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FINAL REVISED REMEDIAL PROJECT MANAGERS MEETING NOTES AND SUMMARY 20
JULY 2011 WITH TRANSMITTAL NS NEWPORT RI
10/28/2011
TETRA TECH NUS



TETRA TECH

C-NAVY-10-11-4633W

October 28, 2011

Project Number 112G02422

Ms. Winoma Johnson, PE
Remedial Project Manager
NAVFAC MIDLANT
9742 Maryland Avenue
Norfolk VA, 23511-3095

Reference: CLEAN Contract No. N62470-08-D-1001
Contract Task Order No. WE50

Subject: Final REVISED RPM Meeting Notes and Summary July 20, 2011
NAVSTA Newport, Newport Rhode Island

Dear Ms. Johnson:

Attached for your records are the Final Notes and attachments that summarize the RPM meeting for the NAVSTA Newport IR Program held July 20, 2011 for the IR sites at NAVSTA Newport. This is a revised transmittal replacing that sent on October 17 which had the wrong attachment

If you have any questions on this material, please do not hesitate to contact me.

Very truly yours,

Stephen S. Parker, LSP
Project Manager

SSP/lh

attachments

- c: P. Crump, RIDEM (2, w/encl.)
- K. Keckler, USEPA (2, w/encl.)
- G. Lombardo, USEPA (Elec. Only)
- D. Moore, NAVSTA (w/encl.)
- R. Pagtalunan, NAVFAC (w/encl.)
- D. Ward, NAVSTA (w/encl.)
- J. Trepanowski, TtNUS (w/encl.)
- G. Glenn, TtNUS (w/o encl.)
- Site File (c/o Glen Wagner, TtNUS Pittsburgh (w/encl.)
- File G02422-3.2 (w/o encl.) File G02422-8.0 (w/encl.)

Tetra Tech

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Meeting Notes: RPM July 20, 2011

Meeting Notes
Remedial Project Manager Meeting, 7/20/11
NAVSTA Newport, Rhode Island

Attachments:

1. Agenda
2. CCRF SASE – HHRA Talking Points
3. Gould Island Flume Testing

Participating:

L. Anderson, Tetra Tech
T. Campbell, Tetra Tech (via phone)
P. Crump, RIDEM
B. Hoskins, USEPA (via phone)
W. Johnson, NAVFAC MIDLANT
K. Keckler, USEPA
G. Kemp, Gannett Fleming (via phone)
G. Lombardo, USEPA
K. Munney, USF&W (via phone)
M. Montegross, NAVFAC MIDLANT
D. Moore, NAVFAC MIDLANT
R. Pagtalunan, NAVFAC
S. Parker, Tetra Tech
T. Reisch, NAVFAC MIDLANT
J. Ropp, Tetra Tech
D. Seiken, Tetra Tech (via phone)
L. Sinagoga, Tetra Tech (via phone)
C. Vu, USEPA (via phone)
D. Ward, NAVFAC MIDLANT

Convened: 12:00 PM

1. Site 8 – NUSC Disposal Area

S. Parker noted that Tetra Tech (Tt) had provided responses to comments on the draft final Supplemental Remedial Investigation (SRI) (Tt letter dated 7/13/11). EPA and RIDEM stated that they had not completed their review of the response letter. However, P. Crump stated that RIDEM does not agree to the explanation of arsenic in soil being a background condition, particularly in the SB113 location (reference comment 3). S. Parker and J. Ropp replied that the soil alternatives in the Feasibility Study (FS) would address these areas where arsenic is highest with anomalies, but they would confirm this to be the case. G. Lombardo acknowledged that a possible path forward is to “agree to disagree” on the background status of arsenic as long as the soil alternatives address the areas of concern. RIDEM stated that they would be preparing a letter to comment on the responses dated 7/13/11.

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In regards to the Monitored Natural Attenuation (MNA) Technical Memorandum (Tt response-to-comment letter issued 7/15/11), G. Lombardo and P. Crump stated that there were no further issues outstanding. M. Montegross stated that the Navy plans to continue MNA evaluations, and data will be provided to the group as it is developed.

J. Ropp described the remedial alternatives presented in the revised draft FS (issued 7/18/11). The soil alternatives include no action, surface soil excavation, and a soil cap. The excavation and capping alternatives also include selective excavation of geophysical (suspected waste) anomalies. The groundwater remedial alternatives include no action, MNA, in-situ enhanced bioremediation, and in-situ chemical oxidation (ISCO). The groundwater alternatives, except for No Action, also include interim Land Use Controls (LUCs). Each of the sediment alternatives include removal of stream sediments, as feasible based on the site conditions. The three sediment alternatives for the pond include no action, enhanced natural recovery (placement of 6 inches of clean material and then monitoring), capping with geotextile and one foot of clean material, and dredging. J. Ropp also described the revised Preliminary Remediation Goals (PRGs) (revised based on the SRI results and EPA/RIDEM comments) and the new features of the FS such as the sustainability evaluation, updated site data, and the BIOCHLOR modeling for evaluating groundwater remediation timeframes.

B. Hoskins noted that his primary concern with respect to sediment is the presence of lead. J. Ropp replied that lead in sediment will be addressed through selective excavation of waste anomalies and stream sediment in addition to the pond action. B. Hoskins noted that an advantage of dredging is that it makes the pond deeper and a disadvantage of capping is that it reduces the size of the pond. B. Hoskins asked whether there is sufficient soil data available to support the remedial alternatives. J. Ropp replied yes, but that the limited pond sediment data are more of a concern given that there are only three toxicity samples for the pond.

P. Crump stated that RIDEM wants to make sure their risk numbers are carried through the process (10^{-6} cancer risk for individual COCs and 10^{-5} cumulative cancer risk). J. Ropp replied that the updated SRI tables included RIDEM's requested changes and that the PRGs in the FS are based on the appropriate risk levels and regulatory criteria. J. Ropp noted that, for the soil PRGs, a 10^{-5} risk level was used for expressed as benzo(a)pyrene equivalents rather than establishing PRGs for individual carcinogenic polycyclic aromatic hydrocarbons (cPAHs).

G. Lombardo stated that EPA will try to provide comments on the FS within the agreed 30-day timeframe in order to maintain the schedule for the September 2012 Record of Decision (ROD), but noted that it may be difficult due to vacations. P. Crump noted that it will also be difficult for her to complete the review within 30 days because she was only recently designated the site RPM.

Actions: J. Ropp will compare the locations of arsenic in subsurface soil to the planned anomaly removal areas (completed – maximum arsenic concentrations were not co-located with anomalies but the soil alternatives will address the locations with the highest concentrations).

2. Site 4 – Coddington Cove Rubble Fill (CCRF) Area

T. Campbell presented a list of talking points to begin a general discussion regarding EPA and RIDEM comments on the human health risk assessment section of the Draft SASE Report. The overall comment was regarding the qualitative risk evaluation presented in the report and the regulator's comments requesting that risk be calculated. See Attachment 2 for CCRF talking points and associated risk and statistics tables.

S. Parker stated that the CCRF site is a degraded wetland that receives storm water from the surrounding industrial area and a gravel operation. S. Parker commented that CCRF is essentially just a fill area, not a CERCLA site. G. Lombardo stated that the purpose of a Study Area Screening Evaluation (SASE) is to screen sites out of the CERCLA process that have no risk at all. Since there are some exceedances of risk benchmarks at the CCRF, G. Lombardo stated that the site needs to continue with the CERCLA process and a full Human Health Risk Assessment (HHRA) needs to be conducted as part of a Remedial Investigation (RI). G. Lombardo stated that risk management decisions to discount the risk exceedances at the CCRF cannot be made at this point in the CERCLA process.

C. Vu expressed concern about the combined qualitative and quantitative approach for the risk assessment. L. Sinagoga acknowledged that it was not a traditional risk assessment, but that it used conservative assumptions and that the risk evaluations are similar to a formal risk assessment. L. Sinagoga stated that she has used this approach successfully at other sites and asked if it was necessary to perform a formal risk assessment. C. Vu expressed concern about their ability to accurately make decisions about the risk using this approach. C. Vu stated that EPA does not allow screening out chemicals of potential concern (COPCs) using background data even though that is the Navy's policy. L. Sinagoga stated that no COPCs on the risk ratio tables were discarded based on background data. C. Vu stated that the EPA does not accept the approach of using risk ratios.

G. Lombardo stated that there is no formal LUC at the site and that if the fence is needed to prevent exposure at the site that that needs to be included in a CERCLA LUC. P. Crump commented that RIDEM concurs with the USEPA. S. Parker noted that there are wetland protection and flood laws which would prevent the site from being used for residential purposes. G. Lombardo stated that it may be possible to do an RI with little or no additional data collection.

B. Hoskins noted that from an ecological risk perspective, a habitat survey would be beneficial to decide what, if any, additional steps to take. It was noted that the wetland area was dominated by Phragmites, an invasive species, and that the ecological value of the site may be limited.

Actions: Schedule a habitat assessment site visit.

Navy will prepare response to comments on the Draft SASE Report.

3. Site 17 – Gould Island

See Attachment 3 for flume testing information.

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S. Parker stated that the baseline ecological risk assessment (BERA) is being revised and that the draft FS will be issued at the end of September, as planned.

S. Parker stated that the sedflume testing could not be done in some areas because the core barrel could not penetrate the sediment substrate (see Figure 2 in Attachment 3). K. Keckler stated that the ERDC Vicksburg team has agreed to attempt to collect samples using different equipment during the field season for the Derecktor Shipyard work. S. Parker noted that if new data is collected for Gould Island, it will be too late to use in the FS report: The sediment transport model is expected to be drafted next month and that information will go into the Draft FS in September. The Navy does not want to rewrite the transport model or wait to write the draft FS. In addition, the information from the model is not expected to change which remedies are developed in the FS.

S. Parker described the difficulties encountered during the sample collection effort by ERDC. He noted that if it is difficult to collect a sample at a location, it should be the first line of evidence that the sediment will not erode under normal conditions. It is possible that the shell hash identified by ERDC is creating an armored layer on the sediment. S. Parker noted that the Navy has successfully taken sediment samples using vibracore methods and divers with pneumatic hammers, but that those methods are not appropriate for sedflume testing because the vibration will disrupt the sediment structure.

S. Parker asked about the EPA letter (comments to responses) dated July 19, with a minor comment on the Crab PCB data. S. Parker asked if EPA needed a response to this comment, and K. Keckler stated that a response was appropriate.

Action: Navy will prepare a response to the EPA letter 7/19/11.

4. Site 11 – Tank Farms 1, 2, 3 Category 1 areas

General Issues

D. Seiken stated that the Navy has decided not to use literature background values for PAHs and dioxins as initially proposed, but may revisit the issue in the future. P. Crump commented that RIDEM only accepts background studies for metals.

The definition of a surface soil sample was discussed. The EPA defines surface soil as 0-1 ft for the risk assessment. RIDEM requested that the 0-2 ft interval be used for surface soil. K. Keckler stated that under CERCLA the 0-1 foot interval must be sampled for determining risk to surface soil, and the Navy can address RIDEMs requirement as an ARAR. She also indicated that at other CERCLA sites the 0-1 ft interval was collected first to perform the risk assessment and then the 0-2 ft interval was collected later because there are no ARARs until there is risk. W. Johnson agreed, explaining that the CERCLA process is to determine risk first and then look at the state's criteria as an ARAR if there is unacceptable risk. The Navy will sample surface soil as 0-1 foot in order to use in CERCLA risk assessment, if risk assessment is needed.

Tank Farm 1

T. Campbell said that the outline of the areas of concern (AOCs) for Tank Farm 1 was based on analysis of aerial photographs. The affected area varied over the years, so

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there is some overlap of the AOCs. T. Campbell said he would include a figure illustrating this in the response document. T. Campbell explained that the sampling grid went outside the AOCs as a conservative approach to make sure the extent of contamination is properly delineated. G. Kemp commented that the majority of the proposed sampling locations are around the perimeter and more sampling needs to be concentrated in the AOCs.

In regards to RIDEM's comment about investigations in other areas, T. Campbell responded that the other contractor is looking at those areas or there are other reasons the areas were not included in the sampling plan.

T. Campbell explained that the transformers will not be sampled because they are part of the active infrastructure. G. Kemp noted that transformers were sampled at Tank Farms 4 and 5. S. Parker commented that active utilities are not investigated under CERCLA. K. Keckler stated that former PCB transformers that were retrofitted could have had a release from past use which would fall under CERCLA and that historic transformers are always sampled at CERCLA sites. S. Parker noted that there is not a record of release from the transformers. S. Parker stated that the sampling plan under review is for the ethyl blending plant and that if the EPA has an issue with what is considered a Category 1 area, then that is a separate subject. T. Campbell stated that The Shaw Group (Shaw) did collect PCB samples at the site and only one sample exceeded industrial standards.

Actions: Tetra Tech will issue response to comments on the Draft SAP. Attachments to the response document will include the Shaw report with PCB sampling results, a revised sample location figure, and a groundwater contour map.

Tank Farm 2

D. Seiken explained that the Sampling and Analysis Plan (SAP) for Tank Farm 2 is different than those for Tank Farms 1 and 3 because it was written first. The Tank Farm 2 SAP includes both Category 1 and Category 2 areas while the other two SAPs only include Category 1 areas.

Regarding RIDEM General Comment 3, D. Seiken asked where the observation is documented. P. Crump will check.

Regarding RIDEM General Comment 7, S. Parker stated that the cable area was within the fence at one time but that it is not part of the site and is upgradient.

Regarding RIDEM Specific Comment 10, D. Seiken stated that the EPA criteria are used for Category 1 areas. If there is unacceptable risk, then the RIDEM criteria will be included as an ARAR. D. Seiken also noted that there is no way to do risk assessment for total petroleum hydrocarbons (TPH). P. Crump stated that RIDEM generally wants their criteria to be included in the process as early as possible.

Regarding other RIDEM comments requesting additional investigation, D. Seiken noted that most of those areas would be considered Category 2 or Category 3 areas. R. Pagtalunan recommended setting up a separate conference call or meeting to discuss Category 2 and 3 areas.

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Actions: P. Crump will check where General Comment 3 is documented.

Navy and RIDEM will coordinate a separate conference call or meeting to discuss Category 2 and 3 areas.

5. Sites 12-13 – Tank Farms 4 and 5

S. Parker stated that comments to responses on the Data Gaps Assessment Report were received from EPA but not RIDEM. S. Parker suggested that, in general, it would be better to email preliminary responses, discuss and resolve those comments if possible, and then send a single set of formal responses. This method would prevent additional letters with comments to responses, and was used successfully at Gould Island.

S. Parker requested that K. Keckler send an email to the Navy with proposed language for the definition of Category 3 areas (completed).

G. Kemp stated that there is a berm/debris area described in a report that should be sampled. G. Kemp stated that there is TPH contamination there, which is used as an indicator compound. K. Keckler noted that if there is just evidence of TPH contamination that EPA cannot investigate it under CERCLA. D. Seiken noted that both the EPA and RIDEM moved sampling locations during and after the site walk to represent the worst case scenario locations instead of adhering to the original grid approach. Both D. Seiken and S. Parker commented that they walked through that area with Bob Lim (USEPA RPM at the time) and Todd Finlayson (USEPA's technical contractor) during the site walk and did not identify a berm or debris pile. G. Kemp stated that the larger issue was that the Navy did not use older data for the Data Gaps Assessment/ Risk Assessment and that this is a data gap.

D. Seiken explained the basis for the Navy's recommendation not to utilize old data for the Data Gaps Assessment Report and Risk Assessment. Groundwater, surface water and sediment and some soil data were determined unusable, as documented in "Technical Memorandum for Data Summary and Plan for Risk Assessment" (TtNUS, 2008). Again in the UFP SAP for the data gaps assessment, it was agreed by stakeholders that these data would not be used. Remaining soil data were not used because a thorough review of the data indicated that it was either 1) outside the limits of the Category 1 DUs or 2) there was no depth associated for the soil sample. K. Keckler agreed that there is no data gap and that the use of the older data was not required.

S. Parker explained the issue regarding PCBs that were detected in groundwater in one sample at Tank Farm 4. The sample with PCBs was one half of a field duplicate pair. PCBs were detected in one aliquot of the duplicate but were not detected in the other aliquot of the field duplicate pair. Because it is unusual to detect PCBs in groundwater the laboratory was contacted on the matter. The laboratory researched their records and identified a likely cross contamination during sample preparation. The duplicate was prepared with a group of samples from another client that had a sample with high concentrations of PCBs. The ratio of the Aroclors found in the two samples was similar, which further supports the conclusion that there was cross contamination. The laboratory has provided documentation on the matter which will be provided in the

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report. S. Parker asked if the data from the cross contaminated sample should be removed from the database or not. K. Keckler prefers that the data remain in the database with a footnote explaining the cross contamination issue.

Actions: K. Keckler will send an email to the Navy with proposed language for the definition of Category 3 areas. (Provided in email from K. Keckler 7/26/11).

S. Parker will provide the regulators with documentation from the laboratory explaining the PCB cross contamination (Included in Draft Final Data Gaps Report (7/29/11)).

6. Other Sites: Sites 1, 22, MRP Site 1

McAllister (Site 1)

M. Montegross stated that the new long term monitoring contractor is on board. M. Montegross stated that the wind turbine study created ruts in the road over the landfill cap which will be repaired.

Carr Point (Site 22 and MRP Site 1)

M. Montegross stated that schedules for Carr Point have been issued because there is funding for these sites. M. Montegross stated that the Navy may be able to move ahead with the sites sooner than the schedules indicate.

7. Site 9 – Old Fire Fighting Training Area

W. Johnson stated that the cover is at the 30% design. The design package also includes applicable design sheets from the military construction (MILCON) project (Fitness Center and Katy Field Parking Lot) that will provide cover for most of the site. W. Johnson stated that she is also looking into having areas outside of the construction limits of the MILCON project, but within the limits of IR Site 9 addressed by the MILCON contract that will consist of adding 2 feet of soil those areas and the IR program will pay the difference in cost. W. Johnson noted that there is a landscaped area included in the 30% design(traffic islands and new curbing) near the SWOS building and that there is no point to digging up that area in order to put down 2 feet of clean soil if that was already done. S. Parker stated that the new curbing and traffic islands installed at the SWOS portion of the site was identified in the design as an area to get a modified cap, with geotextile and 6 inches of topsoil instead of 2 feet of cover.

Actions: W. Johnson will check the as built plans for the SWOS site to determine how much clean soil has already been put in the area where the traffic islands and new curbing is present.

8. Site 19 – Derecktor Shipyard

S. Parker noted the Navy's receipt of comments from USEPA on the Response to Comments on the Draft SAP, and the Comments from RIDEM on the Draft SAP. Specific items on these comment letters were discussed as follows:

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General Comment 2, Sub-comment 1 (EPA) – S. Parker asked EPA to provide input as to where to put the additional zinc/copper samples.

Specific Comment 5 (EPA) – S. Parker stated that the seven samples will be moved 50 feet so they are not under the aircraft carriers. The new locations will be along the hull of the ship. It was agreed that these stations should be sampled, but every effort should be made to get as close to the original proposed location as possible.

Specific Comment 13, Sub-comment C (EPA) – S. Parker stated that a sample to the southwest of Pier 1 would be outside the area of interest and would likely be uncontaminated. K. Keckler stated that it is acceptable to omit that sample.

Comments 2, 3, 4, 10, 11, and 13 (RIDEM) – S. Parker stated that the comments are not applicable to this SAP and are part of a discussion on the PRGs and or the FS that the group had agreed to have at a later date.

Comments 1, 7, 15, and 16 (RIDEM) – S. Parker stated that these are minor changes and the Navy is fine with making these changes.

Comments 5 and 6 (RIDEM) – S. Parker stated that these studies were specifically requested by the EPA and are already included in the project.

Comments 8, 9, and 12 (RIDEM) – S. Parker stated that the new data will replace the old data. P. Crump noted that it is difficult to collect a sample in the exact same location. S. Parker replied that the contamination may have been redeposited elsewhere, so the new data would be more representative of the current site conditions.

Comments 17, 18, 19, and 20 (RIDEM) – S. Parker stated that the Navy will collect the samples that were agreed upon at the planning meetings and will not add new sample locations that are not within the area agreed to by the group.

W. Johnson stated that the Navy would like to get into the field quickly and move forward with the site. K. Keckler agreed and would like the sampling to be conducted this year. S. Parker asked if the physical sampling could begin at the end of August. K. Keckler indicated agreement with beginning the physical sampling at the end of August.

S. Parker stated that the outcome will be a new revision to the FS.

Actions: K. Keckler will send the Navy a map indicating where the additional zinc/copper samples should be located (completed).

The meeting adjourned at 4:30 PM.

Attachment 1

**Proposed Agenda
Remedial Project Manager (RPM) Meeting
Naval Station (NAVSTA) Newport, Rhode Island
Wednesday, July 20, 2011**

Item	Time	RPM / Lead	Matter
1.	12:00-1:00	G. Lombardo M. Montegross G. Jablonski	Site 8 – NUSC Disposal Area <u>Goals:</u> Introduce Revised FS, discuss comments to SRI and MNA Tech Memo. <u>Preparation:</u> Review responses to comments on SRI (Tt, 7/13/11) and MNA (pending). <u>Outcome:</u> Informed team, forward progress.
2.	1:00-1:30	G. Lombardo M. Montegross G. Jablonski	Site 4 – CCRF <u>Goal:</u> Discuss comments on the Draft SASE Report <u>Preparation:</u> Review draft SASE Report, comments (6/10, 6/13, 7/13) <u>Outcome:</u> Forward progress.
3.	1:30-2:00	K. Keckler M. Montegross G. Jablonski	Site 17 – Gould Island <u>Goal:</u> Status of FS & Sediment transport model. <u>Preparation:</u> None. <u>Outcome:</u> Informed team
4.	2:00-2:30	K. Keckler G. Jablonski R. Pagtalunan	Site 11 – Tank Farms 1, 2, 3 Category 1 areas <u>Goal:</u> Discuss comments on Draft SAPs. <u>Preparation:</u> Review comments to Draft SAPs <u>Outcome:</u> Informed team, head start on resolution to comments.
5.	2:30-3:00	K. Keckler G. Jablonski R. Pagtalunan	Sites 12-13 Tank Farms 4 and 5 <u>Goal:</u> Resolve outstanding issues on data gaps assessment. <u>Preparation:</u> Review response to comments on Data Gaps Assessment Report & follow-up EPA letter 7/6/11). <u>Outcome:</u> Path forward.
6	3:00-3:30	All	Other Sites: Sites 1, 22, MRP Site 1 <u>Goal:</u> Brief status updates. <u>Preparation:</u> None. <u>Outcome:</u> Informed team.
7.	3:30-4:00	K. Keckler G. Jablonski W. Johnson	Site 9 – Old Fire Fighting Training Area <u>Goal:</u> Brief group on status of revetment, cover design (30%). <u>Preparation:</u> Familiarity with 30% Design (Tt) and Response to comments on WPA (Agviq-Hill, 7/5/11). <u>Outcome:</u> Informed team.
8.	4:00-5:00	K. Keckler G. Jablonski W. Johnson	Site 19 – Derecktor Shipyard <u>Goal:</u> Resolve outstanding comments on the draft offshore SAP <u>Preparation:</u> Familiarity with Draft SAP, Response to Comments (Tt, 7/11/11). <u>Outcome:</u> Agree on tasks for field work this year.
10	6:00 – 7:00		RAB Meeting at Officer's Club

Attachment 2

Coddington Cove Rubble Fill Area SASE – HHRA Talking Points

Comment documents:

EPA (June 10, 2011) Comments: General comments 1, 2, 3, 4. Specific comments 5, 6, 12 through 14.

EPA (July 13, 2011) Comments: General comments 1, 2. Specific comments 6 through 9.

RIDEM (June 13, 2011) Comments 7 through 16, 36, 37, 38, and 39.

Talking points

1. Value of a Qualitative vs Quantitative Risk evaluation at this site.
2. Does the site warrant further evaluation based on the levels of contaminants detected. (review stats summary tables in Section 6 of SASE).
3. Consideration of future site use as unrestricted – define “unrestricted” for this site.
4. Use of the background study data set.
5. Consideration of upgradient (stormwater) inputs.

TABLE RISK RATIO-1
SUMMARY OF RESIDENTIAL RISKS AND HAZARD INDICES FOR EXPOSURES TO SURFACE SOIL - SITE 04
SITE 04 - CODDINGTON COVE RUBBLE FILL AREA SASE
NAVSTA NEWPORT, NEWPORT RI

Chemical	Incremental Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	95% UCL or Maximum Concentration ⁽¹⁾ (mg/kg)	USEPA Residential RSL ⁽²⁾ (mg/kg)	Estimated ILCR	Primary Target Organs	USEPA Residential RSL ⁽²⁾ (mg/kg)	Estimated HQ
Benzo(a)pyrene Equivalents - 1/2 U ⁽³⁾	1.15	0.015	7.7E-05	NA	NA	NA
Total Aroclor ⁽⁴⁾	0.5893	0.22	2.7E-06	Immune	1.1	0.54
Aluminum	55,400	NA	NA	CNS	77000	0.72
Antimony	9.8	NA	NA	Blood	31	0.32
Arsenic	19	0.39	4.9E-05	Skin, CVS	22	0.86
Beryllium	0.83	1400	5.9E-10	GS	160	0.0052
Cobalt	13.8	370	3.7E-08	Thyroid	23	0.60
Copper	716	NA	NA	GS	3100	0.23
Iron	33300	NA	NA	GS	55000	0.61
Lead ⁽⁵⁾⁽⁶⁾	630	NA	NA	CNS	NA	NA
Manganese	489	NA	NA	CNS	1800	0.27
Silver	57.9	NA	NA	Skin	390	0.15
Zinc	4040	NA	NA	Blood	23000	0.18
			Total ILCR		Total HI	4
			1E-04			

No target-organ-specific HI >

- 1 - The maximum concentration was evaluated for all COPCs except that the 95% UCL concentration is evaluated for the carcinogenic PAHs.
- 2 - USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites, November 2010.
- 3 - The carcinogenic PAHs were calculated using 1/2 non-detected values in the benzo(a)pyrene equivalents calculation.
- 4 - Individual PCB analytes are evaluated for this data set. Aroclor 1260 was the predominant Aroclor detected in soils.
- 5 - The mean concentration is used for lead.
- 6 - See text for evaluation of this analyte.

HI = Hazard Index
 HQ = Hazard Quotient
 ILCR = Incremental Lifetime Carcinogenic Risk
 NA = Not Applicable
 ND = Not Detected
 RSL = Regional Screening Level
 U = Non-detected result
 UCL = Upper Confidence Limit

Target Levels: cumulative ILCR = 1E-04 for carcinogens, cumulative HI = 1 for noncarcinogens

Target Organ Abbreviations:
 CNS = Central Nervous System
 CVS = Cardiovascular System
 GS = Gastrointestinal System

TABLE RISK RATIO 2
SUMMARY OF RESIDENTIAL RISKS AND HAZARD INDICES FOR EXPOSURES TO SUBSURFACE SOIL
SITE 4 CODDINGTON COVE RUBBLE FILL AREA SASE
NAVSTA NEWPORT, NEWPORT RI

Chemical	Incremental Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	95% UCL or Maximum Concentration ⁽¹⁾ (mg/kg)	USEPA Residential RSL ⁽²⁾ (mg/kg)	Estimated ILCR	Primary Target Organs	USEPA Residential RSL ⁽²⁾ (mg/kg)	Estimated HQ
Benzo(a)pyrene Equivalents - 1/2 U ⁽³⁾	0.724	0.015	4.8E-05	NA	NA	NA
Total Aroclor ⁽⁴⁾	0.631	0.22	2.9E-06	Immune	1.1	0.57
Aluminum	14,800	NA	NA	CNS	77000	0.19
Antimony	4.5	NA	NA	Blood	31	0.15
Arsenic	19	0.39	4.9E-05	Skin, CVS	22	0.86
Beryllium	0.67	1400	4.8E-10	GS	160	0.00
Cobalt	17.2	370	4.6E-08	Thyroid	23	0.75
Copper	NA	NA	NA	GS	3100	NA
Iron	39500	NA	NA	GS	55000	0.72
Lead ⁽⁵⁾⁽⁶⁾	NA	NA	NA	CNS	NA	NA
Manganese	612	NA	NA	CNS	1800	0.34
Silver	NA	NA	NA	Skin	390	NA
Zinc	NA	NA	NA	Blood	23000	NA
			Total ILCR		Total HI	4
			1E-04			

No target-organ-specific HI >

- 1 - The maximum concentration was evaluated for all COPCs except that the 95% UCL concentration is evaluated for the carcinogenic PAHs.
- 2 - USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites, November 2010.
- 3 - The carcinogenic PAHs were calculated using 1/2 non-detected values in the benzo(a)pyrene equivalents calculation.
- 4 - Individual PCB analytes are evaluated for this data set. Aroclor 1260 was the predominant Aroclor detected in soils.
- 5 - The mean concentration is used for lead.
- 6 - See text for evaluation of this analyte.

HI = Hazard Index
 HQ = Hazard Quotient
 ILCR = Incremental Lifetime Carcinogenic Risk
 NA = Not Applicable
 ND = Not Detected
 RSL = Regional Screening Level
 U = Non-detected result
 UCL = Upper Confidence Limit

Target Levels: cumulative ILCR = 1E-04 for carcinogens, cumulative HI = 1 for noncarcinogens

Target Organ Abbreviations:
 CNS = Central Nervous System
 CVS = Cardiovascular System
 GS = Gastrointestinal System



Methods

This section describes the field experiments, sampling and experimental methods, and data analysis methods used in determining cohesive sediment erosion at the north end of Gould Island. Background and technical information about the experimental device is presented first, followed by description of how these devices were deployed during field experiments to meet the study objectives.

Sedflume

Sedflume is a field- or laboratory-deployable flume for quantifying cohesive sediment erosion. The USACE-developed Sedflume is a derivative of the flume developed by researchers at the University of California at Santa Barbara (McNeil et al. 1996). The flume includes an 80-cm-long inlet section (Figure 1) with cross-sectional area of 2×10 cm for uniform, fully developed, smooth-turbulent flow. The inlet section is followed by a 15-cm-long test section with a 10×15 cm open bottom (the open bottom can accept cores with rectangular cross-section (10×15 cm) or circular cross-section (10-cm diameter)). Coring tubes and flume test section, inlet section, and exit sections are constructed of clear polycarbonate materials to permit observation of sediment-water interactions during the course of erosion experiments. The flume includes a port over the test section to provide access to the core surface for physical sampling. The flume accepts sediment cores up to 80-cm in length.

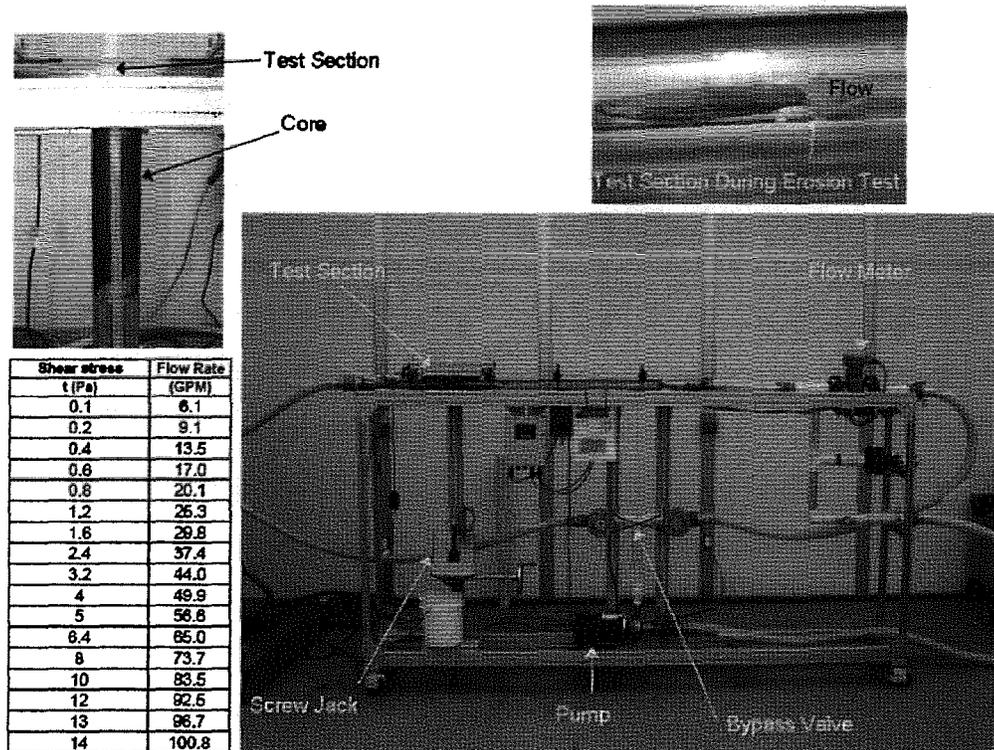


Figure 1. Sedflume erosion flume (lower right). Core inserted into test section (upper left). Core surface flush with bottom of flow channel (upper right). Table of shear stress associated with channel flow rates (lower left).

Locatus

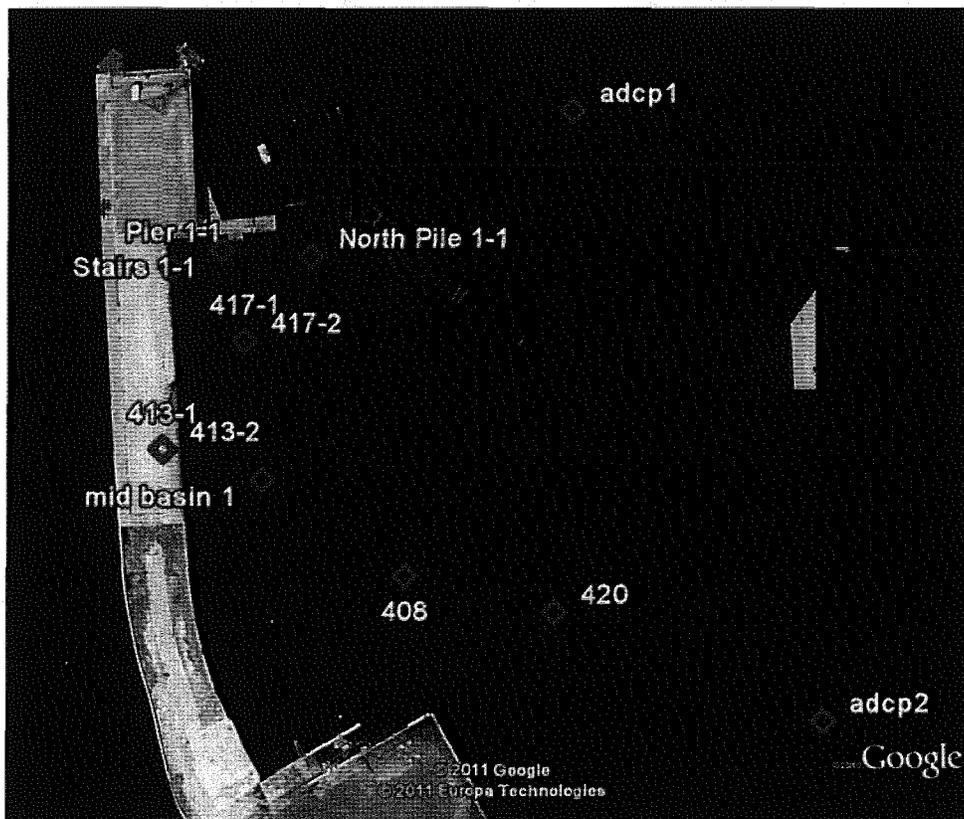


Figure 2 . Sampling locations for Sedflume core collection. Red diamonds indicate locations originally designated for core collection where coring was unsuccessful. Blue diamonds indicate loations were cores were successfully retrieved.

Table 1. Core Summary					
Core ID	Latitude (North)	Longitude (West)	Collection Method	Collection Date	Sample Depth (cm below sediment surface)
413-1	30.331317	88.512333	Gravity	30 March 2011	23-25
413-2	30.289328	88.513036	Gravity	30 March 2011	18-20
417-1	30.287174	88.512805	Gravity	29 March 2011	23-27
417-2	30.289651	88.515403	Gravity	30 March 2011	18-20
NP-1	30.289651	88.515403	Gravity	30 March 2011	25-27
Pier-1	30.28875	88.505767	Gravity	30 March 2011	21-22
Stairs-1	30.28875	88.505767	Gravity	30 March 2011	10-13

unsuccessful cores at planned stations due to shell hash armoring. Gravity core did not penetrate. Blue stations have depositional sediment.

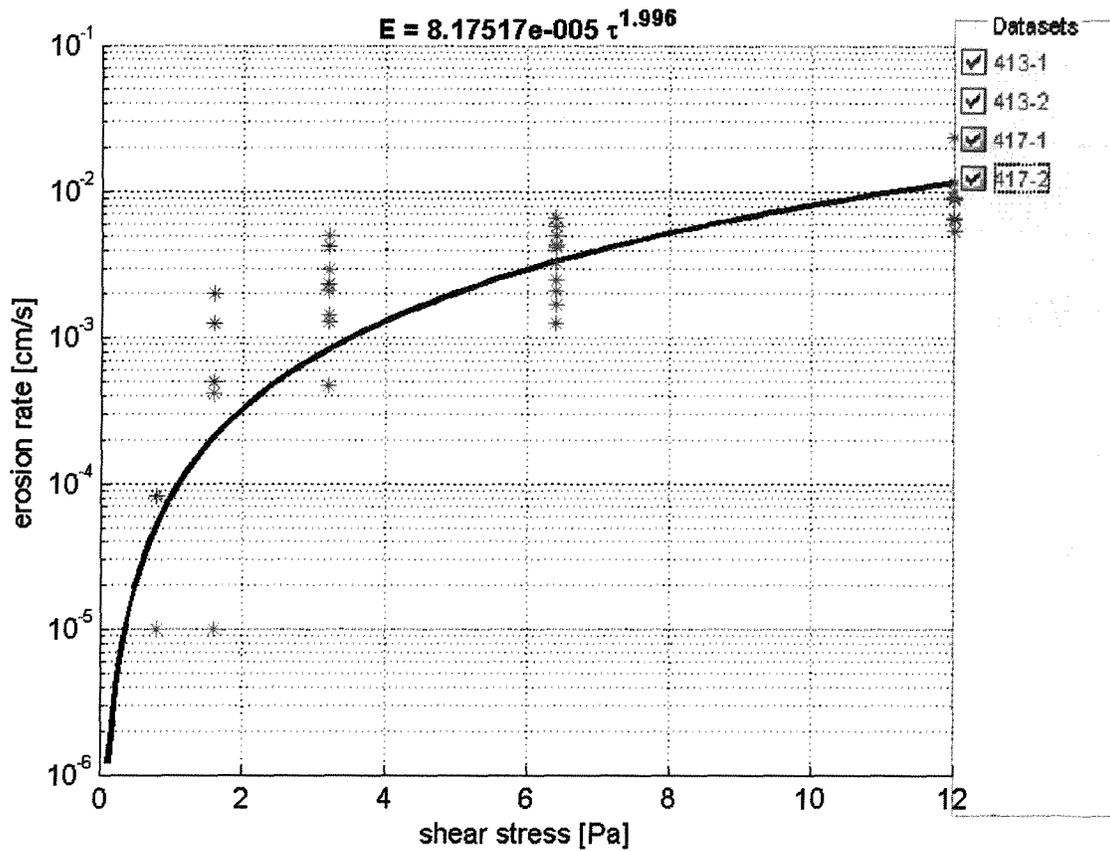


Figure 3. Erosion rate data and best-fit line to Equation 2-8 for data from sites 413 and 417 at depths greater than 6 cm below sediment surface. Datasets included in the analysis are indicated on the right (with check mark), and symbol color for erosion rates is associated with text color of the dataset.

Region	Depth (cm)	τ_c (Pa)	τ_m (Pa)	A	n
413/417	< 4	0.40	3.5	9.6E-4	2.4
	>4	1.10	12.0	8.2E-5	2.0
NP and Pier	<3	0.28	2.0	3.9E-3	2.9
NP	>6	1.80	12.0	1.7E-5	3.0
Pier	3-7	0.44	3.2	1.2E-3	3.0

