserv (none). Spring migration is well underway.

From eBird.org:
April 28, 2017 Kasilof River mouth –observed by *Wildlife Observer*
4 Surf Scoters
1 White-winged Scoter
7 Bald Eagles
30 Mew Gulls
400 Herring Gulls
10 Glaucous-winged Gulls
1 Common Loon
(also various other waterbirds, shorebirds, and songbirds)

April 25, 2017 Erik Hansen Scout Park, Kenai - observed by *Wildlife Observer*
5 Bald Eagles
20 Mew Gulls

I walked the beach on the north side of the Kenai River mouth from 10:15-11am during outgoing tide, and saw 3 Bald Eagles, 4 Mew Gulls, 10 Herring Gulls, and hundreds of other unidentified gulls at a distance, but no other marine birds. I also saw a pod of beluga whales (6-8 individuals) swimming out of river mouth, and a minke whale with them (identified by color, size, small dorsal fin, visible flukes when diving, and grooves on back).

I worked at the CISPRI office to draft reports. I arrived at OSK helipad about 2:30 pm with CISPRI PSO.

We began the survey at 3:30 pm. Predicted slack tide was 3:37 pm, but at Platform C it was closer to 4 pm. There was no ice in the survey area, and the seas were fairly calm with good visibility (see photo). I sat on the outside circling window as we made clockwise circles around

the leak site. The outer ending GPS point (west side) was very close to last survey (60°48.7129N, and 151°34.7360W) although we were not able to take an exact reading. I saw 5 unidentified gulls in 3 different groups in the survey area. CISPRI PSO did not see any birds from the inside circling window.

I departed Kenai at 6 pm on the Twin Otter, and arrived at Ross Aviation hangar in Anchorage about 6:30 pm.

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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
9	4/19/2017	IBR	1106	1254	1120	Nik	72	350	25	99	2	1	0.44444	39	4	N	100+	0	0	EH	CISPRI PSO	1 Herring Gull flying N; 2 Mew Gulls flying S; 1 Leach's Storm Petrel W; 10 Glaucous-winged Gulls flying north
10	4/21/2017	IBR	1230	1400	1352	Nik	77	450	20	100	1	1	1135	46	4.5	ENE	100+	30	0	TC	CISPRI PSO	2 Glaucous-winged Gulls flying S to N thru middle; 3 Mew Gulls sitting between A and C platform first three circles, then flew away; 100 Geese flying N to S on the West edge of area, about 1,000 feet; 3 Glaucous-winged gulls flying next to shore by Helipad as we landed.
11	4/26/2017	IBR	1134	1234	1142	Nik	80	462	see GPS	100	2	<1	0.4875	41.9	4.4	NW	100+	90	0	unk	CISPRI PSO	1 gull flying near dock; 1 gull perched on gravel island; 2 large shorebirds (?) flushed from floating debris; 1 raven flying past. Possibly additional unidentified birds seen by pilots.
12	4/28/2017	IBR	1145	1245	1345	Nik	88	460	see GPS	100	1	negl.	1403	43.2	4.2	ENE	75	60	0	unk	CISPRI PSO	2 gulls, flock of 20 shorebirds, 2 possible WWSC, 1 possible ARTE, and 1 Bald Eagle.
13	5/1/2017	IBR	1530	1630	1600	Nik	72	330	see GPS	100	2-3	1	1430	45.3	17.3	E	50-75	100	sprinkles	Chris	CISPRI PSO	Less gravel exposed. 5 unidentified gulls seen flying.

Cook Inlet Operations - Protected Species Observer Effort Log

Project ID: PSO Hilcorp

Name: Protected Species Observer **Initial:** PSO

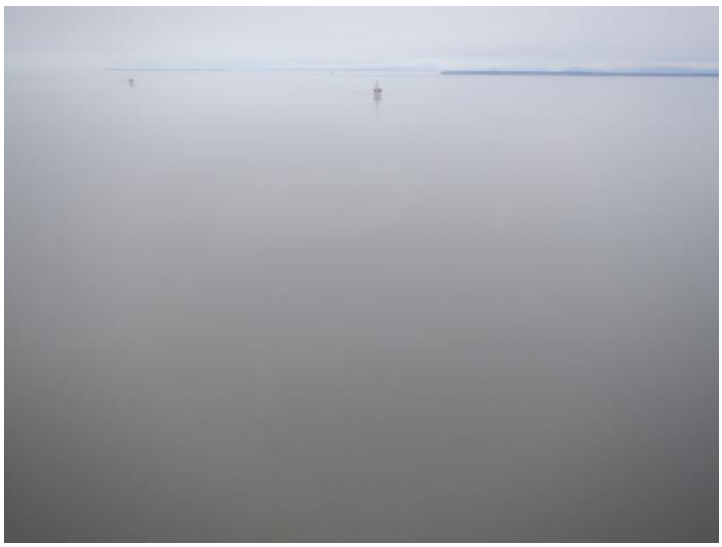
Protected Species Observer PSO

Vessel Name: Hilcorp Helo

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° 44.4109'	W. 151° 18.546	Alt 300-400'	1400	N. 60° 48.545'	W. 151° 29.042'	Alt 300-400'	8.7 Knots	ø	ø	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 363'		ø	ø	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	ø	ø	UNLIMITED	NONE
4/19/2017	PSO	1100	60° 44.414' N	151° 18.702'W	ALT 300	1218	60° 48.258' N	151° 35.557'W	ALT 300	N @ 4 KNT	ø	ø	10 MILES	10%
4/21/2017	PSO	1230	60° 44.975'N	151° 18.953'W	ALT 450	1340	60° 46.469'N	151° 30.545'W	ALT 450	NNE @ 11 KNT	1	1	10 miles	5%
4/26/17	PSO	1050	60° 46.9189 N.	151° 27.1875 W	ALT 400'	1130	60° 52.1954 N	151° 24.8575 W	Alt	SSE @ 1 Knt	ø	ø	unlimited	None
4/28/17	PSO	1245	60° N 44.3530'	151° W 18.9963'	282'	1348	60° N 48.7129'	151° W 34.7360'	Alt 460	N. @ 6 Knt	ø	ø	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 #7

Prepared by SLR International Corporation (SLR)

Report Date: 5-2-2017

1.0 OVERVIEW

The seventh water quality monitoring 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). There was no air/water interface sampling this reporting period.

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, the leak was stopped by applying a temporary clamp over the hole in the gas line. The temporary clamp was removed on April 19 during the slack tide around mid-day to allow for the installation of the permanent clamp. This operation took several dives during slack water. During the installation of the permanent clamp there was intermittent gas leakage from the pipeline as it could only be partially tightened. The permanent clamp failed to stop all the leakage and the temporary clamp was re-installed on April 20. The temporary clamp stopped the gas leakage.

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 25, 2017 which was 5 days after the temporary clamp stopped leakage from the pipeline and one day prior to a spring tide on April 26. The April 25 monitoring event covered portions of an ebb and flood tide. The NOAA tide predictions at the nearby East Forelands area predicted a low tide at 11:27 with height of -0.61 meters above mean lower low water (MLLW) on April 25. 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 Weeks 4, 5, and 6, during Week 7 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 1 meter 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, 6 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 7, the site conditions impacted the activities completed as well as the collection of data, as noted below:

- No dive crew or buoys were near the MRP, therefore drifts could proceed without danger of entanglement in buoy lines.
- No sea ice was encountered during the seventh event. The seas were relatively flat.
- Air temperatures varied between 4 and 8 ºC with water temperatures typically about 0.9 to 1.3 ºC.
- The MiniCH4 and MiniCO2 sensors at both depths 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. Starting on Week 5, the deeper (12 meter) sensor was mounted upward as well.
- The deep and middle depth sensors where soaked in a container of seawater prior to and between drifts to keep them closer to ambient conditions when deployed. The sea water was collected from Cook Inlet prior the first drift near the project site. This technique was used the previous week as well, and appeared to reduce the sensors equilibrium time following deployment.

Three water quality buoy drifts (monitoring transects) were conducted through the area surrounding the MRP on April 25 at differing tidal stages. The duration of each water quality buoy drift varied from approximately 17 to 45 minutes. The average drift speed varied between 8.8 and 9.7 kilometers per hour. Table A-2 in Attachment A provides a summary of the buoy deployments. Attachment A. Figure A-2g illustrates the path of the three buoy drifts. During all three drifts the temporary clamp was installed on the natural gas line and no gas was observed bubbling around the MRP.

Drift #1 occurred during the ebb tide. The buoy was deployed approximately 1,700 meters up current of the MRP and was allowed to drift down current at total of 5978 meters, with periodic adjustment using the vessel to guide it safely past the MRP. The buoy passed within 29.6 meters of the MRP about 13 minutes into the drift.

Drift #2 occurred during the flood tide. The drift began approximately 1,500 meters up current of the MRP. Wind interfered with projected drift pattern and the drift was terminated immediately after passing the MRP due the poor trajectory. At its closest point, the buoy was 202 meters southwest of the MRP. At that point it was decided to reposition the buoy for another attempt at passing closer to the MRP.

Drift #3 occurred during the flood tide. The drift began approximately 700 meters up current of the MRP, and the buoy drifted down current a total of 4007 meters. The buoy passed within 27.9 meters of the MRP about 6.5 minutes into the drift.

No CTD casts were performed during Week 7.

No water samples for laboratory analysis were collected during Week 7.

A photograph log documenting the data collection methods and site conditions during Week 7 is included in Attachment A.

2.2 Summary of Results

2.2.1 Buoy Transects-Week 7

Data plots for the primary parameters of interest (DO, CH_4 and CO_2) for the water quality buoy Drifts #1 and #3 completed on April 25 are provided on Figures A-10.1 and A-10.2 in Attachment A. Drift #2 was terminated when it became evident the buoy would did not come close to the MRP. The data obtained during Drift #2 was not considered relevant for analysis or reporting purposes, and is not discussed.

- Dissolved Oxygen- The lowest DO value recorded after the sensor had time to stabilize and passed the MRP was 11.55 mg/L during Drift #1 and 11.53 mg/L during Drift #3. These lowest values were both recorded on the deepest DO sensor deployed at 11.5 meters on the CTD. There was no significant drop in DO concentrations recorded by the sensors as they passed the MRP, and measurements from each sensor were relatively stable throughout the drift (Attachment A, Figures A-10.1a and A-10.2a).

- Dissolved Methane: The maximum CH_4 concentration recorded was 0.107 and 0.096 mg/L during Drifts #1 and #3, respectively. These values were recorded on the sensor deployed at 6 meters. The sensor at 11.5 meters recorded values about 0.05 to 0.6 mg/L less than the sensor at 6 meters which has been a typical pattern observed during the monitoring events. The recorded CH_4 concentrations did not show a noticeable (sharp) increase as the sensors passed the MRP, and were relatively stable and consistent throughout the two drifts (Attachment A, Figure A-10.2b and A-10.2b). Overall, the recorded CH_4 concentrations were in the lower range of concentrations measured during the project, and similar to the previous four weeks (March 29-April 25 events).

- 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-10.1c and Figure A-10.2c in Attachment A). The recorded concentrations varied the most during the initial 5 to 10 minutes of each drift and prior to passing the MRP, presumably as the instrument equilibrated with the water conditions. The measured CO_2 concentrations were typically between 0.9 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.

2.2.2 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 May 2.

2.3 Activities Planned for the Next Sampling Event

The next water quality sampling event is planned for May 2, 2017. Planned activities include:

- Collecting discrete water samples at similar locations to the sampling performed to-date for the project.
- 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. The water sampling is considered a higher priority than the buoy drifts. This is the final planned water quality monitoring event.

3.0 AIR/WATER INTERFACE MONITORING

3.1 Activities Completed

No air/water interface monitoring occurred during this reporting period.

3.2 Preliminary Summary of Results

No air/water interface monitoring occurred during this reporting period.

3.3 Activities Planned for the Next Sampling Event

The next air / water interface sampling event is planned for May 2, 2017. Planned activities include conducting deployments of the Air / Water Interface buoy in the vicinity of the MRP. These planned activities may need to be modified due to site conditions and logistics. This is the final planned air/water interface monitoring event.

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 25, 2017)

TABLES:
Table A-1: Water Quality Buoy Instrumentation Summary, April 25, 2017
Table A-2: Summary of Water Quality Buoy Drifts

FIGURES:
Figure A-1: Water Quality Monitoring Buoy Schematic (March 23-April 25, 2017)
Figure A-2e: Water Quality Monitoring Week 6 (April 25, 2017), Buoy Drift Tracks

Week 5 Data Plots:
Figure A-10.1a: Buoy Drift #1, April 25, 2017, Dissolved Oxygen
Figure A-10.1b: Buoy Drift #1, April 25, 2017, Dissolved Methane
Figure A-10.1c: Buoy Drift #1, April 25, 2107, Dissolved Carbon Dioxide
Figure A-10.2a: Buoy Drift #3, April 25, 2017, Dissolved Oxygen
Figure A-10.2b: Buoy Drift #3, April 25, 2017, Dissolved Methane
Figure A-10.2c: Buoy Drift #3, April 25, 2017, Dissolved Carbon Dioxide

Cook Inlet Water Quality and Air/Water Interface Sampling Photo Log: Week 7 4-25-17

Photo 1: Typical conditions during Week 7. There was no sea ice and relatively flat seas. Buoy is seen here tied to the boat during Drift 1. Bubbles were not observed on the water surface near the MRP at any point during the day.

Date: 4/25/2017

Photo 2: CTD and mid-level sensors were stored in a container of seawater collected from Cook Inlet near the project site to keep them as close to in-situ conditions as possible between drifts.

Date: 4/25/2017

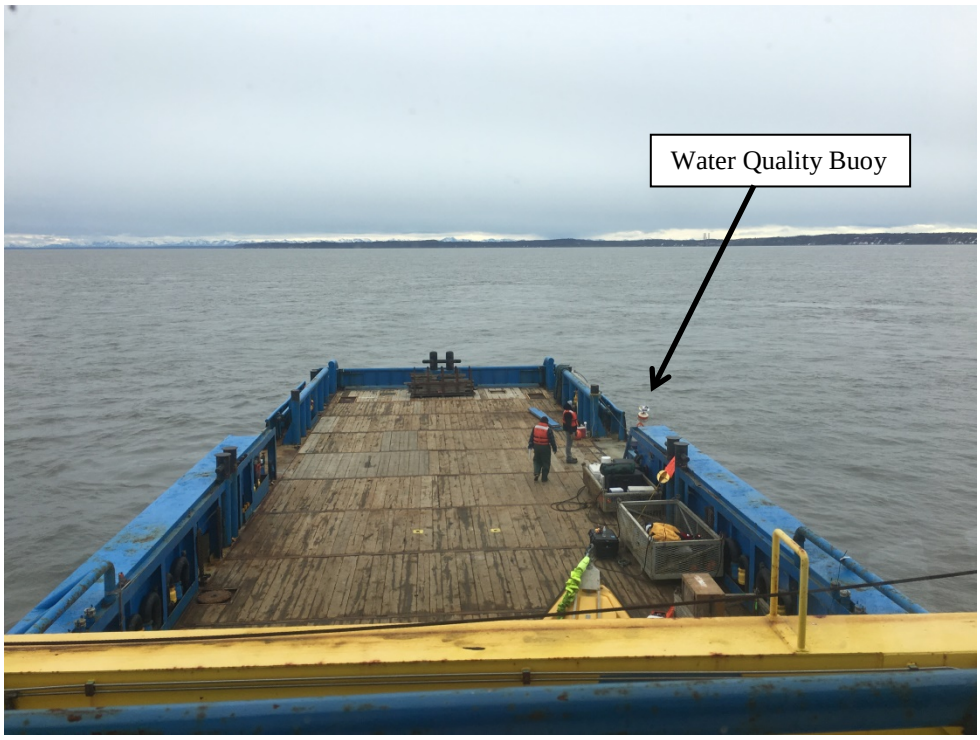


Photo 3: View of the deck and stern on the Resolution during Drift 3. Buoy is attached to the side of the boat on right. Conditions remained ice-free with waves less than 1 foot. Winds were approximately 10 knots out of the North.

Date: 4/25/2017

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 (0-1000ppm)	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		Start of Data Collection (hr:min: sec)[2]	End of Data Collection[2]	Duration of Data Collection[2]	Total Drift Distance (m)[2]	Average Drift Velocity (km/hr)[2]	Minimum Distance to MRP (m)	Drift Elapsed Time at Minimum Distance to MRP (hh:mm:ss)	Wind (knots & direction)	Wave Height (m)	Comments	Estimated flow from leak (MCFD)
Water Quality	Surface	7	D01-031817	Ebb	2 days before neap tide event	4.75	3/18/2017	60 46.622 N 151 25.718 W		60 45.356 N 151 27.877 W		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	193-295
	Mid	7																				
	Deep	12.5																				
Water Quality	Surface	2	D01-031917	Flood		3.84	3/19/2017	60 46.37 N 151 26.239 W		60 47.2 N 151 25.112 W		8:15:45	8:45:55	0:30:10	1930	3.8	44.9	0:05:10	15, SSW	0		
	Mid	7																				
	Deep	12.5																				
Water Quality	Surface	2	D02-031917	Flood			3/19/2017	60 46.35 N 151 25.878 W		60 46.921 N 151 25.878 W		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																				
	Deep	12.5																				
Water Quality	Surface	2	D03-031917	Flood/Slack/ Ebb		--	3/19/2017	60 45.527 N 151 23.097 W		60 45.527 N 151 23.097 W		9:58:00	11:57:30	1:59:30	3684	1.9	9.4	1:05:45	15, SSW	0.2		
	Mid	7																				
	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 151 25.995 W		60 47.479 N 151 24.660 W		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	193-295
	Mid	7																				
	Deep	12.5																				
Water Quality	Surface	2	D02-032317	Flood			3/23/2017	60 46.393 N 151 26.33 W		60 47.755 N 151 26.248 W		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																				
	Deep	12.5																				
Water Quality	Surface	2	D03-032317	Flood/Slack/ Ebb		--	3/23/2017	60 46.781 N 151 25.884 W		60 46.537 N 151 26.248 W		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																				
	Deep	12.5																				
Water Quality	Surface	2	D04-032317	Ebb		4.33	3/23/2017	60 46.695 N 151 25.870 W		60 45.403 N 151 27.936 W		16:31:35	17:18:55	0:47:20	3037	3.9	2.6	0:04:45	Calm	0		
	Mid	7																				
	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 151 25.624 W		60 44.322 N 151 29.507 W		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	85-115
	Mid	7																				
	Deep	12.5																				
Water Quality	Surface	2	D02-032917	Flood		7.86	3/29/2017	60 46.216 N 151 26.734 W		60 49.189 N 151 21.302 W		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																				
	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 151 26.228 W		60 46.654 N 151 25.531 W		13:26:48	13:48:08	0:21:20	793	2.5	67.8	0:08:00	5-10, SSW	0.5		85-115
	Mid	5.8																				
	Deep	11.3																				
Water Quality	Surface	0.8	D01-04057	Flood/Slack/ Ebb		--	4/5/2017	60 46.546 N 151 26.247 W		60 46.361 N 151 26.350 W		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																				
	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 151 25.319 W		60 44.665 N 151 29.450 W		11:21:08	12:09:20	0:48:12	6367	7.9	61.1	0:09:12	Calm	0		78-108
	Mid	6.5																				
	Deep	12																				
Water Quality	Surface	1.5	D02-041217	Flood		6.98	4/12/2017	60 46.071 N 151 25.526 W		60 47.572 N 151 25.366 W		15:31:36	15:57:32	0:25:56	3614	7.4	222.9	0:07:32	Calm	0		
	Mid	6.5																				
	Deep	12																				
Water Quality	Surface	1.5	D01-041917	Flood	neap tide	2.56	4/19/2017	60 46.039 N 151 26.973 W		60 48.26 N 151 23.275 W		9:32:48	11:18:36	1:45:48	5427	3.1	32.1	0:20:44	5, SSW	0.2	Temporay clamp was installed on pipeline leak on April 13, and inplace during this drift.	0
	Mid	6.5																				
	Deep	12																				
Water Quality	Surface	1.5	D02-041917	Ebb		3.54	4/19/2017	60 46.944 N 151 25.555 W		60 45.000 N 151 28.091 W		13:05:44	14:16:16	1:10:32	4766	4.2	18.5	0:18:16	Calm	0.2	Temporary clamp was removed during this drift. Bubbling observed on water surface near MRP.	slight
	Mid	6.5																				
	Deep	12																				
Water Quality	Surface	1	D01-042517	Ebb	1 day before spring	7.01	4/25/2017	60 45.15 N 151 25.205 W		60 44.932 N 151 29.030 W		10:07:36	10:56:36	0:45:00	5978	9.7	29.6	0:12:48	5-10	0.3	Temporay clamp was re-installed on April 20 and in place during this event. No bubbling observed.	0
	Mid	6																				
	Deep	11.5																				
Water Quality	Surface	1	D02-042517	Flood		7.59	4/25/2017	60 46.043 N 151 27.426 W		60 46.754 N 151 26.097 W		13:08:12	13:24:56	0:16:44	1727	8.6	202.3	0:16:44	5-10	0.3	Drift terminated due to poor trajectory (missed MRP).	
	Mid	6																				
	Deep	11.5																				
Water Quality	Surface	1	D03-042517	Flood		7.59	4/25/2017	60 46.267 N 151 26.193 W		60 48.011 N 151 24.182 W		13:41:00	14:18:28	0:37:28	4007	8.8	27.9	0:06:24	10	0.3		
	Mid	6																				
	Deep	11.5																				

Abbreviations

m	meters
MCFD	thousand cubic feet per day
MRP	Methane Release Point

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, 19, 25, 2017)

2 Meters
Below Surface

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

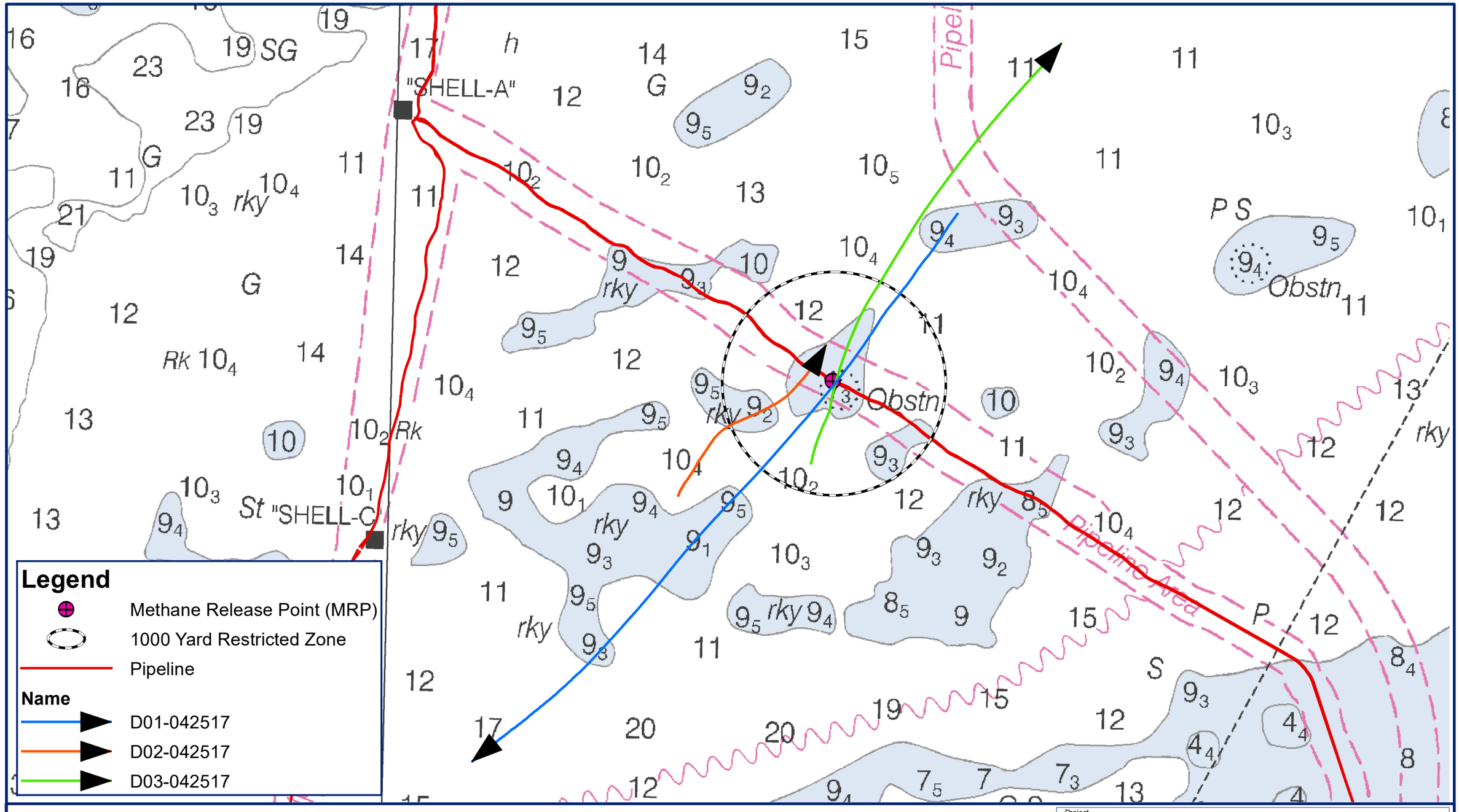
Note: In addition, Air-Interface Buoy will contain a Pro-Oceanus Mini CH_4 sensor Submersible pCH_4 (partial pressure CH_4) sensor and datalogger (0-100% by volume range) for surface water measurements of CH_4.

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 7 (APRIL 25, 2017) BOUY DRIFT TRACKS
Drawing Date	May 2017
Scale	1:30,000
Fig. No.	A-2g
File Name	Figure A2g Methane Release_Event7.mxd
Project No.	105.00874.17015

Figure A-10.1a: Buoy Drift #1, April 25, 2017
Dissolved Oxygen Measurements at 1, 6, 11 and 11.5 Meters Depth
Flood Tide

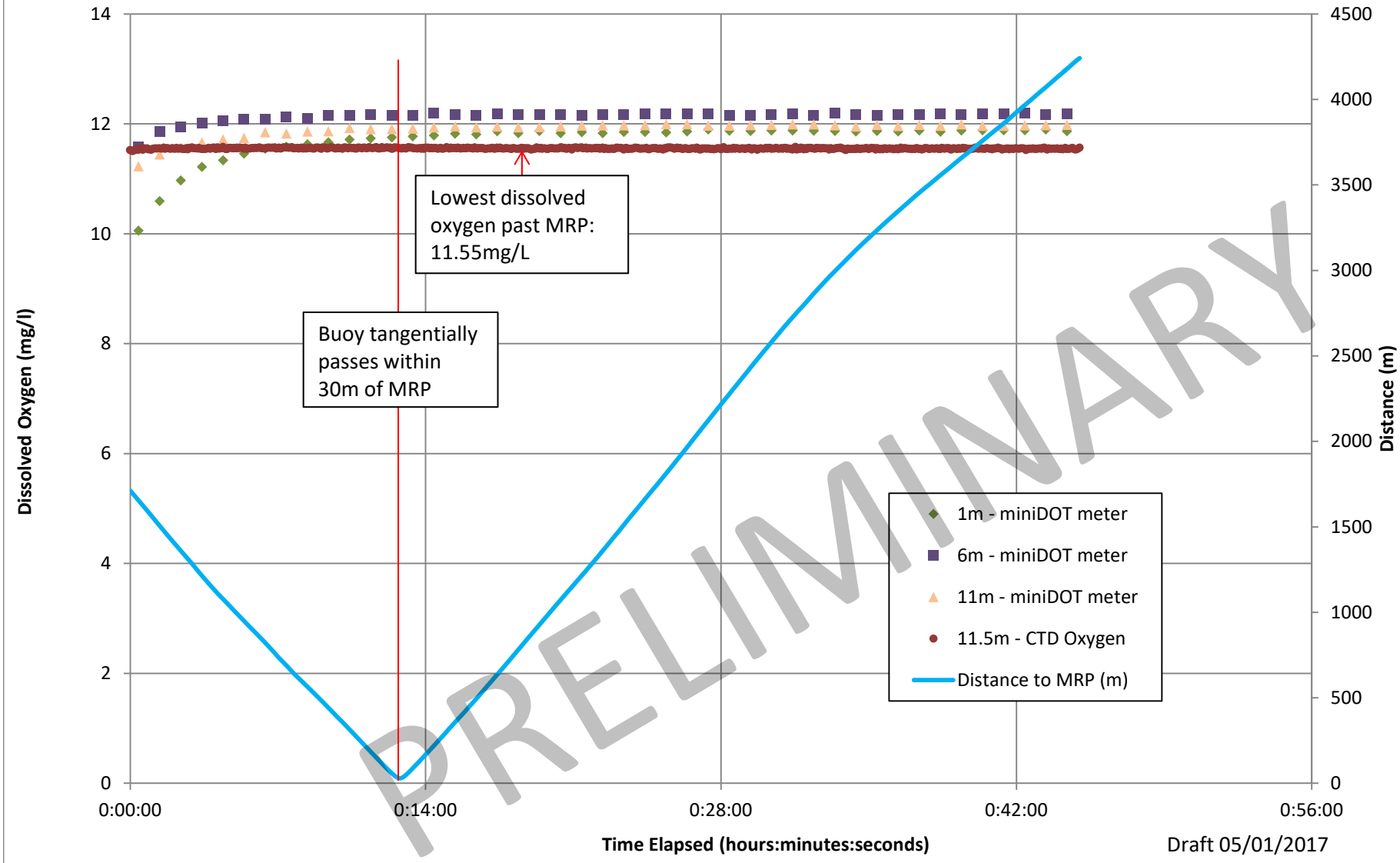
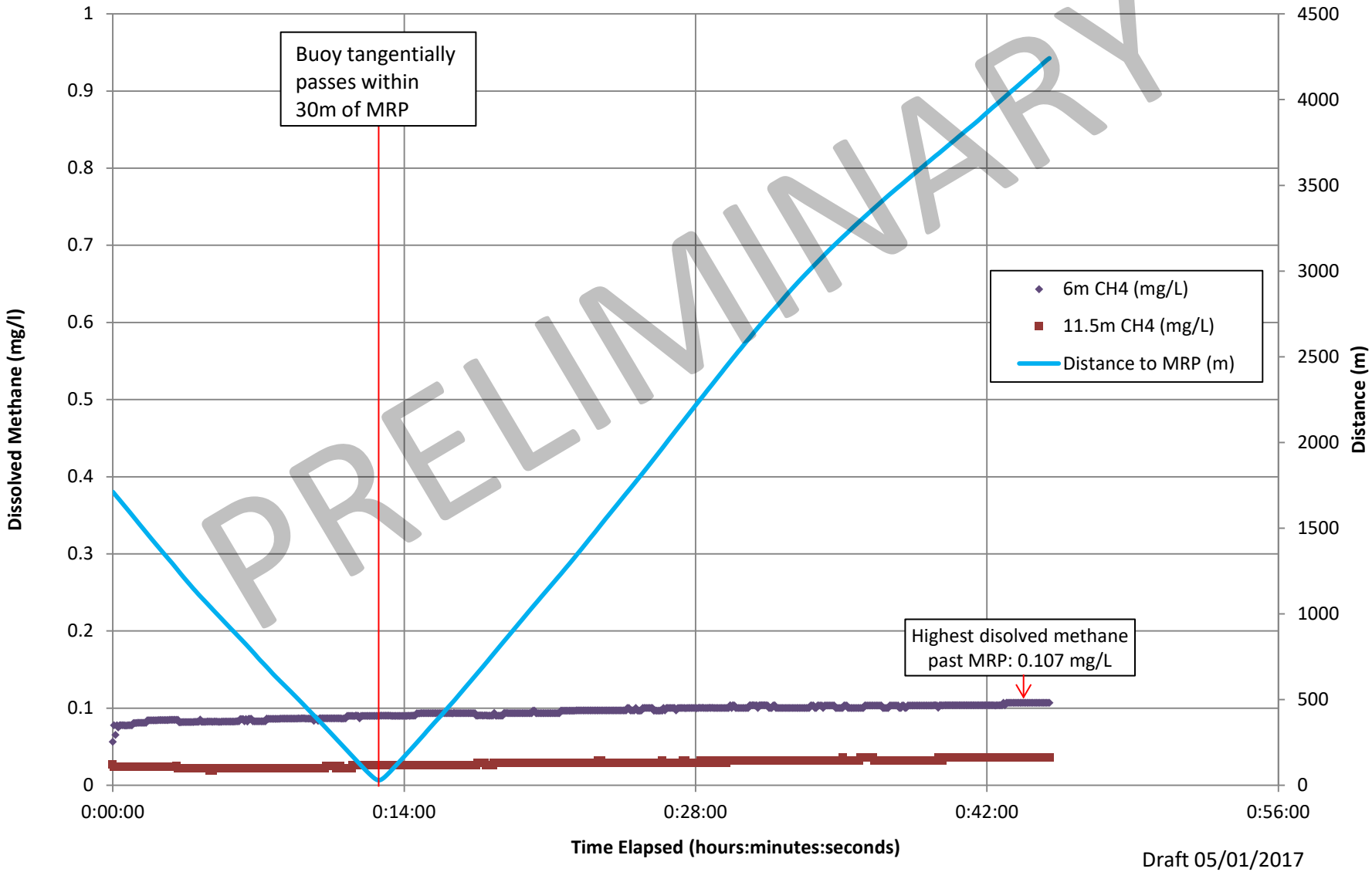


Figure A-10.1b: Buoy Drift #1, April 25, 2017
Dissolved Methane Measurements at 6 and 11.5 Meters Depth
Flood Tide



Draft 05/01/2017

Figure A-10.1c: Buoy Drift #1, April 25, 2017
Dissolved Carbon Dioxide Measurements at 6 and 11.5 Meters Depth
Flood Tide

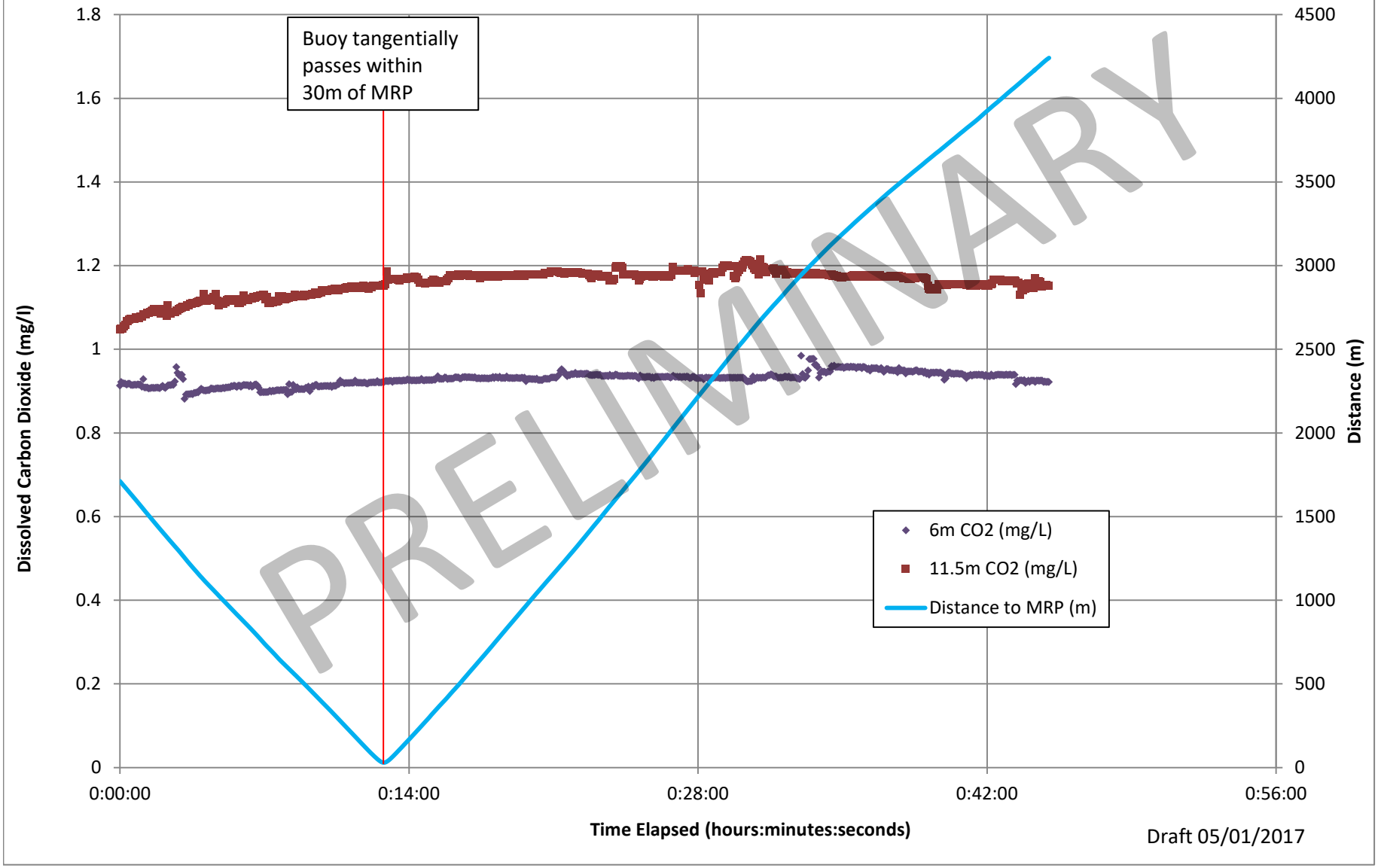


Figure A-10.2a: Buoy Drift #3, April 25, 2017
Dissolved Oxygen Measurements at 1, 6, 11 and 11.5 Meters Depth
Flood Tide

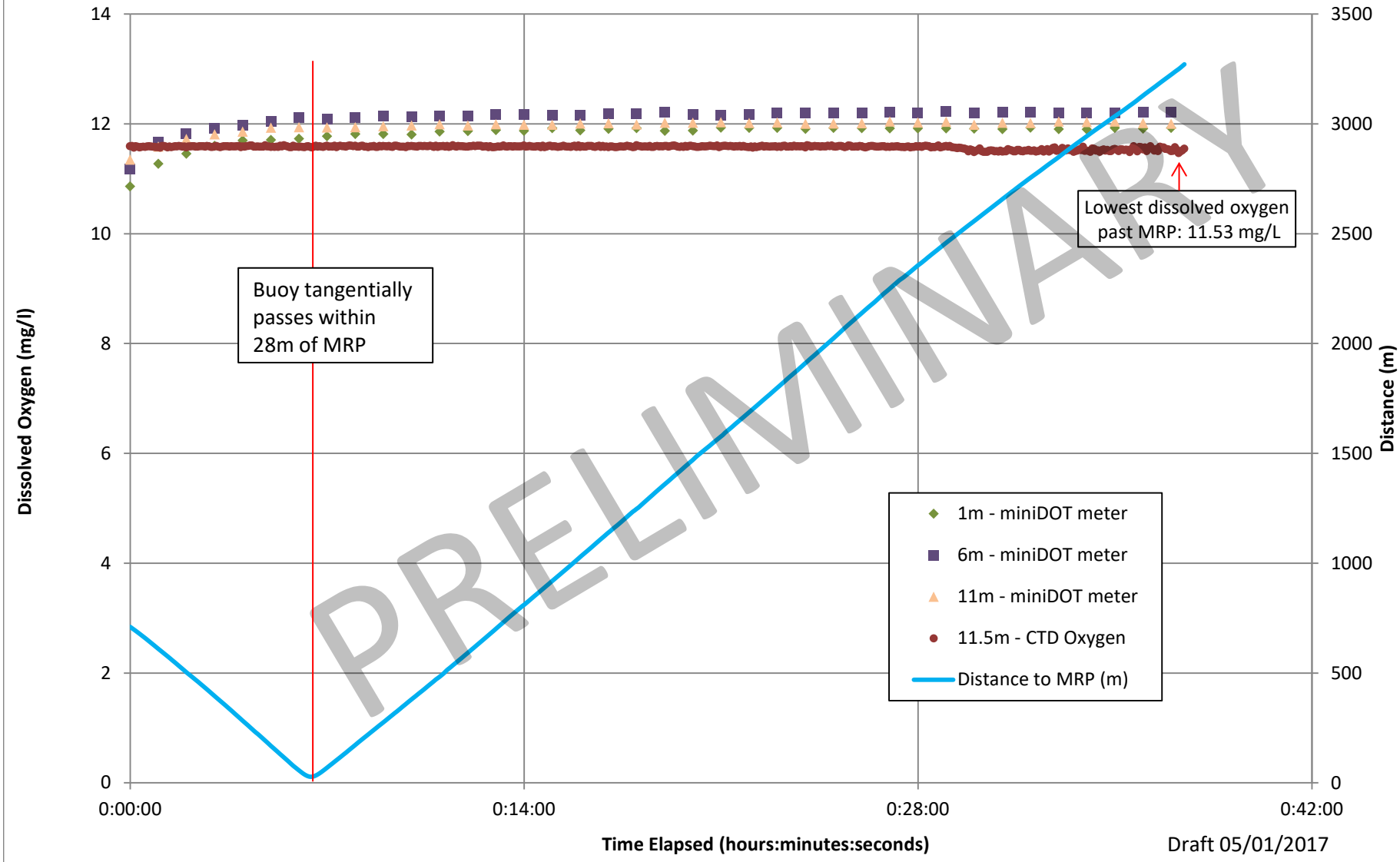
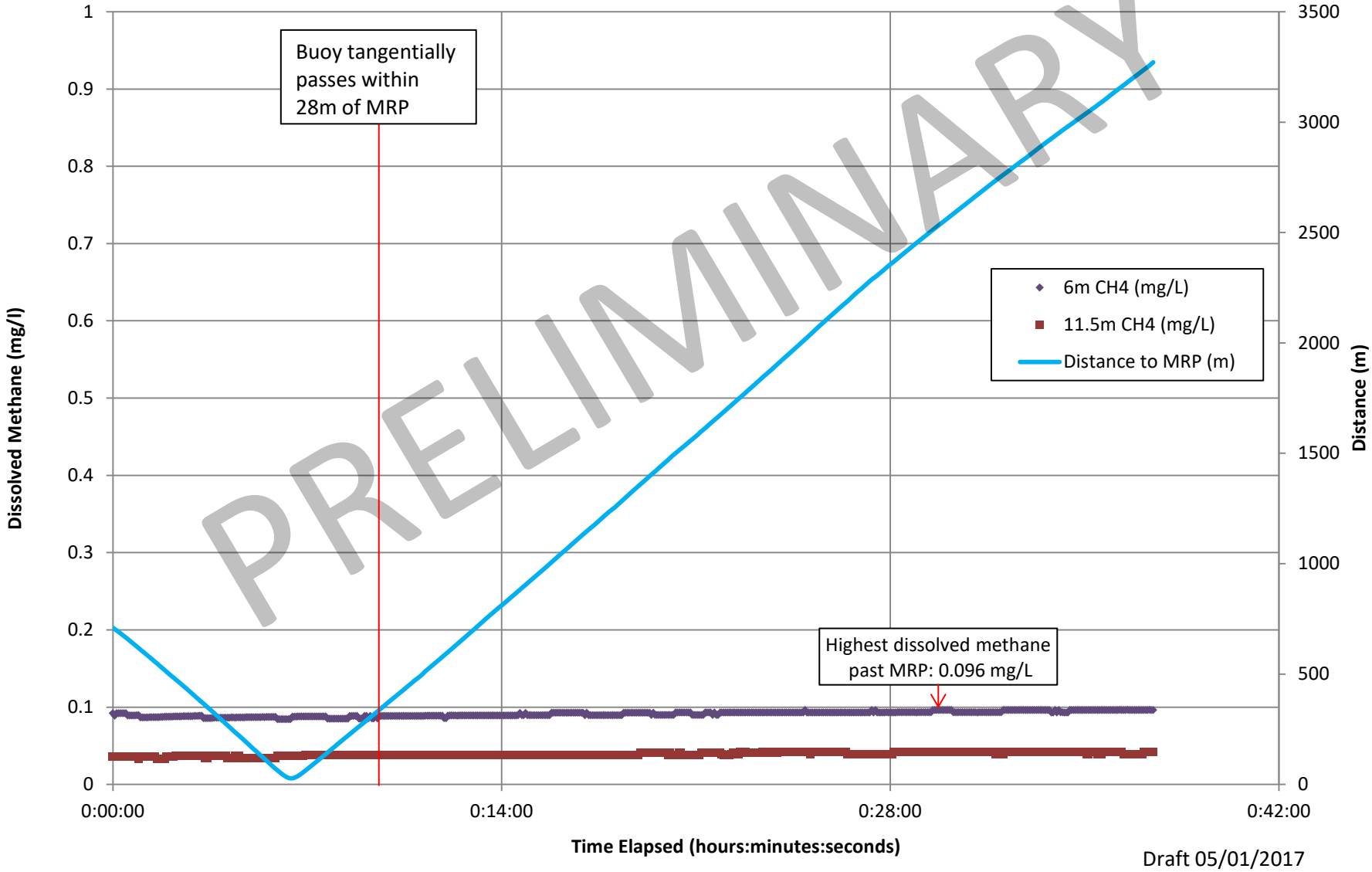
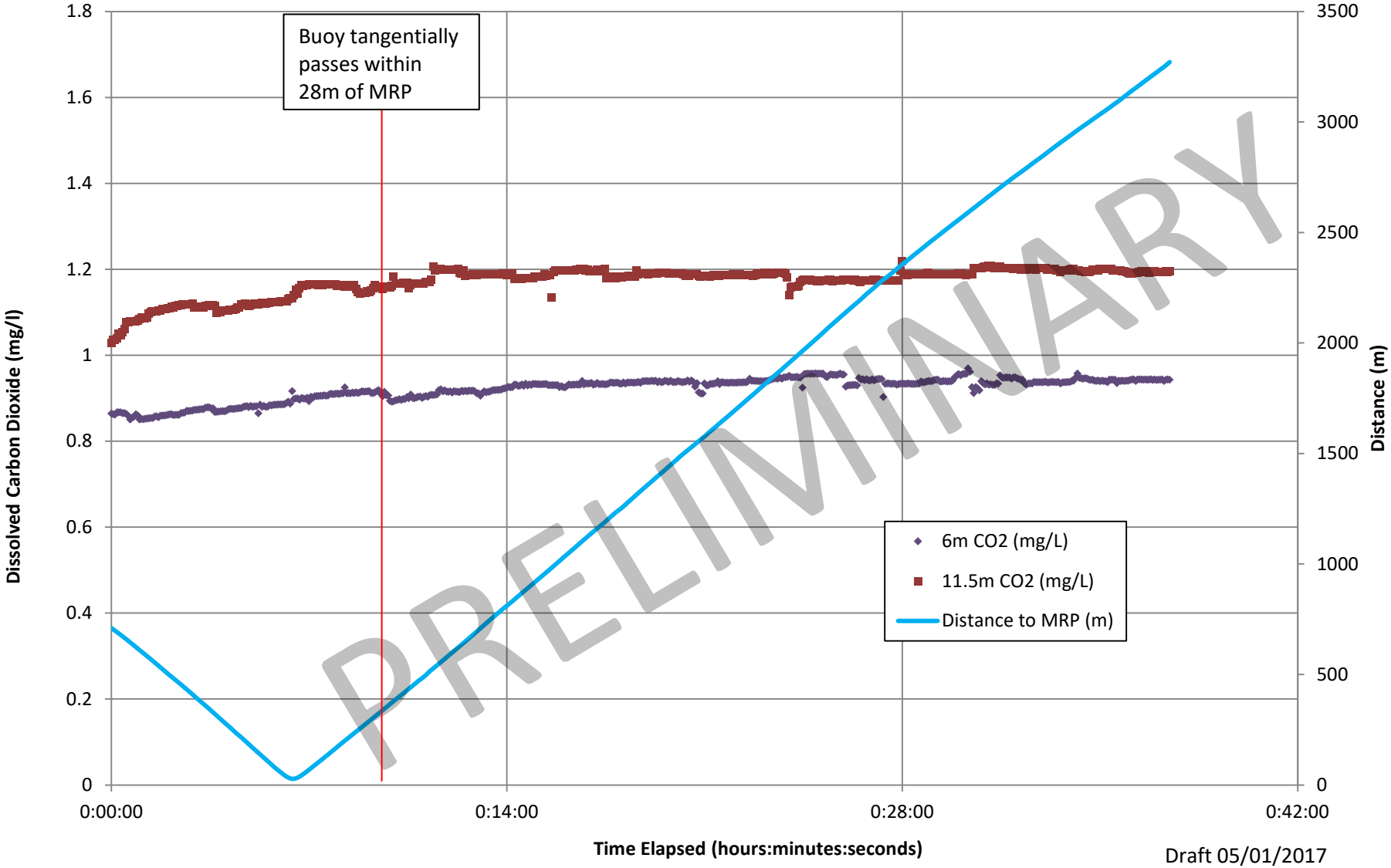


Figure A-10.2b: Buoy Drift #3, April 25, 2017
Dissolved Methane Measurements at 6 and 11.5 Meters Depth
Flood Tide



Draft 05/01/2017

Figure A-10.2c: Buoy Drift #3, April 25, 2017
Dissolved Carbon Dioxide Measurements at 6 and 11.5 Meters Depth
Flood Tide



Draft 05/01/2017

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. 8

Peak Job No. 23054 Date 4/25/2017

Job Name HSE support for water sampling for Gas Pipeline Leak

Work By PEAK:

The work performed by 1 PEAK employee (*Safety Professional* I) 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 1 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.

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
1	SLR	
1	Kinnetic 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 4-25-2017:

0800 – JSA and pre-job safety meeting completed

0815 – Depart Port aboard the Resolution owned and operated by OMSI

0830 – Weather noted: Overcast, wind at 5 knots, 1 foot seas and temperature at 40* F.

0900– 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.

1010 – First water sample buoy with 0% LEL on gas meters. (side of vessel)

1310 – Second water sample buoy with 0% LEL on gas meters. (side of boat)

1430 – Monitors off and headed back to port.

1450 – 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: Safety Professional

Safety: Hilcorp Safety Professional

Environment Construction Rep: Hilcorp Environmental Specialist

Emergency Muster Area: Deck of vessel

DATE: 4-25-17 START TIME: 8:00 END TIME: 2000

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

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)

✓ 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: Environmental Sampler

Work Team Leader: _____ Time: 1450

Area Controller: Vessel Captain Time: 1450

HILCORP ALASKA, LLC: JOB SAFETY ANALYSIS (JSA)

JOB STEPS (Describe and number each step)		POTENTIAL HAZARDS ASSOCIATED WITH EACH JOB STEP (Identify each hazard with a CAPITAL letter)		CORRECTIVE ACTION(S) (Identify responsible person with initials)	
1	Travel to location retrieval & redeployment of equipment and travel to port	A	Heavy seas/wind - fall overboard, wind burn, items moving, falls	a	Hand rails, floatation devices, pilot data, capt discretion, non-slip foot wear, store items
		B	Cool temps - frost bite, skin eye irritation, cold exposure	b	cold weather gear/protocol
		C	Dangerous atmosphere - contact with increased LEL %	c	continuous monitoring w/ 3 4-gas meters
2	Rigging of Equipment	A	Pinch points, crushing, cuts	a	Identify pinch points communicate pinch points cut resistant gloves Inspect equipment prior to use.
3	Deployment and retrieval of equipment	A	Falls overboard, trips	a	Flotation device, keep path clear, tie off
		B	Caught by moving/falling overhead material, crush, struck-by	b	communicate, eye of sight on equipment
		C		c	no working under items communication, hard hats, safety toe boots, trained for use of crane

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

Environmental Sampler

Safety Professional