

**RESPONSES TO EPA'S COMMENTS DATED 2 OCTOBER 2001 ON THE DRAFT
ADDENDUM NO. 2, INTERIM GROUND-WATER SAMPLING PROGRAM
AT SITE 03 FOR THE NAVY UNDER THE "CHARACTERIZATION OF CVOC
CONTAMINATION AT THE FORMER NIKE PR-58 SITE AND ADJACENT NAVY
NCBC DAVISVILLE SITE 03
NORTH KINGSTOWN, RHODE ISLAND"
MAY 2000 REVISED FINAL WORK PLAN**

GENERAL COMMENTS

Comment 1: EPA understands that any long-term monitoring plan for this site needs to be "dynamic" given the ongoing work which will dictate, as appropriate, changes to the site conceptual model and the approach to monitoring. As such, EPA notes that the results of the PR-58/NIKE investigation will be needed before the final LTMPs for sites 01/02/03/04 as well as PR-58/NIKE site can be fully flushed out; but in the meantime EPA strongly supports the Navy's plans to collect additional ground water sampling data on an "interim" basis as a parallel (independent) effort to ongoing characterization efforts at the adjacent PR-58 Nike site. Such information will contribute toward expediting establishment of statistically relevant trends, which will be useful in the longer term to establishing/modifying a final long-term monitoring plan in the future. Given the somewhat irregular schedule which has governed work at the PR-58-NIKE to date, the interim sampling effort should not be overly dependent on schedules for this work. In this context, certain aspects of the proposed interim sampling need a bit of clarification. EPA understands that the Navy is proposing annual sampling for the "interim" effort until the ROD is signed, but the following issues should be clarified:

- a) When will the interim sampling begin ?
- b) What season will be represented, and why ?

Response:

- a) The interim sampling will begin within a month of approval of this interim sampling Work Plan Addendum, preferably we would like to begin the sampling on 15 November 2001, and would be continued annually until the Record of Decision is signed for Site 03.
- b) Based on the available data from 4 sampling events (May and November 1995, December 1996, March 1998, and September to October 2000; summarized in Table 4-5 of the Draft CVOC Characterization Report for Former PR-58 Nike Site and Adjacent Navy Site 03, February 2001), there does not appear to be anomalous fluctuation in the results that might be considered to be seasonal variation. Rather, most of these data show apparent decreasing or increasing trends, or have remained approximately the same. Therefore, sampling annually during the month of November would seem to be acceptable.

Comment 2: Ground water levels: A synoptic round of water levels should be collected prior to collecting samples for water quality so that the results may be assessed with respect to the prevailing ground water flow conditions. Water levels should be measured at all existing wells on the Navy property as well as the adjacent PR-58/NIKE site, so that the groundwater flow information is not bounded by the wells being sampled.

Response: Water surface contour maps prepared from data between 1995 and 2000 have shown the similar patterns. The main difference between the older and newer data has been the incorporation of newer wells that resulted in refinement of the water surface contour map from a previous year. Therefore, as previously planned, the Navy will be collecting a synoptic round of depth to water measurements from the related monitoring wells located on Navy property only.

Comment 3: In terms of the number of monitoring wells and groundwater samples, the program represents a reasonable effort to assess the distribution and concentrations of chlorinated volatile organic compounds in the groundwater at Site 03. However, the plan provides sparse coverage in the area between Seabee Avenue and Davisville Road, and the up gradient boundary with the former Nike site. It also omits the assessment of groundwater to the north of Perimeter Road. Even though this last area is outside the delineated boundaries of Site 03, it is not clear whether the dip of bedrock fractures, described as trending north-northeast would allow flow of contaminants back toward the Site 03 area. Therefore, the current selection of monitoring wells for the Interim Ground-Water Sampling Event may not optimize the information that could be collected to characterize the nature and extent of groundwater contamination beneath Site 03.

Response: MW03-07D and MW03-10D are the only 2 wells located between MW03-08D/R and EA-111D/R (already included in the interim sampling plan) in the referenced area between Seabee Avenue and Davisville Road. The results for the previous sampling events indicate a decreasing trend at MW03-10D and results that are variable, but similar for MW03-07D. The Navy does not see the value of including these 2 wells in the interim sampling program. The Navy does not plan to sample wells located outside Navy property.

Comment 4: *Navy Site 03 Wells*

Although the rate of groundwater movement and contaminant migration from the former Nike site source area is not known, the distance between a near source area well pair (MW03-08D/R) and the next down gradient pair (EA-111D/R) appears to be over 1,000 feet. An even greater distance exists between the near source area well pair to EA-110D/R. There is documented relatively high concentrations of chlorinated volatile organic compounds (CVOCs) in the vicinity of the near source area well pair and low to non-detect levels in those two down gradient well pairs. Collection of groundwater quality data for the aquifer in between those two

locations would appear to be valuable to understanding the nature and extent of the CVOC plume.

Previous sampling of intervening wells, including MW03-10D and MW-Z3-03, has indicated levels of CVOC contamination. Sampling from only the two furthest down gradient well pairs would not allow evaluation of whether groundwater with elevated concentrations of CVOCs are encroaching upon the down gradient locations; i.e., an advancing plume. Additionally, understanding the groundwater quality in the intervening area between the up gradient and furthest down gradient wells is critical in order to understand the dynamics of the groundwater plume. That is, given the potential age of the release, it is possible that the CVOC plume could be receding, or at steady state, rather than advancing. This knowledge has the potential to affect remedial actions.

It is recommended that an additional monitoring well pair be added to evaluate up gradient groundwater quality migrating onto the Navy site. This well pair should be MW03-12D/R. This well pair in conjunction with the proposed MW03-08D/R pair will provide more complete assessment of groundwater quality migrating onto the Navy site.

Response: When combined with the response to Comment 3, the only 2 additional wells located between MW03-08D and EA-111 or EA-110 would be MW03-06D and MWZ3-03 for which the data between 1995 and 2000 indicate an apparent decreasing trend and results that are approximately the same, respectively. Because of the age of the plume, these data already indicate the character of the plume in that area and are not necessary for the interim sampling program. The Navy does not plan to sample wells located outside Navy property; i.e., MW03-12D/R.

Comment 5: *Upgradient Well(s)*

The proposed plan also limits the up gradient coverage of groundwater migrating onto the Navy Site 03. The selected monitoring well pair (MW03-08D/R) appears to be situated to evaluate groundwater quality for the southern portion of the down gradient boundary of the former Nike site. However, the noted groundwater contaminant concentrations, groundwater flow, and bedrock features indicate that groundwater may flow in a semi-radial fashion due east and northeast as well as to the southeast. As a result, the single monitoring well pair (MW03-08D/R) may not be adequate for evaluating up gradient groundwater quality across the approximately 1,500 foot boundary between the former Nike site and the Navy Site 03. This is especially critical given that groundwater and contaminants may flow preferentially along specific bedrock fractures.

Another monitoring well pair (MW03-12D/R) although located slightly within the designated, former Nike site area, lies further to the north along the up gradient boundary of the former Nike site and the Navy Site 03. It is noted that the

measured CVOC concentrations in the MW03-12D/R pair do not mirror the CVOC concentrations measured in groundwater from MW03-08D/R. Although the concentrations are of similar magnitude, the levels of CVOC at times increase and decrease in a dissimilar fashion. For instance, from 1995 to 2000, the levels of CVOCs dropped sharply in MW03-08R but increased slightly in MW03-12R. From 1995 to 1996, the concentrations dropped an order of magnitude in MW03-12D and then rose in 2000. MW03-08D has exhibited more modest fluctuations. Both of these well pairs are described on Table 4-5 as "Detected CVOC Concentration showing no apparent trend." Employing both of these well pairs as up gradient monitoring wells for the Navy Site 03 would be more effective at establishing up gradient groundwater quality for groundwater entering the site.

It is recommended that groundwater from two additional monitoring wells, located between Seabee Road and Davisville Road, be sampled in the Interim Sampling Event. These wells are MW-03-10D and MW-Z3-03. Monitoring both of these wells will allow a more accurate assessment of the plume status. Specifically, whether the plume is advancing or, is at a steady-state condition, or possibly is receding.

Response: This is a re-iteration of Comments 3 and 4. Please refer to the responses to those 2 comments. With regard for the above assessment of the available data (as summarized in the referenced Table 4-5), please note that the 1995 data for the 4 wells (MW03-08D/R and MW12D/R) was in the range of approximately 4 to 8 ppm, the 1996 data (only 'D' wells sampled) showed a decrease, the 1998 data (only MW03-08D was sampled) showed an increase, and lastly, the 2001 data for all 4 of these wells was in the range of approximately 1.5 to 4 ppm (generally an apparent decrease, except for MW03-12R that is near the same (within 6 percent) as detected in 1995 (not a significant increase). Though the actual detected concentrations are different, the overall trend between these 2 well pairs appear to be more similar than stated in the reviewer's comment. Therefore, MW03-08D/R is believed to be sufficient without MW03-12D/R when considering the points raised in this comment.

Comment 6: *Offsite Wells*

A review of the previous groundwater sampling and analytical data along with the interpreted bedrock troughs and orientation of bedrock fractures suggests that CVOC contaminated groundwater is migrating to the northeast along the identified bedrock trough and fracture zone. The proposed plan includes only one groundwater monitoring well in that direction (MW-Z3-01). Elevated concentrations of CVOCs have been identified in that well and in a monitoring well pair further along that trough. While that location is outside the Navy Site 03 area an evaluation of the impact of the plume on the Navy Site 03 area may be limited without data from that location. For instance, it is not clear whether the bulk of the source area contaminants migrate onto the Navy site, or move away from the site along inferred bedrock fracture zones, or possibly move back toward the site

after migrating off site. This backward migration may be along the down dip direction of the north-northeast trending bedrock fracture zone.

It is recommended that at least one ground water monitoring cluster north of Perimeter Road be sampled during the Interim Sampling Event. The well triplet EA-112D/R/R2 should be included in the sampling program. Monitoring of groundwater quality and elevations at this well pair will enhance the evaluation of plume dynamics down gradient of the source area and provide assurance that the source area plume does not migrate back onto the Navy site further downgradient.

Response: Monitoring of EA-112D/R/R2 will not assist in understanding if the northeast arm of the CVOC plume from the PR-58 Nike Site. MWZ3-01 is located closer to the PR-58 Nike source area and would provide a continuing understanding of that portion of the northeast arm of the northeast arm of the CVOC plume. Additionally, MWZ3-01 is located on the Navy property and already included in the interim sampling plan. Further, assessment of northeast plume arm movement back beneath Navy property would be better done at a well located on Navy property; i.e., MW01-10D which was already included in the interim sampling plan for that purpose. Therefore, the Navy does not agree with the addition of the offsite EA-112D/R/R2 to the interim sampling plan. However, the Navy proposes to add MW01-10R to the interim sampling plan.

SPECIFIC COMMENTS

Comment 7: **Table 1:** The Purpose/Rationale portion of this table describes many of the wells as exhibiting decreasing or increasing trends in CVOCs. A review of Table 4-5 data does not show this to be the case for most of the wells, at least, not in a meaningful, statistical sense. If selection of the monitoring well locations was linked to inferred trends, additional information should be provided to support the monitoring wells selected. If the selection was based upon other criteria, the discussion of trends is of limited value given the small sample base. It would be more appropriate, given the present uncertainty, to include a larger set of wells for the interim sampling effort such as is suggested above.

Response: The use of increasing or decreasing trends was qualified with the words '... results of ... samples suggests...'. There was no consideration of representing the data as statistically significant, rather just use of the small data set now available; i.e., as a suggested (apparent) trend to be monitored and confirmed or disproved. It was felt to be an observation important enough to be considered as did the reviewer who provided Comment 5.

Comment 8: **Table 4-5:** This table segregates the monitoring wells into three groups. The text for the three groups describes the wells as showing different trends in groundwater chemical quality. However, it is not clear from the data provided that any meaningful trends can be statistically documented from the data shown. At maximum, only 4 samples have been collected from a limited number of wells over

a 6-year period. Many of the wells have been sampled only two or three times. In addition to the limited number of samples, there is no supporting information of the hydrological or climatic conditions at the time of sampling. Samples collected during a period of high recharge and/or high groundwater table may vary significantly in chemical concentrations from groundwater samples collected during a period of low recharge and/or low groundwater table. The interpretations of chlorinated volatile organic compound trends appear to be somewhat subjective. If additional supporting statistical data is available it should be provided, if the interpretation of CVOC concentration trends influenced selection of monitoring wells.

Response: The text in Table 4-5 for these three groupings notes 'apparent' trend (except the first category where the word 'apparent' will be added). There was no consideration of representing the data as statistically significant, rather just use of the small data set now available for a 5-yr period; i.e., as an apparent trend to be monitored and confirmed or disproved. It was felt to be an observation important enough to be considered as did the reviewer who provided Comment 5. At this time, nothing further is expected to be interpreted from the data.

Comment 9: Page 1 of 2, Para. 1; It is not clear how the timing of the interim sampling is or is not dependent on the "completion" of the PR-58/NIKE study. Please clarify. EPA considers this to be an independent effort, to take place until a ROD is signed for site 3. See General Comment above.

Response: The following related sentence is in the first paragraph of the Introduction (page 1 of the Work Plan Addendum: "This interim ground-water sampling program will occur during USACE's completion of the adjacent former PR-58 Nike Site characterization study and remedy design/implementation." Also, refer to the first part of the response to Comment 1.