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EnSafe / Allen & H
a joint venture for professional services
5720 Summer Trees Dr. Suite E Memphis, TN 38134
(901) 383-9115 Fax (901) 383-1743

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NAS PENSACOLA
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October 14, 1994

U.S. Environmental Protection Agency
Attn: Ms. Allison Humphris
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Re: Draft Final Remedial Investigation Report,
Operable Unit 10 and Site 13,
NAS Pensacola, Contract # N62467-89-D-0318/048

Dear Ms. Humphris:

On behalf of the Navy, EnSafe/Allen & Hoshall is pleased to submit three copies of the Draft Final Remedial Investigation Report for Operable Unit 10 and Site 13 at the Naval Air Station Pensacola in Pensacola, Florida.

If you should have any questions or need any additional information regarding the report, please do not hesitate to call me.

Sincerely,

EnSafe/Allen & Hoshall

Henry H. Beiro
Task Order Manager

Enclosure

cc: Bill Hill, SOUTHNAVFACENGCOM — 2 copies
EnSafe/Allen & Hoshall file
EnSafe/Allen & Hoshall Pensacola
Ron Joyner, NAS Pensacola — 6 copies
Tom Moody, FDEP — 1 copy
John Mitchell, FDEP — 1 copy
Waynon Johnson, NOAA — 1 copy
Lynn Griffin, FDEP — 1 copy

Technical Review and Comments
Draft/Final Remedial Investigation Report for
Operable Unit 10
U.S. Environmental Protection Agency
Naval Air Station (NAS) Pensacola
Pensacola Florida

BASELINE RISK ASSESSMENT COMMENTS

Human Health

Comment 1:

As previously commented, Section 10.1 should include a reference to "Supplemental Region IV Risk Assessment Guidance" (March 1991) in the list of guidance documents.

Response:

Supplemental Region IV Risk Assessment Guidance documents have been referenced (where appropriate) in the revised Baseline Risk Assessment.

Comment 2:

Section 10.1, for consistency of Agency risk documents, "Potential Chemicals of Concern" should be changed to "Chemicals of Potential Concern" (COPCs). COPCs are those chemicals which are carried through the risk assessment process. Throughout the document all references to Chemicals of Concern or COCs should be reserved for those chemicals which contribute to a pathway that exceeds a 1E-4 risk or HI greater than 1 for any scenario evaluation in the risk assessment.

Response:

All references to Potential Chemicals of Concern have been revised to read Chemicals of Potential Concern (COPC). Terminology throughout the BRA has been revised to reflect that Chemicals of Concern are those contaminants which contribute significantly to pathways with risk greater than 1E-4 or hazard index greater than 1 for any scenario evaluated.

Comment 3:

Section 10.1, Toxicity Assessment, incorrectly references Table 10-1. The information on Table 10-1 is not toxicity information. It is inappropriate to include toxicity information in the introduction section.

Response:

The reference to Table 10.1 has been revised. Toxicity information has been included exclusively in the Toxicity Assessment section.

Comment 4:

Section 10.1, page 10-3, paragraph 3, is inappropriate in an introduction section. It is inappropriate to present specific data relative to site characterization or toxicity infomation in the introduction section. The second sentence of this paragraph does not make sense; literally it means that a chemical must be detected in all media before it may be considered. This is contrary to standard risk assessment procedures.

Response:

Substantial revisions to text have been made to provide clarity.

Comment 5:

As previously commented, the initial summary tables (10-2 through 10-8) should include the background concentrations for each media and the 95% UCL values should be moved to the exposure assessment section. These tables should include a footnote indicating that the average values are the average of the detected concentrations only.

Response:

Tabular presentations have been amended to provide a more fluid presentation of information and to facilitate review.

Comment 6:

Section 10.2 should be titled Chemicals of Potential Concern (COPCs). COPCs are those chemicals which are carried through the risk assessment process. Throughout the document all references to Chemicals of Concern or COCs should be reserved for those chemicals which contribute to a pathway that exceeds a 1E-4 risk or HI of 1 or greater.

Response:

The title of Section 10.2 has been changed to Chemicals of Potential Concern.

Comment 7:

Comparison of chemicals to background values should be presented in Section 10.2; this reviewer could not find this information in Section 7 as referenced. This document is

contradictory with regard to the background data issue. Site specific background should be established for this area and clearly presented in this document.

Response:

Comparisons to reference concentrations are included in Section 10.2 of the revised BRA.

Comment 8:

Section 10.2 of this document should include information on which specific samples were used to develop the Baseline Risk Assessment; without this information the verification of the risk assessment values is not possible.

Response:

Lists of the specific samples (per medium) used in the computation of exposure point concentrations for use in Exposure Assessment and Risk Characterization are provided in the revised BRA.

Comment 9:

Table 10-1, indicates that this data is surface soil data. For risk assessment purposes, Region IV Office of Health Assessment considers the top one foot as surface soil available for direct exposure. Based on a review of the Remedial Investigation Report, it appears there were no samples collected in the top foot of soil.

Response:

Subsequent to submission of the last version of the RI report, USEPA Region IV ESD performed limited sampling onsite. This sampling effort included collection of 0 to 1 foot soil samples in and around previously identified hot spots. This data has been used in conjunction with 0 to 1 foot soil sample results from E/A&H's investigation to address the soil exposure pathway. Soil samples collected at other depth intervals were excluded from the dataset for direct soil exposure uses consistent with USEPA IV policy.

Comment 10:

This table should include background levels. The heading of this table indicates that all values presented exceed 2X background; for risk assessment purposes the 2X background comparison is only applicable for inorganic compounds. Table 10-7 and 10-8 indicate that the 2X value is 2X maximum; it should be 2X average. The 95% UCL values should be moved to the Exposure Assessment Section. The response to EPA comments indicates the 95% UCL values were calculated based on a normal distribution; most environmental data is lognormally distributed.

The lognormal calculation should be used for this calculation and presented in this document (see attached guidance). use of the normal UCL equation requires presentation of a normality test for each data set. Most of the above comments for Table 10-1 apply to Tables 10-2, 10-4, 10-5, and 10-6.

Response:

Data were compared to two times the mean reference concentration for the medium during the screening process to establish COPCs in the revised BRA.

Comment 11:

It is unclear form Table 10-3 if only one sample was collected from the deep aquifer; this table should include a footnote clarifying this point.

Response:

Only one deep groundwater monitoring well was sampled as part of the remedial investigation. The table has been revised to reflect this fact.

Comment 12:

Tables 10-7 and 10-8 should be deleted. The background data should be included in the Same table(s) as the site-specific data. It is unclear why Section 10.2 indicates that it was not possible to establish background when these tables present background data. What is the source of the background data?

Response:

Reference data for soil and groundwater are presented in multiple tables in the revised BRA. Stand alone tables are provided as a summary of reference data. The two times reference criteria for these media are provided in screening tables along with risk-based screening values. Both reference and screening values were compared to site data to establish the COPC list.

Comment 13:

As previously stated, a table following the format of RAGS Exhibit 5-7 should be presented in the Chemicals of Potential Concern Section.

Response:

A table following the format of Exhibit 5-7 has been added to the revised BRA.

Comment 14:

The Exposure Assessment Section (10.3) does a poor job of describing the exposure setting, identifying and detailing the exposure pathways and presenting the quantification of exposure. This section requires extensive revision.

Response:

Section 10.3 has been bolstered to provide clear descriptions of exposure setting, complete identification of exposure pathways, and more detailed quantification of exposure discussion. It has been extensively revised.

Comment 15:

Is Section 10.3.1, paragraph 3, sentence 2, accurate? This facility is scheduled for realignment and is included in the Base Realignment and Closure (BRAC) list.

Response:

The portion of NAS-Pensacola covered by the subject RI/FS is not slated for BRAC. Specific operations may change in the near future with the reduction (or elimination) of industrial wastewater treatment volumes. This is not *expected* to appreciably alter the status of OU 10 or Site 13.

Comment 16:

Section 10.3.1 should include more information on the physical environment and potentially exposed populations. Basic site characteristics such as climate, vegetation, groundwater hydrology and the presence and location of surface water should be identified. Potentially exposed populations should be identified and described with respect to those characteristics that influence exposure of the current populations and well as future populations.

Response:

Information regarding the physical environment and potentially *exposed* populations has been added to Section 10.3. Basic site characteristic information has also been added although the reviewer is referred to earlier RI section for more detailed descriptions.

Comment 17:

Section 10.3.2 is poorly written and does not adequately describe the exposure pathways. The second sentence of the first paragraph should be deleted. It is clear form this sentence that the author does not understand the EPA concept of reasonable maximum exposure (RME) and the

purpose of using the 95% UCL or the maximum concentration when the UCL exceeds the maximum (See RAGS Section 6.4.1).

Response:

Section 10.3.2 has been reworked to more clearly describe exposure pathways. The reviewer did not fully comprehend the point of the statement regarding RME. Never the less, this passage has been altered as it has no influence on the overall BRA approach.

Comment 18:

It is unclear from the following statement, included in paragraph 1 of Section 10.3.2, if all soil samples were considered surface soil for the purposes of this baseline risk assessment: "All soil within the area of concern is also assumed to be exposed at the surface." It is inappropriate to consider any samples collected deeper than 1 foot below land surface as surface soil for the Baseline Risk Assessment.

Response:

The statement referenced in the comment was meant to explaii that shallow soils currently located beneath asphalt or other materials were assumed to be exposed. This was considered a conservative assumption. The pertinence of this passage was lost when the dataset was substantially altered by subsequent sampling efforts.

Comment 19:

The following statement in the second paragraph of Section 10.3.2 in unclear: "Although neither exposure pathway has been reported . . . " It is inappropriate to automatically default to the maximum detected value. The maximum detected value should only be used if the calculated UCL values exceed the maximum detected value; though a limited data based will usually result in the maximum it should not be assumed. Also, the first sentence after Table 10-9 is poorly constructed and unclear.

Response:

The referenced statement has been revised. Table 10-9 information has been rearranged and is presented in a more clear and concise format in the revised BRA.

Comment 20:

Table 10-9 should follow the format of Exhibit 6-8 in RAGS. The table as currently presented does not include exposed populations for all exposure routes. Also, the table should clearly distinguish between current and future pathways. The risk management information included

in this table should be removed (the information included in the parenthesis of the second and third bullets).

Response:

See response to comment #19.

Comment 21:

Section 10.3.3 should present the 95% UCL equation and calculated values. The response to EPA comments indicates the 95% UCL values were calculated based on a normal distribution; most environmental data is lognormally distributed. The lognormal calculation should be used for this calculation. Use of the normal UCL equation requites presentation of a normality test for each data set.

Response:

The 95% UCL equation has been included in the revised BRA. Lognormal distributions were assumed for *each* parameter in *each* medium.

Comment 22:

The reference to Figures 10-1 and 10-2 is inappropriate to its location; its location implies that these figures contain infoxmation on the calculation of the 95% UCL or 95% UCL values. Also, these figures should be included in the document on the following page; not 17 pages later.

Response:

Figure references have been entirely revised and said figures promptly follow their first mention in the narrative.

Comment 23:

The uncertainty discussions in Section 10.3.3 should be moved to the Uncertainties Section.

Response:

In the revised BRA, uncertainty related discussions have been moved to the Risk Uncertainty section.

Comment 24:

All references to worst-case should be deleted and replaced with a discussion of the reasonable maximum exposure methodology (see RAGS Section 6.4.1).

Response:

The phrase 'worst case' has been replaced with reasonable maximum exposure (RME) where applicable.

Comment 25:

Section 10.3.3 should present the intake equations and input parameters prior to presenting the chronic daily intake values.

Response:

In the revised BRA, intake equations and input parameters precede chronic daily intake presentations.

Comment 26:

The third paragraph of the Groundwater Pathway Section (page 10-27, top paragraph) does not make sense. The paragraph starts with "This use would . . . ." What is "this" referring to? This paragraph also includes a reference to see Quantification of Exposure, this is the Quantification of Exposure Section. The intake parameters should be clearly presented in this document.

Response:

The referenced passage has been removed from the revised BRA.

Comment 27:

The "Groundwater Value" heading in Tables 10-10 and 10-11 should be changed to "Exposure Point Concentration." Also, chemical concentration values should not be presented in scientific notation. These tables contain no CDI's for 1,2,3-tricholorobenzene.

Response:

All data values used to compute chronic daily intake are referred to as exposure point concentrations in the revised BRA.

Comment 28:

Table 10-12 should not contain hazard quotient values; these should be included in the Risk Characterization Section. It should be noted that hazard quotient values should not be presented in scientific notation. As previously stated, the exposure point concentration should be the lesser of the 95% UCL or the maximum detected concentration. The column heading "Maximum Groundwater Value" should be changed to "Exposure Point Concentration."

Response:

CDI and risk/hazard computations have been segregated in the revised BRA.

Comment 29:

Table 10-13 should not include slope factors, TEFs, reference doses, cancer risk values, hazard index values (which are really hazard quotients). These values do not belong in the exposure assessment section but rather in the Toxicity and Risk Characterization Sections. It is also unclear how a cancer risk value of "0.0E+00" can be obtained for 1,2-dichlorobenzene. As previously commented, the concentration for carcinogenic PAHs should be adjusted by the TEF and not the slope factor as the footnote in this table implies. The column heading "Surface Soil Concentration" should be changed to "Exposure Point Concentration."

Response:

Toxicological values have been removed from all tables presented in the Exposure Assessment. In the absence of carcinogenic slope factors, the cancer risk associated with a specific contaminant has been designated Not Applicable ("NA") in the revised BRA. This change should provide clarity relative to USEPA's concern. TEFs have been used to modify the concentration term (where appropriate).

Comment 30:

Table 10-14 should include a footnote for the "--" used for 1,2-dichlorobenzene and 1,3-dichlorobenzene. The column heading "Surface Soil Concentration" should be changed to "Exposure Point Concentration."

Response:

The table analogous to Table 10-4 in the last BRA revision has been modified to reflect USEPA comment.

Comment 31:

In Table 10-15 the heading "Surface Water Value Detected" should be changed to "Exposure Point Concentration." Lead does not have an MCL; it has a "treatment technique action level" of 0.015 mg/L.

Response:

The term Surface Water Value Detected has been changed to read Exposure Point Concentration. The proper reference for the lead standard has been changed to read "treatment technique action level".

Comment 32:

In Tables 10-16 and 10-17 the heading "Surface Sediment Concentration" should be changed to "Exposure Point Concentration." The 500 mg/kg level set by the agency for lead is an interim remedial action level and not a bioavailability threshold. The notes in Table 10-17 indicate that the TEF computed slope factors are shaded; they are not included in this table. As previously commented, the concentration for carcinogenic PAHs should be adjusted by the TEF and not the slope factor as the footnote in this table implies.

Response:

The term Surface Sediment Concentration has been changed to read Exposure Point Concentration. The screening for lead was changed to 400 mg/kg per recent USEPA guidance. The remainder of comment has been noted and addressed elsewhere in the responses.

Comment 33:

Tables 10-18 and 10-19 should be presented prior to the presentation of the CDI values. Footnote b in Table 10-18 implies that the average of detected chemical concentrations was used in the risk assessment; this contradicts the document and EPA guidance. The reference to "Soil Exposure Formulae Key" in the lifetime category is not understandable by this reviewer. The exposed body parts for dermal exposure should be included.

Response:

The referenced tables have been modified and moved. The average chemical concentrations were not used as part of the risk characterization. Exposed body parts have been listed in the revised BRA.

Comment 34:

Figures 10-1 and 10-2 are confusing. The age-adjusted soil ingestion factor is referenced to RAGS Part A; this is not included in RAGS Part A. RAGS Part A advocates the use of separate equations for calculation of childhood and adult exposures. The heading for these figures indicates these formulas compute carcinogenic and non-Carcinogenic risk; these formulas calculate chronic daily intake not risk. The assumptions included in these equations are not adequately described; for example what is the rationale for the 2.6 hour factor in the "time and age adjusted ingestion rate" and the 104 days/year recreational exposure frequency. Also, it is unclear how the "ingestion during recreation exposure was calculated "50 ml X 2.6 hr/day and adjusted for age as above = 0.1 1/event." The units don't cancel and it is unclear how 0.1 1/event was obtained. Footnotes a and b are not used in Figure 10-1. It should be noted that RAGS Part B is inappropriate for use in the baseline risk assessment; RAGS Part A should be used to develop the equations for the baseline risk assessment. RAGS Part B is used for development of preliminary remediation goals which axe developed during scoping of the remedial investigation.

Response:

Presentation of exposure quantification formulae has been changed in the revised BRA to provide clarity. Where applicable, the formulae have been modified to result in proper CDI units. Figure notes have been expanded.

Comment 35:

Figures 10-3 and 10-4 are not referenced in the text of the baseline risk assessment. See comments on Figures 10-1 and 10-2 for comments relative to these figures. It is unclear why the daily indoor inhalation rate for the worker is different on Figures 10-2 and 10-4.

Response:

In the revised BRA, all figures and tables have been referenced in the text. A typographical error was committed regarding indoor inhalation rates. This **has been corrected in the revised BRA.**

Comment 36:

Table 10-20 should follow the page which it is first cited (page 10-34). The reference in the text implies that toxicological data (i.e. reference doses and slope factors) are included in Table 10-20; they are not. The toxicological values are included in Table 10-21 which is not referenced in Section 10.4, but rather at the bottom of Table 10-20. As previously commented, the main body of this document should include a short description of the toxic effects of each chemical carried through the risk assessment in non-technical language. Included in this description

should be information on the effects associated with exposure to the chemical and the concentrations at which the adverse effects are expected to occur in humans.

Response:

Tables and figures promptly follow their first narrative reference in the revised BRA. Toxicological profiles have been added for each COPC.

Comment 37:

The TEF footnote on Table 10-21 should be changed; exposure point concentration should be adjusted not slope factors. This note also indicates that some values will be shaded; no values are shaded in this table. The 95% UCL, maximum detected, and lead bioavailability notes should be removed from this table; they are not applicable. This table should be rearranged so that it is clear that the cancer class reference column pertains to the slope factors and that the uncertainty and modifying factor columns pertain to the reference doses. It should be noted that this review did not include verification of the reference dose and slope factor values.

Response:

As previously mentioned, statements regarding TEF application in the toxicological reference table have been changed. Misplaced table notes have been deleted.

Comment 38:

Section 10.5 should present risks associated with the site; most of the discussion in this section is uncertainties issues which should be moved to the uncertainties section (e.g., the uncertainty issues presented in Section 10.5.1 relative to chromium).

Response:

Uncertainty discussions have been reserved for the Risk Uncertainty section in the revised BRA.

Comment 39:

Section 10.5.1, second paragraph, first sentence, is incorrect. All references to "worst-case" should be removed from this document. Acronyms should be used consistently throughout this document; PAHs has been used up to this section which now uses PNAs.

Response:

The term 'worst case' has been replaced with RME, where appropriate.

Comment 40:

Section 10.5 should include a table which shows all pathways with risk greater than lE-4 and HI greater than 1. For these pathways all chemicals which individually contribute risks greater than 1E-6 and HI greater than 0.1 should be included.

Response:

A table summarizing exposure pathways with associated risk greater than 1E-4 and/or hazard index greater than 1 has been added to the revised document.

Comment 41:

It is unnecessary to present the REFs, reference doses, cancer slope factors, and soil concentrations in Tables 10-22 through 10-28. These values have already been presented and they confuse the presentation of the risk values. due to the numerous errors in the preceding sections of this risk assessment, verification of Tables 10-22 through 10-28 was not included in this review. Per RAGS, all risk, HI and HQ values should be presented as one significant figure. Additionally, HI and HQ values should not be presented in scientific notation.

Response:

Although presentation of COPC concentrations in risk characterization tables is not necessary, inclusion of toxicological values was deemed appropriate. As a result, slope factors and reference doses appear in risk characterization tables in the revised BRA. This information should facilitate review by allowing the reviewer to quickly confirm CDI values as a back calculation step. HQ and HI values are presented with one significant digit.

Comment 42:

It is unclear why Section 10.71. and 10.7.2 are both titled "Groundwater Pathways" and unusual that Soil uncertainties are not addressed in Section 10.7.

Response:

Section 10.7 has been entirely reformatted to more comprehensively address uncertainty sources. The error identified in the comment has been corrected.

Comment 43:

Section 10.8 should be a risk summary and not a continuation of the Uncertainties Section (10.7).

Response:

Section 10.8 has been rewritten. Specific sources of uncertainty which may have an influence on the interpretation of risk projections have been retained, where appropriate.

Comment 44:

Due to the numerous errors in the preceding sections of this risk assessment, review of Section 10.9, Remedial Goal Options, was not included in this review in addition to Section 10.5, Risk Characterization. However, it should be noted that the terminology Preliminary Remediation Goals or PRGs should be eliminated from this document and that RGOs for non-carcinogenic compounds should be presented for the 0.1, 1, and 10 hazard quotients levels.

Response:

Section 10.9 has been renamed Remedial Goal Options. Non-carcinogenic contaminant RGOs were calculated at hazard quotient levels of 0.1, 1 and 10.

Ecological Assessment

Comment 45:

Sec. 5.3, p. 5-21 - The text states that salinity was measured for surface water samples, yet no salinity data are included with the Auxiliary Field Data presented in Appendix E. This should be checked. (Also, it appears that dissolved oxygen was not measured for the surface water samples. This should be done for any surface water samples collected in the future.)

Response:
Salinity was not **measured at surface water sampling locations. The reference to salinity measurements has been deleted.**

Comment 46:

(a) Sec. 7.3, p. 7-55 and Table 7-10, p. 7-56 - (a) Surface water concentrations are compared to surface water standards or criteria in Section 7.3 (Surface Water Contamination) and Table 7-10, and also in Section 10.6 (Ecological Assessment), pages 10-75 and 10-82, and Table 10-31, but these comparisons are not consistent. Table 7-10 compares only a few metals to the Florida Surface Water Quality Standards for marine waters (Class III0, while Table 10-31 compares detected concentrations of both organic and inorganic chemicals to surface water screening values for freshwater (i.e., Ambient Water Quality Criteria) and the florida Surface Water Quality Standards for marine waters. [On the other hand, sediment data were compared to sediment screening values in Section 10.6, page 10-82 and 10-85 and Table 10-32, but not

under Section 7.2 (Sediment Contamination), pages 7-44 to 7-53.] If these comparisons with standards or screening numbers are primarily for ecological purposes, it would be better to retain them in Section 10.6 and delete them from Section 7.3. Either way, the approaches should be consistent.

(b) The concentrations of all detected chemicals should be compared to the appropriate screening values.

(c) Determine whether the surface water is freshwater or saltwater (e.g., based upon salinity measurements, if available). If it is freshwater, an average hardness should be calculated, based upon the concentrations of calcium and magnesium in the surface water samples. (Hardness is needed because the surface water standards for some metals are hardness dependent.)

(d) In both the text and Table 7-10, the Florida Surface Water Quality Standard for cadmium should be 9.3 ug/L, not 0.3 ug/L. Since the samples were analyzed for total chromium, the standards for both trivalent and hexavalent chromium should be given.

Response:
(a) Section 73 has been revised to compare the surface water concentrations to Florida Surface Water Quality Standards for fresh waters (Class III).

(b) Because the screening values are for ecological purposes, all of the detected chemicals will be compared to the appropriate screening values in Section 10.

(c) The surface water has been determined to be fresh water because the southern drainage ditch is not connected to Pensacola Bay. In addition, tidal influence was not observed in the drainage ditch. Sample 33W02002 was submitted for laboratory analysis of hardness. Hardness is 56 mg/L.

(d) Agreed. The standard for trivalent and hexavalent chromium will be given.

Comment 47:

Sec. 10.1, p. 10-1 - As stated in my memorandum of July 19, 1993, the list of guidance documents used for preparing the risk assessment should also include the following documents:

Risk Assessment Guidance for Superfund, Volume II - Environmental Evaluation Manual, Interim Final, USEPA/OERR, EPA/540/1-89/001, March 1989.

Framework for Ecological Risk Assessment, USEPA/Risk Assessment Forum, EPA/630/R-92/001, February 1992.

Although these documents are mentioned in Section 10.6, page 10-73, they might also be included in the list of risk assessment guidance documents presented in Section 10.1.

Response:

Agreed. The risk assessment guidance documents will be presented in Section 10.1.

Comment 48:

Sec. 10.6, p. 10-73 - (a) In the first sentence of the first paragraph, change "terrestrial ecosystem" to "ecological receptors". Next, mention that this section focuses on the terrestrial ecosystem at OU 10, but it also includes an initial assessment of surface water, sediment, and ground water in relation to possible effects on the ecological receptors of the NASP Wetlands, Pensacola Bay, and Bayou Grande.

(b) In the second paragraph, the meaning of the first sentence is unclear. Each Operable Unit (OU) must have its own ecological risk assessment; an overall ecological risk assessment can be done once all of the individual OUs are addressed. If data gaps are identified, the document should indicate how and when these gaps will be addressed. For example, the Navy, EPA, and the Natural Resource Trustees have agreed that data gaps for the OU 10 wetlands and drainage ditch will be addressed in conjunction with the investigations for the NASP Wetlands, Pensacola Bay, and Bayou Grande Operable Units.

(c) Define the term "trigger levels". As mentioned in the text, the issue of sediment screening values still needs to be resolved. EPA has been reevaluating its sediment screening values and has received recommendations from the Region IV Ecological Technical Advisory Group (ETAG). EPA hopes to complete its reevaluation at the January 27 meeting of the ETAG, and to issue new Region IV Waste Division sediment screening values shortly thereafter.

Response:

(a) "Terrestrial ecosystem" will be changed to "ecological receptors" in the first sentence. It is also stated that this section focuses on the terrestrial ecosystem with an initial assessment of site-related groundwater, surface water and sediment in relation to possible effects on the ecological receptors. Evaluation of potential effects from this media will be addressed in the Sites 40 and 42 investigations.

(b) Agreed. An ecological risk assessment has been completed for OU 10. Any data gaps for the OU 10 wetlands, and drainage ditch will be addressed in conjunction with the investigations for the NASP Wetlands, Pensacola Bay, and Bayou Grande.

(c) The term "trigger levels" has been deleted. Detected concentrations in sediments have been compared to the USEPA Region IV Sediment Screening Values and FDEP regression equations for metals.

Comment 49:

Sec. 10.67, p. 10-75 - (a) In the first paragraph, summarize the results of the Habitat and Biota survey as presented in Section 4.4, and refer to the wetland/habitat map (Figure 4-6).

(b) In the second paragraph, the concentrations of chemicals found in surface soils should not be compared to the sediment screening values, since these are two different media. Instead, information on ecotoxicity of the chemicals should be obtained form available literature, databases, etc., and used to qualitatively or quantitatively evaluate the soil data.

(c) With respect to the third paragraph, the ecological assessment must address the potential for ecological effects with respect to possible discharge of site-related ground water contaminants into surface water bodies. (See Section 9.2.2, page 9-4, Section 9.3, page 9-6, and my memoranda of July 19, 1993 and October 26, 1996 regarding the Draft RI Report for OU 10.) An initial screening of the ground water data can be conducted as part of the OU 10 RI Report, with further evaluation of potential ecological impacts to be addressed in conjunction with the Pensacola Bay, Bayou Grande, and NASP Wetlands OUs, as mentioned in Section 9.3.

(d) Since this section apparently contains the first mention of the Long and Morgan (1990) ER-L and ER-M values, it could include a short explanation of the effects range values generated by NOAA. The reference should be cited in the text, and the reference citation should be included under the References in Section 12.0.

(e) Since a consensus has not yet been reached on sediment screening values to be used at NAS Pensacola, it is acceptable for now to use both the ER-L (the lower loth percentile of the NOAA effects range database, used as a screening value by the EPA Region IV Waste Division) and the lower 20th percentile of the same database (proposed as a screening value by the Navy). However, since the ER-L is defined as the 10th percentile, the term "20% ER-L" is inappropriate and must be changed.

(f) In the fourth paragraph, clarify that the purpose of comparing sediment analytical data to the sediment screening values is to determine the potential for the sediment contaminants to cause adverse ecological effects. Exceedances of these screening values might indicate a need for further site-specific ecological studies. Also, change line 3 to read "USEPA chronic and acute Ambient Water Quality Criteria (AWQC)".

Response:

(a) The results of the habitat and biota survey are briefly summarized in Section 10.6. Reference is also made to Figure 4-6.

(b) Agreed. Soil concentrations were compared to information on toxicological characteristics for parameters in terrestrial ecosystems. That type of information is extremely limited.

(c) Groundwater discharge to surface water will be addressed. Further evaluation of groundwater discharge will be conducted during the Pensacola Bay, Bayou Grande, and NAS Pensacola wetlands investigations.

(d) This comment has been addressed by the modification in approach of this section.

(e) The screening value proposed by the Navy has been deleted and replaced with the screening values agreed to by the Tier I Partnering Team.

(f) The use of sediment screening values to determine if contaminants may cause adverse ecological risk has been clarified.

Comment 50:

Sec. 10.6.1, p. 10-75 - To support the statement about limited use of the IWTP by ecological receptors, expand the description of the IWTP. For example, Section 4.2.2, page 4-5 to 4-6, mentions grasses and bare soils in this area, and that marsh vegetation is present in the closed stabilization and polishing ponds.

Response:

The description of the IWTP has been expanded.

Comment 51:

Sec. 10.6.2, p. 10-76 - In line 6, change "ecology" to "ecological receptors". Also, it would be helpful to number the subsections under Section 10.6.2 (e.g., Section 10.6.2.1, Potential Chemicals of Concern).

Response:

"Ecology" has been changed to "ecological receptors".

Comment 52:

Sec. 10.6.2, Potential Chemicals of Concern, p. 10-76 and Table 10-30, p. 10-77 - Check the guidance for human health risk assessment regarding selection of Potential Chemicals of Concern. Soil concentrations should be compared to two times the mean background concentration rather than the maximum background concentration. Once this comparison is done, revise the text as needed. For non-detects in Table 10-30, include the U value for

comparison. Either include the background soil concentrations or refer to Table 10-7, page 10-15, and refer to the figure which shows the surface soil sampling locations.

Response:

Soil has been compared to 2 x the mean reference concentration.

Comment 53:

Sec. 10.6.2, *Exposure* and *Pathways*, p. 10-79 - (a) In line 1 of paragraph 2, change "biological components" to "animals", since the focus of this paragraph is fauna.

(b) In paragraph 4, mention that the highest surface soil contaminant levels were found in the swale area, rather than in the pine flatwood area. (However, high contaminant concentrations were found in sample 33S57 at the old wastewater treatment plant, which was not included in this evaluation.)

Response:

(a) Biologic components has been deleted.

Comment 54:

(a) Sec. 10.6.2, *Risk Characterization*, pp. 10-80 to 10-81 - (a) Delete the statements about comparison of soil contaminant levels of the NOAA sediment ER-L values and the "20% ER-L" values, Modify this section based upon literature information on ecotoxicity of the contaminants. (See the comments given above.)

(b) The focus of the Ecological Risk Assessment should be populations and communities, rather than individual organisms, unless species of special concern (e.g., endangered or threatened species) are present. Therefore, it is recommended that the information presented under the subheading *Potential* Individual *Organism Effects* be combined with the section titles *Potential Species/Community Effects*.

(c) Recommendations for remedial action should be included in the Feasibility Study, not the Ecological Risk Assessment.

(d) See the comment given above concerning an initial evaluation of ground water contaminants.

Response:

(a) Soil is no longer compared to sediment ER-L values. Ecotoxicity levels obtained from literature information will be used for comparison.

(b) Agreed. The ecological risk assessment is focused on populations and communities.

(c) Recommendations for remedial action have been deleted from the text.

(d) An initial qualitative assessment of ground water contaminants has been included. Further investigation will conducted during the Pensacola Bay, Bayou Grande, and NAS Pensacola Wetlands investigations.

Comment 55:

Sec. 10.6.2, *Uncertainty/Recommendations*, pp. 10-82 - See the comment given above concerning recommendations for remedial action.

Response:

Recommendations for remedial action are not presented.

Comment 56:

Sec. *10.6.3, Surface Water*, p. 10-82 - As mentioned above, see the human health risk assessment guidance concerning non-detects and calculation of the mean concentration. The reference to Table 10-14 is incorrect.

Response:

Non-detects are presented as NDs in Table 10-60.

Comment 57:

Sec. 10.6.3, *Sediment*, p. 10-82 - As mentioned above, change the term "20% ER-L values". Change line 3 to read "to evaluate the potential for adverse ecological effects and the need for further study."

Response:

This comment has been addressed by the significant revisions to the text.

Comment 58:

Table **10-31,** p. 10-82 - This table needs to be revised, as follows:

(a) In the footnotes, indicate that the EPA Region IV Waste Division surface water Screening values are based upon the Ambient Water Quality Criteria, and change "NOAA" to "EPA."

(b) These comparisons should be shown for all detected chemical parameters shown in Appendix O.

(c) For each parameter having at least one detection, the non-detected values should be shown as "U" values, with the U value being the detection limit for that sample. The substitution of the "lesser of 1/2 CRQL or lowest hit" for non-detects does not appear to be correct; generally, 1/2 the detection limit for each non-detect sample is used in calculating the mean concentration. Check the human health risk assessment guidance on this point.

(d) As mentioned above, indicate whether the standards and screening numbers used for comparison are freshwater or saltwater. (The values given appear to be the freshwater numbers for the Ambient Water Quality Criteria and the marine numbers for the Florida Surface Water Quality Standards.)

(e) Include standards/screening numbers for both trivalent and hexavalent chromium, since samples were analyzed for total chromium.

(f) Too many digits are shown for some of the screening values, implying more significant figures than are appropriate; only the original number of decimal places shown for the surface water standards or screening values should be used in the table.

(g) If the values given are for freshwater, include the mean surface water hardness value in a footnote, and adjust the standards/screening numbers accordingly.

(h) The text on page 10-82 should be revised appropriately, based on the comments given above.

Response:

(a) A footnote has been added indicating the USEPA surface water screening values are based upon the Ambient Water Quality Criteria.

(b) All detected parameters are shown in Table 10-60.

(c) "U" values are shown for the non-detects in Table 10-60.

(d) The standards used for screening are for freshwater.

(e) Both trivalent and hexavalent chromium screening values are presented in Tabie 10-60.

(f) The number of digits presented has been decreased.

(g) The surface water hardness of 53 mg/L is presented in a footnote.

(h) The text has been revised significantly.

Comment *59:*

Table 10-32, p. **10-84** - (a) Several of the comments for Table 10-31 also apply to this table.

(b) Change "10% **ER-L** Value" and "20% ER-L Value" to "10th Percentile Value **(ER-L)**" and "20th Percentile Value", respectively, and revise the title.

Response:

The table has been revised. "20% ER-L values" have been deleted.

Comment 60:

Sec. 10.6.3, p. 10-85 - Rather than mentioning specific types of tests to be done in the future, it is recommended that the last two sentences be changed to indicate only that further investigations of the southern drainage ditch will be conducted in conjunction with the investigations for the NASP Wetlands and Pensacola Bay OUs.

Response:

Reference to specific tests to be completed have been deleted.

Comment 61:

Sec. 10.6.2, p. **10-85** - (a) For clarification, state that Magazine Point is Site 13, and that sediments were collected form the dredge *spoils* disposal area.

(b) While the sludge pit area at Magazine Point contains dredge *spoils* (sediments from the yacht basin/Bayou Grande), it seems to be more of an upland habitat rather than an aquatic habitat, and it does not appear to have a direct connection to Pensacola Bay (e.g., no drainage ditch.) (See Section 7.2.2, page 7-48, and Figure 4-6, page 4-23). Figure 4-6 shows the dredge spoil/sludge pit area as a disturbed habitat, adjacent to a pine/flatwood community and a beach/shore habitat. Therefore, it might be more appropriate to address the dredge spoil area

as part of the terrestrial risk for OU 10, rather than including it in the NASP Wetlands, Pensacola Bay, and Bayou Grande OUs.

Response:

It has been added that Magazine Point is Site 13 and that the sediment samples were collected from the dredge spoil depressions.

Comment 62:

Table 10-33, p. 10-86 - If this table is retained, see the comments given above for Table 10-32.

Response:

The table has been deleted.

Comment 63:

Sec. 10.7, p. 10-85 - This section *can* include uncertainties with respect to the determination of ecological risk.

Response:

Uncertainties are provided *in* the discussions of the different media in the ecological risk section, 10.9.

Comment 64:

Sec. 10.8, p. 10-89 - This section should also include a summary of the ecological risk.

Response:

A summary of ecological risk is provided in Section 10.9.

Comment 65:

Sec. 11.2, p. 11-10 - (a) summarize the ecological risk to terrestrial receptors with respect to soils.

(b) Correct the last paragraph where it mentions "NOM" screening values for surface water. Also, as mentioned above, check to see whether freshwater or saltwater screening values are appropriate.

Response:

(a) The ecological risk to terrestrial receptors is summarized in Section 11.2.

(b) "NOAA" has been deleted and replaced with USEPA Ambient Water Quality Criteria. Freshwater screening values are used.

Comment 66:

Sec. 11.2, p. 11-11 (a) Change the first sentence to state that sediment data were compared to the two sets of sediment screening values (i.e., NOM ER-L and the 20th percentile of the NOAA effects range database), and summarize the findings.

(b) In the second sentence, change "action levels for contaminants in freshwater sediments" to "sediment screening values."

Response:

(a) Sediment data were compared to USEPA sediment screening values. Regressions for metals for metals were also used.

(b) "Action levels for contaminants in freshwater sediments" has been deleted and replaced with "sediment screening values."

Comment 67:

Sec. 11.3, p. 11-11- In thethirdparagxaph, indicate that the drainage ditch will also be included in the investigations of the NASP Wetlands and Pensacola Bay OUs.

Response:

Agreed, The drainage ditch will be included in the investigations of the NAS Pensacola wetland and Pensacola Bay investigations.

Comment 68:

Site 13, p. 11-11 - The first paragraph might need revising, depending upon the reevaluation of the dredge spoils area with respect to terrestrial risk.

Response:

The first paragraph has been revised significantly.

Groundwater Comments

Comment 69:

The aquifer tests conducted at OU 10 were unsuccessful in providing representative hydraulic property data. The tests were conducted for 6 hours at pumping rates that did not significantly stress the aquifer. Drawdown in surrounding observation wells ranged from 0.04 to 0.15 feet. The duration of the aquifer test and the amount of drawdown produced in the observation wells were insufficient for evaluating hydraulic properties and boundary conditions of the aquifer. It is critical that a constant rate aquifer test be conducted that lasts a minimum of 72 hours (48 hours drawdown, 24 hours recovery). Data obtained from the test will serve as baseline data for designing the extraction system.

Response:

The Navy agrees with the technical content of this comment. However, as discussed previously with EPA, the Navy feels that further aquifer testing at OU10 is not necessary for the purpose of the RI. The Navy understands that groundwater extraction at this site will almost certainly be included as an element of the ROD, and in this case, the suggested long-term testing should be accomplished at least as part of pre-design for RD/RA. However, in light of the fact tbat long-term testing will probably be required at OU10, and that the results of this testing will enable a more thorough understanding of the aquifer at the site and potentially provide useful information to other NASP sites, the Navy concurs to initiate a long-term aquifer test as soon as possible. As stated before, as the lead agency, the Navy will prepare a plan-of-action for conducting this test, and provide it to the EPA and FDEP. As this type of format does not require formal review/approval process, prior to conducting the test the Navy will follow up with technical discussions between EPA and FDEP to incorporate any suggestions the agencies may have. The Navy does wish to reiterate that lack of long-term test data should not hold up the OU10 RI schedule, and that long-term testing at OU10 will be conducted as soon as funding, logistics, and agency input make it possible.

Comment 70:

The lithology of the surficial zone is described as a continuous quartz sand that extends the thickness of the unit. The text states that the surficial zone is composed of white- to light brown, fine- to medium quartz sand, extending to a depth of approximately 38 to 48 feet bgs. There is no break in the lithology for the entire thickness of the zone (pages 3-6 through 3-7). However, based on slug test and specific capacity tests the hydraulic conductivity of the shallow portion of the surficial zone (upper 15 feet of saturated zone) is an order of magnitude greater than the basal portion of the surficial zone (approximately 30 to 40 feet bgs). The text states that the upper and lower portions of the surficial aquifer exhibit different hydraulic properties but are hydraulically connected and ground water communicates freely between zones (pages 6-39 through 6-41). Based on the limited data provided this may or may not be true. There may be several reasons for the low values calculated in the deeper interval of the surficial aquifer. These include: well installation, well construction, well development, screen corrosion, and/or lithologic changes.

Response:

The primary reasons for stating that groundwater communicates freely between zones were 1) the absence of significant lithological barrier to potential cross-flow, and 2) the similarity in flow regimes (gradients and directions). The Navy agrees with the technical content of the comment, but wishes to point out that lower conductivities noted in the intermediate zone occur primarily in the central portion of the site where contamination is greatest. Given that the intermediate wells were installed, constructed, and developed in similar fashion, it is unlikely then that these factors are the primary reasons for the lower conductivities. While these factors may contribute, the more likely reasons are, as stated by EPA, screen corrosion, lithologic changes, and/or aquifer matrix corrosion induced by biofouling and/or contamination. These types of uncertainties will be resolved upon completion of the planned long-term test.

Comment 71:

The well installation varied for wells installed at OU 10. Shallow wells (12 to 15 bgs) were installed by hollow stem augers and deep wells (30 feet or greater) were installed by mud rotary (pages 5-24 through 5-25). Mud rotary wells are much more difficult to develop properly and often leave a 'skin effect' that does not allow ground water to move freely into the well. Also, the specific capacity tests conducted on the wells indicate that the wells were not properly developed. Table 6-5 (page 6-30) lists the results of the specific capacity tests. Two wells were tested during development and after development. The specific capacity results did not increase but remained the Same after development indicating that development of the wells did not occur.

The lack of development may also be due to the type of screen used in well construction. Rather than using punched slot screens, continuous slot screens should be installed in future

extraction wells. These screens have as much as 40 percent more open area than punched slot screens which increases the transmitting capacity of the well.

As mentioned in the text, another factor that may limit the productivity of the well is corrosion of the well screen. The corrosion may be dissolved chemically or possibly by over developing the well. Finally, the clay composition in the surficial aquifer may increase with depth causing the hydraulic conductivity to decrease with depth.

The lower hydraulic conductivity values observed in the basal portion of the aquifer may be due to one of the factors mentioned above or a combination of the factors. In any case, more work should be conducted at OU 10 to determine the hydraulics of the system. A constant rate aquifer test should be conducted at the site. Ideally the test should be conducted with a new extraction well constructed in a manner that maximizes the transmitting capacity of the well. If an existing recovery well is used, it should first be developed using a high powered flushing technique, such as jetting.

Response:

The Navy in general concurs with the technical content of the comment. It should be noted, however, that the Navy disagrees with the statement that the wells were not properly developed. All procedures for well development provided in the workplan, SAP, and SOPQAM were followed to the letter and are documented in the fieldbooks, and the results of specific capacity testing pre- and post development were provided for information only. This information was not intended to infer that well development was not accomplished, only to point out that "textbook" conditions are not always applicable to documented site-specific conditions.

Comment 72:

.Analytical methods that assume an unconfined aquifer should be utilized to evaluate aquifer test data. Also, it is not acceptable to use the screened interval as the aquifer thickness in calculating the hydraulic properties of the aquifer. The text states that for calculation of the transmissivity of the surficial zone the aquifer thickness was calculated as follows: '. . .by subtracting the elevation of the bottom of the well from static water level elevation.' Depending on the results from the constant rate aquifer test, the thickness should be assumed to be the entire saturated thickness of the surficial zone (approximately 35 feet) or if it is found that the aquifer is indeed composed of two zones with unique hydraulic properties then the value utilized for calculation should include the entire zone that represents those hydraulic properties.

Response:

The Navy agrees with the technical content of the comment. The aquifer test data presented in the RI has been analyzed using unconfined solutions, and the aquifer thickness

has been assumed to be 35 feet, the approximate saturated thickness of the surficial zone at OU 10.

Comment 73:

Before the constant rate test is conducted, a step drawdown test should be performed to determine optimum pumping rates. At least 5 steps or pumping rates should be used to select the optimum pumping rate..

Response:

The Navy agrees with this comment.

Comment 74:

Figures 6-11 through 6-13 - Information should be provided that indicates the tide cycle relative to the water levels measured in the surficial zone aquifer April 22, 1993. Also, information should be provided that provides the pumping rates for each of the recovery wells.

Response:

The water levels collected on April 22, 1993 were measured during a low tide. The pumping rates for the recovery wells, as provided in the monthly operation and maintenance reports to the Navy, are as follows (note that the flow is totaled weekly; to estimate flow from the wells for another measure of time divide accordingly):

Recovery Well	Cumulative Weekly Flow
RW1, RW2, and RW-3	37,350 gallons
RW4 and 6	75,460 gallons
RW5	29,660 gallons
RW7	25,260 gallons

The total weekly flow for that week is 167,730 gallons

Comment 75:

Extent of ground water contamination in the surficial zone has been delineated aerially except in the area of ES-15 and 33G20. Monitoring well ES-15 contained PCE (190 ppb) and TCE (5 ppb). The adjacent recovery well screened in the Same interval contained dichlorobenzene as high as 90 ppb. The source area for the chlorinated solvent contamination is unknown. Monitoring well 33620 contained 1,2 dichlorobenzene (1200 ppb) and 1,4 dichlorobenzene (670

ppb). Additional intermediate wells should be installed northeast and northwest of ES-15 and north or 33G20 to define the extent of the contaminant plume.

Response:
Both the static and pumping gradients have ES-15 and 33620 downgradient of the ISDBs and swale area which would suggest they are the sources for the detected contaminants. Sufficient numbers of monitoring wells have been installed to complete the FS for OU 10. In addition the FS will overdesign the groundwater mediation system to induce drawdown in those areas. Any additional monitoring wells can be installed during RD/RA.

Comment 76:

Section 7.4.2, p. 7-79 - The data interpretation section should address the possible Occurrence of Dense Nonaqueous Phase Liquids (DNAPLs) as free product pooling on the clay surface at' the base of the intermediate zone or as residual trapped in the soil matrix.

Response:
The concentrations of the chlorinated organic compounds are'lower than their respective solubility values. Therefore, it is not likely that Dense Nonaqueous Phase Liquids (DNAPLs) as free product are pooling on the clay surface underlying the intermediate zone. The highest detected concentration of a chlorinated organic compound was 4,600 ppb in monitoring well GM-66. The solubility for TCE is 1,100,000 ppm.