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NSB NEW LONDON
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GENERAL COMMENTS

Comment 1:

Execution of the sampling and analysis documented in the Year 1 Groundwater Monitoring Report (GMR) adheres to the Groundwater Monitoring Plan [1]. Upgradient well 8MW10S has been substituted for 8MW8S (proposed originally in the Groundwater Monitoring Plan) because of failure of the latter to recharge.

Response:

Comment noted. The substitution of well 8MW10S for well 8MW8S was previously discussed with the EPA and documented in the Round 1 Groundwater Monitoring Report for Goss Cove Landfill (TtNUS, May 2002).

Comment 2:

Overall, the results of Year 1 sampling and analysis suggest that the landfill cover is effectively limiting the transport of contaminants from fill to groundwater (e.g., by cutting off infiltration) and from groundwater to surface water (e.g., by reducing the flux of groundwater through the site). Exceedances of primary monitoring criteria and site background values were detected for a number of SVOCs and inorganics. PCE (detected in 8MW10S, 8MW2D, and 8MW8D at concentrations up to 3300 J micrograms per liter) exhibited relatively high concentrations.

Response:

Agree with clarification. The maximum concentration of PCE in 8MW2D (54 µg/L) was significantly lower than the maximum concentrations of PCE in 8MW8D (3,300 J µg/L) and 8MW10S (1,700 µg/L). In addition, the concentration did not exceed the primary monitoring criteria (88 µg/L). Therefore, it does not seem appropriate for the EPA to suggest that this concentration is high. It should also be noted that the source of the PCE is known to be upgradient of the landfill and unrelated to Navy activities.

Comment 3:

The report appropriately compares the analytical results to the primary monitoring criteria as presented in the Groundwater Monitoring Plan [1]. The pending Operations and Maintenance Manual [2] proposes modified primary monitoring criteria, based on surface-water protection and development of a site-specific dilution factor. The proposed primary criteria are generally higher than the values presently applied, particularly for SVOCs. Many of the analyses that currently represent exceedances of the primary monitoring criteria will not be in exceedance of the new criteria. The

following table summarizes compounds and elements that were found to be in exceedance of both primary monitoring criteria and NSB-NLON background values in Year 1, and the current and proposed primary monitoring criteria. Note that all Year 1 exceedances fall under the proposed new primary monitoring criteria, with the exception of arsenic. Arsenic would remain an exceedance of the primary monitoring criterion under the proposed primary criterion. This highlights the importance of developing a sound conceptual model for the mobility and transport of arsenic at the site.

analyte	max. detection, Year 1	current primary monitoring criterion	proposed primary monitoring criterion [2]
benzo(a)anthracene	0.6*	0.3	113
benzo(a)pyrene	1.0	0.3	11.3
benzo(b)flouranthene	1.0	0.3	113
benzo(g,h,i)perylene	1.0	0.3	1130
benzo(k)flouranthene	1.0	0.3	113
chrysene	1.0	0.3	1130
indeno(1,2,3-cd)pyrene	1.0	0.3	113
phenanthrene	7.6	0.3	11,300
total As	28.1	4	4.8
dissolved As	28.1	4	4.8
total Pb	85.6	13	1860
total Zn	386	123	18,600

*all concentrations given in micrograms per liter

Response:

Comment noted. Issues related to monitoring criteria for the Goss Cove Landfill groundwater monitoring program will be addressed during resolution of EPA's April 3, 2003 comments on the Draft Volume II – Groundwater Monitoring Plan, Operations and Maintenance Manual for Installation Restoration Program Sites (TtNUS, March 2003). The criteria will be adopted and used during subsequent years of the monitoring program.

Please see the Response to General Comment 4, Item 3.

Comment 4:

The Year 1 GMR makes several recommendations with respect to the monitoring program, including:

Monitoring wells and frequency: The report recommends continuation with the same suite of wells on a quarterly basis for Year 2. Quarterly monitoring for two years will provide important baseline data. It is appropriate to re-evaluate the monitoring frequency following Year 2, as recommended.

Field measurement of Fe(II): The report recommends that field measurements of ferrous iron be discontinued. These data do not appear to be adding significantly to the understanding of the mobility of metals and/or redox conditions. The laboratory analyses of total (unfiltered) and dissolved (filtered) iron are generally consistent with the field measurements, making the field measurements redundant. In fact, it appears that the field measurements may be encountering limits on accuracy at higher concentrations. The field measurements of Fe(II) can be discontinued without loss to the program.

Laboratory analyses for nitrate and sulfate: The report recommends that laboratory analyses for nitrate and sulfate be discontinued. EPA believes that these analyses should be retained for the remainder of Year 2. No arguments are offered in the present report to discount the value of these analyses. At the end of Year 2, an assessment of all eight rounds of data bearing on the fate and transport of the site COPCs should be performed. This should include an assessment of site redox conditions and their influence on the mobility of inorganics. The nitrate and sulfate data may or may not contribute significantly to this assessment. Their value can be evaluated at that time, and a further recommendation can be made with respect to continuation or discontinuation of the analyses. The fact that arsenic is the only COPC to remain in exceedance of both NSB-NLON background and the proposed new primary monitoring criteria [2] emphasizes the importance of a solid understanding of the mobility of inorganics at the site.

Response:

Item 1: Agree.

Item 2: Agree.

Item 3: Agree with clarification. Sulfate and nitrate were originally added to the monitoring program at EPA's request to assess natural attenuation of PCE. Now that EPA's focus has changed to arsenic, continued analysis for sulfate and nitrate is probably appropriate. It should be noted that the elevated arsenic concentrations detected in Goss Cove Landfill monitoring wells are similar to the concentrations detected in the Thames River dredge spoils at the Area A Landfill and Wetland. Therefore, it is likely that the arsenic is related to Thames River

sediment that underlies the landfill and not the landfill itself. This conceptual model will be further explored during Year 2 of the monitoring program.

SPECIFIC COMMENTS

Comment 1: p. 2-3, §2.1.4

The text refers to the absence of the clayey silt layer near the bedrock high, and this is reflected in the cross section shown in Figure 2-5. The figure does not show the clayey silt (labeled silt (natural) on the section) pinching out or grading into silty sand to the northeast. Please edit the cross section to indicate the inferred change from "silt (natural)" to "silty sand" in this layer.

Response:

Agree. Figure 2-5 will be modified to show the "silt (natural)" pinching out into "silty sand."

Comment 2: p. 2-8, §2.1.5

The report notes that the decision to proceed with or to forego a Feasibility Study for GCL groundwater will depend, in part, upon indications of "... unacceptable risks to human health or the environment ... ." Does the Navy intend to perform a risk assessment based on the available groundwater monitoring data?

Response:

Agree with clarification. The referenced text was taken from the Basewide Groundwater Operable Unit Remedial Investigation (TtNUS, January 2002). The Navy does not intend to change the text; however, further discussion on the issue is provided below.

The intent of the statement "no unacceptable risks to human health and environment" was that the groundwater monitoring results showed compliance with the monitoring criteria. However, for the Navy to pursue a ROD in the future for the groundwater OU at the site, a supplemental risk assessment would need to be completed using the most recent groundwater data to support the decision. The groundwater monitoring results, in conjunction with the supplemental risk assessment results, would be used to determine the need for a Feasibility Study.

Comment 3: p. 3-4, §3.7

The text notes that the Hach kit used for field determinations of ferrous iron

concentrations has a range of 0 to 10 mg/L, presumably according to the manufacturers specifications. The table below shows field and laboratory results for iron for Round 4 (all concentrations given in mg/L). It is noted that the wells showing the highest iron concentrations (8MW2D and 8MW7S) yielded laboratory analyses for total (unfiltered) and dissolved (filtered) iron that are quite comparable. Thus, under the reducing conditions found in these wells (-280 mV and -167 mV, respectively), the iron sampled is essentially all in solution. However, the Hach results for these two samples were factors of 2 to 3 lower. It appears that the Hach test loses accuracy at higher concentrations, even well below the manufacturer's stated upper limit of 10 mg/L. It is further noted that the field iron analyses are redundant (at lower concentrations) or of questionable accuracy (at higher concentrations), supporting Navy's recommendation to discontinue the field analysis (see p. 5-2, §5.2).

Response:

Agree. Field analysis for ferrous iron will be discontinued.

Comment 4: p. 4-1, §4.0

No discussion is offered of the nitrate and sulfate analyses that are reported in Appendix H for Round 4. These results, as well as those for other sampling rounds, should be discussed and the assessment of monitoring data bearing on the fate and transport of inorganics at the end of Year 2. The table below summarizes results of these analyses from Round 4, along with other relevant parameters.

It is evident that the variation in sulfate concentration is dominated by mixing with estuarine water; high sulfate correlates with high salinity. Among fresh-water wells, sulfate tends to be lower under reducing conditions (e.g., 8MW3: sulfate 3 mg/L, ORP -294 mV; 8MW7S: sulfate 2 mg/L, ORP -167 mV; compare to 11 to 13 mg/L in oxidizing, upgradient wells), as might be expected. Similarly, nitrate is ND in most of the reducing wells, and measurable in the oxidizing wells; 8MW5S is an exception, with 0.3 mg/L nitrate. Upgradient well HNUS-23 is very high in nitrate (15 J mg/L); an explanation should be sought.

Response:

Agree with clarification. The table referenced in the comment was not provided by the EPA.

Subsections entitled "Miscellaneous Parameters" will be added to Sections 4.2.1, 4.2.2, and 4.2.3 of the Year 1 report. Text will be added to each subsection that discusses the iron, sulfate, nitrate, and hardness data.

Well HNUS-23 is located within the ball field area of NSB-NLON. It is possible that the high nitrate levels are related to fertilizer used to maintain the grass. The nitrate issue is not related to the Goss Cove Landfill.

Comment 5: p. 4-9, §4.2.2

It is interesting to note that well 8MW2D, which shows the only downgradient detections of VOCs, indicates that PCE is degrading vigorously in this local environment. In Round 4, PCE was detected at 2 micrograms per liter (down from 50 J micrograms per liter in Round 1), while the degradation products TCE, cis-1,2-DCE, and VC were detected at 4, 30, and 10 micrograms per liter, respectively. ORP in Round 4 was recorded at -280 mV, indicating conditions favorable to reductive dechlorination. These observations are welcome, and suggest that at least some of the PCE is degrading before it discharges to the river.

Response:

Agree with clarification. Low levels of chlorinated solvents were also detected in downgradient well 8MW6D during the first year of monitoring. It should also be noted that the source of the PCE is known to be upgradient of the landfill and unrelated to Navy activities.

Comment 6: p. 4-16, §4.4

The text notes that downgradient shallow groundwater shows exceedances of the primary monitoring criterion and the NSB-NLON background value for arsenic, and shows an increase over upgradient groundwater. A similar conclusion is drawn (p. 4-18) for downgradient deep groundwater. As noted elsewhere in this review, these arsenic exceedances are the only exceedances that would prevail should the proposed modifications to the primary monitoring criteria [2] be adopted. Therefore, arsenic takes on particular significance for the long-term monitoring of the site. Elevated arsenic concentrations in downgradient groundwater show a fairly strong association with elevated iron and low ORP. (Note that the four points corresponding to very low arsenic, but at high Fe(II) (>3.5 mg/L) are all from 8MW7S, so this well shows somewhat anomalous behavior. NDs are plotted as zeros.) All elevated arsenic is found at ORP less than 0 mV. Thus, it appears that a complete assessment of the differences between upgradient and downgradient groundwater, and the implications for the impact of the GCL, will require an assessment of differences in redox conditions from upgradient to downgradient, possible influences of the GCL on redox conditions, redox controls on the mobility of iron, and associations of iron and arsenic. All data that might shed light on redox conditions and spatial variations should be included in this assessment. As a result, the nitrate and sulfate analyses should be retained for the remainder of Year 2 monitoring, when their value to the assessment can be re-examined.

Response:

Comment noted. Please see the Response to General Comment 4, Item 3.