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LETTER AND U S NAVY RESPONSE TO COMMENTS ON ENCLOSED RESPONSE TO
COMMENTS FROM U S EPA REGION I AND RHODE ISLAND DEPARMTMENT OF
ENVIRONMENTAL PROTECTION REGARDING THE DRAFT SAMPLING AND ANALYSIS
PLAN TO SUPPORT THE FEASIBILITY STUDY FOR SITE 16 NCBC DAVISVILLE RI

2/18/2010

U S NAVY



DEPARTMENT OF THE NAVY
BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE, NORTHEAST
4911 SOUTH BROAD STREET
PHILADELPHIA, PA 19112-1303

5090
Code BPMP NE/DB
Ser 10-076
February 18, 2010

Ms. Christine Williams
U.S. Environmental Protection Agency, Region I
5 Post Office Square, Suite 100
Mail Code:OSRR07-03
Boston, MA 02109-3912

Mr. Richard Gottlieb
Office of Waste Management
Rhode Island Department of Environmental Management
235 Promenade Street
Providence, RI 02908-5767

Dear Ms. Williams/Mr. Gottlieb:

Enclosed is the response-to-comments (RTCs) document for comments received from EPA Region I and RIDEM on the Draft Sampling and Analysis Plan (SAP) to Support the Feasibility Study (FS) for Installation Restoration Program (IRP) Site 16 at the Former Naval Construction Battalion Center (NCBC) Davisville, Rhode Island. The EPA comments were received in correspondence dated 07 December 2009. The RIDEM comments were received in correspondence dated 08 December 2009.

It should be noted that the Navy is scheduled to begin the implementation of the FS Support SAP in the late March/early April 2010 time frame. The data collected during the field investigation will be used to complete evaluations presented in the Draft FS for Site 16 which is currently scheduled to be published in the fall of 2010 (per the Federal Facilities Agreement [FFA] schedule). Consequently, per our January 2010 BRAC Clean-up Team (BCT) meeting, the Navy, EPA, and RIDEM have scheduled a RTCs review teleconference on March 4, 2010. We look forward to resolving any remaining EPA Region I/RIDEM concerns regarding the SAP during the proposed teleconference so that the FS may be completed according to schedule.

If you have any questions, please do not hesitate to contact me at 617-753-4656.

Sincerely,

A handwritten signature in black ink, appearing to read "David Barney", written over a horizontal line.

David Barney
BRAC Environmental Coordinator
By Direction of BRAC PMO

Enclosures (2):

Copy to:

Mr. Jeff Dale, NAVFAC Midland (1 copy)
Mr. Dave Barclift, NAVFAC Midland (1 copy)
L.Rapp/B/ Capito (NAVFAC) (electronic)
Ms. Kathleen Campbell, CDW (2 copies)
Mr. Steven King, Quonset Development Corporation (1 copy)
Mr. John Reiner, Town of North Kingston (1 copy)
Mr. Casey Haskell, USACE (1 copy)
John Trepanowski, TtNUS PMO (1 copy)
Steve Vetere, TtNUS Boston (1 copy)
Joe Logan, TtNUS, Project FS Engineer (1 copy)
Scott Anderson, TtNUS Project Hydrogeologist (1 copy)
Lee Ann Sinagoga, TtNUS Project Manager (1 copy)
Glenn Wagner, TtNUS, Admin Record (1 copy)
TtNUS Project Files (CTO WE 51 112G02584), Sharon Currie

ENCLOSURE 1

**Navy Response to USEPA Region I Comments on
The Draft Sampling and Analysis Plan to
Support the Feasibility Study for Site 16
Former Naval Construction Battalion Center Davisville
North Kingstown, Rhode Island
(USEPA Region I Correspondence Dated December 7, 2009)**

**Navy Response to USEPA Region I Comments on
The Draft Sampling and Analysis Plan to
Support the Feasibility Study for Site 16
Former Naval Construction Battalion Center Davisville
North Kingstown, Rhode Island
(USEPA Region I Correspondence Dated December 7, 2009)**

EPA General Comments

EPA General Comment No. 1: Determination of Soil Contamination Boundaries in North Central Area: While the Navy discounts the use of a statistically based test pit approach recommended by the USEPA at the June 9, 2009 DQO meeting, it nevertheless is obligated to provide documentation that remedial alternatives which employ addressing contaminated soils, etc. as “hot spots” must be robustly supported by data.

The approach provided in the SAP is inconsistent with discussions held at the DQO meeting on June 9, 2009. The locations of 19 test pits proposed and shown on Figure 17-2 shows sporadic and inconsistent coverage for the determination of the extent of buried waste material outside of the “Northwestern Area.” There are significant areas where no test pits are proposed for installation. Inspection of this figure shows that there is an absence of test pits proposed in the area of SB16-71 south to SB16-75 and west to SB16-041 as well as at the southwest and northwest corners of the North Central Area. Additionally, the test pits within the “Northwestern Area” shown on Figure 17-1 do not follow a uniform grid pattern.

The test pit pattern proposed apparently assumes that data from existing direct push technology (DPT) borings/probes can satisfactorily be used for determination of the absence of buried solid waste material. As noted by USEPA during the June 9, 2009 DQO meeting, soil borings, especially DPT type soil boring/probes, are not adequate for delineation of buried solid waste material. It was stated by USEPA that the very narrow diameter of DPT borings/probes can very likely result in false negatives. That is, because of the heterogeneous nature of buried waste and the narrow diameter of the DPT, there is a high probability that buried waste will not be intercepted and detected. As such, while detection of buried waste by DPT may be interpreted as showing buried waste present, an absence of buried waste in those borings/probes cannot reliably be taken as evidence of lack of buried waste at those locations.

It was also understood during the DQO meeting that the Navy was in concurrence with the use of test pitting since it was relatively fast and inexpensive, as well as providing more reliable evidence of the presence or absence of buried solid waste. While the number of test pits and specific spacing was not discussed, it was discussed that the pattern should cover the entire North Central Area and be conducted in a uniform manner in order to statistically determine the amount of waste at the site. If the number of test pits shown is limited by budgetary constraints, it is recommended that they be distributed in a more uniform pattern sextent of buried waste material, including where “non-detect” results from DPT borings/probes.

Navy Response: *The approach presented in the SAP is consistent with the DQO discussions of 09 June 2009. As discussed during the DQO meeting and based on the currently available information and data, the Navy believes that referenced contamination and debris are likely a consequence of Navy operations in the northwestern portion of the NCA (i.e., the creosote dip tank area, the fire*

training area and BTEX "hot spot" area [likely associated with fire training area operations], and the septic tank area at the southeast corner of Building E-107) and of historic filling in of wetlands (to create useable land), respectively. The spatial distribution of the primary chemicals of concern (COCs) in the surface and shallow subsurface soils (specified in the Draft Feasibility Study [FS] for Site 16 [published February 2009]) support this position (e.g., please see Figures 2-6 and Figures 4-16 through 4-19 of the Phase III Remedial Investigation [RI] report). The Navy's proposed investigative program is designed to determine the boundaries of the surface/shallow subsurface soil contamination in the NCA and to understand the extent of subsurface debris in the NCA. The Navy believes that risk management decisions for the NCA should be based on the results of the HHRA and not solely on the presence/absence of subsurface debris. (Note to the reader: The human health risk assessment (HHRA) presented in the Phase III remedial investigation (RI) report concluded that there were "actionable risks" for soils in the Northwestern portion of the NCA assuming industrial/commercial use of the area. The HHRA also concluded there were no actionable risks for soils in the eastern/southern portion of the NCA assuming residential or industrial/commercial use of the area.)

The Navy acknowledges that the EPA does not concur with the current Navy position. Per the 09 June 2009 meeting notes (distributed on 24 August 2009), the EPA indicated that the subsurface debris detected in the North Central Area (NCA) was indicative of a solid/hazardous waste landfill across an approximately 5 acre area primarily in the northwest quadrant of the NCA. The EPA did recommend that any type of sampling program designed to support the determination of landfill/not landfill be statistically based and that such a program may be difficult to develop and would be expensive. Thus, it may be more cost effective to assume that a landfill exists and to cover the whole debris area accordingly. The EPA further clarified during the BRAC Clean-up Team (BCT) meeting of 28 October 2009 that the Navy is the agency which determines whether or not the northwestern section of the NCA should be declared a solid or hazardous waste land fill. At this point in time, the best descriptor for the area may be "contaminated fill" or "filled land".

Although the Navy and the EPA disagree regarding the presence of a solid waste/hazardous waste land fill in the NCA, the Navy believes that the proposed investigative soil program for the NCA is rigorous and will provide adequate data for risk management decision making for the surface and shallow subsurface soils in the NCA:

- The test pit configuration proposed for the Northwestern portion of the NCA was designed for the delineation of contamination and is not a grid configuration. The 30 test pits planned for this area are in addition to the existing test pits and soil borings and will result in a very dense spatial pattern of monitoring points for this area (see attached Figure A). Also, as noted in Section 11.2.4, Rule #1, the FS Support Sampling and Analysis Plan (the FS Support SAP), "step out" test pits will be excavated if screening conducted for the initial test pits suggest the presence of contamination.
- While the test pit configuration proposed for the areas outside the Northwestern portion of the NCA is also not a grid, these locations, in conjunction with the existing soil boring locations, also result in a dense spatial pattern of monitoring points (see Figure 17-2 and attached Figure A). While test pitting is definitely the superior technique to use when determining the presence/absence of subsurface debris, the Navy does not agree that the soil borings were not useful for this purpose. Indeed, our current understanding of the presence/absence of subsurface debris in the NCA is based, to a large extent, on the soil borings advanced to

date. In aggregate the borings consistently indicate that debris is not present in the eastern/southern portion of the NCA and is present in the northwestern portion of the NCA.

The Navy will add 6 additional test pits as shown in attached Figure 17-2 to address EPA concerns regarding the absence/presence of subsurface debris in the vicinity of area of SB16-71 south to SB16-75 and west to SB16-041 as well as at the southwest and northwest corners of the North Central Area.

The Navy disagrees with the EPA that test pits are "relatively fast and inexpensive".

The FS Support SAP will be changed as follows:

- Six additional test pits will be advanced in the NCA as indicated in Figure 17-2.*
- The first sentence in the second full paragraph on page 120 will be modified to read: The 25 proposed test pit locations in the southeastern section of the North Central Area are depicted in Figure 17-2.*
- Worksheet No 18, page 127 will be modified to indicate that 25 (not 19) test pits will be excavated in the NCA area outside the northwestern quadrant area (see Attachment A).*
- The sample count presented for Problem No. 1 in Worksheet No 20 (page 137) will be modified to reflect the six additional test pits (see Attachment A).*

EPA General Comment No. 2: Redevelopment/Resampling of Select Site 16 Up-Gradient Wells: USEPA is of the opinion that there is a fundamental misunderstanding implicit in this SAP that is an artifact of discussions between the USEPA and the Navy over an extended period of time. Specifically, the Navy assumption that only a "select" set of "1st priority" up gradient wells may need to be redeveloped/re-sampled in order to determine whether there is a contribution from up gradient source area(s) is not entirely correct. That is, while an ad hoc alternative criterion for development and sampling was agreed to during the June 9, 2009 data quality objectives (DQO) meeting, that agreement noted that certain wells may need to be replaced, not just redeveloped/re-sampled, depending upon the results of redevelopment if the ad hoc criteria could not be met.

Navy Response: *Navy agrees that there are fundamental misunderstandings that continue to perpetuate surrounding the Site 16 upgradient wells. This may be in part due to the apparent complete dismissal (without valid reasoning) of Navy responses to EPA concerns, allowing the concerns to continue as though they were never addressed. For instance, the Navy has provided detailed technical responses surrounding EPA concerns for the Site 16 upgradient wells in the correspondence dated January 17, 2009, with summarized technical evaluations provided in the Navy letter dated February 26, 2009. Additionally, Navy responses to EPA concerns were addressed in Navy response to EPA comments on the Draft Phase III Remedial Investigation Report (responses dated January 26, 2009) and in Navy response to EPA comments on the Draft Feasibility Study for Site 16 (responses dated August 24, 2009).*

While no "in advance" agreements that wells may need to be replaced have been reached, the reviewer is correct that EPA does believe certain wells may need to be replaced and the Navy did agree to evaluate those requests and determine if well replacement was necessary to achieve project goals. To clarify the Navy's position.... decisions need to be "data/project need" driven. Wells would only need to be replaced if the data from a well was determined to be unacceptable and it was determined that data from the well was critical to risk management decision making. The outcome of

USACE work may be important to this decision making.

The Navy will concede that many of these wells were sampled earlier than they should have (less than two weeks after development) and this likely started the fundamental misunderstanding.

No change to the SAP is proposed.

As point of reference is should be remembered that the USEPA had expressed in several meetings during the early phase of the TRIAD program the need to install a sufficient number of up gradient permanent monitoring wells in order to fully evaluate potential impacts of contaminants migrating into the Site 16 area. This was needed given the wide expanse of the up gradient boundary and the, to be expected, heterogeneities in the subsurface that potentially create preferential pathways for groundwater flow and potential contaminant migration. Although several additional wells were installed closer to the former Building 41 area, only two permanent monitoring well pairs were installed along that boundary, MW16-82D/R and MW16-83D/R, both of which are of EPA has questioned their soundness. It should also be noted that given the relatively shallow depth of MW16-83D/R it is not even certain whether that well encountered bedrock, and not a large boulder. The "bedrock" well screen for MW16-83R is only 5 feet.

Navy Response: *The upgradient expanse at Site 16 is indeed quite wide. However, the characterization that Navy did not install a sufficient number of upgradient wells is incorrect since the Navy installed the upgradient wells where EPA proposed (with the exception of MW16-83D/R, which was moved at the request of Navy but still installed where EPA concurred). Additionally, more upgradient wells were installed than proposed by the Navy. In fact, over the course of time, numerous upgradient wells have been installed in an effort to characterize upgradient conditions. The Navy recommends that the reviewer consider all the wells that are upgradient of CVOC plume in the former Building 41 area, not just the wells at the western boundary line for Site 16. The actual list of upgradient wells includes 25 Site 16 and non-Site 16 wells:*

- *MW16-55D, R, and R2.*
- *MW16-10D and R.*
- *MW16-09D.*
- *MW16-26D.*
- *MW16-33D.*
- *MW16-54D.*
- *RMW-01D.*
- *RMW-02D.*
- *EA110D and R.*
- *EA111D and R.*
- *MW16-82D and R.*
- *MW16-83D and R.*
- *MW16-84D and R.*
- *MW16-86D and R.*
- *MW-Z4-01.*
- *MW-Z4-02.*

Based on this list, the Navy does not believe that the number of wells installed is insufficient. The Navy recommends that the reviewer consider the preponderance of data collected over time from these wells as well as the more recent investigations conducted by both the EPA and the USACE. While there is seldom absolute certainty in environmental investigations, the weight-of-evidence

Enclosure 1
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suggests that the general Building 41 area and other identified sources in the NCA are the primary source of the CVOCs at Site 16, not the upgradient area.

Additionally, the Navy is confused as to why EPA is uncertain that MW16-83R is installed in bedrock since Ms. Christine Williams and Mr. Bill Brandon were present during the coring of this monitoring well (EPA field visit of 19 October 2007) and examined at least 15 feet of the 25 feet of the cored rock. The well is screened in the upper 5 feet with the concurrence of Mr. Bill Brandon since this was the only portion of bedrock cores that exhibited fractures.

Given the amount of data available at this time from multiple sources, the Navy is not proposing to perform work not already specified in the FS Support SAP for the upgradient area. All future requests from EPA must provide "positive evidence" to support their "upgradient source" hypothesis and not rely on rejecting data based on perceived flaws in data quality.

Any remedial action implemented for Site 16 groundwater will include monitoring of upgradient conditions to ensure the CSM (that former Building 41 and the NCA are the primary source of CVOC in groundwater) remains valid during five year reviews.

No change to the SAP is proposed.

While several additional monitoring points are located up gradient, including MW16-73"D", MW16-74"D", and MW16-75"D" these are direct push technology probes that were converted to narrow diameter wells. These wells were installed to varying depths with no collection of soil samples or confirmation of bedrock. Even where the depth of the well may have approached the interpreted top of bedrock as interpreted by geophysical surveys (MW16-73D) it cannot be ascertained whether this is a true depth or whether the DPT probe deviated from the vertical. The USEPA questioned the suitability of these wells for the intended monitoring objectives; yet, the Navy insisted that they be used in lieu of standard monitoring wells. In particular, the soil boring logs for MW16-55D/R and MW16-82D/R document an interval of approximately 10 to 15 feet thick above the top of bedrock (which is also documented to be highly weathered and fractured) of very coarse grain and likely highly permeable soils. The depth of at least two of the DPT wells (MW16-74"D" and MW16-75"D" does not intercept this zone. Therefore, there is actually very limited groundwater monitoring data for the up gradient areas. None of the temporary well locations include a rock well.

Navy Response: *The statement that "...Navy insisted that they be used in lieu of standard monitoring wells." is incorrect and does not accurately reflect the discussions and decisions made during the Phase III field investigation. The Navy acknowledged that the wells were installed initially as temporary wells in order to assess groundwater flow directions and contaminant concentrations. Subsequently, the Navy decided to retain the wells in order to provide a more comprehensive evaluation of the upgradient area during synoptic water level events. Additionally, the Navy is confused as to why the USEPA continues to request groundwater sampling at these locations (MW16-74D is on the priority one list from EPA) if the USEPA also questions the suitability of these wells.*

Please see response to the previous comment. The Navy is proposing to complete the work specified in the FS Support SAP for the upgradient area and is not proposing additional work in the SAP.

No change to the SAP is proposed.

Several other wells were also installed and included in the total up gradient groundwater monitoring well set. Based upon analysis of data from well development and follow on sampling, USEPA

determined that groundwater samples collected from all of these wells was not likely representative of ambient groundwater. The reasons for this were communicated verbally as well as documented in Technical Memorandums to the Navy in November 2008 and January 2009, included failure to remove drilling water lost into the borehole, aeration of the standing water in the well with insufficient elapsed time before sample collection, and poor well seals. It was noted that all of these wells would require redevelopment and re-sampling with possibly one or more wells requiring replacement.

While the USEPA provided a list of "priority" up gradient monitoring wells to be sampled, this prioritization did not imply that the remaining were not also to be redeveloped/re-sampled at some point in time. The prioritization of a set of wells which the Navy has now construed to be the "select" up gradient wells, was an artifact of discussions with the Navy prior to completion of the Site 16 Phase III Remedial Investigation and was based, in part, on the Navy stated limited resources and other issues including the desire to finalize the Site 16 Remedial Investigation on schedule. This prioritization of "select" wells was focused on the interpreted most likely pathway in order to allow the Navy to complete sampling of at least some of the up gradient wells to obtain data for inclusion in the feasibility study. However, implementation of redevelopment/re-sampling of even this prioritized list of "select" wells before completion of the Site 16 Phase III Remedial Investigation did not occur. Therefore, it is the opinion of USEPA that all up gradient monitoring wells should be sampled in order to obtain representative data.

Navy Response: *The Navy disagrees with EPA's assertion that data collected from the "upgradient wells" is not representative and cannot be used for decision making.*

As noted above, the amount of data available at this time from multiple sources (EPA, Navy, USACE) supports the Navy's decision to not pursue additional investigatory actions in this upgradient area. The Navy is not proposing any additional work not already specified in the FS Support SAP for the upgradient area. All future requests from EPA must provide "positive evidence" to support their "upgradient source" hypothesis and not rely on rejecting data based on perceived flaws in data quality.

No change to the SAP is proposed.

EPA General Comment No. 3: Existing Up-Gradient Data: The Navy seems to imply that there is adequate existing up gradient groundwater data and that the existing data does not provide indications of significant concentrations of contaminants migrating into the Site 16 area. While USEPA acknowledges the Army is investigating the upgradient plume, we believe it is imperative the data we use to determine the remedy for Site 16 is representative of the site conditions.

Navy Response: *Consistent with the Phase III RI, the Navy has concluded based on the comprehensive review of site-specific data that the groundwater data for the upgradient wells is spatially adequate and groundwater representative of site conditions which allows for the conclusion that insignificant concentrations of contaminants are migrating into the Site 16 area.*

Additional investigations completed by Navy and USACE in 2009 confirm the Navy's Phase III conclusions. Therefore, remedy selection during the FS will not need to address contamination migrating onto Site 16.

The Navy acknowledges that the EPA is not in agreement with the conclusion presented in the previous paragraph. Consequently, the Navy has proposed to re-develop/re-sample select upgradient wells as indicated in the FS Support SAP (Problem No. 8). Based on EPA's specific Comment No. 66, that upgradient wells have failed, the EPA already presents a position of bias

against the data proposed to be collected.

No change to the SAP is proposed.

EPA General Comment No. 4: Fate and Transport.

Deep Overburden Groundwater Velocities

We do not agree with the Navy's deep zone groundwater velocity of 12.5 feet per year. The Navy reiterates a geometric mean hydraulic conductivity of 4.4 feet per day. USEPA interprets this value to be low by an order of magnitude. In part, the low hydraulic conductivity value is due to incorporation of all deep overburden groundwater hydraulic conductivity data throughout the entire Site 16 area. More importantly, though, detailed analysis of the slug test data shows that many of the tests underreport the true aquifer permeability due to well seal/screen problems and/or incorrect selection of the slug test recovery response curve, that is use of the later 10% of so of the recovery to calculate hydraulic conductivity, while dismissing the early time data. The interpretation by USEPA is corroborated by the soil boring log descriptions of the aquifer materials in the screened interval which show coarse grain materials including coarse sands and gravels.

According to various industry-accepted references, the hydraulic conductivity of these aquifer materials can be expected to be relatively high. For instance, Analysis and Evaluation of Pumping Test Data, Kruseman, G.P. and N.A. de Ridder, ILRI Publication 47, 1994, page 21, sand and gravel mixes range from 5 to 100 meters per day (16 to 328 feet per day); Hydrogeology and Groundwater Modeling, 2nd edition, Kresic, N., 2007, page 38, clean sand and gravel mixes range from 50 to over 1,000 feet per day; Groundwater Hydrology, 3rd edition, Todd, D.K. and L.W. Mays, page 93, predominantly gravel till can have a hydraulic conductivity of 30 meters per day (98 feet per day); values published by the United States Geological Survey (USGS) in Documentation of Spreadsheets for the Analysis of Aquifer-Test and Slug-Test Data, U.S. Geological Survey Open File Report 02-197, 2002, Halford, K.J. and E.L. Kuniansky, page 9, indicates that likely minimum hydraulic conductivity values for sand and gravel mixes is 30 feet per day with a likely maximum of 300 feet per day.

Inspection of the slug test results and the soil boring log descriptions for wells throughout the Site 16 area show a dichotomy between soil descriptions and reported slug test hydraulic conductivity values. For similarly described soils, the reported hydraulic conductivity values appear to fall into two groups. This information has previously been provided to USEPA. One group has an abnormally low hydraulic conductivity and one group with reported hydraulic conductivity values in the USGS likely minimum range. The first group of deep overburden wells (19 wells) with geologic strata descriptions of gravelly sand, had an average hydraulic conductivity value of 2.5 feet per day while a second group of deep overburden wells (14 wells) with similar descriptions had an average hydraulic conductivity of 35 feet per day. This dichotomy clearly points to problems with use of Site 16 slug test data without careful inspection of the slug test data.

Inspection of hydraulic gradient data for the three time frames contained in the Site 16 Phase III Remedial Investigation Report, the average gradient is 0.0020 feet per day. Using this hydraulic gradient and an effective porosity of 0.25 and a value of 35 feet per day for a hydraulic conductivity would result in a groundwater velocity of approximately 102 feet per year, significantly greater than the stated 12.5 feet per year. As such, contrary to the Navy interpretation of a relatively slow groundwater (and potentially contaminant transport) velocity, USEPA interprets a much higher groundwater velocity to be present in the deep overburden and/or the upper weathered bedrock zone. It should also be noted that this velocity does not include the effects of longitudinal dispersions which would result in faster migration of contaminants through heterogeneities in the soil matrix.

Preferential Groundwater Flow

The Navy statement on Table 10-2 in the discussion on Contaminant release, transport, and Migration that, "although the geophysical investigations conducted for Site 16 indicates that a deep channel occurs parallel to Davisville Road, there is no evidence of preferential flow in or around this feature (i.e. there is no reflection in the potentiometric surface maps", is not agreed to and it is not in conformance with the USEPA interpretation of available data. Various groundwater measurement events provide groundwater elevations that show preferential groundwater flow pathways into the Site 16 area including near/along the geophysical anomaly paralleling Davisville Road when USEPA interprets the data.

USEPA previously interpolated groundwater elevations for several groundwater elevation measurement events which clearly indicate the presence of a preferential groundwater flow path that is reflected in the piezometric contours. This information has previously been submitted to the Navy verbally and in Technical Memorandums regarding 2007 Synoptic Groundwater Monitoring and concerns relative to migration of contaminants from the former Nike PR-58 site as indicated by data from the USEPA Site 03 DPT Investigation. Therefore, given the likely higher than assumed hydraulic conductivity values, in both deep overburden and shallow bedrock, the preferential groundwater flow and potential contaminant migration pathway warrants a robust evaluation of groundwater quality migrating into the Site 16 area from up gradient source area(s).

Navy Response: *Responses to these comments have been provided in several Navy submittals, and those Navy responses appear to be dismissed without rationale other than they do not agree with published hydraulic conductivity ranges for general soil types assumed by EPA for lithologies within the screened zone. Specifically, Navy responses to these issues were supplied in the correspondence dated January 17, 2009 and the subsequent letter dated February 26, 2009. As indicated in the previous Navy responses (included as Attachment B), the Navy is not in agreement with the EPA's analysis and believes there are significant errors in the data analysis provided by the Agency.*

The Navy has concluded that:

- (1) Sufficient hydraulic conductivity data is available from over 400 slug tests to estimate hydraulic conductivity of the stratigraphic units at Site 16;*
- (2) this hydraulic conductivity data is useable to estimate average groundwater flow velocities of the stratigraphic units at Site 16; and*
- (3) these estimated groundwater flow velocities are useable to evaluate potential remedies.*

No change to the SAP is proposed.

EPA General Comment No. 5: However, since the Army is investigating the upgradient area, Navy need only ensure its data is representative of the aquifer conditions.

Navy Response: *Please see response to General Comment No. 2.*

EPA General Comment No. 6: Since groundwater emerging into Allen Harbor from sediment will be diluted rapidly, it is important to measure surface water as close to the sediment surface as possible to estimate the concentration to which benthic epibenthic organisms are actually exposed. Therefore, EPA recommends that the sample tube of the pump be placed within a centimeter of the sediment surface, rather than 0-6 inches.

Navy Response: *The Navy concurs with the need to measure surface water concentrations as close to the sediment surface (the exposure point) as possible. The Navy will make every effort to place the sample tube intake as close to the sediment surface as possible and, at the same time, not compromise the sample integrity. Given the "muck like" sediment surface at some locations within Allen Harbor samples will most likely be collected within 3 to 6 inches of sediment surface. Please note that sampling within 1 centimeter of the sediment surface may not be possible because the placement of the sample tube intake that close to the sediment floor will likely cause sediments to be collected in the sampling tube with water, and invalidate the result.*

No change to the SAP is proposed.

It is also important to measure pore water in the biotic zone of the shallow sediment to estimate the exposure to benthic infauna. Therefore, it is important for the piezometers to be designed to collect pore water between 1 and 3 inches below the sediment surface. Therefore, please include a screen at this level of the piezometers for collection of pore water.

Navy Response: *The Navy concurs that pore water sampling is advisable when attempting to estimate the exposure to benthic infauna. However, given the "muck like" sediments observed at some locations during the Phase III field investigation, pore water sampling would probably be more accurately accomplished using buried PDB bags or peeper-type samplers versus piezometers. This level of effort is often expended when significant sediment contamination is observed; but, risk management decisions based on sediment data only are not clear. Please note that, as depicted on Figure 4-31 of the Phase III RI report, sediment samples were collected at 20 different Allen Harbor locations in support of the Phase II Screening Level Ecological Risk Assessment (SLERA) for IR Program Site 16 (published November 2004). The CVOC, TCE, and BTEX data (as well as a limited amount of sediment data collected in 2007) are summarized on Figure 4-31 and further detailed on Tables 4-61, 4-63, 4-64, and 4-65 of the Phase III RI report. The Phase II SLERA concluded that CVOCs were not COCs for ecological receptors in Allen Harbor. In fact, as stated in the executive summary of that document: "No volatile organic chemical was identified as a COPC in Allen Harbor adjacent to Site 16." Consequently, the Navy has concluded that pore water sampling is not necessary at this time.*

No change to the SAP is proposed.

In the sediment cores, please collect a sediment sample for contaminant analysis from a 1-3 inch segment below the sediment surface, as well as those already proposed. This, in combination with the piezometer data will be useful for calculating empirical attenuation factors for groundwater as it emerges into Allen Harbor. Such empirical attenuation factors may be useful for the calculation of risk-based target levels further upgradient in the groundwater plume.

Navy Response: *Agree. The Navy will collect a sediment sample from 1 to 3 inches below the sediment surface and submit to the fixed-base lab for CVOC analysis. The Navy will also collect a 0 to 1 foot sample and screen for CVOC contamination using PID/Color Tec screening tools.*

The FS Support SAP will be changed as follows:

- *The first full bullet on page 57 will be modified to state that sediment samples will be collected from 1 to 3 inches, 0 to 1 foot, 1 to 2 feet, 4 to 5 feet, and 9 to 10 feet and screened for the presence of CVOCs. The second bullet on page 57 will be modified to state that the sample collected from 1 to 3 inches below the sediment surface will be submitted to the fixed-base*

lab for VOC analysis.

- The first full paragraph on page 87 will be modified to state that sediment samples will be collected from 1 to 3 inches, 0 to 1 foot, 1 to 2 feet, 4 to 5 feet, and 9 to 10 feet and screened for the presence of CVOCs.
- The first sentence of the last paragraph at the bottom of page 121 will be modified to state that a sediment sample from the 1 to 3 inch depth interval will also be collected.
- The list of sediment depth intervals (to be sampled) on page 129 will be modified to include 1 to 3 inches below the sediment floor. (Worksheet No. 18)

Specific Comments

7. *Page 3, 1st Bullet, Last Sentence:* The need for adequate characterization of the extent of subsurface debris is not simply to be "of benefit" for the Navy and prospective developers. Knowledge of the extent of buried solid waste is needed for completion of the feasibility study.

Navy Response: Please note the qualifier "Additionally" in the referenced sentence and the entire preceding sentence in the bullet. Obviously, the characterization of the extent of subsurface debris in the North Central Area (NCA) is intended to support the completion of the feasibility study (FS) for Site 16. The proposed test pit investigation for the NCA is designed to compliment the existing information (both chemical information and "presence of waste" information) currently available from prior test pit and soil boring programs. However, risk management decisions for the NCA soils will continue to be based on the results of chemical analyses of the soils. Soil samples collected from all of the test pits planned for the northwestern quadrant of Site 16 will be analyzed for the target analytes specified in the draft SAP. Soil samples collected from test pits advanced outside the northwestern quadrant of the will also be analyzed for the target analytes specified in the draft SAP if waste materials are observed in these test pits.

No change to the SAP is proposed.

8. *Page 3, 2nd Bullet, Last Sentence:* This bullet needs to include discussion of the need to more accurately evaluate the potential for chlorinated volatile organic compounds (CVOC). Also, the Navy has not complied with USEPA recommendations for a shallow/intermediate groundwater monitoring well pair to be installed to the southeast between the "BTEX" hot spot area and MW16-40S/I. Further, the Navy is not investigating the hot spot area itself, but is proposing to place the single shallow/intermediate well pair outside the "BTEX" hot spot, not in it where photo-ionization detector (PID) readings exceeded 1,000 parts per million (PPM) in the breathing zone.

Navy Response: Please re-read the referenced narrative which states the problem to be resolved (i.e., the investigation of VOCs in the groundwater at the BTEX hot spot). The narrative does not state that the proposed wells will be placed "outside" the BTEX hot spot area. The reviewer is referred to the discussions presented in Worksheet No. 11 for a more complete discussion of the problem to be resolved and the proposed investigative program. The Navy does intend to locate the proposed wells within the BTEX hot spot area. The referenced 1,000 ppm reading reported during the excavation of exploratory test pit (EPT) No. 2 for the PID is not for the "breathing zone" but for the excavated test pit soils. Readings were taken directly from the stockpiled soils (a hole approximately 1 inch wide by 2 inches

deep was cut with a plastic trowel and probe tip inserted) and maximum result recorded.

Additionally, elevated (relative to all other NCA locations) VOC concentrations (including BTEX) were detected in soil samples collected from locations ETP-2 and SB-58, as discussed in Worksheet No. 11. The maximum benzene concentration (4,800 ug/kg) was detected in shallow sub-surface soils at SB-58; the benzene concentration reported for shallow, sub-surface soils from ETP-2 was 340 ug/kg. Consequently, the proposed wells will be placed between these two locations.

With regard to the EPA's request to install a shallow/intermediate well pair between the hot spot area and MW16-40S/I, the Navy has reviewed the available soil data from test pits, soil borings, and monitoring wells between the hot spot area and MW16-40S/I. The additional locations evaluated were: ETP-3, SB16-77, SB16-80, SB16-83, and SB16-84. ETP-3, SB-77, and SB-80, in particular, are in a direct line between the hot spot area and MW16-40S/I. The available screening data and fixed based lab data for these locations are presented in the following Phase III RI data tables: Table 4-12, 4-13, and 4-22. None of the VOC concentrations reported for surface or shallow subsurface soils collected at these locations exceed screening levels established in the Phase III RI to identify potential chemicals of concern for direct human contact or protection of a groundwater resource. While no monitoring wells currently exist between the hot spot area and MW16-40S/I, the available surface and shallow subsurface soil data do not indicate a potential vadose-zone source area in this portion of Site 16. Consequently, shallow and intermediate depth zone wells were not proposed in the draft SAP. However, the Navy does acknowledge that additional wells may be required in the NCA if the analytical results for soil samples collected during the test pit investigation indicate the presence of another (previously unknown) vadose zone source area in the NCA.

9. *Page 3, 4th Bullet:* This problem/issue is not adequately addressed in the SAP. As USEPA reads the text, it leaves open the possibility that no shallow/intermediate monitoring well pair will be installed in front of, and up gradient of the Sea Freeze building. The work proposed states that if field screening does not show significant concentrations of volatile organic compounds (VOC) the wells will be installed to the side and cross gradient of the Sea Freeze building. USEPA specifically requested at least one shallow/intermediate monitoring well pair in front of and up gradient of the Sea Freeze building. The purpose of the field screening was to focus placement of these wells, not serve as a vehicle to not locate wells at the recommended location. USEPA understands from recent communication that the plan is more thorough than can be concluded from the text and looks forward to resolving this issue.

Navy Response: *The reader is referred to Worksheet No. 11, Problem No. 4 and Problem No. 5. Problem No. 4 entails the installation of shallow and intermediate depth permanent monitoring wells. Problem No. 5 entails the advancement of soil borings (for soil and soil gas samples) and temporary monitoring wells. The shallow zone well is intended to characterize VOCs in the shallow groundwater zone, specifically in the area immediately upgradient of the Sea Freeze building. The data collected as part of the vapor intrusion investigation described to resolve Problem No. 5 will be used to optimize the location of this well. Please note that all of the locations described in Problem No. 5 are interpreted to be upgradient of the Sea Freeze building based on analysis of potentiometric maps from 2008. Consequently, the shallow zone well will definitely be installed upgradient of the Sea Freeze building, with appropriate adjustments based on temporary wells as necessary. Note that while the shallow zone well is installed for purposes of evaluating the potential for vapor intrusion in the vicinity of the Sea Freeze building, the intermediate depth well is recommended to investigate*

groundwater quality immediately adjacent to (and, thus, discharging to) Narragansett Bay. If the data collected as a consequence of the Problem No. 5 investigations indicate that VOC concentrations are more significant at one screening location versus other screening locations (e.g., elevated screening results [PID headspace or Color Tec] above shallow zone results), the intermediate depth well will be installed accordingly, else the intermediate depth well will be installed as close to the piers as the infrastructure will allow.

No change to the SAP is proposed.

10. *Page 4, 1st Bullet:* This statement presumes that the “periphery” of the plume is known. The “periphery” of the plume has not been established due to an absence of groundwater monitoring wells in key locations.

Navy Response: *While EPA is correct that the groundwater plume has not been completely delineated, for the intents of Problem No. 5, the periphery of the estimated plume boundary is sufficient to allow completion of the stated task.*

No change to the SAP is proposed.

11. *Page 4, 2nd Bullet:* While this statement is correct, it should be noted that the work performed does not follow all of the recommendations made by the USEPA. The level of effort is more extensive and costly than the approach suggested by the USEPA. Further, the Navy states that installation of three soil borings were “at the recommendation of USEPA.” This is incorrect.

Navy Response: *Please see response to EPA Specific Comments No. 85.*

12. *Page 4, 3rd Bullet:* The work proposed again, is more than recommended by USEPA, yet, still does not address recommendations made by USEPA. Seven soil borings are proposed to go to a depth of 30 feet. However, the stated objective is to evaluate shallow soil risks to receptors and to identify locations where surface releases may have occurred. It should also be noted that while resources are available to perform these soil borings including one within the former Building 41 footprint, the Navy is not complying with a USEPA recommendation to install a soil boring at the location of MW16-31D.

The current Navy contractor has interpreted a previous Navy contractors soil boring log of “silt with gravel” to be “gravel with silt.” This reinterpretation (without actual observation of the in situ soils) is a key assumption of the current Navy contractors Conceptual Site Model (CSM) to explain chlorinated volatile organic compounds (CVOC) in the deep overburden and bedrock. Also, the USEPA has stated that there is the potential for CVOC to have migrated in the past from the North Central Area across Davisville Road to the and southeast. This issue is not being addressed in that none of the additional soil borings are in that area, i.e. between SB16-A2-06 and SB16-A3-10.

Navy Response: *The work proposed accurately reflects the consensus of the parties input during the DQO scoping meeting of June 9, 2009. Contrary to the continued EPA contention and as pointed out in Navy response to Comment No. 31 of the Draft Phase III RI for Site (dated January 26, 2009), the current Navy contractor has not re-interpreted a previous contractors work. Nor is it a key assumption of the CSM. As outlined in Sections 3 and 4 of the Final Phase III RI, the CSM is built upon multiple lines of evidence and simply does not rely on any single interpretation/reading to understand site-wide or localized contaminant*

transport.

The following clarification is provided to resolve the misunderstanding regarding MW16-31D: It appears that EPA is assuming that lithologies generalized based on five boring logs (SB16-A3-37, SB16-A3-33, MW16-31D, SB16-A3-38 and SB16-A3-07) are based solely on a re-interpretation for MW16-31D. Figure 3-2A from the Supplemental Phase II Data Package shows only "gray silt & gravel" in this area, consistent with the boring log (technically, the boring log also has trace sand which was not included on the cross-section). As evidenced in Figure 3-2A in the Phase III RI, a significant number of new borings were advanced near MW16-31D during the Phase III field investigation and, consequently, the subsurface lithologies were generalized in this area on the resultant updated cross-section. The lithologies in this area were generalized to "gray vf silty gravelly sand & rock" in the west and "tan vf silty sand w/gravel" in the east which reflects the composite of lithologies observed in the five boring logs.

While it can be argued that these generalized lithologies do not exactly match any of the boring logs specifically, they are not meant to. Generally, the lithologies of these five borings show sand with a varying degree of silt, ranging from less than the sand percentage (as in the use of "silty") to an equal percentage as in the MW16-31D boring log. Gravels also occur as a component in the lithologies. In no boring logs is silt the dominant matrix in the zone in question (44 to 56 feet bgs). It is accurate to conclude that the highest percentage of silt occurs at MW16-31D; however, it is not accurate to conclude that silt is the dominant fraction.

Sand is the highest percentage component in all of the boring logs (equal to the silt fraction at MW16-31D) which is why Navy has maintained that consistent interpretation from Phase II to Phase III. The continued EPA position that Navy changed a dominantly silt matrix (with sands and gravels) to a dominantly sand matrix (with silt and gravels) is not supported by analysis of the cross-sections or boring logs. It is accurate that the generalized lithologies on Figure 3-2A of the Phase III RI slightly underestimate the silt content with respect to MW16-31D, but this does not warrant the continued EPA implication that Navy contractors have acted inappropriately.

One of the tenets of the EPA position is that a silty dominated matrix would prevent downward migration of CVOC and presumably (see EPA Comment No. 39 for the Comments on the Draft Site 16 FS) the Navy contractor's deliberate change from a "silty" to "sandy" matrix would not support this interpretation. This is not supported by the data. It is evident from the analysis of potentiometric data, vertical gradients, chemical distribution (both soil and groundwater), soil screening data and constant rate tests that there is very good hydraulic connection in this portion of the site between the intermediate and deep overburden zones. While it is logical to conclude that the exact pathway may be arduous, the pathway is complete. Therefore, even if a geotechnical sample were collected that would change this interpretation to a silty dominated matrix, this would not invalidate the other multiple lines of evidence that demonstrate hydraulic connection. Therefore, a soil boring at the MW16-31D location is not necessary as the data garnered will not invalidate the current site conceptual model used to evaluate remedial options in the FS as the Navy concurs with the lithologies as described on the soil boring for MW16-31D.

No change to the SAP is proposed.

13. *Page 25, 2nd Full Paragraph, Last Sentence:* This information has not been provided to USEPA. As such, the Navy statement is not able to be reviewed.

Navy Response: Agree. Please see information provided in Attachment C (sent via email from Jeff Dale to EPA and RIDEM on January 6, 2010). This data will be evaluated and interpreted with the data collected during this proposed field work and will be presented in a revised FS,

14. Page 32 and Table 10-2: Please provide justification for the statement that site 16 metal results are often impacted by salinity and turbidity. A table in this text with these results delineated would suffice.

Navy Response: Agree. The requested information (2004 and 2007 data) is provided in Tables 4-31 through 4-39 (groundwater results tables) of the Phase III RI Report (March 2009). Please note the data presented under "Miscellaneous Parameters". These tables are provided as Attachment D of this response-to-comment (RTC) document. Please note that these tables are from the Phase III RI report for Site 16 which is appended to the FS Support SAP as Appendix A.3.

No changes to the SAP are proposed; however, the revised FS will present data or charts to better support the statement.

15. Page 34: Please note RIDEM GB is not the PRG. MCLs are the PRG.

Navy Response: Disagree. The referenced text is not making a statement regarding the selection of preliminary remediation goals (PRGs) for Site 16. The fact that CVOC benchmarks exceed state benchmarks for a groundwater not used for domestic purposes is an indication to the reader that significant CVOC contamination is present in the groundwater underlying Site 16.

As documented in the meeting minutes for the Site 16 FS comments meeting of October 28, 2009, the EPA and Navy have not reached agreement on the PRGs for groundwater at Site 16. The Navy's position is that all work being proposed will allow for screening and selection of remedies, whether MCL, RIDEM GB, or other risk based criteria are selected as the remedial goal in the ROD.

No change to the SAP is proposed.

16. Page 38: 85 D should be named 85I.

Navy Response: Disagree. Please see Navy response to Comment No. 31 of the Draft Phase III RI for Site 16 (dated January 26, 2009).

No change to the SAP is proposed.

17. Page 39 and Table 10-2: Please reference a map of the wells that are noted for clarity. Also the area should be designated as Class II rather than GB as EPA does not recognize the GB cleanup values.

Navy Response: The referenced text will be modified to note that well locations are specified in Figures 2-1 and 2-5 of the Phase III RI report. The Phase III RI report was appended to the FS Support SAP as Appendix A.3. Per BCT discussions of October 28, 2009, the Navy acknowledges that the Navy and the EPA are not currently in agreement regarding the classification of the groundwater underlying Site 16 and the selection of

preliminary remediation goals for the Site 16 FS. The reviewer is referred to Attachment A of the RTCs document for the Draft FS for Site 16 (dated August 24, 2009 and attached to this RTCs document as Attachment E) as well as the BCT meeting notes for October 28, 2009 (attached to this RTCs document as Attachment F).

18. *Page 49, Table: Why are chlorinated volatile organic compounds not included on this table? The remedial investigation was inconclusive in regard to CVOC in this area due to the limitations of the Color-Tec® screening methodology in BTEX contaminated soils and the limited depth of soil borings. Trichloroethylene, dichloroethylene, and vinyl chloride should be added as chemicals of concern in this table with associated PRG values. Groundwater is contaminated and the soil should be remediated to levels protective of groundwater.*

Navy Response: *The in-text table lists the PRGs for the soil COCs as provided in Table 2-3 of the Draft FS for Site 16. Based on the currently available data, benzene is the only VOC selected as a COC for the vadose zone soils at Site 16. The maximum detected benzene concentration in the vadose zone soils at the BTEX hot spot area [4.8 mg/kg] exceeds the RIDEM Leachability criteria [4.3 mg/kg]. Thus, it was selected as a COC for the Site 16 FS. The CVOCs are definite COCs in groundwater; however, based on the currently available data, these contaminants are significant contaminants in the deeper, saturated zone soils (not in vadose zone soils). Per discussions at the October 28 BCT meeting, the EPA agreed that, from a remediation perspective, such contamination is more realistically addressed as part of groundwater remediation at Site 16. (Please see attached meeting notes in Attachment F.)*

Also, please note that both screening level CVOC data and fixed-base analytical laboratory data are available for vadose zone soils in the BTEX hot spot area (location ETP 2, Phase III RI Table 4-22; location SB-58, Phase III RI Table 4-12). While CVOCs were detected in the vadose zone soils in this area, the maximum concentrations detected do not exceed RIDEM direct contact criteria for the industrial/commercial worker or the RIDEM GB leachability criteria. The reviewer is correct that the list of COCs and PRGs in-text table on page 49 and the Site 16 FS may need to be updated based on the data collected during the implementation of the FS Support SAP. The following sentence will be added to the text on page 49 to acknowledge this possibility: "The PRGs presented in the preceding table are subject to change (i.e., the list of chemicals requiring PRGs may increase) based on the data for samples collected during the implementation of the FS Support SAP".

19. *Page 50: Are the PALs the same as the soil screening levels? Please clarify.*

Navy Response: *Yes, in the sense that screening levels and criteria listed at the top of page 50 will be used to identify if there are any chemicals of potential concern (COPCs) in the soil samples collected from the NCA during the FS Support SAP. Please note that the screening levels at the top of page 50 are not preliminary remediation goals (PRGs) for Site 16.*

No change to SAP is proposed.

20. *Page 50 of 188, Section 11.2.4, Analytical Approach - A Standard Reference Material (SRM) near the lead concentration of 375 (i.e 300-450 mg/Kg) is recommended to be analyzed after every 20 samples. This is typical of the field XRF analysis (see Section 10.2.1 of Method 6200), and would provide a high level of confidence that the soil samples screened would indeed be below the PRG of 500 mg/Kg.*

Navy Response: Agree. The SOP for the field XRF will be modified to state that: A Standard Reference Material (SRM) of approximately 300 to 450 mg/kg will analyzed after every 20 samples.

21. *Page 50, Last Paragraph (Bullet):* This paragraph notes that the initial test pit location is to be selected by the "FS engineer" (subsequently in this SAP the locations are stated to be chosen with a "bias/judgmental" approach). The locations of the test pits need to conform to a more uniform pattern in order to use statistical analysis to evaluate hotspots. While not referenced in this paragraph or Problem Statement, test pit location plans are provided as Figures 17-1 and 17-2. Data from DPT probes that has apparently been used is not acceptable since the narrow diameter can result in false negatives in regard to buried waste material.

Navy Response: Please see response to EPA General Comment No. 1.

22. *Page 51, Note: 11.2.1, 6th and 7th Sentences:* It is not clear why the deepest subsurface sample will be sent for VOC analyses. If screening is inconclusive, then the VOC should be taken consistent with the other contaminants of concern, i.e. the shallowest subsurface interval of 2 to 6 feet. This location is likely to be most representative of shallow soil risks and potential source areas. Likewise, it is not clear why arsenic also should be sampled "randomly". Arsenic can be an artifact of coal ash, etc. and similar to other contaminants of concern should be sampled in the shallowest subsurface sample at 2 to 6 feet.

Navy Response: The reviewer is correct that defaulting to sample collection at the 2 to 6 foot below ground surface (bgs) interval does have the advantage of targeting the most accessible shallow sub-surface zone in terms of direct human contact. However, defaulting to that zone for CVOCs or metals ignores the fact that, from a human health perspective, the risk assessment protocol for Site 16 assumes that subsurface soils (in the vadose zone up to 10 feet deep) may be excavated and spread across the surface. Therefore, human exposure to soils deeper than 6 feet bgs is possible and must be considered in risk management decision making for Site 16. Additionally, a review of both screening level and fixed-base lab data for VOCs reveals that the predominant site VOC contamination has been detected in the deeper vadose zone soils (e.g., based on Phase III field investigation results, CVOC detections were often associated with samples collected in the peat layer [i.e., deeper than 6 feet bgs]). Therefore, defaulting to the 2 to 6 foot bgs zone may actually result in an underestimation of VOC impacts (particularly CVOC impacts). For these reasons, the Navy continues to recommend that, independent of positive screening level results or other evidence of obvious contamination, the deepest test pit soil sample is collected for fixed-base lab for analysis of VOCs.

However, the Navy also concurs that, independent of positive field screening results or other evidence of potential contamination, the shallowest subsurface sample (the 2 to 6 foot interval) should be sent to the fixed-base lab for metals analysis (i.e., arsenic and lead analysis).

The FS Support SAP will be changed as follows:

- The last three sentences of Note 11.2-1 will be deleted and replaced with the following text: An effective method is not currently available for field screening of arsenic. The subsurface soil sample selected for lead analysis by the fixed-base lab

will also be analyzed for arsenic.

23. *Section 11.2.2:* Please explain in the text why the PRGs for delineating soil contamination in the northwestern portion of the North Central Area (4th bullet) are different than those for the southern/eastern portion of the North Central Area (5th bullet). Although the reason appears to be that the former PRGs are industrial and the latter PRGs are residential, it is unclear why this distinction was made. Please explain.

Navy Response: *Agree. As indicated in the Problem Statement on page 48 and in the Phase III RI report: "Actionable risks" were identified during the Phase III RI for soil in the western area (particularly the northwestern portion) of the NCA. Consequently, COCs were identified for soils in this area, PRGs were selected/calculated for those COCs, and remedial alternatives were developed for the soils in this portion of the NCA. In contrast, "actionable risks" were not identified for soils in the eastern/south eastern portion of the NCA. However, both the Navy and EPA have determined that additional exploratory test pits are necessary in this area for purposes of determining the presence/absence of subsurface debris and sampling/chemical analysis of soils if such debris is encountered. COCs have not been identified for this exposure unit (EU) area and PRGs have not been selected/calculated for this area. Note that the proposed investigative program for the northwestern portion of the NCA is intended to more accurately define, if possible, the extent of the soils potentially requiring active remediation (e.g., how wide is the area exceeding the selected PRGs for the carcinogenic PAHs [0.8 mg/kg])? (Please note language in Decision Rules No. 3 and 4 on page 52.) In contrast, given the fact that "actionable risk" was not previously identified for the eastern/southeastern portion of the NCA, any new data collected for this portion of the NCA will need to be combined with the existing data set for this area and re-evaluated from a risk perspective. That re-evaluation will require the selection of soil COPCs (per the typical, conservative [residential-land-use-based] screening criteria at the top of page 50) and COCs may or may not be identified for this area (or a sub-area there-of) based on the out-come of the revise risk evaluation. (Please note language in Decision Rules No. 5 and 6 on pages 52 and 53). (Please also note that it is also plausible that, based on newly collected data, new COCs may also be identified for the northwestern portion of the NCA. This possibility will be noted in the referenced text.)*

The following note to the reader will be added to the end of Section 11.2.2:

- *Note that the proposed investigative program for the northwestern portion of the NCA is intended to more accurately define the extent of the soils potentially requiring active remediation (e.g., how wide is the area exceeding the selected PRGs for the carcinogenic PAHs [0.8 mg/kg])? (Please note language in Decision Rules No. 3 and 4 on page 52.) In contrast, given the fact that "actionable risk" was not previously identified for the eastern/southeastern portion of the NCA, any new data collected for this portion of the NCA will be combined with the existing data set for this area and re-evaluated from a risk perspective. That re-evaluation will require the selection of soil COPCs (per the typical, conservative [residential-land-use-based] screening criteria at the top of page 50) and COCs may or may not be identified for this area (or a sub-area there-of) based on the out-come of the revise risk evaluation. (Please note language in Decision Rules No. 5 and 6 on pages 52 and 53). (Please also note that it is also plausible that, based on newly collected data, new COCs may also be identified for the northwestern portion of the NCA.)*

24. *Section 11.2.3:* This section neglects the population of soil in the southern/eastern section of

North Central Area that currently has no debris found but exceeds the residential PAL. Please address. Also please use the term PRG or PAL, rather than both, to describe decision-making screening concentrations for the two areas. The decision criteria should be clarified by insertion of a table such as:

Soil Population within North Central Area	Debris Presence/Absence	Contaminant Concentration	Remedial Action?
Northwestern	Unspecified	> industrial PRG	Yes
Northwestern	Unspecified	≤ industrial PRG	No
Southern/eastern	present	>residential PAL	?
Southern/eastern	present	≤residential PAL	?
Southern/eastern	Absent (?)	>residential PAL	?
Southern/eastern	Absent (?)	≤residential PAL	No

Navy Response: Please see responses for EPA General Comment No. 1 and EPA Specific Comment No. 23. Please also note that:

- Risk management decisions for the southern/eastern NCA soils will be based on risk assessment results, not on a "presence/absence of debris" criterion.
- In accordance with EPA RAGS, risk estimates for an exposure unit are typically based on the evaluation of the 95 percent upper confidence limit on the arithmetic mean as the exposure point concentration and not on the exceedance of a screening level or even a PRG at one particular location.
- If the revised risk estimates for a hypothetical future resident for the southern/eastern NCA soils exceed risk benchmarks established for Site 16, "land-use-controls" would likely be recommended for the area.
- If the revised risk estimates for a hypothetical future industrial worker for the southern/eastern NCA soils exceed risk benchmarks established for Site 16, remedial alternatives will be evaluated for the area in the FS for Site 16.

No change to the SAP is proposed.

25. Page 53, Section 11.2.4, last paragraph: This hot spot definition seems to negate SB16-81 where TCE was found at 2600 ppb in soil. Please clarify.

Navy Response: The referenced sentence states: A hot spot is defined as a sub-area of the southern/eastern area where concentrations are an order of magnitude greater than concentrations at other locations in the southern/eastern portion of the North Central Area. The Navy requests clarification as to "how" the statement negates the data for SB16-81. Please note that the statement is providing information regarding the identification of hot spot areas (specifically in the surface/subsurface soils) in the southern/eastern portion of the NCA. If such a hot spot is identified, it will be evaluated as a separate exposure unit for purposes of risk evaluation. The referenced TCE data is for a deep, saturated zone soil sample collected from SB16-81 (37 to 38 feet bgs). Given the pervasive CVOC contamination detected in the saturated zone at Site 16, the datum does not appear anomalous. Please see Phase III RI Table 4-15 for other soils samples with noteworthy TCE detections (specifically, locations

SB16-70, SB16-74, SB16-81, and SB16-78).

No change to the SAP is proposed.

26. *Page 53, Section 11.3.1, 1st Paragraph, 2nd Sentence:* The statement that RI data do not indicate the presence of significant VOC in down gradient groundwater is inappropriate and misleading. As noted by USEPA during the June 9, 2009 DQO meeting, there are indications of CVOC in shallow and intermediate groundwater to the southeast at MW16-40S/I and MW16-41I as well as from MW16-40D and MW16-41D. It was also stated that USEPA believed that there was at least intermittent groundwater flow from the BTEX/CVOC hot spot area to the southeast as a result of groundwater mounding from fire fighting activities. This interpretation was supported by the distribution of Color-Tec® hits and photo-ionization detector (PID) and flame ionization detector (FID) (with/without filter) readings during past soil borings in that direction with this information being provided to the Navy during the meeting. The concentrations in groundwater recorded are not insignificant in that they exceed maximum contaminant levels (MCLs) for TCE and/or vinyl chloride.

Navy Response: *The statement is accurate as written since MW16-40 and MW16-41 are not downgradient under current conditions. While Navy has acknowledged that the intermittent flow postulated by EPA is plausible (please see Navy response to Comment No. 21 of the Draft Phase III RI for Site 16 dated January 26, 2009), the concentrations are significantly lower in the shallow and intermediate zones between the BTEX Hotspot to MW16-40/-41 (estimated to be up to 30 ppb) compared to other portions of the NCA (which can be orders of magnitude greater [e.g., the former Fire Training Area])*

Please also see response to EPA Specific Comment No. 27.

27. *Page 53, Last Paragraph:* USEPA noted that in addition to no shallow and intermediate wells being located within the BTEX/CVOC hot spot area, there were no shallow or intermediate wells in the southeast direction toward MW16-40S/I and MW16-41S/I, a distance of approximately 200 feet. Therefore, a shallow/intermediate groundwater monitoring well pair is needed in the southeast direction between the BTEX/CVOC hot spot area and MW16-41S/I and should be included in this Problem Statement. This well is needed to assess the subsurface groundwater quality, both to provide data to assess potential risks and also to refute/confirm this direction as a potential pathway for contaminants observed in Site 16 groundwater. Knowledge of groundwater quality in this area would thus allow better development of remedial alternatives such as the need to cap and/or excavate the BTEX/CVOC hot spot area, or not.

Navy Response: *As stated in response to EPA Specific Comment No. 8, groundwater wells are proposed within the BTEX hot spot area and the proposed text to clarify this has been presented in response to that comment.*

With regards to the request to advance wells between the BTEX/CVOC hot spot area and the MW16-40S/I/MW16-41S/I area, please note that new VOC data will be available for vadose zone soils from this area as a result of the implementation of the investigative work planned for resolution of Problem No. 1. Although the currently available data does not indicate the need to advance wells in this area, the Navy will re-evaluate the need to advance shallow/intermediate depth wells in this area if significant vadose zone soil contamination is detected (i.e., VOC concentrations exceeded PRGs for groundwater protection). It should be noted that, from a risk perspective, the Navy has already determined the groundwater

underlying Site 16 is not suitable for domestic use and that the VOC concentrations in some wells present a vapor intrusion issue. Therefore, further delineation of the groundwater plume is only beneficial if such information is necessary to refine the soil/groundwater remediation alternatives presented in the FS for Site 16.

28. Page 55, Section 11.3.3: Since bedrock maybe up to 50 feet deep in this area, please increase the depth of the investigation to get the information at top of rock.

Navy Response: *Agree. While it is the intent to evaluate shallow and intermediate groundwater zones, the Navy will extend the soil boring to 50 feet deep (as possible based on site conditions). Samples for laboratory analysis will be selected in accordance with soil screening and analytical protocols described in Section 11.3.4.*

The narrative at the top of page 55 will be edited as follows: "The vertical depths of interest below ground surface are 10 to 50 feet for groundwater and 0 to 50 feet for soils."

29. Section 11.4.2, 4th bullet: It appears that the Worksheet #15 Project Action Limits (PALs) in groundwater (piezometers) and surface water are either EPA Region 3 ecological screening levels for marine surface water (or fresh surface water if a marine surface water level is not available) or human recreational risk values calculated using the assumptions for NCBC Site 7 (Calf Pasture Point). EPA will not concur with the latter calculations until it can review documentation that provides the calculations. This documentation should be sent in response to these comments and, if approved, included as an appendix in the revised SAP. Also, EPA Region 1 does not necessarily agree that the EPA Region 3 surface water ecological screening levels represent the most recent best science. EPA previously asked Navy to propose screening levels for marine benthic infauna for NCBC Site 7. These proposed screening levels should be concurred upon by EPA Region 1 prior to groundwater and surface water sampling in the Allen Harbor portion of Site 16. Until this is accomplished, EPA will not consider the currently proposed ecological based PALs for piezometer groundwater or surface water in Worksheet # 15 to be determinative of acceptable risk. In the absence of updated risk-based values, the PAL for TCE in groundwater (piezometers) should be 21 ug/l with a PAL reference of USEPA III Freshwater, rather than 1000 ug/l as the human C RBC. This is consistent with the use of USEPA III Freshwater value for carbon disulfide, in lieu of no marine surface water value. Similarly, the PAL for TCE in surface water should be 21 ug/l with a PAL reference of USEPA III Freshwater, rather than 58 ug/l as the human C RBC, because it is the lower of these two types of values.

Navy Response: *The documentation for the human health screening levels is already presented in Appendix E of the FS Support SAP (Worksheet 15 References and Back-up Information). Regarding the ecological screening criteria, please note the following statement in EPA correspondence dated 11 February 2010 (page 2, last bullet): "Ecological screening criteria will be the Region 3 criteria until such time as the EPA determines if these are appropriate criteria for NCBC." Please note that the use of the Region 3 criteria is in agreement with the criteria hierarchy presented in support documentation presented in Appendix E of the SAP: SAP Worksheet #15B – Ecological Surface Water and Groundwater from Piezometers Reference Limits and Evaluation Background Table. It is the Navy's understanding that the EPA will forward its review of the EPA Region 3 numbers to the Navy when completed.*

No change to SAP is proposed.

30. Section 11.4.2, 5th bullet: It appears that the Worksheet #15 Project Action Limits (PALs) in sediment are either EPA Region 3 ecological screening levels for marine sediment or human recreational risk values calculated using the assumptions for NCBC Site 7 (Calf Pasture Point). EPA will not concur with the latter calculations until it can review documentation that provides the calculations. This documentation should be sent in response to these comments and, if approved, included as an appendix in the revised SAP. Also, EPA Region 1 does not necessarily agree that the EPA Region 3 sediment ecological screening levels represent the most recent best science. EPA previously asked Navy to propose screening levels for marine benthic infauna for NCBC Site 7. These proposed screening levels should be concurred upon by EPA Region 1 prior to sediment sampling in the Allen Harbor portion of Site 16. Until this is accomplished, EPA will not consider the currently proposed ecological based PALs for sediment in Worksheet # 15 to be determinative of acceptable risk.

Navy Response: *The documentation for the human health screening levels is already presented in Appendix E of the FS Support SAP (Worksheet 15 References and Back-up Information). Regarding the ecological screening criteria, please note the following statement in EPA correspondence dated 11 February 2010 (page 2, last bullet): "Ecological screening criteria will be the Region 3 criteria until such time as the EPA determines if these are appropriate criteria for NCBC." Please note that the use of the Region 3 criteria is in agreement with the criteria hierarchy presented in support documentation presented in Appendix E of the SAP: SAP Worksheet #15B – Sediment Reference Limits and Evaluation Background Table. It is the Navy's understanding that the EPA will forward its review of the EPA Region 3 numbers to the Navy when completed.*

No change to SAP is proposed.

31. Page 54, 2nd Bullet: It is not clear what is meant by installation "in the immediate vicinity" of the hot spot area. The well pair should be installed within the hot spot area where debris and extremely elevated breathing zone PID readings (>1,000 PPM) were recorded. A shallow/intermediate groundwater monitoring well pair is also needed to the southeast of the BTEX/CVOC hot spot area.

Navy Response: *Please see responses to EPA Specific Comments No. 8 and No. 32. The term "in the immediate vicinity" will be changed to "within" on page 54.*

32. Page 54, Last Paragraph: While elevated PID readings were recorded for ETP-2 (>1,000 PPM), elevated PID readings were also recorded for ETP-4 and ETP-6 of around 100 PPM, and 20 PPM at ETP-5. These were all from the breathing zone. Therefore, it is likely that elevated concentrations of volatiles exist over a wider area than suggested by this sentence. It should also be noted the presence or absence of CVOC has not been established due to the minimal sampling and the interference of BTEX to allow adequate identification of CVOC by use of the Color-Tec® screening method. As such, the groundwater and soil "populations" should include potential for CVOC contamination in the area equal to that of BTEX.

Navy Response: *Unfortunately, the exact location of the PID readings recorded for the test pits performed during the Phase III field work (provided in Appendix B.16 of the Phase III RI for Site 16) are not clearly recorded. Consultation with personnel who performed the work confirmed that the PID readings are not from the breathing zone, but rather from direct readings on the excavated stockpiled soils. Please see Navy response to Specific Comment No. 8. As such, the referenced paragraph is accurate as written.*

With respect to the EPA concern that interference of BTEX is causing significant uncertainty in the ability to determine if CVOC is present in the NCA, please see Navy response to Comment No. 8 on the Draft Site 16 FS, and Navy responses to Comment No. 21 on the Draft Phase III RI for Site 16.

No change to SAP is proposed.

33. *Page 55, Decision Rule #1, 1st Sentence:* Given the focus of the previous paragraph mentioning BTEX only, CVOC should be specifically called out rather than VOC. Also, it needs to be clarified how many samples total will be collected. Will there be three or four? Will each well be installed in close proximity such that the vadose zone sample will suffice for both wells? Also, discussion for a shallow/intermediate monitoring well pair located to the southeast needs to be included in this discussion.

Navy Response: *The decision rule is written to accommodate all analytical goals (evaluate CVOC and BTEX contamination) based on the problem definition. The previous paragraph only used BTEX as a guide to outline the boundaries of the study area (general extents of the BTEX Hotspot area). The precise number of total samples to be collected will be based on observations in the field. As stated in the decision rule, at a minimum, at least one vadose and one saturated zone soil sample will be submitted for analysis. Additional samples will be collected as determined necessary by the FOL. Based on SAP Worksheet #18, these two minimum samples will be collected at each of the two proposed monitoring well locations (shallow and intermediate).*

Please see response to EPA Specific Comment No. 27 regarding the installation of a monitoring well to the southeast of the BTEX/CVOC hot spot area.

34. *Page 55, Decision Rule #1, Last Sentence:* Since it cannot be ascertained beforehand why non-detects occurred, i.e. interferences, calibration issues, etc., even if VOCs are not detected via PID/Color-Tec® a soil sample should be collected from within the vadose zone also, not just at the water table and the screened interval. Contaminants that potentially exist in this interval pose vapor hazards.

Navy Response: *The Navy agrees that vadose zone VOCs can pose vapor hazards. The final sentence of the text will be revised as follows: "...during well construction, then collect and submit soil samples for fixed-base laboratory analysis (VOCs only) from the vadose zone immediately above the water table and from within the screened interval of the monitoring well."*

The EPA's statement that "it cannot be ascertained beforehand why non-detects occurred" appears to discount the possibility that contamination is not present, and only identifies "interferences, calibration issues, etc". It is possible that an absence of PID readings or positive Color-Tec readings will be measured as an accurate reflection of conditions.

35. *Page 55, Decision Rule #2, Last Sentence:* It should be noted that sufficient lead time must be allowed such that USEPA can respond in a meaningful manner to the data.

Navy Response: *At a minimum, the Navy will advise the EPA/RIDEM weekly via electronic mail (e-mail) regarding the field schedule for the up-coming week. Therefore, the EPA will know in-advance when a well is to be installed. Given the economic and logistic realities*

faced by both EPA and Navy when attempting to optimize well screen placement using field screening and lithologic data collected during well drilling, time is of the essence and the hydrogeologists conducting field events (either EPA- or Navy-lead field events) are typically required to review the data quickly (usually the same day the data is generated) and direct the drilling contractor regarding the placement of the well screen and construction of the well.

While this approach is very demanding, it also serves to optimize well screen placement to the satisfaction of both EPA and Navy hydrogeologists and, hopefully, address any questions/concerns regarding the screened interval.

No change to SAP is proposed.

36. *Page 56, Decision Rule #3: A more comprehensive assessment is warranted. In addition to data from the BTEX/CVOC hot spot wells (which need to be located within the hot spot) data from the USEPA recommended well pair to the southeast needs to be evaluated. The evaluation of results from both of these shallow/intermediate well pairs must also include the distribution of PID/FID and Color-Tec® results (presented at the June 9, 2009 DQO meeting), past laboratory soil analyses, and historic shallow/intermediate groundwater CVOC concentrations in down gradient monitoring wells including those to the east and southeast. Also, an assessment of the past/current impacts of co-metabolism of BTEX present in the soils/groundwater to have affected the present distribution of CVOC in the North Central Area. This investigation should address USEPA's concern.*

Navy Response: *Agree. As the decision rule reads, on the surface it may appear that only a very limited assessment will be performed. However, when evaluating the new data, all available current and historical data (including but not limited to all of the data outlined by EPA in the comment) will be reviewed to ensure a comprehensive evaluation is performed.*

The following note to the reader will be added at the end of Decision Rule #3:

- The evaluation of data from the BTEX/CVOC "hot spot" area will consider the distribution of all available (new and historic) fixed-base laboratory, screening level and hydrogeological data for the area and downgradient of the area. The evaluation will consider the potential impact of the co-metabolism of the BTEX present in the soils and groundwater on the present distribution of CVOCs in and downgradient of the area.*

Also, please see Navy response to EPA Specific Comment No. 27.

37. *Page 56, Last Paragraph, Last Sentence: The comment regarding the lack of significant contamination is not appropriate since, as is noted also in the same sentence, there is insufficient data. The issue is more accurately defined by the latter portion of the sentence. The first portion of the sentence should be deleted. That is, judgments regarding significance cannot be made in the absence of adequate data. In addition, there is a lack of groundwater flow data. Groundwater elevations should be collected from piezometers and plotted to determine groundwater flow paths and discharge points into the Harbor.*

Navy Response: *Disagree. The referenced sentence reads as follows: "Also, whereas the currently available sediment and deep surface water data for Allen Harbor indicate that significant CVOC groundwater concentrations are not discharging to the harbor, the existing deep surface water data and groundwater piezometer data sets for the harbor are somewhat limited and additional data must be collected to determine whether*

unacceptable discharges are occurring.” *The narrative reflects the currently available data; the limitations of that data are clearly identified. Also, please see response to EPA General Comment No. 6 (regarding the available sediment dataset.)*

No change to SAP is proposed.

38. *Page 57, 1st Bullet and 2nd Bullet:* Screening level data is needed for groundwater closer to the harbor floor than 4 to 5 feet. While groundwater quality data is needed for depth, determination of concentration gradients will also require data from a shallower depth such as is obtained from piezometer sampling along shorelines. This depth has typically been accepted to be the top of the groundwater table. Since these samples will be from below the harbor floor a depth of 1-3 inches would be appropriate. Given that “deep surface water” would potentially be diluted, a more representative “deep surface water” sample may be collected from the groundwater just before it discharges into the harbor. Groundwater quality data from this depth interval would complement sediment data from 1-3 inches below the harbor floor.

Navy Response: *Please see response to EPA General Comment No. 6. The proposed “more representative deep surface water sample” would be a pore water sample (as described by EPA in General Comment No. 6). Pore water sampling is not recommended at this time for the reasons stated in the response to General EPA Comment No. 6. However, the Navy will augment the groundwater sampling program to include a sample collected at approximately 1 foot below the sediment surface; that sample will be the sample (per piezometer location) submitted to the fixed-base laboratory for VOC analysis.*

39. *Page 58, Decision Rules Related to FS Evaluation/Decisions:* This section needs to include an evaluation of groundwater flow paths from the North Central Area into the Harbor. At present, there is no mechanism to put the data collected, to date, and to be collected into context. A flow net analysis is needed to support FS Evaluations/Decisions. That is, while sample collection is needed it is difficult to assess whether delineation should be terminated if no concentrations of VOC are detected. While elevated CVOC has been detected close to the North Central Area it is not known whether these concentrations represent upward discharging groundwater or simply the fringe of downward moving groundwater that migrates upward further into the Harbor.

Navy Response: *Once the data is collected, the Navy will construct cross-sections from the NCA into Allen Harbor with chemical concentrations in order to evaluate potential discharge pathways and to evaluate remedial options. Several cross-sections will be completed, as determined necessary by data review. This analysis on cross-sections will assist evaluation in the proper context of remedial actions and risk evaluations.*

The following clarifying note to the reader will be added at the end of Section 11.4.5:

- *“The data analysis will include the construction and evaluation of several cross-sections from the NCA into Allen Harbor with the posting of chemical concentrations in order to evaluate the potential discharge pathways and to evaluate remedial options.”*

40. *Page 59, Problem No. 4:* This identified problem needs to be combined with that of Problem No. 5 since it is inextricably linked to actions to be performed in Problem No. 5. In fact, the problem statements suggest that Problem No. 4 and Problem No. 5 are one and the same,

i.e. resolution of vapor intrusion risk which is directly related to shallow groundwater CVOC concentrations. Separation of this issue is confusing to the reader.

Navy Response: *The Navy agrees that Problem No. 4 and No. 5 are linked. They were presented separately because Problem No. 4 investigates the groundwater quality in the Sea Freeze area only, and Problem No. 5 investigates the vapor intrusion pathway in three different areas. Also, as indicated in the problem statement, Problem No. 4 addresses more than the vapor intrusion pathway: Concentrations of COCs in shallow groundwater along the eastern boundary of Site 16 in the vicinity of MW16-88I must be measured to evaluate the possible significance of the vapor intrusion pathway at the boundary of Site 16 and to evaluate the significance of discharges of CVOCs with groundwater to Narragansett Bay. Since the screening planned in Problem No. 5 will be conducted prior to the well installation planned for Problem No. 4, Problem No. 4 and Problem No. 5 will be switched so that the reader is informed about the screening **first** and then the actual well installation.*

41. *Page 61, Rule #1, 3rd Sentence:* If no VOC is detected in the soil gas investigation referred to (Problem No. 5) the shallow monitoring wells should **NOT** be installed down gradient of MW16-88I as is stated. USEPA clearly noted during the June 9, 2009 DQO meeting that the groundwater and analytical data indicated the potential for CVOC to be migrating in shallow groundwater directly toward the Sea Freeze Building. Therefore, even if elevated VOC are not detected in the soil gas survey, a shallow monitoring well must be installed up gradient in front of the Sea Freeze Building for potential vapor intrusion monitoring.

In regard to the intermediate well, it should be replaced by a second shallow well up gradient and in front of the Sea Freeze Building. The distance between MW16-88I to just beyond MW16-89I is approximately 500 feet. Installation of a single shallow groundwater monitoring well across this distance is inadequate. If soil gas survey results do not show a distinct zone of elevated VOC then one shallow well should be installed approximately 100 feet to the northwest of MW16-88I near the pavement while the second well should be installed approximately 150 feet from that location northeastward along the edge of the pavement to the west of the building.

The rationale to install wells to the side or cross gradient of the building is not understood when the risk is to receptors in the building. Inspection of the data, as conveyed to the Navy during the June 9, 2009 DQO meeting, clearly shows an absence of shallow groundwater monitoring up gradient of the Sea Freeze Building between MW16-88I to MW16-89I.

It should be noted that simply because inconclusive results are obtained from the proposed soil gas investigation this does not negate a need to investigate shallow groundwater up gradient and in the vicinity of the building. The greatest potential risk is to human receptors within the building and not the bay.

Navy Response: *It appears that EPA is assuming that groundwater flow direction in the shallow zone in the upgradient area near the Sea Freeze building is directly from west to east. While this is plausible, Figures 3-19 and 3-20 of the Final Site 16 RI (Intermediate and Deep Overburden zones, respectively), show that groundwater flow direction immediately upgradient of the Sea Freeze building is actually northeast. Since elevated CVOC concentrations occur along the eastern arm (located southwest of the Sea Freeze building), placement of the temporary wells and soil gas locations as indicated are more appropriate.*

Shallow and intermediate groundwater wells will be installed, regardless of VOC data for the

temporary well installation and soil gas borings. Please note Problem No. 4 which outlines the rationale for the placement of the shallow and intermediate wells. A shallow well is already planned in the upgradient portion of the Sea Freeze building. The Navy does not concur with replacing the intermediate well with a shallow well since the intent of the intermediate well is to evaluate contamination potentially discharging to Narragansett Bay. However, based on field screening results, Navy is willing to discuss changes and/or additional shallow wells if significant VOCs are found upgradient of the Sea Freeze Building.

No change to SAP is proposed.

42. *Page 62, Rule #5: Soils must be protective of groundwater at the more stringent MCL level rather than RIDEM GB levels, please change.*

Navy Response: *Please see response to EPA Specific Comment No. 17.*

43. *Page 63, 1st Paragraph, Last Sentence: There are no shallow groundwater monitoring wells in large portions of the down gradient area including up gradient of the Sea Freeze Building and the NORAD Building. The shallowest wells that are in place at those locations are "intermediate" wells which are contaminated as evidenced by data from MW16-271, MW16-281, MW16-571, MW16-881 and MW16-891. Therefore, the last sentence should be removed from this SAP.*

Navy Response: *The referenced sentence states: "In many parts of the CVOC plume, particularly the periphery, 20 to 30 feet of uncontaminated water overlies the CVOC groundwater contamination, which significantly mitigates the vapor intrusion pathway." Please note the qualifying phrase.... "In many parts of the CVOC plume....". While the reviewer is correct that trichloroethene concentrations greater than 5 ug/L were reported for locations MW16-271, -571, 881, and 891, trichloroethene concentrations less than 5 ug/L were reported for locations MW16-281, -501, -491, -761, -171, and 871 (most results were non-detects). This data, the groundwater data for deep monitoring wells at the periphery of plume (e.g., MW16-51D, -52D), the screening and fixed-base lab data for soil samples collected during monitoring well installation and the Phase III DPT program all support the referenced statement. However, the sentence will be modified to read as follows: In many parts of the CVOC plume, analytical data from shallow monitoring wells and/or vadose zone soil samples (both screening level and fixed-base lab data) indicate no evidence or limited evidence of VOC contamination in the shallow zone. This mitigates the potential for vapor intrusion in these areas.*

44. *Page 63, Section 11.6.2: Please include grain size analysis for use in VI modeling.*

Navy Response: *Agree. The Navy will collect soil samples for grain size analysis at locations where VI modeling will be performed. A minimum of two samples will be collected in the upgradient Sea Freeze area and in the NORAD building area. (Grain size analysis has already been performed for soils in the former Building 41 area.)*

A new bullet will be added to Section 11.6.2:

- Grain size data for soil samples collected from the vadose zone/upper saturated zone of soil borings advanced immediately upgradient of the Sea Freeze Building and at the northeastern edge of the plume (i.e., the MW16-28D in the vicinity of the NORAD building) (see Worksheet No. 19 for details of analytical methods).*

Worksheets 17 and 18 (see attached) have been edited in a similar manner.

45. *Page 64, 1st Bullet, Last Sentence and Page 65, 1st Paragraph:* Clarification needs to be provided for the need to revisit the Building 41 area. Inspection of Figure 17-5 shows that additional soil gas investigation is proposed in the exact location of previous soil gas work near the former TCE still where the Navy already has data. Given the Navy repeated communication of limited resources, it would appear that resources should be allocated to complying with USEPA recommendations.

Also, perform soil gas sampling at the water table and half-way from the water table to the surface.

Navy Response: *Note that the TCE concentrations in the soil gas data collected in the vicinity of Building 41 vary by an order of magnitude within very small areas (see areas SG16-005 and SG16-004 depicted in Figure 17-5). The additional samples are proposed to better understand representative soil gas concentrations in the area and to potentially refine the PRG for groundwater (for the VI pathway). Please note that while the groundwater underlying Site 16 may never be used for domestic purposes, further commercial/industrial development (including the construction of buildings) may be desirable in the future. Consequently, a comprehensive understanding of the potential for vapor intrusion is important for the Site 16 area.*

With regard to the recommendation to sample at the water table and half-way from the water table to the surface, please note the following:

- The water table at Site 16 is very shallow. In fact, the extremely shallow water table in the vicinity of Building E-107 (2 to 3 foot bgs) was a logistical problem during the Phase III field investigation. Specifically, the depth of the sampling tube had to be carefully adjusted to prevent sump-ing of groundwater into the Summa Canisters). Therefore, sampling immediately above the water table is not recommended. Instead, sampling at least a couple of feet above the water table is recommended to avoid this problem.*
- EPA guidance recommends that soil gas samples be collected at least 5 feet bgs (EPA, 2002). We believe this recommendation is made to avoid any potential ambient air influence but may not be possible at locations with very shallow groundwater.*

Because of these two constraints, soil gas samples collected above the water table and at half-way from the water table to the surface may actually be very close together (vertically). However, the Navy agrees that such a sampling protocol has the potential to provide useful information regarding the degree of soil gas concentration attenuation with depth. Therefore, the soil gas sampling protocol for the Building 41 area will be decreased from five locations to two locations and the Navy will re-allocate the other three samples such that two soil gas samples will be collected (if at all possible) at one of the soil gas borings (specifically, the worst-case location based on the temporary well and soil screening) in each of the areas targeted for soil gas sampling.

46. *Page 64, 4th Bullet, Table:* The values delineated in this table are subject to interpretation of the site conditions. Specifically, USEPA does not necessarily concur with the listed value for

TCE. Site specific information will need to be entered into the Johnson and Ettinger or some other reasonable model. The value may be lower than the 250 µg/l concentration listed.

Navy Response: *As indicated in the Navy's August 24, 2009 RTCs document for comments received on the Draft FS document for Site 16 (dated February 2009), the 250 ug/L value is based on site-specific information (please see Attachment D of Enclosure 1 of the referenced RTCs document). However, the referenced PRG may be refined based on data collected during the implementation of the FS Support SAP (e.g., new soil gas, new grain size analysis data).*

No change to SAP is proposed.

47. *Page 65, 1st Paragraph, Next to Last Sentence:* This sentence needs to be removed or clarified. Inspection of the SAP does not indicate that groundwater will be sampled again in the area of the former TCE still where the soil gas investigation is proposed to be repeated.

Navy Response: *Agree. The referenced sentence will be deleted.*

48. *Page 65, Rule #1, 1st Sentence:* The locations of the five soil borings near the Sea Freeze Building as depicted on Figure 17-4 are not concurred with. Three of the soil borings are located to the side of the building. Only two soil borings are proposed up gradient of and in front of the Sea Freeze Building. All five soil borings should be located, as discussed at the June 9, 2009 DQO meeting, in front of the building to evaluate vadose zone and shallow groundwater that has the potential to affect receptors in the building. USEPA understood these field screening borings/temporary wells were to help optimize the location of permanent shallow well(s) in the area up gradient and in front of the Sea Freeze building. Please clarify.

Navy Response: *Please see response to EPA Specific Comment No. 41. As outlined in that response, all five soil borings are anticipated to be upgradient of the Sea Freeze Building.*

49. *Page 66, Rule #2:* This rule is confusing to follow. Will temporary wells also be installed along with the five soil borings at each location? The previous rule discusses soil borings only. How are the permanent monitoring wells referenced in Problem No. 4 included in this problem?

Navy Response: *Yes, temporary wells will be installed along with the five soil borings at each location. Please see Note 11.6-1, presented just below Rule #2. It is anticipated that the results of the soil, groundwater, and soil gas screening/sampling conducted for Problem No. 5 will be useful in the placement of the monitoring wells scheduled to be installed for resolution of Problem No. 4. As stated in Navy response to EPA Specific Comment No. 41, problem statements 4 and 5 will be renumbered in the draft final SAP.*

50. *Page 66, Rule #4:* Change GB leachability criteria to EPA SSLs for drinking water protection.

Navy Response: *Please see Navy response to EPA Specific Comment No. 17.*

51. *Page 67, 1st Paragraph:* It was brought to the attention of the Navy during the June 9, 2009 DQO meeting that PAH existed both shallow and at depth at this location. SB16-A3-12 had elevated PAH as well as TPH in the 1 to 2 feet below ground interval along with lower PAH and TPH in the 5 to 6 foot interval. It is more likely to be a liquid release at this location. In

either event, the need is to evaluate the nature and extent of the identified contamination and present that in this SAP.

Navy Response: *This comment is not at variance with the text on page 67. The Navy is not disputing the fact that source of the PAHs is unknown at this time (i.e., an actual liquid release versus pieces of asphalt from the pavement). The investigation is necessary and recommended regardless.*

No change to SAP is proposed.

52. *Page 68, top of page and Page 69 Rule #3:* Please do not use the source areas used during the RI for this proposed forensics study.

Navy Response: *The Navy agrees that the source area soils used in the Phase III investigation (the NCA source areas) for the evaluation of PAH contamination in Allen Harbor would not be appropriate for this investigation. Pavement samples (already collected during the Phase III field investigation) are the more appropriate source materials.*

The following note to the reader will be added to the text and follow Rule #3 (page 69):

- *Pavement material samples collected during the Phase III field investigation will serve as "source area" materials for the environmental forensics investigation."*

53. *Page 70, 2nd Paragraph:* The intent to investigate soils at the eastern end of the former Building 41 area does not appear to describe the intent of the work shown on Figure 17-7. That figure shows one soil boring within the former building footprint and one soil boring to the southeast of SB16-A3-12 with the remaining five being located to the east/southeast of the former building. Additional discussion is needed to support placement of the first two soil borings noted. Further, the soil boring within the former Building 41 footprint is not located adjacent to MW16-31D to confirm the current Navy contractors' interpretation of subsurface soil conditions at that location and there is no soil boring near Davisville Road between SB16-A2-06 and SB16-A3-10 to assess potential contributions from the North Central Area. Both of these issues have been communicated previously to the Navy.

Navy Response: *Agree. The text will be edited to better support the proposed soil borings depicted on Figure 17-7. Specifically, the following text will be added after the first sentence: "Additionally, low level CVOC contamination was present in vadose zone soils just beyond the eastern portion of the former Building 41." The following text will be added before the final sentence: "These releases are south, southeast, and east of the former Building 41 footprint."*

The referenced location between SB16-A3-07 and SB16-A3-08 is between locations (originally established in the Phase III field investigation) between areas within the former Building 41 foot print that demonstrated significant CVOC contamination in the upper-mid saturated zone (e.g., location SB16-A3-37) and a location (SB16-A3-08) that did not.

The referenced location "to the east/southeast of the former building" is, in effect, complimenting the Phase III sampling at locations SB16-A3-11, -A3-12, -A3-13, -A3-16, and -A3-17. In aggregate, these locations and the five locations at the eastern edge of the former building are recommended to further investigate for vadose zone contamination in the vicinity of/downgradient of the potential former Bldg 41 source areas (e.g., the storm drainage

system, the loading dock areas, etc). Note that, as demonstrated in Figure 17-5, relatively significant CVOC contamination was noted in the soil gas samples collected at the eastern end of the former Building 41 (e.g., in the vicinity of location SB16-A3-08).

As requested by EPA, an additional boring will be advanced between SB16-A2-06 and SB16-A3-10.

With regards to proposed boring within the former Building 41 footprint not being located near MW16-31D, please see Navy response to EPA Specific Comment No. 12. To clarify the EPA's statement in the comment, the "current Navy's contractor's interpretation of subsurface conditions" is the Navy's interpretation of subsurface conditions. This Phase 3 interpretation is based on a more robust data set than presented in the Phase 2 RI.

54. Page 70, section 11.8.1: Remove RIDEM GB and use instead EPA SSLs for protection of drinking water.

Navy Response: Please see Navy response to EPA Specific Comment No. 17.

55. Page 72, Problem No.: USEPA requires representative data to use to make decisions. While the Army is investigating the upgradient area, Navy should use representative data in the FS.

Navy Response: Agree. This comment is not at variance with the text on page 72. The Navy does note that there have been differing opinions between EPA and Navy regarding the representativeness of the currently available data, the extent to which the upgradient wells need to be re-developed/re-sampled to produce representative data, and the extent to which upgradient data impacts risk management decisions for Site 16. However, the Navy concurs that only representative data should be used in the decision making process for the Site 16 FS.

No change to SAP is proposed.

56. Page 81, 2nd Paragraph: The discussion of flame ionization detector (FID) in this paragraph is not understood. The FID has an activated carbon filter attachment which can be used to account for the interferences of methane. Please clarify.

Navy Response: Inherently and as evidenced by the data collected with the FID at the NCA during prior investigatory stages (dominantly the Phase I RI field event), an activated carbon filter may or may not be used. In the case of the work completed at Site 16, based on the boring logs, readings were taken with both methods (with and without the filter).

The context of the paragraph as written assumes no activated carbon filter would be used and therefore, readings would potentially be impacted by methane. The Navy concurs that by using the activated carbon filter attachment, one can potentially account for the methane interferences. However, care must still be taken to correlate screening values obtained to fixed-based laboratory results so as not to over-estimate the non-methane portion of the FID response. Since PIDs do not respond to methane but do respond to VOCs, use of a PID simplifies the field screening process.

The third sentence of this paragraph will be revised as follows: "Because of the likely presence of methane from natural (filled land) and contaminant degradation processes, a PID

is proposed to be used in lieu of a FID. A PID is also inherently easier to calibrate for field use."

57. *Page 81, 2nd Paragraph* : PID screening should be performed on all samples using the jar headspace methodology, not just where a sample will be collected. The text provided indicates that samples would be selected using the "continuous scan" only. This is not acceptable since a number of factors can affect volatilization of soil samples from split spoons, test pit soil samples, etc. A "wave over" of the PID may have a dramatically different reading than a sample that is evaluated using the jar headspace procedures. The need to conduct field screening using the PID and the jar headspace procedures has been repeatedly emphasized by the USEPA on all site investigations.

Navy Response: *The Navy does not concur that PID screening with the jar headspace methodology is warranted at all sampling locations. The text accurately describes the proposed method that all soils will be continuously scanned with the PID and that this scan is appropriate for the accurate initial field screening of soils from a core or test pit and selection of samples for further screening (i.e., jar head space/Color Tec). The advantage of this method, compared to the jar head space method, is that the method allows for real-time scanning and potential sampling of discrete zones within a soil core or test pit. Under the jar headspace method, soils from across the entire soil core are "composited" into a single jar sample. As observed during the Phase III Investigation, PID responses can change rapidly within a single soil core, typically when minor variances in lithologies occur. Thus, VOC concentrations in hot spot zones of the core may be diluted by the compositing that occurs when a grab sample is collected across an entire core. As outlined throughout the FS SAP, the continuous PID scan will be combined with Color-Tec® field screening as well. It is not accurate to describe the continuous PID screening process as a "wave over" as this implies carelessness in the collection process. Please refer to Tetra Tech SOP SA-1.3 for detailed procedures.*

No change to SAP is proposed.

58. *Page 81, 3rd Paragraph, 2nd Sentence:* While CVOC have been recorded throughout the site, the use of Color-Tec® is limited by the presence of BTEX compounds which have also been documented to exist in the north central area and other specific locations. Therefore, robust field screening with PID and jar headspace procedures is necessary at this site.

Navy Response: *Please see Navy response to EPA Specific Comments No. 32 and 57.*

59. *Page 82, 2nd Paragraph:* The allocation of test pits is not adequately described in Work Sheet No. 11. Also, the number of test pits described are not allocated across the North Central Area as recommended by USEPA during the June 9, 2009 DQO meeting. Inspection of Figure 17-2 shows that only 19 will be allocated to the area outside of the "Northwestern Area" with the bulk of the effort being applied to the Northwestern Area. Does mean that the remaining 20 test pits will be centered in the previously investigated area? A comprehensive assessment of the North Central Area is needed.

Navy Response: *Please see response to General EPA Comment No. 1. Also, Worksheet 11 is intended to present data quality objectives only. Please see Worksheets No. 17 and 18 for detailed Sampling Design and Rationale.*

60. *Page 82, Last Paragraph:* What is the purpose of advancing the soil borings to a depth of 30

feet? As discussed at the June 9, 2009 DQO meeting the objective of this investigation was understood to be to resolve near surface soil risks.

Navy Response: *The objective is to further investigate the VOC profile in the relatively shallow subsurface soils (i.e., particularly the vadose zone soils and upper saturated zone soils). Significant vadose soil contamination, in particular, has the potential to impact the alternatives presented in the FS for Site 16. In the area of the proposed work, depth to water is approximately 15 feet below ground surface. By advancing the soil borings to 30 feet (as concurred with by EPA in the June 9, 2009 DQO meeting), this allows for analysis of vadose and the upper saturated zone soils.*

No change to SAP is proposed.

61. *Page 83, 2nd Paragraph:* The procedures outlined in this paragraph are not acceptable methods for field screening. Simple passing the PID over the core after opening the acetate and slicing the core will not provide adequate evaluation of VOC in that core. This procedure allows for substantial volatilization, and will not evaluate VOC retained in soil cores with fine grain soil and organic content thereby resulting in potentially erroneously low or false negative readings. This has been a major limitation of past Site 16 field investigations. A specific instance of this failure is where the Navy has designated a major hot spot in the vicinity of the former TCE still yet, PID screening with the continuous passing of the PID over a split core resulted in minimal response on the PID.

Navy Response: *The procedures outlined in this paragraph are consistent with Tetra Tech SOP SA-1. Please see Navy response to EPA Specific Comment No. 57. The Navy does not agree with the EPA in their assessment of the use of continuous scanning of soils with a PID. The method as outlined in the cited SOP is more rigorous than implied by EPA. It is not a simple passing of the PID over the soil core. Additionally, the Navy believes that using this continuous scan approach is more effective in identifying specific portions within the soil cores where elevated VOCs may occur, compared to the jar head-space method.*

Also, one should not automatically assume that high PID screening results directly correlate with the high fixed-base laboratory results or conclude that a source area is present or not present (or even estimate magnitude of source). This analysis was provided to EPA in the Navy response to EPA Comment No. 8 for the Draft Site 16 FS.

*As specified in the Draft FS SAP and to maximize the probability of detecting significant VOC contamination, the Navy will use **all three forms** of VOC field screening (i.e., continuous scan, and jar-head space and Color Tec screening based on the continuous scan readings) to target soil samples for fixed-base laboratory analysis. The Navy is confident that the procedures employed will allow for accurate and representative data to be collected and support risk management the decision making for Site 16.*

No change to SAP is proposed.

5. *Page 84, Section 14.1.7:* Please ensure soil gas is taken at the water table and half way between the water table and ground surface. Please perform grain size analysis on the soil at each of the samples.

Navy Response: *Please see response to EPA Specific Comments No. 44 and 45. (Note to reader: The numbering of this comment is out of sequence; but, is presented as received in*

the EPA comment letter.)

62. *Page 84, 3rd Paragraph, 3rd through 5th Sentences:* The temporary wells must provide data of the maximum reliability. Further, while the wells are “temporary”, depending upon the results, and the limited additional shallow wells be proposed, they may need to be left in place for an extended period of time. As such, collapse of the natural materials around the well should not be allowed and a pre-packed well screen should be used.

Navy Response: *The Navy will use pre-packed screens at all “temporary” well locations; however the Navy does not believe that temporary wells where natural materials are allowed to collapse around the well will automatically produce unreliable results.*

The Navy also concurs that the wells may need to be left in place for an extended period of time based on the preliminary results. When this is the case,, the Navy will make appropriate accommodations to ensure well protection (based on location and the nature of operations that may impact the well).

No change to SAP is proposed.

63. *Page 84, 4th Paragraph, 2nd Sentence:* What is the basis for the selection of “500 NTU” as the criterion for “excessive turbidity?” While these wells are “temporary” wells, a turbidity level of 500 NTU is excessive and not acceptable. Standard turbidity levels used for collection of groundwater samples from permanent monitoring wells should apply, i.e. less than 5 NTU is required.

Navy Response: *The selection of the 500 NTU is somewhat arbitrary. As the complete paragraph indicates, an exceedance of the 500 NTU criteria would likely trigger further development actions (i.e., well development would not be considered complete; the well is not ready for sampling). Every effort will be made to develop the “temporary” wells to standard well development criterion.*

No change to SAP is proposed.

64. *Page 85, 1st Paragraph:* The number of overburden wells is insufficient and is not as discussed at the June 9, 2009 DQO meeting. The purpose of the overburden wells is to assess shallow groundwater quality and potential for vapor intrusion risk. The four overburden wells allocated should be targeted at the shallow groundwater in front and up gradient of the Sea Freeze and NORAD buildings, i.e. two shallow/intermediate well pairs. An additional well pair should be targeted near SB16-A2-06 and SB16-A3-10 along with the pair in the BTEX hotspot.

Navy Response: *The number of proposed wells in this EPA comment is at variance to EPA recommendations in EPA Comment No. 41 and also at variance the recommendations documented in the 09 June 2009 meeting notes (Please see Attachment G).*

Also, the results of the up-front screening (temporary wells/soil borings) planned for the Sea Freeze area is intended to optimize the placement of the well pair recommended for this area. The Navy agrees that, if this screening were not part of the planned investigation, a single well pair might not be adequate.

Finally, as in all environmental investigations, the need for additional wells may become

evident as **a consequence of new data** (e.g., VOC screening data) collected the FS Support field investigation (e.g., soil data collected at the eastern end of the former Bldg 41, in vicinity of SB16-A3-10; screening in the vicinity of the NORAD buildings). To the maximum extent possible, the need for and proposal for additional wells will be provided to BCT for evaluation prior to well installation. However, the Navy may choose to install additional wells without full BCT consultation/concurrence if factors (coordination with lessee for example) prevent adequate consultation time.

No change to SAP is proposed.

65. Page 85, 2nd Paragraph, 6th Sentence: The SAP needs to specifically define the qualifications of "designee." It is not acceptable to have a person not qualified to describe and classify soils. Therefore, the "designee" must be a geologist, hydro-geologist, geotechnical engineer, or soil scientist, etc. The accurate description of soils recovered is critical and misclassification has major ramifications for affecting development of the site conceptual model.

Navy Response: The text will be clarified to specify that soils will be classified by a qualified geologist, hydro-geologist, geotechnical engineer, or soil scientist. Specifically, the phrase "or designee" will be replaced with "or designee determined to qualified to accurately classify soil/lithology".

66. Page 86, 2nd Bullet: The procedure outlined is not acceptable. The screen slot size and sand filter pack must be designed in accordance with industry standards as outlined in ASTM D5092 "Standard Practice for Design and Installation of Groundwater Monitoring Wells" and not just "in consultation between FOL, PM, and Navy". Failure to place an appropriately designed screen slot size and sand filter pack has resulted in failure of several recently installed up gradient wells.

Navy Response: Please see response to EPA Specific Comment No. 67. Also, the Navy does not agree that the Phase III upgradient wells have failed. The last statement of the comment is a biased conclusion that suggests the reviewer will not seriously consider/evaluate data collected to resolve Problem No. 8 of the FS Support SAP.

No change to SAP is proposed.

67. Page 86, 6th Bullet: The sand size must be designed for the screen slot size used and the aquifer materials. Further, consultation of Tetra Tech SOP GH-2.8, page 5, last paragraph: "a Morie No. 1 or No. 10 to No. 20 U.S. Standard Sieve size filter pack is typically appropriate for a 0.020-inch slot size screen; however, a No. 20 to No. 40 U.S. Standard Sieve size filter pack is typically appropriate for a 0.010 inch screen. Therefore, even if the "one size fits all" approach is used employing the No. 10 slot size screen, the proposed filter pack size is in error according to the Tetra Tech SOP. Incorrect application of sand filter pack size even when using the "one size fits all" approach has been a deficiency for many of the wells installed at Site 16.

Navy Response: Similar to the previous comment, the Navy does not agree that the well installation procedures employed over the various investigatory stages have resulted in deficiencies for many of the wells at Site 16 as suggested by EPA. While it may be postulated that inappropriate sand pack size selection may have resulted in stabilized groundwater samples with turbidity greater than 5 NTU, this is not evidence of well failures or

cause to conclude data is unusable for evaluating dissolved contamination in groundwater.

Importantly, the text as written in bullets 2 and 6 of page 86 indicates that the Navy does not intend to employ a "one size fits all" approach. However, the referenced text will be edited in order to not pre-specify any assumed slot or sand size. As specified in the referenced text, the FOL may adjust both the screen slot size and sand pack size based on site-specific lithologies of the targeted screened zone. The Navy uses all applicable standards to assist in well completion (ASTM D5092 and SOP GH-2.8). Additionally, Navy intends to share data with BCT members for review prior to well completion. It is preferred that EPA provides specific response on well construction to minimize uncertainties with future sampling results.

The second bullet on page 86 will be revised to state:

"PVC screens are anticipated to be (consistent with Site 16 wells) 10 feet long, screens will be machine slotted, and slots will be 0.010 inch wide. Screen lengths and slot size may be altered based on site conditions of the targeted zone (with consultation between the FOL, PM, Navy, and BCT [as available])."

The sixth bullet on page 86 will be revised to state:

"No. 1 sand or as appropriate based on the well slot size and lithologies screened will be used for sand pack material around the screens and will extend at least 2 feet above the well screens. The size of sand and thickness of sand pack may be adjusted by the FOL (with consultation between the PM, Navy, and BCT) based on lithologies observed where the screened portion of the well will occur."

68. *Page 87, 1st Paragraph:* Additional samples need to be collected to the east of the line as the plume is also to the east upgradient of these locations (MW16-28D had 85.4 ppb TCVOG recently).

Navy Response: *To provide more comprehensive coverage, the proposed samples will be adjusted to be approximately equi-distant from each other and completely reach from shore to shore (west to east). Figure 17-3 will be updated to show the proposed locations.*

Please see attached revised Figure 17-3.

69. *Page 87, 2nd Paragraph, 1st Sentence:* The "deep surface" water sample should actually be collected from just below the harbor floor to minimize dilution effects during sampling. Please see previous comments for EPA requested depths.

Navy Response: *Please see response to EPA General Comment No. 6.*

70. *Page 87, 3rd Paragraph, 7th Sentence:* A more thorough assessment of groundwater levels is required in order to determine the area/extent of groundwater discharge into the Harbor. A number of piezometers, though not necessarily all, should be surveyed with groundwater levels temporally measured along with several groundwater monitoring wells in the North Central Area. A flow net should be developed from that data to determine the groundwater discharge zone and to verify that the samples collected are accordingly representative. In order to accomplish the recommendations in several piezometers should be installed and left in place as long as necessary to accomplish the survey and water level measurements. This can be accomplished within one day.

Navy Response: Please see response to EPA Specific Comment No. 39.

71. Navy may also use passive samplers to map the extent of the plume.

Navy Response: Comment acknowledged. For purposes of consistency, the Navy will continue to collect groundwater samples using low-flow methods in accordance with EPA Region 1 SOP GW0001 and Tetra Tech SOP SA-1.1.

No change to SAP is proposed.

72. Page 88, 3rd Paragraph, 2nd Sentence: Industry and Navy standard is to remove three volumes of any lost water and one well volume.

Navy Response: Disagree. Standards and practices pertaining to well development are variable throughout federal and state governments and private industry. Please forward the specific standard referenced in the comment. The Navy is only familiar with the general DOD Guidance Manual that does state three volumes should be removed. However, this is not an SOP or strict standard to follow; it merely provides suggestions/guidance upon which site-specific protocols can be formulated.

The sentence as written in the SAP states that at a minimum, at least one standing well volume and any lost water will be removed during well development. Therefore, one volume of lost water will be removed, and likely between five to ten standing volumes of water will be removed (the typical amount removed during well development). This practice will adequately remove all lost water and standing water to ensure that adequate connection to the aquifer is established so that representative groundwater samples are obtained.

No change to SAP is proposed.

73. Page 88, 3rd Paragraph, 3rd Sentence: What is the rationale for a limit of 4 hours for development?

Navy Response: The sentence will be removed.

74. Page 88, Last Paragraph: There is no mention of slug testing to be performed on "select" existing wells to "verify hydraulic connection" as is stated on Page 73, 3rd Bullet. If there is no additional slug testing planned then Page 73, 3rd Bullet should be deleted.

Navy Response: The text in Section 11.9.2 bullet #3 will be removed to reflect that no slug testing will be performed. Section 14.1.13 will be removed.

75. Page 89, 5th Paragraph, 4th Sentence: The parameters listed in Section 11.9 apply only to the up gradient wells that need to be redeveloped/re-sampled. The ad hoc procedures developed and agreed to during the June 9, 2000 DQO meeting applies to those wells only. Standard development, purging criterion still apply to newly constructed wells.

Navy Response: The end-point parameters for purging criteria in Section 11.9 conforms to standard low-flow criteria as outlined in SOP SA-1.1 and USEPA Region I low-flow sampling protocols. No changes to the text are necessary.

76. Pages 102 and 105 of 188, EDB and DBCP - If these two compounds (EDB and DBCP) are contaminants of concern, then they should be analyzed using EPA Method 504.1. If they are not contaminant of concern, then no changes are necessary to this SAP.

Navy Response: *Dibromoethane and 1,2-dibromo-3-chloropropane are not COPCs or COCs for Site 16 as stated in Note (1) of this table.*

No change to SAP is proposed.

77. Page 102 (1, 1, 2, 2-Tetrachloroethane), and Page 104 (Footnote): This footnote underscores the need for quality groundwater samples to be collected from all up gradient monitoring wells. This contaminant is a major constituent of decontaminating agent non-corrosive (DANC) and has been a major contaminant in up gradient source area(s). As has been previously communicated to the Navy in one or more Technical Memorandums, degradation intermediates of 1, 1, 2, 2-TCA including 1, 1, 2 TCA, 1, 1, DCA, and ethane (*Contaminant Hydrogeology*, 2nd edition, 1993, page 350; Fetter, C.W.) have been detected in Site 16 deep overburden and bedrock groundwater. These constituents are also known degradation products of TCE. Also detected in Site 16 groundwater is chloroform, which has been associated with release of DANC (a bleaching agent which forms chloroform in contact with organic material) in the up gradient source area(s). It is also documented that TCE, the major chlorinated hydrocarbon detected in Site 16 groundwater, is a rapid degradation product of 1, 1, 2, 2-TCA.

Navy Response: *The footnote is accurate as written.*

No change to SAP is proposed.

78. Page 104, footnote #2: MCLs will be required as the cleanup levels.

Navy Response: *Please see response to EPA Specific Comment No. 17.*

79. Page 115 of 188, Arsenic QL - Please clarify why arsenic cannot be reported below the PAL of 0.39 mg/Kg. Typically, the QL is 3 times the MDL which would be approximately 0.27 mg/Kg. In addition, there are other analytical methods that should be able to meet this PAL.

Navy Response: *Please note that the Quantitation Limit (QL) is typically set at the lowest calibration standard and is not necessarily three times the Method Detection Limit (MDL). Also, please note that while the QL is greater than the Project Action Limit (PAL) and the Project Quantitation Limit Goal (PQLG) the MDL is not. More importantly, please note that arsenic is a naturally occurring inorganic in soils. The State of Rhode Island GA direct exposure criterion (7 mg/kg) is from a background soils study conducted for the Rhode Island Department of Environmental Management (Background Levels of Priority Metals In Rhode Island Soils, T. Conner, RIDEM). Consequently, the analytical method is capable of achieving a QL approximately an order of magnitude lower than the RIDEM background criterion for soils. This information will be added as a footnote to the PAL presented for arsenic on page 115.*

The following footnote will be added to the soils table presented on page 115:

- *Please note that while the PAL for arsenic in soils (0.39 mg/kg) is less than the quantitation limit (0.8 mg/kg), arsenic is a naturally occurring inorganic in soils. The*

State of Rhode Island GA direct exposure criterion (7 mg/kg) is from a background soils study conducted for the Rhode Island Department of Environmental Management (Background Levels of Priority Metals In Rhode Island Soils, T. Conner, RIDEM). Consequently, the analytical method is capable of achieving a QL approximately an order of magnitude lower than the RIDEM background criterion for soils.

80. *Page 117, Project Schedule Time Table:* This table does not include a date for delivery of information and data obtained during this investigation. The table shows that field investigations, laboratory analyses, and data validation will be completed by April 30, May 30, and June 30, respectively. This information should be submitted for USEPA review, even if only in draft form, prior to submission of the Revised Draft FS/Draft Focused Risk Assessment (September 30, 2010).

Navy Response: *Agree. As the EPA will recall, the Navy periodically forwarded raw analytical data as it was received from the subcontract labs during the Phase III remedial investigation as part of the TRIAD process. The Navy will follow this approach during the FS Support investigation. Additionally, the Navy will periodically compile the key field notes and screening data generated during the field investigation and forward to the EPA. (This type of data transmittal also occurred weekly/bi-weekly during the Phase III field investigation and will continue during the FS Support field investigation.) Data validation memoranda (DV) will be forwarded (on a CD) once they are reviewed and approved by the Tetra Tech data validation coordinator. The exact schedule for field work and interim data distribution will be refined once the SAP is approved and work commences.*

No change to SAP is proposed.

81. *Page 119, 3rd Paragraph, 1st and 2nd Sentences:* The test pit locations chosen by the FS Engineer using the “biased/judgmental” approach and shown on Figure 17-1 will not allow facilitation of issues raised by the USEPA at the June 9, 2009 DQO meeting. Taken in content with the proposed test pit locations for the “Southeastern Area” shown on Figure 17-2, the program will not allow adequate delineation of buried waste material, or a statistically based approach for identification of “hot spots.”

Navy Response: *Please see response to EPA General Comment No. 1.*

82. *Page 120, Last Paragraph:* The single well pair “in the vicinity” of the BTEX Hot Spot area is insufficient to address USEPA concerns. The approach dismisses input from USEPA at the June 9, 2009 DQO meeting. The Project Hydrogeologist “biased and judgmental” sampling locations notwithstanding, the data and analysis presented to the Navy at the June 9, 2009 DQO meeting to support the need for an additional shallow/intermediate monitoring well pair to the southeast of the BTEX (and likely CVOC) Hot Spot area and MW16-40S/I clearly support the need for the additional well pair. Also, the well pair identified to be installed by the Navy needs to be installed within the BTEX (and likely CVOC) Hot Spot area at EPT-2, not “somewhere down gradient.” ETP-3 which is located “somewhere down gradient” from ETP-2 had PID readings of 2 to 3 PPM while ETP-2 had a reading in excess of 1,000 PPM in the breathing zone. ETP-4 and ETP-6 located to the sides and up gradient of ETP-2 had breathing zone PID readings of approximately 100 PPM. Further, ETP-2, ETP-4, and ETP-6 all had observations of “burned material, including wood, paper, and metal, and floor mats, outdoor carpets as well as “BTEX odor” in ETP-2. Contaminants released/disposed of in this area have a high potential to have migrated vertically downward as well as laterally during to

precipitation and the effects of fire fighting activities. Therefore, a shallow/intermediate monitoring well pair must be installed within the BTEX (and likely CVOC) Hot Spot area.

Navy Response: Please see response to EPA General Comment No. 8 and 27.

83. *Page 121, Section 17.4:* In the first paragraph, it is stated that the proposed sampling locations are spaced evenly across the width of Allen Harbor. Based on review of Figure 17-3, EPA disagrees with this interpretation because the transects reach only about one-half to two-thirds across the harbor. Please add one sample location to the east of those currently depicted to each transect in order to capture the total width of Allen Harbor at these locations.

Navy Response: Please see response to EPA Specific Comment No. 68.

84. *Page 122, Section 17.6:* In the first paragraph it is stated that the Navy "requests additional soil gas data in the former Building 41 area to verify the Phase III investigation results". Please clarify whether Navy has asked for access to sample soil gas in the area or intends to sample soil gas itself.

Navy Response: Clarification: The Navy will sample the soil gas as part of this investigation. The sentence will be reworded as: The Navy has requested the collection of additional soil gas samples in the former Building 41 area to verify the Phase III investigation results."

85. *Page 123, Section 17.7, Last Sentence:* This statement misrepresents what was stated by the USEPA at the June 9, 2009 DQO meeting. USEPA only stated that the extent of the PAH release needed to be defined. USEPA also stated that this could be performed economically (field screening test kits) by simple shallow soil sampling outside of the location of SB16-A3-12 to determine how laterally extensive the contamination is. Then, a minimal number of soil borings could be installed to evaluate the depth of the PAH contamination. We did not recommend 4 initial soil borings and 3 additional step-out borings.

Further, USEPA did not suggest that 3 additional soil borings to a depth of 15 feet were needed. What USEPA did state was that release of PAH and/or CVOC could have occurred along the loading dock area. These areas could be responsible for contributions to the elevated CVOC observed in Site 16 groundwater. If the Navy wished to explore this area, it might provide an answer to the observed distribution of CVOC in groundwater.

Navy Response: Please refer to the referenced text. The text does not state that the EPA recommends 4 initial borings and 3 additional step-out borings. The text does state: "At the recommendation of USEPA Region 1, three additional shallow borings will be advanced along the southern side of the former Building 41, as depicted on Figure 17-6." Please note the June 9, 2009 meeting notes on this subject presented in Appendix A.1 (last bulleted item on page 5 of the notes): "CL indicated that the contamination may be indicative of the edge of something spilled in the general vicinity of SB16-A3-12 which is just south of the southern edge of the former Building 41. Thus, soil screening of 3 to 5 borings along the southern edge of the building is also recommended to investigate for spillage or discharge of materials along the face of this building (i.e., in the vicinity of old docking areas or storm sewer system). (Note to the reader: the original published notes reference to location MW16-12 was corrected above to reference location SB16-A3-12.)

Also, the Navy agrees that the proposed borings provide an opportunity to further investigate

CVOC contamination in the vadose soil of this area. Consequently, soils collected from the proposed borings will be screened for the presence of VOC contamination (PID, Color tec). Consistent with revised Section 17.7, samples will be submitted for fixed based laboratory analysis. The analytical results will be used in the evaluation of the need for (and potential approaches) vadose zone soil remediation.

86. *Page 124, Section 17.8:* The objectives of this investigation are not clear. If the purpose is to evaluate risks to receptors from shallow soils then the depth of 30 feet does not appear to be warranted. Further, if a soil boring is proposed for within the former Building 41 footprint as is shown on Figure 17-8, the boring should be collocated with MW16-31D where the current Navy contractor interprets gravel and silt to be present when the previous Navy contractor soil boring log shows silt with gravel in order to support the Navy hypothesis of contaminant migration through the underlying low permeability silt layer to the deep overburden.

Navy Response: *Please see response to EPA Specific Comments No. 12 and 60.*

87. *Page 125: Section 17.9:* All up gradient wells should be redeveloped/re-sampled to provide representative data. The rationale and details have previously been provided to the Navy in a series of Technical Memorandums and meetings. Given the problems associated with those wells slug testing may not “verify that the screened interval of each well is hydraulically connected with the aquifer.” It will only provide a hydraulic conductivity value, unless it can be shown that the value is commensurate with minimal hydraulic conductivity values for aquifer materials at the screened interval as noted in previous USEPA Technical Memorandums to the Navy.

Navy Response: *Please see Navy response to EPA General Comment No. 2. Based on the consistent disagreement between EPA and Navy regarding slug testing and interpreted results, no slug testing will be performed during the Site 16 FS fieldwork. All references to slug testing will be removed from the Site 16 FS SAP. The Navy does not perceive the same “problems” that the EPA perceives with the data collected from upgradient wells.*

88. *Page 127:* The test pits should be distributed uniformly across the North Central Area, with more test pits added if necessary in order to obtain sufficient information to satisfy the requirements of the Feasibility Study and to perform statistical analysis of the data.

Navy Response: *Please see response to EPA General Comment No. 1. Also, please note the provision for additional test pits for the northwestern portion of the NCA in Rule #1 (Section 11.2.4, bottom of page 50 of SAP).*

89. *Page 128:* An additional shallow and intermediate monitoring well pair is needed between the BTEX (and likely CVOC) Hot Spot area and MW16-40S/I. The proposed shallow/intermediate well pair also needs to be installed within the “BTEX” hot spot area.

Navy Response: *Please see response to EPA Specific Comments Nos. 8 and 27.*

90. *Page 129:* Additional piezometers and samples are needed at the east end of the two transects shown on Figure 17-3.

Navy Response: *Please see response to EPA Specific Comments No. 68.*

91. *Page 130:* Two shallow/intermediate monitoring well pairs are needed in front and up

gradient of the Sea Freeze building.

Navy Response: Please see response to EPA Specific Comment No. 64.

92. Page 186 of 188, Field XRF/Laboratory Lead Data Correlation - Please include the project statistician mentioned in the text on the Distribution List (SAP Worksheet #3).

Navy Response: Agree. The environmental statistician currently assigned to the project is Ms. Anna-Marie Christian. Her name will be added to Worksheet No. 3.

93. Figure 10-6: USEPA does not believe this figure correctly depicts "generalized" groundwater flow from the PR-58 Nike Site. Groundwater flow patterns from the 2007 Synoptic Groundwater Sampling Event and Site 03 Interim Monitoring Events clearly show groundwater flow predominantly to the southeast from the location of the PR-58 Nike Site including the area to the northeast of the "PR-58 Nike Site" label on this figure, i.e. the circular road near monitoring well EA-104D/R. The Navy is referred to Figures 3-16 and 3-17 of the Site 16 Phase III Remedial Investigation Report (as well as Site 03 Interim Monitoring Reports) which show groundwater elevation contours for the deep overburden and shallow bedrock for the area depicted. This figure should be removed and replaced with one that includes groundwater elevation contours and correct groundwater flow paths.

Navy Response: Agree. The Navy will adjust the generalized groundwater flowpaths in the Nike PR-58 Site and Site 3 area to reflect those presented on Figures 3-16 and 3-17 of the Site 16 Phase III RI Report.

Please see attached revised Figure 10-6.

94. Figure 10-7: This figure is incorrect in that it presents a value of "no-detect" of <5 µg/L for monitoring wells in the up gradient area. MW16-82D/R has not been shown to be a well capable of providing usable data. As such, no inference as to non-detection can be made for that well location. Other wells in the up gradient monitoring wells set likewise cannot be assumed to yield groundwater with non-detect results or very low results. These include MW16-10I, MW16-13R, MW16-83D/R, MW16-84D/R, and MW16-86D/R, since these wells have been impacted by well construction/development/sampling issues such that sample results cannot be used. These issues have not been resolved.

As noted for MW16-55D, trace amounts of TCE have been detected in the deep well at that location. In addition, inspection of the sampling data for that well shows the presence of elevated pH during well development and at the time of sampling, indicating a likely breached well seal.

Also, data for MW16-74D is not shown on Figure 10-7, yet it also resulted in the detection of TCE at 2.5 µg/L. The depth of this DPT well appears to be above the top of the permeable soil zone noted for MW16-55D/R and MW16-82D/R. Also, a monitoring well in a key location, MW16-75D has never been sampled. The reason for this lack of sampling has been that a rod was stuck in the well, yet, it is not clear whether adequate measures have been made to remove the obstruction or, failing that, to replace this well. It should also be noted that this DPT well was apparently advanced to a depth greater than that for MW16-83D/R (to -29 feet MSL compared to -23 feet MSL).

Navy Response: The Navy does not concur with the EPA conclusion that the upgradient

wells and subsequent contaminant concentrations obtained from them are unusable. Please see Navy response to EPA General Comment No. 2, as well as Navy response to Comment Nos. 1, 16 and 17 from the Navy response to EPA comments on the Draft Phase III RI for Site 16.

Please provide rationale to conclude that MW16-75D occurs at a "key location". Groundwater quality data both upgradient and downgradient from this location does not show site related contaminants above MCLs. Additionally, there does not appear to be a preferential channel occurring in this location. Navy does not believe that additional work, beyond re-sampling of this well, is necessary (proposed as part of the Site 16 FS field work).

The reviewer is correct with regard to the datum presented for MW16-74D. Figure 10-7 will be corrected to match Figure 4-27 of the Phase III RI report which depicts the referenced positive detection. Additionally, a footnote will be added to indicate that Figure 10-7 displays data for 2004 and 2007. CVOCs were not detected in the last RI sample collected from MW16-55D (2004).

Please see attached revised Figure 10-7.

95. *Figures 17-1 and 17-2: The proposed test pit locations on this figure do not support the approach recommended by USEPA during the June 9, 2009 DQO meeting. Resulting data will not allow a statistically based analysis to support hot spot removal.*

Navy Response: *Please see response to EPA General Comment No. 1.*

Please see attached revised Figure 17-2.

96. *Figure 17-3: An additional set of piezometers is needed in the Harbor to the east of those shown for two transects of four. There is no flow net analysis to support not sampling from the gap in the Harbor to the east of the three piezometers in each transect that are depicted. Also, while concentrations of CVOC for TW16-AH-05 and TW16-AH-06 the concentrations of CVOC are higher in the 9 to 10 foot interval than in the 4 to 5 foot interval, inspection of the results for TW16-AH-07 and TW16-AH-08 shows higher concentrations of total CVOC in the 4 to 5 foot interval than the 9 to 10 foot interval. A groundwater sample is needed from 1 to 3 inches below the Harbor floor.*

Given the lack of knowledge regarding where the groundwater actually discharges, groundwater piezometric data from those piezometers should be collected along with re-installation of one line of temporary piezometers at the previous locations in order to develop a groundwater flow net. This analysis is needed to determine the actual discharge point of CVOC in groundwater discharging into the Harbor.

Navy Response: *Please see response to EPA Specific Comments 39, 68, and EPA General Comment No. 6.*

Please see attached revised Figure 17-3.

97. *Figure 17-4: This figure misrepresents the "periphery" of the CVOC plume. Data from the Phase III Remedial Investigation indicates that groundwater flow in a radial pattern toward the east as well, including the "Sea Freeze Building". As such, the area where USEPA recommended additional sampling on the western side of the building is actually within the*

CVOC plume, not at the “periphery”. A groundwater flow arrow should be included to reflect the documented groundwater flow toward the Sea Freeze building. Also, the offset sampling locations near the “Sea Freeze Building” is not concurred with. The five proposed sampling locations should be aligned across the western side of the building in a manner similar to that shown for the “NORAD Building and the small building to the west of that structure.

Navy Response: *The title of the referenced figure will be revised to read: “Soil Gas Investigation for Buildings in the Eastern Portion of the CVOC Plume”. The requested groundwater flow arrow will be added to Figure 17-4. Please also see response to EPA Specific Comment 41.*

98. *Figure 17-5: Please provide clear rationale revisiting the area depicted since the Navy already has data for that area.*

Navy Response: *Please see response to EPA Specific Comment No. 45.*

99. *Figure 17-6: This figure should be annotated to show that the proposed locations are along the former loading docks, not the “Southern Boundary of Former Building 41.”*

Navy Response: *Agree.*

Please see attached revised Figure 17-6.

100. *Figure 17-7: While the intent of this effort is to evaluate potential CVOC sources east of the former Building 41, it is noted that there is a data gap regarding VOC in soil characterization northeast and southeast of SB16-A3-10, west and southwest of SB16-A3-06. The soil descriptions from borings as well as elevated CVOC in SB16-A3-05, SB16-A3-06, SB16-A3-09, SB16-A3-10, SB16-A3-15, and SB16-A2-10 indicate that CVOC may have migrated along lower permeability sloping soils layers to this area from the North Central Area. Alternatively, the point of origin could be from a surface release along Davisville Road.*

SB16-A3-06 had a laboratory CVOC concentration of 2,803 µg/kg at 35-36 feet below ground surface. Elevated concentrations of CVOC were noted at similar depths at SB16-A2-10 (1,200 µg/kg at 34-35 feet), slightly lower depths at SB16-A3-15 (3,300 to 3,500 µg/kg at 39-40 and 40-41 feet), and SB16-A3-18 (2,401 µg/kg at 39-40 feet), and deeper elevations at SB16-A3-10 (6,600 µg/kg at 49-50 feet), SB16-A3-05 (5,802 µg/kg at 48-49 feet), and SB16-A3-09 (710 µg/kg at 57-58 feet).

At locations further to the west toward the former Building 41, no significant concentrations of CVOC or Color-Tec® responses were noted for SB16-A3-03, SB16-A3-04, SB16-A3-08, SB16-A3-12, SB16-A3-13, SB16-A3-14, or SB16-A3-35. This suggests that the source area for the elevated CVOC in soils (and groundwater) originated further to the northeast of the former Building 41. Therefore, one of the proposed soil borings should be moved to between SB16-A3-05 and SB16-A3-10 on the south side of Davisville Road.

Navy Response: *Please see Navy response to EPA Specific Comment No. 53 and Navy responses to EPA comment 21 on the Draft Phase III RI for Site 16.*

Navy will relocate one of the proposed soil borings to between SB16-A3-05 and SB16-A3-10.

Please see attached revised Figure 17-7.

101. *Figure 17-8:* The groundwater flow directions shown on this figure do not reflect groundwater flow directions from the former PR-58 Nike Site. The Navy is referred to Figures 3-16 and 3-17 of the Site 16 Phase III Remedial Investigation Report (as well as Site 03 Interim Monitoring Reports) which show groundwater elevation contours for the deep overburden and shallow bedrock for the area depicted. Groundwater does not flow to the northeast from the PR-58 Nike Site as shown on this figure. Groundwater flow including that from the triangular road to the northeast of the PR-58 Nike Site flows to the southeast. As such, the two flow arrows depicting the northeast direction of groundwater flow are incorrect and should be removed.

Also, groundwater contours do not show flow to the northeast from MW16-55I/D. Figures 3-16 and 3-17 of the Site 16 Phase III Remedial Investigation Report show deep overburden and shallow bedrock flow is to the east-southeast. Accordingly, the arrow showing direct flow of groundwater to the northeast from MW16-55D/R should be removed.

The use of "Monitoring Well (Designated as Priority 1 and 2 by USEPA)" should be removed. This designation is an artifact of an unexecuted agreement between the Navy and USEPA that was intended to collect data prior to the finalization of the Site 16 Phase III Remedial Investigation Report. It was not an agreement to ignore the redeveloping/re-sampling of those wells. Due to well construction, development, and sampling concerns all up gradient wells should to be redeveloped and re-sampled.

Navy Response: *Please see Navy response to EPA Specific Comment No. 93.*

Figure 17-8 correctly identifies the referenced Priority 1 and 2 wells which were discussed during the BCT DQO meeting of 09 June 2009. The meeting was held to discuss DQOs for the FS Support SAP. The reviewer's comment is at variance with Mr. Brian Olson's (EPA Region I) statements of 09 June 2009 indicating that the minimum EPA requirement was for the re-development (as necessary) and resampling of the 7 priority 1 wells. Mr. Olson did not specify the automatic resampling of all upgradient wells. (Please see 09 June 2009 meeting notes distributed on 24 August 2009 included as Appendix A.1 of the FS Support SAP).

The Navy's approach to Problem Number 8 is clearly described in Section 11.9. The purpose of the SAP is to memorialize the "unexecuted agreement" discussed in the DQO meeting of June 9, 2009.

No change to SAP is proposed.

102. Appendix A4, SOP TT 002 - This SOP references an older version of SW 846 6200. Since field XRF is an important component of this SAP, please confirm this TT 002 meets the QC criteria in the most recent version of SW 846 6200.

Navy Response: *Agree. The reference in the SOP will be updated to USEPA (U.S. Environmental Agency), Method 6200: Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment, Office of Solid Waste, Washington, D.C. February 2007.*

Please see revised attached SOP TT 002.

ENCLOSURE 2

**Navy Response to RIDEM Comments on
The Draft Sampling and Analysis Plan to
Support the Feasibility Study for Site 16
Former Naval Construction Battalion Center Davisville
North Kingstown, Rhode Island
(RIDEM Correspondence Dated December 8, 2009)**

**Navy Response to RIDEM Comments on
The Draft Sampling and Analysis Plan to
Support the Feasibility Study for Site 16
Former Naval Construction Battalion Center Davisville
North Kingstown, Rhode Island
(RIDEM Correspondence Dated December 8, 2009)**

RIDEM General Comments

RIDEM Comment No. 1: Page 90, Section 14.1.18, IDW Handling, Characterization, and Disposal – This section states that IDW will be handled in accordance with Tetra Tech SOP SA-7.1. The IDW must also be handled in accordance with RIDEM Division of Site Remediation Policy Memo 95-01.

Navy Response to Comment No. 1: *Agree. The final sentence of Section 14.1.18 will be changed to read as follows: "IDW will be managed in accordance with Tetra Tech SOP SA-7.1 (see Appendix A) and RIDEM Division of Site Remediation Policy Memo 95-01 (as applicable). IDW characterization will be performed after all IDW has been containerized at a secure location determined by the FOL with subsequent disposal based on characterization results."*

RIDEM Comment No. 2: Page 123, Section 17.6, Problem # 5, Investigation of Vapor Intrusion Potential at Periphery of CVOC Plume, Paragraph 1, Sentence 1 – This sentence states that 10 temporary wells will be placed along transects close to the Sea Freeze and NORAD buildings (Figure 17-4) to investigate the potential of vapor intrusion. For completeness it is recommended that an additional temporary well location be placed in between locations SB16-A2-32 and SB16-A2-15.

Navy Response to Comment No. 2: *The intent of Problem #5 is to investigate potential vapor intrusion issues at the periphery of the CVOC plume where existing buildings are present. There are no existing (or planned) buildings at the RIDEM proposed location; therefore, it is unclear how the data collected from this proposed temporary well location would be utilized to assess potential vapor intrusion issues.*

RIDEM Comment No. 3: General Comment – Sediments along the shoreline of Allen Harbor, particularly along the length of Allen Harbor Road need to be collected and analyzed to determine if any unacceptable risk exists at the site. While it is acknowledged that today there is minimal contact with the sediments by humans, that could change in the future depending upon how the marina develops. Two to three samples analyzed for the full suite of contaminants (VOC, SVOC, PCBs, Pesticides and metals) would be sufficient to address this concern.

Navy Response to Comment No. 3: *The requested sampling and analyses has already been conducted. Sediment samples collected from 20 Allen Harbor locations depicted on Figure 2-3 of the Phase III RI report for Site 16 were analyzed for volatile organic chemicals (VOCs), semi-volatile organic chemicals (SVOCs), pesticides and polychlorinated biphenyls (PCBs), and metals. Note in particular, that locations AH-49, AH-28, and AH-51 are in close proximity to the eastern boundary of Allen Harbor and run parallel with Allens Harbor Road. Sediment samples were also collected from seep/sediment locations 16-01, 16-02, and OPW16-01 along the northern boundary of Site 16 (the southern boundary of Allen Harbor.) Additional sediment samples were collected as part of the environmental forensics investigation conducted during the Phase III RI field investigation. The samples (depicted on Figure 2-5 of the Phase III RI report) were analyzed for PAHs. Also, please note that the sediment investigations conducted to date has focused on the southwest corner of Allen Harbor and southern shoreline of Allen Harbor (which are clearly downgradient of Site 16 source areas) and not on the eastern shoreline along Allens Harbor Road which is not immediately downgradient of Site 16 source areas.*

RIDEM Comment No. 4: Similar to above, both surface and sub-surface soil samples should be taken in the same area and analyzed for the full suite of contaminants. Two to three samples would be sufficient to address this concern.

Navy Response to Comment No. 4: *Soil samples have already been collected along northern boundary of the Site 16 North Central Area during pre-Phase III investigations (the southern shoreline of Allen Harbor) as depicted in Figure 2-2 of the Phase III RI report (see locations MW16-03S, SB16-26, and MW16-04S) and during the Phase III investigation (see locations SB16-091, SB16-092, SB16-093, SB16-094, and SB16-095 depicted on Figure 2-5). These locations are downgradient of all known Site 16 source areas. The soil samples collected from MW16-03S, SB16-26, and MW16-04S were analyzed for VOCs, SVOCs, pesticides, PCBs, and metals. A few of these samples were also analyzed for dioxins/furans. Between one and four soil samples (per boring) collected from the SB16-091, SB16-092, SB16-093, SB16-094, and SB16-095 were screened for the presence of PAHs. Additionally, at least one soil sample per boring was also analyzed for VOCs, SVOCs, and metals. Also, as noted in the previous response, there are no Site 16 source areas in the immediate vicinity of the eastern shoreline of Allen Harbor and, therefore, no environmental reason to advance soil borings or test pits in this area.*