



STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION



BUREAU OF WATER MANAGEMENT
PERMITTING, ENFORCEMENT & REMEDIATION DIVISION
FEDERAL REMEDIATION PROGRAM

September 7, 1999

Mr. Mark Evans
U.S. Department of the Navy
Northern Division, Naval Facilities Engineering Command, Code 1823
10 Industrial Way, Mail Stop 82
Lester, PA 19113-2090

Re: *Draft Work Plan and Sampling and Analysis Plan, Basewide Groundwater Operable Unit Remedial Investigation, Naval Submarine Base- New London, Groton, Connecticut*

Dear Mr. Evans:

The Department has received and reviewed the *Draft Work Plan and Sampling and Analysis Plan, Basewide Groundwater Operable Unit Remedial Investigation, Naval Submarine Base- New London, Groton, Connecticut*. The *Work Plan* was submitted to the Department by Tetra-Tech NUS, Inc. On behalf of the Navy and was received by the Department on July 1, 1999. This document was reviewed for general technical merit and conformance to State statutes and regulations, with particular emphasis on the Remediation Standard Regulations. This document was also reviewed for conformance with my comments in a letter to you dated February 19, 1999 and a follow up letter from me to you dated March 26, 1999. The February 19 and March 26 letters transmitted the State's comments regarding the *Draft Existing Data Summary Report*.

All references in this letter to CGS mean the Connecticut General Statutes, 1999 revision, while all references to RCSA mean the Regulations of Connecticut State Agencies.

General Comments

The *Work Plan and Sampling and Analysis Plan* appears to meet the objectives stated on pages 1-2 and 1-3. The sampling and analysis program, if carried out according to the plan, should provide sufficient information to evaluate remedial alternatives during the feasibility study.

The *Work Plan* should consider all of the ground water criteria in the Remediation Standard Regulations. The ground water criteria applicable at the Naval Submarine Base, which has a ground water classification of GB, include the volatilization criteria and the surface water protection criteria. In several cases the text discusses the applicability of only one of these criteria, and not the other.

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The Navy proposes to use the ground water protection criteria, along with other criteria, in selecting Contaminants of Concern. The ground water protection criteria do not have regulatory significance in a GB area. However, it is appropriate to use them in selecting contaminants of concern since this is a conservative approach. Please note that the Navy is only obligated to evaluate and remediate substances which are part of a release.

The text states in several places that Connecticut's acceptable carcinogenic risk level is 1E-5. Please note that the 1E-5 risk level applies to the cumulative risk posed by multiple polluting substances. The acceptable excess carcinogenic risk for individual polluting substances is 1E-6.

Specific Comments

Page 1-3 Section 1.2 Description of Site Conditions

The Basewide Groundwater Operable Unit specifically excludes the Lower Base as well as the DRMO. The Navy has previously stated in its March 10, 1999 letter that groundwater in the Lower Base will be considered during the Lower Base Feasibility Study. As stated in my March 26 letter, this approach is acceptable. However, the State wishes to reiterate its concern that ground water throughout the **entire** base must be considered as a whole. Considering the ground water in the Lower base separately from that in upland portions of the base can result in a fragmented and incomplete investigation. Contaminant plumes originating in upland portions of the base may extend downgradient to the Lower base. The results of the Basewide Groundwater investigation must be considered in scoping the Lower Base Feasibility Study to ensure that no data gaps occur.

Page 1-12 Section 1.3 Site Descriptions

It would be helpful to the reader if site numbers were included in the headers for each subsection.

Page 1-21 Area A Weapons Center

The text states that this site consists of building 524 and the weapons storage bunkers. However, Plate 1 and Figure 1-9 show building 524 as being outside the boundaries of Site 20. It should be noted that the Feasibility Study recently submitted for Site 20 by the Navy also shows building 524 as being outside the site boundaries. Please clarify whether building 524 is included or excluded as part of site 20.

Page 1-25 Section 1.3.3.2 Spent Acid Storage and Disposal Area

This section should briefly discuss the State's soil sampling effort at the Spent Acid Storage and Disposal Area.

Page 1-30 Section 1.4.1.2 Natural Attenuation

Please include carbon dioxide in the list of analytical parameters. It is a daughter product of the oxidative breakdown pathway. Elevations greater than twice background may be considered evidence that attenuation is occurring through oxidation. Please include hydrogen on the list of analytical parameters. Concentrations greater than 1 nM indicate that a reductive pathway may be possible and vinyl chloride may accumulate, while vinyl chloride may be oxidized at concentrations less than 1 nM.

Page 1-32 Section 1.4.1.3.1 Developing Background Groundwater Concentrations

The Navy proposes to develop site specific background concentrations for inorganics, and will conduct statistical analysis to determine if basewide background concentrations can be developed. The methodology proposed by the Navy appears to be sound. Please refer to the definition of "background concentration for groundwater" given in section 22a-133k-1(a)(5). with respect to a particular release, this term means the concentration of a substance in ground water (A) at the nearest location upgradient of and unaffected by the release; or (B) if such release occurred at or created a ground-water divide, at the nearest location representative of ground water quality unaffected by any release.

Page 1-38 Section 1.4.2.1.2 Site 3- Area A Downstream Watercourses and OBDA

The first paragraph states that because ground water protection criteria are not available for an area with a ground water classification of GB, the GA/GAA ground water protection criteria are "used to protect existing groundwater" within the context of the Area A Landfill ground water monitoring program. As the Navy notes, this ground water monitoring program was previously approved by the State. Please note, however, that the Navy must comply with the volatilization and surface water protection criteria. The Navy is not required to comply with the ground water protection criteria. However, the ground water protection criteria provide an appropriately conservative bench mark for the ground water monitoring program.

The second paragraph states that carcinogenic risks were within the Department's target range of 1E-5. Please note that the Department's target carcinogenic risk range for individual pollutants is 1E-6. The 1E-5 target risk applies to the collective risk posed by multiple pollutants.

The third paragraph states that samples will be analyzed for "quick- turn VOCs". Will this be performed by a fixed base laboratory or using field methods?

Page 1-39 Section 1.4.2.1.3 Site 7- Torpedo Shops

Analytical results for ground water should also be compared to the volatilization criteria.

Page 1-40 Section 1.4.2.1.4 Site 14- OBDANE

In the first paragraph, analytical results for ground water should also be compared to the volatilization and surface water protection criteria.

The second paragraph states that carcinogenic risks were within the Department's target range of 1E-5. Please note that the Department's target carcinogenic risk range for individual pollutants is 1E-6. The 1E-5 target risk applies to the collective risk posed by multiple pollutants.

Page 1-41 Section 1.4.2.1.5 Site 20- Area A Weapons Center

In the first paragraph, analytical results for ground water should also be compared to the volatilization criteria.

The second paragraph states that carcinogenic risks exceeded the Department's target range of 1E-5. Please note that the Department's target carcinogenic risk range for individual pollutants is 1E-6. The 1E-5 target risk applies to the collective risk posed by multiple pollutants.

Page 1-42 Section 1.4.2.3.1 Site 8- Goss Cove Landfill

In the first paragraph, analytical results for ground water should also be compared to the volatilization and surface water protection criteria.

The second paragraph states that carcinogenic risks exceeded the Department's target range of 1E-5. Please note that the Department's target carcinogenic risk range for individual pollutants is 1E-6. The 1E-5 target risk applies to the collective risk posed by multiple pollutants.

Page 1-42 Section 1.4.2.3.2 Site 15- Spent Acid Storage and Disposal Area

In the first paragraph, analytical results for ground water should also be compared to the volatilization criteria.

The second paragraph states that carcinogenic risks exceeded the Department's target range of 1E-5. Please note that the Department's target carcinogenic risk range for individual pollutants is 1E-6. The 1E-5 target risk applies to the collective risk posed by multiple pollutants.

Page 1-43 Section 1.4.2.3.4 Site 23- Fuel Farm

In the first paragraph, analytical results for ground water should also be compared to the volatilization criteria.

Page 1-44 Section 1.4.2.4 Background

Please refer to the definition of "background concentration for ground water" given in the Remediation Standard Regulations: "The concentration of a substance in ground water (A) at the nearest location upgradient of and unaffected by the release; or (B) if such release occurred at or created a ground-water divide, at the nearest location representative of ground water quality unaffected by any release."

Page 1-48 Section 1.5.2.1.1 Selection of Chemicals of Concern

The third paragraph states that for the purpose of COC selection, soil samples collected from depths greater than 10 feet will not be used. This appears to be a reasonable approach. However, please note that the direct exposure criteria apply to all soil above a depth of 15 feet. Soils at a depth greater than 4 feet or soils more than two feet below a paved surface comprised of a minimum of three inches of bituminous concrete or concrete are considered "inaccessible soil". The direct exposure criteria do not apply to inaccessible soil provided that an environmental land use restriction is in effect. The environmental land use restriction must ensure that the soil will not be exposed as a result of excavation, demolition, or other activities and that any pavement which is necessary to render the soil inaccessible is maintained in good condition.

The fourth paragraph, which continues onto page 1-49, states that "when necessary, other health based criteria (e.g. Connecticut pollutant mobility criteria) will be used to identify additional COCs based on likely contaminant migration pathways". The various criteria of the Remediation Standard regulations, including the direct exposure, pollutant mobility, ground water protection, surface water protection, and volatilization criteria should be used in all cases for selecting COCs.

Page 1-50 Section 1.5.2.1.1 Selection of Chemicals of Concern

Connecticut Direct Exposure Criteria

The text notes that standards for carcinogens are based on a 1E-6 excess incremental lifetime cancer risk. This is true for individual chemicals. However, it should be noted that a 1E-5 excess incremental lifetime cancer risk also applies to the collective risk posed by groups of contaminants.

This comments applies also to the discussion on the next page regarding the volatilization criteria.

Page 1-51 Section 1.5.2.1.1 Selection of Chemicals of Concern

Connecticut Soil Vapor Volatilization Criteria

The text should distinguish clearly between the volatilization criteria which apply to ground water

(Appendix E of the RSRs) and the volatilization criteria which apply to soil vapor (Appendix F of the RSRs). The soil vapor criteria listed in Appendix F apply only if the groundwater volatilization criteria listed in Appendix E are exceeded.

Page 1-51 Section 1.5.2.1.1 Background

Please consult the Remediation Standard Regulation definition of “background concentration for soil”.

Page 1-52 Section 1.5.2.1.1 Selection of Chemicals of Concern

USEPA Region III COC Screening Levels for Tap Water Ingestion

Please ensure that the most recent version of the Region III RBC table is used. This table is updated every 6 months.

Page 1-53 Section 1.5.2.1.1 Selection of Chemicals of Concern

Federal and State Maximum Contaminant Levels

The second sentence states that “state MCLs have been promulgated under guidance for Connecticut Agencies. Please note that the Public Health Code is part of the Regulations of Connecticut State Agencies. It is not guidance, but is a regulation.

Page 1-52 Section 1.5.2.1.1 Selection of Chemicals of Concern

Connecticut Surface Water Protection Criteria

This paragraph states that because the Thames River is a marine ecosystem, surface water protection criteria are not directly applicable for COC screening. However, the surface water protection criteria listed in Appendix D are applicable to both fresh water and marine water. The Navy has applied to the Department for approval of site specific surface water protection criteria. On June 17 the State notified the Navy that it does not accept as submitted the Navy’s application for approval of alternative surface water protection criteria for the Basewide Groundwater Operable Unit. The Navy must submit additional information in order for the State to continue its review. Discussions between the Department and the Navy’s consultant are ongoing.

Page 1-54 Section 1.5.2.1.1 Selection of Chemicals of Concern

Connecticut Groundwater Volatilization Criteria

The text should distinguish clearly between the volatilization criteria which apply to ground water (Appendix E of the RSRs) and the volatilization criteria which apply to soil vapor (Appendix F of the RSRs). The soil vapor criteria listed in Appendix F apply only if the groundwater volatilization criteria listed in Appendix E are exceeded.

Background

The Navy should consider the RSR definition of "background concentration for groundwater".

Surface Water

Please specify the criteria to which analytical data for surface water will be compared. The Numerical Water Quality Criteria listed in Appendix D of the State's Water Quality Regulations should be included in the comparison.

Page 1-61 Section 1.5.2.2.2 Non Carcinogenic Effects

The third paragraph states that if no CSF is available, then carcinogenic risks will not be quantified. If no CSF or RfD values are available for a given pollutant, risk should still be quantified by selecting an appropriate surrogate chemical to represent the toxicological properties of the pollutant.

Page 1-63 Section 1.5.2.3.2 Conceptual Site Model

The Area A Weapons Center (Site 20) should be included in the list of sites with potential subsurface sources of contamination.

Figure 1-16 Conceptual Site Model- Surface Sources

The figure should consider inhalation by building residents of volatile organic compounds which volatilize from ground water and enter the building. This comment applies also to Figure 1-17.

Page 2-3 Section 2.3.1.2 Site 3- Area A Downstream Watercourses and OBDA

The Navy proposes to use a peristaltic pump to sample the ground water for VOCs via direct push holes. This is appropriate for the intended purpose of determining the source and extent of the VOC plume, and for optimizing the location of permanent monitoring wells. It is the Department's experience that some loss of volatile organics will occur when peristaltic pumps are used for sample collection. Any data generated should be appropriately qualified. Such data should not be used for the purpose of determining compliance with the Remediation Standard Regulations. Standard EPA low flow sampling techniques should be used to collect any samples which will be used to determine compliance with the Remediation Standard Regulations. This comment applies also to the discussion

on page 2-5 regarding the Torpedo Shops, on page 2-8 regarding the Hospital Incinerator, on page 2-8 regarding the Goss Cove Landfill, and on page 2-11 regarding the background wells.

Page 2-6 Section 2.3.1.4 Site 14- OBDANE

The Navy proposes to use a peristaltic pump to collect a ground water sample from existing monitoring well 14MW1S. Due to the potential loss of volatiles during sample collection with a peristaltic pump, a submersible pump should be used instead to collect ground water samples. EPA low flow sampling techniques should be followed. Ground water samples with a turbidity exceeding 5 NTU will not be considered representative and will not be accepted as valid by the Department. This may require that some existing monitoring wells be redeveloped by alternately surging using a properly designed surge block and pumping or bailing. This comment applies also to the discussion on page 2-7 regarding the Area A Weapons Center.

Page 2-8 Section 2.2.3.2 Site 15- Spent Acid Storage and Disposal Area

The Navy proposes to sample four existing monitoring wells. However, none of the four wells are located downgradient of the former acid storage tank. If the Navy intends to determine whether any ground water contamination has emanated from the former tank, it will be necessary to install and sample a well or wells located in the downgradient direction from the tank. Please specify what technique will be used for collection of ground water samples.

Page 2-9 Section 2.3.3.3 Site 18- Solvent Storage Area (Building 33)

The report states that temporary monitoring wells will be installed. Please specify whether these will be installed by direct push or conventional rotary techniques. Please specify also what technique will be used for collection of ground water samples.

Page 2-10 Section 2.3.3.4 Site 23- Fuel Farm

The Navy plans to install and sample two additional monitoring wells as well as sample existing monitoring wells. Please specify what technique will be used for collection of ground water samples.

Page 2-13 Section 2.4.1.1 Temporary Groundwater Monitoring Wells

The Navy proposes to use well screen with a slot size of 0.010 inches, with a filter pack consisting of No. 20 to No. 40 US Standard Sieve sand, if it is possible to install a sand pack. It is the State's experience that this combination of filter pack and screen may not be appropriate for use in formations with a significant proportion of fine grained material. Please ensure that the size of the filter pack, and the slot size of the well screen are specifically selected according to site conditions

to ensure that the samples are not excessively turbid. If silt is present, an appropriate choice would be a filter pack consisting of Morie Size 00 sand with a well screen with a slot size of 0.006 inches. Ground water samples with a turbidity exceeding 5 NTU will not be considered representative and will not be accepted as valid by the Department.

The Navy proposes to develop the wells by alternately surging and bailing. This method is acceptable to the State.

Page 2-14 Section 2.4.2 Hollow Stem Augering and Permanent Monitoring Well Drilling and Installation

The Navy proposes to use well screen with a slot size of 0.010 inches, with a filter pack consisting of No. 20 to No. 30 US Standard Sieve sand. It is the State's experience that this combination of filter pack and screen may not be appropriate for use in formations with a significant proportion of fine grained material. Please ensure that the size of the filter pack, and the slot size of the well screen are specifically selected according to site conditions to ensure that the samples are not excessively turbid. If silt is present, an appropriate choice would be a filter pack consisting of Morie Size 00 sand with a well screen with a slot size of 0.005 or 0.006 inches. Ground water samples with a turbidity exceeding 5 NTU will not be considered representative and will not be accepted as valid by the Department. The Navy proposes to install a secondary filter pack consisting of finer grained sand between the screened interval and the bentonite- cement grout. The State is pleased that the Navy proposes to do so. This should prevent grout from penetrating into the primary filter pack. Please note that monitoring wells must be installed by a licensed well driller.

Page 2-16 Section 2.4.4 Permanent Monitoring Well Development

The Navy proposes to develop monitoring wells by repeatedly pumping the wells, creating drawdown, and allowing the wells to recharge. The wells should also be surged using a properly designed surge block. Wells should be developed until they yield water with a turbidity not greater than 5 NTU.

Page 2-18 Section 2.5.2 Monitoring well Purging and Groundwater Sampling

The Navy proposes to purge and sample the wells using low flow sampling techniques and a peristaltic pump. The Navy should use a submersible pump rather than a peristaltic pump for sampling and purging.

Page 2-19 Section 2.5.2 Monitoring well Purging and Groundwater Sampling

The fourth paragraph states that "groundwater samples collected for dissolved metals will be **dissolved** in the field prior to preservation with nitric acid". I believe the Navy meant to use the

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word "filtered" in place of the bold faced "dissolved". The Navy should collect and analyze unfiltered samples. If proper well development and low flow sampling techniques are used, it should be possible to collect unfiltered samples with a turbidity less than 5 NTU.

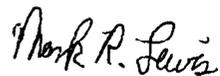
Figure 2-1

Arrows depicting the direction of ground water flow would assist the reader in evaluating the appropriateness of monitoring well locations.

What is the significance of the asterisks next to the monitoring wells in this figure?

If you have any questions regarding this letter, please contact me at (860) 424-3768.

Sincerely,



Mark R. Lewis
Senior Environmental Analyst
Federal Remediation Program
Permitting, Enforcement & Remediation Division
Bureau of Water Management

cc: Kymberlee Keckler, US EPA New England, Federal Facilities Section
Darlene Ward, NSBNL Environmental Department
Corey Rich, TtNUS Environmental