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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
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BOSTON, MASSACHUSETTS 02114-2023

July 3, 2003

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

Re: Basewide Groundwater Operable Unit Remedial Investigation Update/Feasibility Study Report for the Naval Submarine Base - New London

Dear Mr. Evans:

EPA reviewed the *Draft Remedial Investigation Update and Feasibility Study, Base-wide Groundwater OU, Naval Submarine Base New London, Groton, Connecticut, dated April 2003* in light of its completeness, technical accuracy, and consistency with earlier documents. The review checked for adherence to the National Contingency Plan (NCP), consistency with EPA guidance and generally accepted practice for preparation and content for FS documents. Detailed comments are provided in Attachment A.

Since not all operable units on the base have final remedies in place, EPA believes that it may be premature to finalize the remedy for groundwater at this time. Any remedies selected for groundwater would most likely have to be issued on a contingent basis, and would not be final until all other remedies are shown to address unacceptable site risks.

Since petroleum cleanup is outside the scope of this CERCLA document, evaluations and discussion of TPH cleanups should be removed. Alternatively, the FS could make it clear that the TPH cleanup will be addressed under State authority concomitant with the CERCLA action.

The determination regarding whether a CERCLA actionable risk exists at a site should only be based on federal risk standards. Actions proposed due to exceeding State standards need to be clearly identified.

Many chemicals for Sites 3 and 7 are carried forward into PRG development for both soils and groundwater, as shown in Appendix C. However, it is not clear why each chemical has been retained for PRG development. To clarify this point, please add a final summary list of COCs to the text of Sections 3.2.6 for Site 3 and 3.3.5 for Site 7, or the Sections 5.1 (Site 3) and Section 6.1 for Site 7. Also, it would be useful to indicate on the Tables in Appendix C whether COCs

have been retained for PRG development because of HHRA or ERA risk threshold exceedance, contaminant migration concerns or for other reasons.

Since the small area near the Area A Downstream (new source area 3-B) involves both petroleum and CERCLA contaminants, the Navy could choose to address the PAHs as part of a separate state-lead petroleum cleanup rather than as part of this base groundwater OU. For CERCLA purposes, the cleanup of the PAHs could be documented as a removal action. However, if these soils are to be addressed as part of this action, Alternative-specific Chemical, Location, and Action-specific ARARs tables for the PAH-contaminated soil must be developed.

A better free petroleum oil delineation in the New Source Area of Site 3 needs to be developed in conjunction with the remedy selection for this area. Remedies that leave any significant amount of free petroleum oil in the subsurface will not be considered protective. Similarly, the potential impact to groundwater in the New Source Area and downgradient from the free petroleum oil may require better characterization before the selection of a remedy.

Insufficient characterization of the extent of PAH contamination in the New Source Area has been completed to date. The presence of old drums in the surface soil warrants a more thorough investigation of the soil northeast of Stream 5 for any remedy that does not remove all of the contaminated soil in that area.

Because groundwater reportedly discharges to surface water (Stream 5), remedies considered for the New Source Area should also include surface water and sediment monitoring. The presence of free petroleum oil surrounding Stream 5 and the significant detection of vinyl chloride (more than 15 times the MCL) at well 2DMW29S warrants the addition of surface water and sediment monitoring to alternatives considered for the new source area.

A summary of the monitoring program should be added to the FS to provide an assessment specifically addressing the commitment implicit in the Phase II RI to consider groundwater monitoring results as they related to groundwater within Area A Landfill emerging via seeps in the Area A Wetlands. This new information would discuss analytical results for surface water collected in the wetlands immediately adjacent to the landfill have shown sporadic, low-level exceedances of monitoring criteria for SVOCs and metals, with no particular indications that these are related to the landfill.

The groundwater that feeds the Area A Wetlands via seeps is noticeably discolored with iron precipitate. The monitoring information should be used to evaluate whether this could be related to reducing conditions in groundwater resulting from breakdown of VOCs (or any carbon source) within the Area A Landfill.

In particular, the assessment of arsenic geochemistry at the landfill is closely related to issues surrounding groundwater that might discharge to the wetlands. That assessment found that strongly reducing conditions, accompanied by high dissolved iron, are prevalent throughout the

dredged material in the Area A Wetlands. The reducing conditions do not appear to be significantly influenced by the landfill. (For example, the "reference well" (2WMW21S) is not hydrologically downgradient of the landfill, but is indistinguishable chemically from the group of dredged material wells immediately northeast (downgradient) of the landfill.) An assessment of the shallower transport pathway for water passing through the fill and emerging at the toe of the riprap may address this concern.

The FS should mention that the groundwater at Goss Cove and DRMO will be monitored in accordance with the Groundwater Monitoring Plan outlined in the Operations and Maintenance Manual. It should also discuss how the groundwater at the Lower Subase will be addressed.

The FS states that the Torpedo Shop soils will be addressed in a subsequent document. However, in recent discussions among the Navy, EPA, and the CTDEP, the Navy proposed that the Torpedo Shops be addressed as part of the Basewide Groundwater Operable Unit. EPA believes that the groundwater and soils at the Torpedo Shops should be addressed as part of this FS. Moreover, the Administrative Record should be consistent and transparent.

Chapters 5 and 6 develop remedial alternatives for groundwater entitled, "Alternative GW2 - Natural Attenuation with Monitoring and Institutional Controls" (for the combined Site 3 and Site 7 downgradient area, see page 5-32, §5.3.1; for Site 7 "near-field" area, see page 6-33, §6.3.5.1). Actionable risks to human health were exhibited in the groundwater at the Area A Weapons Center and the Torpedo Shops. The FS should evaluate institutional controls to prevent contact with and ingestion of groundwater. A remedy consisting of controls on site use and groundwater development should be evaluated.

There is evidence that "natural attenuation" may already be effecting an improvement in groundwater quality at these sites, and it is entirely appropriate that alternatives considered would include a monitoring component to verify that contaminant levels decline. VOC concentrations have fallen over the period of available data, and degradation products are detected. Nevertheless, I highly recommend that the terminology chosen to describe this alternative be considered carefully. The formal protocol mapped out by EPA for a "Monitored Natural Attenuation" (MNA) remedy is quite demanding, and may not be appropriate for the magnitude of the environmental impacts that are exhibited here (*i.e.*, relatively low concentrations of VOCs, no identification of continuing source(s)). One difficulty that might be encountered in meeting the standards of a formal MNA program is that the first-order requirement is a demonstration of source control. In the case of the CVOCs in Site 3 and Site 7 (downgradient), the source has never been identified unequivocally, and it will therefore be difficult to claim that the source has been controlled. Also, the protocol for MNA can impose a heavy demand for modeling, microbiological studies, expanded analyte lists, etc. It may serve the best interests of all parties to seek alternative terminology - such as "Institutional Controls with Monitoring."

For Site 7, groundwater sampling in the PAH contaminated area needs to be conducted as part of the remedy for Alternatives GW2 and GW3 because there reportedly have not been any

groundwater samples analyzed for PAHs from this area. Sufficient well coverage should be planned to ensure adequate investigation of the contaminated area and downgradient.

Chemicals that were eliminated from the screening process because their concentrations were lower than the background concentrations need to be discussed in the risk assessment summary within the FS and their concentrations need to be evaluated as the contribution to total risks. This issue was discussed in previous comments from EPA and responses by the Navy.

I look forward to working with you and the Connecticut Department of Environmental Protection to protect the groundwater resources of the Naval Submarine Base. Please do not hesitate to contact me at (617) 918-1385 should you have any questions or wish to arrange a meeting.

Sincerely,

Kymberlee Keckler, Acting Chief
Federal Facilities Superfund Section

Attachment

cc: Mark Lewis, CTDEP, Hartford, CT
Dick Conant, NSBNL, Groton, CT
David Peterson, USEPA, Boston, MA
Bart Hoskins, USEPA, Boston, MA
Chau Vu, USEPA, Boston, MA
Jennifer Stump, Gannett Fleming, Harrisburg, PA

ATTACHMENT A

Page	Comment
Table 2-2	In previous exchanges of comments and responses between regulators and Navy, there was some discussion of the desirability to define the local groundwater flow direction in the vicinity of the New Source Area (NSA). It is noted that the larger-scale potential surface, as shown on Fig. 3-3, was shown in the DGI to be consistent with past interpretations, and with the general conceptual model for the basewide hydrology. On the more local scale, however, it is interesting to consider the potential surface and implied flow directions near the NSA. In particular, the data shown in Table 2-2 indicate a local maximum in the water level at 3TW28, and lower levels to the SE (3TW29), the SW (3TW30), and the NW (3TW27). Thus, there is a suggestion of a more radial flow away from the NSA than the expected pattern of flow coming off the elevated area of the NSA and joining the regional pattern toward the west (and discharge to the Thames River). This local groundwater flow pattern should be considered if and when any remedial design efforts are undertaken, as there may have been transport of contaminants from the NSA toward the south, expanding the area of potential downgradient impacts.
p. 3-12, §3.2.3.3	The report notes that chlorinated VOCs at 2DMW29S have decreased significantly (*e.g.*, vinyl chloride has declined from 130 micrograms per liter in the 1994 Phase II RI to 0.3 J micrograms per liter in the 2002 DGI). The conclusion from the DGI is that the most likely source of the CVOCs at this well is the septic system at Site 7. This interpretation is reasonable, and is consistent with the presence of scattered, low-level detections of CVOCs throughout Area 3. The investigation of the New Source Area (NSA) in the DGI does not seem to implicate the NSA as a likely source of the contamination at 2DMW29S, as this well does not appear to be directly downgradient of the NSA, and there were no indications from soil analyses from the NSA that CVOCs are present at significant concentrations.
Figure 2-2	The cross-section suggests that one can expect that a significant fraction of the groundwater flow from the vicinity of the New Source Area (NSA) will discharge to Stream 5. This supports the comment made elsewhere to the effect that monitoring associated with this site should include sampling of surface water and sediment to verify that impacts are diminishing or remain minimal.

Table 2-3	For Site 15 to evaluate soils outside of excavation area, why were subsurface soil samples only analyzed for TCL VOCs and TAL metals and not for TCL SVOCs, pesticides, PCBs and acidity as well? For Site 20 to further define contaminant trends in groundwater, why were TCL VOCs and acidity not analyzed in the groundwater samples?
p. 3-37, §3.2.6	The RI update recommends No Further Action (NFA) for Site 14. This seems appropriate in that a NTCRA was performed in 2000, and the groundwater sample analyzed for the DGI showed no indications of remaining impacts.
p.3-48, §3.3.5	Bullet two lists TCE as a COC requiring further evaluation in the FS. The VOCs hexachlorobenzene, 1,4-dichlorobenzene and benzene should also be included in this bullet.
p. 3-48, §3.3.5	The document recommends (second bullet) that the TCE detected in Site 7 groundwater be "evaluated collectively" with that in Site 3 groundwater. This approach is sensible, in that both areas seem to be characterized by scattered, relatively low-level detections of TCE. The document advances a plausible conceptual model (see, *e.g.*, p. 3-36, §3.2.6) suggesting that the TCE can be traced back to the historical septic system(s) at the Torpedo Shops. Because the TCE detections in both Sites 3 and 7 show similar characteristics (scattered, relatively low concentrations, evidence of degradation), and are plausibly linked to a common source, it is logical to evaluate the TCE impacts and potential remedial approaches for the sites together.
p. 3-54, §3.4.3.3	The document notes that TCE was detected in Site 15 groundwater only in the BGOURI, and not in the Phase II RI or the DGI. The report concludes that the TCE detected in the BGOURI may have been due to sample contamination. However, it is noted that the detection limit for TCE in the 1994 Phase II RI work was 10 micrograms per liter (see Table 3-31), while the subsequent detections in the BGOURI were 3.22, 2.76, and 16 micrograms per liter, *i.e.*, below or close to the detection limit. Therefore, the TCE data alone cannot discriminate between the presence of low levels of TCE (declining to <1 microgram per liter by 2002) and an anomalous sampling round in 2000.
p. 3-55, §3.4.3.3	The document speculates that the elevated metals found in groundwater samples from Site 15 in the BGOURI may have been because of scale build up on the well screens between the Phase II RI and the BGOURI (7 years). While plausible, this explanation would carry more weight if it

were supported with data. Do the turbidity data suggest higher particulate levels in the 2000 sampling? Are iron and/or aluminum concentrations consistent? The following table shows some relevant parameters for wells 15MW-XX, extracted from the BGOURI and the DGI reports. (Note that the Fe and Al values are from filtered samples.) Turbidity was slightly higher in all samples in 2000. Aluminum was high in 15MW2S (~3 ppm) and 15MW3S (~1.6 ppm) in 2000, suggesting possible presence of clay particles that might be associated with the elevated silver analyses.

	BGOURI (2000)					DGI (2002)				
well	ORP	DO	turb	Fe	Al	ORP	DO	turb	Fe	Al
	mV	mg/L	NTU	mg/L	mg/L	mV	mg/L	NTU	mg/L	mg/L
1S	147	6.11	3	1.43	ND <0.68	118	7.31	0.5	ND <0.01	ND <0.025
2S	331	9.44	3.6	ND <0.247	3.04	371	8.78	1.6	2	ND <0.035
3S	-25	1.04	7	8.6	1.65	-36	0.97	4.9	NA	NA

p. 3-55, §3.4.3.3 The report concludes that elevated inorganics at Site 15 in the BGOURI appear to be anomalies, and that is supported by the data (see, *e.g.*, Table 3-31). It is striking that silver, in particular, shows a "spike" in the 2000 sampling (well 15MW2S, 309 micrograms per liter in the BGOURI, and ND in both earlier (Phase II RI) and later (DGI) analyses). Oddly, silver also shows an apparent "spike" in Site 20 groundwater data (wells 2WCMW1S and 2S at 326 J and 114 J micrograms per liter, respectively; again ND in both the earlier and later analyses). Please explain.

p. 3-68, §3.5.4.3 The text states, "... concentrations of inorganics in groundwater have been decreasing over time." This statement is somewhat misleading, in that it seems to imply that some sort of "attenuation" process is operating to drive a temporal trend. However, much of the discussion in Section 3.4.3, is directed toward changes in sampling methodologies. The earlier text suggested that at least some of the decreases in inorganics concentrations (particularly the changes from the BGOURI to the DGI) are because of changes in sampling (*e.g.*, a change to a peristaltic pump from a submersible pump). It is difficult to draw conclusions regarding temporal trends in inorganics when other effects such as sample turbidity, redox conditions, *etc.*, exert a strong influence on the analytical results.

p. 4-1, §4.0	Under Chemical Specific, the example of the Clean Water Act (CWA) AWQC as an ARAR contradicts the discussion on page 4-3, which acknowledges that AWQC are not ARARs. Please correct.
p. 4-2, §4.1	The title of this section should be corrected to "Chemical-Specific ARARs and TBCs" since both are presented and discussed in this section.
p. 4-5, §4.2	If contaminated soils at Site 3 are being excavated in wetland, floodplain, or the coastal zone then those location-specific ARARs should be cited. Otherwise, there are no location-specific ARARs.
p. 4-6, §4.3	The only action-specific ARARs would be those that pertain to the monitoring, institutional controls, or removal of the PAH-contaminated soil at Site 3. The PAHs disposed at Site 3 are hazardous waste, so state/federal hazardous waste standards are either relevant and appropriate for monitoring and institutional controls or applicable for removal and disposal. Unless the removal of the PAHs generates contaminated water that is discharged into a surface waterbody or POTW, remove the citations to the CWA NPDES and pretreatment regulations. Remove RCRA standards for transporters of hazardous waste, TSDs (unless treating on site), LDR, CAMUs and Subtitle D. Remove state citations to Water Pollution control and WQSs unless removal of the PAHs at Site 3 generates waste water that will be discharged into a surface water body.
Tables 4-1 & 4-2	Revise based on the previous comments. The only standards to be listed are those that pertain to the PAH contaminated soil at Site 3. Do not list any standards with a status of "Not applicable." Change any "Potentially Applicable" to "Applicable" and explain in the Synopsis when the standard would apply.
p. 5-1, §5.0	Remove all references to petroleum and TPH except for text that states the petroleum and TPH will be addressed under state authority. The text of the entire section needs to be revised to only discuss alternatives that address the PAH-contaminated soil at Site 3.
p. 5-1, §5.1	There is concern relative to the reported free product petroleum in the subsurface of the New Source Area. It is not apparent that the proposed

RAOs adequately address the free product or that allowing free product to remain at the site will satisfy the CT RSRs.

For #2 under Soil RAOs, please clarify the meaning of the second sentence. It does not make sense as written.

p. 5-2, §5.1

Under RAO Evaluation of Soil, a statement is made that PAHs are relatively immobile. While this is true for some PAHs, the PAHs of interest at Site 3 are not relatively immobile. In fact, the Pollutant Mobility Criteria concentrations for the PAHs of interest are quite low indicating that these PAHs are mobile. Please edit the discussion in the subject paragraph to clarify that the PAHs found at Site 3 are mobile and adjust the discussion accordingly.

p. 5-3, §5.1

Under RAO Evaluation of Soil, the discussion in the second full paragraph on this page states that an evaluation concluded that PAHs are not a threat to ecological receptors or groundwater. Please clarify the scope of the evaluation that is referenced. Review of the soil data for well 3TW29, for example, indicates that the benzo(a)pyrene concentration is twice the allowable PMC concentration for GB mobility, indicating that benzo(a)pyrene in soil is a threat to groundwater.

Under RAO Evaluation of Groundwater, the meaning of the second last sentence in the first paragraph is not clear. Please rewrite this sentence to clarify its meaning.

Under RAO Evaluation of Groundwater, the last sentence in the second paragraph discusses the acceptability of the site-wide average groundwater contaminant concentrations. While this may be true, groundwater use is location-specific so that local contaminant concentrations are drivers for evaluating the risks associated with groundwater use. Please consider revising this discussion with that point in mind.

p. 5-5, §5.2.1

The last sentence in this section suggests that the referenced calculation is presented in Appendix D. It is not. Please either edit the sentence or include that calculation in Appendix D.

p. 5-10, §5.2.4.4

The discussion in this section regarding asphalt as a permeable cover is confusing in that asphalt has a relatively low permeability compared to gravel and some soil covers. For example, the second sentence in the first paragraph appears to contradict itself. It would be more appropriate to differentiate between asphalt and gravel/soil covers to make this point clear. Furthermore, minimizing infiltration is a concern at Site 3 because

of the presence of mobile PAHs. Please review the discussion in this section and edit it to clarify the intent.

p. 5-14, ¶3

In particular, revise the discussion of ARARs based on the comments to Section 4.0. The only ARAR compliant alternatives for the soils are capping that is compliant with RCRA C/CT Soil Remediation Standards or excavation and off-site disposal.

p. 5-20, §5.2.5.3

The discussion for Alternative S2 under Overall Protection of Human Health and the Environment states that the soil cover prevents risks to human health. However, the cover at best reduces the potential for human risk. The soil between Stream 5 and Triton Road has PAH concentrations in excess of the Industrial direct contact criteria and the soil is accessible according to RIDEM definitions. Furthermore, although contamination detected to date northeast of Stream 5 does not exceed the direct contact thresholds, only limited sampling has been conducted. Based on the photographs in Appendix A that show a drum protruding from the surface soil, it is not apparent that any soil cover exists on the northeastern side of Stream 5. It would be appropriate to further characterize the surface soil northeast of Stream 5 before declaring that Alternative S2 is protective. Finally, the presence of free petroleum oil in the subsurface does represent a current threat to the environment given that it surrounds a stream that apparently receives inflow from local groundwater. It would be appropriate to review and revise the discussion in this section to address these issues.

p. 5-21, §5.2.5.3

The discussion for Alternative S2 under Compliance with ARARs and TBCs states that location- and action-specific ARARs are not applicable for this alternative. However, monitoring activities, including the drilling and development of monitoring wells do trigger action-specific ARARs, and location-specific ARARs would exist if Stream 5 has been determined to be wetland. Please edit the text accordingly.

p. 5-23, §5.2.5.3

The discussion for Alternative S3 under Reduction of Toxicity, Mobility, and Volume Through Treatment should acknowledge that if asphalt batching is employed, this would be considered treatment and reduction of mobility would be achieved.

p. 5-24, §5.3.1

Please clarify the third sentence in the first paragraph as it may be misleading. Were the wells with only one detection of contamination sampled more than once?

p. 5-24, §5.3.1	The last sentence in the second paragraph suggests that the referenced calculation is presented in Appendix D. It is not. Please either edit the sentence or include that calculation in Appendix D.
§5.4	The RI update in section 3.2.6 presents the conclusions and recommendations for Site 3. While the suggestion in the text that PAHs in groundwater were probably adhered to particulates may be accurate, it would be prudent if PAHs were included in the long-term groundwater monitoring proposed for this site, given that in the HHRA risks from benzo(a)pyrene were found to exceed 1E-04. Additional rounds of groundwater samples would support the assertions made in this section regarding the particulate nature of the PAHs in the groundwater samples.
p. 5-42, §5.4.2.4	The discussion under Reduction of Toxicity, Mobility, and Volume Through Treatment should acknowledge that if asphalt batching is employed, this would be considered treatment and reduction of mobility would be achieved.
p. 5-43, §5.4.2.5	Please present the basis for the statement that Site-Wide Alternative 3 would achieve RAOs in approximately 1.5 years.
p. 5-43, §5.4.2.7	The table presented in the cost section lists costs that do not correspond with the cost presentation in Appendix E. Rather than itemizing all the O&M costs it would be more appropriate to present only the present worth cost of the O&M. The last column should be the total present worth cost for the alternative (the sum of the capital cost and O&M present worth). Please review and correct the information in this section as appropriate.
§6.0	Please explain why groundwater PRGs for Site 7 are included in both Tables C-2 and C-4. This explanation should be added to Section 6.
p. 6-1, §6.1	For #2 under Soil RAOs, please clarify the meaning of the second sentence; it does not appear to make sense as written.
p. 6-2, §6.1	Under RAO Evaluation of Soil, a statement is made that PAHs are known to be immobile. While some PAHs are relatively immobile, the PAHs of interest at Site 7 are not relatively immobile. In fact, the Pollutant Mobility Criteria concentrations for the PAHs of interest are quite low indicating that these PAHs are mobile. Please edit the discussion in the subject paragraph to clarify that the PAHs found at Site 7 are mobile and adjust the discussion accordingly.

p. 6-2, §6.1	Under RAO Evaluation of Soil, a statement is made in the third paragraph that an evaluation of the erosion into an adjacent water body was made. Please elaborate on the evaluation and identify the location of the subject water body on a site figure.
p. 6-9, §6.2.4.4	The discussion in this section regarding asphalt as a permeable cover is confusing in that asphalt has a relatively low permeability compared to gravel and some soil covers. For example, the second sentence in the first paragraph appears to contradict itself. It would be more appropriate to differentiate between asphalt and gravel/soil covers to make this point clear. Furthermore, minimizing infiltration is a concern at Site 7 because, contrary to the discussion in the third paragraph, mobile PAHs and VOCs are present in the soil at the site. Please review the discussion in this section and edit it to clarify the intent.
p. 6-20, §6.2.5.3	The discussion for Alternative S2 under Compliance with ARARs and TBCs states that action-specific ARARs are not applicable for this alternative. However, monitoring activities, including the drilling and development of monitoring wells do trigger action-specific ARARs. Please edit the text accordingly.
p. 6-22, §6.2.5.3	The discussion for Alternative S3 under Reduction of Toxicity, Mobility, and Volume Through Treatment should acknowledge that if asphalt batching is employed, this would be considered treatment and reduction of mobility would be achieved.
p. 6-23, §6.2.5.3	For the discussion for Alternative S3 under Short-Term Effectiveness, please present the basis for the statement that RAOs would be achieved within 1.5 years.
p. 6-37, §6.3.5.2	The discussion for Alternative GW2 under Compliance with ARARs and TBCs states that action-specific ARARs are not applicable for this alternative. However, monitoring activities, including the drilling and development of monitoring wells does trigger action-specific ARARs. Please edit the text accordingly.
p. 6-46, §6.4.2.7	The table presented in the cost section lists costs that do not correspond with the cost presentation in Appendix E. Rather than itemizing all the O&M costs it would be more appropriate to present only the present worth cost of the O&M. The last column should be the total present worth cost for the alternative (the sum of the capital cost and O&M present worth). Please review and correct the information in this section as appropriate.

Table 6-1	Please clarify the dichlorobenzene listing by changing it to 1,4-dichlorobenzene if that is what is intended.
Appendix B	Table 4.5 RME, Residential child: This table summarizes the exposure factors used in this risk assessment for residential child exposure to soil. The exposure frequency used to evaluate this exposure pathway is listed as 350 days/year. In the BGOURI report, the exposure frequency used for this pathway was 150 days/year. Please verify that the value listed in this table is correct. This change is more protective by a factor of 2.3 than that used in the original BGOURI, so it will not be necessary to alter the calculations made using this exposure factor. However, text should discuss that this one exposure factor has been changed in this RI Update.
Appendix B.2	RAGS Part D tables were only provided for Sites 3 and 15. Please also include RAGS D tables for Sites 7 and 20. For Sites 3 and 15, why were the risks from ingestion and dermal contact of groundwater and inhalation of air for future child resident not quantified as for future adult resident? The rationale that exposures to a child resident are less than those for an adult resident used to disregard this evaluation as provided in the RI/FS has no basis. Please include the quantitative risk evaluation for future child resident through the exposure pathways mentioned above.
Appendix C	Tables 5-1 and 6-1. For the protection of the current receptor, the Connecticut Remediation Standard Regulations Industrial/Commercial value has been selected. Current receptors include construction workers, employees, and adolescent trespassers. While the CRSR would be protective of construction workers and employees, it is not clear that these standards are sufficiently protective of adolescent trespassers given the smaller body weight of this receptor. The FS should demonstrate that the PRGs presented are protective of this current receptor. Otherwise, risk-based PRGs for current receptors should be developed based on a trespassing adolescent receptor.
Appendix D, Site 3	The volume calculations for Site 3 are ambiguous in that it is not apparent that the first set of calculations on page 1 of 7 includes the volume removed for stability (outside the estimated area of contamination). Based on the way the sections were drawn, it appears that the contaminated area can be measured and calculated directly without the need to subtract the area removed for stability. Please review the calculations and edit the presentation to clarify what area was calculated in the first set of calculations.

Review of Figure 5-1 in this appendix suggests that the sections made to calculate the area requiring excavation for Site 3 are separated by distances that differ from the values used in the calculations on page 1 of 7. Please review the values used on page 1 of 7 for the distance between sections and correct them to be consistent with Figure 5-1. If the values are correct as presented, please provide an explanation for the apparent difference between the distances in Figure 5-1 and those used in the calculations.

Figure D-2 is titled Estimated Extent of Petroleum Contaminated Soil; however, the figure also shows the potential extent of free petroleum oil. Since this figure is only one of several sections across the area of soil contamination and appears to be focused more on groundwater contamination, please review the figure title for consistency with the information presented and correct the title as appropriate.

Figure D-3 apparently presents significant chlorinated solvent detections in groundwater at Sites 3 and 7; however, the figure has not been used for any calculations related to groundwater contamination at Site 3 and a different figure was referenced for calculations of groundwater contamination at Site 7. Similarly, Figure D-2 has not been used for calculating the extent of groundwater contamination at Site 3, so it is not clear why the figure has been presented in Appendix D. Please clarify why Figures D-2 and D-3 have been presented in Appendix D.

Please review the figures and figure numbering used for Appendix D and edit the figures presented and their numbering for consistency.

Appendix D, Site 7

In Section 1.3.3, on page 2 of 5 of the calculation sheet, please correct the units for PAH in the last calculation line to milligrams (mg) from micrograms (μg) in two places.

In Section 2.2, on page 4 of 5 of the calculation sheet, assumptions are presented. Are these assumptions supported by data collected from the site?

In Section 2.3.3, on page 5 of 5 of the calculation sheet, please correct the units presented in the last calculation line to show the complete calculation for the conversion of micrograms of contamination per liter (μg/L) to pounds per gallon by indicating that one μg of contamination per liter of groundwater is equivalent to 10-9 pounds of contamination per pounds of groundwater. Also, the reference to PAH needs to be corrected.

Figure D-6 is titled Estimated Extent of Groundwater Contamination at Site 7, but the title appears to be incorrect because it does not present groundwater contamination. Please review and correct the figure title to be consistent with the information presented in the figure.

Appendix E

Throughout Appendix E the present worth analyses use a 7% discount rate. Per EPA guidance, the latest update to OMB Circular A-94 should be used to estimate discount rates. The latest rates were published in the update dated January 2003, and for a 30-year project, the real discount rate is 3.2%. Please revise all the cost estimates using the 3.2% discount rate.

Appendix E, Site 3

On page 7 of 7 of the calculation sheet, the numbers of samples are presented in the third paragraph. For years 2-4, the text should be edited to delete the phrase "per sampling event" because 39 is the total number of samples collected over the three years. Please review and correct as appropriate.

In the cost estimate for Alternative S1, the present worth analysis uses a 7% discount rate. Per EPA guidance, the latest update to OMB Circular A-94 should be used to estimate discount rates. The latest rates were published in the update dated January 2003, and for a 30-year project, the real discount rate is 3.2%. Please revise the cost estimate using the 3.2% discount rate. The same comment applies to the present worth calculations for all other alternatives.

In the capital cost estimate for Alternative S2, please reconcile the apparent discrepancy between the oversight labor time and the PPE requirement. Line items 4.5 and 4.6 suggest there is one person at the site, while line item 4.7 suggests two people for 10 days.

In the operation and maintenance cost estimate for soil characterization for Alternative S2, please include the cost of backfilling or explain why it should not be included.

In the operation and maintenance cost estimate for monitoring and reviews for Alternative S2, it appears that footnote (2) should be deleted because, according to page 1 of 7 in Appendix E, no analytical costs will be incurred after year one. Please review and correct as appropriate.

In the operation and maintenance cost estimate for monitoring and reviews for Alternative S2, it appears that footnote (2) should be deleted because, according to page 1 of 7 in Appendix E, no analytical costs will be incurred after year one. Please review and correct as appropriate.

In the capital cost estimate for Alternative S3, and through the costing for every alternative, please reconcile the difference between the boring cost (line item 2.2) at $70 per foot and the monitoring well installation cost of only $24 per foot. For the limited number of soil samples collected per boring, the cost differential is excessive. Please correct as appropriate.

In the capital cost estimate for Alternative S3, please reconcile the project planning LOE of 50 hours versus the project planning LOE for Alternative S2, which was 150 hours. Please correct as appropriate.

In the capital cost estimate for Alternative S3, please reconcile line item 2.7, sampling labor, with line item 2.8, the PPE requirement for 5 people for 5 days. The labor hours do not appear to be consistent. Please correct as appropriate.

In the capital cost estimate for Alternative S3, please review the quantity of 200 days for line item 4.6, PPE. The quantity appears to be inconsistent with the labor hours. Please correct as appropriate.

In the annual capital cost summary for Alternative GW2, it is not apparent why each report costs $4,000 in year one but $8,000 each for subsequent reports. Please correct. Also, there is an error in footnote (3): change one 20 to 25. Finally, for the assumptions related to the summary table, the title page for the assumptions should not be qualified for Year 1 only.

In the operation and maintenance cost estimate for Alternative GW2, for line item 1.5, please change the Unit to days and the text under Notes to four 10 hour days. Also, please delete the reference to free product measurement in the total row.

Appendix E, Site 7

On page 6 of 11 in the calculation sheet, the cost for reports is presented. It is not apparent why the cost differential between the various reports should be so significant. The scope of work for quarterly reports and reports prepared in subsequent years is identical. The difference between a quarterly report and the year end report is also grossly exaggerated. Please review and correct as appropriate.

On page 8 of 11 in the calculation sheet, the value of 0.6 months in the second last sentence of the first paragraph should be 0.6 years. Please correct.

In Attachment B, under the Basis of Design Data, contaminant B should be chlorobenzene, not dichlorobenzene. Please correct.

In the capital cost estimate for Alternative S3, please reconcile the quantity for line item 1.1, 50 hours, compared to 150 hours for project planning for Alternative S3 for Site 3 and other alternatives for this FS. The quantity is not consistent. Please review and correct. Also, please reconcile the costs for line items 2.8 and 2.9, which are not consistent. Line item 2.9 appears to be incorrect.

In the capital cost estimate for Alternative S3, please review the cost for line item 4.6 that appears to be incorrect.

In the capital cost estimate for Alternative GW2, please reconcile the quantity for line item 1.1, 100 hours, compared to 150 hours for project planning for Alternative GW2 for Site 3. The quantity is not consistent. Please review and correct.

Please review line item 5.1, which is a mobilization to abandon 1 well. Since this work would occur during monitoring well installation, there is no need for a separate mobilization. Please review and correct as appropriate.

In the annual cost summary for Alternative GW2, several errors should be corrected. Under Notes for Analysis/water: 1) the reference to 11 wells is not correct. Rather 11 samples will be collected, except that 13 samples are required for the first year; 2) annual sampling for years 2-5 will be conducted, not semi-annual sampling; 3) the reference to a QA sample for vanadium should apparently be deleted.

In the assumptions for the annual cost summary for Alternative GW2, the analytical costs per sampling event for subsequent years should not include costs for purge water characterization and disposal as these are assumed not to be required after year 1. Please correct as appropriate.

In the capital cost estimate for Alternative GW3, please review line items 2.1, 2.2, and 2.3 to verify the cost of $70/ft versus the cost of $24/ft used for monitoring well installation. The costs appear to be inconsistent. Also, for line items 2.7 and 2.9, the quantity should apparently be 9 drums according to the assumptions that backup these costs. Please correct as appropriate.