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NAS PENSACOLA
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November 12, 1993

U.S. Environmental Protection Agency
Attn: Ms. Allison Drew
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. Drew:

On behalf of the Navy, EnSafe/Allen & Hoshall is pleased to submit seven 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 — 13 copies
Lt. Athena Cozakeos, NAS Pensacola — 1 copy
Gary Sweppenhiser, NAS Pensacola — 1 copy
Tom Moody, FDEP — 1 copy
John Mitchell, FDEP — 1 copy
Waynon Johnson, N O M — 1 copy
Lynn Griffin, FDEP — 1 copy

TECHNICAL REVIEW AND COMMENTS
UNITED STATES **ENVIRONMENTAL PROTECTION** AGENCY
DRAFI' REMEDIAL **INVESTIGATION** REPORT FOR **OPERABLE UNIT 10**
NAVAL ***AIR*** STATION **(NAS)** PENSACOLA
PENSACOLA, FLORIDA

GENERAL ON

Comment 1:

The main objective of the remedial investigation, **to characterize** the **nature** and extent of contamination **at** Operable Unit **(OU) 10, has** not **been met. Specifically,** the following **data** gaps were identified during review of **the** Draft RI **Report:**

Site 32 (Industrial Sludge Drying **Beds (ISDBs)):**

- Northern extent of **soil contamination** in the **swale area**
- Extent of the black, **oily soil** horizon encountered **in boring** 33824
- Northern and westward extent of **soil contamination into the** wetland

Site **33** (Waste Water Treatment Ponds (WWTPs)):

- Extent of **soil** contamination around the former **surge** pond .
- Presence/absence of **soil** contamination adjacent to the **stabilization** and polishing ponds

Site **35 (Miscellaneous SWMUs/sites):**

- Clear identification of **all** miscellaneous sites **(i.e., appurtenances** to **OU 10)** and determination of presence/absence of contamination **at** these sites
- Presence/absence of **soil** contamination at the domestic sludge drying **beds** (east of the **ISDBs),** which potentially received industrial **wastes**
- Presence/absence of **soil** contamination at the dump area east of the domestic sludge drying **beds**
- Presence/absence of **soil** contamination at the abandoned waste water treatment plant (north of the **ISDBs),** which **potentially** received industrial **wastes**
- Extent of **soil** contamination **associated** with the historic waste line breach
- Extent of **soil** contamination **associated** with the present surge **tank**
- Extent of **soil** contamination **associated** with the chlorine contact chamber **area.**
- Presence/absence of **soil** contamination at the former leaking underground waste **oil** storage tank
- Characterization of sediments in the **North-South drainage** ditch which **drains** the **IWTP yard**
- Extent of contamination from the 2,000-gallon sulfuric acid **spill** in **1983**
- Extent of groundwater contamination in the vicinity of the old wastewater treatment plant
- Extent of contamination in the vicinity of the **bilge** water plant (additional **soil** and groundwater samples, including those which Groundwater Technology **collected,**

am needed to fully characterize the nature and extent of contamination in this area)

Site 13 (Magazine Point Rubble Disposal) 2132

- Characterization of actual waste materials

The Navy has acknowledged most of the above data gaps in the Draft RI Report. The report also mentions that many of these data gaps will be addressed in the next revision of this report, once the results of a second round of sampling which was conducted during this same field event are evaluated. However, in the absence of this information, the current RI Report is incomplete and, as such, cannot be reviewed for adequacy in meeting the requirements of an RI Report. Due to the incomplete nature of the present Draft, USEPA will regard the next revision of the RI Report as "Draft" rather than "Draft Final" for purposes of review and resubmittal. Information and data which adequately addresses all of the above data gaps must be presented in the next revision of the RI Report.

RESPONSE:

Site 32:

Soil contamination at the swale area has been defined to the northern fence line of the IWTP. Any northward investigation of this contamination would extend into the possible wetland immediately north of the fenceline. The impacts to on-site wetlands, and off-site impacts to Bayou Grande, Pensacola Bay, and additional possible wetlands, will be deferred, since these will be addressed under OUs 15-17 as agreed by the USEPA and FDEP.

The contaminant nature of the black, oily horizon at 33824 has been characterized and the source identified. The extent has been delineated by its absence in boring 33S25 to the north, 33S08 to the east, 33SS06 to the west, and 33S07 to the southeast. Only the extent to the south has not been delineated. The Navy recommends further work in calculating the specific extent of this horizon is more appropriately a remedial exercise and should be conducted in d a t i o n with the Remedial Design/Remedial Alternatives (RD/RA) work phase.

The extent of PAH contamination at 33S05 and 33S20 has been delineated northward with non-detect results at 33S21, and westward to the edge of the possible wetland beyond the IWTP. Any further westward investigation of this contamination would extend into the possible wetland. The impacts to on-site wetlands, and off-site impacts to Bayou Grande, Pensacola Bay, and additional possible wetlands, will be deferred, since these will be addressed under OUs 15-17 as agreed by the USEPA and FDEP.

Site 33:

Borings now have been placed on all four sides of the former surge pond (33S12 adjacent to the south side; 33S46 near the west side adjacent to surge tank; 33S13

adjacent to the north side; and 33547 near the east side at pipeline leak around the primary clarifier). The north side sample yielded trace to non-detect concentrations; the west, south, and east side samples contained contaminants at concentrations below the recommended remediation.

Soil conditions around the stabilization and polishing ponds have not been studied except, along their northern borders at other potential source sites. Waste water levels within the ponds historically had been maintained below the tops of the asphalt/concrete containment berms. Although, the stabilization pond was designed with the capability to mute excess water into a lift station and back into the waste stream, it has never been needed. Any potential for release from these ponds would have been vertically downward percolation of waste water through any leaks in the lining. Soil samples collected beneath the ponds, at the time of RCRA closure, yielded only trace concentrations of polynuclear aromatic hydrocarbons (PAHs) deemed clean enough to be RCRA-clean closed. Any potential releases from the ponds would have been directed to groundwater. Groundwater conditions around the ponds were found to be relatively unimpacted with no constituents reported above Florida Primary Drinking Water Standards (FPDWS) or Maximum Contaminant Levels (MCLs). Based on these samples and the lack of any historic incidences of overflow, it is the assessment of this RI, the ponds did not pose a threat to surrounding soil.

Site 35:

The miscellaneous SWMUs will be further discussed. A flow diagram of the waste water stream will be added to illustrate the function of the miscellaneous units in the overall treatment process. The figure depicting Site 35 will be altered to delineate the areal extent of the Site. Additional soil sampling was accomplished at Site 35 in April 1993; the analytical results will be presented and discussed in the Draft Final RI Report.

Three borings were completed in the former domestic sludge dryii beds in the April 1993 sampling event.

One boring was completed at the northern extent of the dump area east of the domestic beds in the April 1993 sampling event. The central and southern areas have not been explored; additional borings may be needed to be located in the area during RD/RA.

One split boring was completed in the sludge drying beds and immediately outside the beds at the abandoned waste water treatment plant during the April 1993 sampling event.

One boring was placed at the historic waste line breach during Phase I investigations. The soil samples were contaminated at concentrations below

recommended remediation levels. See the baseline risk assessment (BRA) and the feasibility study (FS). Therefore, no further investigation is recommended.

Three borings have been placed adjacent to the surge tank; one on the south side during the Phase I sampling event in December 1992, and one each on the east and north sides during the Phase II sampling event in April 1993.

The nature of soil contamination near the chlorine contact chamber has been characterized by sample 33514. Contaminants were detected at concentrations below human health based risk scenarios as outlined in the BRA. No further investigation is recommended.

A soil boring was completed at the site of the former leaking underground waste oil tank. The analytical results will be presented and fully discussed in the Draft Final RI Report.

Sediments in the north-south drainage ditch at the south end of the site have not been characterized. This ditch drains the southern yard of the IWTP and discharges to the southern possible wetland and drainage ditch. The sediments should be sampled and analyzed during RD/RA.

Most of the sulfuric acid spilled at the acid tank storage area, was contained within the berm. Concentrated sulfuric acid is not expected to contain any Contract Laboratory Program (CLP) Target Analyte List/Target Compound List (TAL/TCL) constituents. Therefore, further soil sampling and analysis would not characterize the extent of the former spill. Because of its high solubility, the contamination effects of the acid would be better tracked in the groundwater. The present well network has identified the extent of a low pH plume associated with the former acid spill.

Monitoring well 33615 and GM-81, both in the vicinity of the abandoned waste water treatment plant, were sampled. 33G15 was contaminated with organic constituents. GM-81 was non-detect with respect to organic contaminants and yielded metals below FPDWS and MCLs. Further characterization of groundwater conditions is not necessary because groundwater in the area is targeted for remediation and will be addressed in RD/RA.

The bilge water treatment plant is not a component of OU 10. Investigation of the petroleum spill there has been investigated under the jurisdiction of the Florida Department of Environmental Protection (FDEP) Underground Storage Tank (UST) Program.

Site 13:

Boring 33S04 was completed in the heart of a debris pile and contained chips of rubble; some was apparently asphalt. Boring 33S06 was completed through rubble

and soil at the eastern end of a large debris pile. These samples characterized the chemical nature of the most prominent debris piles at Site 13. Other Site 13 borings were completed in artificially elevated areas of soil fill and debris. The text of the Draft RI Report is misleading in this regard and will be revised accordingly. A description of site debris has been provided in the report, and will be expanded in the Draft Final RI Report.

Comment 2:

The data necessary to address the data gaps acknowledged by the Navy was presumably collected during the second round of sampling associated with this field event. However, the following information and data is needed to address the above-mentioned data gaps which were not acknowledged by the Navy:

A. Monitoring well 33015 contained PCE (190 ppb) and TCE (5 ppb). The adjacent recovery well screened in this same interval contained dichlorobenzene as high as 90 ppb. Monitoring wells should be installed, sampled and analyzed for TCL/TAL constituents in the vicinity of, and downgradient of, the old wastewater treatment plant (towards Pensacola Bay) in order to confirm the extent of ground water contamination in this area.

B. Additional soil and groundwater samples should be collected downgradient of the bilge water plant and analyzed for full *scan* TCUTAL constituents.

RESPONSE

A. Monitoring well 33G15 and GM-81, both in the vicinity of the abandoned waste water treatment plant, were sampled. 33G15 was contaminated with organic constituents. Organic contaminants were not detected at GM-81. The analysis also yielded metals below FPDWS and MCLs. Further characterization of groundwater conditions is not necessary because groundwater in the area is targeted .for remediation and data gaps vvill be addressed in RD/RA.

B. The bilge water treatment plant is not part of OU 10. Investigation of the petroleum spill there belongs under the jurisdiction of the FDEP UST Program.

Comment 3:

The Draft RI Report must be revised to include an adequate definition and description of Site 35 (Miscellaneous IWTP SWMUs). This information is needed to ensure that all goals of the RI/FS *are* adequately addressed in the completed report. In general, Site 35 has been described as consisting of any portions of, or appurtenances to, the IWTP (exclusive of the WWTPs and the ISDBs) which potentially received or released hazardous waste or constituents. The March

1990 revision of the Community Relations Plan (pages 14-15) contains a fairly detailed description of this site. This definition should be expanded to include some of the additional potential sources which were identified in the current Draft RI Report.

All screening and WFS sites which occupy the geographic area known as Magazine Point Peninsula must be investigated simultaneously. All sites on the Peninsula which the Parties identify as requiring an WFS shall become part of OU 10 and be incorporated into the single RI/FS Report to be submitted for this OU. The WWTPs and the ISDBs are already WFS sites. Site 35, which encompasses all remaining sites, is currently a Screening site. As agreed to at the informal dispute resolution meeting held in February 1993 and documented in the approved FY93 Site Management Plan:

> "Each screening PSC will remain as screening PSC until such time as defensible and validated Level III or IV data becomes available. Once available, the Navy will utilize such data to either prepare individual PSC assessment reports to support a No Further Remedial Action Planned (NFRAP) determination with the USEPA/FDEP concurrence or immediately reclassify the site to RI/FS status.."

All data for Site 35 must therefore be collected in a timely manner which will allow the Parties to determine the status of each portion of Site 35 (RI/FS vs. Screening) without delaying finalization of the RI or Feasibility Study (FS) Reports for OU 10. Simultaneous investigation of all potential sites on the Magazine Point Peninsula should prove advantageous by expediting the RI/FS process in numerous ways. For instance:

- Reduce the time required for document preparation and review by reducing the number of site-specific documents required for this geographic area
- Minimize the potential for collection of duplicative information and facilitate data evaluation efforts by assigning one contractor to collect all necessary information within a single time frame
- Facilitate the coordination of remedial actions for this geographic area where appropriate and advantageous.

RESPONSE

As was discussed in response 1, Site 35, the description of the miscellaneous SWMUs will be expanded in the Draft Final RI Report. Additional sampling of soil at Site 35 was accomplished in April 1993. Results of that sampling will be presented in the Draft Final RI Report. See comments on individual data gaps.

Comment 4:

A specific method for calculating soil clean-up goals which axe protective of ground water must be proposed. Site-specific values for parameters such as Fraction of Organic Carbon (FOC) and soil partition coefficients (Kd) must be provided in order to evaluate soil clean-up goals for contaminants of concern. Laboratory analyses and the sources of information utilized to establish these parameters must be provided. Two of models currently used by USEPA to calculate soil clean-up goals are Summers and Pestan. The Navy may propose other models. However, the model selected should be deemed *appropriate* for site conditions by USEPA before it is utilized.

RESPONSE:

Methods for calculating risk posed by contaminated soils have been **discussed in the Baseline Risk Assessment. Cleanup goals have been presented in the Draft Feasibility Study Report for Operable Unit 10 dated July 7, 1993. Models** used **to calculate soil cleanup goals shall be deemed appropriate for site conditions by the USEPA and FDEP.**

Comment 5:

All available analytical data (present and historical) which will facilitate completion of the RI/FS for OU 10 must be submitted in an electronic format which is compatible with USEPA's Interchange File Format (IFF). For additional information on the required format for data submittal, please refer to previous USEPA correspondence on this subject, *or* contact Phyllis Mann at 404/347-3406.

RESPONSE

Ecology and Environment is presently compiling historical data into an electronic database to be submitted to the USEPA.

Comment 6:

Please include page numbers on all tables and figures.

RESPONSE:
All pages containing figures and tables will be numbered.

SPECIFIC COMMENTS

Comment 1: Foreword, Paragraph 2

The RI/BRA for Operable Unit (OU) 10 must include a complete ecological risk assessment of all on-site impacts associated with these sites. Only the impacts to on-site wetlands, and off-site impacts to Bayou Grande, Pensacola Bay, and additional wetlands, may be deferred, since these will be addressed under OUs 15-17.

RESPONSE

The ecological impacts at the sites themselves, barring offsite wetlands, Bayou Grande and Pensacola Bay, will be assessed in the Draft-Final RI Report or separate document as discussed with FDEP and USEPA.

Comment 2: Page i, Paragraph 1

All relative terms, such as "low" and "elevated", must be clearly defined prior to using these terms to describe observed levels of contamination in the text.

RESPONSE:

The relative terms describing concentrations, *such* as "low" or "elevated," will be clarified in the text.

Comment 3: Pages 2-1 through 2-3, "OU 10 Sites" and Figures 2 1 and 2 2 .

Site 35 (Miscellaneous IWTP SWMUs) must be clearly defined and located in the text and corresponding figures. Include references which identify and delineate the boundaries of this site.

RESPONSE:

Please see the response to General Cominent 3.

Comment 4: Page 2-3, Figure 2-2

The boundaries for OU 10 and Site 13 must be clearly marked on this figure.

RESPONSE

A boundary between OU 10 and Site 13 will be added to Figure 2-2.

Comment 5: Page 2-5, Paragraph 1

See comment 3 above.

RESPONSE

See comment response 3 above.

Comment 6: Page 2-6, Paragraph 1

The temporary industrial sludge holding pond referred to here must be located on one of the site figures.

RESPONSE

The former temporary sludge holding pond was mentioned without description or location in a 1983 basewide investigative document. No other information concerning the temporary pond was encountered. Therefore, the location was not shown on any map. This will be clarified in the text.

Comment 7: Page 2-8, Paragraph 4

Provide a listing of the specific types of contaminants identified beneath the ISDBs.

RESPONSE:

Specific contaminants found beneath the former industrial sludge drying beds have already been identified in Subsection 2.2.3, Previous Analytical Results OU 10.

Comment 8: Page 2-9, Paragraph 3

Provide a listing of the specific types of contaminants identified beneath the surge pond.

RESPONSE:

Specific contaminants found beneath the former surge pond have already been listed in Subsection 2.2.3, Previous Analytical Results OU 10.

Comment 9: Pages 2-15 and 2-16, Table 2-2

The depth for wells DG-1 through DG-6 is listed as unknown. However, the approximate depth of these wells is apparently known, since they are listed in the "shallow well" portion of Table 2-2. The depths of these wells should also have been determined during the recently completed well inventory. Please provide the depth for each of these wells.

RESPONSE:

Reported well completion depths for the DG-series wells are not available. Wells DG-1, DG2 and DG-6 were destroyed during closure of the former surge pond and construction of the surge tank. Since these wells were installed as part of the RCRA detection program, their depths are assumed to have been shallow. The remaining wells DG3, DG-4 and DG-5 have been measured in the well inventory, confirming the shallow depths of the well series. These depths will be reported in Table 2-2.

Comment 10: Page 2-19, Paragraph 3

Given the historically fluctuating nature and extent of the ground water contamination beneath OU 10, a more thorough description of this contamination must be provided. This description must be used to evaluate: (i) the impact which the recovery well system installed in 1987 may have had on ground water contamination beneath OU 10 and (ii) any relationships (or differences) between historical and present-day groundwater contamination which may facilitate design of an appropriate and effective remediation action in the future.

RESPONSE

The nature of contamination has been summarized in Tables 2-3 and 2-4. A discussion of areal variations and trends in groundwater contamination will be expanded. Changing groundwater conditions with respect to the recovery system will be evaluated.

Comment 11: Page 2-22, Paragraph 2

Provide the well number, sample collection date and contaminant level/concentration for each observed occurrence of each contaminant listed here.

RESPONSE

Groundwater contaminants are presented with the highest concentration found from the available historical data. Where possible, this list will be expanded to include the well ID and date of sampling corresponding to the concentration presented.

Comment 12: Page 2-25, Figure 2-4

Include a symbol explaining the hatched area (i.e., does it represent the spill area?).

RESPONSE:

The hatched area in Figure 2-4 is clearly labeled with an arrow and identifier "1992 Bilge Water Waste Oil Spill." This spill is not within the jurisdiction of Operable Unit 10 and falls under the regulation of the FDEP UST Program.

Comment 13: Pages 2-28 through 2-29, Section 2.3.2 and Table 2-7

For comparative purposes, please provide the Florida Primary Drinking Water Standards (FPDWS) and the USEPA Maximum Contaminant Levels (MCLs) in this and all other text tables which present groundwater data.

RESPONSE

Federal MCLs will be added to all tables which include the State FPDWS.

Comment 14: Page 3-6, Paragraph 2

The text here states that the depth to groundwater ranges from 0 to 4 feet, while paragraph 2 on page 3-3 states that the depth to groundwater ranges from 0 to 20 feet. Clarify this discrepancy.

RESPONSE

There is no discrepancy between the depth ranges to groundwater presented in Subsections 3.2.1 and 3.2.2. The former depth range of 0 to 20 feet was presented under Regional Characterization, and therefore indicates the general depths to groundwater found across NAS Pensacola. The latter depth range of 0 to 4 feet was presented under Site Specific Stratigraphy and Hydrogeology, and therefore indicates the general depths to groundwater found at OU 10 and Site 13.

Comment 15: Pages 3-11 through 3-12, Section 33.2

The following comments are provided regarding this section:

A. This section is titled "Site-Specific Setting", but it actually pertains to the NAS Pensacola facility as a whole. Change the title to reflect this, and mention that a site-specific description of OU 10 is given in Section 4.4 (page 4-19).

B. In line 7 of this section, "sports" should be "supports".

RESPONSE

A. The Title for Subsection 3.3.2 will be changed from "Site-Specific Setting" to "NAS Pensacola Setting".

B. The word "sports" is not a misspelling of "supports." The base does not "support" beaches, forests, etc. This word will be *changed* to "contains."

Comment 16: Page 4-12, Figure 4-3

Proofread the legend and correct as needed.

RESPONSE

The typographical error in the legend of Figure 4-3 will be *corrected.*

Comment 17: Page 4-22, Figure 4-5

In addition to the wetlands present at OU 10, the locations of the other vegetative habitats present (pages 4-19 to 4-24), including Godfrey's Golden Aster (page 4-25), must also be shown on this or some figure.

RESPONSE:

Information in Figure 4-5 will be expanded to include all described habitats and the colony of Godfrey's Golden Asters.

Comment 18: Page 4-25, Section 4.4.4

Indicate whether any other endangered, threatened, or sensitive species inhabit or use this site.

RESPONSE:

A sentence will be added to the text indicating no other endangered *species* were observed at the site.

Comment 19: Page 4-37, Paragraph 5

The text refers to a surface drainage swale. For clarification, please show this drainage swale on all site maps.

RESPONSE:

The drainage swale will be added to other figures in the RI report.

Comment 20: Page 5-4, Section 5.0

When using contract laboratories, it is good practice to designate QA/QC information for duplicate samples, etc. These type samples should be submitted "blind."

RESPONSE

The USEPA-approved OU 10 Sampling and Analysis Plan outlines the sampling numbering system; moveover, the sampling nomenclature does not identify "blind" samples.

Comment 21: Page 5-11, Paragraph 2

Provide the approximate depth of the intermediate and deep borings referred to in the text, as was done for the shallow borings.

RESPONSE:

Approximate depth range of the intermediate borings will be included in the text.

Comment 22: Page 5-14, Figure 5-5

Provide the location of deep borehole 33S31 from which two Shelby tube samples were Collected.

RESPONSE:

Deep borehole 33S31 will be located in Figure 5-5.

Comment 23: Page 5-20, Paragraph 1

Surface water samples for VOC analysis were not collected in accordance with the approved SAP, and the method of sample Collection described is not acceptable. Surface water samples

for VOC analyses must be collected as grab samples, and should not be poured from an intermediate container. The probable impact upon the data is that VOC concentrations were lowered or possibly rendered non-detect. These surface water samples must be recollected and reanalyzed.

RESPONSE

On surface water sampling, Section 4.8.3.1 of the USEPA SOP/QAM states "Any equipment or sampling techniques used to collect a sample are acceptable as long as they do not cause the integrity of the sample to be violated..." Comment 23 indicates the integrity of the VOC samples was violated because an intermediate container was used. However, the SOP/QAM states a bailer or a bucket (intermediate containers) may be used to collect surface water samples; intermediate containers should therefore be acceptable.

Volatile organics were sampled with an intermediate container to control and minimize any loss of HCl preservative if a prepreserved vial had been opened beneath the water surface. Also, preservation after sample collection with a VOA vial would have required reopening the vial and adding drops of HCl onto the water meniscus, resulting in overflow of the preservative. Moreover, any reopening and closing of a VOA vial increases the danger of introducing air bubbles. Therefore, volatiles were sampled via an intermediate container. Extreme care was used during the sampling process. The transferred water samples were never agitated, and transfer from the intermediate container to the VOA vial was prompt.

Comment 24: Page 5-23, Table 5-4

Provide the installation date for the "newly installed" monitoring wells.

RESPONSE

The installation dates for the newly installed monitoring wells are provided in the well construction diagrams in Appendix F.

Comment 25: Page 5-29, Section 5.4.3

The "PVC hand pump with a one-direction check valve" was not mentioned in the SAP. Inertial pumps are unacceptable for purging monitoring wells. Operation of this type pump severely agitates the water column, and may have two adverse effects upon the sample. First, it may mobilize the sediment material causing it to be entrained in the sample, with the effect of raising the apparent concentrations of metals. Second, the agitation may facilitate the movement of volatile organics from the groundwater to atmosphere, with the effect of lowering the apparent concentration of volatiles, possibly below detection limits. Improper use of a bailer *can* also have these same effects.

RESPONSE:

The USEPA-approved *SAP* indicates a pump may be used for well purging. The USEPA-approved *SAP* does not specify the type of pump to be used. The SOP/QAM indicates pumps may be used for well purging, but neither prohibits the use of a hand pump nor limits the types of pumps to be used.

The BK hand pump was used to purge only a few intermediate wells; all other wells were purged with Teflon bailers. The pump was used to facilitate removal of the large volumes of water in those intermediate wells within a reasonable time frame. Contrary to allegations of Comment 25, the purging equipment was not used improperly; extreme care was taken to avoid agitation of the water column and filter pack during purging with the hand pump or bailers. The wells were purged to stability of pH, conductivity and temperature per the USEPA-approved *SAP*. For those few wells purged using the hand pump, a final polishing volume was removed with Teflon bailers before sampling. Between three and five well volumes were removed from each well before sampling.

This purging procedure did not produce turbidity beyond natural conditions due to tannic acids or other discoloration.

Comment 26: Page 5-33, Table 5-6

It appears that the water samples analyzed for radiological parameters were not properly preserved with HNO_3 to pH <2. Please clarify.

RESPONSE:

The radiological samples were analyzed by gamma spectroscopy, not wet *chemistry*. Wet chemical analyses for radiological samples requires preservation with nitric acid, gamma spectroscopic analysis does not require chemical preservative.

Comment 27: Page 5-39, Paragraph 4

In calculating the transmissivity of the surficial zone, "The aquifer thicknesses used for shallow and intermediate depth wells were calculated by subtracting the elevation of the bottom of the well from static water level elevation." This procedure is not acceptable. The surficial zone of the Sand and Gravel Aquifer is composed of fine grained sand. Clay beds within the zone were not reported, indicating that the sandy zone is continuous to a depth of about 40 feet. Differences in hydraulic conductivities within the aquifer exhibit the heterogeneity of the aquifer. These differences should not be interpreted to mean that the surficial zone is composed of two separate hydraulic zones. This assumption is implied if the aquifer is split for hydraulic property calculations. Ground water flow within the unconfined surficial zone communicates freely from the upper to the basal portions of the surficial aquifer, as *stated* in conclusion 4 on page 6-34.

A saturated aquifer thickness of approximately 35-40 feet should be assumed when calculating transmissivity and storage values for the surficial zone.

RESPONSE

The differences in hydraulic properties between the shallow and intermediate zones of the surficial aquifer are a result of the wells available for characterization. Given the hydraulic properties are significantly different, it was the Navy's intention to present them as two "end members" of the surficial zone, not as separate and discrete aquifer units. Contrary to the USEPA's contention they are not "two separate hydraulic zones," because there is strong evidence they may be two separate hydraulic zones, each with a specific and individual set of hydraulic parameter values influencing the migration of contamination.

As for the thickness of the aquifer used in these calculations, it is a common and viable practice to apply the use of the *screened* interval as aquifer thickness in low discharge situations. The basis for the validity of this assumption consists of three main points: (1) the well is not fully penetrating, and is not open to the entire thickness of the aquifer; (2) discharge from the aquifer into the well is of low magnitude taking the path of least resistance (i.e., entering the well immediately adjacent to the well screen); (3) vertical conductivities are normally much lower than horizontal conductivities (i.e., discharge from the aquifer into the well will take the path of least resistance by entering the well primarily from a horizontal direction). Given these tests were very low discharge tests, it seemed reasonable and technically correct to assume vertical flow into the well was negligible when compared to horizontal flow into the well; hence, the use of the screened interval as the aquifer thickness.

Comment 28: Page 5-40

The specific capacity tests results cannot be considered accurate because they were conducted while the well was being developed. As the well is developed the *specific* capacity will increase. Actual specific capacity will be higher once the well is developed and fine sediments are removed from around the well bore.

RESPONSE:

The Navy agrees the specific capacity of a well increases as development removes the fine sediments disturbed during drilling from the vicinity of the well borehole. The mechanics of conducting a specific capacity test are to determine the discharge available per foot of drawdown in the well. Thus, the specific capacity value for a well is based on the stabilized drawdown in the well for a given discharge rate; drawdown in a well will generally not reasonably stabilize until development is complete (i.e., the fines have been removed from the well borehole). The specific capacity values used in the OU 10 assessment were based on reasonably stabilized drawdowns and should represent the specific capacity of the well following removal of the fine sediments.

Two additional arguments supporting the validity of the specific capacity data are as follows: the Navy's contractor conducted field tests by collecting specific capacity data obtained during development and following development of wells at OU 10 drilled by mud rotary techniques. The results of these tests indicated no difference, therefore the collection of this data during development was a valid procedure. Secondly, the equations used to calculate T from specific capacity data (Bradbury and Rothschild, 1985) and a sensitivity analysis conducted by the Navy's contractor indicated no significant differences in transmissivities were calculated, given a wide range of well efficiency (i.e., 60 to 100 percent).

Comment 29: Pages 5-42 through 5-43, Paragraph 3 through end of section

As stated in the text, the five 6-hour aquifer tests conducted at OU 10 "[did] not significantly stress [the aquifer] at discharge rates that would approach those necessary to employ an effective remedial recovery system". Inappropriate analytical methods were also used to evaluate the aquifer test data. Therefore, representative data which defines the hydraulic properties of the surficial zone have not been obtained by the specific capacity tests, the slug tests, or the short term aquifer tests. As part of the ground water remediation activities at OU 10, a pump and treat system will likely be installed. It is therefore critical that a constant rate aquifer test be conducted for a minimum of 72 hours (48 hours drawdown, 24 hours recovery) in order to obtain data which can serve as baseline data for designing the extraction system.

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

As mentioned above, the unconfined aquifer should be continuously pumped for at least 48 hours during the pumping test. This length of time will ensure that the data collected reflects: (i) instantaneous release from storage in the aquifer, (ii) the secondary recharge effects in the aquifer due to gravity drainage, and (iii) the late data which represents essentially horizontal flow in the aquifer.

Several type curves have been developed for the analysis of unconfined aquifer test data. These include Boulton (1954), Neuman (1972), and Streltsova (1972). It is difficult to obtain a true match with a type curve if sufficient data has not been collected. For instance, the drawdown which was observed in observation wells during the 6-hour pumping tests conducted ranged from 0.04 to 0.15 feet. This amount of drawdown in the observation wells is insufficient to accurately evaluate the hydraulic properties of the surficial zone, such as hydraulic conductivity and storage values.

RESPONSE:

The Navy is aware of groundwater hydraulics theory relating to the hydrogeological evaluation of a site for both site characterization and groundwater remediation. For a

comprehensive summary relating the Navy's position, please see Attachment 1 to these Responses to Comments.

For OU 10, the Navy is cognizant groundwater remediation will likely be required. To effectively model this site for remediation purposes, full-scale long-term pumping test(s) will have to be conducted to confirm and refine T and S values calculated during site characterization. To conduct these tests, two options are available:

- Physical and/or *chemical* redevelopment of the existing recovery wells for testing purposes (a "swabbing" effort conducted by Ecology and Environment, Inc. in 1990 increased specific capacity by as much as 400 percent in these wells; however, the wells remained clear for only a matter of weeks); or

- Design and installation of specific production well(s) for testing.

  Importantly, either of these options provides no obstacle to issuance of the ROD, and can be implemented during RD/RA to show existing conditions at a time closer to RA.

Finally, it is not the amount of drawdown as much as the time distribution of drawdown in a given observation well for aquifer characterization; this is succinctly implicit in Theis' origiial publication and in heat-transfer equations (the basis for well hydraulics theory). The necessity to "stress" an aquifer during design is to simulate long-term pumping effects. The difficulty in using small amounts of drawdown lies in the ability of measuring devices to resolve these drawdowns.

The aquifer test data presented in the OU 10 RI report has been re-evaluated using only unconfined analytical methods; previous data were presented for comparative analysis only and not intended *to* confuse the reviewer.

Comment 30: Page 6-3, Paragraph 3

The north-south drainage ditch referred to here must be clearly located on at least one, and preferably all, figures.

RESPONSE:

The north-south drainage ditch will be added to figures.

Comment 31: Page 6-17, Figure 6-10

Figure 6-10 is incomplete due to the lack of groundwater contours. The text on page 6-18 states that the contours were not added "because of the small number of data points *(5)* and the ambiguity of the data." However, the data are not ambiguous. The only legitimate method of

contouring clearly shows a potentiometric high at well GM-63 with radial flow outward toward the northwest, north and northeast.

RESPONSE

Re-evaluation of water level data indicated an error in a single measurement; the water elevation recorded at well GM-68 was 1.97 feet rather than 1.67 as shown on the figure. The water level data suggests groundwater in the south at GM-63 and in the north at GM-68 flow toward each other from two groundwater highs into a groundwater trough between them. Nevertheless, the data will be contoured and presented as such in the Draft Final RI report.

Additional water table measuring event was conducted in April 1993; the results will be presented in the Draft Final RI report.

Comment 32: Page 6-19, Paragraph 2

The text states that the groundwater below the clay confining Unit flows in an east-northeast direction. Evaluation of the groundwater elevation data indicates that the groundwater also flows in a north and northwest direction. Please make the necessary corrections.

RESPONSE:

Please see the response to USEPA Comment 31.

Comment 33: Page 6-19, Paragraph 3

Present the methodology for defining vertical hydraulic gradient calculations (i.e., vertical depth within the screened interval) for the assigned potentiometric heads.

RESPONSE:

The methodology defining vertical hydraulic gradient calculations has been added to the Draft Final RI report. Vertical gradients were calculated by dividing the differences between shallow, intermediate, and deep water level elevations by the differences in the completion depths of the wells.

Comment 34: Page 6-20, Table 6-2

Insert another header above well pair GM-64/GM-63 that indicates measured water level differences between intermediate/deep wells.

RESPONSE

This has been added to the Draft Final RI report.

Comment 35: Pages 6-29 through 631, "Aquifer Pumping/Recovery Tests"

When evaluating aquifer test data for the surficial zone, the analytical method must assume that the aquifer is unconfined. Why was the pumping test data for the surficial zone evaluated using analytical techniques which assume a confined aquifer, when slug test and specific capacity test data were evaluated using analytical techniques which assume an unconfined aquifer (pages 6-24 through 6-25)? It is often difficult to match the aquifer parameters precisely to the assumptions of the analytical methods. However, the above parameter is critical for evaluating the data accurately.

RESPONSE

The data were evaluated using a variety of methods; a conceptual model of aquifer conditions (i.e., confined vs. unconfined) can be incorrect, and may also be difficult to precisely match the observed test curve to the "assumptions" of the conceptual model. In fact, some of the "unconfined" test curves matched precisely to confined solutions. All of the analytical solutions used were presented in the report in an effort to provide the reviewers with all of the available data, both confined and unconfined solutions for slug tests were presented. Careful review of the data presented in the report will illustrate to the reviewer there are insignificant differences between aquifer parameters using the different solutions. The values derived using this data are intended for site characterization and not remedial design (see Attachment 1 to these Responses to Comments). The unconfined data solutions have been presented in the revised report.

Comment 36: Page 6-35

Slug test data alone cannot be used to design an efficient extraction system because only the aquifer medium near the well bore is stressed during the test. The hydraulic properties calculated from such data are representative of only a discrete interval in the aquifer. USEPA agrees with conclusion 10, which states that aquifer test results are more reliable and representative of aquifer properties than specific capacity and slug tests. Please refer to comment 28.

RESPONSE:

Please see Attachment 1.

Comment 37: Pages 7-6 through 7-7, Paragraph 3 and Figure 7-2

The first sentence of this paragraph states that phenols were detected in four borings. The third sentence states that phenols were detected in 5 brings. According to Figure 7-2, phenols were detected in six brings. Please correct these discrepancies.

RESPONSE

The text, tables **and** figures will **be corrected for the appropriate phenol count.**

Comment 38: Page 7-12, Paragraph 3

The text refers to "elevated" concentrations of various compound groups. It is not clear what constitutes an "elevated" concentration. Please define this term as per specific comment 2.

RESPONSE

The term "elevated" will be clarified.

Comment 39: Pages 7-15 and 7-20, Tables 7-3 and 7-4

The most recent analytical results for samples collected near the bilge water treatment plant are not consistent with either previous analytical results, or the physical description of the sample. Soil sample 33S16 was analyzed for full scan TCL/TAL constituents, none of which were detected. A soil sample collected by Groundwater Technology near the same location revealed the presence of ethylbenzene, xylenes and Total Recoverable Petroleum Hydrocarbons (TRPHs). During recent field work, the area immediately north and west of the bilge water plant appeared to be the most heavily affected by the 3,000-gallon waste oil spill: "soil was highly stained, possible wetland surface waters were oil-laden, and a permeating odor of heavy petroleum persisted." The description of sample 33S16 also states that this location "yielded oil saturated soil below approximately 1 foot in depth." Based on this description, it would seem nearly impossible for every analytical result to be "Not Detected," particularly the analysis for PAHs and metals. Additional sampling is therefore needed in the vicinity of the bilge water plant to determine the nature and extent of the contamination from the waste oil spill. The results of all previous investigations pertaining to the Bilge water waste oil spill area should also be presented.

RESPONSE

The bilge water treatment plant is not a part of OU 10. The investigation of the spill has been conducted under the jurisdiction of the FDEP UST Program. **Therefore, an investigation of the nature and extent of contamination at the bilge water treatment plant is not appropriate in the OU 10 RI.**

Comment 40: Page 7-25, Paragraph 1

The association of PCBs with the road must be pursued. It is very possible that this dirt road (and perhaps others at this NAS) were oiled with waste transformer oil for dust control.

RESPONSE:

Sampling and analysis of the clay road has been accomplished at the northern extent of Magazine Point (Section 7.1.4). PCBs were discovered in samples from the interface with the sand dredge spoils and the underlying buried road. These PCB levels were lower than TOSCA action levels and are probably related to standard operating procedures of oiling roadways for dust control. Further investigation is not deemed necessary.

Comment 41: Pages 7-48, 7-56, 7-59, 7-65, 7-71, and 7-76; Tables 7-9, 7-11, 7-12, 7-14, 7-15 and 7-16

See comment 13.

RESPONSE:

Federal MCLs will be added to all tables which include the State FPDWS.

Comment 42: Page 7-51, Paragraph 2

The turbidity in the samples is most likely due to poor purging/sampling techniques. Each of these wells must be properly resampled, and the sample analyzed for the TCL/TAL, in order to determine the true concentration of metals in the groundwater at OU 10.

RESPONSE:

The Navy believes the turbidity is not the result of poor sampling techniques but the natural result of the high tannic acid contents which causes discoloration. As was outlined in response 25 above, the wells were purged and sampled with extreme care in accordance with the USEPA-approved SAP, to avoid elevating turbidity beyond natural conditions.

Comment 43: Page 7-62, Section 7.4.1

1,1-dichloroethene and petroleum VOCs were detected in soil-gas and temporary well samples collected from around the former ISDBs, but not in samples collected from the permanent monitoring wells installed in this area. This may be the result of poor sampling techniques (see comments 40 & 41), poor analytical work, or both. These data discrepancies must be resolved through proper resampling and analysis of the subject wells.

RESPONSE:

The purpose of soil gas and groundwater screening is to determine the locations most suitable for placement of soil borings and monitoring wells. The Screening provided useful data for suspect areas of contamination and for boring/well placement. However, soil-gas and groundwater Screening are not intended to be comparable to the Level IV analytical data collected from the groundwater/soil sampling and analysis for the following reasons:

Groundwater samples collected for Screening were retrieved via a tube inserted in a plunger-driven hole to the water table. The plunger bar likely drove a small amount of vadose soil into the saturated zone. The plunger action greatly agitated and disturbed the small segment of the saturated zone it penetrated, causing extreme turbidity. Some cave-in of vadose soil occurred after the plunger bar was removed but before the tube was inserted. Because no screen or filter pack was used for this screening procedure, the retrieved screening samples were muddy. In contrast, the CLP groundwater samples were taken from properly installed and developed monitoring wells, then collected through a procedure of gentle purging and bailer retrieval to avoid agitating the water column. Due to proper filter-packing and well development, the CLP samples were less turbid than the screening samples.

Groundwater was screened on a portable gas chromatograph with limited calibration and analytical capabilities. The CLP groundwater samples were analyzed according to USEPA SOW 3/90 at a CLP-approved laboratory with CLP QA/QC controls. The CLP data were validated, as in Section 8 of the Draft RI Report, and deemed useable and reliable.

A heated headspace method was used on the screened samples; the USEPA-approved CLP extraction method was used on the CLP samples.

Discrepancies between sets of data should be attributed to the differences between the two sampling and analytical methods. The review comments, indicating an inclination to reject an entire set of Level IV data based on a small set of screening data of much lesser quality control, are not justifiable.

The Navy feels the CLP groundwater data are not inconsistent with the soil-gas and groundwater screening results. CLP soil data from the swale area indicate petroleum constituent contamination within a clayey material above the water table, in agreement with the soil-gas data. The absence of this contamination in the CLP groundwater data for 33G01 indicates the clayey material in which this contamination is found does not allow substantial percolation to the water table. Historical and recent data from wells GM-9 and GM-69, located in the swale area near screening station B6/6 and well 33G01, likewise have shown no petroleum VOC contamination in the local groundwater since at least 1989. The presence of petroleum constituents in the screening groundwater sample, on the other hand, is likely the result of the plunging process into the water table, cave-in into the saturated zone, or contamination of the tube intake while it was lowered through the contaminated clay down to the water table. As for chlorinated volatiles, the screening data indicate the

presence of 1,1-DCE in a tightly restricted zone around the former ISDBs. However, 50 feet east of this zone at soil-gas station B6/6, the screening surveys did not detect any 1,1-DCE either in soil gas or in groundwater. Consistent with these results, CLP groundwater data for monitoring well 33G01 indicate no detectable 1,1-DCE. Moreover, monitoring wells GM-8, GM-9 and GM-69, similarly located near and east of the former ISDBs, have not had any detected concentrations of 1,1-DCE since at least 1990. Therefore, the CLP analytical data from this investigation are compatible with the screening surveys and historical trends. The argument the CLP data may be invalid based on any discrepancies with screening results is unsubstantiated.

Comment 44: Page 7-62, Section 7.4.2

As with the shallow groundwater samples, the turbidity in the samples is most likely due to poor purging/sampling techniques. Each of these wells must be properly resampled, and the sample analyzed for the TCUTAL, in order to determine the true concentration of metals in the groundwater at OU 10.

RESPONSE:

As outlined in response 25 above, the wells were purged and sampled with extreme care in accordance with the USEPA-approved SAP, to avoid elevating the turbidity beyond natural conditions. See the response to Comment 42.

Comment 45: Page 8-1, Section 8.0

The Statement of Work for organic analyses is OLM01.1-8, 10/92. The Statement of Work for inorganic analyses is ILM03.0.

RESPONSE:

The text will be changed accordingly.

Comment 46: Page 8-6, Section 8.3

See comment 45 above.

RESPONSE:

The text will be changed accordingly.

Comment 47: Page 9-5, Section 9.3

For risk assessment purposes, the term "receptors" refers to humans, animals, or plants, not environmental media. Replace "Receptors" with a more appropriate term (e.g. "Media" or "Impacted Media").

(Reviewers Note: Given the incompleteness of the Draft RI Report, only a limited risk review was conducted. Section 10 was reviewed for procedural issues only; no verification of data presented or risk results was performed.)

RESPONSE:

The term "receptor" will be replaced in the text with "impacted media," when not referring to humans, animals, plants or ecological system.

Comment 48: Page 10-1, Paragraph 2

The Party responsible for conducting all RI/FS activities is the Navy, not the Navy's contractor. Please make the necessary corrections here and throughout the text.

RESPONSE

The text will be modified to state the Department of the Navy has conducted all RI/FS activities.

Comment 49: Page 10-2, Paragraph 1

Provide and describe the equation used to calculate 95 percent Upper Confidence Limit (UCL) mean concentrations.

RESPONSE

The equation used to compute the 95 percent UCL mean for each contaminant was derived from *Supplemental Guidance to RAGS: calculating the Concentration Term.* USEPA/OSWER, May 1992. The 95 percent UCL means were calculated assuming a normal distribution.

Comment 50: Page 10-2, "Guidance Documents"

Please add the following risk assessment guidance documents to this list:

Supplemental Region IV Risk Assessment Guidance (March 26, 1991).

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

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

Copies of these documents *can* be provided upon request.

RESPONSE:

The referenced guidance documents will be added to the list previously provided in the Draft Final RI Report Baseline Risk Assessment section.

Comment 51: Pages 10-3 through 10-9, Tables 10-1 through 10-4

The following comments are provided regarding these tables:

A. Include the frequency of detection, range of detects, average concentration and background concentration in these initial tables summarizing the potential site contaminants of concern.

B. Non-detects must not be incorporated into the average concentrations.

C. Move the 95% UCL values to the exposure assessment Section. (Note: half the detection limit should be used for non-detects in the 95% UCL calculation, but not in the initial table of site contamination).

D. Many of the values presented in these tables appear to contain more significant figures than the data would indicate is appropriate. Revise as needed.

E. Provide units for the organic data presented in Tables 10-1 and 10-2. For consistency, present the inorganic units on Table 10-4 as mg/kg rather than ppm.

F. Use the same format for both pages of Table 10-4, and for all of the tables.

RESPONSE:

A. **The range of detects and average concentration (hits only) will be included for each parameter. The frequency of detection was provided in the Draft version. Background contaminant concentrations for all Sites (all media) at NAS Pensacola will be established through sampling of designated background areas. These areas were selected based on their location outside the operational areas (past and current) of the base. At the time the Draft RI report was issued, data from these areas was not yet available.**

B. Comment noted.

C. Discussion of the 95 percent UCL values will be relocated to the exposure assessment section.

D. The number of significant figures presented was established by the computer program used to compute the mean, These will be corrected before issuance of the Draft Final RI Report.

E. Units will be provided on all tables.

F. A consistent format will be used throughout Table 10-4.

Comment 52: Page 10-10, Paragraph 1 .

Mention that the ecological risk assessment basically follows the same steps as those for the human health risk assessment, but that ecological risk will be addressed in a separate section.

RESPONSE:

The ecological risk assessment approach will be discussed in the Draft Final RI report or separate document as discussed with FDEP and USEPA.

Comment 53: Page 10-10, "Contaminant Identification"

Please retitle this subsection as "Chemicals of Potential Concern." "Chemicals of Concern" *are* those which contribute to a pathway that exceeds a 1E-4 risk or has an HI ≥ 1. "Chemicals of Potential Concern" *are* those which *are carried* through the risk assessment process.

RESPONSE

"Contaminant Identification" will be titled "Potential Contaminants of Concern". According to the results presented in the Draft RI BRA, there are no Chemicals of Concern.

Comment 54: Page 10-10, "Toxicity Assessment"

Evaluation of the predicted exposure levels relative to internal dose and toxicological responses is conducted in the "risk characterization" process. Also, the toxicity assessment does not determine acceptable levels. Delete the reference to "potency factors" or "(q_1*s)" and replace it with "cancer slope factor."

RESPONSE:

The "Toxicity Assessment" discussion will be revised to differentiate between individual contaminant toxicity evaluation and the characterization of risk. All references to potency factors will be replaced with references to cancer slope factors.

Comment 55: Page 10-11, Paragraph 3

"Due to the highly disturbed nature of site soils, it was not possible to establish a viable site-specific background location for comparison with inorganics data." A site-specific background location does not have to be onsite (i.e., inside the site boundary). A sample collected from an undisturbed location in the vicinity of the site *can still* be used to establish site-specific natural background levels for inorganic constituents. Such a sample must be collected if at all possible.

RESPONSE

Comment noted. At the time the Draft RI report was issued, analytical results for environmental media samples collected at designated background locations were not available. In the Draft Final RI report or separate document as discussed with FDEP and USEPA, all environmental media results for OU 10 will be compared to corresponding background results.

Comment 56: Page 10-12, Table 10-5

The following comments are provided regarding this table:

A. Revise this table to follow the format of Exhibit 5-7 in "Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part A)."

B. The "notes" which this table indicates will be provided for lead have not been included. Please correct as needed.

RESPONSE:

A. Table 10-5 will be revised to follow the format provided in Table 5-7 of RAGS, Volume I, Part A.

B. The table notes pertinent *to* evaluation of lead values were inadvertently left off of Table 10-5. These notes will be included in the future drafts.

Comment 57: Pages 10-14 through 10-17, Section 10.3

The following comments axe provided regarding this section:

A. The Exposure Assessment must evaluate both current and potential future exposure scenarios. Specifically, a future residential scenario must be included in this document.

B. Please divide this section into three subsections: Characterization of Exposure Setting, Identification of Exposure Pathways, and Quantification of Exposure.

C. The quantification of exposure should include exposure estimates which axe expressed in terms of the mass of substance in contact witb the body per unit body weight per unit time (e.g., mg chemical per kg body weight per day, mg/kg-day).

D. The 95% UCL or the maximum concentration (whichever is smaller) must be used as the exposure point concentxation; it is not appropriate to use average or mean concentrations as the exposure point concentration. Also, provide the equation used for obtaining the 95% UCL.

E. USEPA Region IV considers the top one foot as surface soil available for direct contact.

RESPONSE

A. The Navy will consider both industrial and residential scenarios to determine soil and groundwater Remedial Cleanup goals. Cleanup goals will be to present use; if at a later date land use should change (although unlikely) the Navy will reassess cleanup criteria.

B. The Exposure Assessment will be subdivided into the requested subsections in Draft Final RI report.

C. Exposure quantitation will be expressed (for each pathway) in terms of mass of substance (mg) per unit body weight (kilogram) per unit time (days) in the revised Exposure Assessment as chronic daily intake (CDI).

D. A single estimate of CDI (per pathway) will be provided in the revision using the lesser of average or 95 percent UCL mean concentrations for each potential contaminant of concern.

E. The zero to 1-foot depth soil sample results were used in computing soil pathway (direct ingestion and dermal contact) exposure. The statement made on page 10-16 of the original Draft RI document was in err.

Comment 58: Page 10-17, Table 10-6

The following comments are provided regarding this table:

A. Potential of exposure via fugitive dust inhalation must be considered under a typical industrial scenario.

B. Typographical error: the second bullet contains two "(" and only one ")".

RESPONSE

A. **Fugitive dust exposure was not evaluated as a potential indirect soil exposure pathway because identified hot spots (i.e., swale area) were vegetated. The presence of a vegetative cover serves to preclude dust generation from these areas.**

B. **Comment noted. The typographical error will be corrected.**

Comment 59: Page 10-18, Table 10-7

The following comments are provided regarding this table:

A. The table contents must be verified against the most recent toxicity information available. A spot check indicates numerous errors in the toxicity information presented (many inhalation slope factors are not presented, the cancer class is missing for several chemicals with slope factors, and not all chemicals with RfDs have uncertainty factors). Some of the specific deficiencies noted include:

1. Inhalation slope factor for trichloroethene: **6 E 3 (mg/kg/day)$^{-1}$.**

2. *Oral* reference dose for trichloroethene: 6E-3 mg/kg/day.

3. *Oral* slope factor for arsenic: 1.75 (mg/kg/day)$^{-1}$.

4. Provide inhalation slope factors for benzo(a)pyrene, 4,4'-DDT, aldrin, dieldrin, heptachlor epoxide, alpha-BHC, beta-BHC, cadmium, and chromium.

B. Each value in this table must be referenced specifically to IRIS or HEAST since these sources have different levels of USEPA verification.

C. Per the *Supplemental Region IV Risk Assessment Guidance*, the concentration for carcinogenic PAHs must be adjusted by the toxicity equivalency factor (TEF), not the slope factor. Also, USEPA does not consider pyrene and benzo(g,h,i) perylene as carcinogenic PAHs; these should not be included in the TEF approach.

D. Many of the values presented in this table contain mom significant figures than the data indicates appropriate. "0.00E+00" entries must not be included in this, or any other, table.

E. Include a cancer class for all compounds with slope factors.

F. Improve the legibility and presentation of the table. Footnotes must be numbered and specified in the table (e.g., source of individual reference dose [RfD] and slope factor [SFJ). Scientific notation must be used consistently throughout the table.

RESPONSE:

A. Table 10-7 will be corrected to reflect an updated toxicological database search (IRIS and HEAST). Inhalation slope factors and reference doses for semivolatile compounds and metals were not included in the original version of Table 10-7. These references were omitted because no potential inhalation exposure mutes were identified (see Response to Comment 58 A).

The specific corrections outlined in this response to comments will be made in the Draft Final RI report. Inhalation slope factors for benzo(a)pyrene, 4,4'-DDT, aldrin, dieldrin, heptachlor epoxide, alpha-BHC, beta-BHC, cadmium, and chromium can be included in the Draft Final RI report, however, the utility of this information is questionable in the absence of air exposure pathways.

B. Each reference value will have a source designation in the Draft Final RI report.

C. The presentation will be modified to adjust carcinogenic PAH concentrations by the TEF rather than adjusting the slope factor. This modification will not change the computed risk for the referenced compounds. The TEF approach for pyrene and benzo(g,h,i)perylene will be removed from the Draft Final RI report.

D. The significant figures in toxicological values will be corrected to reflect the exact values presented in the toxicological database outputs. 0 values will be removed from all pertinent tables.

E. Cancer class will be indicated for *each* carcinogenic compound/parameter where provided in the IRIS and/or HEAST database outputs.

F. Table 10-7 will be modified for legibility and presentation. Sources of individual toxicological values will be provided.

Comment 60: Page 10-20, Paragraph 1

The risk management information presented here is not appropriate and should be deleted.

RESPONSE:

The risk management information provided was included to provide a reference point for future users of the document. The risk thresholds described support BRA conclusions relative to the significance of computed risk/hazard. The NCP establishes remedial action is not imperative unless the incident risk exceeds the 10^{-4} point of departure. Without benefit of some reference point for evaluating computed risk/hazard, the BRA would be of limited utility to future non-regulatory users.

Comment 61: Page 10-20, Paragraph 2

Revise to indicate that IRIS is the primary source and HEAST is a secondary source.

RESPONSE

The text will be revised to indicate IRIS is the primary source of toxicological database information, and HEAST is the secondary source.

Comment 62: Page 10-21, Paragraph 1

Specify the criteria used to determine that the concentration of a contaminant is "significantly above background."

RESPONSE:

The metals data set was reduced on the basis of a gross evaluation of relative concentrations. Florida average soil concentrations from Dragun and Chiasson, 1991, *Elements in North American* Soils, HMCR1, were used to evaluate soil metals. The Draft Final RI report will use soil background data collected in unimpacted, non-industrial areas around OU 10, as available. Similar comparisons will be performed for sediments, surface water and groundwater.

Comment 63: Pages 10-21 through 10-36, Section 10.5

Much of the information contained in *this* section should be moved to Section 10.3 (Exposure Assessment). The exposure assessment section should include the estimation of chemical intakes for individual pathways. Use Exhibit 9-1 in the "Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part A)" as a general outline.

RESPONSE

The discussions relative to exposure concentrations and CDI's will be moved to the Exposure Assessment section. The presentation in the original Draft RI report was designed to condense the evaluation by combining CDI and risk/hazard calculations.

Comment 64: Pages 10-21 through 10-26, Section 10.5.1

The use of average exposure point concentrations must be eliminated from the body of the report since the NCP states that risk and remedial decisions will be based on the Reasonable Maximum Exposure (RME). A central tendency risk estimate must be provided as an appendix and discussed in the uncertainties section of the risk assessment. The 95% UCL should be used as the exposure point concentration in the central tendency risk estimate, since it is the best estimate of the mean, and the exposure frequency, duration and intakes may be adjusted to reflect central tendency values. Maximum detected concentrations should be used when the 95% UCL exceeds the maximum detected concentration (see Attachment 1).

RESPONSE

The 95 percent UCL mean or maximum concentration of *each* potential contaminant of concern will be used as the sole basis for computing CDI. Both average and 95 percent UCL mean values were used in the Draft RI report to provide some appreciation of the potential variability in computed risk/hazard for *each* pathway.

Comment 65: *Pages* 10-22 through 10-23, Table 10-8

The following comment *are* provided regarding this table:

A. Why *are* no inhalation pathways considered in this table?

B. Why *are* risks and hazard quotients summed by chemical class?

C. "Hazard Quotient" rather than "Hazard Index" must be used in the heading for this table. Hazard quotient is the ratio of a single substance exposure level over a specified time period to a reference dose for that substance derived from a similar exposure period. A hazard index is the sum of more than one hazard quotient for multiple substances and/or multiple exposure pathways.

D. All cancer risks, hazard indices and hazard quotients must be expressed as one significant figure only. Please correct as needed, here and throughout the document.

RESPONSE

.A. No Inhalation pathways were presented for soils because: (1) the areas of concern are vegetated preventing the generation of fugitive dust (2) the concentrations of volatile parameters in surface soils were not considered sufficiently concentrated to present a volatilization hazard. (3) The releases which resulted in surface soil volatile contamination were not recent. Surface soils have been subjected to long-term solar heating serving to remove volatiles.

B. Although the approach is not without some problems, risk/hazards are summed by chemical class to assist in the FS process. Compounds from different chemical classes necessitate differential remedial approaches (i.e., volatiles vs. metals). By *summing* within chemical classes, the FS team is provided with a tool for evaluating (1) what *class* of chemical contributes to overall risk/hazard; and (2) what types of remedial alternatives could be selected to address these contaminants. Chemical classes could be further subdivided to provide additional information (i.e., aromatics vs. chlorinated hydrocarbons).

C. Hazard quotient will replace hazard index in the revised table.

D. Cancer risk, hazard quotients and hazard indices will be reported with one significant figure throughout the Draft Final RI report.

Comment 66: Page 10-24, Paragraph 2

The discussion of lead criteria must be revised to reflect OSWER interim guidance on lead cleanup levels. OSWER directive #9355.4-02 sets an interim soil cleanup level for total lead at 500 to 1000 ppm protective for direct contact at residential settings. Region IV considers *500* ppm as the level of concern which may be lowered to protect groundwater.

RESPONSE:

The lead criteria discussion will be revised to reflect OSWER interim guidance on soil lead cleanup levels. The original discussion will not affect conclusions since the 200 mg/kg bioavailability threshold referenced in the original Draft RI report is more conservative.

Comment 67: Pages 10-24 through 10-26, Table 10-9 and Figure 10.1

The following comments are provided regarding the subject table and figure:

A. Move the information presented in this table and figure to the exposure assessment section of the document.

B. Provide a description of the rationale for the parameters provided in Table 10-9.

C. The oral RfDs and SFs presented in Figure 10-1 must not be applied directly to assess dermal exposure, but converted to obtain adjusted dermal toxicity values. The conversion factors adopted by USEPA Region IV are 80 percent for volatile organic compounds, 50 percent for semivolatile organic compounds and 20 percent for inorganic constituents.

RESPONSE:

A. Table 10-9 and Figure 10-1 will be moved to the Exposure Assessment section.

B. The rationale for each exposure assumption will be provided in the Draft Final RI report. The values presented in Table 10-9 represent the default assumptions from OSWER Directive 9285.6-03.

C. Adjustment factors will be applied to oral reference doses and slope factors for evaluation of the dermal contact pathway in the Draft Final RI report. USEPA, Region IV approved adjustment factors will be used.

Comment 68: Pages 10-27 through 10-30, Section 10.5.2

Revise this section per the comments listed above for Section 10.5.1.

RESPONSE:

The information provided in Section 10.5.2 will be subdivided and relocated (where necessary) to reflect exposure assessment and risk characterization as separate issues.

Comment 69: Pages 10-36 through 10-39, Section 10.6

The following comments are provided regarding this section:

A. The ecological risk assessment requires major revision. It must include the Same general components as the human health risk assessment (i.e., contaminant identification, exposure assessment, toxicity assessment, risk characterization). USEPA recommends that the Navy prepare an outline of the ecological risk assessment, using the guidance documents listed in Section 10.1 (particularly the Framework document), and submit this to USEPA for review prior to submitting the revised Draft RI Report. This outline should be submitted early enough to allow the Navy time to incorporate any USEPA comments into the revised Draft RI Report.

The Contaminants of Concern (COCs) for ecological receptors must be identified. This section can refer to the summary tables (Tables 10-1 through 10-4) in the human health assessment, but ecological COCs must be chosen with respect to ecological effects (since the COCs for ecological receptors may differ from those for human receptors). Contaminants must also be addressed for each medium, particularly focusing on contaminants in different habitat areas (e.g. sediment contaminants in the drainage ditch and in the dredge spoil area).

The contaminant migration pathways and exposure pathways must be presented and discussed in relation to the habitats and potential ecological receptors present on and neat OU 10 (as presented in Section 4.4, pages 4-19 to 4-27). An evaluation of the risks to both terrestrial and aquatic receptors must be included. The terrestrial evaluation may be qualitative (i.e., comparison of surface soil concentrations to toxicity information available in the literature for terrestrial receptors) and/or quantitative (e.g., modeling of contaminant transfer along a food chain). The risk assessment must also address potential effects on any potentially affected endangered, threatened, or otherwise sensitive species.

B. For screening purposes, surface water data must be compared to the Federal Ambient Water Quality Criteria (AWQC) (used as screening values by USEPA Region IV) and the Florida Surface Water Quality Standards (SWQSs). Sediment data must be compared to the Effects Range-Low and Effects Range-Median sediment values generated by NOAA (used as sediment screening values by the USEPA Region IV). Sediment data can also be compared to the sediment screening values being generated by the U.S. Navy.

C. The ecological risk assessment should emphasize the fact that the potential ecological impacts of OU 10 on Pensacola Bay and Bayou Grande will be evaluated during the RI/FS for the Bay (Site 42) and Bayou (Site 40). However, a major goal of the RI/BRA for OU 10 is to ensure that the remedial action selected prevents or limits future migration of ground water contaminants into those surface water bodies at levels that might adversely impact ecological receptors. This goal must be considered in determining the need for remedial action at OU 10.

D. Move the discussion of uncertainties to Section 10.7 (Risk Uncertainty).

E. Once comments A. through D. above are addressed, the section on recommendations for additional studies must be revised, as needed.

RESPONSE:

A. **For purposes of the overall NAS Pensacola RI, the ecological risk assessment for OU 10 has been addressed to date as a baseline Phase I survey. Supplemental ecological investigations will be conducted, as necessary, upon agreement of an investigative approach and trigger levels between USEPA, FDEP and the Navy. As a result, it**

was not addressed in detail in the original Draft RI. There are a number of outstanding issues regarding ecological risk assessment approach. The Navy, USEPA, and FDEP are currently negotiating sediment action levels to be applied to all such media across NAS Pensacola. Sediment action levels will apply to those areas which represent viable aquatic habitat. Upon arriving at a consensus with USEPA and FDEP, the Navy will initiate evaluation of potential ecological risks on and around OU 10.

B. surface water data will be compared to Federal AWQC in the Draft Final RI report. Reference values for sediment have not been determined. Region IV of the USEPA, FDEP and the Navy are currently discussing appropriate criteria for comparison with onsite sediment data.

C. The Draft Final RI report will discuss potential migration mute and possible implications thereof.

D. The discussion of uncertainties will be moved to Section 10.7.

E. The recommendations for additional studies will be revised, as needed.

Comment 70: Page 10-38, Table 10-14

This table must be revised in accordance with comment 66.B. and the following comments:

A. Check the column headings. The screening numbers given in this table appear to be the Ambient Water Quality Criteria (AWQC), not the sediment screening numbers based upon the NOAA sediment values.

B. The freshwater AWQC for cadmium, trivalent chromium, and lead are hardness-dependent. Therefore, include the hardness of the surface water body in a footnote (see Appendix E) and adjust the surface water screening values, if needed.

C. Include the screening values for both trivalent and hexavalent chromium, since total chromium was analyzed.

RESPONSE:

A. The units of Table 10-14 will be revised to facilitate comparison of surface water screening values with the surface water data presented in the table. The heading will be changed to **AWQC.**

B. The hardness of the surface water will be included as a footnote (if available). The AWQC for cadmium, trivalent chromium, and lead will be adjusted to reflect the influence of freshwater hardness and presented in Table 10-14.

C. The revised table will include the *screening* value for hexavalent chromium.

Comment 71: Pages 10-43 through 10-44, Section 10.8

Surface water data must be compared to Federal AWQCs and Florida SWQSs (see comment 66.B.). The NOAA screening values pertain to sediments. This section must also include a summary of the risk to terrestrial ecological receptors.

RESPONSE

The Draft Final RI report will include in Table 10-14 a comparison of Florida SWQS values to surface water data. An assessment of terrestrial ecological risk will be performed upon selection of screening criteria.

Comment 72: Page 10-44 through 10-50, Section 10.9

The following comments are provided regarding this section:

A. Change the title and contents of this section to refer to Remedial Goal Options (RGOs). preliminary remediation goals (PRGs) are established at scoping stage for toxic substances known to be present at the site in order to provide a basis for the feasibility study consideration of all appropriate remedial alternatives which may achieve the target levels.

B. This section must contain media clean up levels for each chemical which contributes to a pathway that exceeds (i) the risk level chosen as the remediation "trigger" by the risk manager (generally 1E-4) or (ii) an HI of 1 for each scenario evaluated in the baseline risk assessment. Chemicals contributing risk to these pathways need not be included if their individual carcinogenic risk contribution is less than 1E-6 or their noncarcinogenic HQ is less than 0.1. A table must also be provided which includes the 1E-4, 1E-5, and 1E-6 risk levels for each chemical, media and scenario (land use) and the HQ 0.1, 1 and 10 levels as well as any ARAR values (state and federal).

C. Table 10-15 is confusing; the reviewer could not locate the soil remedial goals, as described in the text and indicated by the table title. Please correct this discrepancy;

D. The MCLs on Table 10-16 must be referenced to state or federal sources. Lead and copper do not have MCLs; the values are treatment technique action levels. Many of the notes on Table 10-16 do not apply to the information presented.

RESPONSE

A. This section will be retitled "Remedial Goal Options".

B. If the criteria outlined in the comment are applied, no cleanup levels need to be established. No individual pathway poses a cancer risk greater than 1E-4 or a non-cancer hazard greater than 1 (hazard index). A table will be provided presenting individual contaminant concentrations which equate with cancer risks equal to 1E-4, 1E-5 and 1E6 and non-cancer hazard (hazard index) equal to 10, 1 and 0.1.

C. The incorrect table was included as Table 10-15. The correct table will be incorporated into the Draft Final RI report.

D. Specific references for each MCL presented in Table 10-16 will be provided in the Draft Final RI report.

Comment 73: Page 11-10, Section 11.2

The following comments are provided regarding this page:

A. See the previous comments provided regarding the evaluation of surface water data.

B. Paragraph 3, line 7: change "r,r'-DDD" to "4,4'-DDD".

C. In addition to the summary of ecological risk related to sediment contaminants, the revised version of this report must also include a summary of ecological risk related to contaminated surface soils.

RESPONSE

A. See the previous response to Comment 71 regarding the evaluation of surface water data.

B. The change will be made.

C. An assessment of ecological risk related to contaminated surface soil will be performed upon selection of screening criteria.

Comment 74: Page 12-1, "Personal Communications"

Include the title or position of the person contacted and his/her affiliation (i.e., place of work).

RESPONSE

The title and department of affition will be included in the references of personal communications.

:omment ' p P, 'Detected Concentrations - QA/QC Samples"

The following comments are provided regarding the data contained in this appendix:

A. The data is poorly presented. The designations of many of the QA/QC samples do not follow the proposals in the approved SAP, making it impossible to determine what was sampled. Label each sample in terms which clearly indicate what was being sampled. Reduce and reorganize the data in a manner which permits the maximum amount of information to be presented on each page in a clear fashion.

B. The legible portions of Appendix P indicate problems with the field and/or analytical work for OU 10. Following is a list of some of the particular problems noted:

- The proper type of water was apparently not used to make up field blanks.
- There is some confusion as to what matrix spike and matrix spike duplicate samples are and how they should be submitted. This apparently resulted in the submittal of many extra, unnecessary samples for analysis at great cost to the Navy.
- It appears that either the materials used in monitoring well construction were either contaminated with low levels of pesticides, or the pesticide data is suspect.
- The permanent monitoring well data does not agree with the results of screening analyses (soil gas) or historical analytical results for OU 10. Given this lack of agreement among the data, and the sampling techniques used during the most recent round of field work, all permanent wells must be resampled and reanalyzed prior to submitting the RI Report. Shallow wells should be purged and re-sampled using low flow pumps (e.g. peristaltic). Intermediate depth wells could be purged using a low-flow pump such as the RediFlo II, and sampled with a peristaltic pump.

RESPONSE:

A. The data will be reorganized. Refer to Section 5 of the RI report for an explanation of the sample numbering system.

B.

- All of the trace concentrations of compounds reported in the field blanks were detected in associated trip blanks and method blanks at various concentrations. If action levels are calculated from the contamination levels found only in method blanks and trip blanks, all field blank contamination would then be qualified as non-detected. Also, field blanks are evaluated as QA/QC samples along with trip blanks, method blanks and equipment rinsate

blanks as specified under CLP guidelines. These QA/QC samples are then used as a whole to evaluate all "true" samples for cross-contamination caused by handling, preparation and/or sample analysis within the laboratory. Therefore, as per USEPA-specified data validation procedures, all of the hits reported in the field blanks can be attributed to trip blank and/or laboratory contamination, and will be omitted in the Draft Final RI report. In addition, a Culligan water purification system provided ASTM II-grade water for use in field blanks, equipment blanks, decontamination, etc. The system deionized and removed organic constituents from the processed water.

- The Navy does not feel excessive matrix spike and matrix spike duplicate samples were analyzed. These QA/QC samples were submitted one for 20 samples. What appears to be extra MS/MSD samples are the result of laboratory protocols or batch shipments received by the laboratory.

- The values reported for pesticides/PCBs were at or below the contract required quantitation limits calculated by the laboratory for soil samples. Most of these compounds were qualified because they had a greater than twenty-five percent difference between the quantitation and confirmation columns for the detected concentrations. ("here are not any pesticide/PCB guidelines for sample results which fall within this category when no contamination is found in the associated blank.) The contamination present can therefore be attributed to laboratory conditions from sample preparation and/or sample analysis.

- The contention the soil-gas *screening* results are allegedly inconsistent with the Level IV CLP data has already been addressed in response 43 above. The screening can only be used for placement of soil borings and monitoring wells. Drastic differences between the analytical methodologies for screening and CLP analysis, in addition to the considerably lower quality control for the screening results, provide no basis for the use of screening results as a check on the CLP data. The contention of improper sampling technique being implemented for CLP samples has been refuted in response 25 above; all sampling was accomplished with extreme care in accordance with the USEPA-approved *SAP*.

Comment *76:* Appendix *Q*, "IRIS Database"

It is not necessary *to* include the IRIS database files for each chemical in an appendix. Per RAGs, Section 7.7, 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. This description should include information on the effects associated with exposure to the chemical and the concentrations at which adverse effects are expected to occur in humans. If toxicity values are derived in conjunction with the regional risk assessment contact and ECAO

for chemicals lacking USEPA-derived values, a technical documentation/justification of the method of derivation should be prepared and included as an appendix. This explanation should include a description of the toxic effects of the chemical (e.g. information on the noncarcinogenic, carcinogenic, mutagenic, reproductive, and developmental effects).

RESPONSE

Appendix Q will be omitted from supplemental deliverables.

ATTACHMENT 1

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
2155 EAGLE DR., P.O. BOX 190010
NORTH CHARLESTON, S.C. 29419-9010

PLEASE ADDRESS REPLY TO THE COMMANDING OFFICER, NOT TO THE SIGNER OF THIS LETTER.
REFER TO:
5090/13
Code 1851
29 Sep 93

RECEIVED
OCT 4 1993

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Ms. Allison Drew
U.S. EPA, Region IV
4WD/FFB
345 Courtland Street, NE
Atlanta, GA 30365

AQUIFER TEST DATA USED IN SITE CHARACTERIZATION AND REMEDIAL DESIGN, NAS PENSACOLA, FL

Dear Ms. Drew,

During the course of RI Work Plan generation, subsequent Response to Comments, and now regulatory comments on the RI field investigation at Operable Unit 10 (OU-10) there have been continued references to the completion of constant rate aquifer tests at the subject RI sites. In an effort to mitigate further comment the Navy would like to clarify their position for all remedial activities at NAS Pensacola including 1) the collection and use of hydrogeologic parameters for site characterization, 2) the use of these parameters for groundwater remediation design, and 3) the necessity for and execution of long-term, full scale pumping tests for remedial design. This letter also serves to clarify and summarize our position at NASP on monitoring well development and purging to address supplemental concerns expressed by the FDEP and US EPA in comments on OU-10.

Constant Rate Aquifer Tests

Site characterization requires aquifer permeability data necessary to illustrate aquifer homogeneity (or inhomogeneity) and the nature of groundwater occurrence in the aquifer; This information also provides some measure of groundwater velocity which is important to the advective transport of potential contamination; and, in some cases, the degree of connection between aquifer units. Site characterization *does not* necessarily provide the data required for site remedial design, but it *does* provide data which can be used to design long-term, full-scale pumping tests (which are required for proper remedial design). These types of tests are required *only* when site characterization data indicate groundwater extraction will be necessary to site remediation. Conducting these types of pumping tests prior to confirmation of their necessity, and their proper design based on a conceptual site model, can lead to tremendous unnecessary execution and disposal costs and can significantly reconfigure plume distribution in the host and adjacent aquifers (and can, in fact, induce contaminant migration across aquifer boundaries).

The Navy believes aquifer parameters estimated by using slug tests and/or specific capacity tests are adequate for site characterization. It has been shown, specific capacity tests (along with their recovery data), in particular, provide realistic estimates of aquifer transmissivity and the nature of groundwater occurrence, compare favorably to those calculated using pumping test data (Bradbury and Rothschild, 1985; Bradbury and Muldoon, 1990: full references attached to this letter).

AQUIFER TEST DATA USED IN SITE CHARACTERIZATION AND REMEDIAL DESIGN, NAS PENSACOLA, FL

The question concerning the procedure of collecting specific capacity data during well development is reasonable. The equations used to analyze specific capacity data are presented in Bradbury and Rothschild (1985), and offer correction factors for well efficiency. The proper application of these equations, therefore, allows data to be used for the calculation of representative aquifer characteristics. Furthermore, field testing at NAS Pensacola by the Navy's contractor on wells drilled by *mud rotary* indicates little to no change in the specific capacity of wells prior to development and after development (well development procedure were conducted in accordance with SOP/QAM procedures). The Navy contends slug test and/or specific capacity test data fulfill the requirements for site characterization, and can be used to anticipate, plan, and design test well locations, discharge volumes, and execution times for full-scale, long-term pumping tests where groundwater extraction is necessary. This approach will prevent the unnecessary duplication (i.e., change in aquifer conditions, or liability to the Remedial Action Contractor) of aquifer tests and provide real time data for RD/RA.

At sites where groundwater remediation is required (as determined by RI analytical data), full-scale, long-term pumping tests will be conducted. If existing wells onsite will sustain discharge rates necessary to adequately stress the aquifer, then these wells will be used. If not, then specific aquifer test wells may have to be installed; these *can,* however, be designed to double as extraction wells once the extraction system is in place. In addition to production wells, specifically located piezometers may also need to be installed. In order to simulate long-term effects of pumping, discharge rates for these tests (designed using site characterization data) should, as a rule be approximately twice the anticipated extraction rate to be employed in the remediation system or, at a minimum, at the maximum discharge rate that the well will practically sustain. For tests involving unconfined aquifers, execution times will be a minimum of 72 hours (48 hours production, 24 hours recovery), and for confined aquifers will be a minimum of 48 hours (24 hours production, 24 hours recovery).

Importantly, site characterization data (slug and/or specific capacity tests) can be used to effectively evaluate the feasibility of groundwater extraction. This evaluation *can* be conducted using the information provided in the RI/FS reports. Therefore, it is also the Navy's position that long-term, full-scale pumping test data is not necessary until actual design of an extraction system. This data is a luxury and *not* a necessity to issuance of a Record of Decision, and *can* be collected as an integral part of Remedial Design/Remedial Action (RD/RA) or in a predesign phase of RD/RA.

Monitoring Well Development

Monitoring well development will be performed in accordance with Appendix E.7 of the USEPA SOP/QAM. Development can be performed using a variety of techniques, both individually and in combination. Techniques which may be used include:

- Pumping
- Compressed Air (with the appropriate organic filter system)
- Bailing
- Surging
- Backwashing
- Jetting

AQUIFER TEST DATA USED IN SITE CHARACTERIZATION AND REMEDIAL DESIGN, NAS PENSACOLA, FL

The objectives during monitoring well development are to remove any residual materials from monitoring well installation and to re–establish the natural hydraulic flow conditions. Monitoring wells are to be developed until free of visible sediment given the geology of the area, and until Ph, temperature, and specific conductivity have stabilized.

Monitoring Well Purging

Monitoring well purging has and will continue to be performed in accordance with Section 4.9.3 of the USEPA SOP/QAM. The objective of monitoring well purging is to remove stagnant water from the monitoring well which is not representative of aquifer conditions. Well purging completed during groundwater sampling for Operable Unit 10 was implemented utilizing either pumping or bailing techniques. A hand pump was used to initiate well purging on three intermediate wells. From these wells approximately 2 well volumes or water were removed and subsequent purging was completed by bailing. All wells were purged of a minimum of 3 to 5 well volumes and until pH temperature and conductivity had stabilized. The Navy feels all samples collected during the RI for OU-10 are representative of groundwater and deemed useable.

In order to mitigate regulatory concern, all future well purging will be achieved by using a peristaltic pump, bailer, bladder pump, or Grundfos pump. Purging will continue until Ph, temperature, and specific conductivity have stabilized. At least three but no more than five well volumes will be removed during purging. The CSAP will be revised to specify which types of pumps may be used during monitoring well purging.

In closing, the Navy wishes to point out, it is imperative to maintain a proactive role in the investigation and remediation of sites at NAS Pensacola. However, it is also imperative these activities be conducted with a mind towards not only timeliness, but also technical efficiency and correctness, proper sequencing of events, and cost effectiveness.

If you have any questions or comments concerning this position summary, please contact Ms. Linda Martin at (803)7434574.

Sincerely,

Linda A. Martin

LINDA A. MARTIN
Environmental Engineer
Installation Restoration I Division

copy to:
NAS Pensacola (Mr. Ron Joyner, Code 18520)
E/AH (Mr. Paul Stoddard)