River Flow Velocity Monitoring Work Plan

Orrington Reach Capping Remedy

Prepared for

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ACRONYMS AND ABBREVIATIONS

ABS	acoustic backscatter
ADCP	acoustic Doppler current profiler
BOD	basis of design
COL-NASA	Consortium for Ocean Leadership–National Aeronautics and Space Administration
CTD	conductivity-temperature-depth
ERP	emergency response plan
FSP	field sampling plan
HASP	health and safety plan
HITL	human-in-the-loop
NIST	National Institute for Standards and Technology
NOAA QARTOD	National Oceanic and Atmospheric Administration Quality Assurance for Real-Time Oceanographic Data
NRDC	Natural Resources Defense Council, Inc.
NTU	nephelometric turbidity unit
QA/QC	quality assurance and quality control
QAPP	quality assurance project plan
RSSI	Receiver Signal Strength Indicator
SOW	statement of work
SWMP	site-wide monitoring plan
TLC	thin layer cap
YSI	Yellow Springs, Inc.

1 INTRODUCTION

This Orrington Reach River Flow Velocity Monitoring Work Plan (Velocity Monitoring Work Plan) has been prepared pursuant to the Consent Decree (Case No. 1.00-cb-00069-JAW, ECF No. 1187) between Maine People's Alliance and Natural Resources Defense Council, Inc. (NRDC) vs. HoltraChem Manufacturing Company, LLC, and Mallinckrodt US LLC entered by the U.S. District Court for the District of Maine on October 11, 2022, and in accordance with Paragraph 5 of the Statement of Work, Appendix A to the Consent Decree (SOW). As summarized in Table 1, this work plan meets the requirements for an investigation work plan under Paragraph 6(a) of the SOW.

As described in the Consent Decree, the Work in Orrington Reach will consist of capping 130 acres of intertidal sediment, primarily on the east side of Orrington Reach. Orrington Reach is a portion of the Penobscot River immediately downstream of the former HoltraChem Facility in Orrington, Maine, as shown on Figure 1. Preliminary Orrington Reach Basis of Design (BOD) evaluations have identified river flow velocities and associated bed shear stresses as important elements of the thin layer cap (TLC) design. The BOD will be incorporated in the Orrington Reach Thin Layer Cap Design Work Plan (TLC Design Work Plan) as required by Paragraph 5(b) of the SOW. The TLC Design Work Plan will be submitted for Beneficiary review and comment no later than April 2023. This Velocity Monitoring Work Plan addresses a data gap that requires investigation to update information on flow velocities and is being submitted for Beneficiary review and comment before the TLC Design Work Plan due to the time-sensitive nature of measuring river flow associated with the freshet, which typically occurs in March. As required by Paragraph 6(a) of the SOW, this Velocity Monitoring Work Plan includes (i) an evaluation and summary of existing data, and a description of data gaps; (ii) a description of Data Quality Objectives; (iii) a detailed sampling plan; (iv) a sampling schedule; and (v) a description of the quality control and quality assurance measures to be undertaken.

Data collected during the proposed velocity monitoring will enable updates to the existing hydrodynamic model. The updated model will be used to simulate river flow velocities and associated bed shear stresses to:

- Identify areas most conducive to capping (i.e., where shear stresses are lowest);
- Determine cap materials (e.g., grain size) and armoring requirements for a stable cap;
- Evaluate the potential to impact the habitat in intertidal mudflats and marshes; and
- Assess the potential to increase flood risk.

These design elements are critical in determining the feasibility and cost of the cap.

The updated hydrodynamic model will also be used to support the TLC permitting process. In preliminary conversations with the Remediation Trust, the Maine Department of Environmental Protection indicated that it would like to review data from a hydrodynamic model to evaluate whether increasing the surface elevation of intertidal flats may have negative effects on shoreline areas.

River flow velocity data collected from the Penobscot River within Orrington Reach is needed to update and refine calibration/validation of the existing hydrodynamic model and estimates of shear stresses in the area to be capped. This Velocity Monitoring Work Plan provides data collection objectives, a description of existing data, and the methods for collecting river flow velocity data collection in the Penobscot River to support the design of the Orrington Reach sediment cap.

2 SUMMARY OF EXISTING DATA AND DATA NEEDS

The existing hydrodynamic model will be updated and used to support the design of the Orrington Reach sediment cap. The model will be used to simulate river flow velocities and associated bed shear stresses to identify areas most conducive to capping (i.e., where shear stresses are lowest); determine cap materials, grain size, and need for armoring; evaluate the potential to impact the habitat in intertidal mudflats and marshes; and assess the potential for the cap to increase flood risk. These design elements are critical in determining the feasibility and cost of the cap.

The existing hydrodynamic model uses Deltares' Delft3D-FLOW, a state-of-the-science model that solves the 3-dimensional equations of motion in a water body with variable-fluid density using free-surface and hydrostatic conditions. The existing hydrodynamic model was calibrated based on river flow velocity measurements collected as part of the Phase II Penobscot River Mercury Study by Geyer and Ralston (2018). The authors obtained multiple field measurements between Bangor and Fort Point, Maine, to characterize active processes during the Phase II study period. The data collection activities included 12 months of velocity and salinity measurements at two moored stations in 2010 and two moored stations in 2011, and multiple shipboard conductivity, temperature, and salinity profiles performed from March through June of 2010 and 2011. The 2010 moored stations were located in Mendall Marsh and the Orland River. The 2011 moored stations were located near the thalweg just downstream of Winterport and near the thalweg in Bucksport. The study represents the most comprehensive set of field measurements for the characterization of hydrodynamic and sediment transport processes collected in the river to date.

The previous model calibration consisted of running model simulations for April 2011 and June 2011 and comparing the model-predicted velocities to the velocities measured by the Geyer and Ralston (2018) study. These 2 months encompassed a high-flow event (1,420 m^3/s) and low-flow event (270 m^3/s), respectively. Although the data collected by Geyer and Ralston (2018) provide a strong foundation for calibration of the hydrodynamic model, the data were collected more than a decade ago and before the removal of the Veazie Dam, and thus may not be representative of current conditions in the river. Further, the monitoring was conducted downriver from Orrington Reach.

This work plan provides for collection of current river flow velocity data within Orrington Reach to refine the hydrodynamic model calibration and, in turn, support the design of the Orrington Reach sediment cap.

3 DATA QUALITY OBJECTIVE

The data quality objective for the river flow velocity monitoring is to collect river flow velocity data from a representative location in Orrington Reach across a range of river flow conditions, including a high-flow period, to support refinement of the hydrodynamic model, as summarized in Table 2.

4 SCOPE OF MONITORING

The monitoring will include deployment of an instrument platform in the Penobscot River thalweg in Orrington Reach adjacent to Bartlett Cove, as shown in Figure 1. The instruments will include:

- An acoustic Doppler current profiler (ADCP) to record the vertical profile of velocity in the water column from approximately 0.8 m above the river sediment bed to within about 0.5 m of the water surface at vertical intervals of 0.25 m
- An optical turbidity probe to measure water column turbidity (a qualitative measure of the suspended solids in the water column) at a depth of approximately 0.25 m above the riverbed.[1]

The instrumentation will be mounted on a bottom platform and deployed for an approximate 3-month period, from late March through June, to target the occurrence of the spring freshet. The methods for setting up, calibrating, and deploying the platform and instruments are described below. Instrumentation and equipment lists are provided in Appendix A.

4.1 PLATFORM DESCRIPTION

The measurement station will be composed of a bottom platform, ADCP, and turbidity probe. The platform will support and stabilize the "upward looking" ADCP, which will measure current velocities (magnitude and direction) in the water column. The 2,000-kHz Nortek Aquadopp ADCP (or similar) and optical turbidity probe will be mounted to the platform prior to deployment in an equivalent (or similar) manner as shown in Figure 2. The ADCP and turbidity probe will be hard-fixed to the fiberglass grate platform, which has aluminum legs for rollover stability. A protective cage will be installed over the instruments to protect the sensor bodies from underwater strike hazards. To prevent bio-fouling, a thin layer of silicon grease will be applied to the transducer heads. The optical turbidity probe will be equipped with bio-wiper technology to mitigate against biofouling.

A 0.25-inch diameter galvanized steel or spectra recovery line will be affixed to the platform and extended horizontally downstream. The length of line will be at least twice the water depth and will terminate at a clump weight for anchorage. The recovery line will allow for simple recovery via a grappling hook during instrument servicing and maintenance visits.

[1] The ADCP measurements include measurement of echo intensity, which can be used to calculate acoustic backscatter (ABS). ABS data can be used to estimate turbidity as a function of depth throughout the water column. The optical turbidity data will be used to validate turbidity derived from the ABS data.

4.2 ADCP SETUP

The sampling frequency for the moored ADCP will be maximized for the expected deployment duration and memory capacity. Data will be collected in burst averaging mode, which, for example, will collect data every 15 minutes at 1 Hz from which a time-average (or ensemble-average) can be computed. These data will characterize the current velocity in the water column in each 0.25-m vertical bin, beginning at approximately 0.8 m above the bed and extending to about 0.5 m of the water surface. Depending on deployment duration, the ADCP may be retrieved, the data downloaded, and the instrument batteries replaced as needed to accommodate longer deployment periods. Once the data download is complete, the instrument will be serviced as needed, and prepared for redeployment.

Instrument deployment settings are entered using *AquaPro*, which is commercial software provided by Nortek. This program allows the ADCP to be custom programmed to the location where it will be deployed, based on a range of expected site conditions and project requirements (e.g., water depth, sampling frequency, ping rate). The software then indicates the expected accuracy of the measurements, and the expected memory and battery pack usage. For quality assurance, the accuracy of the ADCP should be within 1 cm/s. To ensure full data collection during deployment, the ADCP parameter settings should be selected such that the battery consumption for the duration of the deployment is not expected to exceed 80 percent.

4.3 ADCP CALIBRATION AND MAINTENANCE

Routine maintenance generally entails checking instrument connections and verifying proper operation. Each instrument has a standard complement of field-replaceable components and consumables that is checked for completeness prior to deployment to the field and during routine maintenance checks. Initial equipment calibration certification for ADCPs is provided by the manufacturer. Nortek *AquaPro* software provides additional standard field checks that will be performed and documented prior to deployment to ensure performance within manufacturer specifications.

An example of a few of the standard tests are an internal compass check, a test of all electronic functions, memory check, and beam continuity test. The beam continuity test measures the quiescent Receiver Signal Strength Indicator (RSSI), which ensures that the transducers are working properly. Instrument calibration cycles are determined as a function of their deployment frequencies and durations (run-time duty cycles). As such, the ADCP velocity transducers are factory-calibrated and typically do not require calibration.

For quality assurance, the ADCP factory calibration will be verified prior to field installation. Nortek ADCPs have internal compasses that require calibration prior to field deployment or when batteries are replaced (due to the variation in magnetic signature of the batteries). The compass calibration procedure uses the manufacturer-provided protocols and software and

involves commanding the ADCP to collect a heading measurement every 5° of rotation (for a full 360° rotation).

4.4 OPTICAL TURBIDITY PROBE SETUP

An optical turbidity probe will be integrated with a conductivity-temperature-depth (CTD) multi-parameter water quality sonde, the Yellow Springs, Inc. (YSI), EXO2 or EXO3. The optical turbidity probe measures optical scattering by detecting infrared light scattered from suspended matter. The EXO-series of multi-parameter sondes feature multiple ports to obtain multiple water quality measurements simultaneously. The EXO deployment settings will be determined using the manufacturer-provided software, *KorEXO*. Similar to the ADCP, the sampling frequency for the moored multi-parameter sonde (including optical turbidity probe) will be maximized for the expected deployment duration and memory and battery capacity. Data will be collected in burst averaging mode, which, for example, will collect data every 15 minutes at 1 Hz from which a time-average can be computed. The sensing volumes of bottom-mounted EXO probes will be located approximately 0.25 m above the sediment bed. Bio-wipers, activated immediately before each measurement, will be employed to minimize biofouling.

4.5 OPTICAL TURBIDITY PROBE CALIBRATION

Measurement probes and the integrated pressure sensor will be calibrated prior to initial deployment and validated during the servicing period using National Institute for Standards and Technology (NIST) traceable standards. Calibration and validation procedures will follow manufacturer protocols and recommendations. Calibration of the optical turbidity probe will likely follow a two-point calibration procedure (0 nephelometric turbidity unit [NTU] and 126 NTU) to ensure accurate measurements from low to high turbidity conditions.

4.6 INSTRUMENT PLATFORM DEPLOYMENT PROCEDURE

The instrument platform will be mobilized and initialized at a shoreside facility and loaded onto the vessel. The vessel will proceed to the deployment location using global positioning system coordinates to find the exact location. Once on location, the platform will be lifted over the boat rail. The platform will be lowered into the water using a slip line that will be recovered once the platform is on the bottom. The recovery line will then be deployed. To recover the platform, a grappling hook will be used to pick up the recovery line and clump weight. The platform will be raised to the surface with the recovery line. Any mud or bio-fouling will be removed on shore with a deck brush.

5 DATA ANALYSIS

Raw data will be recovered from the instruments and redundantly backed up to external hard drives and cloud-based storage to safeguard the data. ADCP and water quality sonde data will be pre-processed with the manufacturer's processing software *AquaPro* and *KorEXO*, respectively.

5.1 CURRENT VELOCITY

Current velocity data quality assurance and quality control (QA/QC) procedures follow manufacturer-recommended and oceanographic community-accepted protocols (e.g., Consortium for Ocean Leadership–National Aeronautics and Space Administration [COL-NASA] 2012). Aquadopp ADCP data products include depth-resolved time series of east- and north-component current velocities (u and v), from which current speed and current direction can be derived.

Nortek software, *Storm* (version 1.17.06), will be used to post-process ADCP data. It will be configured to remove erroneous Aquadopp data and perform system configuration corrections such that the Aquadopp-measured current directions are relative to true north. Manufacturer-recommended *Storm* software data quality settings will be followed.

5.2 WATER QUALITY

YSI *KorEXO* software automatically applies calibrations and corrections to EXO water quality data. The software is configured to compute and provide data products such as salinity (from measured CTD). Additional data processing for the ADCP and multi-parameter sonde includes removal of data collected prior to deployment and following recovery (i.e., out-of-water data). Out-of-water data are identified through comparisons between data collection periods and on-water servicing activities, as noted in the field logbook, and evaluation of water depth data.

In addition to removal of pre-deployment and post-recovery water quality data, data processing of EXO water quality data will include evaluation that follows QA/QC recommendations from National Oceanic and Atmospheric Administration Quality Assurance for Real-Time Oceanographic Data (NOAA QARTOD[2]) and COL-NASA (2012). These QA/QC procedures include:

1. Missing time stamp check. Gaps in data series (i.e., missing time stamps) will be filled in with not-a-number (NaN) and flagged as fail.

[2] https://ioos.noaa.gov/project/qartod/

2. Gross range test. Each data point will be evaluated against analyst-selected minimum/maximum values. For example, if turbidity is negative (<0), it will be considered as failed.
3. Spike test. Large positive and negative spikes in data will be evaluated for suspect or failed data following NOAA QARTOD recommendations.
4. Flat line test. Data will be considered suspect if the exact same value is reported for three consecutive hours (12 data points) and fail if reported for six consecutive hours (24 data points).
5. Biofouling test (human-in-the-loop; HITL). Data will be evaluated by the analyst for biofouling or other errors. Biofouling will be identified as linear or exponential increases in data over time, with additional screening to include variability and trend analysis against data from other nearby stations, if applicable. Linear biofouling effects corrections can be performed using trend analysis methods developed from more than 25 years of experience and recommendations by subject matter experts (Manov et al. 2004; COL-NASA 2012).
6. Deployment-to-deployment comparisons (HITL). Calibration differences between deployments, if any, can be quantified and corrected in cases where multi-parameter sondes are swapped and/or recalibrated or sensor drift is observed. Calibration differences are typically calculated through evaluation of previous deployment data endpoints compared to current deployment data start-points and accounting for servicing time (period over which the sonde is out of the water).

5.3 TURBIDITY FROM ACOUSTIC BACKSCATTER (ABS)

ADCPs, in addition to measuring depth-resolved current speed and direction, show promise for providing non-intrusive estimates of turbidity (and suspended solids concentration if properly calibrated) with little risk of data contamination due to biofouling. However, the procedure for converting ADCP output, echo amplitude (units of counts), to ABS (units of decibels; dB) requires computations. Acoustic transmission losses from beam spreading and attenuation must be determined and corrected. These losses can be attributed to suspended matter, salinity, temperature, and water pressure, and to instrument-specific characteristics such as power, frequency, and transducer size. Further, the relationship between ABS and turbidity is highly dependent on sampling protocols. To develop the most accurate empirical relationships between turbidity and ABS, optical turbidity data should be collected concurrently in time and space.

The procedures for calculating ABS from echo amplitude are as follows (Gartner 2004; Wall et al. 2006):

1. Unit conversion. Convert Nortek ADCP echo amplitude data from units of counts to dB using manufacturer-provided scaling factors (e.g., Amp_dB = Amp_cnts * 0.43 dB/count).
2. Range normalization. Compensate scattering data for acoustic losses due to acoustic beam spreading, water absorption, and particle attenuation.

   Acoustic beam spreading: BS = 20 log10 (R)
   R = range to transducer
   Water absorption: WA = 2 ⌀ R
   $\alpha = \{ [(S A f_T f^2) / (f_T^2 + f^2)] + [(B f^2) / f_T] \} \times 8.687$
   $f_T = 21.9 \times 10^{[6 - c/(T + 273)]}$ (temperature-dependent relaxation frequency)
   S = salinity
   T = temperature
   c = speed of sound underwater (calculated from T and S)
   f = acoustic frequency
   $A = 2.34 \times 10^{-6}$ (constant for the ionic relaxation process in seawater)
   B = 3.8 × 10-6 (pure-water viscosity mechanism)
3. Absolute calibration. Account for transmit power losses over time through linear trend analysis.

A log-linear regression will be determined for optical turbidity and concurrent ABS data; this regression will then be applied to time series of ABS following:

$$\text{Turbidity} = 10^{(ABS * m + b)}$$

where ABS is derived from echo amplitude and m and b are determined through log-linear regression with concurrent, collocated optical turbidity data.

Note that ABS-derived turbidity and measured optical turbidity will serve as qualitative indicators of suspended solids concentration (SSC) in the water column. For quantitative measures of SSC, it would be necessary to collect discrete water samples analyzed in the laboratory for SSC to serve as calibration (not proposed as part of this investigation).

6 QUALITY CONTROL AND QUALITY ASSURANCE

QA/QC will be performed routinely throughout the project duration to assess the health of any subsurface and vessel-mounted instrument. Instrument functions will be tested and verified prior to shipment to the site and again upon arrival at the project site. Instrument functionality will be verified at specified intervals during the project (e.g., 6 weeks following initial deployment). Periodic maintenance will ensure that external interference (i.e., bio-fouling) does not contaminate the data.

During periodic assessments, the instrument battery life and available memory will be assessed. Batteries will be replaced as needed and the data card memory will be cleared. Typical instrument maintenance will be conducted as required (e.g., clearing of bio-fouling). Each instrument is designed as a field device and, as such, has a robust system. As mentioned above, integral components of the instrument systems have a standard complement of field replaceable components that are shipped with the systems for field replacement if necessary.

Data will be downloaded during the periodic instrument assessment. The quality of the downloaded data immediately will be assessed and proper measures will be taken to correct any data deficiencies. The data will undergo consistent, strict quality control after the measurements have been downloaded from the instruments. As noted in Section 5 of the Velocity Monitoring Work Plan, data will be backed up on a separate hard disk and on cloud-based storage systems for safekeeping. Results from standard pre- and post-processing routines will be analyzed for accuracy.

7 PERMITS AND ACCESS REQUIREMENTS

The monitoring under this work plan does not involve/require:

- Access of privately-owned property (instrumentation will be placed in the subtidal zone)
- Permanent placement of instruments or materials in the waterway
- Surface or near-surface expression of instruments or related materials (e.g., a buoy) within the navigation channel
- Collection of environmental samples, including biological tissue.

As a result, no permits or access agreements are required. Because the instrumentation will be within the navigable channel, the United States Army Corps of Engineers will be notified prior to the instrument deployment.

8 SUPPORTING DELIVERABLES AND DATA REPORTING

The Statement of Work (SOW) identifies supporting deliverables and reporting requirements for Penobscot River investigations. These deliverables include a health and safety plan (HASP), emergency response plan (ERP), quality assurance project plan (QAPP), field sampling plan (FSP), and site-wide monitoring plan (SWMP). A HASP focused on the river flow velocity monitoring fieldwork described in this work plan is provided as Appendix B. An ERP focused on the river flow velocity monitoring fieldwork described in this work plan is provided as Appendix C. Because the river flow velocity monitoring does not include sample collection or laboratory analysis, a QAPP and FSP are not required. The river flow velocity data collection is a one-time event and is not anticipated to be a component of the SWMP.

Data collected during this investigation will be provided in an investigation report that conforms to SOW requirements.

9 SCHEDULE

The following summarizes the schedule milestones for the river flow velocity monitoring:

- Instrument Deployment Mid-March 2023
- Instrument Recovery Late May/Early June 2023[3]

The data will be processed to support the refinement of the hydrodynamic model and reported in the Work Design Report.

[3] Timing for instrument recovery will depend on the freshet hydrograph. USGS gauge data from Station ID 01037050, Bangor, ME, will be monitored to identify the freshet.

10 REFERENCES

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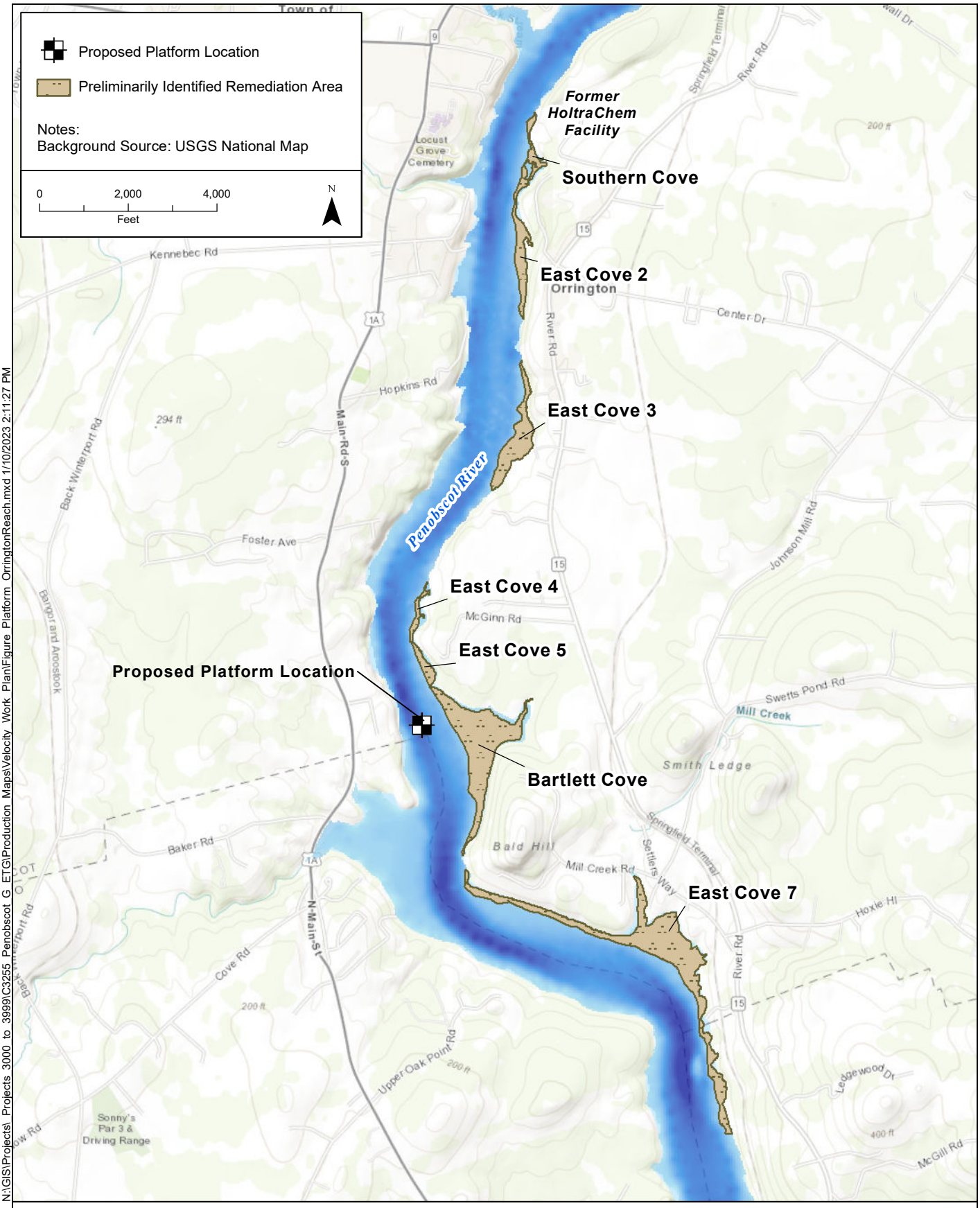
Figures



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Prepared for: Penobscot Estuary Mercury Remediation Trust

Prepared by: integral consulting inc.

Figure 1.
Proposed Velocity Data Collection Platform Location in Orrington Reach

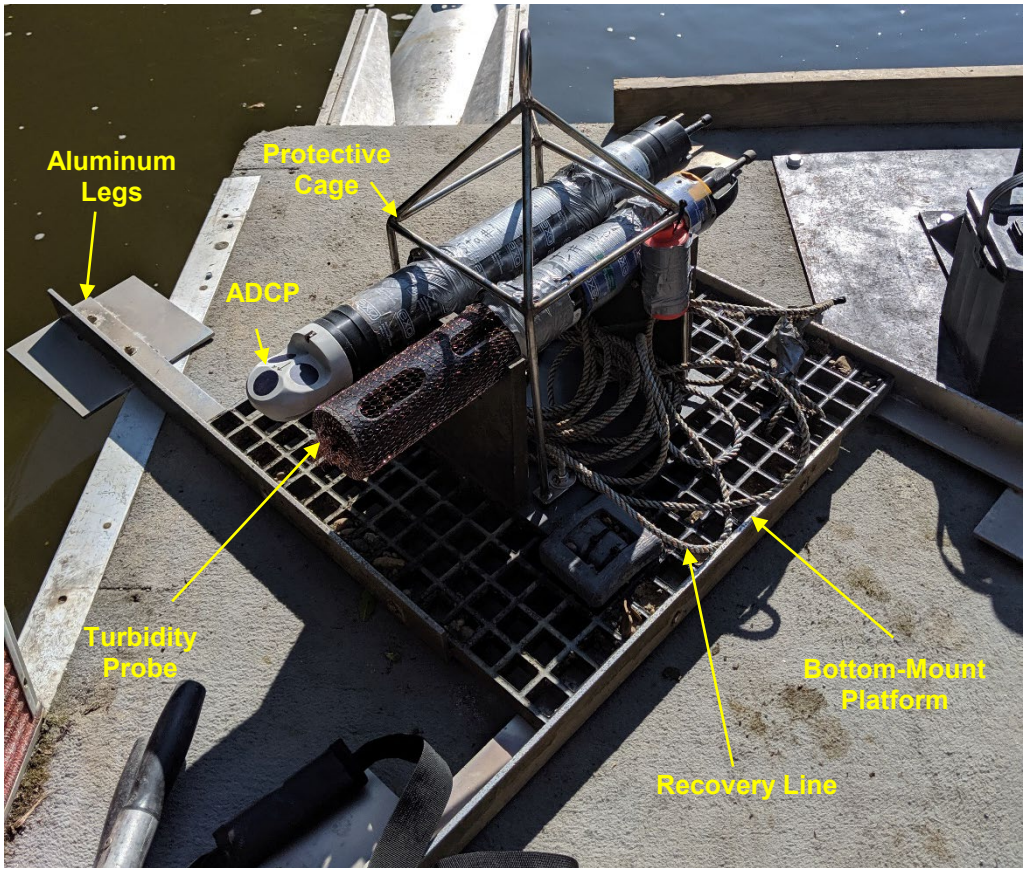

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Figure 2.
Bottom-Mount Instrumentation Platform prior to Deployment

Tables

Table 1. Statement of Work Compliance

Statement of Work (SOW) Requirement		Work Plan Section
¶ 6(a)(i) An evaluation and summary of existing data and a description of the data gaps that require further investigation in order to complete the Work Design	✓	Section 2
¶ 6(a)(ii) A description of the required technical and/or regulatory decisions to be made or questions to be answered with the Investigation results, along with a summary of the type, quantity, and quality of data needed to reach those decisions ("Data Quality Objectives" or "DQOs")	✓	Section 3
¶ 6(a)(iii) A sampling plan including media to be sampled, contaminants or parameters for which sampling will be conducted, location (areal extent and depths), and number of samples	✓	Section 4
¶ 6(a)(iv) A schedule for the Investigation	✓	Section 9
¶ 6(a)(v) Cross references to quality assurance/quality control ("QA/QC") requirements set forth in the QAPP as described in Paragraph 31(d)	✓	Section 6[a]

Notes:

[a] = Section 6 presents the QA/QC requirements specific to the velocity monitoring. Because no samples will be collected, the quality assurance project plann (QAPP) is not cross referenced.

Table 2. Data Quality Objective for River Flow Velocity Monitoring

Problem Statement and Goals	Information/Data Needed	Data Collection Approach
Hydrodynamic modeling will be the primary basis for estimating shear stresses that will act on the thin layer cap and thus is critical to the cap design (e.g., area to be capped, cap materials, armoring). The current model is calibrated to velocity data collected prior to the Veazie dam removal and from locations several miles downriver of Orrington Reach. Additional velocity data are needed to support calibration/validation of the model under present site conditions and to refine model estimates of shear stresses in Orrington Reach.	Velocity data from the subtidal channel during the spring freshet (late March to April) to provide a data set from a high flow condition.	Deployment of a bottom-mounted, upward facing acoustic Doppler current profiler at a location adjacent to Bartlett Cove, where a large area of intertidal mudflats are anticipated to be capped. Data collection during the period leading up to, through, and following the spring freshet. Data will be used to refine the calibration of the hydrodynamic model in Orrington Reach.

Appendix A

Instrumentation and
Equipment Lists

APPENDIX A. INSTRUMENTATION AND EQUIPMENT LISTS

Instrumentation and equipment lists for the Orrington Reach velocity monitoring are provided below.

Instrumentation List

Nortek Aquadopp 2000 kHz ADCP

- Depth range: 4–10 m (for 0.25-m bin depths)
- Velocity Range: ± 10 m/s
- Velocity Resolution: 0.001 m/s
- Velocity Accuracy: ±1% of measured value or ±0.005 m/s
- Standard Deviation: <0.01 m/s (depends on system deployment settings)
- Power: internal batteries and optional external battery pack for extended deployments

YSI EXO2 (or 3) multi-parameter sonde with integrated pressure sensor and probes for temperature, conductivity, and optical turbidity

- Depth range: 0–100 m, resolution of 0.001 m, accuracy to ±0.04% of full scale
- Temperature range: −5°C–35°C, resolution of 0.001°C, accuracy to ±0.01°C
- Conductivity range: 0–200 mS/cm, resolution ±0.5% of reading or 0.001 mS/cm (0–100 mS/cm) or ±1% of reading (100–200 mS/cm), accuracy between 0.001 and 0.01 mS/cm (range dependent)
- Turbidity range: 0–4,000 nephelometric turbidity units (NTU), resolution 0.3 NTU or ±2% of reading (for 0–999 NTU) or ±5% of reading (1,000–4,000 NTU), accuracy 0.01 NTU or 0.1 NTU (range dependent)

Equipment List

- Printed copy of work plan, health and safety plan (HASP), and emergency response plan (ERP)
- Personal protective equipment as required by HASP
- Waterproof field logbook

- Writing tools (pencils, Sharpie®)
- Standard array of field tools and hardware
- Spectra slip line for deployment
- Hand-held global positioning system unit
- Acoustic Doppler current profiler (ADCP) bottom-mount platform
- Galvanized steel or spectra recovery line, double water depth in length
- Clump weights
- 2,000-kHz Nortek Aquadopp ADCP
- YSI EXO multi-parameter sonde equipped with conductivity, temperature, and depth (CTD) and optical turbidity probe
- Galvanized steel or spectra recovery line, double water depth in length
- Clump weights
- Grappling hook
- Laptop computer with Nortek and YSI software; and standard operating procedures

Appendix B

River Flow Velocity Monitoring
Health and Safety Plan

Appendix B.
Health and Safety Plan

River Flow Velocity Monitoring Work Plan

Orrington Reach Capping Remedy

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March 6, 2023

CONTENTS

LIST OF ATTACHMENTS

ACRONYMS AND ABBREVIATIONS

ADCP	Acoustic Doppler Current Profiler
CFR	Code of Federal Regulations
CHSM	Corporate Health and Safety Manager
CPR	cardiopulmonary resuscitation
ERP	emergency response plan
HASP	health and safety plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
IDLH	immediately dangerous to life and health
Integral	Integral Consulting Inc.
JHA	job hazard analysis
OSHA	Occupational Safety and Health Administration
PEL	permissible exposure limit
PFD	personal flotation device
PPE	personal protective equipment
Remediation Trust	Penobscot Estuary Remediation Trust LLC
SOW	Statement of Work
SSO	Site safety officer
STEL	short-term exposure limit
USCG	U.S. Coast Guard

HEALTH AND SAFETY PLAN APPROVAL

This health and safety plan has been reviewed and approved for deployment and retrieval of an instrument platform for river flow velocity monitoring in Orrington Reach, Penobscot River Estuary.

Project Manager	Date
Corporate Health and Safety Manager	Date

HEALTH AND SAFETY PLAN ACKNOWLEDGMENT

In the absence of an appropriate subcontractor or consultant health and safety plan, and with the written approval of Integral Consulting Inc. (Integral) corporate health and safety manager, the subcontractor or consultant may utilize the Integral health and safety plan (HASP), provided there is written concurrence from the subcontractor or consultant that they will directly administer the plan for their employees and assume all risks associated with any possible errors or omissions in the plan. This HASP does not cover any construction activities. The Integral HASP is a minimum standard for the Site and will be strictly enforced for all Integral personnel, or its subcontractors or consultants where applicable.

I have reviewed the HASP prepared by Integral, dated March 6, 2023 for the Orrington Reach river flow velocity monitoring platform deployment and retrieval and associated field activities. I understand the purpose of the plan, and I consent to adhere to its policies, procedures, and guidelines while an employee of Integral, or its subcontractors or consultants. I have had an opportunity to ask questions regarding this plan, which have been answered satisfactorily by Integral.

Employee signature	Company	Date
Employee signature	Company	Date
Employee signature	Company	Date
Employee signature	Company	Date
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Employee signature	Company	Date

1 INTRODUCTION

It is the policy of Integral Consulting Inc. (Integral) to provide a safe and healthful work environment that is compliant with applicable regulations. No aspect of the work is more important than protecting the health and safety of all workers.

This Orrington Reach River Flow Velocity Monitoring health and safety plan (HASP) provides general health and safety provisions to protect workers from potential hazards during deployment and retrieval of an instrument platform for river flow velocity data collection in Orrington Reach, Penobscot River Estuary. The federal government's Occupational Safety and Health Act administered by the Occupational Safety and Health Administration (OSHA) covers workplace health and safety regulations within the state of Maine for private sector employees. This HASP follows federal OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER; 29 Code of Federal Regulations [CFR] 1910.120) regulations.

This HASP has been prepared for the Penobscot Estuary Remediation Trust LLC, Trustee of the Penobscot Estuary Mercury Remediation Trust (Remediation Trust) pursuant to the Consent Decree (Case No. 1.00-cb-00069-JAW, ECF No. 1187) between Maine People's Alliance and Natural Resources Defense Council, Inc. (NRDC) vs. HoltraChem Manufacturing Company, LLC, and Mallinckrodt US LLC entered by the U.S. District Court for the District of Maine on October 11, 2022, and in accordance with Paragraph 31(a) of the Statement of Work, Appendix A to the Consent Decree (SOW).

As described in the Consent Decree, the Work in Orrington Reach will consist of capping 130 acres of intertidal sediment, primarily on the east side of Orrington Reach. Orrington Reach is a portion of the Penobscot River immediately downstream of the former HoltraChem Facility in Orrington, Maine. River flow velocity monitoring is proposed to provide data that will support the Orrington Reach cap design. The monitoring will include deployment of an instrument platform in the Penobscot River thalweg in Orrington Reach adjacent to Bartlett Cove. Velocity monitoring addresses a data gap that requires investigation to update information on flow velocities and is planned to capture river flow associated with the freshet, which typically occurs in March. Details on the scope of work are presented in the River Flow Velocity Monitoring Work Plan, to which this HASP is appended.

Attachments to the HASP provide the route to the hospital from the Orrington Reach boat launch (Attachment 1); regulatory notices (Attachment 2); an employee exposure/injury incident report, and a near-miss incident report (Attachment 3); job hazard analysis (JHA) for instrument platform deployment and retrieval (Attachment 4); and Integral safety guidelines that are relevant to instrument platform deployment and retrieval (Attachment 5).

This HASP identifies potential Site hazards to the extent possible based on information available to Integral. Integral cannot guarantee the health or safety of any person entering this Site. Because of the potentially hazardous nature of this Site and the activity occurring thereon, it is not possible to discover, evaluate, and provide protection for all possible hazards that may be encountered. Strict adherence to the health and safety guidelines set forth herein will reduce, but not eliminate, the potential for injury and illness at this Site. The health and safety guidelines in this plan were prepared specifically for this Site and should not be used on any other Site without prior evaluation by trained health and safety personnel.

A copy of this HASP must be in the custody of the field crew during field activities. All individuals performing fieldwork must read, understand, and comply with this plan before undertaking field activities. Once the information has been read and understood, the individual must sign the Health and Safety Plan acknowledgment form provided as part of this plan. The signed form will become part of the project file.

This plan may be modified at any time based on the judgment of the Integral Site safety officer (SSO) in consultation with the project manager and Integral corporate health and safety manager (CHSM) or designee. Any modification will be presented to the onsite team during a safety briefing and will be recorded in the field logbook.

1.1 OBJECTIVES AND METHODS

This HASP was developed specifically for the Orrington Reach river flow velocity monitoring platform deployment and retrieval and associated field activities. Integral will measure the current velocity and suspended sediment present in Penobscot River Estuary, Maine, by use of bottom-mounted instrument platforms. Instrumentation will consist of an acoustic Doppler current profiler (ADCP) and water quality sonde. One instrument platform will be deployed at one location for 3 months. The platform will be deployed by hand using a slipline to lower the platform to the bottom of the Penobscot River. Once on the river bottom, the platform slipline will be recovered and the recovery line with a clump weight will be dropped to the river bottom. Platform coordinates will be collected for guidance in recovery. For the recovery of the platform, a grapple hook will be used to pull the recovery line to the boat; the recovery line will be used to pull the platform to the water surface and onto the vessel.

1.2 ROLES AND RESPONSIBILITIES

All Integral personnel, subcontractors, or consultants and visitors on this Site must comply with the requirements of this HASP. The roles and specific responsibilities and authority of management, safety and health, and other personnel on this Site are detailed in the following paragraphs. Staff role assignments are provided in Section 1.4.

1.2.1 Site Safety Officer

The SSO has full responsibility and authority to implement this HASP and to verify compliance. The SSO reports to the project manager and is onsite or readily accessible to the Site during all work operations. The SSO is responsible for assessing Site conditions and directing and controlling emergency response activities. The specific responsibilities of the SSO include:

- Managing the safety and health functions on this Site
- Serving as the onsite point of contact for safety and health concerns
- Assessing Site conditions for unsafe acts and conditions and ensuring corrective action
- Ensuring that all Integral employees and subcontractors understand and follow the HASP
- Ensuring that daily work schedules and tasks are reasonable for the required levels of effort and weather conditions
- Confirming local emergency response phone numbers and locations
- Conducting and documenting the initial and daily or periodic health and safety briefings
- Evaluating and modifying the level of protective apparel and safety equipment, based on Site conditions
- Ensuring that the field team observes all necessary decontamination procedures.

If the SSO determines that Site conditions are unsafe, he or she has the authority to suspend field operations until the problem is corrected. The SSO can modify HASP procedures in the field. Any changes must be documented in the field logbook, and field staff must be immediately informed of the change. The project manager and Integral's CHSM must be notified by phone or email within 24 hours of any major changes to the HASP.

1.2.2 Project Manager

The project manager has overall responsibility to ensure that personnel working onsite are safe. The specific responsibilities of the project manager include:

- Ensuring that the HASP is developed prior to the fieldwork or Site visit
- Reviewing and approving the HASP prior to the fieldwork or Site visit
- Ensuring employee understanding of and compliance with the HASP.

1.2.3 Corporate Health and Safety Manager

The CHSM provides guidance to the project manager and SSO on HASP preparation and reviews and approves the HASP. The CHSM also serves as an arbitrator if there is a conflict between the project manager, SSO, and field personnel. In addition, the CHSM[1] conducts periodic unannounced audits of Integral field operations to ensure compliance with the HASP.

1.2.4 Field Personnel

All Integral personnel and subcontractors on this Site are responsible for reading and complying with this HASP, using the proper personal protective equipment (PPE), reporting unsafe acts and conditions, and following the work and safety and health instructions of the project manager and SSO. All Integral personnel, subcontractors, or consultants can and are encouraged to suspend field operations if they feel conditions have become unsafe.

1.3 SITE DESCRIPTION

The Site includes the tidal, inter-tidal, riverine, and marine environments of the Penobscot River Estuary. The Penobscot River is the second largest river in New England, and largest estuary in New England. River flow velocity monitoring is proposed for Orrington Reach in the vicinity of Bartlett Cove (Figure 1). In the area of the proposed river flow velocity monitoring platform, Orrington Reach ranges from 1,000 to 3,000 ft wide, and from 0 to approximately 50 ft deep at mean lower water with a tidal fluctuation of between 10 and 14 ft. Currents typically run 3 to 5 knots and may be influenced by many factors, including tides, manmade structures, weather, and shoaling. Bottom conditions range from soft sediments and grass, to mud, gravel, boulders, and rock or ledge.

All work will be conducted from a vessel. Drinking water will be brought aboard the vessel; sanitary facilities will be identified onshore prior to boarding the vessel. No onshore Site facility is available. Field crew will have cell phones.

[1] The audit task may be delegated to an office health and safety representative by the CHSM.

1.4 PROJECT MANAGER AND OTHER KEY CONTACTS

	Name (Affiliation)	Work Telephone	Cell Phone
Project manager	Sara Barbuto (Integral)	207.800.3803	860.705.0620
Site safety officer	Frank Spada (Integral)	831.576.2880	805.637.5514
Corporate health and safety manager	Matt Behum (Integral)	667.225.5412	443.454.1615

2 JOB HAZARD EVALUATION

This section presents a hazard assessment and comprehensive JHA for each task covered by this Site-specific HASP.

2.1 SITE HAZARD ASSESSMENT

The following sections present the chemical, physical, and biological hazards associated with this Site.

2.1.1 CHEMICAL HAZARD EVALUATION

The known or suspected contaminants for the Penobscot River Estuary are listed in the table below. In addition, the table lists chemical properties and OSHA permissible exposure limits (PELs), short-term exposure limits (STELs), and immediately dangerous to life and health (IDLH) levels.

Chemical Properties for Chemicals of Concern

Chemical of Concern	Concentration (Orrington Reach maximum)[2]	Medium	OSHA PEL (mg/m^3)	OSHA STEL (mg/m^3)	OSHA IDLH (mg/m^3)
Mercury	12,500 ng/g (surface sediment); 37 ng/L (surface water)	Sediment, Surface Water	0.1	--	28
Methyl Mercury	58 ng/g (sediment); 0.6 ng/L (surface water)	Sediment, Surface Water	0.01	0.03	2

Notes:
-- = none established

The following table summarizes the chemical characteristics and potential chemical exposure routes at the Site.

[2] AMEC. 2018. Final Phase III Engineering Study Report. AMEC Foster Wheeler Environment & Infrastructure, Portland, Maine. September 14, 2018.

Chemical Characteristics and Exposure Routes

	Likely	Possible	Unlikely
Potential Chemical Exposure Routes at the Site			
Inhalation			X
Ingestion			X
Skin absorption			X
Skin contact			X
Eye contact			X
Chemical Characteristics			
Corrosive			X
Flammable			X
Ignitable			X
Reactive			X
Volatile			X
Radioactive			X
Explosive			X
Biological agent			X
Particulates or fibers			X
If Likely, Follow These Safety Protocols			
If chemical exposure occurs on skin and/or eyes, rinse immediately with water. Seek medical attention.			

2.1.2 PHYSICAL HAZARD EVALUATION

The following table presents possible physical hazards that are expected to be present during field activities.

Possible Hazard	Yes	No	Proposed Safety Procedure
Heavy equipment		X	Stay back from operating equipment; wear safety vests and hard hats; coordinate and maintain eye contact with equipment operator.
Material handling	X		Lift properly; seek assistance if necessary; do not overfill coolers or boxes. Seek assistance if drums must be moved.
Falling objects		X	Wear hard hats near overhead hazards.

Possible Hazard	Yes	No	Proposed Safety Procedure
Adverse weather	X		Seek shelter during electrical storms; work in adverse weather conditions only with proper training and equipment.
Water Hazards	X		Wear a U.S. Coast Guard (USCG) approved personal flotation device (PFD) at all times when working over water greater than 6 in. deep. Inspect the PFDs prior to use and do not use defective PFDs. Keep sampling equipment on boats organized at all times. Boats are required to be equipped with a throwable life ring, fire extinguisher, and warning horn, and each field member will be briefed on the storage location of these safety items on the first day of the field event.
Uneven terrain/tripping	X		Use caution, wear properly fitting shoes or boots, and keep work area orderly.
Cold/hypothermia	X		Keep warm and dry; bring changes of clothes; do not work in extreme conditions without proper equipment and training. Follow cold stress information (Attachment 3). *Note:* potential for cold/hypothermia will depend on season and location of the Site.

A summary of potential physical hazards posed by proposed Site activities is as follows:

Activity	Potential Hazard
Instrumentation Deployment and Recovery	Uneven terrain/tripping, water hazards, heavy equipment, adverse weather

2.1.3 BIOLOGICAL HAZARD EVALUATION

No biological hazards were identified for Orrington Reach river flow velocity instrument platform deployment and retrieval.

2.2 OVERWATER WORK GUIDELINES

2.2.1 General Overwater Safety Guidelines

The overwater safety program requires the following:

- Wear U.S. Coast Guard (USCG) approved personal flotation device (PFD) at all times when working over water greater than 6 in. deep. Inspect the PFDs prior to use and do not use defective PFDs.
- The boat operator must have training in the safe operation of the boat.
- No smoking is allowed on boats or near refueling activities.

- Keep sampling equipment on boats organized at all times.
- Boats are required to be equipped with a throwable life ring, fire extinguisher, first aid kit, eyewash bottle and water (if acids are taken on the boat), drinking water (for long trips), alternate propulsion mechanism (e.g., paddles), rope, and warning horn; each field member will be briefed on the storage location of this equipment on the first day of the field event.
- Use all equipment in accordance with the manufacturers' recommendations.

The following table summarizes possible physical hazards that are expected to be present during overwater work field activities.

Possible Hazard	Yes	No	Proposed Safety Procedure
Water hazards	X		Wear a USCG-approved PFD at all times when working over water greater than 6 in. deep. Inspect the PFDs prior to use and do not use defective PFDs. Keep sampling equipment on boats organized at all times. Boats are required to be equipped with a throwable life ring, fire extinguisher, and warning horn, and each field member will be briefed on the storage location of these safety items on the first day of the field event.
Vessel operations	X		Exercise prudent overwater safety.

2.2.2 Sampling Vessel Operations

The physical hazards associated with the deployment and retrieval of sampling equipment from a sampling vessel result from the equipment's weight and the method of deployment and retrieval. Only trained personnel will deploy and retrieve sampling gear. Under circumstances of potentially dangerous waves or winds, the boat operator and SSO will employ best professional judgment to ensure safe field operations.

To avoid injuries from heavy equipment, personnel will wear steel-toe boots when over land as well as working on the work deck or loading/unloading heavy equipment from the vessel. Sample handling equipment, containers, deck lines, hydraulic cables, and water hoses not in immediate use will be kept clear of walkways and work areas until needed. Each time sampling operations at a given location have been completed, excess sediment on the deck will be washed from the deck over the sampling location.

USCG-approved PFDs will be provided for and worn by all personnel working on the deck, or as directed by the Integral SSO or vessel operator. As mentioned above, the vessel must also be equipped with throwable life rings, fire extinguishers, and warning horns, and each

crewmember will be briefed on the location of this equipment prior to initiation of the sampling event.

2.2.3 Small Craft Operation

Safety procedures on small boats (i.e., length 20 ft or less) may necessitate an increased level of protection, depending on boat size, and location on the water body. Small boat procedures will include all the requirements listed above, except that a fire extinguisher is not necessary for a row boat and a throwable seat cushion may be used in place of a life ring. In addition, all personnel onboard will be required to wear USCG-approved PFDs at all times. Any Integral personnel or subcontractors operating small boats must have completed a Coast Guard Auxiliary *Boating Safely* course and have a demonstrated knowledge of the safe handling of these craft.

2.2.4 U.S. Coast Guard Notification

If required for the body of water that will be sampled, USCG will be notified of the schedule and scope of the overwater sampling work. The AMEC 2017 Site HASP[3] indicated USCG does not patrol upstream of Searsport, and does not require a "Notice to Mariners" be filed for environmental data collection field activities. The AMEC 2017 Site HASP also indicates there are no specific devices to be displayed (i.e., day flags) when working in shipping vessel channels. Integral will contact USCG prior to deployment to confirm USCG requirements.

If USCG deems a notice to other mariners to be necessary, then information will be provided by Integral to USCG to make barge and other river traffic aware of their sampling activities. Field teams will be diligent in avoiding impeding vessel traffic.

2.3 TASK-SPECIFIC SAFETY PROCEDURE SUMMARY

Attachment 5 presents the JHA prepared for instrument platform deployment and retrieval.

Always wear a USCG-approved PFD when doing any work on the sampling vessel or floating dock. Safety glasses, had hat, steel-toe boots, Tyvek coveralls, and nitrile gloves are required at all times. Use hearing protection as needed.

Exercise caution when working on a boat deck. Always be aware of the surroundings and river wave action that can rock the sampling vessel without notice. Use proper lifting techniques. Keep deployment and recovery equipment on boats organized at all times. Boats are required to be equipped with a throwable life ring, fire extinguisher, and warning horn, and each field

[3] AMEC. 2017. Site-Specific Health and Safety Plan, Penobscot River, Orrington, Maine. AMEC Foster Wheeler Environment & Infrastructure, Portland, Maine. June 6.

member will be briefed on the storage location for this equipment. Always wear nitrile gloves when handling the instrumentation, and wash hands thoroughly before eating or drinking. Hand sanitizer may be used if hand washing facilities are not available.

3 PERSONAL PROTECTIVE EQUIPMENT AND SAFETY EQUIPMENT

The following sections address PPE and safety equipment required for completing the field activities.

3.1 PERSONAL PROTECTIVE EQUIPMENT

Based on the hazards identified above in Section 2, the following table identifies the PPE required for Orrington Reach river flow velocity monitoring instrument deployment and retrieval.

	Level of Protection	
Site Activity	Initial	Contingency
Instrument Platform Deployment and Retrieval	Modified D (MD)	Leave Site

Each level of protection will incorporate the following PPE:

Level MD	Long pants and work coveralls, PFD, eye protection, and steel-toe boots are required. Hearing protection is required as needed.

3.2 SAFETY EQUIPMENT

The following safety equipment will be onsite during the proposed field activities.

First Aid Kit Mandatory, including absorbent compress, adhesive bandages, adhesive tape, antiseptic, burn treatment, medical exam gloves, sterile pad, cardiopulmonary resuscitation (CPR) shield, triangle bandage, scissors—for cutting off the PPE from an injured person (check additional items required for the Site)

- [ ] Emergency blanket
- [ ] Insect repellent
- [X] Sunscreen
- [ ] Other: _____

Other (check the items required for this project)

- [ ] Eyewash
- [X] Drinking water
- [ ] Stopwatch for monitoring heart rate for heat stress monitoring[4]
- [ ] Thermoscan® thermometer for heat stress monitoring
- [ ] Survival kit[5]
- [X] Personal flotation device
- [ ] Cool vests
- [ ] Fit test supplies
- [X] Fire extinguisher (drill rigs and onboard larger sampling vessels)
- [ ] Windsock
- [X] Cellular phone
- [ ] Radio sets
- [X] Global positioning system
- [ ] Other: _____

[4] Heart rate monitoring requires special training.
[5] Consult the CHSM for guidance for site-specific survival kits.

4 AIR MONITORING

Air monitoring will not be required for river flow velocity monitoring in Orrington Reach.

5 HEALTH AND SAFETY TRAINING AND MEDICAL MONITORING

The following sections present requirements for health and safety training and medical monitoring.

5.1 HEALTH AND SAFETY TRAINING AND MEDICAL MONITORING

State and federal laws establish training requirements for workers at uncontrolled hazardous waste sites (including areas where accumulations of hazardous waste create a threat to the health and safety of an individual, the environment, or both). Integral and subcontractor personnel are required to complete the following training requirements prior to working at the Site.

5.1.1 Training Requirements

Task	No Training	24-hour	40-hour[a]	Supervisor[b]	First Aid/CPR[c]	Medical Monitoring
Integral Field Personnel						
Frank Spada			X	X	X	X

Notes:

[a] Must have current OSHA 8-hour refresher if it has been more than a year since the OSHA 40-hour training.

[b] At least one person onsite must be OSHA HAZWOPER supervisor trained if this is a hazardous waste Site.

[c] At least one member of each team of two or more people onsite must be first aid/CPR trained.

[d] Integral subcontractors and consultants may have requirements that are more stringent than those listed above. These are minimum training and monitoring requirements required to work on this Site.

[e] The vessel operator and deck hand will not be required to have 40-hour training. The vessel operator will stay out of the exclusion and contamination reduction zones during sample collection and decontamination activities. The vessel operator and deckhands are required to have USCG training.

5.1.2 Site Safety Meetings

Site safety meetings must be held before beginning new tasks or when new staff enter the Site. Site safety meetings will be held daily, and will include review of the day's work plan and specific hazards that may be encountered. Additional meetings will be held at any time health and safety concerns are raised by any of the personnel. Attendance and topics covered are to be documented in the field logbook.

5.2 MEDICAL MONITORING

OSHA requires medical monitoring for personnel potentially exposed to chemical hazards in concentrations in excess of the PEL for more than 30 days per year and for personnel who must use respiratory protection for more than 30 days per year. Integral requires medical monitoring for all employees potentially exposed to chemical hazards.

Will Integral personnel working at this Site be enrolled in a medical monitoring program?	Yes X	No _____

6 EMERGENCY RESPONSE

The following sections discuss emergency recognition and prevention, emergency response and notification, emergency decontamination, Site communications, and use of the buddy system. A project-specific Emergency Response Plan (ERP) is provided as Appendix C to the River Flow Velocity Monitoring Work Plan.

6.1 EMERGENCY RECOGNITION AND PREVENTION

It is the responsibility of all personnel to monitor work at the Site for potential safety hazards. All personnel are required to immediately report any unsafe conditions to the SSO. The SSO is responsible to immediately take steps to remedy any unsafe conditions observed at the work Site.

The following are examples of some emergency situations that could occur during the Orrington Reach river flow velocity monitoring instrument platform deployment and retrieval field activities:

- Slips, trips, and falls (on sloped areas, steel stairs, etc.)
- Lacerations from scrap metal (in soil, waste piles, etc.)
- Entrainment of clothes or objects in moving equipment or parts
- A person falls overboard
- Serious injury or illness (e.g., physical injury, heart attack)
- Vessel power loss/engine malfunction
- Severe thunderstorm with lightning.

Immediate actions will be taken by the field team under the leadership of the SSO in response to these emergencies.

6.2 EMERGENCY RESPONSE AND NOTIFICATION

If an emergency on the vessel warrants it, all personnel must immediately evacuate the affected work area and report to the SSO at the predetermined emergency assembly location: **Vessel wheelhouse.**

In case of injury, field personnel should take precautions to protect the victim from further harm and notify local or facility emergency services. In remote areas or on-water work, it will be necessary to have first aid-trained personnel on the field team. The victim may require

decontamination prior to treatment if practicable—requirements will vary based on Site conditions.

Emergency medical care will be provided by:

- [X] Local emergency medical provider (i.e., fire department)
- [ ] Facility emergency medical provider
- [X] First aid-trained field staff (for remote areas or on-water work only)

Local Resources	Name	Telephone	Notified Prior to Work (Yes/No)?
Fire	Orrington Fire Department 271 Center Dr, Orrington, ME 04474	911 if emergency; (207) 825-3530	No
Police	240 Main St, Bangor, ME 04401	911 if emergency; (207) 947-7384	No
Ambulance	Northern Light Medical Transport 931 Union St, Bangor, ME 04401	911 if emergency; (207) 262-3115	No
Hospital	360 Broadway, Bangor, ME 04401	(207) 907-1000	No

Prior to initiation of any fieldwork, the SSO must confirm that the hospital listed is still in operation and that it has an emergency room. **It is required that the SSO drive to the hospital so that the directions are practiced and understood prior to initiating fieldwork.**

Corporate Resource	Name	Work Telephone	Cell Phone
Integral CHSM [a]	Matt Behum	Office: (667) 225-5412	(443) 454-1615
Integral Project Manager	Sara Barbuto	Office: (207) 800-3803	(860) 705-0620
Integral President	Bill Locke	Office: (720) 465-3315	(303) 548-1111
Integral Human Resources Manager	Joseph Drew	Office: (206) 957-0330	(206) 379-1289
Medical Consultant	Dr. Peter Greaney (WorkCare)	Office: (800) 455-2219 x 2114	NA
Incident Intervention (WorkCare)	-	(888) 449-7787	NA

Notes:

[a] If the CHSM cannot be reached, call Eron Dodak [Office: (503) 943-3614; Cell: (503)407-2933]. If Eron Dodak cannot be reached, call David Livermore [Office: (503) 943-3613; Cell: (503) 806-4665].

In case of serious injuries, death, or other emergency, the Integral CHSM must be notified immediately at the phone numbers listed above. The Integral CHSM will notify the project manager and Integral's President. The project manager will notify the client.

6.3 DECONTAMINATION PROCEDURES

The river flow velocity monitoring instrument platform may have sediment on it during retrieval. Gloves will be worn when retrieving the platform and river water will be used to rinse off sediment.

6.4 SITE COMMUNICATIONS

Each field team will carry a cell phone or satellite phone that is in good working order. If there is any type of emergency that requires the vessel to be evacuated (e.g., severe thunderstorm with lightning, chemical release), the SSO will notify all personnel. Personnel will then meet at the predetermined emergency assembly location, provided the muster point is in safe territory (e.g., vessel wheelhouse). All other emergency notifications that do not require evacuation (e.g., a person falling overboard) will be conducted using a cell or satellite phone.

6.5 BUDDY SYSTEM

The buddy system will be used at the Site at all times. The buddy system is a system of organizing employees into field teams in such a manner that each employee of the field team is designated to be observed by at least one other employee in the field team. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

7 WORK ZONES

Work zones are defined as follows:

Exclusion zone	Any area of the Site where hazardous substances are present, or are reasonably suspected to be present, and pose an exposure hazard to personnel
Contamination reduction zone	Area between the exclusion and support zones that provides a transition between contaminated and clean zones
Support zone	Any area of the Site, so designated, that is outside the exclusion and contamination reduction zones

Site control measures in work zones are described below for each type of field activities.

7.1 INSTRUMENTATION RECOVERY AND DEPLOYMENT

Exclusion zone: The forward deck of the vessel will be considered to be the exclusion zone. Instrumentation recovery and deployment will occur in this area. Only properly equipped and trained personnel (i.e., wearing modified D PPE) will be allowed in this area.

Contamination reduction zone: After instrumentation deployment/retrieval is completed at a station, the exclusion zone will become the contamination reduction zone.

Support zone: The pilot house will be the support zone. No chemical or sample handling activities will occur in this area. Personnel will be required to wash chemicals and sediment from raingear or Tyvek® coveralls before entering this area.

8 EQUIPMENT DECONTAMINATION AND PERSONAL HYGIENE

The following sections present equipment decontamination procedures and personal hygiene.

8.1 EQUIPMENT DECONTAMINATION PROCEDURES

The river flow velocity monitoring instrument platform may have sediment on it during retrieval. Gloves will be worn when retrieving the platform and river water will be used to rinse off sediment.

8.2 PERSONAL HYGIENE

The following personal hygiene practices will be used when performing the instrument platform retrieval to reduce exposure to chemicals:

- Long hair will be secured away from the face so it does not interfere with any activities.
- Following deployment and retrieval of the instrument platform, personnel will wash their hands, forearms, and faces in the contaminant reduction zone prior to entering any clean areas or eating areas. No person will eat, drink, or chew gum or tobacco in the forward deck of the vessel, where the instrument platform will be deployed and retrieved. Single portion drink containers and drinking of replacement fluids for heat stress control will be permitted only in support areas.
- Smoking is prohibited by Integral personnel and subcontractors in all areas of the Site because of the potential for contaminating samples and for the health of the field team.

9 VEHICLE SAFETY, SPILL CONTAINMENT, AND SHIPPING INSTRUCTIONS

The following sections present vehicle safety, spill containment, and shipping information.

9.1 VEHICLE SAFETY

Integral's vehicle safety program requires the following:

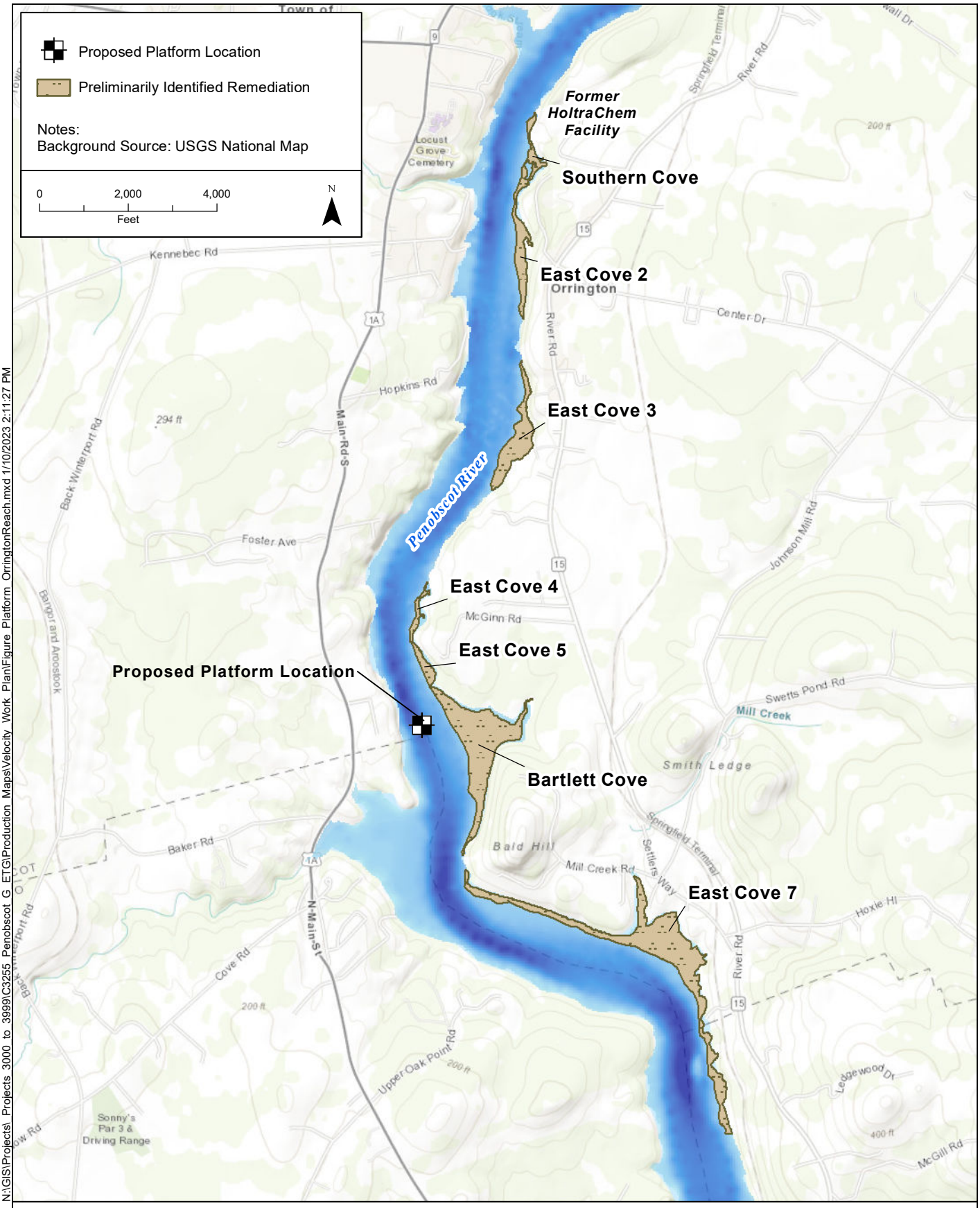
- Cell phone usage while driving is not allowed, including the use of hands-free devices. If it not feasible to wait to use the cell phone until arriving at the destination, pull off the road and park in a safe location to use the cell phone. Do not pull to the side of the road to use a cell phone because this significantly increases the risk of a rear-end collision.
- All vehicles are to be operated in a safe manner and in compliance with local traffic regulations and ordinances.
- Drivers are to practice defensive driving and drive in a courteous manner.
- Drivers are required to have a valid driver's license and liability insurance (per local state laws).
- Seat belts are to be worn by the driver and all passengers.
- No persons are allowed to ride in the back of any trucks or vans, unless equipped with seatbelts.
- Vehicles are to be driven in conformance with local speed limits.
- Personnel who are impaired by fatigue, illness, alcohol, illegal or prescription drugs, or who are otherwise physically unfit, are not allowed to drive or work on Integral field Sites.
- Personnel are to avoid engaging in other distractions such as changing radio stations while driving.
- Motor vehicle accidents are to be reported to the responsible law enforcement agency, the Integral human resources manager, and the Integral CHSM on the same day of occurrence. Documentation of damage should be photographed.
- Personnel who have experienced work-related vehicle accidents or citations may be required to complete a defensive driving program.

9.2 SPILL CONTAINMENT

No bulk chemicals will be used during the fieldwork.

9.3 SHIPPING INFORMATION

No sampling will be conducted, so no sample shipping will be necessary.



N:\GIS\Projects_Projects_3000_to_3999\C3255_Penobscot_G_ETG\Production_Maps\Velocity_Work_Plan\Figure_Platform_OrringtonReach.mxd 1/10/2023 2:11:27 PM

Prepared for: Penobscot Estuary Mercury Remediation Trust

Prepared by: integral consulting inc.

Figure 1.
Proposed Velocity Data Collection Platform Location in Orrington Reach

ATTACHMENT 1

HOSPITAL ROUTE

Google Maps

Boat launch - Orrington, Orrington, ME 04474 to St Joseph Hospital, 360 Broadway, Bangor, ME 04401

Drive 10.2 miles, 19 min

Boat launch - Orrington
Orrington, ME 04474

Follow Town Rd and Blake Rd to ME-15 N

1 min (0.4 mi)

1. Head northeast toward Town Rd

82 ft

2. Turn left onto Town Rd

0.1 mi

3. Turn left onto Settlers Way

46 ft

4. Turn right onto Blake Rd

0.2 mi

Continue on ME-15 N to Bangor

20 min (9.8 mi)

5. Turn left at the 1st cross street onto ME-15 N

7.5 mi

6. Continue onto S Main St

0.9 mi

7. Turn left onto Betton St

499 ft

8. Slight right onto Penobscot St

338 ft

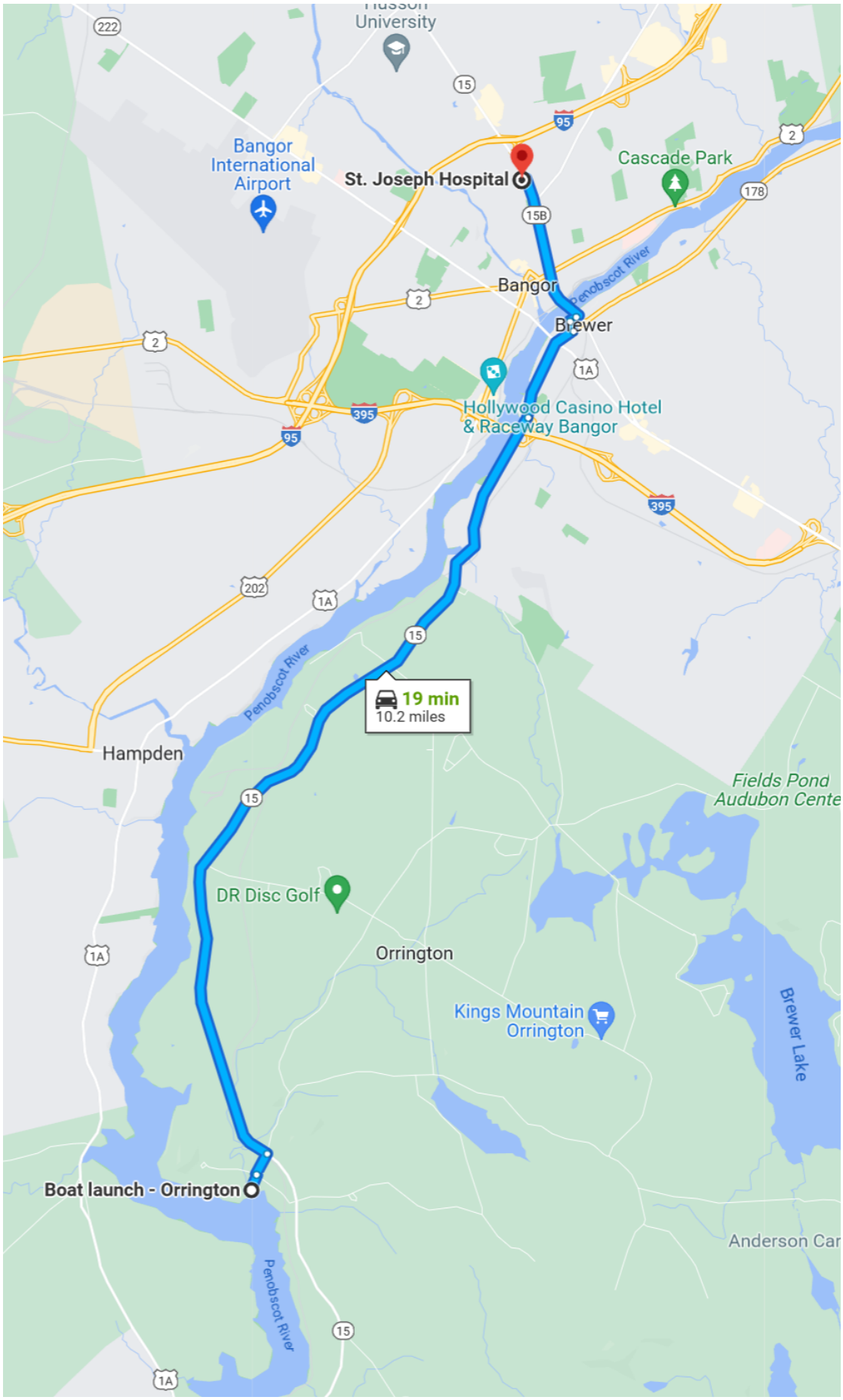
9. Turn left onto ME-15BUS/State St
Continue to follow ME-15BUS

1.3 mi

10. Turn left
Destination will be on the left

38 sec (167 ft)

St Joseph Hospital
360 Broadway, Bangor, ME 04401


University
222
15
95
Bangor
International
Airport
St. Joseph Hospital
Cascade Park
2
178
15B
Penobscot River
Bangor
2
Brewer
2
1A
Hollywood Casino Hotel
& Raceway Bangor
395
95
395
202
1A
15
Penobscot River
19 min
10.2 miles
Hampden
Fields Pond
Audubon Cente
15
DR Disc Golf
1A
Orrington
Kings Mountain
Orrington
Brewer Lake
Boat launch - Orrington
Anderson Car
Penobscot River
15
1A

ATTACHMENT 2

REGULATORY NOTICES

You Have a Right to a Safe and Healthful Workplace.

IT'S THE LAW!

- You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in the inspection.
- You can file a complaint with OSHA within 30 days of discrimination by your employer for making safety and health complaints or for exercising your rights under the *OSH Act*.
- You have a right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violation.
- Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- You have the right to copies of your medical records or records of your exposure to toxic and harmful substances or conditions.
- Your employer must post this notice in your workplace.

The *Occupational Safety and Health Act of 1970 (OSH Act)*, P.L. 91-596, assures safe and healthful working conditions for working men and women throughout the Nation. The Occupational Safety and Health Administration, in the U.S. Department of Labor, has the primary responsibility for administering the *OSH Act*. The rights listed here may vary depending on the particular circumstances. To file a complaint, report an emergency, or seek OSHA advice, assistance, or products, call 1-800-321-OSHA or your nearest OSHA office: • Atlanta (404) 562-2300 • Boston (617) 565-9860 • Chicago (312) 353-2220 • Dallas (214) 767-4731 • Denver (303) 844-1600 • Kansas City (816) 426-5861 • New York (212) 337-2378 • Philadelphia (215) 861-4900 • San Francisco (415) 975-4310 • Seattle (206) 553-5930. Teletypewriter (TTY) number is 1-877-889-5627. To file a complaint online or obtain more information on OSHA federal and state programs, visit OSHA's website at **www.osha.gov**. If your workplace is in a state operating under an OSHA-approved plan, your employer must post the required state equivalent of this poster.

1-800-321-OSHA

www.osha.gov

U.S. Department of Labor • Occupational Safety and Health Administration • OSHA 3165

ATTACHMENT 3

EMPLOYEE INCIDENT, NEAR-MISS/NEAR-LOSS INCIDENT, AND HAZARDOUS ASSESSMENT FORMS

EMPLOYEE INCIDENT AND ROOT CAUSE ANALYSIS REPORT

This report is to be completed by the corporate health and safety manager (CHSM) within 2 weeks of the incident. The investigation must be initiated within 24 hours of the incident.

GENERAL INCIDENT DESCRIPTION

Date and time of incident: _____

Name(s) of injured/exposed employee(s):

Name(s) of witness(es):

Field or office location and project name:

Weather conditions if incident occurred outside (temperature, precipitation, wind speed/direction, etc.):

What general activity was being performed when the incident occurred? Describe briefly (e.g., site reconnaissance, soil sampling, office work).

Was the activity conducted under a site-specific health and safety plan? Yes __ No __
If yes, please attach a copy of the plan.

Was medical treatment given? Yes __ No __
If yes, when was it given and who gave it?

Were any employees admitted to the hospital? Yes __ No __
If yes, provide name(s) and indicate how many days each person spent at the hospital.

Did any employees miss work or experience restricted activity at work? Yes __ No __
If yes, provide name(s) and specify the number of days of missed and/or restricted work.

When was Integral management notified? _____
Who was notified (name and title)?

The information provided in this section has been reviewed by the site safety officer (SSO; field incident) or office health and safety representative (office incident) and is accurate.

_____ _____
SSO or office health and safety representative signature Date

CONFIDENTIAL:
DETAILED DESCRIPTION OF INCIDENT

Copy this page and fill out separately for each injured/exposed individual.

Name of injured/exposed employee: _____

Exact location of the employee when the incident occurred:

What specific task was being performed by this employee at the time of the incident?

Part(s) of the body affected:

Detailed description of the incident:

Witness interview summary for this employee:

The information provided in this section has been reviewed by the above-named employee and is accurate.

_____ _____

Employee signature Date

ROOT CAUSE ANALYSIS

Overview

A root cause analysis (RCA) is an investigative technique for identifying all the potential causes associated with a particular incident before narrowing it down to a small number of primary root causes that need to be addressed.

The investigation team brainstorms on possible risk factors for the incident, such as human factors, methods and policies, equipment and materials, environment, training, and management. Integral uses a fishbone diagram (see Figure 3-20 of the corporate health and safety program plan), which is constructed in steps to graphically illustrate the results of the RCA brainstorming exercise. The RCA focuses on causes—not symptoms—and provides an organized structure to explain why an incident has happened. It also serves as a visual display of causes that have been discussed and reviewed.

Fishbone Analysis Results

Investigation team member names:

Analysis results:

Summary of Root Causes

RCA summary statement:

CORRECTIVE ACTIONS AND CHSM REVIEW

Corrective action/procedure changes carried out for this project(s) or office(s):

Corrective action notifications and steps taken to prevent similar incidents at other project sites or offices:

The information provided in this document has been reviewed by the CHSM and is accurate.

CHSM signature Date

NEAR-MISS/NEAR-LOSS INCIDENT REPORT

This form is to be completed by field or office staff.

Employee: _____

Office or site location: _____

Near-loss incident (check one or more): Exposure ☐ Physical injury ☐ Property damage ☐

Location (city and state): _____ Project no.: _____

Date of incident: _____ Time of incident: _____

Fully describe the incident, including how it happened, persons involved, if chemicals were involved in the incident, etc.:

_____

_____

_____

_____

_____

_____

Was the operation being conducted under an established safety plan? ☐ Yes ☐ No

If yes, attach a copy. If no, explain: _____

_____

_____ _____

Employee signature Date

_____ _____

Site safety officer signature (field incidents only) Date

_____ _____

Project manager or office health and safety representative signature Date

CORPORATE HEALTH AND SAFETY MANAGER (CHSM) REVIEW AND COMMENTS

Corrective action/procedure changes carried out on this project or in this office:

Corrective actions to be taken to prevent similar incidents at other project sites or offices:

CHSM signature

Date

HAZARD ASSESSMENT AND CORRECTION RECORD

Date of inspection:			
Name of person conducting inspection:			
Office or field location:			
Location (city and state):		Project and Contract No.	
Describe the unsafe condition or work practice (attach extra sheets if necessary):			
Describe what corrective action(s) were performed (attach extra sheets if necessary):			

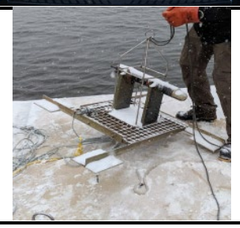
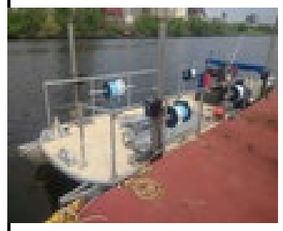
Inspector's signature	Date

ATTACHMENT 4

JOB HAZARD ANALYSIS

Job Hazard Analysis (JHA) Assessment Form

JHA Title: River Flow Velocity Monitoring Platform Deployment and Retrieval	**JHA Number:** 001	**Date Prepared:** 2/6/2023
Job Description: Assembly, deployment, and retrieval of instrumentation monitoring platforms	**Project Number:** C3255	
General Personal Protective Equipment (PPE) Required: Steel toe boots, hard hat, personal floatation device, sunscreen and work gloves	**JHA Team Names:** Frank Spada	**Approved by:** Matthew Behum, Integral CHSM
Additional PPE Required: Rain gear		

Job Steps	Photographs	Hazard Type	Potential Hazards	Control Type	Existing Controls	SEV	OCC	EFF	HPN	Control Type	Recommended Controls	SEV	OCC	EFF	HPN
Transport of Instrumentation platforms to field site.		Phys	Ergonomics—Heavy lifting (material handling)	Adm	Sprain/strain protection—Proper lifting techniques / body posture	3	2	0.50	3		Not applicable (NA) - No substantial recommendations, hazard already low				0
		Phys	Manual movement of heavy items (>40 lb)	Adm	Ergonomics—Assisted lifts (>40 lb)										
		Phys	Slip/trip/fall—Same level	PPE	Foot—Safety shoes										
		Phys	Object or machine that may crush or pinch a body or body part	PPE	Foot—Safety shoes with metatarsal protection										
		Phys	Traffic	Adm	Administrative control—Other (defensive driving)										
Assembly of Instrumentation platforms prior to deployment		Phys	Ergonomics—Heavy lifting (material handling)	Adm	Sprain/strain protection—Proper lifting techniques / body posture	3	2	0.50	3		Not applicable (NA) - No substantial recommendations, hazard already low				0
		Phys	Manual movement of heavy items (>40 lb)	Adm	Ergonomics—Assisted lifts (>40 lb)										
		Phys	Object or machine that may crush or pinch a body or body part	PPE	Foot—Safety shoes with metatarsal protection										
		Phys	Slip/trip/fall—Same level	PPE	Foot—Safety shoes (electrical rated)										
		Phys	Sharp or rough surfaces (laceration/puncture)	Eng	Crush/pinch/abrasion protection—"Body out of line of fire"										
Deployment and retrieval of Instrumentation platforms from boat		Phys	Impact with or strike by moving, flying, or falling object	PPE	Head/face—Hard hat	3	2	0.50	3		Not applicable (NA) - No substantial recommendations, hazard already low				0
		Phys	Manual movement of heavy items (>40 lb)	Eng	Ergonomics—Mechanical lifting devices (SPI camera deployed with cable and winch)										
		Phys	Slip/trip/fall—Same level	PPE	Foot—Safety shoes with metatarsal protection										
		Phys	Object or machine that may crush or pinch a body or body part	Adm	Crush/pinch/abrasion protection—"Body out of line of fire"										
		Env	Environmental—Adverse weather	Adm	Atmospheric monitoring (monitoring of weather forecasts)										
		Phys	Unexpected start-up	Adm	Alarms—Audible or visible										
		Phys	Overboard	Adm	Buddy system (If man overboard, keep sight of person until rescued)										
		Phys	Overboard	PPE	PPE—Other (PFD)										
Disassembly and transport of Instrumentation platforms, packing components into cases.		Phys	Ergonomics—Heavy lifting (material handling)	Adm	Sprain/strain protection—Proper lifting techniques / body posture	3	2	0.50	3		Not applicable (NA) - No substantial recommendations, hazard already low				0
		Phys	Manual movement of heavy items (>40 lb)	Adm	Ergonomics—Assisted lifts (>40 lb)										
		Phys	Slip/trip/fall—Same level	PPE	Foot—Safety shoes										
		Phys	Object or machine that may crush or pinch a body or body part	PPE	Foot—Safety shoes with metatarsal protection										
		Phys	Traffic	Adm	Administrative control—Other (defensive driving)										

Job Hazard Analysis Control List

Engineering	Administrative	Personal Protective Equipment (PPE)
Electrical safety—Lockout/tagout	Administrative control—Other (specify)	Electrical safety—Arc flash PPE / tools
Engineering control—Other (specify)	Alarms—Audible or visible	Fall protection—Arrest system (describe)
Ergonomics—Ergonomically designed tools	Allow cool time	Fall protection—Positioning (describe)
Ergonomics—Mechanical lifting devices	Atmospheric monitoring (describe)	Foot—Safety shoes
Flying projectile protection—Shields/barriers	Buddy system (describe)	Foot—Safety shoes (electrical rated)
Machine guarding (describe)	Contaminant protection—Personal hygiene practices	Foot—Safety shoes with metatarsal protection
Physical barrier (describe)	Crush/pinch/abrasion protection—"Body out of line of fire"	Hand—Gloves (chemical resistant)
Ventilation (describe)	Designated walking paths	Hand—Gloves (cotton)
	Documentation—Job safety analysis / risk assessment	Hand—Gloves (cut/puncture resistant)
	Documentation—Permit (describe)	Hand—Gloves (heat resistant up to 2,600ºF)
	Documentation—Standard operating procedures / work instructions	Hand—Gloves (heat resistant up to 600ºF)
	Ergonomics—Assisted lifts (>40 lb)	Hand—Gloves (leather)
	Housekeeping (describe)	Hand—Gloves (vibration resistant)
	Job rotation (describe)	Head/face—Aluminized hood (high heat)
	Overhead protection—Prohibit lifting loads overhead	Head/face—Aluminized hood (low heat)
	Pre-shift or use inspection	Head/face—Chemical goggles
	Safety training/briefing—Job/task/hazard–specific	Head/face—Face shield
	Slip/trip/fall protection—"Eyes on path"	Head/face—Hard hat
	Sprain/strain protection—Proper lifting techniques / body posture	Head/face—Safety glasses with side shields (ANSI Z71)
		Head/face—Tinted/filtered safety glasses
		Head/face—Welding helmet/goggles
		Hearing—Ear muffs
		Hearing—Ear plugs
		PPE—Other (specify)
		Respiratory—Full-face APR
		Respiratory—Half-face APR
		Respiratory—NIOSH N95 dust mask (voluntary)
		Torso—Chemical-resistant apron
		Torso—Chemical-resistant suit
		Torso—Fire-retardant clothing
		Torso—Leather welders apron
		Torso—Tyvek suit

Notes:

ANSI = American National Standards Institute

APR = air purifying respirator

NIOSH = National Institute for Occupational Safety and Health

ATTACHMENT 5

SAFETY GUIDELINES

SAFETY GUIDELINE SG-02

SLIPS, TRIPS, AND FALLS PREVENTION

Slips, trips, and falls constitute the second most common of general industry accidents, second only to motor vehicle accidents. Slips, trips, and falls can result in head injuries, back injuries, broken bones, cuts and lacerations, or sprained muscles. Nearly half of falls occur on stairs. At Integral, slips, trips, and falls and are responsible for the most significant accident costs at Integral to date. Greater than the economic loss is pain and suffering and potential disability on the part of the injured employee. For both office and field personnel, the following are necessary to eliminate slips, trips, and falls hazards:

- An understanding of how fall accidents happen
- Identifying the areas in which falls may occur
- Eliminating or minimizing hazards of falling.

Statistics show that the majority (60 percent) of falls happen on the same level resulting from slips and trips. The remaining 40 percent are falls from a height (discussed in safety guideline SG-24, "Fall Protection Awareness").

Slips can happen where there is too little friction or traction between the footwear and the walking surface. Common causes of slips are wet or oily surfaces, weather hazards (snow or ice), loose rugs or walk-off mats, spills, and changing walking surface characteristics.

Trips can happen when your foot strikes or hits an object, causing you to lose balance and eventually fall. Common causes of tripping are curbs in parking lots or uneven asphalt, obstructed views, poor lighting, and clutter or objects in the pathway one is accustomed to taking. Dirt clods, wiring or other projecting debris, open bottom drawers, and uneven walking surfaces also contribute slips, trips, and falls.

Falls occur when you are too far off balance for recovery.

The following are examples of sound slip and trip prevention guidelines. Note that every condition and location is different.

- Survey a new project site for all walking surface hazards posed during the scope of work.
- Wear footwear that is well fit and appropriate to the environs, season, and planned tasks. No footwear's anti-slip properties are appropriate for every condition.

- Ensure proper illumination for walking and performing tasks; auxiliary lighting should be carried or provided whenever task or project lighting is inadequate.
- Ensure that items being carried do not impair clear view of obstructions, spills, etc. Backpacks or other carrying arrangements are preferred as they leave hands free to better balance yourself.
- Pay attention to the walking surface and adjust your step size accordingly.
- Walk using small steps and do not run. Point your feet slightly outward, keeping your center of balance under you. Get your feet under your body quickly to maintain balance after the initial step.
- Use handrails or other stable objects where available.
- Exercise an abundance of caution when walking over snow or ice, uneven pavement, and frozen ground.
- If you do fall, protect your head, spine, and neck. If you fall backward, tuck your chin so that your head does not strike the ground with full force. Try to avoid using your arms to break your fall.
- Be cognizant of vehicular traffic and wear a reflective vest to be easily seen.
- Watch out for curbs, ramps, cracked asphalt, potholes, uneven sidewalks, and black ice.
- Slow down when moving between light and dark areas so your eyes will have sufficient time to adjust.
- If it is necessary to temporarily run cables, wires, or ropes across foot paths, ensure that the items are well marked and that field personnel are made aware of the routing.

SAFETY GUIDELINE SG-03

PERSONAL PROTECTIVE EQUIPMENT OVERVIEW

The proper use of personal protective equipment (PPE) is vital to protect personnel from contacting hazardous materials at a site. PPE is provided, inspected, used, and maintained in a sanitary and reliable condition. PPE may be required by reasons of hazards of processes or environment to protect body parts from inhalation, absorption, or physical contact. This applies to employer-issued or employee-owned equipment, if employee-owned equipment is allowed based on jurisdiction.

Safety guideline SG-03 provides an overview of Integral's program for the use of PPE. Additional details on respiratory protection, eye protection, and hearing protection are covered in safety guidelines SG-04, SG-05, and SG-06, respectively.

Integral has implemented the following guidelines to ensure the proper selection, use, and availability of PPE for site projects.

LEVELS OF PROTECTION

It is Integral's policy not to conduct fieldwork requiring Level A or B PPE. Fieldwork requiring Level A or B PPE will be subcontracted to qualified firms. Integral field personnel may use either of two levels of PPE as described below:

- **Level C** requires an air-purifying respirator (APR) and use of a cartridge that is specific to the types of materials or chemicals of concern (COCs). APRs cannot be used in an oxygen-deficient environment, and cartridges may not be approved/available for some COCs present at a site. The degree of dermal protection depends on anticipated hazards and tasks; it may include disposable protective coveralls, gloves, and boot covers.
- **Level D** (and Modified D) is the basic work uniform, described below, as modified for work at the site.

SELECTION

Selection of appropriate PPE is included in the site safety planning process and documented in the site-specific health and safety plan (HSP). The PPE choices are subject to approval by the corporate health and safety manager (CHSM). The selection of PPE will be based on the following criteria:

- Chemical hazards—No single type of coveralls, rubber boots, or gloves provides protection against all chemical hazards. During preparation of the HSP, project personnel (generally the site safety officer [SSO], with guidance from the CHSM and project manager) must identify the site-specific COCs and select the proper PPE for the specific exposure hazard. Field personnel may refer to manufacturers' testing data, reference sources, and previous experience when selecting appropriate PPE.
- Physical hazards—No single personal protective garment (e.g., steel-toed boots, hard hat, knee pads) provides protection against all physical hazards. During preparation of the HSP, field personnel (generally the SSO, with guidance from the CHSM and project manager) must identify the physical hazards at the site and physical hazards that may be encountered during the field activity, and select the proper PPE for the specific physical hazard.
- Concentration of contaminants—Diluted mixtures of contaminants pose less of a threat than pure product. Project personnel must evaluate the concentration of contaminants present at the site and select PPE accordingly. The SSO or CHSM can provide guidance on the concentrations of contaminants that are anticipated to be present at the site.
- Physical state of contaminants—Field personnel must evaluate the physical state of contaminants present at the site. Liquids may pose a hazard to field personnel because of the potential for spilling, splashing, and permeating PPE. If exposure to contaminants in liquid form is possible, impermeable PPE will be required. Gas and dust inhalation may also pose significant hazards to field personnel and may require that respirators be donned at the site.
- Level of activity—Some field tasks pose greater risk of exposure to chemical hazards than others. Sample collection (e.g., groundwater or sediment sampling) poses a significant risk for contact with the contaminated media, and field personnel collecting samples will require greater chemical protection in their PPE than those performing field oversight or site survey work. Field personnel must evaluate the level of activity required for the project and select appropriate PPE. Note: If the project requires that field personnel perform strenuous activities in hot climates, then the HSP must attempt to balance the need for durable and impermeable PPE against the increased risk of heat-related illness.

TRAINING

All Integral field personnel are trained in the use of PPE as a part of the 40-hour training and annual refresher program. This training includes:

- Procedures for inspecting PPE prior to use
- Selecting appropriate PPE

- Recognizing PPE failure and limitations (e.g., breakthrough, degradation, physical failure)
- Preventing heat stress, cold stress, and other physical hazards associated with the use of PPE.

PURCHASING

Disposable PPE is purchased on an as-needed basis, with the purchase price charged directly to the project that is using the PPE. Disposable PPE includes such items as respirator cartridges, earplugs, nitrile gloves, dust masks, and Tyvek suits. Integral's daily health and safety charge covers the costs of non-disposable PPE, such as rain gear, safety glasses, hardhats, air purifying respirators, steel shank boots, and steel-toed boots. These items require preauthorization by an Integral office manager and are to be charged directly to the health and safety overhead charge number (OH26).

SAFETY GUIDELINE SG-13

SAFE WORK PRACTICES

Safe work practices can help reduce exposure of field personnel to hazardous materials in the work place. The following safe work practices must be observed by Integral field personnel for all field activities:

- All personnel will behave in a professional manner at all times.
- No personnel will be allowed to participate in field activities at potential hazardous materials sites without proper training, equipment, and identification (see safety guideline SG-07, "Site Control").
- All personnel will follow procedures established in safety guideline SG-13 and the site-specific health and safety plan. Personnel will also comply with facility or contractual procedures, where appropriate. Any field person who fails to comply with established procedures will be dismissed from the site.
- Working under the influence of drugs or alcohol is strictly prohibited. Field personnel should consult with their physician regarding use of any prescription medications while engaged in field activities at hazardous materials sites.
- Possession or use of firearms, ammunition, fireworks, or explosives is prohibited.
- Climbing, riding, or standing on heavy equipment or machinery is prohibited, unless seats, platforms, or ladders are provided for that purpose.
- The buddy system will be used during all field activities or work in remote areas (see SG-07). In some situations, this requirement may be satisfied by using site personnel, radios or cellular phones to provide emergency communications.
- No person will eat, drink, or chew gum or tobacco in potentially contaminated areas. Drink containers and drinking of replacement fluids for heat stress control will be allowed only in areas that are free from contamination (i.e., designated areas within the contamination reduction zone, support areas, or offsite).
- Smoking is prohibited in all areas of the site.
- The number of personnel and the amount of equipment in contaminated areas should be minimized.

- Contact with contaminated or potentially contaminated materials should be avoided. Support activities (including sample processing and decontamination) should be placed upwind of contamination sources. Field personnel should avoid walking through puddles, across stained soils, or through other potentially contaminated areas.
- Personnel should not climb on drums or other containers, unless the container is designed for that purpose (e.g., Baker tanks with handrails).
- Proper decontamination procedures must be followed before leaving the site (possible exceptions include medical or other emergency situations).
- Field instruments, notebooks, and other equipment must be decontaminated prior to being removed from potentially contaminated areas. Where possible, these items should be wrapped in plastic or otherwise protected from contamination.
- Long hair will be secured away from the face so it does not interfere with respirator fit or become entangled in machinery.
- All personnel leaving potentially contaminated areas will shower (including washing hair) and change into clean clothing as soon as possible after leaving the site.
- It is incumbent on the employer (Integral safety management) to maintain a list of all hazardous chemicals on a job site. This includes maintaining safety data sheets on all hazardous chemicals in office settings as well as those on field projects. A list of hazardous chemicals is also maintained in all health and safety plans drafted for field work. Labels and other forms of warning documentation will be kept in good order on the chemical containers at all times and will not be removed nor will be defaced. The employer and Integral staff shall not remove or deface incoming containers of hazardous chemicals.

SAFETY GUIDELINE SG-16

OVERWATER SAFETY

Integral field projects may require the collection of biological, sediment, and water samples from vessels. In addition to the physical and chemical hazards associated with all field sampling, there are special hazards associated with work on board sampling vessels. Safety guideline SG-16 presents policies and procedures for ensuring the safety of Integral field personnel while engaged in overwater activities.

At a minimum, the Integral overwater safety policy provides for training, appropriate equipment, hazard recognition, and establishment of emergency procedures. These procedures address inland or protected waters only. Additional procedures must be developed for working on vessels offshore.

TRAINING

Appropriate training is essential to prevent accidents and ensure the proper completion of field duties. The following training requirements apply to all Integral fieldwork conducted on the water:

- All Integral and subcontractor personnel must participate in project-specific safety meetings.
- If the project is a potential hazardous materials site, all personnel must complete the 40-hour hazardous waste operations and emergency response (HAZWOPER) health and safety training, and at least one person must have Occupational Safety and Health Administration (OSHA) supervisor training.
- All Integral field personnel must have completed training in first aid and cardiopulmonary resuscitation.
- Vessel operators must demonstrate proficiency in the operation of that type of vessel and knowledge of overwater safety and navigation rules, or may be required to complete training in these subjects according to state law.

SAFETY EQUIPMENT

To prevent accidents and ensure adequate preparation for emergencies that may arise, the following safety equipment must be provided for all overwater operations:

- U.S. Coast Guard (USCG)–approved personal flotation devices (PFDs)—There must be one PFD for every person on board the vessel, plus a throwable device on board vessels greater than 16 ft in length.
- Fire extinguisher—Requirements vary, depending on the vessel's length and if the vessel has enclosed or inboard engines.
- First-aid kit—Kits must be provided for all Integral fieldwork.
- Marine radio with weather channel—A VHF radio with weather channel is required for commercial vessels and by Integral for fieldwork on most inland waters.
- Cellular telephone—If a two-way radio is not available, then a cellular telephone must be on board.
- Horn or bell—USCG regulations require that a signaling device be on board all vessels longer than 36 ft and require that all vessels, regardless of length, be capable of making audible signals during certain events (i.e., approaching or overtaking other vessels). Integral requires a horn or bell on all vessels, regardless of length.
- Navigation lights—The requirements for navigation lights vary based on the length and type of vessel. All vessels operated at night must have the appropriate navigation lights.
- Oars or paddles—Small power boats must be equipped with alternate means of propulsion.
- Anchor and suitable line—In most cases, vessels should be equipped with two anchor types and sufficient anchor line for expected water depths plus rode and bottom conditions.
- Reach pole or shepherd's hook—On larger vessels (i.e., greater than 36 ft in length), a reach pole or shepherd's hook should be available to rescue anyone who falls overboard.
- Other rescue gear—On larger vessels, a block and tackle or other means must be available to pull a person from the water.

HAZARDS AND PREVENTION

There are numerous physical hazards associated with working on board a vessel. Potential hazards and appropriate precautions are listed below:

- Slips/trips/falls—The combination of a moving vessel and wet or slippery decks increases the potential for slips, trips, or falls. Onboard personnel can prevent these by increasing their awareness of the surroundings, keeping one hand free for handholds and support, keeping the deck and working areas clear of unnecessary obstacles or hazards, and wearing nonskid boots or shoes.

- Drowning—Even the best swimmer can drown if caught unprepared, tired, or weighed down with bulky clothing and boots. Drowning can be prevented by taking precautions against falling overboard (avoid reaching over the side; beware of slips, trips, and falls; avoid on-deck work in heavy seas) and by wearing a USCG-approved PFD. PFDs should be worn underneath chemical protective equipment such as Tyvek® coveralls (thus allowing the wearer to remove the coveralls without first removing the PFD and minimizing potential contamination) and should be properly secured or buckled.
- Crushing/falling objects—The use of hoists to lift coring tools and other equipment could result in crushing or other injuries to field personnel. These injuries can be avoided by using properly adjusted and maintained hoists, allowing only experienced personnel to operate the hoist, keeping all personnel out of the way during lifting and hoisting, and wearing hardhats to protect against head injuries or bumps.
- Gear deployment and retrieval—The deployment and retrieval of sampling gear presents a hazard because of the weight of the gear, its suspension over the deck, and the risk of entanglement or accidental and premature release or closure. Setting the triggering mechanism must always be performed when the equipment is resting on a stable surface. During sample retrieval, at least one crew member is required to watch for the appearance of the sampling gear and alert the winch operator (e.g., yell "sight"). Failure to observe the sampling gear and stop the winch could lead to cable breakage, loss of sampling gear, and possible injury from either the falling gear or the end of the broken cable. All nonessential personnel should stay clear of the work area during the retrieval and deployment of sampling gear. All personnel should be knowledgeable in the proper hand signals for guiding the winch operator.
- Cables—After repeated use, stainless steel cables may fray or break. Sampling personnel must never take hold of the moving cable unless they are wearing work gloves. Periodically during the sampling event, the site safety officer (SSO) should inspect the cable for wear, especially where the wire or cable is attached to the sampling equipment. If a cable is frayed, an onsite evaluation should be made to determine if the damaged section needs to be cut off or the entire cable replaced.
- Climate—Depending on weather conditions, field personnel may suffer from hypothermia, dehydration, or heat stress. Climate-related illnesses and injuries can be prevented by dressing appropriately for the expected weather and by having additional clothing on board should personnel get wet or the weather change suddenly. When working in cold, wet weather, appropriate clothing may include raingear, wool, and modern synthetics. Cotton clothing should only be worn during warm, dry weather. In addition, fluid replenishment beverages (to protect against heat stress and dehydration) or warm beverages (to protect against hypothermia) should be available during fieldwork. In extreme climates, survival suits, use-tested prior to the project, may be required.

- Unsecured gear—Wherever possible, all on-deck sampling and safety gear should be secured to a deck, rail, or bulkhead to prevent loss from unexpected movement caused by wind or waves.
- Hatches—All personnel should be alerted to the presence of an open hatch; hatches should not be left open unnecessarily.
- Chemical and sample storage—To prevent fire, health hazards, or sample contamination, all field chemicals such as solvents and formalin should be stored in secured boxes or appropriately ventilated cabinetry on deck—not in the cabin, hold, or near samples. Solvents must be recapped immediately after use.

SAMPLING VESSEL OPERATIONS

Physical hazards associated with the deployment and retrieval of sampling equipment from a sampling vessel result from the equipment's weight and the method of deployment. Only trained personnel may deploy and retrieve sampling gear. Under circumstances of potentially dangerous waves or winds, the vessel pilot and field team leader must employ best professional judgment to ensure safe field operations.

To avoid injuries from heavy equipment, personnel must wear steel-toed boots when on the work deck or loading/unloading heavy equipment from the vessel. Hard hats must be worn by personnel on the work deck, because of the proximity of overhead gear. Sample handling equipment, containers, deck lines, hydraulic cables, and water hoses not in immediate use must be kept clear of walkways and work areas until needed. Each time sampling operations at a given location have been completed, excess sediment on the deck should be washed off onto the sampling location or, if specified in the field sampling plan (depending the anticipated level of contamination), containerized in U.S. Department of Transportation–approved 55-gallon drums. These procedures are in place to 1) prevent personnel from slipping, 2) minimize personnel exposure to potentially contaminated sediment, and 3) limit cross-contamination between sampling locations.

USCG-approved PFDs must be provided for and worn by all personnel working on the deck, or as directed by the Integral SSO or vessel operator. The vessel must also be equipped with throwable life rings, fire extinguishers, and warning horns. All crew members will be briefed on the location of this equipment prior to initiation of the sampling event.

SMALL CRAFT OPERATION

An increased level of protection may be required on small boats (i.e., length 20 ft or less), depending on boat size and location in the river. Small boat procedures will include all the requirements listed above. In addition, all personnel on board are required to wear USCG-approved PFDs at all times. Any Integral staff or subcontractors operating small watercraft

must have completed a USCG Auxiliary *Boating Safely* course and have a demonstrated knowledge of the safe handling of these craft.

U.S. COAST GUARD NOTIFICATION

If required for the body of water that will be sampled, the USCG will be notified of the schedule and scope of the overwater sampling work. If the USCG deems a notice to other mariners to be necessary, then information will be provided by Integral to the USCG to make barge and other river traffic aware of the sampling activities.

EMERGENCY PROCEDURES

In case of a boating-related injury or fatality, Integral field personnel must perform the following actions:

- Notify emergency medical or rescue personnel immediately (the USCG emergency frequency is VHF channel 16).
- Be knowledgeable of when and how to use flares to signal Mayday or SOS.
- Notify the SSO, the appropriate Integral project manager, and the corporate health and safety manager (CHSM) immediately. The project manager and CHSM will coordinate notifying OSHA and the USCG, as appropriate.

In case of boating-related property damage, Integral field personnel must:

- Notify police or other legal jurisdictions (as appropriate).
- Notify the SSO, the appropriate Integral project manager, and the CHSM within 4 hours of the incident. The project manager and the CHSM will coordinate notifying the USCG.
- Notify the Integral contracts and risk manager to initiate insurance claims.

SAFETY GUIDELINE SG-26

COLD STRESS AND ADVERSE WEATHER CONDITIONS

Adverse weather conditions are an important consideration in planning and conducting site operations and field activities. Extreme weather can cause physical discomfort, loss of efficiency, and personal injury. Adverse weather conditions include heat (discussed in safety guideline SG-25), cold, and snow and electrical storms. The sections below provide information regarding work in cold environments and electrical storms.

COLD WEATHER

Performing field activities in cold climates may cause severe injury to the surface of the body or may result in profound generalized cooling (hypothermia) that can result in death. Work in cold climates may also increase physical hazards, such as slips/trips and vehicle accidents.

Frostbite is caused by the actual freezing of tissue and is usually caused by exposing skin to extremely cold temperatures. Frost nip or incipient frostbite is characterized by sudden blanching or whitening of the skin. With superficial frostbite, the skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient. Deep frostbite is an extremely serious injury, characterized by tissues that are cold, pale, and solid.

Hypothermia is the gradual lowering of the body temperature, which may result in loss of coordination, confusion, sleep, and death. Unlike frostbite, hypothermia may occur at temperatures above freezing. Symptoms are usually exhibited in five stages:

- Shivering
- Apathy, listlessness, sleepiness, and (sometimes) rapid cooling of the body to less than 95°F
- Glassy stare, slow pulse, slow respiratory rate, and unconsciousness
- Freezing of extremities
- Death.

Three factors influence the development of a cold injury: ambient temperature, wind velocity, and moisture. Wind chill is used to describe the chilling effect of moving air in combination with low temperatures. For example, an ambient temperature of 10°F with a wind of 15 mph has the equivalent chilling effect of still air at -18°F. Additionally, water conducts heat 240 times faster than air. Thus the body cools much faster when wearing damp or wet clothing.

Other cold-related hazards include slips and trips on snow-covered or frozen surfaces, falling through ice into lakes or ponds, and motor vehicle accidents. Cold weather also can hamper field operations by freezing decontamination solutions, and restricting the use of monitoring instruments (cold causes condensation to form on the lamps of photoionization detectors and can significantly reduce battery life).

Field personnel can implement many practices to prevent cold weather–related injuries or illnesses. Appropriate measures must be included in the site-specific health and safety plan. Precautionary measures include the following:

- Avoid work in adverse weather conditions.
- Dress warmly and stay dry, using rain gear and wool or synthetic insulated clothing (do not wear cotton).
- Provide warm liquids and shelter for breaks.
- Stay off frozen ponds or lakes.
- Exercise caution when walking on frozen or snow-covered surfaces.
- Obtain hot water for decontamination solutions.
- Provide portable heaters for decontamination.
- Provide shelter from wind or snow for field sampling activities.
- Select appropriate, well-maintained vehicles for winter driving (i.e., four-wheel-drive trucks with high clearance) and provide tire chains or other approved traction devices.
- Obtain appropriate emergency supplies when working in remote areas, including extra clothes, radio or cellular telephone, blankets, emergency shelter, food, and other survival supplies, as dictated by local terrain and climate.

ELECTRICAL STORMS

Lightening can pose a hazard during outdoor operations, especially for personnel handling metal equipment or working near drill rigs or other elevated equipment. To protect against this hazard, field personnel should observe local weather conditions and suspend field activities during electrical storms. Other precautions are as follows:

- Provide lightning protection on structures.
- Do not handle flammable liquids or gases during an electrical storm.
- If traveling by vehicle, stay inside the vehicle during an electrical storm.
- Do not use electrical equipment or telephones during electrical storms.

SAFETY GUIDELINE SG-40

STOP WORK POLICY

The following information supplements the 2018 Corporate Health and Safety Program Plan (CHSPP) maintained by Integral Consulting Inc. (Integral) supporting all employees and subcontractors.

The following points are additional to Section 2 of the CHSPP dealing with the Stop Work Policy.

- No staff within office or field operation settings should ever feel compromised in terms of personal safety or perceived safety issues that can potentially impact themselves, fellow Integral coworkers, subcontractors, or clients. Integral incorporates a no-questions-asked "Stop Work Policy" ("stop work") wherein all staff are trained upon orientation and follow-up safety reviews that they are empowered to stop work operations when safety concerns, real or perceived, arise.
- Reasons for staff to stop work include, but are not limited to, when there is uncertainty with regard to potential health and safety risks, or when risks are not clearly established or understood; when safety issues arise throughout any portion of the process; and personal discomfort.
- A stop work order can apply to any office or field operation and extends beyond Integral staff, to include subcontractors.
- The main steps for issuing a stop work order are the following:
  - Staff issues the stop work order to all involved parties ("stop")
  - The concerned staff member (or staff members) notifies the site safety officer (or office safety representative) of the issue ("notify"),
  - Safety management will work to directly correct the safety issue ("correct"), and then make the decision to resume operations when all are comfortable with actions taken to address the perceived safety issue ("resume").
- No work will resume until all issues and concerns are satisfactorily addressed for all staff members. Site safety officers or office safety representatives will confirm any safety issue concerns are addressed before operations resume.

- No staff, subcontractors included, will be reprimanded for exercising a stop work order, even if the perceived safety issue is mistaken judgment. Integral would rather staff be proactive in terms of safety concerns and not focus on reactive measures.
- All stop work intervention will be fully documented and the resulting stop work reports will be reviewed by the project manager as well as the corporate health and safety manager.
- In field operations, site safety officers will ensure all field operations cease when a staff member exercises a stop work order. The site safety officer will discuss the perceived safety issue with the staff member as well as the project manager, CHSM, and any other involved staff. Decisions will be made following the discussion whether the safety issue is resolved or if further action is necessary. Similarly, with office operations, the office safety representative will ensure involved office tasks are halted and a discussion will include the staff issuing the stop work order, the office manager, and (if needed) the CHSM. A decision will be made by the site health and safety representative if further action is required to address the perceived safety issue.
- Finally, it is important to stress the necessity of the project supervisor and the CHSM to follow up with relevant staff after a stop work order has been initiated and also after the stop work case has been closed to ensure full understanding of any potential safety concerns.

ATTACHMENT 6

EMERGENCY RESPONSE PLAN

Appendix C

River Flow Velocity Monitoring
Emergency Response Plan

Appendix C.
Emergency Response Plan—
River Flow Velocity Monitoring Work Plan

This River Flow Velocity Monitoring Emergency Response Plan (ERP) describes actions that must be taken in response to a release (as defined by 40 C.F.R. Part 302.3 and the Comprehensive Environmental Response, Compensation and Liability Act [CERCLA] Section 101(22)) or emergency event associated with the work described in the River Flow Velocity Monitoring Work Plan, to which this ERP is appended.

Emergency Incident Contact

The person responsible for responding in the event of an emergency incident is the Orrington Reach Site Safety Officer, Frank Spada (work: 831.576.2880, cell: 805.637.5514, email: fspada@integral-corp.com). Integral project manager Sara Barbuto (work: (207.800.3803, cell: 860.705.0620, email: sbarbuto@integral-corp.com) will be available for in-office support during field activities.

The Orrington Reach Site Safety Officer is required to immediately notify the Remediation Trust's Program Manager, Lauri Gorton (cell: 414.732.4514, email: lg@g-etg.com) in the event of release or emergency.

Meeting with Local Community

Given the limited nature of the field effort for river flow velocity data collection, a meeting will not be held with the local community prior to deployment of the velocity monitoring platform. In the unlikely event that an emergency response is triggered by implementation of the velocity monitoring work, the Remediation Trust will provide information to community members.

Spill Prevention, Control, and Countermeasures Plan

No oil or materials will be sampled or transported during implementation of the velocity monitoring that might fall under 40 C.F.R. Part 112, *Oil Pollution Prevention.* Smaller quantities of fuels, oils, and greases will be used on the velocity monitoring deployment/retrieval vessel. A spill response kit will be stored on the vessel to clean up any leaks or spills of petroleum products. Release reporting, if necessary, will follow the requirements in the following section.

No investigation-derived waste will be generated during river flow velocity data collection.

Release Reporting

Release reporting will be conducted to meet all federal, state, and local regulations. In addition, upon the occurrence of any event during performance of the activities described in the River Flow Velocity Monitoring Work Plan, the following actions will be taken:

- Immediately report pursuant to Section 103 of CERCLA, 42 U.S.C. § 9603, or Section 304 of the Emergency Planning and Community Right-to-Know Act (EPCRA), 42 U.S.C. § 11004.
- Immediately notify the Remediation Trust and follow all verbal notifications to the Remediation Trust with a written summary detailing the release event, the initial response, and any communications made by the contractor.
- The Remediation Trust will immediately notify the appropriate state and federal regulatory agencies orally and notify the Beneficiaries and the Trustees orally or by electronic mail.

For any event requiring release reporting, the Contractor (Integral) must provide the Remediation Trust with the following information:

1. Within 2 days after the onset of such event, submit a report describing the actions or events that occurred and the measures taken, and to be taken, in response thereto; and
2. Within 10 days after the conclusion of such event, submit a report describing all actions taken in response to such event. The report must include all information required for reporting under CERCLA § 103 or EPCRA § 304.

Emergency Response and Reporting

Emergency response and reporting will be conducted in accordance with all federal, state, and local regulations. In addition to all applicable regulatory requirements, the Contractor (Integral) shall respond to any event that occurs during performance of activities associated with the river velocity flow monitoring that causes or threatens to cause a release of Waste Material[1] on, at, or from the work site and that either constitutes

[1] It is not anticipated that river flow velocity monitoring instrument platform deployment or retrieval will result in release of Waste Material. Waste Material is defined in the Consent Decree as 1) any "hazardous substance" under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14); 2) any pollutant or contaminant under Section 101(33) of CERCLA, 42 U.S.C. § 9601(33); 3) any "solid waste" under Section 1004(27) of RCRA, 42 U.S.C.§ 6903(27); and

an emergency situation or that may present an immediate threat to public health or welfare or the environment, as follows:

1. Immediately take or direct all appropriate action to prevent, abate, or minimize such release or threat of release.
2. Immediately notify the appropriate state and federal regulatory agencies orally as well as the Remediation Trust and provide a summary of the situation to allow the Remediation Trust to make other required notifications.
3. Take such actions in accordance with all applicable provisions of the HASP and this ERP.

All oral notifications made to state and federal regulatory agencies pursuant to the Emergency Response and Reporting provisions herein must be followed up in writing within 48 hours of issuance to document the time, date, nature, and content of the oral notification that was provided and as described below:

1. Within 5 days after the onset of such event, submit a report to the Remediation Trust describing the actions or events that occurred and the measures taken, and to be taken, in response thereto; and
2. Within 10 days after the conclusion of such event, submit a report to the Remediation Trust describing all actions taken in response to such event. This reporting requirement is in addition to any other reporting required by federal, state, or local regulations. The report must include all information necessary to satisfy required reporting under CERCLA § 103 or EPCRA § 304.

4) any "hazardous substance" under the Maine Uncontrolled Hazardous Substance Sites Law, Me. Rev. Stat. tit. 38, §§ 1361-71.