June 19, 2015

Addendum to the Deepwater Sediment Sampling to Assess Post-Spill Benthic Impacts from the Deepwater Horizon Oil Spill

Deepwater Benthic Communities Technical Working Group

June 19, 2015

1.0 Background and Objectives:

Beginning in 2011, a cooperative effort was undertaken to help identify any potential impacts of the Deepwater Horizon oil spill on deepwater sediments and resident benthic fauna in support of the Natural Resource Damage Assessment (NRDA) injury-assessment process. The efforts were conducted pursuant to the cooperative work plan titled, *Deepwater Sediment Sampling to Assess Post-Spill Benthic Impacts from the Deepwater Horizon Oil Spill*, which was approved May 2011 (hereafter referred to as the "Deep Benthic Work Plan"). Broadly, the effort included the following three tasks:

1) Enumeration and identification of macrofauna and meiofauna in a selected number of sediment cores taken as part of the Response.
2) Planning and implementation of a field effort to collect additional sediment cores, which was implemented in 2011 on M/V *Sarah Bordelon* (Sarah Bordelon 9 cruise).
3) Analysis of sediment cores, including enumeration and identification of macrofauna and meiofauna and analysis of sediment chemistry (hydrocarbons, metals) and sediment properties (total carbon [TC], total organic carbon [TOC], total inorganic carbon [TIC], total nitrogen [TN], porewater chemistry, and grain size) in cores collected on the 2011 cruise.

This addendum to the above-mentioned work plan extends the efforts outlined within the original plan. In particular, it includes the following three tasks:

1) Enumeration and identification of macrofauna and meiofauna in a selected number of archived second-tier priority sediment cores taken as part of the Response in order to fill in spatial data gaps.
2) Planning and implementation of a follow-up field effort to be conducted during the summer of 2014.
3) Analysis of sediment cores, including enumeration and identification of macrofauna and meiofauna and analysis of sediment chemistry (hydrocarbons, metals), sediment toxicity, and sediment properties (TC, TOC, TIC, TN, and grain size) in cores to be collected on the 2014 cruise.

2.0 Methods and Approach:

The methods and approaches to be implemented pursuant to this addendum will be identical to those methods and approaches detailed in the original Deep Benthic Work Plan, with a few exceptions, which are detailed in the subsections below.

All materials associated with the collection or analysis of samples under these protocols or pursuant to any approved work plan, except those consumed as a consequence of the applicable sampling or analytical process, must and will be retained unless and until approval is given for their disposal in accordance with the retention requirements set forth in paragraph 14 of Pretrial Order #1, paragraph 6 of Pretrial Order #30, Pretrial Order #35 , the entirety of Pretrial Order #16 which details the retention of metadata, and any other applicable Court Orders governing tangible items that are or may be issued in MDL No. 2179 IN RE: Oil Spill by the Oil Rig "DEEPWATER HORIZON" (E.D. LA 2010). Such approval to dispose must be given in writing and by a person authorized to direct such action on behalf of the state or federal agency whose employees or contractors are in possession or control of such materials.

This addendum will be implemented consistent with existing Trustee regulations and policies. All applicable state and federal permits must and will be obtained prior to conducting work.

2.1 Second-tier Priority Response Cores:

The Deep Benthic Work Plan identified 65 priority cores taken as part of the Response effort for analysis. To further the understanding of the potential spatial extent of impacts to the sediment infauna community attributable to the spill, approximately 42 second-tier priority samples from the Response have been identified for analysis under this addendum. These samples are indicated in Appendix A. These samples will be analyzed in a manner consistent with the methods detailed in the original Deep Benthic Work Plan.

2.2 2014 Field Effort:

The 2014 follow-up field effort will occur on two cruise legs that target 131 stations for sediment sampling (Table 1), using the same type of 12-core multicorer as used previously. The following four types of stations will be visited:

- Single drop multicorer sampling for benthic infauna, sediment chemistry, and sediment properties (Table 1A).
- Triplicate drop multicorer sampling for benthic infauna, sediment chemistry, sediment properties, and sediment toxicity (Table 1B).
- Triplicate drop multicorer and triplicate drop box corer sampling for benthic infauna, sediment chemistry, sediment properties. Samples for sediment toxicity testing will be collected from the multicorer only (Table 1C).
- Single drop multicorer sampling for sediment chemistry and sediment properties (Table 1D).

Seventy-two of the 131 stations will be sampled for analysis of benthic infauna, sediment chemistry, and sediment properties. Forty-nine of the 72 stations will be sampled using single drops of the multicorer. Twenty-three of the 72 stations will be sampled using triplicate multicorer drops, and analyses at these stations will also include sediment toxicity. Of the 23 triplicate drop multicorer stations, 8 stations will also be sampled with triplicate drops of a 0.2-m^2 GOMEX box corer. Box core samples will be analyzed for benthic infauna, sediment chemistry, and sediment properties.

Fifty-nine of the 131 stations will be sampled with single drops of the multicorer for analysis of only sediment chemistry and sediment properties (Table 1D). No samples for macrofauna, meiofauna, or toxicity analysis will be collected at these stations. Chemistry-only stations are located southwest of Biloxi Dome and in the De Soto Canyon area at randomly selected locations within each grid cell of a regularly spaced grid (3 km × 3 km for the area southwest of Biloxi Dome; 15 km × 15 km for De Soto Canyon). A small number of non-random, targeted stations are also included in these areas.

The methods and approaches to be implemented on the 2014 follow-up field effort will be identical to those relevant methods and approaches detailed in the original Deep Benthic Work Plan, with the following exceptions:

- Porewater ammonia will not be measured. On the Sarah Bordelon 9 cruise, porewater ammonia was measured on deck after retrieval of the sediment cores.
- No samples will be sent for DOSS analysis.
- Only one multicorer drop will be performed at the majority of locations that include infauna analysis, as opposed to three per location, as was done on the 2011 cruise. Although three replicates (independent multicorer drops) were collected at each sampling location on the Sarah Bordelon 9 cruise, the 2014 field effort will only collect one multicorer replicate per location at a large number of locations in order to maximize spatial coverage in the context of the normal logistical constraints of performing deep sea sampling. The exception to this will be for a series of 23 stations at which triplicate drops will be performed (see Table 1).
- At the majority of stations, only the top 10 cm of cores for macrofauna and the top 3 cm of cores for meiofauna will be collected; these sections will be sliced horizontally into the following subsections:
    - Macrofauna: 0-3 cm, 3-5 cm, and 5-10 cm
    - Meiofauna: 0-1 cm and 1-3 cm.

  Because a decision was made not to analyze deeper sections of cores collected during the Sarah Bordelon 9 cruise, such deeper sections will not be collected in the 2014 field effort, with the exception being samples collected for purposes of the sampling equipment comparison effort, which will be collected and analyzed down to the 15-cm depth, as detailed in the bullet below.
- As part of a sampling equipment comparison effort, eight stations will be sampled using triplicate drops with the multicorer as well as triplicate drops using a 0.2-m^2 GOMEX box corer (Table 1C). GOMEX box corer samples will be collected and processed

according to the methods used by Rowe and Kennicutt (2009) (Appendix B). Multicore samples will be analyzed to 15 cm for these stations, because that is the depth at which Rowe and Kennicutt sampled.

- At sediment chemistry stations (Table 1D) visited on Leg 2 of the cruise, only the top 3 horizontal depth horizons (0–1 cm, 1–3 cm, and 3–5 cm) will be analyzed for sediment chemistry (metals, hydrocarbons); the 5–10 cm depth horizon will be archived at least initially, but may be analyzed at a later date, and the 10–15 cm depth horizon will not be collected for chemistry analysis.
- Sediment samples for toxicity analysis will be collected according to the procedures outlined in Appendix C of this addendum at each of the 23 stations at which triplicate drops of the multicorer will be performed.
- Quality control samples (i.e., field blanks and equipment rinsate blanks) will be collected as outlined in Appendix D of this addendum.

The latitude, longitude, and depth of the target sampling locations for 2014 are listed in Table 1. A map of these locations is provided in Figure 1. The cruise will be conducted on the Adriatic Marine M/V *Irish*, with the first leg beginning on May 28, 2014.

Table 1. List of sampling locations for Leg 1 and Leg 2 of the DWH/NRDA soft-bottom deep-benthic research cruise in summer 2014.

Station	Latitude	Longitude	Type	Depth (m)	Sample Types	Equipment Type	Total Number of Gear Drops	Cruise Leg	Destination Laboratories for Analysis of Infauna
Table 1A									
2.21	28.7847	-88.453846	Chemistry and Infauna	1359	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
1.01	28.739144	-88.468292	Chemistry and Infauna	735	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
2.23	28.874447	-88.622432	Chemistry and Infauna	630	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
ALTFF012	28.297308	-88.636311	Chemistry and Infauna	1738	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
D007S	28.086583	-88.516989	Chemistry and Infauna	2052	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
D009S	28.833163	-87.868325	Chemistry and Infauna	1921	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
D010S	28.570086	-88.32335	Chemistry and Infauna	1884	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
D012S	28.6724	-88.2339	Chemistry and Infauna	1819	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
D014S	28.5654	-88.4481	Chemistry and Infauna	1760	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
D015S	28.293817	-88.460031	Chemistry and Infauna	1576	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
D017S	28.473367	-88.478325	Chemistry and Infauna	1712	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
D019S	28.672787	-88.368802	Chemistry and Infauna	1662	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
D024S	28.774613	-88.167853	Chemistry and Infauna	1709	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
D034S	28.73484	-88.362211	Chemistry and Infauna	1561	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
D042S	28.742302	-88.370713	Chemistry and Infauna	1499	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
D043S	28.988977	-87.93454	Chemistry and Infauna	1499	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
D050S	28.792493	-88.348558	Chemistry and Infauna	1440	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
D057S	28.549282	-88.677556	Chemistry and Infauna	1364	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
D062S	28.265489	-88.923301	Chemistry and Infauna	1313	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
D067S	29.139347	-87.364935	Chemistry and Infauna	1162	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
D068S	28.710903	-88.748325	Chemistry and Infauna	1172	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
D069S	29.049605	-88.070383	Chemistry and Infauna	1114	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
D070S	28.949605	-88.170375	Chemistry and Infauna	1074	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR

Station	Latitude	Longitude	Type	Depth (m)	Sample Types	Equipment Type	Total Number of Gear Drops	Cruise Leg	Destination Laboratories for Analysis of Infauna
D072S	28.613457	-88.857355	Chemistry and Infauna	1085	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
D077S	28.969724	-88.313665	Chemistry and Infauna	1005	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
D094S	29.335197	-87.046351	Chemistry and Infauna	668	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
FF005	28.803038	-88.56481	Chemistry and Infauna	1000	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
FF010	28.667819	-88.430058	Chemistry and Infauna	1358	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
LBNL10	28.415556	-88.704154	Chemistry and Infauna	1408	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
LBNL11	28.345175	-88.778517	Chemistry and Infauna	1438	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
LBNL14	28.730118	-88.417347	Chemistry and Infauna	1514	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
LBNL17	28.696626	-88.385168	Chemistry and Infauna	1616	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
LBNL3	28.705242	-88.402027	Chemistry and Infauna	1587	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
LBNL7	28.639087	-88.471193	Chemistry and Infauna	1557	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
LBNL9	28.51404	-88.600484	Chemistry and Infauna	1521	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
MF001	28.878098	-88.261856	Chemistry and Infauna	1200	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
MC294-1	28.673788	-88.488176	Chemistry and Infauna	1452	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	2	TAMU/UNR
MC338-1	28.662897	-88.496843	Chemistry and Infauna	1508	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	2	TAMU/UNR
MC339-1	28.644067	-88.456685	Chemistry and Infauna	1438	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	2	TAMU/UNR
MF002	28.824227	-88.200429	Chemistry and Infauna	1350	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
MF003	28.648855	-88.655421	Chemistry and Infauna	1250	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
MF004	28.593	-88.522	Chemistry and Infauna	1706	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
MF005	28.44153	-88.292254	Chemistry and Infauna	1950	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
NF009	28.738093	-88.39746	Chemistry and Infauna	1495	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
NF011	28.765173	-88.366656	Chemistry and Infauna	1440	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
NF013	28.73887	-88.335635	Chemistry and Infauna	1569	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR
VK785-1	29.209748	-87.847361	Chemistry and Infauna	566	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	2	TAMU/UNR
VK870-1	29.114648	-87.972035	Chemistry and Infauna	935	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	2	TAMU/UNR
VK916	29.106744	-87.888737	Chemistry and Infauna	1132	CN, Grain, HC, Macro, Meio, Metals	Multicorer	1	1	TAMU/UNR

Station	Latitude	Longitude	Type	Depth (m)	Sample Types	Equipment Type	Total Number of Gear Drops	Cruise Leg	Destination Laboratories for Analysis of Infauna
Table 1B									
ALTNF001	28.734453	-88.370188	Triplicate Multicorer	1553	CN, Grain, HC, Metals, Tox, Macro, Meio	Multicorer	3	1	TAMU/UNR-Rep1, BVA-Reps2&3
ALTNF015	28.709752	-88.366437	Triplicate Multicorer	1615	CN, Grain, HC, Metals, Tox, Macro, Meio	Multicorer	3	1	TAMU/UNR-Rep1, BVA-Reps2&3
D031S	28.731676	-88.358897	Triplicate Multicorer	1585	CN, Grain, HC, Metals, Tox, Macro, Meio	Multicorer	3	1	TAMU/UNR-Rep1, BVA-Reps2&3
D040S	28.742285	-88.362701	Triplicate Multicorer	1517	CN, Grain, HC, Metals, Tox, Macro, Meio	Multicorer	3	1	TAMU/UNR-Rep1, BVA-Reps2&3
D044S	28.744524	-88.374421	Triplicate Multicorer	1491	CN, Grain, HC, Metals, Tox, Macro, Meio	Multicorer	3	1	TAMU/UNR-Rep1, BVA-Reps2&3
LBNL1	28.731803	-88.3766	Triplicate Multicorer	1565	CN, Grain, HC, Metals, Tox, Macro, Meio	Multicorer	3	1	TAMU/UNR-Rep1, BVA-Reps2&3
LBNL4	28.687908	-88.418396	Triplicate Multicorer	1433	CN, Grain, HC, Metals, Tox, Macro, Meio	Multicorer	3	1	TAMU/UNR-Rep1, BVA-Reps2&3
NF008	28.719989	-88.388758	Triplicate Multicorer	1591	CN, Grain, HC, Metals, Tox, Macro, Meio	Multicorer	3	1	TAMU/UNR-Rep1, BVA-Reps2&3
NF010	28.757216	-88.388696	Triplicate Multicorer	1440	CN, Grain, HC, Metals, Tox, Macro, Meio	Multicorer	3	1	TAMU/UNR-Rep1, BVA-Reps2&3
NF014	28.719982	-88.34464	Triplicate Multicorer	1588	CN, Grain, HC, Metals, Tox, Macro, Meio	Multicorer	3	1	TAMU/UNR-Rep1, BVA-Reps2&3
B0412	28.667025	-88.590828	Triplicate Multicorer	1408	CN, Grain, HC, Metals, Tox, Macro, Meio	Multicorer	3	2	TAMU/UNR-Rep1, BVA-Reps2&3
B0413	28.703402	-88.530008	Triplicate Multicorer	1350	CN, Grain, HC, Metals, Tox, Macro, Meio	Multicorer	3	2	TAMU/UNR-Rep1, BVA-Reps2&3
DSH08	29.122783	-87.867733	Triplicate Multicorer	1136	CN, Grain, HC, Metals, Tox, Macro, Meio	Multicorer	3	2	TAMU/UNR-Rep1, BVA-Reps2&3
DSH10	28.97905	-87.891617	Triplicate Multicorer	1516	CN, Grain, HC, Metals, Tox, Macro, Meio	Multicorer	3	2	TAMU/UNR-Rep1, BVA-Reps2&3
PCB06	29.1227	-87.266217	Triplicate Multicorer	1014	CN, Grain, HC, Metals, Tox, Macro, Meio	Multicorer	3	2	TAMU/UNR-Rep1, BVA-Reps2&3
Table 1C									
FFMT3	28.21861	-89.491843	Multicorer/Box Corer	998	CN, Grain, HC, Metals, Tox, Macro, Meio	Box Corer and Multicorer	6	1	TAMU/UNR

Station	Latitude	Longitude	Type	Depth (m)	Sample Types	Equipment Type	Total Number of Gear Drops	Cruise Leg	Destination Laboratories for Analysis of Infauna
FFMT4	27.828145	-89.164753	Multicorer/Box Corer	1410	CN, Grain, HC, Metals, Tox, Macro, Meio	Box Corer and Multicorer	6	1	TAMU/UNR
HIPRO	28.551521	-88.579092	Multicorer/Box Corer	1578	CN, Grain, HC, Metals, Tox, Macro, Meio	Box Corer and Multicorer	6	2	TAMU/UNR
NF006MOD	28.744784	-88.359812	Multicorer/Box Corer	1517	CN, Grain, HC, Metals, Tox, Macro, Meio	Box Corer and Multicorer	6	2	TAMU/UNR
NF012	28.757857	-88.344246	Multicorer/Box Corer	1528	CN, Grain, HC, Metals, Tox, Macro, Meio	Box Corer and Multicorer	6	2	TAMU/UNR
S36	28.918526	-87.672135	Multicorer/Box Corer	1835	CN, Grain, HC, Metals, Tox, Macro, Meio	Box Corer and Multicorer	6	2	TAMU/UNR
S37/D002S	28.556952	-87.760436	Multicorer/Box Corer	2401	CN, Grain, HC, Metals, Tox, Macro, Meio	Box Corer and Multicorer	6	2	TAMU/UNR
021	28.737806	-88.386371	Multicorer/Box Corer	1528	CN, Grain, HC, Metals, Tox, Macro, Meio	Box Corer and Multicorer	6	2	TAMU/UNR
Table 1D									
DC12-1	28.976943	-87.371017	Chemistry Only	1365	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
DC139-1	28.823351	-87.593	Chemistry Only	2185	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
DC142-1	28.823517	-87.461707	Chemistry Only	1562	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
DC186-1	28.765375	-87.443526	Chemistry Only	1478	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
DC190-1	28.799883	-87.232242	Chemistry Only	1017	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
DC223-1	28.729794	-87.790833	Chemistry Only	2166	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
DC278-1	28.698373	-87.25706	Chemistry Only	1066	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
DC316-1	28.671532	-87.54713	Chemistry Only	2101	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
DC48-1	28.899541	-87.762717	Chemistry Only	1849	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
DC5-1	28.941945	-87.697966	Chemistry Only	1792	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
DD626-1	29.345412	-87.276766	Chemistry Only	603	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
DD666-1	29.326213	-87.515144	Chemistry Only	492	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
DD753-1	29.236257	-87.573574	Chemistry Only	921	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
DD759-1	29.241917	-87.274062	Chemistry Only	815	CN, Grain, HC, Metals	Multicorer	1	2	-NA-

Station	Latitude	Longitude	Type	Depth (m)	Sample Types	Equipment Type	Total Number of Gear Drops	Cruise Leg	Destination Laboratories for Analysis of Infauna
DD837-1	29.129843	-87.758791	Chemistry Only	1269	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
DD846-1	29.145796	-87.27956	Chemistry Only	993	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
DD885-1	29.07078	-87.549781	Chemistry Only	1435	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
DD887-1	29.103227	-87.437299	Chemistry Only	1425	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
DD971-1	29.010556	-87.635319	Chemistry Only	1696	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
DD975-1	29.023966	-87.436114	Chemistry Only	1578	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC248-1	28.733189	-88.575593	Chemistry Only	1083	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC249-1	28.735043	-88.540241	Chemistry Only	1169	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC250-1	28.734046	-88.500683	Chemistry Only	1382	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC250-2	28.721285	-88.485336	Chemistry Only	1395	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC260-1	28.734159	-87.988416	Chemistry Only	2045	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC292-1	28.692632	-88.592607	Chemistry Only	1142	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC292-2	28.671537	-88.590896	Chemistry Only	1347	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC293-2	28.702856	-88.559701	Chemistry Only	1326	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC293-1	28.708008	-88.530121	Chemistry Only	1313	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC293-6	28.691867	-88.538811	Chemistry Only	1413	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC293-7	28.693965	-88.519041	Chemistry Only	1396	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC293-8	28.672216	-88.529051	Chemistry Only	1488	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC293-3	28.703305	-88.535125	Chemistry Only	1350	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC293-4	28.703566	-88.524894	Chemistry Only	1357	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC293-5	28.698898	-88.529708	Chemistry Only	1376	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC335-1	28.644802	-88.612633	Chemistry Only	1377	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC336-3	28.66751	-88.56776	Chemistry Only	1451	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC336-1	28.66698	-88.595943	Chemistry Only	1374	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC336-5	28.645593	-88.56974	Chemistry Only	1544	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC336-2	28.667125	-88.585713	Chemistry Only	1418	CN, Grain, HC, Metals	Multicorer	1	2	-NA-

Station	Latitude	Longitude	Type	Depth (m)	Sample Types	Equipment Type	Total Number of Gear Drops	Cruise Leg	Destination Laboratories for Analysis of Infauna
MC336-4	28.662516	-88.590638	Chemistry Only	1440	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC337-1	28.63167	-88.551259	Chemistry Only	1596	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC338-2	28.639173	-88.502809	Chemistry Only	1584	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC338-3	28.63352	-88.485452	Chemistry Only	1585	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC338-4	28.626597	-88.479009	Chemistry Only	1603	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC379-1	28.612744	-88.635383	Chemistry Only	1313	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC380-1	28.620524	-88.604777	Chemistry Only	1441	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC380-2	28.60644	-88.561998	Chemistry Only	1493	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC380-3	28.593686	-88.586416	Chemistry Only	1407	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC381-1	28.607001	-88.545045	Chemistry Only	1599	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC381-2	28.593297	-88.534358	Chemistry Only	1659	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC382-1	28.614367	-88.497201	Chemistry Only	1661	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC41-1	28.976706	-87.924716	Chemistry Only	1537	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC424-1	28.577287	-88.573641	Chemistry Only	1506	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC424-2	28.574066	-88.590386	Chemistry Only	1513	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC424-3	28.559036	-88.576615	Chemistry Only	1561	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC85-1	28.905383	-87.928631	Chemistry Only	1689	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC253-NESW1	28.748421	-88.359957	Chemistry Only	1499	CN, Grain, HC, Metals	Multicorer	1	2	-NA-
MC253-NESW5	28.74687	-88.360998	Chemistry Only	1502	CN, Grain, HC, Metals	Multicorer	1	2	NA

Notes

BVA:	Barry Vittor & Associates (macrofauna and meiofauna)
CN:	TC, TOC, TIC, TN
Grain:	Grain size
HC:	Hydrocarbons
Macro:	Benthic Macrofauna
Meio:	Benthic Meiofauna
TAMU/UNR:	Texas A&M University--Corpus Christi (macrofauna and sediment properties), University of Nevada Reno (meiofauna)
Tox:	Toxicity Testing - for multicorer stations only; box corers will not be used to collect samples for toxicity testing

2.3 Analysis of Sediment Cores Collected during the 2014 Field Effort:

2.3.1 Infauna Analysis:

Subsequent to the 2014 field collection effort, collected sediment infauna samples will be analyzed in a manner consistent with the methods detailed in the Deep Benthic Work Plan, with the following exception: some infauna samples will be split between Texas A&M University (TAMU)–Corpus Christi (macrofauna)/University of Nevada, Reno (UNR) (meiofauna) under Trustee contract, and Barry Vittor & Associates under contract to BP. The disposition for infauna samples is indicated in the last column of Tables 1A through 1C.

2.3.2 Other Sediment Analyses:

Subsequent to the 2014 field collection effort, collected sediment chemistry samples will be analyzed in a manner consistent with the methods detailed in the Deep Benthic Work Plan, with one exception. Toxicity samples collected from the triplicate drops of the multicorer will be sent to EEUSA under contract to BP for analysis. EEUSA will forward aliquots of the sediment being used for toxicity testing to Alpha Analytical and ALS Kelso for hydrocarbon and metals analysis, respectively.

2.4 Quality Assurance and Quality Control and Inter-laboratory Comparisons:

All analyses will be undertaken as described in the Deep Benthic Work Plan, with the exceptions noted above. All quality assurance and quality control (QA/QC) procedures will also be followed in accordance with the Deep Benthic Work Plan, with the following additions due to the use of multiple laboratories for infauna analyses:

- After analyses of macrofauna are completed at TAMU–Corpus Christi and meiofauna are completed at UNR, samples (i.e., processed animals[1]) from stations in Table 1B and Table 1C, will be sent to Barry Vittor & Associates for confirmation of taxonomic identification.

3.0 Milestones and Deliverables:

- Cruise Report: Within 6 weeks of cruise completion.
- Results from enumeration and identification of macrofauna and meiofauna, and related analyses from second-tier priority Response cores (from 2010 Gyre and Ocean Veritas cruises): Within 6 months of completion of the cruise.

[1] Individual animals from a given sediment sample will be grouped by family in a single, labeled vial. All of the vials containing animals from a given sample will be stored in the original sediment sample jar. In this way, the original sample jars with relevant sample information, containing vials of animals grouped and identified to the family level, will be shipped.

- Results from enumeration and identification of macrofauna and meiofauna, and related analyses from cores collected as part of the 2014 field effort: Approximately 1 year after cruise completion.
- Results from chemistry analyses from cores collected as part of the 2014 field effort: Within 6 months after cruise completion.
- Results from sediment properties analyses from cores collected as part of the 2014 field effort: Within 6 months after cruise completion.
- Results from sediment toxicity testing as part of the 2014 field effort: Within 6 months after cruise completion.

4.0 Key Personnel and Laboratories:

Key personnel and laboratories are listed below.

- **Project Management:** For the Trustees: Jeff Hyland (NOAA/NCCOS), Paul Montagna (TAMU–Corpus Christi), and Jeff Baguley (UNR) as co-Project Leads. For BP: Paul Boehm (Exponent), Ann Michelle Morrison (Exponent), and Tom Ginn (Exponent) as co-Project Leads.
- **Field Work:** Cynthia Cooksey (NOAA/NCCOS) and Jeff Baguley (UNR) will serve as Chief Scientist and 2nd Watch Leader on Leg 1 of the 2014 cruise. Karen Murray (Exponent) and Kirk O'Reilly (Exponent) will serve as Chief Scientist and 2nd Watch Leader on Leg 2 of the 2014 cruise.
- **Macrofauna Analysis:** Paul Montagna (TAMU–Corpus Christi) and Barry Vittor & Associates.
- **Meiofauna Analysis:** Jeff Baguley (UNR) and Barry Vittor & Associates.
- **Sediment Grain and Elemental C/N Analyses:** Paul Montagna (TAMU–Corpus Christi).
- **Sediment Hydrocarbon and Metal Chemistry Analysis:** Alpha Analytical and ALS-Kelso, respectively.

5.0 Safety Plans:

The ship's operational safety procedures will be followed at all times. All activities will follow the protocols of the cruise-specific Health and Safety Plan (Appendix E), which will be available on the vessel. MSDS hazardous materials sheets will be posted as well.

6.0 Protection of Sensitive Marine Species:

Best management practices for the protection of sensitive marine species will be employed at all times onboard the vessel. Best management practices are provided in Appendix F. If an accidental take of a protected species occurs, the accidental take procedures will be followed.

Accidental take materials are included in Appendix G, and will be made available onboard the vessel.

7.0 Data Sharing:

All data sharing will be conducted in accordance with the original Deep Benthic Work Plan, with the exceptions previously noted herein.

8.0 Costs:

The budget for this work plan is indicated in Table 2, below. The Parties acknowledge that this budget is an estimate, and that actual costs may prove to be higher due to a number of potential factors. As soon as factors are identified that may increase the estimated cost, BP will be notified and a change order provided describing the nature and cause for the increased cost in addition to a revised budget for BP's consideration and review. The project costs indicated below are to be submitted by the Trustees for reimbursement by BP.

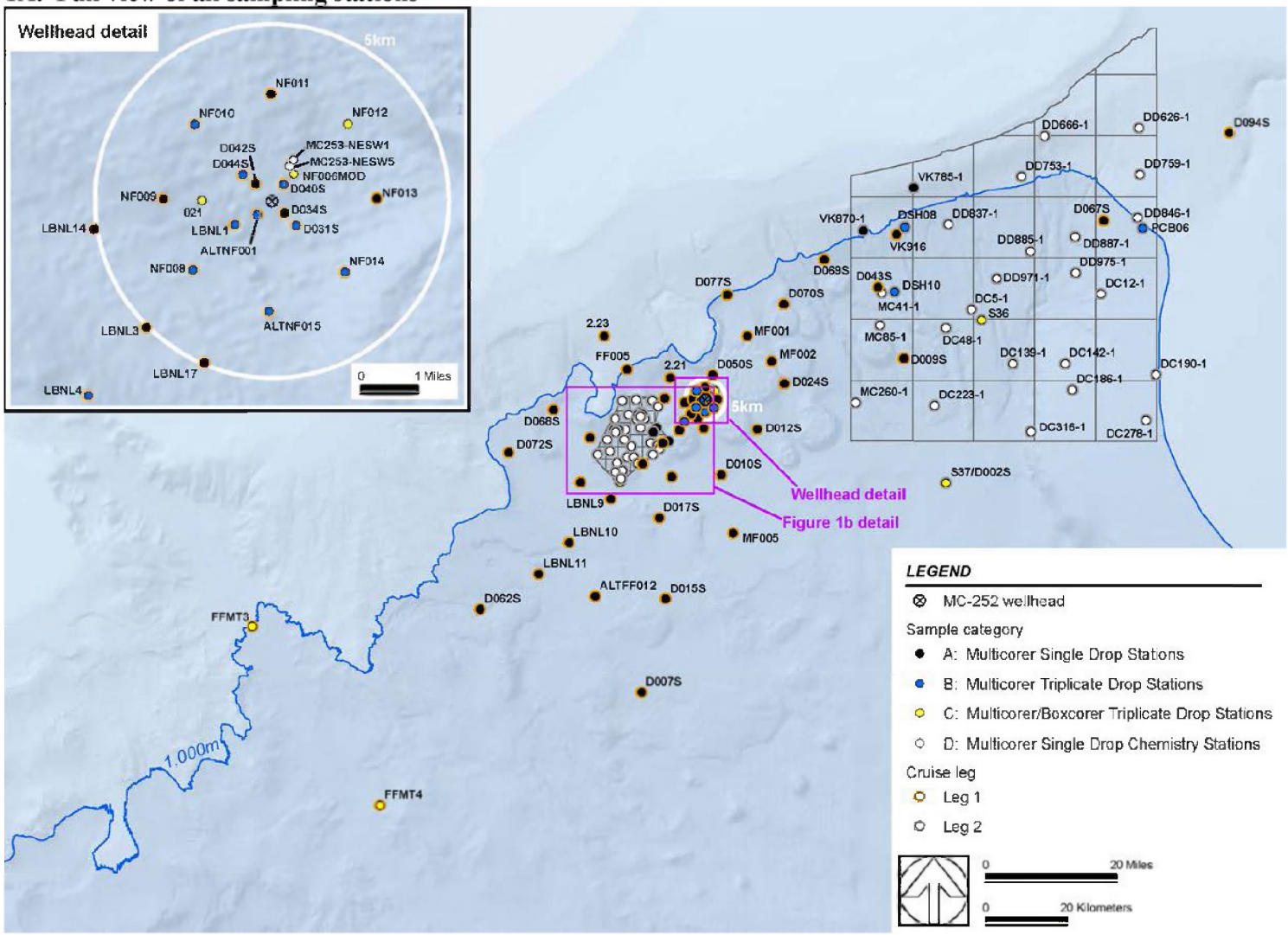
Table 2: Anticipated Budget

Item	Estimated Budget
Texas A&M Cruise Participation, Including Travel	$150,000
University of Nevada, Reno Cruise Participation, Including Travel	$100,000
NOAA Cruise Participation, Including Travel	$75,000
Texas A&M Macrofauna Identification and Enumeration of Response Cores	$500,000
University of Nevada Reno, Meiofauna Identification and Enumeration of Response Cores	$200,000
Texas A&M Macrofauna Identification and Enumeration of 2014 Cores, CHN, Solids Analysis	$950,000
University of Nevada, Reno Meiofauna Identification and Enumeration of 2014 Cores	$350,000
NOAA and Subcontractor Reporting and Analysis	$50,000
Total*	**$2,375,000**

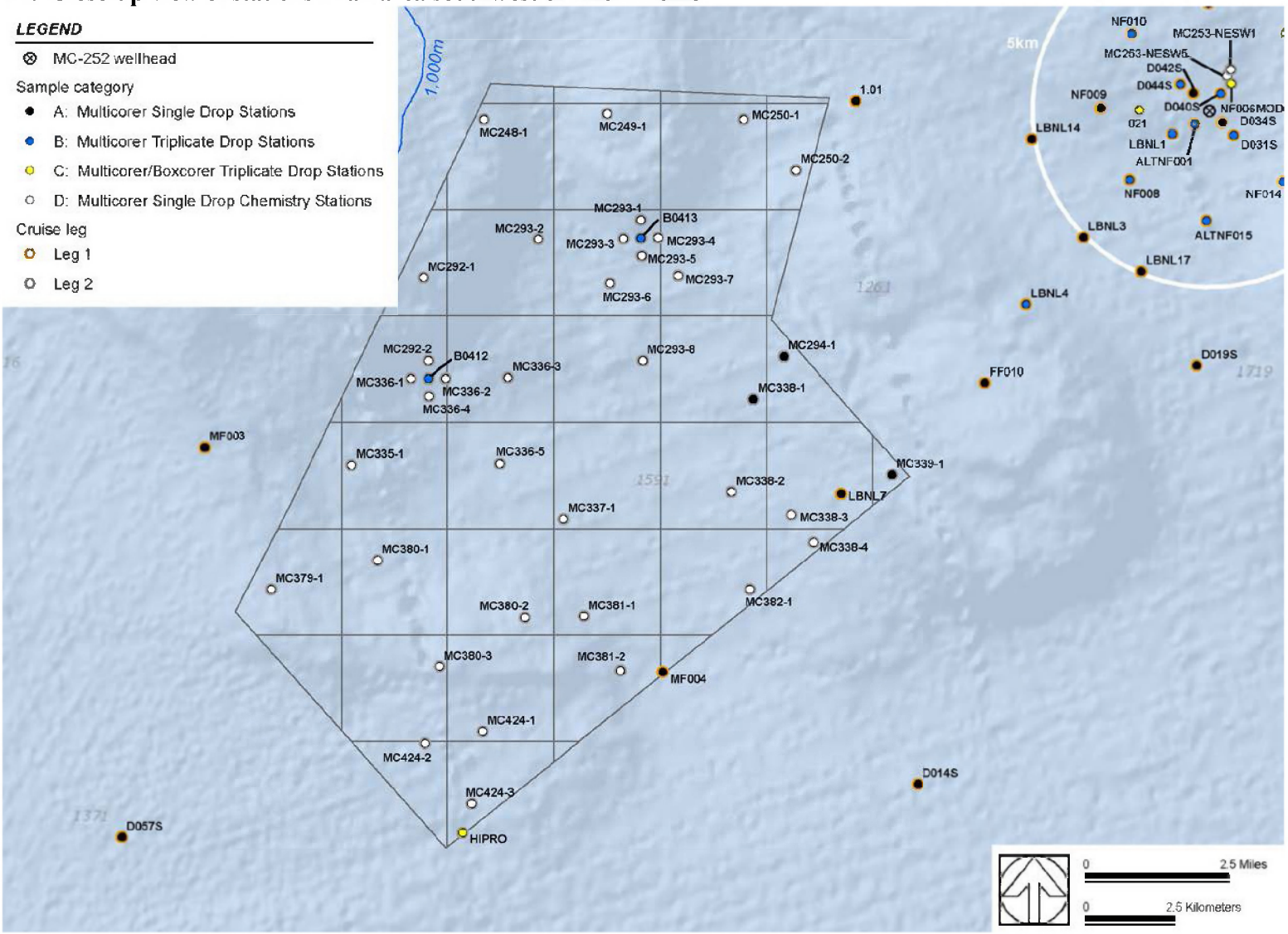
* Excluding costs of chemical contaminant analyses by NOAA Trustees analytical chemistry laboratories (Alpha Analytical Laboratories and Columbia Analytical Services) to be covered separately outside project budget. Vessel costs and sediment toxicity testing costs will be covered separately by BP.

Figure 1. Map of 2014 sampling locations.

1A. Full view of all sampling stations



1B. Close-up view of stations in an area southwest of Biloxi Dome



Appendix A

Table of second-tier priority cores from 2010 Response cruises to be analyzed pursuant to this addendum. Abbreviations: GY = Gyre cruise (out of a total of 65 stations from September–October 2010), OV = Ocean Veritas cruises (out of a total of 104 stations from September–October 2010).

Number	Ship	Station	Latitude	Longitude	Depth
1	OV	D077S	28.9697	-88.3137	1005
2	OV	D070S	28.9496	-88.1704	1074
3	OV	4.46	29.0148	-88.3482	716
4	OV	3.33	28.9926	-88.4693	699
5	OV	4.47	29.0978	-88.3415	426
6	OV	3.34	29.0779	-88.5038	359
7	OV	S02SW	29.1271	-88.3889	98
8	OV	D009S	28.8332	-87.8683	1921
9	OV	D101SW	29.1569	-88.1433	460
10	OV	4.48	29.1883	-88.3353	211
11	OV	3.35	29.1628	-88.5384	169
12	OV	D071S	29.1388	-87.8480	1089
13	OV	M009SW	29.2769	-87.9127	210
14	OV	M012S	29.3535	-87.6270	199
15	OV	D067S	29.1393	-87.3649	1162
16	OV	D089S	29.2221	-87.2069	793
17	OV	M019S	29.4888	-87.4238	162
18	OV	M004S	29.6307	-87.2205	260
19	OV	D107SW	29.4874	-86.7481	326
20	OV	M013SW	29.7739	-86.9129	187
21	OV	M022SW	29.9740	-86.8140	126
22	OV	M023SW	29.9550	-87.0282	124
23	OV	M026SW	29.8787	-86.6163	112
24	GY	D004S	28.5809	-87.8857	2309
25	GY	D003S	28.1251	-88.0718	2286
26	GY	D006S	28.3431	-88.1397	2127
27	GY	FF11	28.5110	-88.5299	1639
28	OV	0.00	28.7379	-88.3865	1519
29	OV	D046S	28.0754	-87.7148	1458
30	OV	1.01	28.7391	-88.4683	1455
31	GY	D053S	27.6512	-89.2820	1409
32	GY	LBNL10	28.4156	-88.7043	1402
33	GY	D064S	27.3614	-90.5688	1200
34	GY	D068S	28.7109	-88.7483	1172
35	OV	D069S	29.0406	-88.0704	1114
36	OV	D072S	28.6135	-88.8574	1085
37	OV	D090S	28.8421	-88.6805	770
38	OV	S01S	29.0268	-88.9121	106
39	OV	2.23	28.8744	-88.6224	641
40	OV	2.24	28.9236	-88.7173	400
41	GY	D055S	28.4157	-88.7256	1376
42	OV	1.03	28.7409	-88.6731	1024

Appendix B
Box Corer Sampling Methods

Adapted from: Rowe, G.T. and M.C. Kennicutt II, eds. 2009. Northern Gulf of Mexico continental slope habitats and benthic ecology study: Final report. U.S. Dept. of the Interior, Minerals Management. Service, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study MMS 2009-039. 456 pp.

Summary of Method

At select gear comparison stations, a 0.2-m^2 GOMEX box corer will be used to collect sediment samples. On return to the deck prior to collection of macrofauna samples, each grab will be evaluated for acceptability using standard EPA sediment grab sampling criteria (U.S. EPA 2001). Six subcores will be collected from the box core sample as follows:

- One subcore for meiofauna sampling (55-mm inner diameter) will be mounted onto a cross bar within the box corer
- Four subcores (100-mm inner diameter) will be mounted onto the cross bar for analysis of (1) sediment properties (TC, TOC, TIC, and TN); (2) grain size; (3) hydrocarbons, and (4) metals
- One spare subcore (55-mm inner diameter) will mounted onto the cross bar.

The subsampling approach is shown in Figure B-1. Upon return of the box corer to the vessel after sediment collection, the subcores will be capped; the overlying water will be siphoned off through a 300-micron sieve from the remaining area of the box corer; and a photograph of the sediment surface will be taken. Before the sediment is disturbed, meter sticks marking the sediment surface and the 15 cm depth location will be mounted on two sides of the box corer. The subcores for meiofauna and chemistry will be removed prior to the removal of the macrofauna sample. As sampling personnel remove the subcores, any sediment which remains on the exterior of the core tubes, tools, or the sampler's arms will be rinsed with seawater into a bucket that will be added to the macrofauna sample. Once the subcores are removed, the macrofauna sample will be collected by removing the initial 15 cm of sediment based on the levels determined by the meter sticks, prior to any disturbance of the sediment surface. The sediment sample for macrofauna analysis will be elutriated and wet-sieved on board through a 0.3-mm mesh sieve with gentle streams of seawater.

Macrofauna samples will be processed using the overflow barrel technique. The sample will be transferred to the upper holding barrel of the sieving apparatus and gently passed through the PVC pipe into the sieve (Figures B-2 and B-3). The sieve bucket will be placed into the lower spill over barrel or sink of the sieving apparatus and held with the sieve screen slightly below the water surface. The apparatus can also be outfitted with a saltwater hose to gently spray down the sieve and remove any remaining sample in the upper holding barrel.

The remaining sample on the sieve screen will be transferred into the appropriate containers and preserved with 4% buffered formalin with Rose Bengal stain. Detailed procedures for macrofauna processing are described below.

Samples from the subcore for meiofauna analysis will be sectioned in the shipboard laboratory (0–1 cm and 1–3 cm sections relative to the sediment surface), and the fractions will be relaxed in 7% $MgCl_2$, preserved in 4% buffered formalin with Rose Bengal, and sieved later onshore with a 0.042-mm sieve. On return to the laboratory, the formalin-Rose Bengal solution will be changed to a 70% EtOH solution.

Taxonomic identification of macrofauna and meiofauna collected with the box corer will be consistent with that described above for macrofauna and meiofauna collected with the multi-corer.

Sediment collected for analysis of sediment properties, hydrocarbons, and metals will be sectioned and processed as described for multicorer sampling.

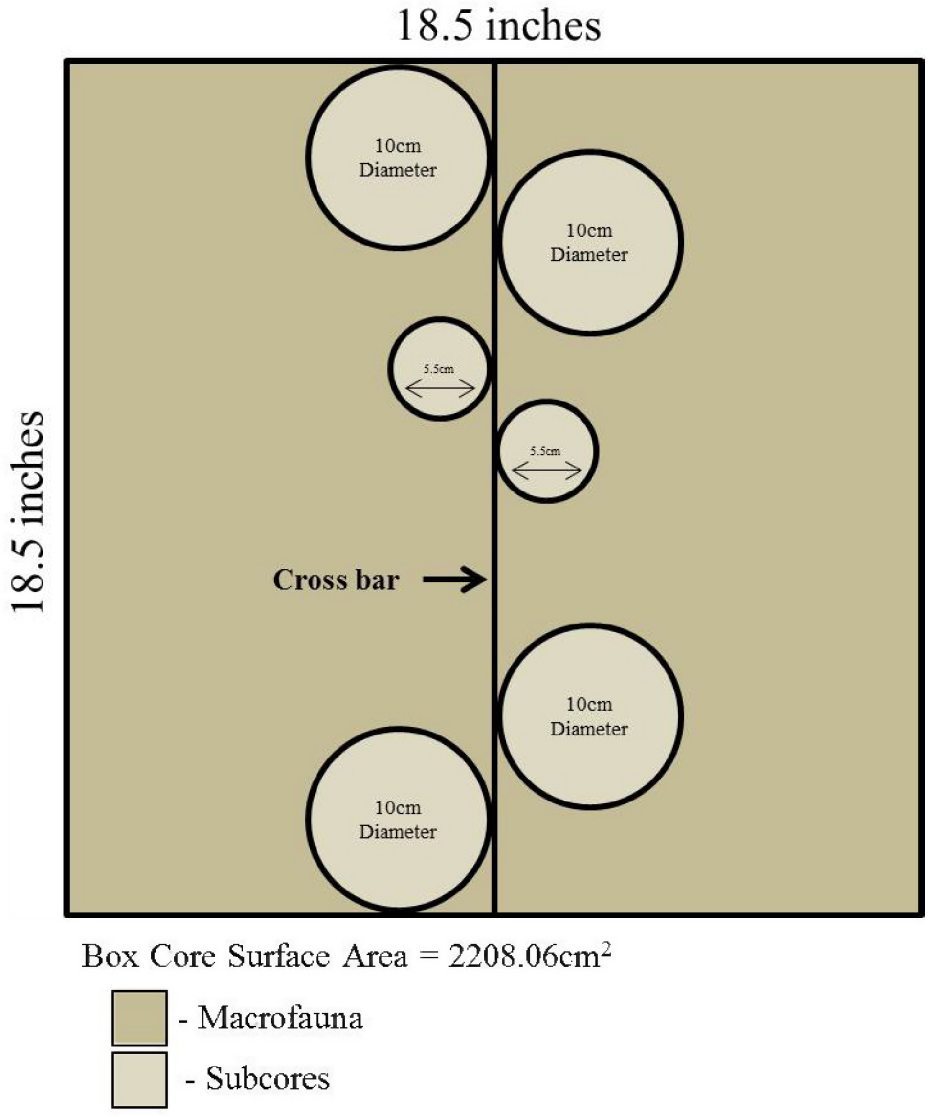


Figure B-1. GOMEX or Gray-O'Hara box core used in Rowe and Kennicutt (2009)

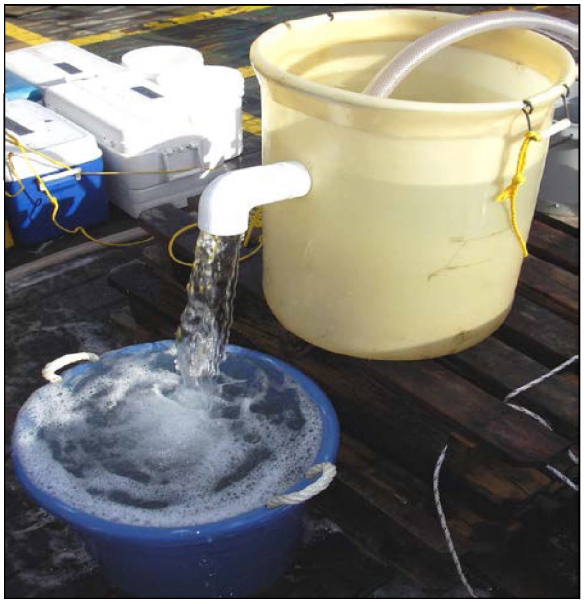


Figure B-2. Infauna sample sieving apparatus consisting of an upper holding barrel and lower spill over barrel.

Figure B-3. Infauna sample sieving apparatus

Detailed Procedures for Macrofauna Processing

1. Cap subcores. Siphon off remaining overlying water without disturbing the sediment surface. Photograph the sediment surface. Mark 15 cm depth with meter sticks. Remove subcores. Collect the top 15 cm in the box corer, as indicated by the meter sticks.
2. Place sample into the upper holding barrel.
3. A sieve bucket fitted with a 0.3-mm mesh will be placed into the lower spillover barrel or the sink of the sieving apparatus and held with the sieve screen slightly below the water surface.
4. The filtered (30-micrometer or equivalent) seawater hose (input hose) will be placed into the upper holding barrel, and the spill over pipe will be adjusted to pass directly into the sieve bucket.
5. The extracted sample slurry within the upper holding barrel will be stirred by hand to suspend all sediment, infauna, and debris.
6. Water flow into the upper holding barrel will be adjusted so that the suspended material flows at a steady and controllable rate onto the sieve bucket screen.
7. The sieve bucket will be gently shaken to facilitate the passage of fine material through the filter screen. If the screen becomes clogged and the water level within the bucket rises, the input hose in the upper holding barrel will be withdrawn (stopping flow) until the material can be cleared. This process will be continued until all the sample is transferred through the sieve bucket screen.

8. The sieved sample (containing infauna, residual sediment, and debris) will be transferred to a sample container(s) with a metal spoon or by gently spraying with a filtered saltwater hose/squirt bottle and preserved using 4% buffered formalin with Rose Bengal stain.
9. The seams of the container cap will be sealed with electrical tape and then properly stored aboard the vessel.
10. On return to the laboratory, the formalin-Rose Bengal solution will be changed to a 70% EtOH solution.

Multipliers for Scaling Cores and Boxcores

It is necessary to standardize the organism counts to a square meter (m^2) to compare cores and boxcores. The inner diameter (ID) of core tubes is used to calculate the area sampled. Because the area sampled is based on ID, the ID of the cores within the boxcore (Fig. B.1) is the area removed from the boxcore, and is thus the area not sampled. Sample size calculations for the multipliers are given below.

Name	Core ID	Core area (cm^2)	Units	Multiplier	Units
Macrofauna Core	10 cm	78.54	n/cm^2	127.3	n/m^2
Meiofauna core	5.5 cm	23.76	n/cm^2	420.9	n/m^2
CSA Boxcore	18.5" x 18.5"	2208.06	n/cm^2		
4 macro ID		-314.16	cm^2		
2 meio ID		-47.52	cm^2		
Area Remaining		1846.38	n/cm^2	5.42	n/m^2

References[2]

Puget Sound Water Quality Authority. Recommended Protocols for Sampling and Analyzing Subtidal Benthic Macroinvertebrate Assemblages in Puget Sound. January 1987.

U.S. Environmental Protection Agency (U.S. EPA). 2001. Methods for Collection, Storage and Manipulation of Sediments for Chemical and Toxicological Analyses: Technical Manual. October 2001. EPA-823-B-01-002.

[2] References to the studies cited in this work plan are for background and context only. Approval of this work plan does not constitute endorsement of, or agreement with, the methods, analysis, or conclusions of any study cited herein.

Appendix C
Standard Operating Procedure for the Collection of Samples for Laboratory Sediment Toxicity Bioassays

Introduction

This standard operating procedure (SOP) is for the collection, processing, and storage of sediment samples to be used in 10-day sediment toxicity bioassays using the marine amphipod *Leptocheirus plumulosus*. This SOP is intended as an addendum to the current Natural Resource Damage Assessment sampling plan: *Addendum to Deepwater Sediment Sampling to Assess Potential Post-Spill Benthic Impacts from the Deepwater Horizon Oil Spill* ("Study Plan").

The sediment samples will be collected from deepwater locations in the Gulf of Mexico using a sediment multi-corer device during a cooperative study between Trustee and BP representatives. As part of this cooperative study, all bioassay analyses results received from the laboratory will be shared with both the Trustees and BP.

The 10-day sediment toxicity bioassays will be performed by Environmental Enterprises USA, Inc. (EEUSA) in Slidell, Louisiana, according to the methods described in American Society for Testing and Materials (ASTM) Standard Method ASTM E1391-02: *Standard Guide for Collection, Storage, Characterization, and Manipulation of Sediments for Toxicological Testing*. The marine amphipod *L. plumulosus* will be the test organism used for the bioassays.

Sediment Sampling Procedures

The procedures for collection of sediment samples using a sediment multicorer are detailed in the work plan. To summarize, the sediment multicorer will be deployed three times at each station at which toxicity samples are to be collected, and up to three cores from each successful deployment will be designated as sediment toxicity bioassay samples, for a total of six to nine total cores.

Sediment Processing Procedures

The upper 3-cm interval of the six to nine sediment cores (i.e., three replicates from three multicorer deployments) collected at sediment toxicity sampling stations will be composited for use in the sediment toxicity bioassays. Two aliquots of the composited sediment sample will be collected for chemical analysis (hydrocarbons and metals), while the remaining portion will be collected for use in the 10-day sediment toxicity bioassay.

The following procedure will be used for developing the composite sample:

1. Install the sediment core into the holder/extruder apparatus.
2. Remove the overlying water that does not contain visible suspended sediment using a length of clean Tygon tubing.
3. Push the sediment surface up to the top of the core using the extruder apparatus.
4. Extrude the upper 3 cm of the sediment core above the top of the core liner.

5. Slice the bottom of the 0–3 cm interval horizontally using a pre-cleaned stainless-steel spatula and transfer this portion into a pre-cleaned stainless-steel pan.

This process will be repeated for the upper 0–3 cm portion of each of the six to nine sediment cores designated for the sediment toxicity bioassays. The stainless-steel bowl will be covered using solvent-rinsed aluminum foil and refrigerated in between processing the sediment cores. To avoid loss of sediment, the foil should not contact the sediment in the bowl. When the 0–3 cm portions of all six to nine cores have been collected into the bowl, the contents will be composited to a uniform color and texture using a large stainless-steel spoon or other appropriate stainless-steel tool. Unrepresentative materials (e.g., shell, rock, or plant) greater than approximately 1 cm in size will be removed from the sample during the compositing process.

- The composited sample will be transferred into the appropriate pre-labelled sample containers. The two aliquots collected for chemical analysis will be transferred into pre-labelled 8 oz. glass jars.
- The remaining composited sediment sample will be transferred into a pre-labelled 1-gallon plastic bucket supplied by the toxicity testing laboratory.

Decontamination

All re-useable sampling equipment will be decontaminated in between uses according to the methods described in Appendix C of the *Deepwater Sediment Sampling to Assess Post-Spill Benthic Impacts from the Deepwater Horizon Oil Spill*.

Sample Storage and Custody

The samples will be placed in storage at 4°C immediately after collection and maintained at that temperature until transfer to EEUSA for analysis.

The sample information will be recorded onto a chain-of-custody form in order to record and maintain custody of the samples during the transfer to EEUSA. EEUSA will send a courier to the dock when the sampling vessel arrives in port and will directly receive the samples.

References[3]

ASTM. 2002. E 1391-02 Standard guide for collection, storage, characterization, and manipulation of sediments for toxicological testing. *In*: 2002 ASTM Standards on Environmental Sampling, Vol. 11.01 Conshohocken, PA.

[3] References to the studies cited in this work plan are for background and context only. Approval of this work plan does not constitute endorsement of, or agreement with, the methods, analysis, or conclusions of any study cited herein.

Appendix D
Preparation of Field Quality Control Samples

This standard operating procedure describes the purpose, preparation, and collection frequency of equipment rinsate blanks and field blanks for sediment samples to be collected under the *Addendum to the Deepwater Sediment Sampling to Assess Potential Post-Spill Benthic Impacts from the Deepwater Horizon Oil Spill* (hereafter referred to as the "Addendum").

Equipment rinsate blanks and field (deck) blanks will be taken no less frequently than once every other day. The three types of blanks are described in detail below. All field quality control samples will be packaged and shipped with other samples in accordance with procedures outlined in the Addendum. Sample custody will be maintained in accordance with procedures outlined in the Addendum.

Equipment Rinsate Blanks

Equipment rinsate blanks will be used to help identify possible contamination from the sampling environment and/or from decontaminated sampling equipment. Equipment rinsate blanks will be prepared by pouring laboratory distilled/deionized water through, over, and into the decontaminated sample collection equipment, then transferring the water to the appropriate sample containers and adding any necessary preservatives. Equipment rinsate blanks will be prepared for metals and hydrocarbon analytes at least once every other day. The actual number of equipment rinsate blanks prepared during an event will be determined on a case-by-case basis by the Principal Investigator or other designee.

Field Blanks

The field blank is prepared in the field to evaluate potential background concentrations present in the air and in the distilled/deionized water used for the final decontamination rinse. Field blanks should be collected at a minimum frequency of one sample every other day of active sampling. To prepare a field blank in the field, open a clean sample bottle while at a sample collection site, fill the sample bottle with distilled/deionized water and then seal. Assign the field blank a unique sample number, label the bottle, and then send the bottle to the laboratory with the field samples.

Appendix E
Health and Safety Plan

BP-GCRO

Sediment Sampling

Gulf of Mexico

PROJECT-SPECIFIC HEALTH AND SAFETY PLAN

CSA Ocean Sciences Inc.

REVISION STATUS			APPROVAL		
Rev	**Date**	**Reason for Issue**	**Originator**	**Reviewed**	**Approved**
01	5/16/14	Draft for Review	KAJ	5/16/14	EH
02	5/20/14	Revisions	KG	5/20/14	KG
03	5/27/14	Final	KAJ	5/27/14	KAJ

Distribution:	**Subject:**	Health and Safety Plan				
As per page 2	**Activity:**	Sediment Sampling Cruise (Leg 1 and Leg 2)				
	Location:	Gulf of Mexico				
	CSA HSSE Manager:	Kim A. Johnson, R.G.				
		Location	Disc	Document Type	Sequence No.	Rev
	Doc. No.					

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Stuart, FL 34997

ELECTRONIC DOCUMENT ISSUE & ACKNOWLEDGEMENT

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1.0 INTRODUCTION

CSA Ocean Sciences Inc. (CSA) has been retained by BP Gulf Coast Restoration Organization (BP-GCRO) to provide Natural Resources Damage Assessment (NRDA) services related to the 2010 Deepwater Horizon Oil Spill that occurred in Mississippi Canyon lease block 252 (MC-252) in the Gulf of Mexico.

CSA's fieldwork, inclusive of CSA subcontractors, shall be performed in accordance with this Project-Specific Health and Safety Plan (HASP), and following industry-standard safe work practices. CSA's project Operations Manager and project Safety Officer shall be responsible for ensuring and documenting project safety compliance.

An acknowledgement form is included in **Appendix A** to document that all field personnel shall have received a pre-cruise safety briefing and vessel orientation, shall have had an opportunity to review the contents of this HASP, and shall comply with all vessel safety rules and this Project-Specific HASP.

1.1 Safety Objectives

CSA's Health, Safety, Security, and Environmental (HSSE) goals are to prevent all injuries and illnesses, to ensure worker and equipment safety and security, and to cause no harm to the environment. CSA's HSSE policies are intended to create and maintain a safe working environment for all employees, subcontractors, and on-site personnel and to protect facilities, equipment, materials, and the environment from damage. CSA expects each employee and project team member to actively support and implement the HSSE policies and procedures outlined in the Project-Specific HASP, as well as any other applicable CSA policies and procedures, whether or not they are explicitly included in this HASP. All CSA employees and project team members are responsible for HSSE compliance.

1.2 Stop Work Authority and Responsibility

All project personnel, including subcontractors, client representatives, and trustees have Stop Work Authority and Responsibility, and field activities are to be suspended if the safety of personnel cannot be ensured.

1.3 Scope of Work

The scope of work includes the collection of sediment samples using a multicorer in accordance with the 2014 Addendum to the Deepwater Sediment Sampling to Assess Potential Post-Spill Benthic Impacts from the Deepwater Horizon Oil Spill.

Sediment sampling shall be conducted during two cruise legs (Leg 1 and Leg 2) from the supply vessel M/V *Irish*, which has been chartered by CSA through Adriatic Marine, LLC. Sediment cruise participants include representatives of multiple subcontractors, client representative(s), and trustees.

The scope of work for the 2014 sediment cruise includes approximately 129 sampling stations. Operations are to be conducted 24 hours per day, with personnel to work 12-hour shifts, with 12 hours rest between shifts. Based on the sample production rate experienced during prior (2011) surveys, it is estimated that the work will be completed during two cruise legs lasting approximately 13 days for Leg 1, and approximately 14 days for Leg 2, including transit time. The project is to be completed during May and June 2014, and the general location for both legs of the project is shown in **Figure 1**.

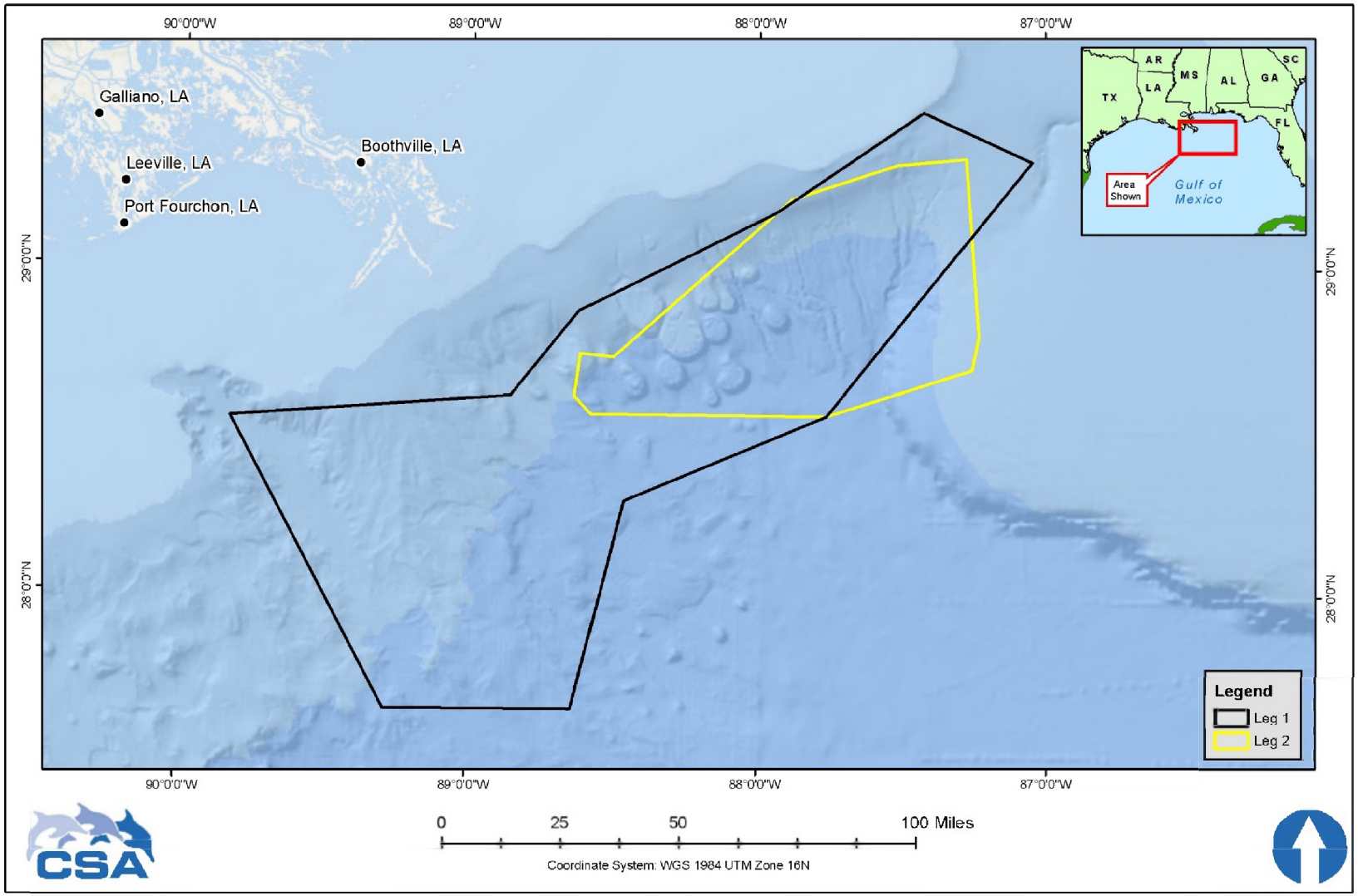

Figure 1. Location Map.

1.4 Contact Information

Contact information for CSA project personnel, the project vessel, and vessel personnel is included in **Table 1.**

Table 1. Contact Information for CSA and Vessel Personnel.

CSA Contact Information		
Position	Name	Email/Phone Number
CSA Project Managers	Fred Ayer / Bob Mulcahy	fayer@conshelf.com 407-408-3154 rmulcahy@conshelf.com
CSA Project Coordinator	Eddie Hughes	ehughes@conshelf.com 813-335-0811
CSA Operations Director	Frank Johnson	fjohnson@conshelf.com 561-309-9048
CSA HSSE Director	Lynwood Powell	lpowell@conshelf.com 561-676-5814
CSA Project Safety Officer	Kim Johnson	kjohnson@conshelf.com 504-214-7136
Vessel Contact Information		
Navigation Desk	(All Personnel)	985-276-9136
Science Desk	(All Personnel)	985-277-9012
Bridge	Captain	985-413-6792
Satellite 1	(All Personnel)	985-346-5121
Satellite 2	(All Personnel)	985-346-5122
Position	Name/Operator	Email/Phone Number
Adriatic Marine Executive Vice President	Stuart Faucheux	stuart@adriaticmarinellc.com 985-258-0044
Adriatic Marine Vice President, QHSE/HR	Barrett Grabert	barrett@adriaticmarinellc.com 985-278-2797
Adriatic Marine Captain	Joseph Allen	irish@adriaticmarinellc.com
Adriatic Marine Captain	Frederick Randle	irish@adriaticmarinellc.com
Adriatic Marine Captain	Sammy Smolcich	irish@adriaticmarinellc.com

2.0 EMERGENCY PREPAREDNESS

2.1 Emergency Preparedness

The project vessel is equipped with first aid kits, eye wash, fire extinguishers, an Automated External Defibrillator (AED), throwable life rings, life rafts, and U.S. Coast Guard-compliant Type I Personal Flotation Devices (PFDs) at a ratio of 150% to 200% of the number of personnel on board the vessel. Type I PFDs are located in sleeping berths (one for each person), and additional Type I PFDs are located throughout the vessel in areas where personnel are likely to be conducting work.

All CSA field personnel and vessel crew are trained and certified in First Aid and Cardiopulmonary Resuscitation (CPR), and CSA personnel are further trained in AED use and oxygen administration.

The ship's personnel are trained in fire extinguisher use and fire response, and CSA personnel are trained in fire extinguisher use.

2.2 Emergency Drills

The vessel shall conduct emergency drills on a weekly basis. Emergency drills may include fire, man overboard, abandon ship, environmental/spill, or medical emergency. All shipboard personnel are required to participate in all ship drills, under the direction of the vessel Captain. Vessel passengers shall familiarize themselves with the location of the safety equipment listed in **Section 2.1.**

2.3 Environmental Emergencies

In the event of an environmental emergency (e.g., chemical, oil, fuel spill), the vessel's Captain and crew will direct the environmental response, and vessel passengers are to follow the instructions of the Captain and crew.

In the event of an environmental emergency, CSA's Safety Officer shall make verbal notification to CSA's HSSE Department as soon as possible. CSA's Safety Officer shall investigate the environmental incident and complete a written Initial HSSE Incident Report form, to be submitted directly and only to CSA's HSSE Department under strict confidentiality. Incident reports are to be submitted as soon as possible, and in all cases, within 24 hours after the incident.

2.4 Fire Emergencies

In the event of a fire emergency, the vessel's Captain and crew will direct the fire response, and vessel passengers are to follow the instructions of the Captain and crew.

In the event of a fire emergency, CSA's Safety Officer shall make verbal notification to CSA's HSSE Department as soon as possible. CSA's Safety Officer shall investigate the fire incident and complete a written Initial HSSE Incident Report form, to be submitted directly and only to CSA's HSSE Department under strict confidentiality. Incident reports are to be submitted as soon as possible, and in all cases, within 24 hours after the incident.

2.5 Illness or Injury to Personnel

In the event of an illness or injury to any project personnel, regardless of severity, and including all subcontractors, client representatives, and trustees, follow the procedure outlined in **Table 2**.

Table 2. Illness or Injury Procedure.

Illness or Injury Procedure	
1	Treat/Stabilize the Patient; mitigate safety hazards; notify Captain and CSA Project Safety Officer.
2	CSA Project Safety Officer to notify the Injured Party's company HSSE Manager immediately for Case Management instructions **(Table 3).**
3	Determine (in consultation with Injured Party's HSSE/Case Manager) if MedEvac will be necessary. If so, Captain to initiate MedEvac.
4	CSA Project Safety Officer to notify CSA HSSE Department immediately in the event of MedEvac, or as soon as possible for non-MedEvac injuries and incidents.
5	CSA Project Safety Officer to investigate incident and complete *Initial HSSE Incident Report* form. Incident Report to be submitted directly *and only to* CSA HSSE Department under strict confidentiality *as soon as possible*.

In the event of an illness or injury to any worker, CSA's Safety Officer shall make verbal notification to CSA's HSSE Department as soon as possible. CSA's Safety Officer shall investigate the medical incident and complete a written Initial HSSE Incident Report form, to be submitted directly and only to CSA's HSSE Department under strict confidentiality. Incident reports are to be submitted as soon as possible, and in all cases, within 24 hours after the incident.

For all illnesses and injuries, the CSA Project Safety Officer shall contact the Injured Party's HSSE Manager (Table 3) for Case Management.

Table 3. Emergency Contact Information.

Contractor/Subcontractor Emergency Contact Information		
Company/Organization	HSSE Manager or Case Manager	Phone/Email
NOAA	Katie Fedeli, Supervisor DWH NRDA Field Operations	504-303-2086
Cardno-ENTRIX	CoreHealth	855-227-3661
Exponent	1) Kevin Reichelderfer Director, Quality and EHS 2) Christina Meddings EHS Specialist	650-823-3031 kreichelderfer@exponent.com 267-252-3924 cmeddings@exponent.com
Integral Consulting	Eron Dodak Corporate Health and Safety Manager	503-407-2933 edodak@integral-corp.com
CSA – primary contact	Woody Powell, HSSE Director	561-676-5814 lpowell@conshelf.com
CSA – secondary contact	Kim Johnson, HSSE Manager	504-214-7136 kjohnson@conshelf.com

2.6 First Aid

In the event that First Aid is required, it is preferable that an injured or ill worker administer First Aid to themselves, to reduce the potential for exposure of other workers to blood borne pathogens. If the injured or ill worker is unable to self-administer First Aid, any on-site personnel who are trained in First Aid may assist or administer First Aid to the injured or ill worker.

First Aid is defined as: Any one-time treatment and subsequent observation of minor scratches, cuts, burns, splinters, and so forth that do not ordinarily require additional medical care. Such treatment and observation are considered first aid even when provided by a physician or registered professional person. The U.S. Occupational Safety and Health Administration (OSHA) further defines First Aid as:

- using a non-prescription medication at non-prescription strength (for medications available in both prescription and non-prescription form, a recommendation by a physician or other licensed health care professional to use a non-prescription medication at prescription strength is considered medical treatment for recordkeeping purposes);
- administering tetanus immunizations (other immunizations, such as Hepatitis B vaccine or rabies vaccine, are considered medical treatment);
- cleaning, flushing, or soaking wounds on the surface of the skin;
- using wound coverings such as bandages, Band-Aids™, gauze pads, etc.; or using butterfly bandages or Steri-Strips™ (other wound closing devices such as sutures, staples, etc., are considered medical treatment);
- using hot or cold therapy;
- using any non-rigid means of support, such as elastic bandages, wraps, non-rigid back belts, etc. (devices with rigid stays or other systems designed to immobilize parts of the body are considered medical treatment for recordkeeping purposes);
- using temporary immobilization devices while transporting an accident victim (e.g., splints, slings, neck collars, back boards, etc.);
- drilling of a fingernail or toenail to relieve pressure, or draining fluid from a blister;
- using eye patches;
- removing foreign bodies from the eye using only irrigation or a cotton swab;
- removing splinters or foreign material from areas other than the eye by irrigation, tweezers, cotton swabs, or other simple means;
- using finger guards;
- using massages (physical therapy or chiropractic treatment are considered medical treatment for recordkeeping purposes); and/or
- drinking fluids for relief of heat stress.

If medical treatment beyond First Aid is required, consult with the Injured Party's HSSE Manager (or Case Manager) as listed in **Table 3** for guidance on potential Medical Evacuation (MedEvac) of the patient for further treatment or evaluation.

2.7 Medical Treatment Beyond First Aid

Medical Treatment is defined as: The medical treatment of injuries or illnesses, beyond First Aid, administered by physicians, registered professional medical personnel (e.g., paramedic or nurse), or lay persons (i.e., non-medical personnel). Medical treatment does not include First Aid treatment, even if the First Aid is provided by a physician or other registered medical professional.

If medical treatment beyond First Aid is required, consult with the Injured Party's HSSE Manager (or Case Manager) as listed in **Table 3** for guidance on potential MedEvac of the patient for further treatment or evaluation.

Given the distance and time required to obtain medical treatment beyond First Aid, the CSA Safety Officer is to coordinate with the vessel Captain to initiate MedEvac in the event of any of the following imminent danger/medical emergency conditions, or any other condition that is, or could become, life-threatening in the time that it would take for the vessel to return to port:

- Excessive bleeding;
- Shock;
- Airway obstruction;
- Critical injury; loss of limb;
- Unconsciousness (without regaining consciousness);
- Severe allergic reaction; or
- Immediate life-sustaining needs.

In all cases, the CSA Safety Officer is to ensure that the patient's HSSE Manager or Case Manager has been informed of the patient's condition to allow for appropriate case management.

2.8 MedEvac

In the event it is determined that a patient is in imminent danger, and that MedEvac of the patient is necessary, the following MedEvac options are available:

Option 1: Transport patient directly to nearest available BP-operated platform or production facility using the project vessel or Fast Rescue Craft (FRC).

Four BP-operated drilling or production facilities are proximate to the project work area, and each of the four facilities has full Emergency Medical Services (EMS) capabilities, including Paramedic and emergency life-saving medical equipment. The BP-operated facilities are: *Atlantis, Mad Dog, Nakika*, and *Thunder Horse*. Data cards for each of these facilities, including the location, complete contact information, and approach information, are included in **Appendix B**. Initial contact information is included in **Table 4 (Option 1).**

Option 2: Call for helicopter MedEvac, using MedEvac service with full EMS capability.

There is no charge for placing a MedEvac helicopter on standby. Typical ready-time for a MedEvac helicopter to make ready to launch is 15 minutes, so it is recommended to put the helicopter on standby while continuing to evaluate and treat the patient on the vessel. Flight time from Fourchon, Louisiana to the work area is approximately 40 to 60 minutes, weather permitting. Three MedEvac services are listed in **Table 4 (Option 2).**

Option 3: Contact the U.S. Coast Guard (USCG) for MedEvac by USCG helicopter or boat. If weather conditions prohibit private/contracted helicopter MedEvac and the patient is considered to be in imminent danger, contact the USCG for guidance. Contact information for three USCG Air Operations Bases is included in **Table 4 (Option 3).**

Option 4: Transport the patient to nearest port of call for shore-based emergency medical response (e.g., local ambulance) using project vessel or FRC. The nearest port-of-call shall be determined in real-time, based on the vessel location, the wind/water conditions at the time, the nature of the medical emergency, the medical facilities available at the ports of choice, and any other pertinent factors.

Table 4. MedEvac Options.

Option 1: BP-Operated Facilities in the Work Area		
Lease Block Number	Facility Name	Contact Info
GC 787 A	Atlantis	VHF Ch. 13 / 73 / 74 Call Sign: WPYW 299 Control Room: 979-235-2222 / 2223
GC 782	Mad Dog	VHF Ch. 16 / 73 Call Sign: WPYQ 678 Control Room: 979-235-2105
MC 474	Nakika	VHF Ch. 72 Call Sign: WPXVN 955 Control Room: 979-230-4101 / 4110
MC 778	Thunder Horse	VHF Ch. 16 / 17 Call Sign: WPXF 501 Control Room: 979-235-2885 / 2900 Email: thunderhorseBCO@bp.com
Option 2: Private MedEvac Helicopter		
ERA Helicopters*	Fourchon, LA and Galveston, TX	800-655-1414
Acadian Air Ambulance	Houma, LA and Lafayette, LA	877-663-4853
HALOFlight Air Ambulance	Corpus Christi, TX	361-265-0509
Option 3: U.S. Coast Guard		
U.S. Coast Guard	Grand Isle, LA	985-787-2136
U.S. Coast Guard	New Orleans, LA	504-846-6161
U.S. Coast Guard	Galveston, TX	713-678-9057

*ERA is a fully equipped mobile Emergency Room with full Search and Rescue capability. ERA helicopters are able to launch in winds of up to 45 knots and fly in wind speeds up to 65 knots. ERA is capable of flying using visual flight rules (VFR) and instrument flight rules (IFR). ERA helicopters are equipped with dual-hoist capability, which allows for lifting a patient from a vessel or location without the helicopter having to land.

The vessel Captain has the ultimate authority and responsibility for personnel safety. Therefore, when deciding which MedEvac method to use, the Captain shall consider all pertinent factors, such as the patient's condition, the time required for each method of MedEvac, the wind/water conditions at the time (and at time of MedEvac), the safety of all other personnel, and any other relevant factors.

In all cases of MedEvac, a CSA representative (or designee) shall escort the patient during transport to the emergency medical facility and shall remain with the patient until such time as the patient is either evaluated and released or admitted to a medical facility (hospital).

3.0 CSA HSSE POLICY VARIANCES

3.1 Short Service Employee Policy

A Short Service Employee (SSE) is a CSA employee or contractor employee with less than 6 months employment with CSA (or the contractor) or less than 6 months experience in a particular job function or job classification.

Section 11.3.1 of CSA's HSSE Manual states the following:

> *CSA employees and contractors with less than 6 months employment with CSA or their respective employer, or employees with less than 6 months experience in a new role or position will be monitored and mentored for HSSE awareness and compliance, safe work practices and behaviors, and job competency.*
>
> *CSA contractors must manage their Short-Service Employees according to the requirements of this Policy while working on CSA projects.*
>
> *Short-Service Employees shall be visually identified when performing fieldwork. Visual identification may include the use of a specific colored hardhat, work shirt, work vest, or other visual method of identification. The method used to identify the Short-Service Employee shall be communicated to the client's designated representative at the project location.*

Variance:

- CSA's HSSE Department has authorized Adriatic Marine to provide an SSE Captain, based on the Captain's prior work history and experience.
- Visual identification of SSE's shall not be required. Based on the conglomerate nature of the project team which is composed of multiple contractors, client representatives, and trustees who are respectively unfamiliar with working with each other, all project contractors/companies/teams are to be considered SSE's with respect to each other.

All other aspects of CSA's Short Service Employee Policy apply.

4.0 DOCUMENTATION

4.1 Health, Safety, Security, and Environmental Documentation

This following HSSE documentation may be utilized during the project:

- Acknowledgement Form (**Appendix A**)
- Next-of-Kin Information
- Daily Safety Meetings
- Job Safety Analyses
- Pre-Incident Log
- Management of Change (if necessary)
- Incident Report (if necessary)

The project Safety Officer shall have copies of all appropriate HSSE documents available for use during fieldwork.

5.0 HAZARD IDENTIFICATION

5.1 General

Hazard Identification and Risk Assessment (HIRA) is the process of identifying foreseeable hazards and assessing risk in order to enable advance planning for the mitigation of risk to a level as low as reasonably practicable (ALARP). Risk is ranked (low, medium, or high) based on the likelihood or probability of an incident occurring combined with the potential severity of consequences of the incident.

5.2 Hazard Identification

Identified potential hazards associated with project fieldwork include the following, in alphabetical order:

- Blood borne pathogens;
- Chemical handling/storage/hazard communication;
- Cold stress;
- Compressed air;
- Electrical;
- Fatigue and complacency;
- Fire prevention/response;
- Flammables/combustibles;
- Food safety and sanitation;
- Hand and power tools;
- Heat stress/sun exposure;
- Journey management;
- Ladders;
- Lifting operations;
- Lightning/severe weather;
- Management of change;
- Manual lifting;
- Permit to work;
- Personal hygiene;
- Personal protective equipment (PPE);
- Slips, trips, and falls;
- Vessel/on-water hazards; and
- Wildlife and insects.

A project-specific HIRA is included in **Appendix C**, and shall be referenced for examples of mitigation and safe work practices to be applied to the listed hazards.

5.3 Job Safety Analysis

Task-specific Job Safety Analyses (JSAs) shall be completed prior to conducting work tasks (one per work task per work shift is acceptable) in order to provide additional safety to ensure that risk is mitigated to a level ALARP.

5.4 Hazard Mitigations, Safe Work Practices, and Policies

Below are summary briefs of hazard mitigations, safe work practices, and safety policies applicable to the project. All personnel shall adhere to these safe work practices, mitigations, and policies, in addition to any other safe practices that will ensure that the project is completed in a safe manner with zero accidents, incidents, and injuries.

Allergies and Medications: Project personnel shall notify the CSA Safety Officer and the vessel Captain of any known allergies, medications that may cause impairment on the job, and if they carry a prescribed epinephrine auto-injector (Epi-Pen) or other prescription medicines (e.g., insulin, nitroglycerin, blood pressure medication, etc.). The location of the prescription medicines related to potential medical emergency conditions (e.g., diabetes, high/low blood pressure, heart conditions, etc.) should be provided to the CSA Safety Officer and vessel Captain if permission is granted to assist with administering the medication in the event of emergency.

Blood Borne Pathogens: In the event of an injury that results in bleeding, practice universal precautions with respect to providing First Aid or medical treatment to others.

Chemical Handling / Storage / Hazard Communication: All chemicals are to have a Safety Data Sheet (SDS, formerly Material Safety Data Sheet [MSDS]), which is to be located in a readily accessible location in the area where chemicals are used or stored. Practice safe handling practices, including proper labeling and storage of chemicals, wearing all appropriate PPE (including splash protection), using the smallest necessary size containers, having adequate ventilation during chemical use, preventing spills and waste, closing containers when not in use, and properly disposing of any chemical waste in accordance with all applicable regulations. Maintain a First Aid kit and eye wash in proximity to chemical use.

Cold Stress: Cold stress is unlikely during the project. To protect against cold stress, wear rain gear in the event of rain and dress warmly if the temperature drops during rain squalls or unseasonably cold weather.

Compressed Air: Ensure that whip-checks are used on compressed air hoses. Visually inspect air hoses daily before use to monitor for excessive wear or weakness in hoses. If worn or weak hoses are found, remove from service immediately and destroy or mark "Do Not Use." Never stand in the line of fire where an air hose could whip if it were to break. Always relieve residual air pressure in hoses upon completion of the task. Do not step on air hoses, to avoid causing unnecessary wear. Do not use compressed air to blow dirt or dust off a person.

Designated Smoking Areas: Project personnel shall adhere to designated smoking areas on the vessel and shall dispose of all smoking-related waste in appropriate receptacles (no littering, on or off the vessel). No smoking is allowed anywhere inside the vessel.

Drug and Alcohol Policy: CSA's Drug and Alcohol Policy applies to all CSA personnel and CSA subcontractors. No alcohol or illegal drugs are permitted. All project personnel are subject to "for cause" drug and alcohol screening.

Electrical Hazards: Ensure all electrical cords, plugs, and outlets are in good condition prior to use. Do not overload electrical outlets.

Fatigue and Complacency: Long work hours, particularly under stressful conditions (such as high heat and humidity, or performing hard physical work), and interrupted sleep schedules can

lead to fatigue. To combat fatigue, get a minimum of 7 to 8 hours of sleep when not on shift, and take periodic breaks from hard work or hot/humid work during work shifts to allow the body to rest. Vary the type or position of the work in order to reduce the risk of repetitive motion injuries and reduce complacency due to boredom and routine. Adjust work schedules if necessary to allow for fatigue management. To recover from fatigue, a minimum of 8 hours of sleep are needed for a minimum of 3 days in a row. It is each person's responsibility to remain fit for duty, which includes self-management of fatigue and complacency. Supervisors and managers are responsible to monitoring work crews and adjusting the work schedule as necessary to manage fatigue and complacency.

Fire Prevention and Response: The vessel crew is responsible for fighting fires on board the vessel. Passengers are responsible for following the directives of the fire response team.

Flammables/Combustibles: Only properly trained personnel shall use or work with flammables/combustibles.

Food Safety: When serving food, use utensils, not your hands. Wash hands prior to eating food or touching serving utensils.

Hand and Power Tools: Project personnel shall follow safe work practices regarding the use of hand and power tools, including the completion of a JSA prior to using tools.

Heat Stress Management: Project personnel shall practice heat stress management daily, including the following practices: drink plenty of water, avoid or minimize caffeine intake, take rest breaks in a cool location to reduce body temperature, adjust work schedules if possible to avoid the hottest times of the day, wear light-colored lightweight clothing made of natural fibers, wear a sun hat and long-sleeve shirt, if necessary drink low-sugar electrolyte replacement fluids (ERF) at a rate of 1 ERF to every 3 waters, and use the buddy system and monitor each other closely for signs of heat stress. Additional heat stress management techniques include installing temporary shade structures, utilizing misting systems, using a fan or air conditioning if available, and minimizing excessive PPE. Sufficient quantities of water and ERF shall be available in the work area at all times. Accommodations shall be available for field treatment of heat stress. In the event of a heat-related emergency, emergency response procedures should be followed.

Journey Management: All project personnel shall follow their respective company's Journey Management policies.

Ladders: Only properly trained personnel are to use ladders. Follow safe work practices, including ensuring the ladder is placed at a proper angle (minimum angle 4:1), the ladder feet are stable, a spotter is assigned to hold the ladder, the ladder is visually inspected and is in good condition, tools are raised/lowered in a bucket (or equivalent) or carried on a tool belt not held in hands while climbing, use three points of contact, and if working at heights above 5 feet, use fall protection.

Lifting Operations: Prior to conducting lifting operations using A-frames, winches, and tuggers, a JSA shall be completed (one per work shift per task is sufficient). All lifting operations shall follow safe practices, including: maintain lift as low to the vessel deck as possible; keep the load's center of gravity low and stable through proper rigging; reduce swinging loads by utilizing tag lines; for additional leverage and stability, wrap tag lines through fixed shackles or around cleats; never wrap tag lines around a body part; always wear abrasion-resistant gloves when handling tag lines; if the load begins swinging too much; lower

the load and wait for it to stabilize before starting the lift again; review hand and/or voice signals with the signalman and the winch/A-frame operator prior to conducting the lift; always notify the vessel Captain prior to conducting any lift (or any work on the back deck) so the Captain can position the vessel appropriately; no unnecessary personnel in the work area during the lift; stay out of the line of fire of lines under tension (ropes, cables, wires, slings); and never disable machine guarding.

Lightning/Severe Weather: Lightning can strike as far as 10 miles from a thunder cloud, and frequently strikes behind a storm cloud. Because of this, lightning can strike even when there is blue sky overhead. Therefore, no work shall be conducted on the back deck of the vessel if lightning is detected within 10 miles of the vessel. The Captain and Operations Managers shall monitor weather radar, weather forecasts, and any other means available (e.g., lightning detector, radio communication with other vessels in the area, etc.) to ensure that work is discontinued if lightning approaches within 10 miles of the vessel. Thunder can be heard up to 8 miles away from a lightning strike. Therefore, if thunder is heard, it indicates lightning is within 10 miles of your position. If thunder is heard, discontinue operations on the back deck immediately. Remain on lightning stand-down with respect to back deck operations until the storm clouds (lightning) are at least 10 miles away or 30 minutes has passed since the last thunder. Indoor work tasks can be completed during lightning stand-down events. The CSA Safety Officer and/or CSA Vessel Manager shall document all lightning stand-downs (and their duration).

Lone Worker Policy: Project personnel are required to follow the buddy system when working, and in the event of port calls, work and travel in teams of two or more persons at all times.

Management of Change: Changes in equipment, materials, systems, procedures, or safety-critical personnel, etc., can introduce safety and project risk. Risk shall be assessed by the appropriate parties (e.g., Captain, CSA Vessel Manager, CSA Safety Officer, CSA Project Manager, Chief Scientist, Client Representative, etc.) prior to making any material changes to the scope of work, safety- or quality-critical equipment, materials, systems, procedures, or safety-critical personnel. The risk assessment shall be documented, including updating the project's hazard identification if appropriate. Any new or increased hazards shall be mitigated to reduce risk to a level ALARP. A Management of Change (MOC) form shall be completed, if appropriate. The MOC shall be authorized by the appropriate level of project/client management (including all relevant parties) and distributed to all affected parties prior to commencing the change. In the event of an emergency change, the MOC shall be documented as soon as possible after the change has been made.

Manual Lifting: Use proper lifting techniques when conducting manual lifting, including: proper positioning of the load close to the body; bend at the knees and lift with the legs, not the back; obtain assistance with loads weighing over 25 pounds; use mechanical lifting devices whenever possible; clear the pathway prior to initiating the carry; and never carry the load so high that you cannot see where you are walking.

Permit to Work: Work permits are required to complete hot work/welding, energy isolation (lock-out/tag-out), confined space entry, and crane lifts.

Personal Hygiene: Communal/close-quarters living requires all personnel to practice good personal hygiene, including frequent hand-washing using soap and/or hand sanitizer, covering one's coughs and sneezes with an elbow or shoulder (not a hand), and cleaning up after oneself after using the restroom, shower, and/or laundry facilities.

Personal Protective Equipment (PPE): PPE shall be required as listed in the project-specific PPE Matrix, included in **Appendix D.** Project personnel shall wear appropriate and professional work clothing, including long pants, appropriate footwear, shirts with sleeves (no tank tops), safety glasses, and head covering that provides protection from sun while working. Full PPE is required at all times while on the back deck of vessel. All PFDs shall be properly worn, and fully zipped and clipped while in use. Improperly worn or improperly sized PFDs are insufficient protection of your life. Type I PFDs are to include whistle and safety light. Additional task-specific PPE may be required, as listed in the PPE Matrix.

Pre-Incident and Incident Reporting: All incidents and pre-incidents (unsafe conditions, unsafe acts, and near misses) are to be reported to the CSA Safety Officer and vessel Captain immediately. Incidents and pre-incidents shall be mitigated, documented, and investigated in accordance with CSA policy. Failure to report incidents and pre-incidents is a serious violation of this HASP.

Slips, Trips, and Falls: Slips, trips, and falls are extremely common hazards on vessels. It is critical that all personnel maintain extreme vigilance in watching out for and mitigating all slip, trip, and fall hazards. The best mitigation is to eliminate the hazard entirely (e.g., pick up and properly stow a broom that was left on the floor). If the hazard cannot be eliminated, install a barrier or barricade to prevent people from encountering the hazard. If barricades/barriers are not possible, then mark or flag the hazard with caution tape, bright yellow paint, or other means of warning personnel of the hazard. Always be aware of your surroundings and watch where you are walking. Use three points of contact (two hands and one foot, or two feet and one hand) for stability when walking. Pick up your feet higher than usual as you walk, due to the uneven surfaces of the boat deck/floors. In all cases, if you see a hazard, attempt to mitigate the hazard immediately. If you cannot personally mitigate the hazard, report it immediately to your supervisor, to the Operations Manager, or to the Captain, to be mitigated as quickly as possible.

Sunscreen: Project personnel should utilize sunscreen for protection against sunburn, even if the sky is overcast. A sun protection factor (SPF) of 20 or greater is recommended. Check the expiration date of sunscreen prior to use, and if expired, discard and replace.

Vessel/On Water Hazards: Use three points of contact at all times when standing/walking throughout the vessel (e.g., two hands and one foot, or two feet and one hand). Hold handrails and guardrails when walking up or down stairs. Only one person on a stairway at a time. Walk, don't run. Wear traction-soled shoes as floors/decks are often slippery. Keep egress routes clear of trip hazards and obstructions. Do not block safety equipment or life-saving appliances. Stow and secure all gear to avoid shifting gear during rough water. If prone to seasickness, take anti-seasickness medication several hours prior to encountering rough water. If seasick, watch the horizon (do not look down at the water), get outside or otherwise breathe fresh air, eat light foods.

Waste Management and Recycling: Project personnel shall strive to minimize generation of project-related household hazardous waste and shall recycle when possible. CSA shall dispose/recycle all project-related household waste in accordance with applicable local laws and regulations.

Wildlife Avoidance: The project and the vessel are to avoid all contact with wildlife, including but not limited to marine mammals, birds, sea turtles, rodents, snakes, and insects. Workers may encounter threatened, endangered, or dangerous wildlife while conducting work on the project.

APPENDICES

APPENDIX A

Acknowledgement

ACKNOWLEDGEMENT

My signature below acknowledges:

1. I have attended a Pre-Cruise Safety Briefing, including vessel safety orientation.
2. A copy of the Project-Specific Health and Safety Plan has been made available for my review.
3. I agree to follow the safety rules of the vessel and the Project-Specific Health and Safety Plan.

Clearly Print Name	Signature	Date
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APPENDIX B

BP Facility Data Cards

Data Card – Atlantis

The Vessel Master , Mates and relevant Atlantis Personnel must read and understand the applicable sections in BP's GoM 500-m Zone Practice Doc# 2057-T2-OP-PR-006 and the associated field specific documents.

Communications	
Phone Number: Control Room OIM	 **(979) 235-2222 / 2223** **(979) 235-2201**
VHF Channels: Control Room: FCL Call sign: PMQRS Call sign:	 **VHF Ch 16 Int.** **VHF Ch 13 / 73 / 74 USA** **WPYW 299** **WQET 532**
Block	**GC787A**
Water depth: 7,100-ft	**Max POB: 100** **Escape Ladders located at NW & SE legs**

Arrival

1 Hour prior to arrival in the field, the attending vessel should contact control room on VHF Ch. 13 or 16.

Attending Vessel Master is to ensure that the point of arrival approach takes them clear of facility. At no time should the vessel steer directly toward the facility.

On arrival at any installation, contact the Control Room for authorization to enter the 500-meter safety zone.

Comment: Cannot tie off to facility

Pre-Entry Check to be completed prior to entry into the 500-meter zone

Attending vessel is to perform their own company specified Field Arrival / 500-m entry check list in addition to the BP entry checklist found in 2057-T2-OP-FM-002. Signed check lists are to be kept for 6-months or the duration of the project.

Crane Details

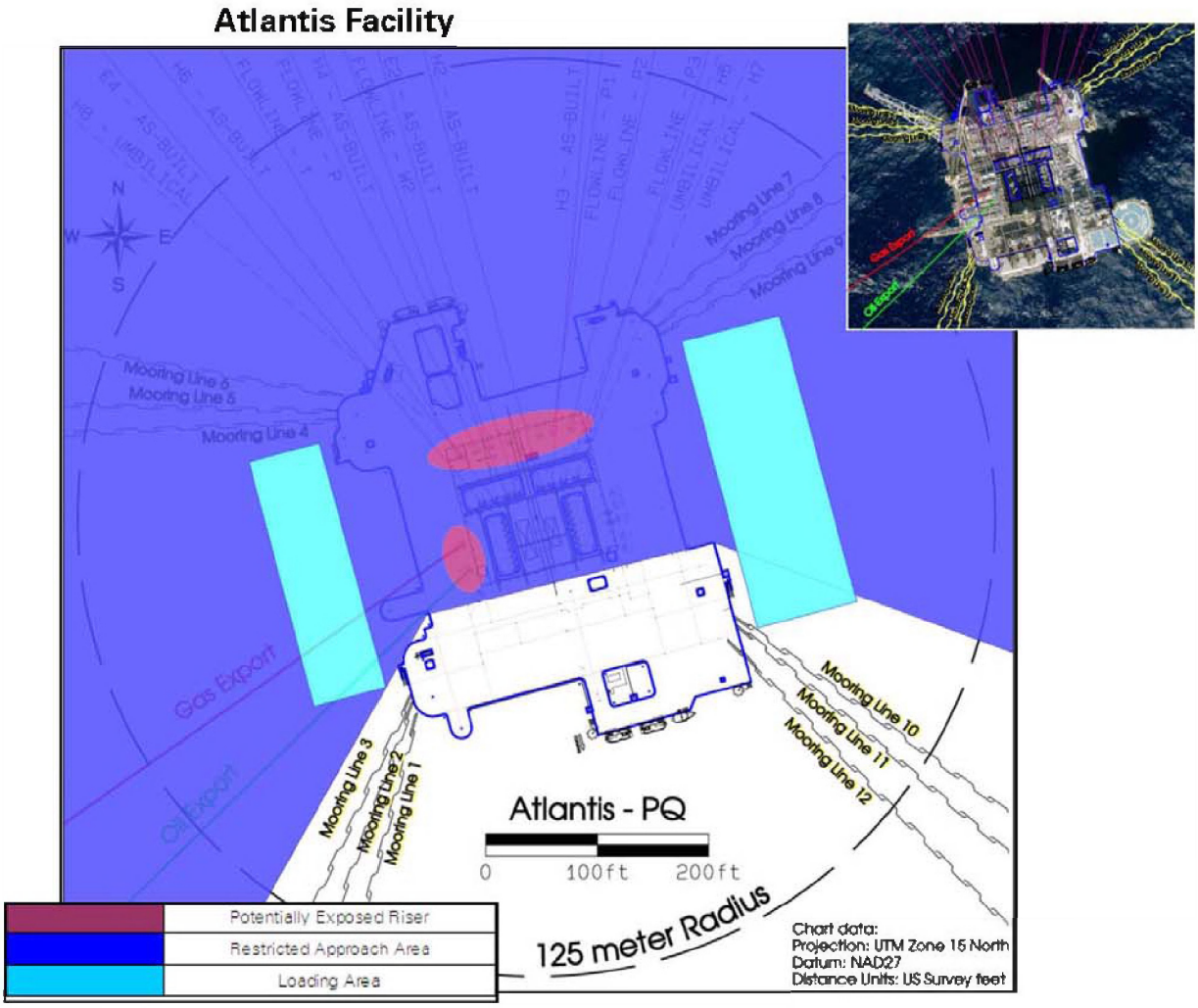
Crane Location	Fast Line SWL (t)	Main Block SWL (t)
West	15	60
East	15	60
Power Gen. Module	15	60

Bulk Details

Material:	Connection Size:	Location:
Diesel	4" Todomatic	E and W
Water	4" Todomatic	E and W
Methanol	4" Todomatic	E and W

- **Confirm vessel is able to work in prevailing weather**
- **Confirm there is adequate lighting**
- **Ensure pump rates are agreed prior to transfer**
- **Transfer is to commence at slow rate until line integrity is proven**

Atlantis Facility



Vessel Approach

Attending vessel should approach from the **South** and not approach the facility from a constant bearing (bow or stern) to an area of potential exposed riser (indicated in purple).

The attending vessel should give preference for approach and working the leeward side of the facility such that if the attending vessel were to lose position, it would be in a drift-off situation.

If the loading zone is located within a restricted approach zone, the attending vessel should give preference to being positioned such that the angle of the bow or stern does not enter between the columns or potentially come in contact with risers or hull piping in the event of a position loss.

The Restricted Approach Areas extend out to the 250-meter mark.

Particular Marine Hazards

- West, North and East side of Atlantis has restricted approach area
- West loading area has potential risk for dropped object
- Launching of the FRC within the 500-meter zone is not allowed without OIM permission, except in an emergency.

All vessels operating near or in conjunction with a BP Facility should be aware of marine pollution rules and regulations

Data Card – Mad Dog

bp

The Vessel Master , Mates and relevant Mad Dog Personnel must read and understand the applicable sections in BP's GoM 500-m Zone Practice Doc# 2057-T2-OP-PR-006 and the associated field specific documents.

Communications	
Phone Number: Main Control Room OIM	**(979) 235-2105** **(979) 235-2110**
VHF Channels: Control Room: Call sign:	**VHF Ch 16 / 73** **WPYQ 678**
Block	**GC 782**
Water depth: 4,500 ft	**Max POB: 162** **Escape Ladders located at NE & NW side**

Arrival

1 Hour prior to arrival in the field, the attending vessel should contact the control room on VHF Ch. 16 or VHF Ch. 73.

Attending Vessel Master is to ensure that the point of arrival approach takes them clear of facility. At no time should the vessel steer directly toward the facility.

On arrival at any installation, contact the Control Room for authorization to enter the 500-meter safety zone.

Comment: Cannot tie off to facility.

Pre-Entry Check to be completed prior to entry into the 500-meter zone

Attending vessel is to perform their own company specified Field Arrival / 500-m entry check list in addition to the BP entry checklist found in 2057-T2-OP-FM-002. Signed checklists are to be kept for 6-months or the duration of the project.

Crane Details

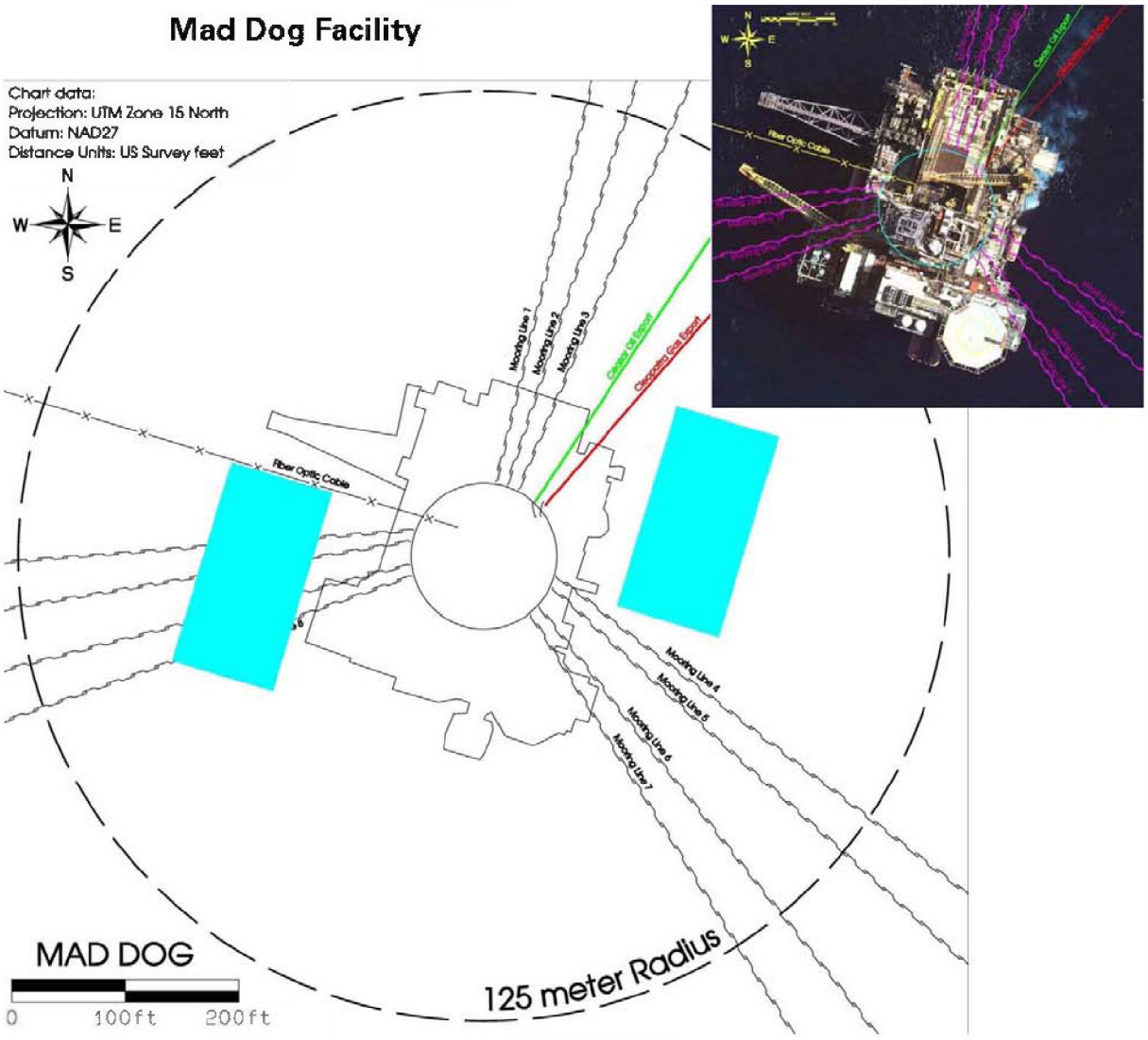
Crane Location	Fast Line SWL (lbs)	Main Block SWL (lbs)
West	30,560	123,240
East	30,000	123,240

Bulk Details

Material:	Connection Size:	Location:
Diesel	4" Todomatic	East
Pot Water	4" Cam lock	East
Drill Water	4" Cam Lock	East
Base Oil	4" Todomatic	East
SBM	4" Todomatic	East and West
Barite	6" Cam lock	East
Cement	6" Cam lock	East
Brine	4" Todomatic	West
Water base	4" Todomatic	West

- **Confirm vessel is able to work in prevailing weather**
- **Confirm there is adequate lighting**
- **Ensure pump rates are agreed prior to transfer**
- **Transfer is to commence at slow rate until line integrity is proven**

Mad Dog Facility



Loading Area

Vessel Approach

Attending vessel should not approach the facility from a constant bearing (bow or stern).

The attending vessel should give preference for approach and working the leeward side of the facility such that if the attending vessel were to lose position, it would be in a drift-off situation.

Particular Marine Hazards

- Launching of the FRC within the 500 meter zone is not allowed without OIM permission, except in an emergency.

All vessels operating near or in conjunction with a BP Facility should be aware of marine pollution rules and regulations.

Data Card - Nakika

The Vessel Master , Mates and relevant Nakika Personnel must read and understand the applicable sections in BP's GoM 500-m Zone Practice Doc# 2057-T2-OP-PR-006 and the associated field specific documents.

Communications	
Phone Number: Control Room OIM	 **(979) 230-4101 / 4110** **(979) 230-4124**
VHF Channels: Control Room: Call sign: BP Radio:	**VHF Ch 16 Int.** **VHF Ch 72 USA** **Platform Radios Ch. 6 & 7** **WPXVN 955** **Talk 3**
Block	**MC474**
Water depth: 6,350 ft	**Max POB: 99** **All four columns have egress ladders**

Arrival

1 Hour prior to arrival in the field, the attending vessel should contact control room on VHF Ch.16 or VHF Ch. 72.

Attending Vessel Master is to ensure that the point of arrival approach takes them clear of facility. At no time should the vessel steer directly toward the facility.

On arrival at any installation, contact the Control Room for authorization to enter the 500-meter safety zone.

Comment: Cannot tie off to facility

Pre-Entry Check to be completed prior to entry into the 500-meter zone

Attending vessel is to perform their own company specified Field Arrival / 500-m entry checklist in addition to the BP entry checklist found in 2057-T2-OP-FM-002. Signed checklists to be kept for 6-months or the duration of the project.

Crane Details

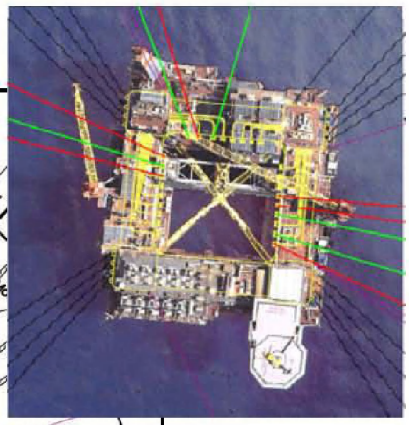
Crane Location	Fast Line SWL (lbs)	Main Block SWL (lbs)
West	35,600	132,520
East	35,600	132,520

Bulk Details

Material:	Connection Size:	Location:
Diesel	3" Todomatic	E and W
Water	3" Cam lock	E and W
Methanol	3" Todomatic	E and W

- **Confirm vessel is able to work in prevailing weather**
- **Confirm there is adequate lighting**
- **Ensure pump rates are agreed prior to transfer**
- **Transfer is to commence at slow rate until line integrity is proven**

Nakika Facility



Vessel Approach

Attending vessel should not approach the facility from a constant bearing (bow or stern) to an area of potential exposed riser (ndicated in purple).

The attending vessel should give preference for approach and working the leeward side of the facility, such that if the attending vessel were to lose position, it would be in a drift-off situation.

If the loading zone is located within a restricted approach zone, the attending vessel should give preference to being positioned such that the angle of the bow or stern does not enter between the columns, or potentially come in contact with risers or hull piping in the event of a position loss.

The Restricted Approach Areas extend out to the 250-meter mark.

Particular Marine Hazards

- West and East side of Nakika has restricted approach areas
- East side loading zone has potential risk for dropped object
- Launching of the FRC within the 500-meter zone is not allowed without OIM permission, except in an emergency.

All vessels operating near or in conjunction with a BP Facility should be aware of marine pollution rules and regulations .

Data Card – Thunder Horse

The Vessel Master , Mates and relevant Thunder Horse personnel must read and understand the applicable sections in BP's GoM 500-m zone practice Doc# 2057-T2-OP-PR-006 and the associated field specific documents.

Communications	
Phone Number: Main Control Room OIM	**(979) 235-2885 / -2900** **(979) 235-2860**
Email Address: BCO	**ThunderhorseBCO@bp.com**
VHF Channels: Control Room: Call sign: BP Radio:	**VHF Ch 16 / 17** **WPXF 501** **Ch 4**
Block	**MC 778**
Water depth: **6,230 ft**	**Max POB: 298** **Escape Ladders located at NW & SE legs**

Pre-Entry Check to be completed prior to entry into the 500-meter zone

Attending vessel is to perform their own company specified Field Arrival / 500-m entry checklist in addition to the BP entry checklist found in 2057-T2-OP-FM-002. Signed checklists to be kept for 6-months or the duration of the project.

Crane Details

Crane Location	Fast Line SWL (t)	Main Block SWL (t)
Starboard fwd	20	80
Port fwd	20	80
Starboard aft	15	62
Port fwd	15	62

Arrival

1 Hour prior to arrival in the field, the attending vessel should contact control room on VHF Ch. 16 or 17.

Attending Vessel Master is to ensure that the point of arrival approach takes them clear of facility. At no time should the vessel steer directly toward the facility.

On arrival at any installation, contact the Control Room for authorization to enter the 500-meter safety zone. Email completed 500m check list to BCO at ThunderhorseBCO@bp.com.

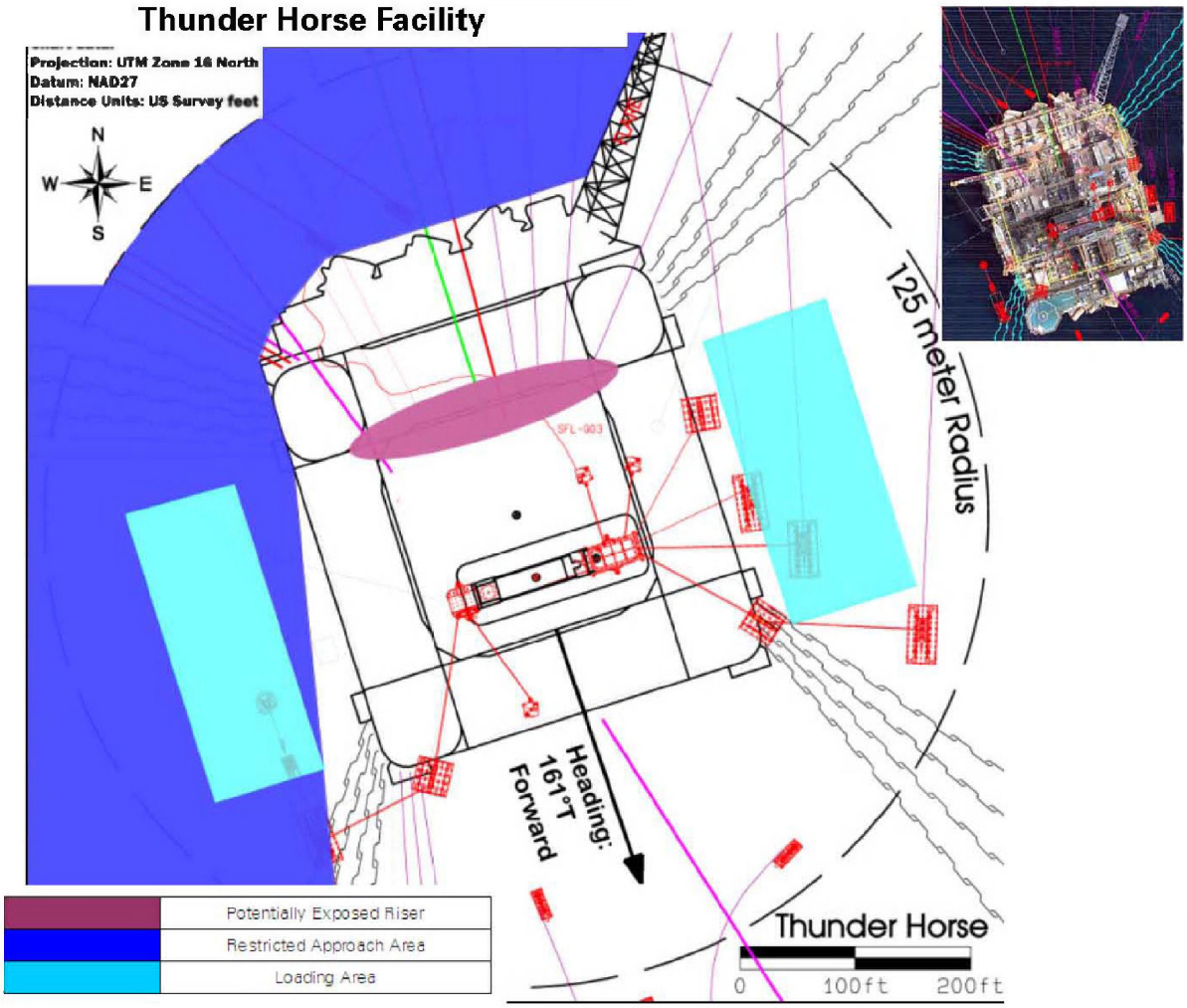
Comment: Cannot tie off to facility
Reference to 2057-T2-MA-PN-0001 - MAP for GOM Facilities with Exposed Risers
- North side approaches from a constant bearing should be prohibited.
- Starboard (West) side Approaches should be limited.

Bulk Details

Material:	Connection Size:	Location:
Diesel	4" Todomatic	Port/ Starboard
Water	3" Todomatic	Port/ Starboard
Methanol	4" Todomatic	Port/ Starboard
Base Oil	4" Todomatic 4" line	Port/ Starboard
SBM	4" Todomatic	Port/ Starboard
Barite	6" Cam lock	Port/ Starboard
Cement	6" Cam lock	Port/ Starboard
Brine	6" line/ 4" Todomatic	Port/ Starboard

- **Confirm vessel is able to work in prevailing weather**
- **Confirm there is adequate lighting**
- **Ensure pump rates are agreed prior to transfer**
- **Transfer is to commence at slow rate until line integrity is proven**

Thunder Horse Facility



Vessel Approach

Attending vessel shall not approach the facility from the **North** or with a constant bearing (bow or stern) to an area of potential exposed riser (indicated in purple).

The attending vessel should give preference for approach and working the leeward side of the facility, such that if the attending vessel were to lose position, it would be in a drift-off situation.

If the loading zone is located within a restricted approach zone, the attending vessel should give preference to being positioned such that the angle of the bow or stern does not enter between the columns, or potentially come in contact with, risers or hull piping in the event of a position loss.

The Restricted Approach Areas extend out to the 250-meter mark.

Particular Marine Hazards

- North side of Thunder Horse restricted approach area
- West side of Thunder Horse environmental dependant
- Starboard (West) side loading area has restricted approaches
- Launching of the FRC within the 500-meter zone is not allowed without OIM permission, except in an emergency.

All vessels operating near or in conjunction with a BP Facility should be aware of marine pollution rules and regulations.

APPENDIX C

Preliminary Hazard Identification and Risk Rating

HAZARD IDENTIFICATION AND RISK ASSESSMENT

The likelihood or probability of an incident occurring is classified and rated on a scale of 1 to 5, as illustrated in the following table.

PROBABILITY OF OCCURRENCE		
Rate	Degree	Description
1	IMPROBABLE	So unlikely that occurrence may not be experienced
2	REMOTE	Unlikely but possible to occur during project
3	OCCASIONAL	Likely to occur sometime during project
4	PROBABLE	Will occur several times during project
5	FREQUENT	Likely to occur frequently

Severity of consequence is classified and rated on a scale of 1 to 5, as illustrated in the following table.

SEVERITY OF CONSEQUENCE			
Rate	Degree	Category	Example Descriptions for Each Category
1	NEGLIGIBLE	Human	Negligible injury or health implications, no absence from work
		Property	Negligible loss of function/production with no damage to equipment
		Environment	No damage to environment
		Reputation	No impact
2	MINOR	Human	Minor injury requiring first aid treatment or headache, nausea, dizziness, mild rashes
		Property	Damage to equipment requiring minor remedial repair, loss of production
		Environment	Minor impact to the environment
		Reputation	Local impact
3	CRITICAL	Human	Event leading to a lost time incident or persistent dermatitis, acne, or asthma
		Property	Localized damage to equipment requiring extensive repair, significant loss of function/production
		Environment	Moderate pollution incurring some restitution costs
		Reputation	Limited national impact
4	MAJOR	Human	Involving a **single death or severe injury**, poisoning, sensitization, or dangerous infection
		Property	Damage to equipment resulting in production shutdown and significant production loss
		Environment	Severe pollution with short-term localized implications incurring significant restitution costs
		Reputation	Extensive national impact
5	CATASTROPHIC	Human	**Multiple deaths**, lung diseases, permanent debility, or fatality
		Property	Massive equipment damage
		Environment	Major pollution with long-term implication, very high restitution costs
		Reputation	International impact/negative exposure

The numeric product of the probability rating and the severity rating for each potential incident results in a quantitative and qualitative risk rating, as outlined in the table below.

P = PROBABILITY OF OCCURRENCE			S = SEVERITY OF CONSEQUENCE				
			1	2	3	4	5
			NEGLIGIBLE	MINOR	CRITICAL	MAJOR	CATASTROPHIC
	IMPROBABLE	1	1 Low	2 Low	3 Low	4 Low	5 Medium
	REMOTE	2	2 Low	4 Low	6 Low	8 Medium	10 Medium
	OCCASIONAL	3	3 Low	6 Low	9 Medium	12 Medium	15 High
	PROBABLE	4	4 Low	8 Medium	12 Medium	16 High	20 High
	FREQUENT	5	5 Low	10 Medium	15 High	20 High	25 High

Project-specific hazards and planned mitigations are illustrated in the following table: **"Preliminary Hazard Identification / Risk Assessment."**

PRELIMINARY HAZARD IDENTIFICATION / RISK ASSESSMENT								
Hazard	Consequences/Risk	Severity	Mitigations/Control Measures	Likelihood	Risk Rating	Additional Mitigations/Control Measures	Responsibility	Status
Boarding/loading vessel	Slips, trips, falls, injuries, damage to or loss of equipment	Minor	Designated boarding/loading areas and procedures, first aid, clear work procedures, lifting technique,	Occasional	Low	Review procedures in daily safety meeting prior to activity	n/a	Closed
Navigation and positioning control	Wrong locations, work delays, impact to work productivity	Critical	Obtain latest nautical charts, set up and check CSA vessel GPS navigation during mobilization, prepare pre-plots, provide accurate locations, provide coordinates in a digital exchange file	Remote	Low	Confirm accuracy of coordinates through backup GPS	Navigator	Closed
Deployment/handling of study equipment	Pinching injury, impact/crushing injury, entanglement, man overboard	Critical	Worker training, established procedures, work gloves, HSSE briefing	Remote	Low	Review procedures in daily safety meeting and JSA prior to activity	n/a	Closed
Man overboard	Loss of personnel, fatality	Major	PFDs, work deck rules, safety chain, man overboard procedures	Improbable	Low	Review procedures in daily safety meeting prior to activity	n/a	Closed
General health and safety (offshore/on water)	Heat/cold-related illness, allergic reactions, food-related illness, minor injuries	Minor	Adequate drinking water available, sunscreen, light clothing, clear decks, designated work areas, clear work procedures, first aid	Remote	Low	Review during HSSE induction and daily safety meeting prior to activities	n/a	Closed
Minor spillage of fuels, oils, and lubricants (under 5 gallons)	Environmental degradation, regulatory fines, damage to reputation	Minor	Secondary containment, refueling on land or in port only, adequate capacity for full-day operations, no equipment maintenance/refueling during rough seas	Improbable	Low	Review procedures in daily safety meeting and JSA prior to activity	n/a	Closed
Major spillage of fuels, oils, and lubricants (over 5 gallons)	Environmental degradation, regulatory fines, damage to reputation	Critical	As above; seek safe haven during high seas	Improbable	Low	Review procedures in daily safety meeting and JSA prior to activity	n/a	Closed
Road/driving accidents	Collisions, damage to vehicles or equipment, injury	Major	Use of licensed and experienced drivers, safe driving at posted speeds, seatbelts	Improbable	Low	Review procedures in daily safety meeting and JSA prior to activity	n/a	Closed
Lifting accidents, dropped equipment	Injuries, damage to or loss of equipment/material	Critical	Lifting procedures, lift plan, worker awareness, qualified/experienced personnel	Improbable	Low	Review procedures in daily safety meeting and JSA prior to activity	n/a	Closed
Food-/water-/blood-borne pathogens	Debilitating illness, impacts to productivity	Major	Worker training, HSSE briefing, emergency response plan	Improbable	Low	Review during HSSE induction	n/a	Closed

PRELIMINARY HAZARD IDENTIFICATION / RISK ASSESSMENT								
Hazard	Consequences/Risk	Severity	Mitigations/Control Measures	Likelihood	Risk Rating	Additional Mitigations/Control Measures	Responsibility	Status
Manual material lifting	Back strains, muscle pulls	Critical	Proper lifting techniques and proper ergonomics; lift with legs, not back; request assistance if over 25lb	Remote	Low	Include manual material lifting in JSA, review proper lifting techniques, emphasize buddy system for items over 25lb	n/a	Closed
Unsafe weather/sea state conditions	Damage to vessels	Major	Weather forecast reviews, continuous monitoring of local weather, ongoing communications, delay/cancel/abort weather thresholds	Improbable	Low	Conduct continuous monitoring of weather while on site, morning forecast reviews and postpone mobilization if predicted to exceed limitations	n/a	Closed
Rough sea conditions	Injuries, man overboard , damage to or loss of equipment/materials	Major	Check for secure deck and equipment/materials before getting underway, use of PFDs, 3 points of contact	Improbable	Low	Cross check for clear deck prior to getting underway	n/a	Closed
Vessel mechanical failure or damage	Loss of vessel, vessel adrift, stranded personnel	Major	Rigorous vessel maintenance and inspection, standby vessel, float plan, established communications	Improbable	Low	Ensure valid vessel inspections, pre-day vessel checklists	n/a	Closed
Unsafe deck conditions (e.g., wet, cluttered)	Slips, trips, falls, minor damage to equipment	Minor	Clear decks, designated work areas, 3 points of contact, clear work procedures, secure equipment	Remote	Low	Review procedures and PPE requirements in daily safety meeting and JSA prior to activity; install safety line across stern	n/a	Closed
Unsafe deck conditions (e.g., wet, cluttered)	man overboard, major damage to equipment	Major	Clear decks, designated work areas, clear work procedures, emergency response plan	Improbable	Low	Review procedures and PPE requirements in daily safety meeting and JSA prior to activity; install safety line across stern	n/a	Closed
Underwater obstructions, contact with bottom, grounding	Damage to seabed features/organisms, damage to vessel/ equipment, injuries	Minor	Review of nautical charts, mapping of navigation hazards, licensed and experienced vessel operators	Improbable	Low	Review transit route for obstructions, shallow water	n/a	Closed
Other vessel/traffic shipping	Collisions, vessel/equipment damage, injury, man overboard	Catastrophic	Review of nautical charts/shipping channels, proper radio channels/communication, radar systems, bridge watch	Improbable	Medium	Review of shipping patterns, contact any vessels in vicinity	Vessel Captain	Open

PRELIMINARY HAZARD IDENTIFICATION / RISK ASSESSMENT								
Hazard	Consequences/Risk	Severity	Mitigations/Control Measures	Likelihood	Risk Rating	Additional Mitigations/Control Measures	Responsibility	Status
Medical emergencies (injured/unconscious worker), limited timely medical access/support	Lack of/delayed medical attention leading to medical complications, possible disablement/ fatality	Major	Emergency procedures for worker MedEvac, established communications to shore, vicinity emergency support, emergency response plan, emergency oxygen on-board, comprehensive first aid equipment	Improbable	Low	Prior arrangements with port/ambulance, advice to Navy and/or U.S. Coast Guard, post-emergency contact information readily available on all vessels/boats	n/a	Closed
Emergency preparedness	Inadequate response to emergencies	Catastrophic	Conduct weekly drills, HSSE inspection to review emergency systems	Improbable	Medium	Review procedures in daily safety meeting prior to activity	Vessel Captain	Open

GPS = global positioning system; HSSE = health, safety, security, and environment; JSA = job safety analysis; MedEvac = Medical Evacuation; PFD = personal floatation device; PPE = personal protective equipment.

APPENDIX D

Personal Protective Equipment Matrix

PPE Matrix for Field Operations

X = Minimum Requirement

Task Title		Task Description & Requirements	HEAD		EYES		EARS	HANDS		FEET			SKIN				BODY		COMMENTS
			Sun Hat	Hard Hat	Safety Glasses (1)	Safety Goggles	Hearing Protection	Nitrile Gloves	Abrasion Resistant Work Gloves	Closed-toe Shoes	Steel/Safety-Toe Boots	Rubber Boots	Sunscreen	Long Pants; Shirt with Sleeves (i.e., no tank tops)	Face Shield	Chemical Apron	Fall / Man Overboard Protection	USCG Approved PFD	
1	Mobilization / Demobilization	All Operations tasks conducted on the dock and/or back deck of the ship during mobe/demobe	---	X	X	---	(2)	---	X	---	X	---	X	X	---	---	(2)	X	Footwear to have appropriate traction soles.
2	Work on Back Deck of Vessel - Operations	Operations work (other than sample handling), including launch and recovery of equipment.	---	X	X	---	---	---	X	---	X	---	X	X	---	---	(2)	X	Footwear to have appropriate traction soles.
3	Work on Back Deck of Vessel - Sample Handling	Sample handling work conducted on the back deck.	---	X	X	(2)	---	X	---	---	X	---	X	X	(2)	(2)	---	X	Footwear to have appropriate traction soles.
4	Exterior of Vessel, other than Back Deck	Exterior areas of the vessel, while not engaged in Operations work.	X	---	X	---	---	---	---	X	(2)	(2)	X	---	---	---	---	(2)	Footwear to have appropriate traction soles.
5	Laboratory Work	All laboratory and/or sample processing work that includes chemical handling.	---	---	---	X	---	X	---	X	---	(2)	---	X	(2)	(2)	---	---	Protect skin from liquid chemicals; work in well-ventilated area or under fume hood.
6	Interior of Vessel	All interior areas of the vessel, other than bathrooms/showers.	---	---	---	---	---	---	---	X	---	---	---	---	---	---	---	---	Closed-toe shoes required at all times, other than to/from shower rooms. No bare feet in common areas of the ship.

FOOTNOTES:

(1) Shaded lenses with UV protection preferred during daylight hours; only clear lenses shall be used at night.

(2) Wear when a specific hazard associated with the task exists and warrants wearing of this PPE. This will be determined onsite by conducting a field JSA prior to starting the task. The JSA is to be completed by personnel engaged in the task who are trained in completing JSAs.

Appendix F
Best Management Practices for the Protection of Sensitive Marine Species

Vessel Strike Avoidance Measures and Reporting for Mariners NOAA Fisheries Service, Southeast Region

Background
The National Marine Fisheries Service (NMFS) has determined that collisions with vessels can injure or kill protected species (e.g., endangered and threatened species, and marine mammals). The following standard measures should be implemented to reduce the risk associated with vessel strikes or disturbance of these protected species to discountable levels. NMFS should be contacted to identify any additional conservation and recovery issues of concern, and to assist in the development of measures that may be necessary.

Protected Species Identification Training
Vessel crews should use an Atlantic and Gulf of Mexico reference guide that helps identify protected species that might be encountered in U.S. waters of the Atlantic Ocean, including the Caribbean Sea, and Gulf of Mexico. Additional training should be provided regarding information and resources available regarding federal laws and regulations for protected species, ship strike information, critical habitat, migratory routes and seasonal abundance, and recent sightings of protected species.

Vessel Strike Avoidance
In order to avoid causing injury or death to marine mammals and sea turtles the following measures should be taken when consistent with safe navigation:

1. Vessel operators and crews should maintain a vigilant watch for marine mammals and sea turtles to avoid striking sighted protected species.

2. When whales are sighted, maintain a distance of 100 yards or greater between the whale and the vessel.

3. When sea turtles or small cetaceans are sighted, attempt to maintain a distance of 50 yards or greater between the animal and the vessel whenever possible.

4. When small cetaceans are sighted while a vessel is underway (e.g., bow-riding), attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the cetacean has left the area.

5. Reduce vessel speed to 10 knots or less when mother/calf pairs, groups, or large assemblages of cetaceans are observed near an underway vessel, when safety permits. A single cetacean at the surface may indicate the presence of submerged animals in the vicinity; therefore, prudent precautionary measures should always be exercised. The vessel should attempt to route around the animals, maintaining a minimum distance of 100 yards whenever possible.

6. Whales may surface in unpredictable locations or approach slowly moving vessels. When an animal is sighted in the vessel's path or in close proximity to a moving vessel and when safety permits, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area.

Additional Requirements for the North Atlantic Right Whale

1. If a sighted whale is believed to be a North Atlantic right whale, federal regulation requires a minimum distance of 500 yards be maintained from the animal (50 CFR 224.103 (c)).

2. Vessels entering North Atlantic right whale critical habitat are required to report into the Mandatory Ship Reporting System.

3. Mariners should check with various communication media for general information regarding avoiding ship strikes and specific information regarding North Atlantic right whale sighting locations. These include NOAA weather radio, U.S. Coast Guard NAVTEX broadcasts, and Notices to Mariners. Commercial mariners calling on United States ports should view the most recent version of the NOAA/USCG produced training CD entitled "A Prudent Mariner's Guide to Right Whale Protection" (contact the NMFS Southeast Region, Protected Resources Division for more information regarding the CD).

4. Injured, dead, or entangled right whales should be immediately reported to the U.S. Coast Guard via VHF Channel 16.

Injured or Dead Protected Species Reporting

Vessel crews should report sightings of any injured or dead protected species immediately, regardless of whether the injury or death is caused by your vessel.

Report marine mammals to the Southeast U.S. Stranding Hotline: 877-433-8299
Report sea turtles to the NMFS Southeast Regional Office: 727-824-5312

If the injury or death of a marine mammal was caused by a collision with your vessel, responsible parties should remain available to assist the respective salvage and stranding network as needed. NMFS' Southeast Regional Office should be immediately notified of the strike by email (takereport.nmfsser@noaa.gov) using the attached vessel strike reporting form.

For additional information, please contact the Protected Resources Division at:

NOAA Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701
Tel: (727) 824-5312
Visit us on the web at http://sero.nmfs.noaa.gov

Protected Species Interaction Prevention Procedures for No-impact Gear Types

For data collection efforts involving a number of gear types that are routinely deployed for measuring physical properties of the ocean or collecting plankton samples, the trustees and BP have determined that there will be no effect on protected species (endangered and threatened species, and marine mammals) under the Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA) if deployed according to standard protocols.

Endangered and threatened species considered to potentially occur in the sampling area.

Common Name	Scientific Name	Status
leatherback sea turtle	*Dermochelys coriacea*	endangered
loggerhead sea turtle	*Caretta caretta*	threatened
Kemp's ridley sea turtle	*Lepidochelys kempii*	endangered
green sea turtle	*Chelonia mydas*	threatened
hawksbill sea turtle	*Eretmochelys imbricata*	endangered
sperm whale	*Physeter macrocephalus*	endangered

In depths greater than 200 m, Kemp's ridley, green, and hawksbill sea turtles are expected to occur in such low abundances that they are discounted from any potential effects occurring to these species. Leatherback and loggerhead sea turtles, and sperm whales are considered further for potential adverse effects. In addition, non-listed species of marine mammals are also considered for the potential of incidental capture and entanglement occurring.

The gear types considered for their potential to incidentally capture or entangle protected species include:

- CTD and rosette samplers and instruments attached to these arrays
- Radiometers
- Bongo nets
- Neuston nets
- Vertically deployed or towed imaging systems
- $1m^2$ MOCNESS
- $10m^2$ MOCNESS

CTD and rosette samplers (with associated instrument packages) and radiometers are typically deployed in a vertical cast. The instruments are deployed on a cable and have no loose lines or other entanglement hazards for protected species.

Bongo nets are typically deployed on a cable down to a depth of up to 200 m and neuston nets are deployed in the upper 1 m of the water column. The small size of these nets (neuston net 2 square meters, 2 bongo nets of 0.5 square meters each) and the lack of a loose line makes the likelihood of capture or entanglement of a marine mammal or sea turtle exceedingly small. In more than two decades of the SEAMAP program conducting bongo and neuston tows, no incidental captures of marine mammals or sea turtles have occurred.

Imaging systems such as the Digital Automatic Video Plankton Recorder (DAVPR) are either lowered vertically through the water column or towed on a conducting cable. The overall footprint of the instrument package is small and the wire is kept tight for proper deployment. No loose lines are present.

Neuston net – 2square meters
Bongos are each ½ square meter for a total of 1 square meter
Manta Neuston net – approximately 0.5 square meter

$1m^2$ MOCNESS and $10m^2$ MOCNESS nets are deployed up to 2000m or more in depth (typically targeting 1500m). The net system is mounted on a rigid frame and no loose lines are hanging in the water. Although larger than bongo and neuston nets, these nets are still relatively small and only sweep a very small percentage of the water volume. The heavy, rigid frame results in a sinking rate of approximately 20m/s and thus the net is descending through the upper water column quickly. The nets are towed at 1.5 to 2.5 knots and tows last about 4 – 6 hours. Thus, for the 10m MOCNESS, the average volume swept in a deployment (assuming 1500m descent and a 5 hour tow at 2 knots) is approximately 215,000 cubic meters of water. Since sampling stations are on 30 nautical mile centers, the percentage of volume swept by a $10m^2$ MOCNESS, not including the volume below 1500m is 0.0000046% or approximately 1 in 215,165. Given that the most abundant turtle species, the leatherback has approximately 1 animal per 417 sq km of ocean in waters greater than 200m depth, if it is assumed that this density remains the same for waters in excess of 1500m, there are approximately 7.4 leatherbacks per 30 nm x 30 nm cell. Thus, if the animals were randomly distributed within the water volume and did not move, the probability of capturing one in the $10m^2$ MOCNESS is 1 in approximately 29,000 tows. Similarly, loggerheads are expected to be present at a density of about 1 animal per 500 square km and have a catch probability of 1 in 34,900 tows. However, since much of the tow time of the MOCNESS net is well below the foraging depth of turtles, the probability of capture is in fact, much lower.

Although a no impact determination on endangered species from these gear types has been made, and the likelihood of capture or entanglement of marine mammals in these gear types is exceedingly small during the deployment and retrieval of the nets from deep water tows, the following precautionary mitigating measures will be taken.

1. **Marine mammal and sea turtle observers.** Prior to deploying any sampling equipment, at least one observer shall be established to keep dedicated watch for marine mammals and sea turtles. The observer's sole purpose shall be to scan for marine mammals or sea turtles, with a focus of monitoring 180 degrees in front of the vessel's course, prior to the deployment of sampling gear. Since the intent of scanning for marine mammals and turtles is to assure that the gear is not deployed if marine mammals or turtles are shipside, a visual scan of the deployment area should be conducted for at least 30 minutes prior to deploying sampling gear. During night deployments night-vision binoculars or deck lighting with the naked eye may be used for monitoring. If marine mammals or turtles are observed in the vicinity of the vessel, deployment of sampling gear should not occur until protected species are verified to be clear of the area, or if not resighted, 30 minutes

after the initial sighting, until the chief scientist, in consultation with the captain deem that it is safe to do so.

2. **Keep all cables tight on sampling gear.** Protected species may become entangled in loose lines associated with sampling gear. Dolphins are known to become entangled in lazy lines on shrimp trawl nets, float lines of trap/pot gear, and buoy lines of gillnet gear, etc. Although none of the gear types under consideration here have lazy lines or other rope types, and cables are unlikely to entangle protected species, lines should not be allowed to become slack.

3. **If protected species are observed during sampling.** It is possible that marine mammals or turtles will be observed after sampling gear has been deployed but before sampling is complete. Given the small size of nets, the slow ship speeds, and the other factors outlined above for these sampling gears, any injurious interaction between the sampling gear and a turtle or marine mammal is still extremely small. However, if an observation is made while gear is in the water, the proximity of the observed animal to the sampling gear should be closely monitored and the gear should be removed from the water if there appears to be any potential for capture or entanglement.

If a protected species take occurs, the following measures shall be conducted:

1. **Report any marine mammal capture/entanglement immediately.** Marine mammal entanglements (live or dead) must be reported immediately to 1-877-WHALE HELP (1-877-942-5343).

2. **Report any sea turtle capture/entanglement immediately.** Immediately report any sea turtle takes to takereport.nmfsser@noaa.gov or Bob Hoffman at the NMFS Southeast Regional Office (727-403-2641). In the event of any unauthorized takes of sea turtles, sampling should cease until the harm avoidance measures can be reviewed with NMFS Southeast Regional Office, Protected Resources Division, and modified as needed.

3. **In the event of a live animal capture/entanglement within sampling gear,** work from the vessel as quickly and carefully as possible to disentangle the animal for prompt release. Ensure the marine mammal's blowhole and sea turtle's mouth are kept at the surface to ensure it can continue to breathe while disentangling. If possible, the animal shall be identified, photographed, and released directly back into the water to avoid further injury from being brought aboard the ship. If the animal is not able to be released directly back into the water, the animal and sampling gear shall be carefully placed on the deck of the ship, preventing the animal from falling on the deck and becoming further injured. For turtles, follow the turtle resuscitation guidelines (attached). For marine mammals, ensure the animal's blowhole is free of obstructions and work quickly and carefully to return the animal to the water.

4. **In the event of a mortality,** the animal shall be retained and guidance shall be given on how to maintain the carcass. The Principal Investigator or Chief Scientist shall seek

guidance from Wendy Teas (305-361-4595) for sea turtles and Blair Mase (305-361-4586) for marine mammals at the NMFS, Southeast Fisheries Science Center on how to retain the carcasses (i.e., whether they should be put in the cooler and immediately brought back to shore for sampling, or frozen for future sampling). Photos, measurements, and entanglement information shall also be documented per "NMFS' Protocol For Dead Entangled Small Cetaceans" (attached) or a sea turtle stranding form (attached) filled out and sent to Wendy Teas. Reports should also include whether mitigation measures were followed, and if not, an explanation provided.

Sea Turtle Resuscitation Guidelines

If a turtle appears to be unconscious or comatose, attempt to revive it before release. Turtles can withstand lengthy periods without breathing; a living comatose sea turtle may not move, breathe voluntarily, or show reflex responses or other signs of life. In other cases, a lightly comatose turtle may show shallow breathing or reflexes such as eyelid or tail movement when touched. Use the following method of resuscitation in the field if veterinary attention is not immediately available:

- Place the turtle on its plastron (lower shell) and elevate the hindquarters approximately 15 - 30 degrees to permit the lungs to drain off water for a period of 4 up to 24 hours. A board, tire or boat cushion, etc. can be used for elevation.

- Periodically, rock the turtle gently left to right and right to left by holding the outer edge of the carapace and lifting one side about 3 inches, then alternate to the other side.

- Keep the turtle in the shade, at a temperature similar to water temperature at capture. Keep the skin (especially the eyes) moist while the turtle is on deck by covering the animal's body with a wet towel, periodically spraying it with water, or by applying petroleum jelly to its skin and carapace. Do not put the turtle into a container with water.

- Do not put the turtle on its carapace (top shell) and pump the plastron (breastplate) or try to compress the turtle to force water out, as this is dangerous to the turtle and may do more harm than good.

- Periodically, gently touch the corner of the eye or eyelid and pinch the tail near the vent (reflex tests) to monitor consciousness.

- Sea turtles may take some time to revive; do not give up too quickly. Turtles that are successfully resuscitated benefit from being held on deck as long as possible (up to 24 hours) to fully recover from the stress of accidental forced submergence.

- Release successfully resuscitated turtles over the stern of the boat, when fishing or scientific collection gear is not in use, the engine is in neutral, and in areas where they are unlikely to be recaptured or injured by vessels. A turtle that has shown no sign of life after 24 hours on deck may be considered dead and returned to the water in the same manner.

NMFS/SEFSC Photos

References:

Federal Register, December 31, 2001. Government Printing Office, Washington DC 66 (250), pp. 67495- 67496.

July 2009

Appendix G
Accidental Take Materials

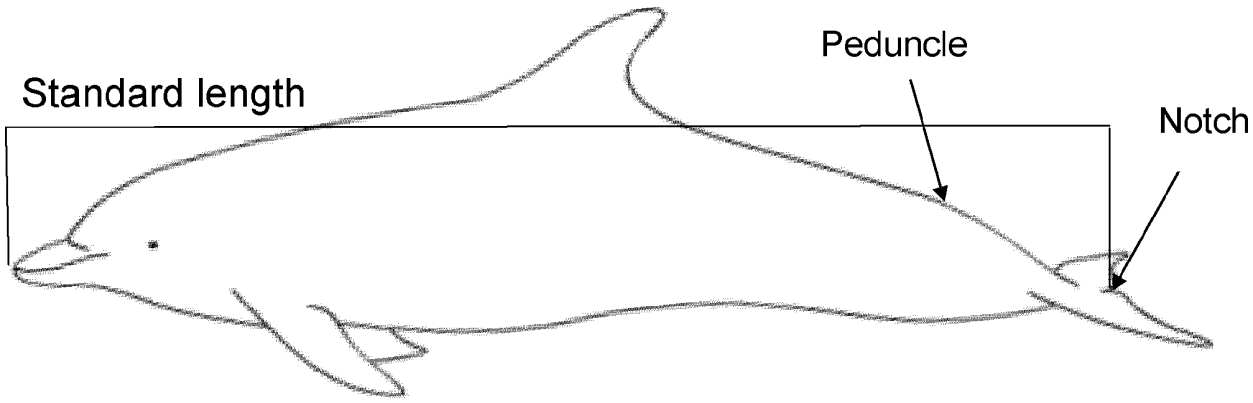
NMFS' PROTOCOL FOR DEAD ENTANGLED SMALL CETECEANS

In the event of a small cetacean mortality that is incidentally captured, please document the following items in addition to Title and Report Submitter.

1. Date of Incident.
2. Time of Incident.
3. Vessel name.
4. (a) Latitude of incident.
   (b) Longitude of incident.
5. (a) Describe where in the gear the animal was entangled.
   (b) Describe how the gear was wrapped around the animal.
6. (a) Indicate (yes or no) if animal was hauled onto vessel.
   (b) If no, briefly describe reason.

Provide Images

1. Photograph entire animal before removing from gear (with a scale bar if possible).
2. Photograph lateral view of dorsal fin (for photo-identification) with no gear (with a scale bar if possible).
3. Measure standard length (from tip of upper jaw to notch in the tail).
4. Photograph ventrum, including genital slits so sex can be determined (with a scale bar if possible).
5. After removal of gear, photograph any obvious signs of net impressions/lacerations or rope wounds (with a scale bar if possible).
6. Document where in the gear the animal was entangled/caught and how gear was wrapped around animal.



Please return this form to:
Stacey Horstman
NOAA NMFS
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

NATIONAL OCEANS AND ATMOSPHERIC ADMINSTRATION
NATIONAL MARINE FISHERIES SERVICE
PROTECTED RESOURCES

DEAD ENTANGLED SMALL CETECEANS REPORT

Title: | Report Submitted by:

1) Date of Incident | 2) Time of Incident

3) Vessel Name

4) (a) Latitude | 4) (b) Longitude

5) (a) Describe where in the gear the animal was entangled.

5) (b) Describe how the gear was wrapped around the animal.

6 (a) Could the entangled animal be hauled aboard the vessel? ☐ YES ☐ NO

6 (b) If NO, indicate the reason.

Provide Images as Indicated Below with this Report

☐ 1. Photograph entire animal before removing from gear (with a scale bar if possible).

☐ 2. Photograph lateral view of dorsal fin (for photo-identification) with no gear (with a scale bar if possible).

☐ 3. Measure standard length (from tip of upper jaw to notch in the tail).

☐ 4. Photograph ventrum, including genital slits so sex can be determined (with a scale bar if possible)

☐ 5. After removal of gear, photograph any obvious signs of net impressions/lacerations or rope wounds.

☐ 6. Document where in the gear the animal was entangled/caught and how gear was wrapped around animal.

Return this form to:
Stacey Horstman
NOAA NMFS
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

Print Form | Submit by Email

NOAA Fisheries Service

Southeast Region Ship Strike Report

Reporter Information

Reporting Vessel/Aircraft Name or # | Reporter's Name | Reporter's phone | Date of Report

Strike Vessel Information *(complete all that apply)*

TYPE OF VESSEL: Check all that apply

- ☐ Container
- ☐ Tanker
- ☐ Freight
- ☐ Research
- ☐ Fishing
- ☐ Towing
- ☐ Government
- ☐ Whale watch
- ☐ Ferry
- ☐ Recreational
- ☐ Other

Specify _____

Draft _____ ○ Feet ○ Meters

Forward _____

Aft _____

Mean _____

Name of Vessel involved in Strike | Gross Tonnage | Vessel Length ○ Feet ○ Meters

Vessel Make | Vessel Model | Propulsion | Engine Make

Distance between shafts | Horsepower | Prop Diameter | Prop Pitch

Observed or Noted Strike Information *(strike was noted visually or impact felt)*

Date of Strike | Time of Strike ○ Local ○ GMT | General Location | North Latitude | West Longitude

ENVIRONMENTAL CONDITIONS AT TIME OF STRIKE

Lighting | Weather | Visibility | Distance of Visibility ○ Kilometers ○ Miles | Air Temperature ○ Degrees F ○ Degrees C

Wind Speed | Direction (degrees) | Current Speed | Direction (degrees) | Water depth

Wave Height ○ Feet ○ Meters | Swell Height ○ Feet ○ Meters | Water Depth ○ Feet ○ Meters

NOAA Fisheries Service

Southeast Region Ship Strike Report - Continued

NAVIGATION INFORMATION AT TIME OF STRIKE

Vessel Activity	Engine RPMs	Engine Speed (Knots)	Vessel Course (Degrees)	Autopilot ON / Autopilot OFF

Total # of watchstanders	# on Navigation Bridge	# on Observation Bridge	# on Bow	Other

INCIDENT INFORMATION

Part of vessel struck by whale

Describe what was seen, felt, heard, etc.

Was avoidance action taken

Describe action taken, or reasons why avoidance not possible

Comments on damage to vessel

NOAA Fisheries Service

Southeast Region Ship Strike Report - Continued

ANIMAL INFORMATION

Time elapsed between sighting and collision

Distance from vessel when first sighted

Animal's orientation to the vessel

Estimated size/species of whale

Other marine mammals present?

Approximate number

Species

What direction was the whale traveling

Briefly describe whale's behavior prior to strike

Briefly describe whale's behavior after collision *(if seen)*

Portion of animal struck

Condition post-strike

Blood seen in water after strike

Description of wounds on animal. Use drawings to mark the location of wound(s). Include estimates of length and depth of wounds.

SEA TURTLE STRANDING AND SALVAGE NETWORK
Stranding Report

Observer's Name, address, phone #:

Stranding Date: | **Turtle number by day:** | **Coordinator notified within 24 hrs by:**

Stranding Location: | **Description of location: (be specific)**

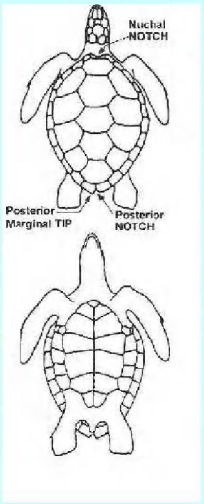
State:

County/Parish: | **Latitude:** | **Longitude:**

Turtle Condition: | **Yes** ☐ **No** ☐ **Carcass necropsied?** **Yes** ☐ **No** ☐ **Photos taken?**

Turtle Species: | **Yes** ☐ **No** ☐ **Species verified by coordinator?**

Sex: | **How was sex determined?** | **If tail extends beyond carapace enter amount in centimeters:**



CARAPACE MEASUREMENTS

Using calipers --

Straight length (NOTCH-TIP) ☐ cm ☐ in ☐

Min length (NOTCH-NOTCH) ☐ cm ☐ in ☐

Straight width (Widest Point) ☐ cm ☐ in ☐

Using non-metal measuring tape --

Curved length (NOTCH-TIP) ☐ cm ☐ in ☐

Min length (NOTCH-NOTCH) ☐ cm ☐ in ☐

Curved width (Widest Point) ☐ cm ☐ in ☐

Weight: ☐ kg ☐ lb ☐ est ☐ actual ☐

TAGS: *Contact coordinator before disposing of any tagged animal!!!*

Checked for flipper tags? Yes ☐ No ☐

Check all 4 flippers. Record tag numbers(s) /tag location / return address.

PIT tag scan? Yes ☐ No ☐

If found record number / tag location

Coded wire tag scan? Yes ☐ No ☐

If yes, record location (flipper).

Checked for living tag? Yes ☐ No ☐

If yes record location.

Mark wounds / abnormalities on diagrams at left and describe below. (note tar or oil, gear or debris entanglement, propeller damage, epibiota, papillomas, emaciation, etc.) **Please note if no wounds /abnormalities are found.**

FINAL DISPOSITION:

☐ 1. Left on beach where found: If painted indicate color below (8).

☐ 2a. Buried on beach. ☐ 2b. Off beach. ☐ 2c. Painted before buried.

☐ 3a. Parts salvaged. What, Why?

☐ 3b. Salvaged all.

☐ 4. Pulled up on beach dune: If painted indicate color below (8).

☐ 5a. Found alive, taken to rehab. Where?

☐ 5b. Found alive, released.

☐ 6. Left floating : If painted indicate color below (8).

☐ 7. Disposition unknown; explain:

☐ 8. Color painted:

INSTRUCTIONS FOR COMPLETING STSSN STRANDING REPORT FORMS

OBSERVER'S NAME/ADDRESS/PHONE#:
This is the person who handled the turtle in the field. Please give an address and phone number where you can be reached in the event we need to contact you for clarification of the reported data.

STRANDING DATE:
This is the date the stranded turtle was first reported or encountered. If you did not investigate until a later date, please note that in the remarks section at the bottom of the form. "Turtle Number by Day" is used to keep track of more than one turtle investigated on a single day by the same volunteer - your first turtle of the day is 01, second of the same day is 02, etc. Please notify the state coordinator within 24 hours for any stranding you document and check the box describing how the coordinator was notified.

STRANDING LOCATION:
Check "Offshore" if the turtle was found on an ocean beach or "Inshore" if the turtle was in a bay, river, sound, inlet, etc. Give a detailed descriptive location of the stranding using a reference point that can be found on a NOAA navigation chart. Local names or landmarks not found on most charts do not help pinpoint a location. Good reference points are inlets, fishing piers, light houses, water tanks, etc. Latitude/Longitude - if you have a GPS unit or are familiar with latitudes and longitudes and you have a navigation chart, please include the latitude/longitude of the stranding location. If you cannot provide accurate lat/longs, please leave this space blank. It then becomes even more important to provide a location description than can be pinpointed on a chart.

CONDITION:
Check the box that best describes the stranding. If the turtle seems intermediate between two stages of decomposition, pick the one that fits best. Fresh dead turtles should have no foul smell; moderately decomposed turtles smell bad, but skin and scutes are intact or are only beginning to peel, internal organs are still distinguishable; severely decomposed turtles smell very bad with scutes lifting or gone and skin beginning to peel or liquefy, internal organs beginning to liquefy, hard to distinguish individual organs; dried carcasses, leathery, internal organs completely decomposed.

TURTLE SPECIES:
Use the species identification key on the back of the form to positively determine species. If you are not positive of the species identification, check "Unidentified", please do not guess. Check boxes to indicate if photos were taken and if the state coordinator verified species. The state coordinator may verify species based on photos taken and submitted with the stranding report form.

SEX:
Check appropriate box(es). Sea turtles cannot be sexed externally until they are mature adults. If the turtle is not adult-sized (generally at least 92 cm straight length for loggerheads and green turtles, 60 cm straight length for Kemp's ridleys, 80 cm straight length for hawksbills and 130 cm curved length for leatherbacks) then you should check "immature, undetermined" if the turtle is not necropsied. Some males may begin to mature at slightly smaller sizes than those listed above and tail length should be documented if it is being used to externally sex a turtle.

CARAPACE MEASUREMENTS:
Use calipers to obtain straight measurements and /or flexible, non-metal measuring tape to obtain curved measurements. Measurement points are noted on drawings on left side of form. Circle units of measure -centimeters or inches; if units are not circled we cannot include measurements in the database.

FINAL DISPOSITION:
Check the box(es) next to the number that best describes what was done with the stranding after it was documented on the beach. Provide additional information regarding salvaged specimens. Record what rehabilitation facility live turtles were taken to.

TAGS: Contact state coordinator before disposing of any tagged animal!!

Flipper tags- check all flippers on all species and record information; note also if tag scars are seen.

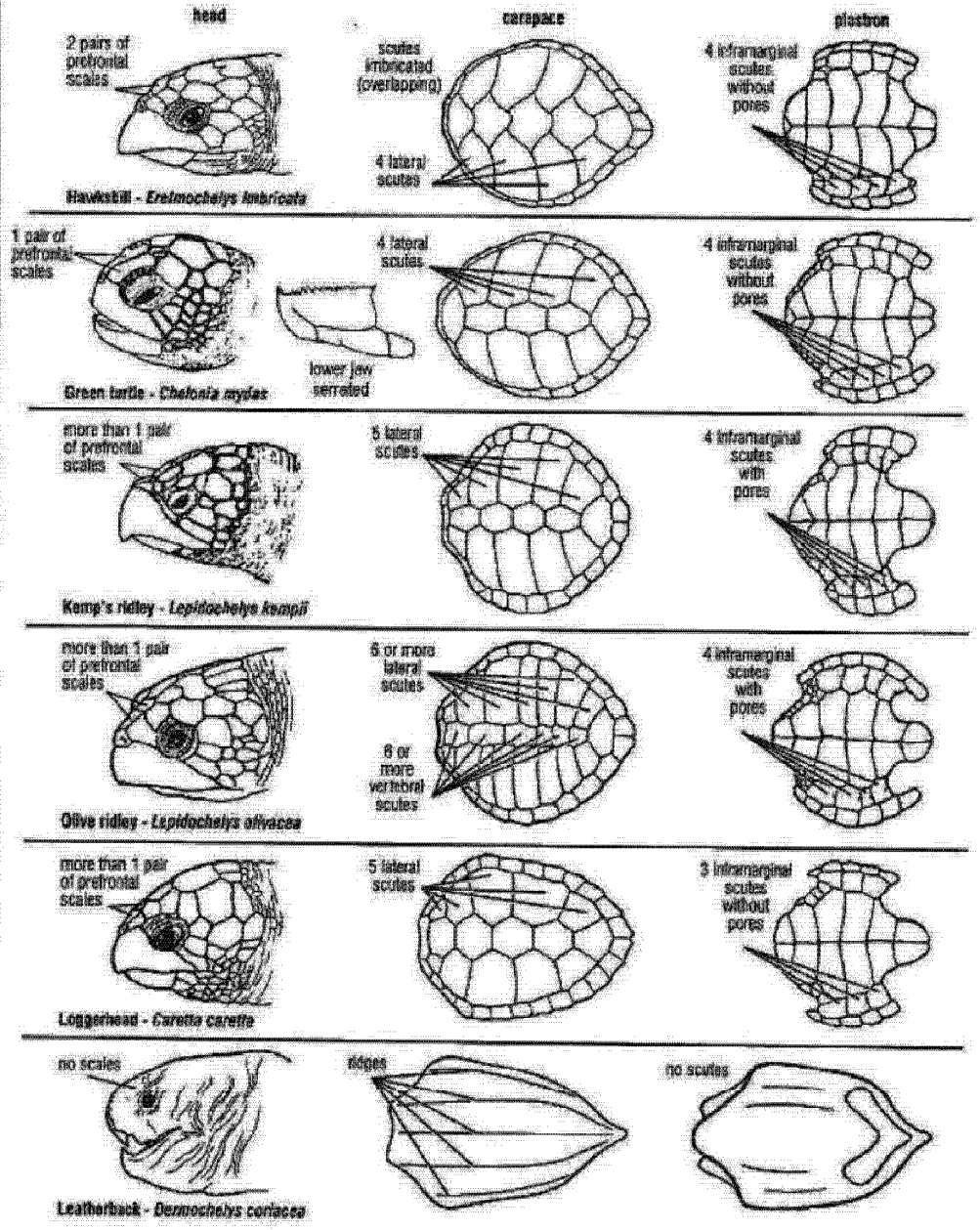
PIT tags -scan front flippers and shoulder areas of all species (see PIT tag scanning protocol for Specific instructions).

Coded wire tag scan -currently only being placed in front flipper region of Kemp's ridleys (see wire tag scanning protocol or specific instructions). Both front flippers and associated shoulder and "armpit" areas of all Kemp's ridleys should be salvaged for later scanning if a magnetometer is not available).

Living tags - check all Kemp's ridleys for light-colored areas on the dark carapace. Living tags are tissue transplants of the plastron onto the carapace which grow with the turtle and were used to mark head started turtles to distinguish between different ages. If you suspect a living tag is present the entire carcass should be salvaged. In most cases, Kemp's ridleys with living tags were also marked with external flipper tags, PIT tags and coded wire tags as well. The Cayman Turtle Farm has also used living tags on some green turtles to distinguish age and a couple of these have been documented by the STSSN; these turtles should have external flipper tags or tag scars as well.

REMARKS SECTION AT BOTTOM OF FORM:
Mark wounds/abnormalities on the diagrams at left and describe in detail. The more information you include, the easier it will be for us to code the record. Use the back of the data sheet to continue your remarks if needed. Always note anything unusual about a stranding event.

SPECIES IDENTIFICATION



Please use an envelope and mail original form to:

APPROPRIATE STATE STSSN COORDINATOR

A list of these state coordinators can be found at:

http://www.sefsc.noaa.gov/seaturtleSTSSN.jsp