UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND - REGION I
5 POST OFFICE SQUARE, SUITE 100
MAIL CODE: OSRR07-03
BOSTON, MASSACHUSETTS 02109-3912

December 7, 2009

N62578.AR.002265
NCBC DAVISVILLE
5090.3a

Jeff Dale
Dept of the Navy, BRAC PMO Northeast
Code 5090 BPMO NE/JD, 4911 South Broad St
Philadelphia, PA 19112-1303

Re: *"Draft Sampling and Analysis Plan to Support the FS for IRP site 16,* dated October 2009 at the Former Davisville Naval Construction Battalion Center (NCBC), Rhode Island

Dear Mr. Frye:

Pursuant to § 7.6 of the Davisville Naval Construction Battalion Center Federal Facility Agreement dated March 23, 1992, as amended (FFA), the Environmental Protection Agency has reviewed the subject documents and comments are below. The Document reiterates the same information in different ways in many places. We have tried to only make a comment once and it will be the responsibility of the Navy to ensure the changes are made in the entire document. To help us more efficiently review the next version, please include change pages with the responses to these comments and/or in subsequent drafts of the SAP, please highlight any changes to facilitate review.

General Comments

***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 throughout portions of the North Central Area where there is a clear data gap relative to the extent of buried waste material, including where "non-detect" results from DPT borings/probes

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.

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.

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.

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 gradients 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.

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.

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).

5. However, since the Army is investigating the upgradient area, Navy need only ensure its data is representative of the aquifer conditions.

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.

   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.

   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.

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.

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.

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.

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.

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 <u>three</u> soil borings were "at the recommendation of USEPA." This is incorrect.

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.

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.

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.

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

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

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.

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.

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

20. P*age 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.

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.

22. *Page 51, Note: 11.2.1, 6th and 7th Sentences:* It is not clear why the deepest <u>subsurface</u> 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 <u>subsurface</u> 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.

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.

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

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

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 or 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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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 rational 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.

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

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 MW16-27I, MW16-28I, MW16-57I, MW16-88I and MW16-89I. Therefore, the last sentence should be removed from this SAP.

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

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.

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.

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.

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.

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?

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

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.

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.

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.

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

55. *Page 72, Problem No. 8:* 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.

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.

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, text 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.

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.

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 USEAP 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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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 TCVOC recently).

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.

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.

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

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

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

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.

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.

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.

77. *Page 102 (1, 1, 2, 2-Tetrachloroethane), and Page 104 (Footnote 1):* 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 not 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.

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

79. Page 115 of 188, Arsenic QL - Please clarify why arsenic can not 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.

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).

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."

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.

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.

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.

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

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.

87. *Page 125: Section 17.9:* All up gradient wells should be redeveloped/re-sampled to provide representative data. The rational 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

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.

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.

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

91. *Page 130:* Two shallow/intermediate monitoring well pairs are needed in front and up gradient of the Sea Freeze building.

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).

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.

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 breeched 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).

95. *Figures 17-1and 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.

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.

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.

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

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."

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 <u>35-36 feet</u> 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.

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.

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.

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If you have any questions with regard to this letter, please contact me at (617) 918-1384.

Sincerely,

Christine A.P. Williams, RPM
Federal Facilities Superfund Section

cc: Richard Gottlieb, RIDEM
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Steven King, RIEDC
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