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January 8, 2003

U.S. Environmental Protection Agency – Region II
290 Broadway – 22nd Floor
New York, New York 10007-1866

Attn: Mr. Adolph Everett, P.E.
Chief, RCRA Programs Branch

Re: Contract N62470-95-D-6007
Navy CLEAN, District III
Contract Task Order (CTO) 0034
U.S. Naval Station Roosevelt Roads (NSRR), Puerto Rico
RCRA/HSWA Permit No. PR2170027203
Response to EPA Comments Dated October 24, 2002
Draft Final Corrective Measures Study Task I Report
Tow Way Fuel Farm (SWMU 7/8)

Dear Mr. Everett:

Baker Environmental, Inc. (Baker), on behalf of the Navy, is providing you with two copies of replacement pages for the Addendum to the Draft Final Corrective Measures Study (CMS) Task I Report, Tow Way Fuel Farm (TWFF) dated January 3, 2003. The replacement pages consist of Page 3-34 and Page 3-43, that are to replace the existing corresponding pages in the abovementioned document.

Baker is also providing you, on behalf of the Navy, with responses to EPA comment letter dated October 24, 2002 on the Draft Final CMS Task I Report for the TWFF dated July 9, 2002 for your review. This submittal is in accordance with the EPA's letter of October 24, 2002.

If you have questions regarding this submittal, please contact Mr. Kevin Cloe, P.E. at (757) 322-4736. Additional distribution has been made as indicated below.

Sincerely,

BAKER ENVIRONMENTAL, INC.

Jon C. Edel Jr. for

Mark E. Kimes, P.E.
Activity Manager

MEK/lp
Attachments

cc: Mr. Kevin R. Cloe, LANTDIV - Code EV23KRC (1 copy)
Ms. Madeline Rivera, NSRR (4 copies)
Mr. Tim Gordon, US EPA Region II (2 copies)
Ms. Kathy Rogovin, Booz Allen & Hamilton (1 copy)
Mr. Mace Barron, Booz Allen & Hamilton (1 copy)
Mr. Carl Soderberg, US EPA Caribbean Office (1 copy)
Mr. Carmelo Vazquez, PR EQB (2 copies)
Mr. John Tomik, CH2M Hill Virginia Beach (1 copy)

NAVY RESPONSE TO EPA COMMENTS
DATED OCTOBER 24, 2002 ON THE
DRAFT FINAL CORRECTIVE MEASURES STUDY (CMS)
TASK I REPORT FOR TOW WAY FUEL FARM (TWFF)
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JULY 9, 2002

GENERAL COMMENTS

1. *EPA has reviewed the July 9, 2002 Draft Final Corrective Measures Study (CMS), Task I Report (Task I Report), for Tow Way Fuel Farm (TWFF), Naval Station Roosevelt Roads (NSRR). The screening of soil remediation technologies requires additional detail. As currently written, it is unclear why bioventing was the only active treatment technology retained as part of a potential alternative for further evaluation in Task 2. Similarly, it is not clear why many of the groundwater and phase separated hydrocarbon (PSH) remedial technologies were ultimately excluded from the alternatives identified for further study. Additional discussion should be added to Sections 7 and 8 to further develop/justify the rationale provided for exclusion of the majority of the technologies in Section 7 and to describe the rationale for selection of each of the alternative components in Section 8.*

Navy Response to EPA General Comment 1:

Additional details have been added to Section 7 and 8 for remedial technologies for groundwater, soil, and PSH to further develop/justify the inclusion/exclusion of the technology. Additional rationale to describe the selection of alternative(s) was added to Section 8.

2. *The water table elevations depicted on many of the figures present in the Task I Report and its appendices begin at the edge of Ensenada Honda facility with elevations of 100 feet (ft) mean sea level (msl) or more. However, the figures in the Groundwater Modeling Report depict water levels approaching zero ft msl at the water edge. This seem to be a more appropriate depiction. If some other datum than msl is being used to present water level and other elevation data, this datum should be clearly identified in all figures and tables where it is used.*

Navy Response to EPA General Comment 2:

The datum used at NSRR is mean low water elevation of 100 feet. The U.S. Navy survey section established this in November 1941. The table and figure presented in Appendix E (Additional Data Collection Report) clearly indicates the datum utilized at this site. The tables and figures found in Appendix G (Draft Calibrated Groundwater Flow Model) were presented without the datum typically used at NSRR. The data was presented this way to give a more realistic presentation of groundwater elevation in conjunction to the edge of Ensenada Honda. The Draft Calibrated Groundwater Flow Model has been modified to clearly state the way in which the elevations will be presented.

3. *As EPA guidance is updated based on recent advances in science, it is important that current EPA guidance be considered throughout the corrective action process. Subsequent to NSRJR's submittal and EPA's review of the January 31, 2001 revised Section 3.0 of the Task I Report, EPA has released new and/or updated guidance, including Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment (EPA/5401R1991005, September 2001) (RAGS Part E), and Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (SSL) (OSWER 9355.4-24, March 2001) (Supplemental SSL Guidance). As a result, methodologies applied in the*

Task I Report for assessing dermal and inhalation exposures are not in accordance with the more recent guidance. Specifically, equations used by NSRR to calculate the dermal exposures and assumptions regarding dermal absorption factors are not in keeping with RAGS Part E. NSRR should correct the dermal exposure equations and recalculate the corrective action objectives (CAOs) for soil and groundwater. Additionally, EPA's Supplemental SSL Guidance, which updates the 1996 SSL guidance, provides an updated method for calculating a site-specific Q/C term that is specific to the increased particulate emissions that would be expected during site construction due to earth moving activities and construction related traffic on unpaved roads. NSRR should consider this guidance with respect to the Q/C term, and if it appears that these types of activities might be performed that would result in increased particulate emissions, then NSRR should correct the inhalation exposure equations and recalculate the CAOs considering the potential for increased particulate emissions exposures in the final CMS Report.

Navy Response to EPA General Comment 3:

Complied with comment concerning new dermal guidance and dermal absorption factors. The new SSL guidance with respect to the Q/C term was examined and text was added to state that heavy earth moving activities and road making are unlikely in the contaminated portions of the site.

4. *With regards to the ecological risk assessment (ERA), the Task I Report presents an adequate characterization of ecological exposures and appropriate characterization of ecological risks. However, EPA requests clarification of several aspects of the ERA, as detailed in the specific comments below.*

Navy Response to EPA General Comment 4:

Responses to specific comments pertaining to the ERA (Specific Comment Nos. 3 through 12) are presented below.

SPECIFIC COMMENTS

2.3.1 Soil Contamination, Page 2-11

1. *Soil contamination is discussed on page 2-11, but total petroleum hydrocarbons (TPH) measurements are not discussed. NSRR should clarify if TPH data are available for surface soils at TWFF and present any data in the final Corrective Measures Study (CMS) Report.*

Navy Response to EPA Specific Comment 1:

This page of the document has been revised to explain to the reader when TPH data was obtained and where it can be located.

2.3.3 Surface Water Analytical Results, Page 2-12

2. *Page 2-12 states that polycyclic aromatic hydrocarbons (PAHs) were detected in surface water samples 75W4 and 75W4D. Sample 75W4D could not be located on Figure 2-3. The sample location should be clarified and Figure 2-3 should be revised in the final CMS Report.*

Navy Response to EPA Specific Comment 2:

The text has been modified to ensure that the reader clearly understands that the environmental sample and duplicate sample were collected from the same sample location. There is no reason to modify the Figure.

3.7 Step 3a of the Baseline Risk Assessment (Refinement of Conservative Exposure Assumptions), Pages 3-19 to 3-31

3. *Page 3-31 states that a dilution factor of 10 was used to estimate surface water concentrations of contaminants from groundwater concentrations. NSRR should clarify how conservative this assumption is by comparing near-shore groundwater concentrations of selected analytes to measured surface water concentrations in proximity to a selected well.*

Navy Response to EPA Specific Comment 3:

The dilution factor was one of several lines of evidence used in the risk evaluation for groundwater to determine the potential for adverse effects associated with ecological COPCs retained in Step 3a of the ERA process. It was not considered during the identification of preliminary ecological COPCs in Step 2 of the ERA process, nor was considered in the identification of chemicals retained as ecological COPCs in Step 3a. As evidenced by Section 3.7.1.2.1, the dilution factor was used in the risk evaluation as a line of evidence for two chemicals retained in Step 3a as ecological COPCs for groundwater (2-methylnaphthalene, and silver).

As evidenced by table 3-22 of the draft CMS Task 1 Report, silver was detected in a single groundwater sample, while 2-methylnaphthalene was detected in two groundwater samples. Although detected in one or more groundwater samples at concentrations greater than surface water screening values, they were not detected in Ensenada Honda surface water samples. Furthermore, detections near the exposure point (i.e., Ensenada Honda) were reported at concentrations less than the reporting limit (2 J ug/L for silver and 6.2 J ug/L for 2-methylnaphthalene). The absence of positive detections in Ensenada Honda surface water samples, the low frequency of detection, and the magnitude of detections near the exposure point (positive detections were reported at concentrations less than the sample quantitation limit and qualified as estimated, "J" by the laboratory) provide considerable lines of evidence suggesting that silver and 2-methylnaphthalene do not seem to reasonably pose a potential risk to aquatic receptors in the Ensenada Honda. As such, the dilution factor, although used as a supporting line of evidence, had little impact on the conclusions regarding silver and 2-methylnaphthalene.

Because positive detections for silver and 2-methylnaphthalene near the exposure point were reported at concentrations less than the reporting limit, and the fact that both chemicals were not detected in Ensenada Honda surface water, a comparison of groundwater data to surface water data would provide no information on the conservatism of the dilution factor. Chemicals other than ecological COPCs could be used in the comparison; however, such a comparison would be limited to metals (only metals were detected in both groundwater collected adjacent to the Ensenada Honda and surface water). Metals are naturally occurring in both groundwater and surface water (as supported by base background data). Furthermore, the vast majority of groundwater and surface water results for metals were either reported as non-detect or as positive detections at concentrations less than the reporting limits. Identical to silver and 2-methylnaphthalene, a comparison of these data would provide no information on the conservatism of the dilution factor.

3.7.1.1.1 Risk Evaluation for Surface Soil, Pages 3-32 to 3-33

4. *Page 3-32 discusses the comparison of background soil concentrations to site sample results. NSRR should clarify if background data are discussed in detail in other TWFF documents. For example, how does site background compare to regional background? Where were background samples collected? This information should be presented in the final CMS Report.*

Navy Response to EPA Specific Comment 4:

The surface soil background data used in the comparison to site surface soil data were base background data (site background data are not available for SWMU 7/8). A new figure (Figure 3-9) has been added to Section 3.0 showing the location of base background surface soil (and groundwater) sampling locations. The text in Section 3.7 has been revised to reflect the incorporation of this new figure into Section 3.0 (see ninth bullet item in Section 3.7). This text has also been revised to reflect the specific type of background data (e.g., type of media) used in the comparison to site media data. Note that a comparison of base background surface soil data to Island-wide surface soil data presented by the USGS (1992) was previously presented in the document entitled Draft Corrective Measures Study Investigation report for SWMU 9 (Baker 2001).

Baker Environmental Inc. (Baker). 2000. Draft Corrective Measures Study Investigation Report for SWMU 9, Naval Station Roosevelt Roads, Ceiba, Puerto Rico. July 2, 2001. Coraopolis, Pennsylvania.

3.7.1.3.1 Risk Evaluation for Sediment, Pages 3-36 to 3-38

5. *Page 3-36 states that Appendix C and Table 3-39 present sediment benchmarks derived from equilibrium partitioning (EqP). EqP is discussed in Appendix B (not Appendix C). Also, the values presented in Table 3-39 appear to be extremely high and do not appear to be consistent with the PAH benchmarks derived by DiToro and McGrath (2000) using EqP. NSRR should clarify whether these values are correct and have been correctly applied in the ERA. NSRR should also clarify whether the surface water benchmarks used in deriving the sediment EqP screening values were consistent with DiToro and McGrath (2000).*

Navy Response to EPA Specific Comment 5:

The EqP-based benchmarks for PAHs presented in Table 3-39 were derived using the approach used by the USEPA to derive sediment quality criteria for nonionic organic chemicals (USEPA 1993a and 1993b). This methodology was presented in Appendix C of the Final Work Plan for Additional Data Collection, Tow Way Fuel Farm, Naval Station Roosevelt Roads, Ceiba, Puerto Rico (Baker 2001). USEPA comments (received via email on October 12, 2001) did no include any general or specific comments that questioned the EqP-based approach presented in the final work plan. As such, this approach was used to derive the PAH sediment benchmarks presented in Table 3-39. For this reason, as well as budgetary constraints, the ERA will not be revised to reflect use of the Di Toro and McGrath (2000) EqP-based values. However, a comparison of PAH sediment concentrations to Di Toro and McGrath (2000) EqP-based is presented below. In addition, future ERAs at NSRR will incorporate the Di Toro and McGrath (2000) EqP-based PAH sediment benchmarks into the sediment evaluation.

A comparison of the EqP-based PAH sediment benchmarks presented in Table 3-39 of the Draft Final CMS to the PAH sediment benchmarks presented in Di Toro and McGrath (2000) indicate that EqP-based benchmarks derived using the USEPA (1993a and 1993b) approach are higher than the Di Toro and McGrath (2000) values. However, use of the Di Toro and McGrath (2000) EqP-based PAH benchmarks in place of the PAH benchmarks presented in Table 3-39 would not change the conclusion that PAHs in

Ensenada Honda sediments are not impacting the Ensenada Honda benthic macroinvertebrate community. As demonstrated by the following table, maximum PAH sediment concentrations are less than the Di Toro and McGrath (2000) EqP-based benchmarks [Note: The Di Toro and McGrath (2000) EqP-based benchmarks were derived assuming one percent organic carbon. The average total organic carbon content in Ensenada Honda sediment samples was 1.0069 percent].

PAH	**Maximum Concentration (ug/kg)**	**Di Toro and McGrath (2000) EqP-Based Benchmark (ug/kg)**
Acenaphthene	140 J	8,312
Benzo(a)anthracene	1,700	14,222
Benzo(a)pyrene	2,200	16,324
Chrysene	2,600	14,268
Dibenz(a,h)anthracene	530	18,983
Fluoranthene	5,800	11,974
Phenanthrene	2,800	9,747
Pyrene	4,700	11,792

Identical to the EqP-based benchmarks, the surface water benchmarks used in the ERA were presented and discussed in the draft final work plan without comment from the USEPA. While they may not be consistent with the surface water benchmarks used by Di Toro and McGrath (2000), they were obtained from the literature (e.g., Buchman 1999) or from USEPA sources (USEPA 2001 and USEPA 1996). As such, they are considered appropriate values for use in the derivation of EqP-based sediment benchmarks.

References:

Baker Environmental, Inc. (Baker). 2001. Final Work Plan for Additional Data Collection, Tow Way Fuel Farm, Naval Station Roosevelt Roads, Ceiba, Puerto Rico. September 27, 2001. Coraopolis, Pennsylvania.

Buchman, M.F. 1999. NOAA Screening Quick Reference Tables. NOAA HAZMAT Report 99-1. National Ocenaic and Atmospheric Administration, Seattle, WA. 12 pp.

Di Toro DM and McGrath JA. 2000. Technical Basis for Narcotic Chemicals and Polycyclic Aromatic Hydrocarbon Criteria. II. Mixtures and Sediments. Environ. Toxicol. Chem. 19:1971-1982.

United States Environmental Protection Agency (USEPA). 2001. Region 4 Ecological Risk Assessment Bulletins - Supplement to RAGS. Waste Management Division, Atlanta, GA. http://www.epa.gov/region4/waste/ots/ecolbul.htm

USEPA. 1996. Ecotox thresholds. Eco Update, Volume 3, Number 2. Office of Solid Waste and Emergency Response, Washington, D.C. EPA 540/F-95/038.

USEPA. 1993a. Technical Basis for Deriving Sediment Quality Criteria for Nonionic Organic Contaminants for the Protection of Benthic Organisms by Using Equilibrium Partitioning. Office of Water, Washington, D.C. EPA-822-R-93-011.

USEPA. 1993b. Guidelines for Deriving Site-specific Sediment Quality Criteria for the Protection of Benthic Organisms. Office of Science and Technology, Washington, D.C. EPA-822-R-93-017.

6. *Page 3-37 indicates that the available background sediment samples are not applicable to deeper water locations. Page 3-37 also notes that sediment quality in Ensenada Honda is influenced by activities unrelated to the TWFF (e.g., naval shipping, cargo handling, ship repair, storm sewer discharges). NSRR should clarify whether additional deeper water background samples are needed to resolve uncertainties in potential risks from contaminated sediment at deeper water locations Ensenada Honda.*

Navy Response to EPA Specific Comment 6:

The evaluation of groundwater data (see Section 3.7.1.2.1 of the draft CMS Task 1 Report) has demonstrated that chemicals are not currently migrating with groundwater to surface water or sediment at concentrations that would reasonably pose a potential risk to aquatic receptors within the Ensenada Honda. The only other significant migration pathway from the TWFF to the Ensenada Honda is overland transport of chemicals with surface soil via surface runoff to a downgradient storm sewer (Outfall 010). Based on an evaluation of sediment samples collected adjacent to the Outfall 010 storm sewer in Step 3a of the ERA process (see Section 3.7.1.3.1 of the Draft CMS task 1 Report), three metals had HQ values greater than 1.0. The evaluation of surface soil data for these three metals indicate that they were detected at concentrations similar to base background surface soil concentrations. As such, even if cobalt, copper, and vanadium are migrating with surface soil to the Ensenada Honda via Outfall 010, subsequent sediment concentrations would not be expected to exceed background sediment levels. As such, the Navy does not believe that open water marine background sediment samples are warranted.

3.6.1.5.2 Aquatic Food Web Exposures, Page 3-25

7. *Page 3-35 lists detected metals with hazard quotients (HQs) for upper trophic level receptors. NSRR should clarify why antimony is not included in this section because Table 3-25 shows an HQ of 1.29 for the manatee. Although this HQ is a marginal exceedence, EPA requests clarification because of the special status of the manatee.*

Navy Response to EPA Specific Comment 7:

The text in Section 3.6.1.5.2 has been revised to include antimony as a preliminary ecological chemical of concern (COPC) for aquatic food web exposures. The text in Section 3.6.1.5.2 and Section 3.7.1.5 has also been revised to reflect the correct number of metals identified in Step 2 of the ecological risk assessment (ERA) process as preliminary ecological COPCs for aquatic food web exposures.

3.7.2 Uncertainties Associated with the Refined Screening-Level Risk Characterization, Pages 3-39 to 3-42

8. *Pages 3-39 to 3-49 present a general discussion of uncertainties in the ERA. The ERA has concluded that there are no risks to manatees but does not specifically discuss uncertainties in the risk characterization for the manatee. EPA requests that NSRR clarify the level of certainty in this risk conclusion and the level of conservatism used to assess risks to manatees.*

Navy Response to EPA Specific Comment 8:

Section 3.7.2 has been revised to include a discussion of uncertainties associated with the dietary exposure model for the West Indian manatee (see eighth bullet item under Section 3.7.2). The impact of the uncertainties on risk conclusions is also discussed.

9. *Pages 3-41 and 3-42 state that risks were only evaluated for individual chemicals, and the ERA did not consider interactions from the complex mixtures at the site (e.g., additive toxicity of chemicals with the same mode of action). NSRR should clarify whether mixtures of PAHs would have posed a risk if assessed using screening values for total PAHs (tPAH) rather than on an individual compound basis. For example, the screening value listed for the PAH 7,12-dimethylbenz(a)anthracene in sediment (203 mg/kg) is nearly 100 times higher than the probable effect concentration for total PAHs (22.8 mg/kg; MacDonald et al., 2000).*

Navy Response to EPA Specific Comment 9:

The text in section 3.4.1.3 has been revised to include a discussion of a total PAH screening value (threshold effect level [TEL] developed by MacDonald [1994]). The total PAH screening value has been added to the list of chemical-specific screening values presented in Table 3-11. It is noted that the total PAH screening value is specific to thirteen individual PAH compounds (MacDonald 1994). These thirteen PAHs are acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene.

A comparison of total PAH concentrations in Ensenada Honda sediment to the total PAH sediment screening value has also been added to Tables 3-23 (Step 2 sediment screening table) and 3-34 (Step 3a sediment screening table. The text discussing the results of the Steps 2 and 3a sediment screening value (see Sections 3.6.1.4 and 3.7.1.4) has also been revised to include total PAHs. Finally, the risk characterization presented in Section 3.7.1.3.1 has been revised to include a discussion of the significance of total PAHs in Ensenada Honda sediments.

3.7.3 Conclusions and Recommendations, Pages 3-42 to 3-43

10. *Page 3-42 recommends additional soil sampling downgradiant from MWl7-00 to characterize ecological risks in this area. NSRR should clarify whether this recommendation has been incorporated into future corrective measures work at the site.*

Navy Response to EPA Specific Comment 10:

The text in Section 3.7.3 and Section 8.0 has been revised to reflect that additional surface soil sampling downgradient from the MW17-00 surface soil sample will be incorporated into future corrective measures work at the TWFF.

11. *Page 3-42 notes that stormwater Outfall 011 may be a migration pathway from site source areas to the Ensenada Honda, and that the TWFF is not considered a significant source of contamination. NSRR should clarify whether the Outfall 011 transport pathway will be investigated as part of other site activities.*

Navy Response to EPA Specific Comment 11:

An evaluation of Outfall 011 is not warranted for the following reasons: (1) Solid Waste Management Unit (SWMU) 7/8 is not located within the boundaries of the Outfall 011 drainage area nor are there any other SWMUs or Areas of Concern (AOC) located within the Outfall 011 drainage area (see Figure 2-2 for the location of SWMUs and AOCs at NSRR and Figure 3-7 for the location of the Outfall 011 drainage area); and (2) there are no migration pathways from source areas at SWMU 7/8 or source areas from any other SWMU to the Outfall 011 drainage area.

The language in the last paragraph of Section 3.7.3 can be incorrectly interpreted to mean that chemical releases may have occurred within the Outfall 011 drainage area. As discussed above, there are no SWMUs located within the Outfall 011 drainage area. To eliminate potential confusion, the words "potential sources and" has been deleted from this paragraph.

12. *Page 3-42 states that trichloroethylene (TCE) has increased from 2 to 28 mg/L at 7MW07. Using the dilution factor of 10, as applied in the ERA, results in an estimated surface water/pore water concentration of TCE of 28 mg/L, which exceeds the surface water screening value of 0.2 mg/L used by NSRR. NSRR should clarify why ecological risks were not considered for TCE. NSRR should also clarify if TCE levels have increased at 7MWlO and whether they exceed the surface water screening value.*

<u>Navy Response to EPA Specific Comment 12:</u>

TCE was identified as a preliminary ecological COPC for groundwater in Step 2 of the ERA process (see Table 3-21 and Section 3.6.2.1) and Step 3a of the ERA process (see Table 3-32 and Section 3.7.1.2). The risk evaluation for groundwater, presented in Section 3.7.1.2, included a discussion of the potential for adverse effects associated with TCE in groundwater. This evaluation noted the following: (1) TCE was not detected in a downgradient monitoring well (7MW10) located within the estimated travel path of the TCE plume; and (2) TCE was not detected in Ensenada Honda surface water and sediment, including those surface water and sediment samples collected downgradient from 7MW07 (7SW6, 7SW7, 7SW8, 7SW9, 7SD9, 7SD11, 7SD12, AND 7SD14). Based on these data, it was concluded that TCE is not currently migrating with groundwater to the Ensenada Honda. While there is no evidence that TCE is currently migrating with groundwater to the Ensenada Honda, Section 3.7.1.2 and Section 3.7.3 (second paragraph) of the ERA also discussed a recommendation to investigate the source of TCE at 7MW07. Both of these sections also noted that as part of the source investigation, groundwater monitoring will be conducted in downgradient wells.

The discussion presented above shows that ecological risks were considered for TCE in the ERA. Some confusion may result from the last paragraph in Section 3.7.3:

> "*Based on the groundwater evaluation, the low risk presented by detected metals at the population level, and the location of potential sources and industrial activities unrelated to the TWFF, additional evaluation is not recommended*."

This recommendation is related to the preceding paragraph in Section 3.7.3, which presents a discussion of Ensenada Honda sediments. To eliminate any potential for confusion, the text in this paragraph has been revised and incorporated into the paragraph discussing Ensenada Honda sediment.

Additionally, the human health CAO for TCE has been calculated to be 2.2 ug/L, which is significantly lower than the ecological screening value of 200 ug/L. Therefore, the human health CAO is also protective of ecological receptors.

4.3 Summary of Human Health Risk Assessment and Selection of Contaminants of Potential Concern, page 4-2

13. *The Task I Report does not adequately explain how high detection limits were factored into the decision to select or eliminate constituents of potential concern (COPCs). A review the data summaries in Tables 4-4 through 4-6 indicates that the following constituents had reported detection limits exceeding EPA Region 3 risk-based criteria (RBCs) used as screening criteria, but were not among selected COPCs. Revise the final CMS report to provide additional rationale*

for why the following constituents were not selected as COPCs, with specific consideration of high detection limits:

- *Table 4-4 surface soil data: benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate*
- *Table 4-5 subsurface soil data: 5-nitro-o-toluidine, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, and dibenzofuran*
- *Table 4-6 groundwater data: 1,2-dibromo-3-chloropropane, 2-butanone, acetone, acetonitrile, acrolein, acrylonitrile, carbon tetrachloride, cis- 1,2-dichloroethene, methyl methacrylate, styrene, tert-butylbenzene, trichlorofluoromethane, 2,4-dimethylphenol, 2-methylphenol, acenaphthene, acetophenone, bis(2-ethylhexyl)phthalate, fluoranthene, fluorene, ideno(c,d)pyrene, isophorone, and antimony.*

Navy Response to EPA Specific Comment 13:

Text was added to this section discussing the uncertainties caused by not including as COPCs those analytes that have detection limits in excess of the RBCs. The list in the comment above was included in this section. The text includes discussion of how some some of the analytes exceedances are produced by data with exceedingly high detection limits (particularly PAHs) due to masking effects related to high TPH levels and how some of the exceedances (especially groundwater) are in every sample due to very low RBCs rather than unusual detection limits.

4.4.2 Quantitative CAOs, page 4-4

14. *The QIC term used by NSRR to calculate particulate inhalation risks addresses only windbome particulates. EPA's Supplemental SSL Guidance provides methodology for calculating a QIC term that is specific to the increased particulate emissions that would be expected during site construction due to earth moving activities and construction related traffic on unpaved roads. The Task I Report indicates that the construction scenario assumes only trenching for utility repair, which will not generate a lot of dust as defined by site construction activities. However, if large-scale earth moving activities involving construction traffic over unpaved areas is anticipated at TWFF, then a construction-related health and safety risk assessment using EPA's current guidance must be performed.*

Navy Response to EPA Specific Comment 14:

See response to general comment 3.0.

4.4.2 Quantitative CAOs, pages 4-5 and 4-6, Target Risk Levels

15. *Page 4-6 states that it is necessary to set the CAO target risk level for PAHs at I x because the more conservative risk level of 1 x 10-6 that is used for all other COPCs will result in a CAO that is less than PAH detection limits. This statement does not appear to be true, based on information presented in the draft CMS report itself Specifically, by combining the surface soil I x 10-6 CAOs for PAHs reported in Tables H-l through H-4 would result in a final (combination) CAO of 3380 ug/kg each for benzo(a)anthracene, benzo(a)fluoranthene, and ideno(1,2,3-cd)pyrene and a combination CAO of 337 ug/kg for benzo(a)pyrene. These CAOs are clearly within both the range of detection limits and the range of positive detections reported in Table 4-4. The text should be revised to discuss and/or clarify this issue in the final CMS Report.*

Navy Response to EPA Specific Comment 15:

The text has been modified to explain that the 1 x 10^{-5} target risk level will be used for benzo(a)pyrene due to unattainability (i.e., CAO less than standard method detection level) but that 1 x 10^{-6} will be used for other PAHs.

Table 4-1 Cancer Risks and Hazard Indices from the RFI

16. Footnote 3 in Table 4-1 states that the future on-site resident cancer risk is the sum of the adult and child cancer risks. However, Table 4-3 presents the separate adult and child cancer risks, which do not sum to the value presented in Table 4-1. Also, Table 4-1 presents the total hazard index for the future construction worker as "029." Clarify whether this value should actually read "29" or "0.29" in the final CMS Report.

Navy Response to EPA Specific Comment 16:

These tables are as they were in the RFI RA. They were proofed and corrected.

Table 4-6 Groundwater Data and COPC Selection

17. The tap water RBC for chloroform should be 0.0627 based on noncarcinogenic effects at a hazard quotient of 0.1. This correction should be reflected in the final CMS Report.

Navy Response to EPA Specific Comment 17:

The chloroform RBC was changed as suggested.

Table 4-10 Summary of Soil-to-Air Volatilization Factor (VF) Calculation

18. EPA's Supplemental SSL Guidance recommends calculation of a separate volatilization factor (VF) for construction workers that reflects their subchronic exposures. The final CMS Report should either use this more up-to-date methodology or discuss why a calculation of a subchronic VF for construction workers is not necessary.

Navy Response to EPA Specific Comment 18:

Text was added to explain why the subchronic VF for construction workers was unnecessary.

Table 4-10 Summary of Soil-to-Air Volatilization Factor (VF) Calculation

19. The site-specific Q/C term corresponding to data for Miami is taken from EPA's 1996 Soil Screening Guidance. As noted in the general review comment above, EPA has updated the air dispersion modeling used to derive the Q/C term and presented the updated methodology in EPA's Supplemental SSL Guidance. Using this updated methodology with data for Miami and an assumed source of 0.5 square acres, the Q/C term would be calculated as 74.70 g/m^2-s per kg/in^3, rather than the 85.61 g/m^2-s per kg/in^3 used in the Task I Report. Subsequent use of this lower Q/C term results in a calculation of a more protective CAO for inhalation exposure to volatiles from soil. Revise the final CMS Report to use the updated Q/C calculation methodology and recalculate the inhalation CAOs accordingly.

Navy Response to EPA Specific Comment 19:

The VF was changed and the CAOs were recalculated.

Table 4-12 Summary of Quantitative CAO Calculations, Exposure Via Dermal Absorption of Chemicals in Soil

20. The final CMS Report should incorporate EPA's RAGS Part E. This guidance does not recommend use of a default inorganic constituent absorption factor (ABS) of 0.01. This guidance also recommends use of an ABS of 0.001 for cadmium, 0.13 for benzo(a)pyrene, and 0.13 for other PM-Is. The final CMS Report should recalculate the CAOs to incorporate the most recent guidance recommendations regarding the ABS parameter.

Navy Response to EPA Specific Comment 20:

The ABS values were changed as suggested.

Table 4-16 Determination of Dermal Absorption Factor (DAF) for Use in Calculating Dermal Absorption of Organic Chemicals from Water

21. The equations to calculate the Kp, B, and Dsc parameters are not consistent with the equations recommended in EPA's RAGS Part E. Additionally, none of the equations shown in Step 5 of Table 4-16 are correct relative to the new guidance. The equations shown in Step 6 of Table 4-16 are missing a parameter reflecting the concentration in water. The final CMS Report should recalculate the CAOs using the methodology and equations provided in this guidance.

Navy Response to EPA Specific Comment 21:

The equations have been reconfigured from the RAGS Part E equations simply to maintain concentration units in their normal form but they were checked and are correct.

Table 4-17 Dermal Absorption Factor Parameter Values for Groundwater COPCs

22. It is preferred that Kp values from EPA's RAGS Part E. Where Kp values are not available, they should be calculated using the equation provided in this 2001 guidance. Additionally, the 2001 dermal risk guidance does not recommend an across-the-board Kp of 0.001 for all inorganics. Hexavalent chromium, cobalt, lean, nickel, potassium, silver, and zinc have been assigned Kp values other than 0.001. The final CMS report should use the appropriate Kp values for inorganics.

Navy Response to EPA Specific Comment 22:

See response to Comment 20.

Table 4-18 Toxicological Data Summary

23. The latest EPA Region 3 RBC table (April 2002) recommends an NCEA provisional inhalation cancer slope factor (SF) for ethylbenzene-of3.85E-03 kg-d/mg. This should be incorporated into the final CMS report. Additionally, EPA Region 3 RBC table identifies the NCEA provisional inhalation SF for trichloroethene as 4.OE-0l kg-ding, which is considerably more conservative than the SF used in the Task I Report. The RBC table also identifies an NCEA provisional oral *reference dose (RfD) for trichloroethene of 3.OE-04 mg/kg-d and an oral SF of 4.OE-0l kg-ding. The final CMS Report should either use the latest Region 3 RBC table provisional values or provide a reference source for the alternate provisional toxicity data provided in Table 4-18.*

Navy Response to EPA Specific Comment 23:

All toxicity values mentioned were updated.

Table 4-19 Quantitative Soil CAOs

24. The proposed CAOs for semi-volatiles PAHs in surface soil are those that have been calculated considering a target risk of 1 x 10^{-5}, while those CAOs for semi-volatile PAHs presented for total soil are based on a target risk of 1 x 10^{-6}. The target risk for PAHs should be consistent for both surface soil and total soil. The table and CAOs should be revised accordingly in the final CMS Report.

Navy Response to EPA Specific Comment 24:

See response to Comment 15. By changing the target risk level to 1 x 10-5 for benzo(a)pyrene only this inconsistency has been eliminated.

4.5.3 Approach to Evaluating Carcinogenic PAHs, page 4-9

25. Page 4-6 indicates that the CAOs for Polynuclear Aromatic Hydrocarbons (PAHs) in soil are developed assuming a 1 x 10^{-5} target risk level. It should be noted that NSRR is not aggregating all PAHs to derive a benzo(a)pyrene (BaP) equivalent and then applying a 1 x 10^{-5} target risk level. Although this text is consistent with the January 31, 2001 Revised Task I CMS Report, which was reviewed and approved by EPA, the text states that this methodology is consistent with the Task I CMS Report (Baker, 2000). However, the Baker 2000 Task I CMS Report explicitly states "a risk-based clean up goal was established for all cPAHs at an ICR of 1 x 10^{-5}," thereby implying that a target risk level for total cPAHs was 1 x 10^{-5}. In the January 31, 2001 Revised Section 3.0 Task I CMS Report, soil CAOs for future construction worker (Table A-10) are calculated for PAH CAOs considering individual constituents at a 1 x 10^{-6} target risk level, while soil CAOs for a future industrial worker (Table A-5) are calculated for PAH CAOs considering individual constituents at a 1 x 10^{-5} target risk level.

The argument for using a 1 x 10^{-5} target risk level would be much stronger if a BAP- equivalent was used. Rather, NSRR wishes to apply the less conservative target risk level for each PAH constituent on the basis that it is consistent with the previous CMS draft, and on the basis that use of the lower target risk level will result in CAOs that are lower than detection limits and/or lower than background. The following issues should be addressed:

- *Explain more clearly how the previous draft of the CMS report (Baker 2000) supports the argument that a less conservative constituent-specific target risk level should be used for PAHs.*

- *Tables 4-4 through 4-6 indicate that detection limits for PAHs were enormously variable, and in many cases exceeded the screening criteria used to select constituents of potential concern. However, it is not clear how it is known that using a 1 x 10^{-6} target risk level for individual PAHs would definitively result in CAOs that are lower than detection limits. Clarify which type of laboratory detection limit is being discussed in the text on page 4-6* *of the Task I Report. Explain why a procedure was not proposed to set the CAO as either the higher of the laboratory detection limit or the 1 x 10-6 target risk level for each PAH.*

- *The Task I Report does not present any explicit comparison data on background PAHs to support the argument that CAOs established at a 1 x 10^{-6} target risk level would exceed background. Furthermore, anthropogenic sources of background contamination (listed as including fossil fuel combustion sources and asphalt) would only be expected to impact surface soils due to deposition from the air and subsurface soils in the immediate vicinity of asphalt paved areas. Screening against PAH background would not be generally appropriate for subsurface soils. Explain why a procedure was not proposed to set the CAO as either the higher of the established anthropogenic background level (for surface soils only) or the 1 x 10-6 target risk level for each PAH.*

<u>Navy Response to EPA Specific Comment 25:</u>

See response to Comment 15. The text has been revised accordingly.

5.0 Identification of COCs, Pages 5-1 to 5-2

26. Page 5-1 states that human health and ecological CAOs were compared to each other. Page 3-42 provides a comparison for TCE, but no other comparisons could be located. NSRR should clarify where this comparison is provided. Section 5 does not discuss surface water or sediment, which should also be clarified by NSRR.

<u>Navy Response to EPA Specific Comment 26:</u>

A discussion of the comparison of human health and ecological CAOs is provided in Section 5. Generally speaking, the human health CAOs were more conservative than the ecological CAOs. Section 3 did not identify any CAOs for surface water or sediment, therefore no comparison or discussion of surface water or sediment is necessary in Section 5.

27. Page 5-1 states that all inorganic background levels were below their respective CAOs, and only risk-based CAOs were used to select Constituents of Concern (COCs). This contradicts what is reported on page 4-10, Section 4.6, which states that background-based CAOs were used for arsenic in soil and groundwater and lead in groundwater. The final CMS Report must resolve this discrepancy.

<u>Navy Response to EPA Specific Comment 27:</u>

The text on page 4-10 states that the background levels for arsenic and lead may be used however they were not used in determining CAOs.

5.2 Soil COCs, page 5-2

28. Section 5.2 dismisses arsenic in soil as a COC on the seemingly arbitrary basis that the target risk level for this constituent should really be set at 1 x 10^{-5}, since establishing the CAO for arsenic using a target risk level of 1 x 10^{-6} causes this constituent to be selected as a COC. It is unacceptable to mix and match target risk levels for CAOs simply as a means to minimize the list of COCs. Additionally, the referencing of EPA's target risk range of 10^{-6} to 10^{-4} refers to multi-pathway, multi-chemical cumulative risk, and should not be used as a tool to argue away risk to a *single constituent in a single media. Revise the final CMS Report to retain arsenic as a COC, so that the selection process for COCs is consistently applied to all constituents.*

Navy Response to EPA Specific Comment 28:

The CMS was revised to retain arsenic as a COC.

Table 5-1 Groundwater COCs and CAOs

29. The CAOs reported in Table 5-1 do no correspond to the CAOs reported in Table H-14. The values should be identical. Revise the final CMS report to eliminate the inconsistency and confirm that the COCs were selected using the correct CAOs.

Navy Response to EPA Specific Comment 29:

Table 5-1 was changed to reflect the corrected CAO that was derived from Table 4-20. Table H-14 only has construction worker CAOs while Table 4-20 has both the construction worker and industrial worker. Therefore, Table 5-1 used the more conservative CAO of the two.

Table 5-2 Soil COCs and CAOs

30. As previously discussed, derived CAOs for PAHs in surface soil are based on a 1×10^{-5} risk level, while CAOs for PAHs in total soil are based on a 1×10^{-6} risk level. The CAOs must be revised to be based upon a consistent target risk level in the final CMS Report.

Navy Response to EP Specific Comment 30:

See comment 15.

Table 6-1 Potentially Applicable Corrective Measure Technologies, Soil Matrix

31. The majority of the technologies identified on Table 6-1 appear appropriate. However, some of the identified technologies appear to be of questionable use, while other potentially relevant technologies have not been identified. For example, soil vapor extraction would be appropriate for removing many of the fuel components, but would be a poor candidate for removing PAH contamination, such as benzo(a)pyrene, due to the limited volatility of these constituents. Similarly, low temperature thermal desorption (LTTD) would have limited effectiveness for PAHs such as benzo(a)pyrene. High temperature thermal desorption (HTTD) would likely be more effective. In addition, technologies that require chemical injection, such as CleanOx are generally limited to treatment of groundwater and saturated soil. If the contamination resides above the saturated zone, these technologies may have very limited effectiveness. The table should be revised to include HTTD as a potential alternative, and the evaluations in Sections 7 and 8 should address contaminant and technology specific issues, such as those described above.

Navy Response to EPA Specific Comment 31:

High temperature thermal desorption (HTTD) was added to Table 6-1. Sections 7 & 8 were revised to address contaminant and technology specific issues.

6.0 Preliminary Corrective Measures Technologies

Table 6-2 Corrective Measures Treatment Technology Descriptions, Soil Matrix

32. *Table 6-2 does not include some of the technologies identified in Table 6-1. CleanOx and asphalt incorporation are missing. If these technologies were dropped as part of an initial screening, this should be described in the text. Otherwise, the list of technologies should remain consistent among Tables 6-1, 6-2, 7-1, 7-2, and 8-1.*

Navy Response to EPA Specific Comment 32:

Tables 6-1, 6-2, 7-1, 7-2, and 8-1 have been revised for consistency.

7.0 Screening of Corrective Measures Technologies

Table 7-1 Treatment Technologies Screening Matrix

33. *The screening matrix that has been used in the assessment is based on the second edition of the Remediation Technologies Screening Matrix and Reference Guide (EPA/542/B-94/0 13, October 1994). A more current edition of the screening matrix is available on the Federal Remediation Technologies Roundtable (FRTR) web site at www.frtr.aov and incorporates some revisions relevant to this evaluation. For example, the rating for the effectiveness of soil vapor extraction (SVE) in treating semi-volatile organic compounds (SVOCs) has been reduced from average to worse. Table 7-1 should be updated to be consistent with the current screening matrix.*

Also, the table should be expanded to evaluate all technologies identified in Table 6-1. CleanOx, asphalt incorporation, and electrochemical geooxidation (ECGO) are listed as potential technologies in Table 6-1, but are missing from this table.

Navy Response to EPA Specific Comment 33:

Table 7-1 has been updated to include latest technologies from FRTR. Technologies from Table 6-1 were added to be consistent.

Table 7-2 Applicable Corrective Measures Technologies, Soil Matrix

34. *The rationale for excluding or retaining individual technologies is inadequate. For example, two-thirds of the technologies (i.e., all ex-situ technologies) have been excluded from further evaluation because it is "unfeasible to excavate soils in an active fuel farm." This evaluation is too general. Although certain areas within the fuel farm may be impractical to excavate, areas that are not directly affected by fuel system infrastructure may be accessible. A discussion should be provided in the text that describes elements of the fuel system that would specifically preclude excavation of the contaminated soil. This discussion should also evaluate the feasibility of other invasive technologies such as bioventing and ECGO. Also, it is unclear how bioventing will allow adequate distribution of oxygen when biodegradation and CleanOx are excluded because "soil heterogeneity may impede 02." The rationale for exclusion should be expanded to be more contaminant and site specific.*

Navy Response to EPA Specific Comment 34:

Table 7-2 was revised to retain most of the technologies previously identified as "unfeasible to excavate soil in an active fuel farm" and "soil heterogeneity may impede O_2". A paragraph was added to Section 7.4 that addresses where excavation can be implemented and that further discussion will be presented in the alternative evaluation section of the CMS. Rationale for screening out CleanOx was changed to reflect results of the on-site pilot test.

8.0 Identification of the Corrective Measure Alternative, Page 8-1

35. When presenting the alternatives that will be evaluated during Task II and Task III of the CMS, the Task I Report (p. 8-1) provides little rational for the development of the two alternative identified. A large number of soil, groundwater, and PSH remedial technologies have been excluded from the alternatives that will be evaluated without any apparent justification. For example, it is unclear why bioventing is included in an alternative for soil remediation but ECGO is not, although both were carried through the initial screening. Bioventing may be a good option for treatment of fuels contamination in general; however, PAHs are more recalcitrant than most fuel components and biodegradation rates may be prohibitively slow. The groundwater and PSH remedial technologies that have been excluded from a remedy include dual phase and vacuum vapor extraction, air sparging, and others. No justification has been provided for these exclusions. It appears to be appropriate to carry many of these technologies forward into the Task II and Task III of the CMS in the context of several additional alternatives. The number of alternatives and included remedial technologies that will be carried forward in the CMS should be expanded.

Navy Response to EPA Specific Comment 35:

Three additional alternatives were developed using the technologies that passed screening. This brings the total number of alternatives to be evaluated in the CMS to five. Additional paragraphs were added to discuss the applicability of the technology.

APPENDIX E ADDITIONAL DATA COLLECTION INVESTIGATION REPORT

GENERAL COMMENTS

36. The Additional Data Collection Investigation Report provides a generally adequate documentation of the additional investigations undertaken and the results of these investigations. However, the report does not provide significant discussion regarding the investigation results. No discussion of any conclusions that can now be drawn from these results is provided, nor is an assessment provided of whether the recently obtained data address the data gaps intended to be addressed by the additional investigation. In addition, these results have not been placed in the context of the results of previous investigations, and any discrepancies that may exist with previous investigation results have not be identified and discussed. The report should be augmented to include this further analysis.

Navy Response to EPA Specific Comment 36:

A new section (Section 5.0) has been added to the report explaining how the objectives of this investigation were met.

APPENDIX G DRAFT GROUNDWATER MODEL REPORT - TOW WAY FUEL FARM

GENERAL COMMENTS

37. *To provide a more complete documentation of the calibrated model and further potential evaluation of the model, all input files should be provided. These files should be provided in an electronic format on a CD provided with the Groundwater Modeling Report.*

Navy Response to EPA Specific Comment 37:

Copies of the requested files are provided on CD with the report.

SPECIFIC COMMENTS

1.1 Groundwater Modeling Objectives

38. *The Draft Groundwater Modeling Report (p. 1-1) indicates that "because of the current conclusions of the CMS, the model was not run under a steady state pumping scenario and therefore the PHS flow was not modeled." It is not clear which CMS conclusions are being referred to in this statement. The Task I Report included the screening of a number of remedial technologies and their potential exclusion from the alternatives identified for further study. The evaluation of many of these technologies may have benefited from study using the model. Moreover, containment/collection through the use of extraction wells has been included in one of the alternatives that will be further evaluated during subsequent tasks of the CMS. Further justification should be provided for not simulating pumping scenarios and developing other aspects of the model such as transport modeling.*

Navy Response to EPA Specific Comment 38:

Because the pump and treatment remedial option is not the preferred alternative developed in the CMS, a steady state pumping scenario was not run. If necessary in the future, various pumping scenarios can be developed for optimization of such a system. Also, if deemed necessary in the future, transport modeling can be done using the results of the steady-state groundwater flow model.

3.2 Model Grid and Boundary Conditions

39. *The Draft Groundwater Modeling Report (p. 3-2) indicates that the bottom of third layer of the groundwater model was set at -300 ft. msl. When discussing the hydraulic conductivities obtained during calibration, the Draft Report (p. 3-3) indicates that "the vertical conductivity was larger than expected at the site," and that "because of the of the deep nature of groundwater flow, vertical conductivity was often modeled at values equal to the horizontal conductivity in order to allow the water to enter the third layer of the model." The Draft Report adds that "this is realistic ... when the fractured nature of the rock is taken into account." However, it is probable that the portion of the bedrock in which significant groundwater flow occurs extends to a depth of much less than 300 feet. Consequently, the model may simulate a much greater flow in bedrock than is actually occurring. This potentially excessive flow may provide an explanation for the apparently high levels of recharge that were obtained during calibration (see Specific Comment No. 3). The thickness of the bottom layer of the model should be carefully reexamined to determine the potential impact that the assumed thickness may have on model calibration and subsequent use of the model during the CMS.*

Navy Response to EPA Specific Comment 39:

The third layer of the model was reduced in thickness by 200 feet. The new bottom elevation of the third layer is –100 feet msl. The calibration of the model resulted in better correlation to the mean water table than the original estimation.

3.3 Recharge

40. The Draft Groundwater Modeling Report (p. 3-2 and Figure 3-4) indicates the recharge used in the calibrated model ranges between 0 and 60 inches per year, with large portions of the model area receiving 30 to 36 inches per year of recharge. The Draft Report (p. 2- 1) states that rainfall averages between 60 and 75 inches per year. Based on these numbers, it appears that the model has been calibrated to a net infiltration rate that approaches fifty percent of the average annual rainfall. This appears to be an unusually large amount of infiltration that may result in overestimates of groundwater flux through the model domain. While they may be conservative when estimating travel times for contaminants, such overestimates of the groundwater flux may lead to significant errors in the evaluation of the efficacy of extraction well systems and other containment systems. Generally, the parameter sets obtained during calibration of a groundwater flow model are not unique. Consequently, it may be possible to reduce both infiltration and hydraulic conductivities, while achieving a similar match to the observed water levels. The infiltration rates and hydraulic conductivities used in the model should be closely examined to ensure that they result in realistic groundwater fluxes in the model area.

<u>Navy Response to EPA Specific Comment 40:</u>

The recharge was reduced to values of 0 to 45 inches/year.

4.1 MODFLOW Results

41. The Draft Groundwater Modeling Report (p. 4-1 and Figure 4-1, 4-2, and 4-3) presents a discussion regarding the residual errors resulting from predictions of the calibrated model. This discussion focuses entirely on the root mean square (RMS) error over the entire model. While the RMS error over the entire model is an important measure of the calibration of the model, it is not the only relevant measure of a model's calibration. It is important to identify any systematic bias in model predictions and, in particular, to identify significant errors in model output in areas of importance to the model intended use. Consequently, the residual errors at each target should be identified in tabular form. Similarly, figures depicting residual error in each model layer should be provided to facilitate the identification of specific areas of the model where significant errors may be prevalent. This can be done by depicting contours of residual errors if the patterns of residual error follow regular patterns, or by labeling residual errors at each target water level location on figures for each model layer. An analysis of the potential impaction of the identified error on potential model uses should similarly be provided.

<u>Navy Response to EPA Specific Comment 41:</u>

Table 4-1 was added to the document summarizing the errors in the model at each target. Figures depicting the residual errors are given in Figures 4-1, 4-2, and 4-3. No systematic bias was seen during calibration.

42. The Draft Groundwater Modeling Report provides no sensitivity analyses of the model calibration to individual parameters or parameter groups. Such analyses is important for evaluating the uncertainty inherent in the calibration and consequently for estimating the reliability of the model results relevant to their intended uses. For example, sensitivity analyses *may demonstrate that the model calibration is not sensitive to the hydraulic conductivity in a particular zone or area. This would imply that this hydraulic conductivity value is not well determined in the calibrated model. However, this hydraulic conductivity value may be important for calculating contaminant transport times through this same area of the model. In such a situation, it may not be possible to place much confidence in the travel times predicted by the model. The sensitivity analyses may also provide some estimate in the potential error inherent in the computed travel time. Sensitivity analyses of the model calibration to specific model parameters should be provided.*

Navy Response to EPA Specific Comment 42:

A sensitivity analysis for hydraulic conductivity and recharge was done and is given in Section 4.1.1.

4.2 MODPATH Pathline Analysis

43. The Draft Groundwater Modeling Report (p. 4-2 and Figure 4-4) states that MODPATH analysis indicates that the travel time from the 470 wells to the Honda is approximately 40 years. However, based on a distance of approximately 500 feet from these wells to the Honda, a loss to hydraulic head of approximately 4 feet, a hydraulic conductivity of 15 feet/day (see calibration values on Figure 3-6), and an assumed porosity of 0.20, the travel time would appear only to be approximately 2.25 years. Further analysis of the calibrated model and MODPATH analysis should be provided to justify the projected travel times from the 470 wells and the TCE spill area to the Honda.

Navy Response to EPA Specific Comment 43:

This travel time output from MODPATH depends on the vertical movement of the groundwater. The travel time decreased from the original model because of the shorter vertical movement along the groundwater flow paths in the third layer. The revised travel times are 4 to 32 years, depending on which layer (second or third) the particles were started in for the area near the 470 wells and 5 to 6 years for the travel time from the TCE spill area.

APPENDIX H CORRECTIVE ACTION OBJECTIVE (CAO) CALCULATIONS

Table H-4 Corrective Action Objectives, Soil Dermal Absorption

44. The ABS factors presented in Table H-4 do not correspond with the recommendations in EPA's RAGS Part E. Specifically, incorrect dermal ABS parameters have been used for all PAHs. The ABS value should be 0.13 for all PAHs. Additionally, default values for inorganics (i.e., chromium, thallium and vanadium) are no longer recommended in the guidance. The final CMS Report should consider guidance provided in RAGS Part E and recalculate CAOs accordingly.

Navy Response to EPA Specific Comment 44:

The ABS values were changed in accordance with the guidance.

Table H-5 CAOs for the TWFF- Surface Soil
Table H-10 CAOs for the TWFF- Total Soil

45. *NSRR has applied a target risk level of 1 x 10^{-5} for PAH CAOs in surface soil and a target risk level of 1 x 10^{-6} for PAH CAOs in total soil. The final CMS Report must be revised to apply a consistent target risk level for PAHs in both surface soil and total soil.*

Navy Response to EPA Specific Comment 45:

See response to Comment 24.

Table H-13 CAOs Groundwater Dermal Absorption

46. *The Dermal Absorption Factors (DAFs) presented in Table H-13 are inconsistent with the DAFs presented in Table 4-17 for every constituent. The final CMS Report must correct this inconsistency and, as appropriate, recalculate CAOs.*

Navy Response to EPA Specific Comment 46:

The errors were corrected and the tables fixed.