STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

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June 23, 1995

Mr. Mark Evans
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Northern Division, Naval Facilities Engineering Command, Code 1823
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Lester, PA 19113-2090

Re: State Comments Regarding Phase II Remedial Investigation Report for Naval Submarine Base New London, Groton, Connecticut

Dear Mr. Evans:

Staff of the Permitting, Enforcement, and Remediation Division of the Bureau of Water Management have reviewed the Phase II Remedial Investigation Report for Naval Submarine Base New London, Groton, Connecticut. This document was submitted for our review by the U.S. Department of the Navy, Northern Division, Naval Engineering Facilities Command (North Div). It was received by the Department on March 1, 1995. Our comments regarding this document are listed below. I apologize for the late submittal of these comments.

General Comments

State Water Quality Standards and Cleanup Regulations

The Phase 2 RI report recommends No Further Action at several sites where contaminants were detected at concentrations in excess of ARAR or TBC values and/or where risk assessment showed that contaminants posed risks outside the acceptable range. These sites include the CBU Drum Storage Area, The Area A Wetlands, the Area A Weapons Center, the Torpedo Snops, and the Spent Acid Storage and Disposal Area (SASDA). Due to the potential risks posed by these sites, the State cannot support the recommendation of No Further Action at these sites.

The ground water classification for all of these sites except the SASDA is GA, while the ground water classification for the SASDA is GB/GA. A classification of GA means the State considers the site to be a potential source of water for private wells. It is the State's goal to maintain the natural quality of these ground waters. A rating of GB/GA means that while the State recognizes that the ground water may not currently meet GA standards, the State's goal is to restore it to GA quality. Any ground water contamination within GA areas must be remediated to a quality

suitable for human consumption without treatment. Contaminated soils must be remediated so that they no longer are a source of pollution to the waters of the State. The proposed Cleanup Standard Regulations identify specific concentrations for pollutants in ground water that the State considers suitable for drinking without treatment. The proposed regulations also identify concentrations for pollutants in soil below which the State considers the soils to no longer be a source of pollution to the waters of the State.

In addition, the State's Water Quality Standards currently apply. The Water Quality Standards were adopted as required by Section 22a-426 of the Connecticut General Statutes. Under Section 5 of the Standards, the State's goal is to maintain drinking water quality in GAA areas and GA areas, and to restore the ground water to drinking water quality standards in GB/GA areas. The standards also specify that chemical constituents in ground water in these areas must comply with the standards of the Public Health Code (Regulations of Connecticut State Agencies §19-13-B102), with advisories of the Department of Public Health and Addiction Services, and with Secondary Standards of the Safe Drinking Water Act. In addition, the Water Quality Standard for Oils and Grease is "None other than of natural origin." These requirements constitute Chemical Specific ARARs (Applicable or Relevant and Appropriate Requirements).

Hydrogeologic Investigations

The State is concerned that the hydrogeologic investigations documented in this report are generally inadequate to establish whether offsite wells and ecological receptors may be impacted by contamination originating from the base, and do not provide data of sufficient quantity or quality to support Remedial Design studies. This is of concern to the State because of the presence of numerous private wells near the base, particularly to the north and northeast along Route 12.

Numerous discrepancies were noted between water levels plotted on the potentiometric surface maps, and the water level data in Table 4-5. In some cases these discrepancies were significant enough that the actual direction of ground water flow appears to be different from that depicted on the map.

The report does not adequately consider the individual hydrogeologic characteristics of the various stratigraphic units, and in particular, differences between the bedrock and overburden aquifers. Numerous monitoring wells are screened in both bedrock and overburden. In addition, some wells listed in the text as bedrock wells are actually screened either partially or wholly in overburden. Several wells designated as overburden wells in the text actually are screened wholly or partially in bedrock. Table 2-1 lists the stratigraphic unit or units in which each well is screened, and lists the depth to bedrock and screened interval. In several cases the bedrock or overburden designations disagree with the numerical depth information. In numerous cases, the

designation of a well in this table as an overburden or bedrock well disagrees with the text discussions on the individual sites, with the well logs in Appendix A, or with both. Several well logs are omitted from the wells, so it is not possible to determine whether these wells are accurately designated.

The potentiometric surface maps do not appear to distinguish wells screened in the overburden from those screened in bedrock. At our meeting on June 1, 1995, Halliburton NUS stated that the maps were based on wells screened in the overburden. However, in several places, the maps show contours which extend into areas which are shown on the maps as bedrock outcrops. It is likely that ground water is present in bedrock at these locations. However, it is likely the potentiometric contours will be deflected to some degree in these locations due to vertical hydraulic gradients between the bedrock and overburden. Separate maps should be drawn for the overburden and bedrock units.

The individual potentiometric surface maps for each site were derived from the larger site wide map (Drawing 4) using cut and paste techniques. The weaknesses of the site wide map are shared by, and in some cases are particularly apparent on the individual site maps. These weaknesses include a contour interval which varies but is generally too large to provide sufficient detail. While it may be appropriate to use a wide contour interval on the site wide map, the individual site maps should use a smaller contour interval which will allow sufficient detail to be distinguished. While different contour intervals may be appropriate on different maps, a constant contour interval must be used on any given map. In general, a contour interval of between 1 and 5 feet would appear to be appropriate for the individual site maps, depending on the degree of potentiometric "relief" on a given map.

Some contours are drawn in areas of the maps where no monitoring wells are present, and thus no water level data is available. The text states that these contours are inferred based upon information regarding depth to bedrock ans site topography. While some of these "inferred" contours are shown on Drawing 4 using dotted lines, others are shown using solid lines. In other cases, contours which are dotted on the base wide map are shown on the corresponding site specific map as solid lines. This implies a level of certainty for these contours which does not in fact, exist. All contours shown on the potentiometric surface maps must be based on accurately measured water level measurements using accepted contouring techniques. Contours should not be shown outside the area covered by the monitoring well network.

Manganese Concentrations

Manganese was detected in unfiltered ground water samples at concentrations as high as 9.36 mg/L (Area A Wetlands). This is dismissed as being due to naturally occurring conditions, and/or to the presence of dredge spoils at several sites, particularly the various Area A sites. On

this basis, No Further Action is recommended at several sites. However, non-carcinogenic health risks at several of these sites exceed acceptable limits, due largely to high manganese concentrations. The State feels that any site which presents risks which exceed the range requires further action, regardless of whether the source of the risk is anthropogenic or naturally occurring. It is the experience of the Department that manganese concentrations in ground water in Connecticut generally do not exceed 1 mg/L. Concentrations significantly in excess of this value generally indicate that naturally occurring manganese is being mobilized due to a landfill leachate plume, agricultural waste runoff, or other source of reducing conditions. The current Connecticut Department of Public Health and Addiction Services Action Level for manganese is 5 mg/L. This is expected to be revised soon to 0.5 mg/L.

Background Metals Concentrations

In several chapters, metals concentrations detected in soils are compared to background concentrations as determined by the Navy in a report dated July 1994. In some cases the text states that metals concentrations detected are not of concern because they are within the range of background concentrations or do not exceed background concentrations. The State, the Navy, and EPA have not yet reached final agreement regarding specific background concentrations for various metals, and how those background concentrations will be used. For this reason, comparisons should not be drawn to background concentrations unless a disclaimer is included noting that final agreement has not yet been reached.

Report Format

The data tables and figures should be revised to present a more clear and concise picture of the extent of contamination at various sites. In addition, all laboratory data should be included in Appendix C. Numerous samples are omitted from this Appendix. In addition, for many samples, the appendix contains only summary tables, which in some cases omit important information such as the analytical technique used, or the identity of the laboratory which performed the analysis.

The report should make more extensive use of figures to depict the areas affected by various contaminants. These and any accompanying tables should be designed so the reader does not have to wade through the appendices to form an overall impression of the extent of contamination. The present report requires the reader to refer to several different tables and the appendix to determine what analyses were performed on a given sample, and what was detected. It would be useful in any table of analytical data to include a column listing the relevant regulatory criteria, and to use shading or bold type to designate results which exceed these criteria. The present report shows regulatory criteria only for a few samples which were analyzed for TCLP metals.

Specific Comments

Executive Summary

Page ES-4, Section E.2.3

This section should discuss the possibility that a road may be constructed on the Area A landfill. The final RI should also note that leachate collection will be carried out as part of the source control remedy for the landfill. In the third line of this section, the word "encapsulation" should be replaced with "capping". MARK

Chapter 1- Introduction

Page 1-20 Section 1.2.3.9 Background Soils Investigation

This section states that Atlantic Environmental's July 1994 report discussed statistical analysis procedures used to evaluate the background concentration of various contaminants in soil. This report was, in fact, a compilation of analytical data, with no discussion of sample collection methods, or of the statistical methods used to arrive at background concentrations. The Department has recently received an updated version of this report, which contains a more extensive discussion of these topics. This revised report has not yet been reviewed by the Department. MARK

The text states that the background data were used in the Phase II RI. Background concentrations are to be selected by mutual agreement between the Navy, US EPA, and the Department. Since agreement has not yet been reached, it is not appropriate to use them in the Phase II RI unless a suitable disclaimer is included.

Page 1-24 Section 1.2.4.7- D.R.M.O.

The word "capping" should be used in place of "encapsulation" in the sixth line.

Chapter 3- General Data Evaluation Procedures

Page 3-18 Section 3.2.2.6

The text states that under aerobic conditions, DDT may be transformed to DDE, while under anaerobic conditions it may be transformed to DDE. According to the ATSDR May 1994 Toxicological Profile for 4,4'-DDT, 4,4' DDD, and 4,4' DDD (page 89), DDT biotransforms to DDD under anaerobic conditions. Please clarify this statement.

Page 3-21 Section 3.2.3.1 Volatile Organics ¶ 2

The word "surface" should be eliminated from the last sentence.

Page 3-21 Section 3.2.3.4 Inorganics

The text states that particles larger than 0.45 microns are not removed from water by filtration prior to analysis. Please clarify this statement.

Page 3-23 Section 3.3 Risk Assessment Procedures ¶ 2

The term "COCs" should be defined here where it is first used, rather than in the last paragraph on this page.

Page 3-26 Table 3-3 Background Soils Data

This table presents background concentrations for various metals in soil. It is based on data contained in Atlantic's July 1994 report on background soils concentrations. Although the Navy, EPA, and DEP have met to discuss this report, we have not reached final agreement regarding specific background concentrations, or the appropriate use of those concentrations. Until we reach agreement on this subject, it is not appropriate to draw conclusions based on comparison between proposed background concentrations listed in this table, and specific concentrations detected at a particular site unless a suitable disclaimer statement is included.

Page 3-55 Figure 3-1 Conceptual Site Model

The flow chart does not include direct contact with surface water as a route of exposure for adult recreational users. Since the Thames River is used for water skiing, boating and other recreational activities, this route should be included in the flow chart and in risk assessment calculations. The direct dermal contact , ingestion, and fish ingestion scenarios should each be included. In Section 17, the risk assessment calculations for an adult recreational user of the Thames are discussed.

Pages 3-58 and 3-59 Section 3.3.3.3 Potential Routes of Exposure

The text states that based on measured water levels and water levels inferred from bedrock topography, no private wells are located down gradient of any source areas. In addition, the text notes that the base is served by a public water supply system. Based on these factors, routine exposure to ground water in a residential setting is eliminated from consideration in the risk assessment calculations. It is inappropriate to eliminate exposure to ground water in a residential

setting from the risk assessment calculations for two reasons. First, given the significant limitations of the piezometric surface maps as discussed above under General Comments, it is not possible to state with certainty based on available information that no wells are located down gradient of potential contaminant sources. Second, the ground water classification for much of the base is GA. This means the State considers it a potential source of drinking water, regardless of whether any wells currently exist in the area.

Page 3-61 Table 3-10 Summary of Receptors by Site

Construction workers should be evaluated as potential receptors at the Area A landfill, since a proposal to construct a road on top of the landfill has been discussed. The Navy has indicated that the road would be constructed after the cap is in place. However, if there is any possibility that the road would be constructed prior to capping, this possibility needs to be evaluated.

Page 3-71 Ingestion of Shellfish/Fin Fish

Despite the title of this section, ingestion of fin fish is not discussed.

Page 3-77 Section 3.3.5.2 Uncertainty in Exposure Assessment

This paragraph is awkwardly written and difficult to understand.

Chapter 4- General Physical Characteristics of the Subase

Page 4-10 Table 4-2 Summary of Manganese Concentrations- Groundwater

Manganese concentrations in this table are incorrectly expressed in mg/L.

Page 4-11 Section 4.6.1 Groundwater Quality and Designations

The text notes that although manganese concentrations across the base exceeded offsite concentrations, "no clear indication of an offsite source (or sources) could be found". The elevated concentrations of manganese are attributed to geologic conditions. This appears to contradict statements elsewhere in the report, where elevated concentrations are attributed to the presence at several sites of dredge spoils which originated in the Thames. It should be noted that naturally occurring manganese concentrations in ground water in Connecticut generally do not exceed 1 mg/l, except in some localized areas. Manganese concentrations significantly in excess of 1 mg/l are generally considered to be an indication that an organic leachate plume or another manmade source of contamination is present. The highly reducing conditions in such a plume can mobilize naturally occurring manganese and other metals. This effect would be enhanced by

the presence of manganese rich dredge spoils at numerous locations on the base. It should be noted that the highest manganese concentrations generally were found in the various Area A sites, many of which are potentially affected by leachate from the Area A landfill, and possibly by the dredge spoils underlying the Area A Landfill and Wetlands.

Page 4-11 Section 4.6.2 Aquifer Characteristics ¶2

Shallow overburden material is described here as both "very dense" and "stiff". These terms should not be used to describe the same soil. A soil may either be cohesionless or cohesive, but may not be both.

Page 4-15 Section 4.6.3.1 General Discussion of Groundwater Flow

The Potentiometric Surface Map (Drawing Number 4) discussed here is based on wells screened both in bedrock and overburden, and in some cases, on wells which are screened in both. A water level measurement from one off site residential well (OSW12) is included in the data used to generate the map, although according to Table 2-2 it is unknown what type of material this well is screened in. This is justified based on the fact that "in most cases, the ground water elevations at well clusters are similar in the bedrock and overburden". However, vertical head differences "greater than several feet" were noted in several bedrock/overburden well clusters. This approach is inappropriate, as it ignores the existence of vertical gradients. Separate piezometric surface maps should be drawn for the overburden and bedrock aquifers.

The contour interval on this map varies between 1 and 50 feet, but is generally 10 feet. This wide and variable contour interval may obscure many locally important variations in the piezometric surface. In addition in some areas of the map, such as northwest of the Torpedo Shops, solid lines are used to depict the water table although no wells are present in the area. It is in appropriate to use solid lines to depict a piezometric contour unless those contours are based on measured data.

Dashed contours were used in areas where no data was available and water table elevations were inferred based on topography and bedrock surface elevations. These contours should be omitted from the map since they provide no useful information.

Comparison between the water levels listed in Table 4-5 and those plotted on Drawing 4 shows several large discrepancies. In some cases, these may cause actual ground water flow directions to differ significantly from those shown on the map.

The weaknesses of this map are particularly apparent when the individual piezometric surface maps for each separate site are examined. These individual maps were derived from the larger site wide map using a "cut and paste" approach. In many cases contours on the individual maps

are apparently derived from wells located outside the boundaries of the map. In many cases this makes it impossible to determine what wells were used to derive the contours. Separate water table maps should be drawn for each individual site discussed in the text. Data from wells at adjacent sites can be used a map for a particular site, where warranted. However, each site must be considered on an individual basis.

Page 4-46 Section 4.8 Ecology ¶ 2

The term "fowl" typically refers to chickens and related birds, not all types of birds as is apparently meant here.

Chapter 5- CBDU Drum Storage Area- Site 1

Page 5-7 Section 5.3.4 Geology

The text notes that wood fragments, bullets, and plastic were encountered at boring 1TB1, while gravel, brick, plastic, and aluminum foil were noted in 1TB2 and 1TB3. On Figure 5-2, 1TB1 and 1TB2 are shown outside the boundary of the Area A Landfill. This suggests that these borings may actually be located within landfill material. This suggests that the landfill boundary depicted on Figure 5-2 requires reinterpretation. MARK

Page 5-8 Figure 5-3

The contour interval on this map is too large to allow any useful conclusions to be drawn from this map.

Page 5-16 Section 5.4.1 Nature and Extent of Contamination- Soil ¶ 1

The correct State Pollutant Mobility Criteria for lead is 15 µg/l.

Pages 5-17 & 5-18 Tables 5-4 & 5-5

Lead is not listed as an analyte in either of the rounds of ground water sampling. Lead is also not shown in the corresponding data tables in Appendix D-1. Since lead exceeded the State's Pollutant Mobility Criteria in at least one soil sample, it should have been included in the ground water sampling program. If lead was sampled for but was not detected in any samples, this fact should be indicated in the Appendix, and preferably also in the appropriate tables within the main body of the report.

Page 5-25 Section 5.7.3 Recommendations

The Navy recommends no further action at this site. The Department disagrees with this recommendation, and requests that further evaluation of this site be performed. This position is based on two facts. First, possible landfill materials were detected in soil borings within the CBU Drum Storage Area. Second, several metals and contaminants, including lead, carbazole, and manganese exceed Federal or State Regulatory Criteria. The Department agrees with EPA's position on this matter as stated on page 13 of Kymberlee Keckler's comment letter of April 7, 1995.

Chapter 6- Area A Landfill- Site 2

Page 6-21 Figure 6-4

This piezometric surface map is derived from the site wide map. The 160 foot contour is shown on this map as a solid line, but on the site wide map the same contour is shown as a dotted line. In addition, the 120 foot contour is shown as a solid line on both maps. However, in the vicinity of Route 12, both of these contours are located outside the area covered by the monitoring well network. Since both of these contours appear to be unsupported by data, they should be eliminated from both maps.

Page 6-45 Section 6.7.3 Recommendations

The word "capping" should be substituted for "encapsulation". Encapsulation implies that the landfill would be both capped and lined. This is not the case.

The report recommends monitoring of a limited number of monitoring wells. The Department feels that a comprehensive ground water monitoring program must be carried out at the Area A Landfill Site in conjunction with the Navy's plans to cap the landfill and install a leachate collection system. This will allow the effectiveness of the capping/ leachate collection source control remedy to be evaluated. The ground water monitoring program must include, but not be limited to a more complete assessment of the nature and extent of any bedrock contamination and a thorough assessment of whether any off site residential wells may be affected by contamination originating at the Area A landfill.

Chapter 7- Area A Wetlands- Site 2

Page 7-43 Section 7.7.2 Baseline Risk Assessment ¶ 3

The report notes that manganese is a naturally occurring chemical, and that concentrations

detected at the Area A Landfill are similar to those detected in Thames River sediments. While manganese is a naturally occurring chemical, it can be mobilized by the reducing conditions typically found in landfill plumes and other sources of organic contamination. Regardless of its origin, the risk presented by manganese must be evaluated, and if warranted, appropriate remedial measures must be taken.

Page 7-43 Section 7.7.3 Recommendations

The State cannot support the recommendation of No Further Action at the Area A Wetlands site. Risk assessment calculations showed that manganese posed an elevated non-carcinogenic risk to children. The report states that because children could be exposed to manganese at a number of other sites, "access controls or...any remedial efforts whatsoever, are considered of limited effectiveness". In addition, the report does nots state whether contaminants detected exceed Federal or State ARAR levels. As noted by Kymberlee Keckler in her letter of April 7, 1995, the ground water classification at this site is GA. This means the State's goal is to restore the water to drinking water quality. Where this is not possible, deed restrictions or other institutional controls must be implemented to prevent use of the ground water. Deed restrictions would not apply as long as the base remains under Federal ownership. However, they would be required if the United States transfers the base to another person or entity. The Department feels that the existing fence around the wetlands should also be maintained to prevent risks posed by direct contact with contaminated surface water and sediments. In addition, the Area A Wetlands should be included in the surface and ground water monitoring program which will be conducted as part of the Interim Remedy at the Area A Landfill.

Chapter 8- Area A Weapons Center- Study Area H

Page 8-1 Section 8-1 Site Description ¶2

The Weapons Center is listed as Building 424 in this paragraph, but is shown as Building 524 on the accompanying site plan (Figure 8-1) and other overall site maps.

Page 8-15 Figure 8-4 Potentiometric Surface Map

The 160 foot contour is drawn with a solid line on this map, although it is drawn with a dotted line on the site wide map (Drawing 4). In the vicinity of well 2WMW1D, the 120 foot contour shown on Figure 8-4 does not match the 120 foot contour shown on Drawing 4. Both of these contours are drawn to the east of Route 12, outside the area covered by the monitoring well network. A number of private wells are located to the east and northeast of the site along Route 12. For this reason, uncertainties regarding ground water flow directions must be resolved.

Page 8-17 Section 8.4.2 Groundwater

The text states that no metals exceeded drinking water standards in ground water samples. However, according to Table 8-4, manganese concentrations in filtered shallow ground water samples were found to range between 3070 µg/L and 5095 µg/L in the first round of Phase 2 sampling and 2820 µg/L and 6500 µg/L in the second round. The current Connecticut Department of Public Health and Addiction Services Action Level for manganese is 5000 µg/L. This is to be revised soon to 500 µg/L. The US EPA Secondary MCL for manganese is 50 µg/L. Lead was detected at a concentration of 16.8 µg/L in an unfiltered ground water sample. The USEPA Action Level for lead is 15 µg/L.

"Boron" should be substituted for "boring" in the last sentence of the first paragraph.

Page 8-37 Section 8.7.3 Recommendations

Manganese and other metals exceeded drinking water standards in several ground water samples at the Area A Weapons Center. In addition, risk assessments have shown an unacceptable level of non-carcinogenic risk to construction workers. In addition, the ground water classification of this site is GA. For this reason, the State cannot support the recommendation of No Further Action at the Area A Weapons Center. The State recommends that monitoring of surface and ground water be continued at this site. The State supports EPA's recommendation that measures be taken to prevent future contact with contaminated ground water.

Chapter 9- Area A Downstream Watercourses and Overbank Disposal Area- Site 3

Page 9-1 Section 9.1 Site Description

The Small Arms Range near the corner of Shark Boulevard and Triton Avenue is not mentioned in the site description or shown on Figure 9-1. Has this area been evaluated as a possible source of lead contamination?

Page 9-17 Table 9-2 Summary of Sampling and Analytical Program- Phase II RI

This table includes a column for dioxins, yet the table does not indicate that any of the samples from the Area A Downstream Watercourses were analyzed for dioxins. However Appendix D5 indicates that sediment sample 3SD6 was analyzed for dioxins. Although pesticides or herbicides may have been disposed of in the Area A Landfill, or used in other areas, only the Area A Downstream Watercourses site was sampled for dioxins. Please explain the rationale for sampling this area for dioxins while excluding other areas. In addition, Table 9-2 indicates that sediment sample 3SD6 was analyzed for radiological parameters, yet the radiological results for

this sample are not included in the corresponding laboratory data, which is presented in Table D5.

Page 9-22 Section 9.3.5 Hydrogeology

Table 2-1 indicates that 6 wells were screened in the overburden and 3 were installed in the bedrock at the Area A Downstream Watercourses/ OBDA site. However, no information is included regarding slug testing or other testing to determine hydraulic conductivity of the overburden and bedrock aquifers. This information should be included, with consideration given to different stratigraphic units which may exist within the overburden and bedrock aquifer.

Page 9-23 Figure 9-5 Potentiometric Surface Map

The contour interval of this map varies between 7 and 10 feet, but is generally 10 feet. Many locally important details of the potentiometric surface may be obscured by using such a wide contour interval. A constant and smaller contour interval should be used throughout the map.

Page 9-44 Section 9.4.4.4 Sediment- OBDA

As at other sites within Area A, the report attributes high levels of metals detected here, including manganese, arsenic, lead, cadmium and zinc to the presence of dredge spoils in this area. Although the dredge spoils may be the source of some or all of the metals detected, the mobility of these metals may be enhanced by the presence of landfill leachate. Based on the ground water flow directions shown in Figure 9-5, portions of the Area A Downstream Watercourses could potentially be affected by leachate from the Area A Landfill. During previous visits to this site, I observed orange yellow material suggestive of leachate in some of the watercourses in Area A.

Chapter 10- Rubble Fill Area at Bunker A86- Site 4

Page 10-8 Section 10.3.5 Section 9.4.4.4 Hydrogeology

The first paragraph of this section discusses the 5 monitoring wells at this site, states that 3 wells are screened in bedrock, and 2 are screened partially in overburden and mostly in bedrock. This information conflicts with information listed in Table 2-1, and with information listed in the drilling logs in Appendix A-6. According to the drilling logs, only 4MW1S is screened entirely within bedrock. This well is listed in Table 2-1 as a bedrock/ overburden well, and in the text as a bedrock well. According to the drilling logs the top of the screen of well 4MWS is even with the top of bedrock. However, the sand pack for this well projects 1.5 feet above the top of the bedrock. This means that this well is in effect a bedrock/ overburden well. This well is listed as a

bedrock well in the text, and as a bedrock/ overburden well in Table 2-1.

The table below summarizes the information from these sources regarding the geologic units in which the wells are completed.

	Information Source		
Well	Text- Page 10-8	Well Logs (Appendix A)	Table 2-1
4MW1S	Bedrock	Bedrock	Bedrock/ Overburden
4MW2S	Bedrock/ Overburden	Bedrock/ Overburden	Bedrock/ Overburden
4MW3S	Bedrock/ Overburden	Bedrock/ Overburden	Bedrock/ Overburden
4MW4S	Bedrock	Bedrock/ Overburden	Bedrock/ Overburden
4MW4D	Bedrock	Bedrock	Bedrock

The presence of several wells which are screened both in overburden and bedrock has several important implications. First, as noted by Kymberlee Keckler in her letter of April 7, 1995, (page xvii), slug testing of wells screened across the water table will result in hydraulic conductivity values which are a composite average of the overburden and bedrock, but do not distinguish the individual conductivities of either unit. Second, since there are no bedrock/ overburden well clusters at this location, it is not possible to determine whether any vertical hydraulic gradients are present between the overburden and bedrock. Third, since there are no wells screened solely in overburden at this location, there is no information regarding the potentiometric surface in the overburden.

Page 10-9 Figure 10-3 Potentiometric Surface Map

A smaller contour interval should be used for this map.

Chapter 11- Defense Reuitilization and Marketing Office- Site 6

Page 11-15 Figure 11-3 Potentiometric Surface Map

A consistent contour interval should be selected for this map. In addition, it is unclear which wells were used to derive this map, and thus whether this map depicts the potentiometric surface in the bedrock or overburden. Appendix A-7 does not include logs for wells 6MW1S, 6MW2S, 6MW3S, 6MW4S, or 6MW8S, so it is unclear which unit these wells are screened in.

Page 11-17 Section 11.3.5 Hydrogeology

The text states that an upward vertical gradient exists at well cluster 6MW2, "which indicates that the bedrock and overburden ground water are discharging to the Thames River." No well log is available in Appendix A-7 for the shallow well in this cluster, 6MW2S. However, according to the well log, the deep well, 6MW2D is screened in the overburden. Since there does not appear to be a bedrock well at this location, the direction of any vertical gradient between overburden and bedrock cannot be determined at this location.

Page 11-41 Section 11.7.1 Nature and Extent of Contamination

The text notes that relatively low levels of contamination are present in the ground water at the DRMO in comparison to the concentrations detected in soil. This may reflect dilution due to tidal flushing. This suggests that the Thames River may be impacted by this site, although sampling of surface water, sediment, and shellfish from the river have not detected any impact which can be attributed to the DRMO site. Additional work should be performed to evaluate the degree and effect of tidal flushing at the DRMO. This should an estimate of the net flux of contaminants to the river via ground water flow. This should be based on a conceptual model which considers the individual hydrogeologic properties of the different stratigraphic units, including landfill material, overburden, and bedrock.

Page 11-42 Section 11.7.3 Recommendations

The text states that capping of the DRMO serves to eliminate any further risks from direct contact with soil or from fugitive dust emissions. However, this remedy does not address ground water. The text recommends "continued ground water monitoring down gradient from the area of volatile organic contamination", together with maintenance of the cap. However, lead and PCBs remain in the landfill at significant concentrations. For this reason, continued monitoring should focus on metals and PCBs, as well as volatile organics.

Since the site is located immediately adjacent to the Thames River, it is likely that a significant

portion of the landfill waste is saturated, and is affected by tidal fluctuations. Tidal flushing may account for the relatively low ground water concentrations detected at this site. Although Section 4.6.5 discusses a base wide study of tidal fluctuations on ground water flow, this study did not include the DRMO area. Further information is required regarding the role of tidal fluctuations in contaminant fate and transport at the DRMO. In addition, only one well is known to be installed in bedrock at the DRMO. Existing data need to be evaluated more carefully to determine whether any additional bedrock wells exist at this site. Additional bedrock characterization, including installation of additional wells may be required.

Chapter 12- Torpedo Shops- Site 7

Page 12-1 Section 12.1 Site Description ¶3

The discharge location of the shallow sump previously used as a wash down/ blow down area for weapons should be determined. Depending on the location of the discharge point, additional sampling may be warranted. Also, more specific information needs to be provided regarding the composition of Otto fuel and "high octane alcohol". What specific type of alcohol is this? MARK

Page 12-3 Section 12.1 Site Description ¶2

The former waste Otto fuel tank at Building 450 was previously identified as being subject to RCRA closure requirements. Section 20 of the Federal Facilities Agreement specifically identifies substantive RCRA closure requirements as ARARs. To date, the Navy has not submitted documentation to the Department regarding closure of this tank. Additional sampling may be required to document "clean closure" of this tank. MARK

The location of the former underground waste Otto fuel tank, and of current and former above ground and underground storage tanks should be shown on Figure 12-2. The location of the former septic system for Building 450 should also be included.

Page 12-6 Section 12.3.1 Topography and Surface Features ¶2

Building 477 is discussed here, however its location is not identificd in the accompanying figures. Please revise the figures to include this building.

Page 12-13 Section 12.3.5 Hydrogeology ¶1

The text states that a downward vertical gradient exists at the 7MW5 well cluster. However, according to Table 2-1 and the well logs in Appendix A-8, well 7MW5S is screened partially in overburden and partially in bedrock. Therefore, although these wells appear to show a downward

gradient, no conclusion can be drawn regarding vertical gradients between overburden and bedrock at this location. In addition, the text states that only three wells, 7MW1D, 7MW2D, and 7MW5D were screened in bedrock. However Table 2-1 and the logs in Appendix A-8 indicate that well 7MW4S is installed in bedrock. In addition, well 7MW7S is listed as an overburden well in Table 2-1. However, the borings logs and the depth information in the table show that this well is actually screened in bedrock.

A hydraulic gradient was calculated for the overburden between wells 7MW7S and 7MW3D. Since 7MW7S is actually screened in bedrock, the calculated gradient is of no value. This estimated gradient is applied in the next paragraph to estimate a seepage velocity for the overburden. For this reason the calculated seepage velocity is in error and should be recalculated using more realistic data.

Page 12-14 Figure 12-4 Potentiometric Surface Maps

The contours on this map are too widely spaced , and may obscure locally important features of the potentiometric surface. The maps should be redrawn using a more appropriate contour interval. In addition wells 7MW1D and 7MW2S are depicted on the Figure, but are not listed in Table 2-1, and no logs for these wells are included in Appendix A-8.

Page 12-15 to 12-17 Table 12-3, and Pages 12-19 to 12-21 Table 12-4

These two tables summarize analytical results from Phase I and Phase II sampling. Both list Total Petroleum Hydrocarbons (TPH) as being detected in some samples. The analytical method used must be specified. Appendix D8 contains tables listing analytical results for individual soil samples. However, these tables do not specify what analytical method was used.

Page 12-18 Section 12.4.1 Soil ¶3

This paragraph, and Table 12-3 compare detected concentrations of various soil contaminants to background values. As discussed above (Page 3-26 Table 3-3), it is not appropriate to draw such comparisons until the Navy, EPA and the State have mutually agreed on specific background concentrations, and how they will be used unless a disclaimer statement is included.

This section does not discuss which borings were drilled in the area of the former waste Otto fuel tanks. High concentrations of TPH were detected in samples from two borings installed as part of the Draft Supplemental Initial Assessment Study (November 1994).

Page 12-31 Table 12-7

This table includes TPH results for Phase II Round 2 ground water samples. As with soil samples, the table and accompanying text do not indicate what analytical method was used for TPH. Appendix D8 includes laboratory reports for some, but not all ground water samples. These show that some samples were analyzed for Oil and Grease using USEPA Method 413.2, while others were analyzed for TPH by USEPA Method 418.1. The use of Method 413.2 is not indicated anywhere in the text of the report, or in the accompanying tables. It is important to distinguish which method was used to analyze each sample, as the two methods do not necessarily yield results which can be directly compared. Method 413.2 is a gravimetric method, while Method 418.1 uses infrared spectrometry. Method 413.2 is generally not considered appropriate for use with samples containing hydrocarbons because the sample preparation includes heating the sample to drive off the chlorofluorocarbon extractant. The more volatile hydrocarbons may be lost, particularly those in the gasoline-fuel oil range.

Page 12-42 Recommendations

The State cannot support the recommendation of No Further Action at the Torpedo Shops. Non carcinogenic risks for several contaminants at this site exceed unity, and several soil and water samples contain contamination which exceeds MCLs, the State's Proposed Soil and Ground Water Protection Criteria, or other ARAR or TBC values. As noted by Kymberlee Keckler in her letter dated April 7, 1995, the ground water classification of the site is GA. This means the State's goal is to restore the water to drinking water quality. Where this is not possible, deed restrictions or other institutional controls must be implemented to prevent use of the ground water. Deed restrictions would not apply as long as the base remains under Federal ownership. However, they would be required if the United States transfers the base to another person or entity.

Chapter 13- Goss Cove Landfill- Site 8

Page 13-16 Section 13.3.5 Hydrogeology

This section should include a discussion of the role of tidal fluctuations as its applies specifically to the Goss Cove landfill.

Page 13-17 Figure 13-3 Potentiometric Surface Map

This map should use a smaller and consistent contour interval. The wide and variable contour interval used in this map may obscure many important features of the potentiometric surface. This is particularly important at the Goss Cove landfill due to the proximity of this site to the

Thames River. As at the DRMO, it is likely that there is significant dilution of ground water contaminants due to tidal flushing.

In addition, this map includes the 20, 30 and 40 foot contours on the east side of Military Highway. However, no monitoring wells are located in this area. The corresponding Contours on Drawing 4 are dotted, indicating that they were approximated. These contours should be omitted from both maps.

Page 13-55 Section 13.7.3 Recommendations

The State agrees with EPA's position as stated on page 20 of Kymberlee Keckler's letter dated April 7, 1995. Due to the potential for public exposure to contaminants at this site, and the possibility of impacts to the Thames River, the State feels that capping of this site may be required as an interim action, before the RI/FS process is complete. This should be carried out as soon as possible.

Chapter 14- Lower Subase- Site 13

Page 14-18 Section 14.3.5 Hydrogeology

This section should include a discussion of the role of tidal fluctuations as its applies specifically to the Lower Base Area.

Page 14-18 Section 14.4 Nature and Extent of Contamination

The text states that four separate areas of contamination have been identified in the Lower Base, including the Fire/ House Power House, Building 20, Bullhead Road, and Building 79. This section does not discuss other areas of contamination identified within the Lower Base, such as lead contamination at Building 31, the Pier 33 and Berth 16/ Former Incinerator areas, and the Quay Wall. Although these areas have been studied separately and are outside the scope of the Phase 2 RI, they should be referenced in the text. It is important that all actual or potential sources of contamination within the Lower Base Area be considered together.

Page 14-31 Table 14-5, Page 14-32 Table 14-6 and Page 14-37 Table 14-7

As at the Torpedo Shops, these tables do not specify the analytical methods used to analyze surface water, ground water or soil samples for TPH. However, Appendix D9 shows that some water samples were analyzed by USEPA Method 418.1, while others were analyzed by method 413.2. The concerns discussed above regarding TPH sampling at the Torpedo Shops also apply at the Goss Cove Landfill.

Page 14-48 Section 14.5 Contaminant Fate and Transport

The report concludes, "based on the absence of any substantial ground water contamination in the Lower Subase" that significant migration of contamination does not appear to have occurred. However, a number of contaminants, including lead are present in soil at levels considerably in excess of the State's proposed ground water protection criteria, and in some cases in excess of the RCRA hazardous criteria. These soils represent a potential source of pollution to site ground water, and to the Thames River. The relatively low concentrations of lead and other contaminants detected may reflect dilution by tidal flushing, rather than immobility of soil contaminants.

Page 14-58 Section 14.7.3 Recommendations

The State agrees that further investigation of the Lower Subase is required because of the many areas where elevated concentrations of lead, TPH and other contaminants were detected in soil samples. This investigation should include a more thorough evaluation of the hydrogeology of the Lower Subase. This investigation should define all potential sources of contamination, including those not addressed in the Phase 2 RI, such as the Building 31 lead remediation, and the Pier 33/ Berth 16 and former incinerator site.

Chapter 15- Over Bank Disposal Area Northeast-Site 14

Page 15-7 Section 15.3.5 Hydrogeology

A ground water seepage velocity is derived using a hydraulic conductivity value which is the geometric mean of dredge spoil and fill material. It is likely that the dredge spoil and fill material have hydraulic conductivity values which are significantly different from one another. For this reason it would be more appropriate to consider the fill and dredge spoil as separate stratigraphic units, and to separately determine the hydrogeologic properties of each layer.

Page 15-8 Figure 15-3 Potentiometric Surface Map

Only one monitoring well is shown on this map, so it is not apparent to the reader what monitoring wells were used to derived the contours shown. It would be useful to show a wider area which includes other monitoring wells. In addition a smaller contour interval should be chosen to show the potentiometric surface in greater detail.

Page 15-23 Section 15.7.3 Recommendations

The State cannot support the recommendation of no further action at this site. Elevated

concentrations of arsenic, boron, and lead were detected in some surface samples as discussed on Page 15-14 and shown in Figure 15-15. While this does not appear to represent a major source of contamination, some remediation may be required.

Chapter 16- Spent Acid Storage and Disposal Area- Site 15

Page 16-10 Figure 16-3 Hydrogeology

Comparison of this map to the site wide potentiometric surface map (Drawing 4) shows that few monitoring wells are located in this area. Much of the area where contours are shown is in fact outside the area covered by the monitoring well network. It is not apparent what information was used to derive these contours. In addition, as Kymberlee Keckler notes in her comment letter dated April 7, 1995, several of the water levels given in Table 4-5 do not match the contours on Figure 16-3.

Page 16-11 Section 16.4.1 Soil ¶5

This paragraph compares metals concentrations detected in soils to background concentrations. As stated previously, it is not appropriate to make comparisons to background concentrations until the Navy, the State, and EPA have reached agreement regarding background concentrations, unless a suitable disclaimer is included..

Page 16-29 Section 16.7.3 Recommendations

Risk assessment shows non-carcinogenic risks to construction workers in excess of the acceptable range, and lead was detected in subsurface soil samples at concentrations in excess of the State's proposed Ground Water Protection Criteria. In addition, during the Removal Action completed at this site in January 1995, only soil containing total lead in excess of 500 ppm was removed. Although this level addresses satisfies the proposed Direct Contact Criteria, it does not satisfy the Ground Water Protection Criteria. Since the actual ground water flow direction appears to differ from that shown on Figure 16-3, the Navy must demonstrate that no private wells are impacted. For this reason the State cannot support a recommendation of No Further Action at the Spent Acid Storage and Disposal Area.

If you have any questions regarding this letter, please contact me at (203) 424-3768.

Sincerely,

Mark R. Lewis

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cc: Ms. Kymberlee Keckler, US EPA Region 1, Federal Facilities Section
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