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LETTER AND U S NAVY RESPONSE TO U S EPA REGION I COMMENTS REGARDING DRAFT SAMPLING AND ANALYSIS PLAN FOR SITE 19 DERECKTOR SHIPYARD NS NEWPORT RI
07/11/2011
TETRA TECH NUS

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C-NAVY-07-11-4476W

July 11, 2011

Project Number 112G02747

Ms. Kymberlee Keckler, Remedial Project Manager
U.S. EPA Region I
5 Post Office Square, Suite 100
Boston, Massachusetts 02114-3912

Reference: CLEAN Contract No. N62470-08-D-1001
Contract Task Order No. WE61

Subject: Response to Comments
Draft Sampling and Analysis Plan, IR Site 19, Former Derecktor Shipyard (Offshore),
Naval Station Newport, Newport RI

Dear Ms. Keckler:

On behalf of Ms. Winoma Johnson, US Navy NAVFAC Mid-Atlantic, I am providing to you, attached, the response to comments on your letter dated June 23 regarding the UFP SAP for the off-shore portions of Site 19 (May 2011). It is our hope to be able to discuss and resolve any remaining issues at (or prior to) the RPM meeting planned for July 20, 2011. As you know, it is our interest to complete the field portions of this study during this field season.

If you have any questions, please do not hesitate to contact me at 978-474-8434.

Very truly yours,

Stephen S. Parker, LSP
Project Manager

Enclosures

c: D. Barclift, NAVFAC (w/encl.)
K. Finkelstein, NOAA (w/encl.)
A. Gavaskar, NAVFAC (w/encl.)
G. Glenn, TtNUS (w/o encl.)
G. Jablonski, (w/encl.)
W. Johnson, NAVFAC (w/encl.)
K. Munney, USF&W (w/encl.)
P. Steinberg, Mabbett Associates (w/encl.)
D. Ward, NAVSTA (w/encl.)
Site File (c/o G. Wagner TtNUS (w/encl.)
File 112G02747-8.0 (w/encl.), 3.1 (w/o encl.)

Tetra Tech
250 Andover Street, Suite 200, Wilmington, MA 01887-1048
Tel 978.474.8400 Fax 978.474.8499 www.tetratech.com

RESPONSES TO
USEPA COMMENTS
DRAFT UFP SAMPLING AND ANALYSIS PLAN
SITE 19 - FORMER ROBERT E. DERECKTOR SHIPYARD
NAVAL STATION NEWPORT
NEWPORT, RHODE ISLAND
COMMENTS DATED JUNE 23 2011

General Comments

General Comment 1: *Throughout the SAP, reference is made to 'limiting COCs' that were the major risk drivers identified in the ecological risk assessment. However, zinc and copper contributed to risk as noted in the ecological risk assessment and it is possible that they could drive risk in the vicinity of the piers. EPA does not agree that actions should be limited based only on the concentrations of certain contaminants. Zinc and copper concentrations that exceed the BPRG and TBT concentrations that exceed the NOEC likely contribute to risk and sediment containing such concentrations should be either assessed to demonstrate no excess risk or managed to reduce risk as governed by federal law. The SAP must acknowledge this.*

Response: The SAP is designed to clearly describe the use of the data in decision making. The statements regarding "limiting COCs" are intended to do that, showing the previous agreements made with regards to the risk assessment, the COCs and the RPRGs.

As discussed during planning meetings, the Navy agreed to add TBT, zinc and copper to the analyte list, and it is our expectation the concentrations measured will be similar to those measured in the past. However, if concentrations are dissimilar to those previously measured (i.e. concentrations are higher), it is agreed that discussions on how to address those areas would be appropriate. This point will be added to the executive summary of the SAP.

In addition, the second bullet on page 38 of the SAP will be revised to state: "The measured copper and zinc concentrations will be reported to the regulatory parties regardless as to whether they exceed PAL, and the project team will convene to determine the appropriate path forward at that time."

General Comment 2: *EPA's comments that were e-mailed on February 7, 2011 on the Navy's sampling plan revisions of December 21, 2010 included the following:*

1) *EPA identified 24 locations around and under Pier 1 and nine locations around Pier 2 where zinc and copper samples are needed. Why hasn't this SAP included all these locations?*

2) *EPA requested that TOC be collected for all samples to better assess potential risk. That has not been done for this SAP. TOC samples are proposed only in selected locations.*

3) *EPA indicated that step out sampling for asbestos may be required depending on the analytical results. Also, if damaged asbestos-containing material is present at Pier 2, asbestos samples should be collected there as well. These are not discussed in the SAP.*

4) *EPA requested that details for the proposed multi-beam sonar survey be provided in the detailed sampling plan for evaluation. However, no details were included in the SAP for this survey. Please provide the details for this work.*

Response:

1) During the DQO meetings, the Navy agreed to collect copper and zinc in areas that could not be previously accessed. Thirty eight locations are presented in the SAP for zinc and copper analysis. This includes 8 at Pier 2, 19 at Pier 1, and 11 in the southern outfall area, as identified in the

December 21 letter summarizing the December meeting and conceptual plan. While the Navy believes this is adequate coverage to meet the objectives described at the meeting, It is recognized that the email from K. Keckler to W. Johnson dated 2/7/11 requests analysis for these metals at 24 stations around Pier 1 and 9 at Pier 2. As such, we are willing to add this analysis to one station at Pier 2 and to five stations at Pier 1, and it is requested that EPA suggest locations accordingly using the grid presented on Figure 17-1.

2) The purpose of TOC analysis is to support bioavailability of the chemical constituents found. EPA requested on 2/7/11 to add TOC to all samples in order to better assess the potential risk. Since assessment of risk is not the goal of this data gaps investigation, the Navy elected to analyze a subset of the samples for TOC: 50% of the surface sediment samples and at 20% of the sediment sample locations. The Navy believes that this coverage should be more than sufficient to provide the data necessary to support this data gaps investigation.

3) As previously agreed, the Navy will sample for asbestos under Pier 1. The Navy agrees with the EPA request made 2/7/11 which states sampling under Pier 1 initially, and stepping out if asbestos becomes an issue. To clarify, the Navy will conduct the sampling under the Pier as requested and present data to the team for discussion as to the use and need for step-out sampling. However, the step-out contingencies are not intended to be addressed in the SAP. Also be advised that NAVSTA has completed asbestos abatement of piping and lagging under Pier 1.

   Regarding Pier 2, the Navy has previously stated that the asbestos lagging is present on pipes that are in use. The asbestos lagging on these pipes are maintained, inspected and reports provided to EPA, in accordance with the Clean Air Act requirements. Additionally, as previously provided, NAVSTA reports no history of releases of lagging from piping under Pier 2, although an abatement project is awarded as part of pier repair work.

4) Survey data objectives are not typically included in the UFP SAP. However, it was recognized that having a survey map would be useful to the team in advance of the sampling effort, and therefore, the multibeam sonar survey was conducted in May 2011. This was done in order to allow adjustment of sampling stations if significant mounding or scour holes were found to be present. The resulting mapping product and report were provided by the surveyor on 6/24/11. The map and report are therefore provided as Attachment 1 to this response summary, and will be integrated into the data gaps investigation report as appropriate.

General Comment 3: *Please explain why the Radioisotope analysis of the sediment cores is not discussed. It was included in the physical data collection plan in the December 15, 2010 Conceptual Sampling Plan.*

Response: Radioisotope analysis was inad**v**ertently left out of the SAP. A subcontract has been procured, and their technical submittal is provided as Attachment 2 to this response summary. The appropriate work sheets of the SAP will be revised to incorporate this information. To summarize, one foot cores collected at the geophysical stations will be sectioned into 9 separate vertical sections and analyzed for decay of the lead isotope Pb210 so as to determine the bedding time of the sediment present at these stations and within these layers. The analysis will be done via alpha spectroscopy under method DOE STL-RC-0210 to an MDL of 1 pCi/g. A total of 90 samples will be analyzed using this process. The subcontractor's technical submittal is provided attached to this response package (Attachment 2).

Specific Comments

Comment 1: *p. 3, Executive Summary: The third paragraph states that sampling in 2004 detected lower contaminant concentrations around Pier 1. This statement needs to be retracted because two aircraft*

carriers were docked on either side of Pier 1 and no samples were collected in 2004 along most of Pier 1.

Response: This sentence will be edited to state "Additional sampling conducted in 2004 found similar contaminants in the same locations, but at much lower concentrations. This was particularly true at samples collected near the former Building 234, and samples collected in the vicinity of the aircraft carriers that are/were docked at Pier 1." Only one station was not accessible to the team in 2004, and other samples were added to compensate.

Comment 2: *p. 9, Worksheet #2: Please check the November 11, 2010 date for scoping session 2. A conference call was held on November 22, 2010. See also worksheet #9b that refers to November 22, 2010.*

Response: Comment noted, change will be made.

Comment 3: *p. 35, §11.2: Please change the RPRG for lead to 168 mg/kg.*

Response: Comment noted, change will be made.

Comment 4: *p. 36, §11.2: The third paragraph states that non-detected results with associated LOD values greater than the PAL will be treated as values that are less than the PAL for the purposes of making decisions. This is not appropriate. A conservative approach is required and in such situations non-detected results greater than the PSLs shall preferably be treated as exceedances or at a minimum as data gaps. Please edit the document accordingly. The remainder of the paragraph is appropriate in that such data shall be evaluated in concert with the rest of the data to determine what action is necessary.*

Response: The PALs are above the laboratory LOQs. Therefore any sample result that is below the laboratories LOQ will be considered "clean". The LOQ are higher than the LOD, and therefore an LOD detection can only mean that the sample is "clean". On review, it is actually unclear how an LOD value could ever be greater than the PAL. Therefore, the entire passage of the SAP will be eliminated.
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Comment 5: *p. 37, §11.4: The second paragraph assumes that if no PALs are exceeded during this sampling, the team would recommend no further investigation or remedial action. This assumption disregards the existing data that identified unacceptable risk. If no PALs are exceeded during this sampling round, at a minimum, the entire data set should be evaluated by the project team. Confirmation sampling in selected areas should be completed before a no further action can be agreed to. Also, the presence of the aircraft carrier on the north side of Pier 1 will hinder the collection of sediment samples from their preferred locations. Because those sample locations are considered important for decision-making, that data gap will have to be evaluated and addressed before a remedy is implemented or a no further action decision is rendered.*

Response: This paragraph will be revised to state "If all newly-acquired target analyte concentrations in the site sediment are less than the associated PALs (discussed in Section 11.2), then the team will evaluate potential steps forward, including no further action or remedial action."

The presence of the aircraft carrier (Saratoga) needs further discussion: The planning team believed that the Saratoga would be moved in 2011. Current schedule indicates that the ship may not move until later in 2011 or in 2012. However the team agreed to proceed with sampling at this site and select a remedy based on current site conditions. If the team believes that remedial alternatives cannot be evaluated for the purpose of completing the FS until the five samples can be collected directly underneath the hull of the vessel, then the sampling and the FS both may need to be delayed accordingly. However, the Navy believes that the collection of samples in close proximity to the ship and samples from beneath the adjacent carrier (now moved), should be sufficient for characterizing contamination at this site and selecting an appropriate response action. It is understood that as a part of the Five Year Review process, protectiveness of the remedy must be assessed, when contamination is left in place.

Comment 6: *p. 38, §11.4:*
a) The second bullet needs to be revised. Exceedance of the PALs for copper or zinc will prompt the need for a risk evaluation and possibly a more detailed risk assessment depending on the analytical results.

b) The penultimate sentence in the last paragraph expresses that additional investigations are not expected. However, based on the spatial distribution of the planned sample locations, EPA believes that additional investigation to better define the limits of detected contamination (i.e., a pre-design investigation) is possible and could be necessary to support a remedy. This sentence should be deleted.

Response:

a) The bullet will be revised as described in the response to General Comment 1, above. However, it is concerning that the comment is not consistent with previous agreements or documents. It was agreed at the planning meetings that zinc and copper would be collected at NOAA and F&W request although it was clear that the group was not sure how that data would be used. Exceedance of the PAL for copper or zinc will not prompt the need for risk evaluations. Given that the ERA and the PRG document were previously accepted, a decision about revising the risk or doing a new assessment could only be made if conditions are found that are completely unexpected at this point in time.

b) The comment is concerning because at the outset of the planning stages, the Navy stated that this sampling effort was intended to support remedial decision-making. The second sentence of the conceptual sampling plan (December 15, 2010) states "Data will be adequate to support remedy selection and design." The statement from the SAP that additional investigations are not expected is correct, and should remain.

Comment 7: *p. 41, §13: This worksheet states that previously-collected data will not be used in the development of the FS. EPA does not accept that statement. Previously-collected data should be considered when evaluating the site sediment. Also, the spatial distribution of the proposed samples is large, so all available data need to be considered to reduce errors in characterizing the extent of contamination.*

Response: The text will be revised to state that previously collected data were used to aid in the selection of sample stations for this SAP, and will also be considered while evaluating new data.

Comment 8: *p. 44, §14.1: Will the sediment stability cores be collected by ERDC? Please clarify the SAP.*

Response: This paragraph will include a sentence that will state the following "ERDC will be responsible for the collection of the cores as well as the onsite testing."

Comment 9: *p. 46, §14.4: Please include any reports received for the physical data collected in addition to the summaries mentioned in the text as appendices.*

Response: This section will be updated to indicate that physical data reports will be included in the report as appendices.

Comment 10: *p. 58, Worksheet 18: Please clarify the intent regarding the collection of TOC samples. Based on this worksheet, there should be 104 TOC samples including 58 surface samples and 46 subsurface samples (assuming one for each subsurface interval). However, Worksheet 20 lists only 81 TOC samples, suggesting that only 23 subsurface samples will be collected. This appears inappropriate and it is not clear which depth intervals will be sampled. The scope of TOC sampling should be discussed.*

Response: Please refer to the response to General Comment 2, part 2.

Comment 11: *p. 64, Worksheet 19:*
a) For TBT, holding time references "frozen < 18^{o}C." Should this be ^{o}F or -18^{o}C? Please correct.
b) For TOC holding time, the 1988 Lloyd Kahn method specifies fourteen days to analysis if held at 4oC. Please correct.

Response: The typo is noted, samples will be frozen to -18 degrees C (approximately 0 degrees F).

Comment 12: *p. 66, Worksheet 20*
a) According to Worksheet 18 and Figure 11-1, there are 38 locations where cores will be collected for copper and zinc analysis. Therefore, there should be 114 sample locations for these metals, not 93.
b) Since equipment blanks are listed in this table, source blanks will be required. Please list the required source blanks.
c) Temperature blanks will also be used for this project. Please list them or add a note.

Response:

a) Comment noted, the change will be made to WS 20.
b) The source blank water for this project would be off-the-shelf DIUF water (Fisher Scientific is the supplier), and is therefore unnecessary. The column will be deleted from the table.
c) A note will be added to the bottom of the table.

Comment 13: *Figure 11-1:*
a) Please relocate the label for DSY-22 because it is covering a sample location.
b) The December 2010 sampling plan, included samples around the end of Pier 1. However, those sample locations have been omitted from the plan depicted. Please add location AD1 and X1 as orange symbols.
c) It is possible that the presence of the carriers inhibited and still inhibits the clockwise current flow that was measured before the presence of the carriers at Pier 1. If correct, then a monitoring point southwest of the end of Pier 1 would be appropriate based on the possibility that the counter current flow in the presence of the carriers is redirected to the southwest rather than continuing north under the carrier and past the piers.

Response:

a) Comment noted, the requested change will be made.

b) The December 2010 sampling plan presented a very basic figure to provide the Project Team with a general idea regarding proposed locations. The intent was clearly to sample sediment beneath Pier 1, and beneath the locations where the aircraft carriers are, which are the same locations where the floating dry-docks previously were. In development of the figures, however, , one station at the grid position of AD 1 (Figure 17-1) was not added as intended, and this station will be added accordingly.

c) Any changes based on this request would require discussion. The comment states clockwise flow, but the flow is actually counterclockwise. Whether the carriers impede this flow is speculative. In addition, it is unclear whether the sample position requested is the one described in the response (b) above, or if an additional regional situation is the concern of the reviewer. Additionally, it is unclear what data southwest of the pier would tell us. It was not included in the planning discussions, and it is not recommended to be added without clear data objectives.

Comment 14: *Appendix F, p. L-2-5: Regarding the last paragraph, when recoveries are less than specified this will have to be noted. EPA understands the desire to maintain the sample depth interval for sample identification purposes, but it should be known when recoveries are less than specified and what the recoveries actually were. That actual recovery data need to be presented, preferably concomitant with the analytical results.*

Response: During the development of the analytical report, a discussion will be presented on the topic of recovery and sample nomenclature. All penetration/recoveries will be recorded on field log sheets and summarized into tables within the report.

MARINE AND FRESHWATER
SURVEY SERVICES

OCEAN SURVEYS, INC.
129 MILL ROCK ROAD EAST
OLD SAYBROOK, CT 06475
TEL. (860) 388-4631 FAX (860) 388-5879
www.oceansurveys.com

23 June 2011

Mr. Stephen S. Parker
Tetra Tech NUS, Inc.
250 Andover Street
Wilmington, MA 01887

SUBJECT: OPERATIONS REPORT (OSI REPORT NO. 11ES036)
MULTIBEAM HYDROGRAPHIC SURVEY
CODDINGTON COVE
NAVAL STATION NEWPORT, NEWPORT, RI

Dear Mr. Parker:

During the period 25-27 May and 3 June 2011, Ocean Surveys, Inc. (OSI) conducted a multibeam hydrographic survey within Coddington Cove, Naval Station Newport, Newport, RI. The objective of this investigation was to develop full bottom coverage of the harbor floor within the study area to generate bottom contours and surficial imagery. This letter report outlines the procedures and instrumentation employed during the survey.

SUMMARY OF FIELD INVESTIGATION & EQUIPMENT

Upon arrival on site, a Trimble MS 750 Real Time Kinematic Global Positioning System (RTK GPS) base station was established over the control point "Log 1, Base 2" which is a drill hole set into a concrete foundation situated on the north side of a small, ruined pier in the southeast corner of Coddington Cove. The coordinates of 'Log 1, Base 2" were derived by Louis Federici Associates and provided to OSI by Tetra Tech. Based on the known and the measured position of the RTK GPS base station reference antenna, the base unit generates correctors for each GPS satellite in view and transmits these values via radio modem to the shipboard RTK GPS unit. The shipboard RTK GPS unit employs the correctors in calculating position data with a manufacturers stated 1 cm horizontal and 2 cm vertical accuracy.

The coordinates of "Log 1, Base 2" as well as supplementary project control, also provided by Tetra Tech, were referenced horizontally to the Rhode Island State Plane Coordinate System, NAD 27, US Survey Feet. Project control was referenced vertically to the National Geodetic Vertical Datum of 1929 (NGVD29), Feet. The control point positions were converted to the horizontal and vertical datums used during data acquisition: Rhode Island State Plane Coordinate System, NAD 83, US Survey Feet and North American Vertical Datum of 1988 (NAVD88), Feet. The control point coordinates and elevations are provided in Tables 1 and 2 below.

Table 1
Project Control XYZ

STATION	NORTHING	EASTING	ELEVATION
	RI State Plane, NAD27, Feet		NGVD29, Feet
Log 1, Base 1, Nail	160768.87	551465.00	10.12
Log 1, Base 2, DH	160875.11	551435.44	13.12

Table 2
Converted Project Control XYZ

STATION	NORTHING	EASTING	ELEVATION
	RI State Plane, NAD83, Feet		NAVD88, Feet
Log 1, Base 1, Nail	160808.86	379685.06	9.24
Log 1, Base 2, DH	160915.11	379655.50	12.24

Survey operations were conducted from OSI's *R/V Able*, a 25-foot boat equipped with an array of survey and support equipment. A Real Time Kinematic Global Positioning System (RTK GPS) receiver, integral to the internal navigation electronics, was installed on the survey vessel. Communications between the vessel RTK GPS and the reference station GPS were made possible via radio link. This integrated 3-dimensional precision positioning system provided the field team with the ability to navigate the survey vessel precisely along pre-plotted tracklines throughout the survey area and the ability to correct soundings for water level variation. The vertical and horizontal accuracy of the positioning system was verified daily by comparing the observed position of the positioning system with the known coordinates of a control point provided by Tetra Tech.

A summary of the primary equipment installed on the survey vessel and employed to complete this investigation follows:

- Applanix POS MV, Version 4, Position and Orientation System (heave, pitch, roll, heading)
- Trimble RTK-GPS integral to the POS MV (vessel navigation)
- Trimble MS750 RTK-GPS interfaced to a Pacific Crest radio link (base station)
- HYPACK 2010 PC-based navigation and data-logging software package
- Reson SeaBat 8125 ultra high resolution multibeam echosounder
- Sea-Bird SBE19 CTD profiler for water mass speed of sound determination (water column)
- Sea-Bird SBE37 MicroCat sound velocity sensor (sound velocity determination at multibeam transducer face)

Before commencement of multibeam sounding operations, the sound velocity profile of the local water mass speed of sound was determined by means of a CTD cast. In addition to developing sound velocity profile information, real-time sound velocity determination at the transducer face was accomplished by means of the velocity sensor affixed directly to the multibeam transducer.

A sensor alignment test or "patch test" was preformed prior to survey operations. Initially, the precise vertical and horizontal offsets between multibeam system components (echosounder transducer, position-orientation system) were physically measured. Once the physical offsets were stored in the data collection platform, the required patch test data were acquired and analyzed to determine the system roll, pitch, and heading biases along with any navigation timing errors. The angular and timing values, along with water level (discussed below) and water column sound velocity profile information, were subsequently used during data processing to determine the final depth and position of each sounding.

Upon determination of all physical, angular, and timing offsets by means of the various methods described above, a "QA Performance Test" was carried out per specifications in the U.S. Army Corps of Engineers (ACOE) Hydrographic Surveying Manual "EM 1110-2-1003." Per the ACOE manual, "The performance test is used to evaluate the quality and confidence of multibeam data being collected. This test typically compares overlapping data sets from two different multibeam surveys, performed by either the same or different vessels."

The test consists of two phases. First, a "performance surface" is created by means of executing a small survey run over a flat area. Multiple runs (~400% overlap) are performed during development of the performance surface. The performance surface data are cleaned and bin-averaged into 1-foot by 1-foot cells resulting in an accurate (free from sensor alignment bias artifacts due to data density and averaging) and dense XYZ data set describing seafloor elevations. Next, a series of "multibeam check lines" is run over the performance surface. These data are input to the HYPACK Beam Angle Test program, which compares multibeam check lines to the performance surface and estimates the depth accuracy of the multibeam system at different beam angle limits. The estimated accuracy is used to determine if the multibeam system meets project requirements.

In the case of this survey, a performance surface was established on 25 May 2011 and a set of performance test values was derived the same day. On 3 June 2011 a second set of multibeam check lines were compared to the performance surface generated on 25 May and performance test values were derived. The 3 June check lines were collected at a time when the water level and water column sound velocity profile were different than during acquisition of the 25 May performance surface data. In both test cases each of the ACOE test parameters; depth outliers, mean bias, and standard deviation were considered. The quality of the data tested exceeded the most stringent accuracy requirements specified in the ACOE manual. Table 3 below presents the results of the QA performance tests as well as the ACOE standards for these QA/QC criteria.

Table 3
Performance Surface Beam Angle Test Results

Statistical Quantity Per Beam Angle Group	25 May Result	3 June Result	ACOE Maximum Allowed
Mean Difference (Reference Surface – Check Line)	0.01-0.04 ft.	0.02-0.03 ft.	0.1 ft.
Depth Standard Deviation (1-σ)	±0.08 ft.	±0.10 ft.	------
Depth Accuracy At 95% Confidence	±0.17 ft.	±0.19 ft.	±0.5 ft – 1.0 ft.

The depth measuring accuracy of the echosounder was confirmed by means of a daily "bar check". The bar check procedure consists of lowering an acoustical target on a graduated sounding line to the deepest practical depth. The target is then raised to successively shallower depths and the displayed digital depths noted.

During the course of the survey, the water column velocity profile was monitored by means of additional CTD casts and all observed changes in sound speed (as a result of changing tidal currents and temperature, etc.) recorded. During post processing, sound velocity profile data were applied to the multibeam soundings yielding maximum accuracy in the resulting depth data.

Sounding data were reduced to the NAVD 88 vertical datum based on RTK GPS water levels. The vertical accuracy afforded by the RTK GPS system (2 cm manufacturers' stated accuracy) allows for the collection of precise water level information. Water level values were recorded at the location of the survey platform as the vessel was maneuvered along each survey transect.

The data collection and processing software package HYPACK 2010 allows the surveyor to record the vertical component of the vessel RTK GPS solution by placing this value in the project raw data file while bathymetric data are being recorded. Procedurally, a measured vertical offset (height of the antenna over the water surface) is applied to the RTK GPS solution during data collection. Thus the elevation of the water surface is derived based on the vessel's RTK GPS antenna height.

Vessel RTK GPS water level values were compared to a physically measured water level value at least twice daily. Procedurally the vertical distance from the water surface to a control point provided by Tetra Tech was measured and the water level calculated. The calculated water level value was compared to a simultaneously observed RTK GPS water level to confirm the accuracy of the RTK GPS-derived value.

The survey site was centered on Pier 1 in Coddington Cove and extended approximately 300 feet north of Pier 2 and 2,000 feet south of Pier 1 (see Figure 1). Multibeam soundings were collected along a set of parallel tracklines oriented roughly parallel to Piers 1 and 2 and the coastline. The trackline plan consisted of lines offset at intervals intended to result in over 100% ensonification of the harbor floor. Additionally, shoreline features and near-shore shallow areas were mapped with the multibeam transducer oriented in a "side-looking" configuration. Multiple vessels were tied up alongside Piers 1 and 2 limiting the full coverage of the seafloor below these vessels. A large gap in multibeam coverage on the north side of Pier 1 is attributed to the *USS Saratoga*, an aircraft carrier permanently moored at the Newport Navy Base. A small gap in multibeam coverage along the north side of Pier 2, located approximately at 41-31-51 N, 71-18-55.5 W, denotes the location of the NOAA Ship *Henry B. Bigelow*, which was tied to the pier for the duration of data acquisition.

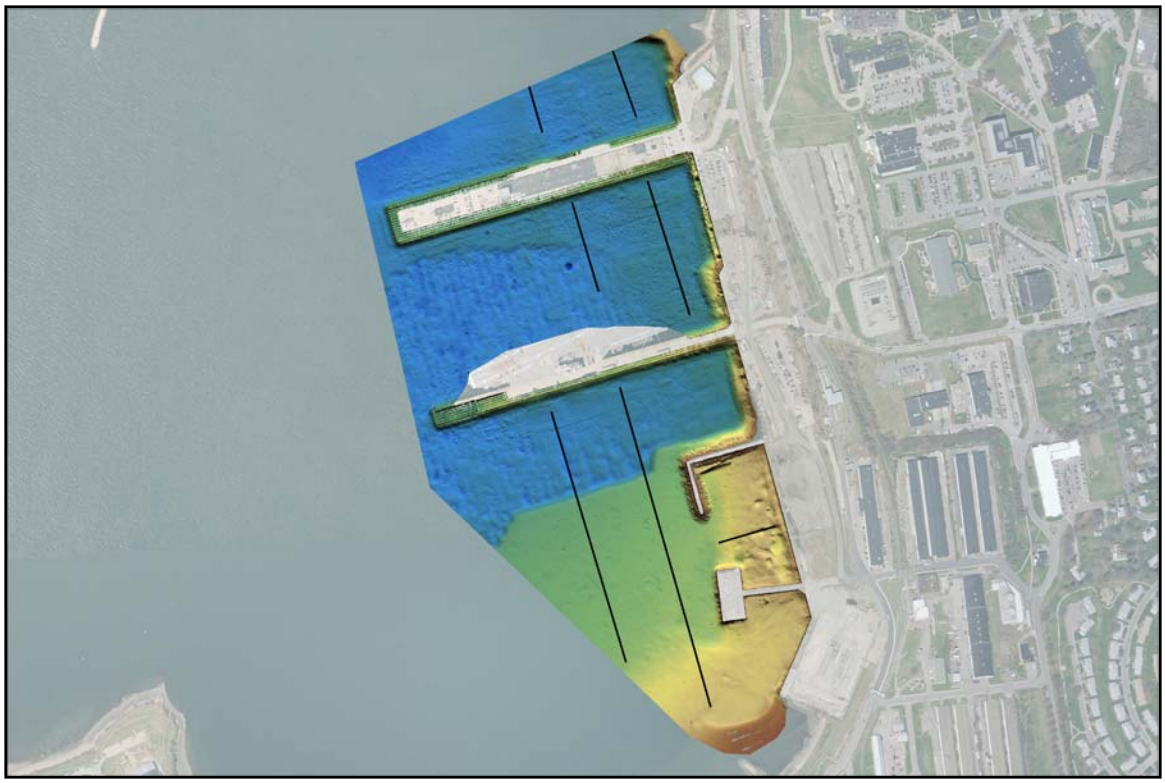


Figure 1. Coddington Cove Coverage Area. A 1-foot x 1-foot surface colored by depth is shown with an aerial photo of the survey area in the background. The location of the QA cross check lines are overlain on the surface in black.

To further evaluate the data quality and multibeam system setup, seven (7) QA cross check lines, "tie" lines, were acquired on a line plan perpendicular to the mainscheme multibeam survey lines (see Figure 1). Data from each tie line were compared to an XYZ data set generated from the mainscheme survey lines using the HYPACK Beam Angle Test program. Table 4 presents the results of the QA cross check line tests as well as the ACOE standards for these QA/QC criteria.

Table 4
Cross Check Line Beam Angle Test Results

Statistical Quantity Per Beam Angle Group	Tie Line 1636_1	Tie Line 1639_2	Tie Line 1657_5	Tie Line 1702_3	Tie Line 1708_5	Tie Line 1713_6	Tie Line 1854_7	ACOE Maximum Allowed
Mean Difference (Reference Surface – Check Line)	(-0.01) - 0.01 ft.	0.00 - 0.01 ft.	(-0.03) - (-0.07) ft.	(-0.03) - 0.02 ft.	(-0.09) - (-0.07) ft.	(-0.08) - (-0.05) ft.	(-0.04) - (-0.01) ft.	0.1 ft.
Depth Standard Deviation (1-σ)	±0.10 ft.	±0.11 ft.	±0.11 ft	±0.11 ft	±0.09 ft	±0.10 ft	±0.11 ft	------
Depth Accuracy At 95% Confidence	±0.19 ft.	±0.20 ft.	±0.21 ft.	±0.21 ft.	±0.17 ft.	±0.19 ft.	±0.21 ft.	±0.5 ft. – 1.0 ft.

DATA PROCESSING

Following completion of the field surveys, raw data files and records were returned to OSI's headquarters in Old Saybrook, Connecticut where data processing tasks were completed.

Procedurally, the raw multibeam data files for each trackline were sequentially loaded into the HYPACK 2010 MB Max multibeam editor. Within the editor, raw data files, consisting of multibeam range and beam information, water level, water column velocity profile, vessel position and attitude information, were "cleaned" (edited) to eliminate invalid sensor data or "fliers" using automated and manual editing tools. After the sensor data were cleaned datum-corrected X, Y, Z data points were computed. Final data products are horizontally referenced to Rhode Island State Plane, NAD 83, US Survey Feet, and vertically referenced to local Mean Lower Low Water (MLLW), feet. The plane of vertical datum NGVD29 is 1.18 feet above the plane of MLLW.

Sounding X, Y, Z data points were contoured using the QUICKSURF TIN Model program. Plan view depth contours with a 1-foot interval are presented on Drawing 1. Bottom contours were developed from 1-foot by 1-foot binned data with the average depth within each bin posted in the center of the bin. A shaded relief map colored by depth with a cell resolution of 1 foot by 1 foot is presented on Drawing 2. Drawings are provided as paper copies as well as AutoCAD DWG files, which are included with a sounding X, Y, Z file on a project DVD.

OSI appreciates the opportunity to support Tetra Tech on this project and we look forward to continuing this working relationship in the future. If you have any questions regarding any aspect of this survey, or we can be of service on other survey efforts, please do not hesitate to contact me.

Sincerely,

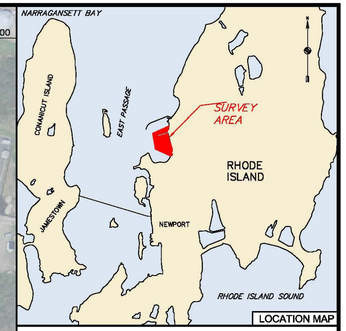
Bonnie L. Johnston
Hydrographer, Ocean Surveys, Inc.

BLJ/lf
Enclosures

N 164,000
E 376,000
E 378,000
E 380,000
N 162,000
N 160,000

NAVAL STATION NEWPORT,
RHODE ISLAND

CODDINGTON COVE,
NARRAGANSETT BAY

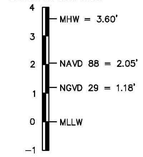


LOCATION MAP

DEPTH (MLLW)
FEET
0
10
20
30
40

SHADED RELIEF INFORMATION:
SUN
SUN POSITION
ALTITUDE: 45°
AZIMUTH: 10°

DATUM INFORMATION:



DISPLAYED TIDAL DATUMS, MEAN HIGH WATER (MHW), NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 88), NATIONAL GEODETIC VERTICAL DATUM 1929 (NGVD 29), AND MEAN LOWER LOW WATER (MLLW) WERE PROVIDED BY THE NATIONAL GEODETIC SURVEY.

NOTES

1. GRID SYSTEM IS IN FEET AND IS THE RHODE ISLAND STATE PLANE COORDINATE SYSTEM, NAD 83.
2. DEPTHS ARE IN FEET AND ARE REFERENCED TO MEAN LOWER LOW WATER (MLLW) BASED ON BENCHMARK "560" WHICH HAS AN ELEVATION OF 13.12 FEET NGVD 29 AS PROVIDED BY LOUIS FREDERICI ASSOCIATES. THE PLANE OF NOVD 29 IS 1.18 FEET ABOVE THE PLANE OF MLLW. DEPTHS WERE DEVELOPED FROM ONE FOOT BY ONE FOOT BINNED DATA WITH THE AVERAGE DEPTH WITHIN EACH BIN POSTED IN THE CENTER OF THE BIN.
3. SHORELINE AND ONSHORE FEATURES ARE APPROXIMATE AND WERE TAKEN FROM DIGITAL ORTHOPHOTO QUADRANGLES FLOWN IN 2009 AND OBTAINED FROM THE USGS SEAMLESS DATA WAREHOUSE.
4. THE INFORMATION PRESENTED ON THIS DRAWING REPRESENTS THE RESULTS OF A MULTIBEAM SURVEY PERFORMED BY OCEAN SURVEYS, INC. ON 25–27 MAY AND 3 JUNE 2011 AND CAN ONLY BE CONSIDERED AS INDICATING THE CONDITIONS EXISTING AT THAT TIME. REUSE OF THIS INFORMATION BY CLIENT OR OTHERS BEYOND THE SPECIFIC SCOPE OF WORK FOR WHICH IT WAS ACQUIRED SHALL BE AT THE SOLE RISK OF THE USER AND WITHOUT LIABILITY TO OSI.

SURVEY VESSEL:	ECHOSOUNDER:
R/V ABLE	RESON SEABAT 8125

NAVIGATION SYSTEMS:
APPLANIX POS MV IN REAL TIME KINEMATIC MODE

SURVEY ACQUISITION SOFTWARE:
HYPACK VERSION 2010

SURVEY PROCESSING SOFTWARE:
HYPACK MULTIBEAM EDITOR VERSION 2010

SCALE: 1"=200'
200 0 200 400 600
CHECK GRAPHIC SCALE BEFORE USING

OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT
(860) 388-4631
www.oceansurveys.com

PREPARED FOR:
TETRA TECH NUS, INC.

SHADED RELIEF MAP
MULTIBEAM HYDROGRAPHY
CODDINGTON COVE
NAVAL STATION NEWPORT
NEWPORT, RHODE ISLAND

PROJECT MANAGER:	SURVEY DATE:	PROJECT NUMBER:	
J. WETMUR	25–27 MAY, 3 JUNE 2011	11ES036	
DRAFTED BY:	DATE:	DRAWING:	SHEET:
A. RIZZO	23 JUNE 2011	2	1 OF 1

GEL Laboratories, LLC
P.O. Box 30712
Charleston, SC 29417
(843) 556-8171 phone
(843) 766-1178 fax
www.gel.net

QUOTE NO. GELP11-0747	
PRICE QUOTATION	
Prepared For:	Ms. Meg Price Tetra Tech, Inc. 234 Mall Boulevard Suite 260 King of Prussia, PA 19406 610-382-1525 meg.price@tetratech.com
Date:	24-Jun-11
Revision No.	**0**

GEL Laboratories, LLC (GEL) is pleased to submit this quotation for the referenced project. Prices are valid for 60 days and may be extended upon request. As part of our commitment to the success of your project, a GEL Project Manager has been designated to assist in the implementation of your project requirements. Contact information is provided below. Thank you for the opportunity to submit this quote for analytical requirements and we look forward to working with you on this project.

Project Specifications:

Required Certification	DoD ELAP	**Start Date**	TBD
TAT	21 Calendar Days (Reference additional TAT options below)	**Shipment Costs**	GEL will ship bottles and coolers via ground service to the site. Pricing also includes overnight shipment from the site to GEL.
Data Deliverable	Electronic .PDF delivery via e-mail of: Level IV CLP-Like Data Package with Raw Data, an EDD in the standard TetraTech format.	**Standard Terms & Conditions**	**This project is subject to GEL's Standard Terms & Conditions which are included as a separate worksheet.** If contract specific Terms & Conditions are required, they must be provided for review and acceptance by the laboratory.
Detection Limits	GEL's standard MDAs (Reference Attachment A enclosed)	**Waste Disposal**	GEL will retain samples for a minimum of 60 days following the delivery of analytical data.

Project Quote: NAVSTA Newport, RI - CTO # WE61

****** Reference Pricing Tab ******

Technical Notes:

1. GEL has established the criteria outlined in the table below for the classification and handling of radiological samples. Please note that the individual unit costs provided in the Project Quote are based on the assumption that the samples do not exceed the Environmental Radioactive Category. If a sample exceeds the environmental radioactive category then the applicable RAD II and RAD III multipliers will be added. RAD II and RAD III multipliers cover the additional radiation safety oversight costs associated with handling samples with elevated radioactivity. These multipliers are provided with the assumption that samples will contain typically encountered isotopic mixtures. Special isotopic mixtures or highly dispersible physical forms may cause samples to be moved to an elevated category. GEL also reserves the right to refuse shipments due to license or handling restrictions. GEL requests that the sample activity data be submitted to your GEL Project Manager prior to the shipment of radioactive samples.

Radiological Category	Sample Criteria	Multiplier
Environmental Radioactive	Less than 1 uCi/sample and 0.5 mR/hr	1.0X
RAD II	Between 1 and 100 uCi/sample and/or 0.5 and 100 mR/hr	1.5X
RAD III	Greater than 100 uCi/sample and/or greater than 100 mR/hr	2.0X

2. Certain mixed wastes and TSCA regulated/licensed waste will be returned to the client due to the high cost of laboratory disposal.
3. The above quantities are estimated. GEL will bill samples submitted at the applicable unit rate.
4. Client requested QC including trip/field blanks will be billed at the applicable unit rate.
5. GEL will use our standard quality procedures as outlined in our QAP as no SOW exists at the time of quote.
6. GEL will determine Polonium-210 by Alpha Spectroscopy and assume equilibrium with Lead-210.

Point of Contact
Ann Skradski
team.skradski@gel.com
(843) 556-8171 - Phone
(843) 766-1178 - Fax

Ship to Address
GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Attention: Ann Skradski

All work requires submission of a valid PO or signed acknowledgement of this quotation and is subject to GEL's Standard Terms & Conditions. Client specified QC will be invoiced at the applicable unit rates. Unit prices are based on radioactivity levels below 0.5 mR/hr or 1 uCi/sample; additional charges may apply if these levels are exceeded. Standard MDAs and MDLs assume sufficient sample volume is received for analysis. **Payment terms are net 30 days.** Upon acceptance, unit prices are valid for one year or for the length of a specific project, whichever is less. For projects that are ongoing, GEL may increase the unit prices on a yearly basis after the first year.

ACCEPTED BY: _____ **DATE:** _____ **PO #**_____