



State of New Jersey  
Department of Environmental Protection  
Site Remediation Program  
Publicly Funded Site Remediation

Robert C. Shinn, Jr.  
*Commissioner*

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*Director*

MEMORANDUM

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**TO:** Robert Marcolina, Case Manager  
Bureau of Federal Case Management  
Division of Responsible Party Site Remediation

**FROM:** Linda Welton, Project Geologist  
Bureau of Ground Water Pollution Abatement  
Division of Publicly Funded Site Remediation

**SUBJECT:** Naval Weapons Station, Earle (NWSE), Colts Neck,  
Monmouth County - Review of the draft Feasibility Study  
(FS) for Sites 4,5,19, and 26

SUMMARY

As requested, I have reviewed the subject document. As submitted, the subject document is unacceptable. There are several omissions and incorrect statements repeatedly made in this report. Detailed below are recommendations and correction which need to be incorporated into a revised addendum submittal.

RECOMMENDATIONS

The following recommendations are listed in the same order as they appear in the subject document.

GENERAL COMMENTS:

*The addendum is filed  
for the RI - which you have approved.*

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1. As previously stated the technical data should be presented in a RI addendum report not in an FS report.
2. Hydrogeological assumptions are made on unqualified data.
3. The contractor repeatedly makes reference to the ground water underlying some of the sites as not currently being used as a potable water system on the base. The aquifer systems which compromise the subsurface beneath the Earle facility are all considered to be potable aquifers. If the base chooses not to use them as such it does not change their importance, status or classification.

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SITE-SPECIFIC COMMENTS:

SITE 4, Section 1.3.2:

1. Subsection 1.3.2.4.2, Nature and Extent of Contamination, page 1-28:

Under the Ground Water heading of this referenced section, the contractor discusses 1,2 DCE results and references a Table 1-12. The associated Figure 1-8 does not reflect the 1,2 DCE results for 04GW02. The contractor must add the 1,2 DCE results of 25ug/l to the 04GW02 data box. In addition, the contractor has included in the 04GW02 data box [Vinyl Chloride at 3ppb], since the Ground Water Quality Standard for Vinyl Chloride is 5ppb, it is not clear why the contractor included this constituent.

2. Subsection 1.3.2.4.3, Contaminant Fate and Transport, page 1-36:

This section of the document discusses Nitrobenzene levels in the sediments. The contractor states that the compound is fairly mobile in the environment and may be subject to leaching to the ground water or surface water. The concentration of Nitrobenzene in the sediments is 66ug/l and the Ground Water Quality Standard [GWQE] is 10ug/l. The contractor states that this compound is "...considered susceptible to biodegradation in the environment." The issue to be evaluated is that there is not downgradient monitor well to verify that this degradation is occurring and that levels in excess of the GWQE are not impacting the environment. Since a CEA will be required for the site, downgradient monitor wells [sentinel wells] which are clean (ND) must be installed as part of the required line of compliance/long term monitoring well network for th site.

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## **SITE 5, Section 1.3.3:**

1. **Subsection 1.3.3.4.2, Nature and Extent of Contamination, pag 1-42:**

This section of the document discusses that , "Seven hydropunch samples were also taken as a screening tool to determine if existing groundwater monitoring wells were sufficient to characterize the lateral extent of ground water contamination". The contractor references Figure 1-11. On Figure 1-11 there is no data presented for any of the hydropunch sample locations. If these locations were clean or demonstrated only low levels of contamination then appropriate narrative should be added to this section of the document stating that or if the results are above standards then they should be included on the referenced figure. The contractor should recheck the results and revise the section and/or figure as needed. In either case a table of the hydropunch data should be included in this section since the data is referenced several time with no qualification of results.

## **SITE 26, Section 1.3.5:**

1. **Subsection 1.3.5.4, Addendum Remedial Investigation, pag 1-68:**

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The contractor states that, "B&R collected ground water samples from 28 locations (26HP01 through 26HP28)....". "Lithologic profiling was performed at eight locations (26CPT00, 26HP01, 26HP....". From the cross-sections presented and the way the data is discussed, it appears that the contractor used two different types of investigatory equipment to collect the data. It seems that the ground water samples were collected using a hydropunch [HP] sampling device and that the lithologic logs were generated using a Cone Penetrometer Rig [CPT]. This is confusing since it is usually impossible to use the same borehole to collect the two different types of samples. The Remedial Investigation Addendum report does not adequately discuss th differentiation between the two sampling protocols which only leads to additional confusion. The contractor since they are already using the PS as an Addendum RI discussion docum nt should add additional narrative clarifying that the ground water samples were collected using a hydropunch sampling device and a Hollow-Stem Auger Drill Rig and that the Cone Penetrometer Rig was used to generate the lithologic logs. Most likely the CPT rig used a separate borehole for their direct push technique as the hydropunch and the HSA would destroy th soil integrity need to generate the CPT log.

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**2. Subsection 1.3.5.5.2, Nature and Extent of Contamination, Conceptual Site Model, page 1-82:**

The contractor has not considered the potential for DNAPL to migrate under a density gradient in a direction sometimes not in agreement with the direction of ground water flow. It would appear from the contour maps presented in this section that lateral migration in a southwesterly direction is occurring. The contractor makes similar reference to this occurrence. But, the direction of ground water flow from the maps presented would appear to be in a more west-southwest direction. DNAPL will spread out taking the path of least resistance which when it encounters a "confining unit" is in the lateral direction with only a very small component of vertical migration.

The configuration of the plume gives cause to consider several possibilities, one of which is lateral migration. Another possibility is a second source of contamination located in the vicinity of 26HP-19. Still a third possibility is slug-like releases of contaminant from the seepage tank giving the appearance of episodic discharge events. The contractor needs to consider all possibilities when evaluating a conceptual model for the site.

**3. Figure 1-16, page 1-71:**

The total depth of 26HP-21 is omitted from the stratigraphic log depicted on cross-section A-A' on this figure.

**4. Figure 1-21, page 1-83:**

The contractor has placed the "Legend" so as to block the identifying tag for 26HP-24. The legend block should be moved to the upper left corner of the figure.

**5. Subsection 1.3.5.5.5, Ecological Risk Assessment, page 1-96:**

The contractor states that, "Ground water discharge of contaminants to surface water is also insignificant since no wetlands or other surface waters area present near the sit. Ground water contaminants are not expected to migrate sev ral hundred yards to the nearest substantial surface waters because of the relatively slow ground water flow velocity."

DNAPL migration of contaminants does mov with the assistance of the ground water but also can migrate under different circumstances, as previously discuss d. There are no monitor

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wells installed downgradient and in the deeper portion of the aquifer to confirm the contractor allegation. It is inappropriate to write-off a potential receptor without data to support the decision. It should be noted that most of the additional delineation has been conducted with hydropunch sampling and now that the vertical and horizontal extent of the contaminant plume is being determined, it will be necessary to install additional monitor wells to confirm the screening investigation findings.

**SECTION 2.0, IDENTIFICATION AND SCREENING OF TECHNOLOGIES:**

**1. Subsection 2.1.1, Potential Chemical-Specific ARARs and TBCs, page 2-3:**

In this section of the document the contractor states that, "Chemical -specific ARARs for the NWS Earls Sites include the New Jersey Ground Water Quality Standards (GWQSS) [N.J.A.C 7:9-6] that regulate ground water quality". "These state ARARs may potentially be relevant and appropriate and may be used to establish cleanup levels that are protective of human health and the environment". The words "may potentially" must be revised. The GWQSS are relevant and appropriate.

**2. Section 2.6, Site 4 Technology Screening, subsection Environmental Media Protection Considerations, page 2-25:**

The contractor needs to incorporate narrative into this section of the report stating that downgradient monitor wells will be installed at the site in order to establish a Line of Compliance [LOC] monitor well network. This sentinel well system is required as part of the CEA and long-term monitoring which is also required as part of the closure of the landfill.

**3. Section 2.9, Site 26 Technology Screening, subsection Environmental Media Protection, Ground Water, page 2-95:**

The contractor makes reference to an,..."underlying aquitard (a clay layer varying between 10 to 15 feet in thickness at approximately 25 feet below ground surface)...". The stratigraphic classification which the contractor uses is based upon CPT lithological profiles interpretations. Prior to design of any remedial alternative, it is recommended that the contractor install several soil borings to the depth of the "clay unit" and verify its integrity and existence.

**SECTION 3.0, DEVELOPMENT AND SCREENING OF REMEDIAL ACTION ALTERNATIVES:**

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**THE FOLLOWING RECOMMENDATIONS APPLY TO THE SITES 4, 5, 19 AND 26 DISCUSSED IN THIS SECTION OF THE DOCUMENT.**

1. In the Subsection, "Long-Term Monitoring" the contractor discusses a sampling frequency for the operation phase of the alternative. The contractor states that analytical data will be collected semi-annually. It is inappropriate to assume that the regulatory agencies will concur with this frequency. It may be more appropriate to conduct quarterly sampling during the first few years of operation and then revise the sampling frequency based upon the data generated. The contractor must revised all reverent sections of Section 3.0, that discuss the semi-annual sample frequency to reflect that the sample frequency is not predetermined.

2. Also in the Subsections, "Long-Term Monitoring" the contractor must understand that as part of the CEA, sentinel wells will be installed. This is of prime importance due to the fact that several of the sites DO NOT have "clean" downgradient monitor wells. The contractor has made reference to installation of "line of compliance" wells as part of the CEA. This is correct, it is the timing of the installation that is important. The contractor may want to install the sentinel wells or line of compliance wells during the Pre-Design/Pre-Construction phase of the sites investigation as it may be necessary to modify the final design based upon th establishment of where the "clean wells" monitoring network.

3. ~~Section 3.4, SITE 26, DEVELOPMENT AND SCREENING OF ALTERNATIVES:~~

The screening of alternatives section for Site 26, needs to take into consideration that the vertical horizontal extent of the contaminant plume(s) emanating for the "sources" has not been fully delineated. This issue must be addressed and resolved prior to final 100% Design submittal.

In addition, the "sentinel well/clean well" network will have to be established for this site as part of preparation for the CEA.

4. Section 3.4, Site 26, Development and Screening of Alternatives, subsection 3.4.2.4, Alternative 4 - Pump and Treat (Source Removal, Ground Water Extraction and Treatment, Institutional Controls, and Long Term Monitoring, page 3-56:

The ground water pump and treat system proposed as part of this remedial alternative does not consider the installation of a recovery well in hottest source area, rather they present recovery wells to capture the migrating pump. Installation of r covery wells within the 3000ppb contour, proximate to 26HP-

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19 and proximate to 26HP-04 would facilitate a quicker clean up of residually contaminated "source" soils. The contractor presents Figure 3-8 as a site plan for a proposed extraction system. The contractor has failed to identify and compensate for the highly contaminated areas proximate to 26HP-01 which is located within the 10,000ppb contour for TCE on Figure 1-21. In addition, contaminant levels at 26HP-22 are much higher than 3000ppb, as depicted in Figure 1-21b. Thus, the diagram presented as Figure 3-8 does not adequately present the contaminant plumes [TCE and 1,2 DCE] nor their respective concentrations and the proposed pumping/recovery scenario most likely will not be adequate to remediate the contamination.

In addition, the contractor proposed an, "anticipated combined pumping rate of 2 gpm" for the extraction system, it is not expected that this low rate would even product a gradient deviation on the site. The contractor must justify this recommendation and present the calculations to validate this claim. The inadequate pumping rate will not effectively and efficiently remediate the contaminant plume(s). The excessive low pumping rate will only remediate limited contaminant mass and allow most of the plume(s) to continue to migrate. This is unacceptable.

Section 3.4, Site 26, Development and Screening of Alternatives, subsection 3.4.2.6, Alternative 6 - Engineered Bioremediation (Source Removal, Engineered Bioremediation, Institutional Controls, and Long Term Monitoring, page 3-66:

The contractor proposes in this section to optimize placement of nutrient, methane, and oxygen to facilitate "engineered bioremediation". The contractor has not conducted any microbe studies to verify that population amount and correct species of "bugs" is even present at this site. The contractor has also not presented any indication that they comprehend the requirements to implement a proper bioremediation study and the extensive monitoring required to validate the operation.

#### **SECTION 4.0 DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES:**

The contractor should make the changes to the appropriate subsection of this section of the document to reflect the recommendations and comments provide in this memorandum.

The implementation of the proposed Site 26 remedial alternatives will require additional pre-design investigation and treatability/pilot studies. In addition, the scope of the proposed Site 26 RAS requires validation of several assumptions upon which the RAS are generated, such as the





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integrity and presence of the "clay layer" and the ground water velocity and transmissivity must be generated via a aquifer pumping test.

2. Subsection 4.4.5, Site 26 - Alternative 5: Air Sparging with Soil Vapor Extraction (Source Removal, Institutional Controls, and Long-Term Monitoring), page 4-77:

This section of the document must be revised to incorporate ground water remediation into the alternative. It is unacceptable to simply air sparge and vapor extract without a ground water pump and treatment system maintaining the hydraulic containment of the plume. A sparge/SVE system on its own will not prevent migration of contamination and thus not be protective of human health and the environment.

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File (4).