EnSafe / Allen
a joint venture for professio
5720 Summer Trees Dr. Suite 8 Memphis, TN 38134
(901) 383-9115 Fax (901) 383-1743

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September 29, 1993

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

Re: Response to Comments
Comprehensive Sampling and Analysis Plan
NAS Pensacola
Contract # N62467-89-D-0318/CTO-036

Dear Ms. Drew:

On behalf of the Navy, EnSafe/Allen & Hoshall is pleased to submit seven copies each of the Response to Comments for the Comprehensive Sampling and Analysis Plan at the Naval Air Station Pensacola in Pensamla, Florida. The Navy is in agreement with the July 7, 1993 USEPA letter for (i) the schedule for CSAP finalization, and (ii) the Navy proposes to extend the period of informal dispute on the "Batch 2" RI/FS Work Plans to the anticipated date of CSAP approval, December 16, 1993.

Please let us know if you have any questions or comments regarding the responses.

Sincerely,

EnSafe/Allen & Hoshall

Allison L. Dennen
Project Geologist

Henry H. Beiro
Task Order Manager

Enclosures

cc: EnSafe/Allen & Hoshall file
Linda Martin, SOUTHNAVFACENGCOM - 2 copies
Ron Joyner, NASP - 13 copies
Tom Moody, FDEP - 1 copy
John Mitchell, FDEP - 1 copy
Waynon Johnson, NOAA - 1 copy
Lynn Griffin, FDEP - 1 copy

ENVIRONMENTAL PROTECTION AGENCY
TECHNICAL REVIEW AND COMMENTS
COMPREHENSIVE SAMPLING AND ANALYSIS PLAN
NAVAL AIR STATION (NAS) PENSACOLA
PENSACOLA, FLORIDA

Comment 1: Page 1-1, Paragraph 1

Please delete the following statement from the CSAP text:

"The sampling and analysis plan (SAP) completed for each site will be the primary document for the RUFS investigation. The SAP will document any deviations for the previously submitted work plans and document specific sampling procedures and analytical methods to be used during the investigation."

This statement is somewhat confusing and misleading given that the SAP is not a primary document, as per Section VIII. of the Federal Facilities Agreement (FFA). Please replace it with the following statement:

"The RI/FS for each site shall be completed in accordance with the final approved Sampling and Analysis Plan (SAP) for that site. All activities and procedures contained in this SAP shall supersede any activities and procedures specified in any previously-submitted documents associated with the RI/FS process, including the RI/FS Work Plan and CQAPP. Consequently, the RI/FS Work Plan for a site shall not be considered complete, or implementable, until the corresponding SAP for that site is finalized."

Response:

Agreed. **The original statement has been deleted and replaced with the following statement:**

"The RI/FS for *each* site shall be completed in accordance with *each* sites' final approved Sampling and Analysis Plan *(SAP)*. All activities and procedures contained in the *SAP* shall supersede any activities and procedures specified in any previously-submitted documents associated with the RI/FS process, including the RI/FS Work Plan and *CQAPP*. Consequently, the RI/FS Work Plan for a site shall not be considered complete until the corresponding *SAP* is finalized."

Comment 2: Page 1-1, Paragraph 2

Regarding the proposed use of a "Contract Laboratory Program (CLP) approved Laboratory", the U.S. EPA CLP does not approve laboratories. The CLP is a contractual arrangement whereby the U.S. EPA procures analytical services. Also, as described in the EPA guidance document Data Quality Objectives for Remedial Response Objectives (March 1987) "Level IV

protocol" applies to analytical methods only. Please make the appropriate corrections to the text.

Response:

The text has been revised to read "The laboratory to be used will be Naval Energy and Environmental Support Activity (NEESA)-approved, Contract Laboratory Program (CLP) analytical methods using Level IV protocol will be used by the selected laboratory."

Comment 3: Pages 3-3 through 3-6, Section 3.2

EPA agrees that a soil gas survey is useful as a screening tool for VOC contamination. The general soil gas sample procedures and equipment outlined in the plan are acceptable. However, a soil gas survey is not a substitute for soil sampling. Also, what alternate screening approaches and techniques will be used at sites where the only suspected contaminants are non-VOCs (e.g. metals, PCBs, pesticides)?

Response:

Agreed. A soil gas survey will be used as a preliminary survey only and will not be used as a substitute for soil sampling. Data collected by Ecology and Environment, Inc. during Phase I investigations completed at most of NAS Pensacola sites will be used to focus the investigations at sites where non-VOCs are the suspected contaminants.

For sites not investigated by Ecology and Environment, Inc., soil gas surveys and/or Dexsil CL screening for pesticides and PCBs will be performed depending upon the contaminants of concern. Dexsil screening procedures will be included in the Draft Final CSAP.

Comment 4: Page 3-10, Section 3.5

The results of the habitat/biota surveys completed by Ecology and Environment, Inc. should be referenced in this section and taken into consideration when designing and conducting these surveys. Duplication of previous efforts must be avoided whenever possible in order to ensure timely progress towards RI/FS completion.

Response:

Agreed. Habitat/biota surveys presented in the Interim Data Reports completed by Ecology and Environment, Inc. will be used as a preliminary guide for all habitat/biota surveys undertaken during the RI/FS investigation.

Comment 5: Pages 4-1 through 4-14, Section 4.0

A. EPA recommends monitoring the breathing zone for volatile organic vapors during borehole advancement. A flame-ionization detector (FID) and photo-ionization detector (PID) should be used during all subsurface soil sampling (e.g. Section 4.6).

B. It is extremely important that surface and subsurface soil samples be mixed as thoroughly as possible to ensure that the sample is representative of the interval sampled. Soil samples should be mixed as specified in Section 4.2.10. (Environmental Compliance Branch (ECB) Standard Operating Procedures and Quality Assurance Manual (2/1/91) (SOPQAM). The most common method of mixing is referred to as quartering. The soil in the sample pan is divided into quarters. Each quarter is mixed, then all quarters are mixed into the center of the pan. This procedure is followed several times until the sample is adequately mixed. If round bowls are used for sample mixing, adequate mixing is achieved by stirring the material in a circular fashion and occasionally turning the material over. Soil and sediment samples collected for purgeable organic compounds analyses should not be mixed. The 2-ounce (50-ml) sample container should be filled completely; no head space should remain in the sample containers.

Response:

A. Agreed. The breathing zone will be monitored with a flame-ionhation detector (FID) or photo-ionization detector (PID). All health and safety concerns will be monitored in accordance with the site-specific Health and Safety Plan (HASP).

B. Soil samples collected without the use of stainless steel linen will be homogenized in accordance with SOP/QAM procedures. Samples collected for volatile organic compound (VOC) analysis will not be homogenized. The VOC samples will be immediately containerized with zero headspace in the sample containers.

Soil and sediment samples collected with the stainless steel liners will not be homogenized. The liners will be capped at each end with Teflon septa and sealed with PVC caps. Stainless steel liners will be used at sample locations where loss of volatile constituents is a concern.

Comment 6: Page 4-4, Section 4.3, Before Surface Soil Sampling

Item #3 should go before #1.

Response:

Agreed. Personal protective clothing and equipment will be donned before surveying and staking the sample locations.

Comment 7: Page 5-1, Section 5.0

EPA agrees with the Navy's statement that "proper well construction and development are essential in reducing the amount of entrained sediment in the groundwater sample". EPA does not agree with the statement that "Temporary monitoring wells do not meet both of these criteria...". During the summer of 1992, personnel from EPA's Environmental Services Division installed a test well at NAS Pensacola. Following a minimal amount of well development (pumping) a sample visibly free of entrained sediment was obtained. While obtaining a relatively sediment-free sample may prove difficult in some portions of the facility, the predominantly sandy lithology at NAS Pensacola would indicate that as long as proper temporary well installation and development procedures are followed, a sediment-free sample can be obtained using temporary well methods.

Likewise, the installation of permanent wells does not guarantee the collection of a representative, sediment-free groundwater sample. Appropriate well installation, development, purging and sampling techniques must still be adhered to. For instance, as stated in Section 7.4 (page 7-51) of the Draft RI Report for Operable Unit 10, "groundwater purged from many of the wells was slightly to substantially turbid at locations both near and removed from the IWTP...". Based on a preliminary review of this report, it appears that this turbidity is most likely due to the type of pump used to purge the wells prior to sampling. The surging action of the pump may have resulted in the collection of groundwater samples which yielded false positives for metals and possibly false negatives for volatiles.

Temporary well installation methods offer a means for rapidly delineating groundwater contaminant plumes in the field when used in conjunction with appropriate analytical methods, such as a field GC. The results tend to be more reliable than those obtained for soil-gas investigations. The technique can also be used to detect a wider range of contaminants. Attachment A provides a list of some of the currently available temporary groundwater sampling methods. This same list was provided as Appendix A to EPA's comments on the Draft RI/FS Work Plans for Operable Units 6-9 (see correspondence dated August 13, 1992).

Rapid and cost-effective completion of these investigations should be the goal of all of the Parties. The use of permanent monitoring wells to accomplish plume delineation (which appears to be the intent for most sites where the number of planned permanent wells exceeds 5) does not meet this goal. Therefore, for all such sites where plume delineation is still ongoing, an alternate means for delineating groundwater contamination must be used. Suitable approaches include: (i) the use of one of the temporary groundwater sampling methods described in Attachment A, or (ii) the use of soil gas screening techniques, for sites where VOCs are the primary contaminants, in combination with the collection of 10-20% confirmation samples using one of the temporary groundwater sampling methods listed in Attachment A.

Response:

The Navy's choice of permanent versus temporary wells for Phase 11 investigations was made according to the following rationale. The data collected from Phase I investigations by Ecology and Environment, Inc. using temporary wells will be used to focus monitoring well locations. The Ecology and Environment investigations were plagued by a high bias in the detected concentrations of metals caused by poor temporary well installation and development procedures. In addition, the installation of permanent wells will establish a network of sampling locations to be used for a consistent sampling program before, during, and after remediation and will provide a contiguous historical data base to establish the effectiveness of cleanup. Since the cost difference between temporary wells and permanent wells is relatively small, we conclude the cost-benefit tradeoff favors installing permanent wells at the outset, as previously discussed in the Response to Comments for Category 2 — Site 27 dated May 11, 1993. Since the Navy is the lead agency, permanent wells will be used for Phase II investigations. Where available, well locations will be based on data generated from soil gas surveys.

Comment 8: Page 5-2, Section 5.3

EPA wishes the record to show that it recommends and prefers the use of stainless steel (304 or 316) over PVC for well construction. However, EPA notes that the Navy has opted to use PVC (NSF Standard 14) at their own risk, following a thorough consideration of the use of this material.

Response:

Monitoring wells will be constructed of PVC (NSF Standard 14) as discussed in the document entitled *Justification for the Use of Polyvinyl Chloride as Monitoring Well Construction Material at Naval Air Station Pensacola, Pensacola Florida* and as agreed to by the USEPA in the letter dated March 18,1992.

Comment 9: Pages 5-3 through 5-6, Figures 5-1 through 5-4

The following comments are provided regarding the proposed monitor well construction designs:

A. At least 6 inches of filter material should be placed at the bottom of the bore hole to serve as a firm footing before installing the well screen and casing.

B. According to these figures, "no glued fittings" will be used. In order to create a joint that is sealed properly, teflon tape or teflon "o" rings should be used in conjunction with the threaded couplings.

C. The screen length selected should be no greater than 10 feet in length (i.e. $\geq$ 10') to ensure that a discrete interval of the aquifer is monitored. Dilution of the ground water sample may occur for screen lengths greater than 10 feet.

Response:

A. *Agreed.* If possible, filter material will extend a minimum of 6 inches past the bottom of the well screen ensuring a firm footing. However, the fluid nature of the natural sand may preclude *extending* the filter material past the bottom of the well screen.

B. *Agreed.* Teflon tape or Teflon "O" rings will be used with the threaded couplings.

C. *Agreed.* The screen length of monitoring wells will be no greater than 10 feet in length.

Comment 10: Page 5-8, Subsections 2 & 3

During well construction, the well should be purged or bailed after the sand pack is installed and before the bentonite seal is installed. Purging the well will force the sand to move around the well screen quicker and promote settling and packing of the sand grains in the annular space. If the sand pack is not allowed to settle around the well screen before the bentonite pellets are installed, a void space will form above the sand pack creating a less efficient well.

Response:

Our experience with "running sand" at NAS Pensacola does not allow for the development of the well before construction completion. The bentonite seal using pellets has been replaced with a bentonite slurry because of "running sand." The fluid nature of the natural sand does not allow for void formation.

Comment 11: Pages 5-14 through 5-16, Section 5.4

What circumstances or conditions will be used to determine which well development method will be utilized?

Response:

The monitoring well development technique will be selected based on recovery of the aquifer. In a monitoring well with low aquifer recovery, development will be achieved by bailing or *surging* and bailing. In a monitoring well with high aquifer recovery, monitoring well development will be achieved by surging and pumping.

Comment 12: Page 6-4, "After Purging"

"If well is purged dry...". It is recommended that the well not be pumped dry or dewatered below the top of the well screen. If the water level drops below the well screen, ground water contained in the aquifer is exposed to oxygen which will chemically change the water chemistry. Also, if the well is dewatered below the screen, volatile contaminants may be stripped from the ground water as it cascades along the well screen during recharge.

Response:

Every effort will be made to avoid purging the monitoring wells dry.

Comment 13: Page 6-6, Section 6.2, "During Groundwater Sampling"

Groundwater Samples must not be filtered. If the Navy prefers, both a filtered and non-filtered Sample may be collected for metals analysis. Proper well installation, development and purging techniques must be utilized to minimize the turbidity of the samples (see Appendix E of the SOPQAM.

Response:

Sample filtration guidelines are provided only for Cyanide samples with a positive sulfide spot check (e.g. lead acetate paper changing to bluish-black). Groundwater samples collected for total metals analysis will not be filtered.

Comment 14: Page 7-2, "During Dredge Sampling"

Since a Ponar sampler opens from the bottom, clarify how the VOC and toxicity samples will be collected directly from the Ponar, rather than first emptying the sediment into a large container, such as a stainless steel bowl.

Response:

Agreed. The Ponar sampler contents will be emptied into a stainless steel bowl before sediment samples are collected. If possible, VOC samples will be collected using a split barrel sampler with stainless steel liners to reduce the loss of volatile organic compounds.

Comment 15: Page 7-3, "Coring Equipment"

Provide the diameter of the core sampler.

Response:

The core sampler will be 2 inches in diameter.

Comment 16: Pages 7-3 through 7-4, "During Core Sampling"

The sample used for lithologic logging should not be handled prior to evaluation. The information should be visual until after the sample (or portion of the sample to be analyzed) has been removed.

Response:

Agreed. The sample collected for lithologic logging will not be handled before the sediment sample is collected.

Comment 17: Page 7-7, Paragraph 1

In cases where surface water depth exceeds 3 feet, it should be sufficient to record water quality parameters at 3 depths (i.e. 1 foot below water surface, mid-depth, and 1 foot above the bottom), rather than at every foot of the water column.

Response:

Agreed. Surface water quality parameter measurements will be collected at the following locations: 1 foot below the water surface, mid-depth, and 1 foot above the bottom.

Comment 18: Pages 8-1 through 8-19, Section 8.0

While much of the strategy and conceptual design information included in this Section is useful and essential to the full RI/FS Work Plan, it belongs in the work plan, proper, and should therefore be deleted from the CSAP. The contents of the Sampling and Analysis Plan (SAP) should be limited to a presentation of sampling and analytical techniques/protocol (Comprehensive SAP) and the location, number, type etc. of samples to be collected (Site-Specific SAP). For example, the Sections contained in this Draft CSAP on soil and groundwater sampling are primarily limited to descriptions of the *necessary* sampling steps and protocol. They do not include discussions of such issues as (i) how these individual sampling events fit into the overall investigative approach, or (ii) the conditions under which a test may or may not be performed.

Also, in order for this document to be a comprehensive SAP, it must be expanded to include sampling and analysis plans for all three major habitat types, including: (i) upland/terrestrial

areas, (ii) wetlands and (iii) surface water bodies. At present, for example, most of the "Phase I" subsections deal with wetlands; upland areas are only briefly mentioned, and surface water bodies are not addressed. Please recall, also, that the appropriate data must be collected for all sites where a potential threat to the environment exists. This includes not only sites 40-42, but also sites 1-39. The potential on-site ecological risks for the latter group of sites must be assessed in the RODs for each of these sites.

Response:

Agreed. The information in the current *CSAP* will be incorporated into the work plans. The work plan will show a broad outline of the objectives of the RI investigation much like the CSAP was written. The CSAP and the site-specific SAPs will follow the outline of the work plans and deviate where necessary. However, based on the limited information known about the sites, the site-specific SAPs cannot provide much more detail.

The CSAP has been rewritten to place more emphasis on the upland areas associated with the 32 terrestrial sites and surface water bodies (the Bay and the Bayou). Wetlands are still given a high priority because they are *often* the first place contaminants migrate and are recognized as an important resource. They are also much more difficult to delineate and sample because of their complexity and variability. Therefore, to present a valid approach to sampling wetland sediments and surface water, much more detail is necessary. Soil and surface water bodies will receive adequate study because the protocol can be adapted for these areas. Much of the information on upland areas is being collected during the RI investigation at specific sites. This may preclude further sampling in the upland areas.

Comment *19:* **Pages 8-1 through 8-2, Section 8.1**

Phase I involves the collection and compilation of preliminary background information on the site, including "basic biological characteristics of the site and how they may relate to contamination" and a "review of existing information...(including)...data from previous sampling...topographic maps, aerial photographs...". EPA concurs that this information is needed "to develop a sampling strategy for Phase II". However, the result of this approach is that:

(i) the OU-specific *SAP* will not be completed until after Phase I, since the data gathered during Phase I is needed to design the RI/FS sampling plans; and

(ii) the true RI/FS (i.e. adequate characterization of contaminant sources or pathways) will not commence until Phase II.

Consequently, while EPA may approve of the contents of the forthcoming Draft Final RI/FS Work Plan for Operable Units 40-42, these documents may not be considered for approval as RI/FS Work Plans until the OU-specific SAPs which specify the proposed sampling strategies for adequately characterizing the nature and extent of any contamination in the Bay, Bayou or Wetlands are received.

B. The original intent of the FFA Parties in designating the Wetlands, Bay and Bayou Operable Units was to provide a means for addressing any offsite migration of contaminants from the 39 terrestrial sites identifed in *Appendix* A of FFA into these ecologically sensitive areas. The propose of establishing these Operable Units was not to provide a means for identifying any additional contaminant sources which may or may not have impacted these ecological resources. In order to assure that valuable resources are effectively concentrated with this goal in mind, the work plans must clearly state this goal and identify the portions of the Bay, Bayou and Wetlands which clearly have little or no chance to be impacted by one of the 39 terrestrial sites. Remaining portions of these ecological areas, which have potential to be impacted by one or more of these 39 sites, should then be identifed as requiring at least a Phase I, with additional phases to be performed as needed. The only exceptions to this approach should be for wetlands which are identifed as background, or reference, wetlands for the study. Upon identification, these non-impacted wetlands may be carried through Phase I and beyond.

Response:

A. **The OU-specific *SAP* can be completed before Phase 1. Sampling will not occur until Phase II, but the sampling strategy should be known even though information is limited. A technical memorandum is planned to show where samples are to be collected after Phase I is completed.**

B. **First, there are 32, not 39, terrestrial sites. See the approved 1993 SMP. The approach has been altered to state if site history and a site visit do not indicate the likelihood of site specific contamination, then it will not be studied further. Phase I does not have to be completed in its entirety to show this. The only exception would be reference areas, as stated in the *CSAP*.**

Comment 20: Page 8-1, Paragraph 1

"Data generated from Phase I will consolidate the results of the diversity studies, chemical analyses, and toxicity tests performed in Phase II.. ." Is this a reference to the Phase II results for sites other than the Bay, Bayou and Wetlands? Presumably, results cannot be consolidated until after they are collected. Please clarify.

Response:

Agreed. **This statement has been changed to,** "This information can be correlated with the qualitative data from Phase I."

Comment 21: Page 8-1, Paragraph 3

The text should also include threatened species.

Response:

Agreed. Threatened species have been included in the text.

Comment 22: Page 8-2 through 8-8, Section 8.1.0 through 8.1.6

A. Many of the wetland delineation criteria discussed in these sections could be determined through either visual field observation or through more rigorous and extensive laboratory analytical methods. It appears that the former approach is planned. However, this should be clearly stated in the work plan. Also, a field schedule which estimates the planned duration of wetland delineation activities must be provided in the work plan.

B. "Emphasis will be placed on performing a statistically defensible study." Since Phase I is a qualitative study, as stated on page 8-1, it does not need to be "statistically defensible". For example, a qualitative description of the relative abundance of terrestrial plant species would be sufficient for Phase I. Phase II can provide a more quantitative study, if needed. *Also,* the habitat biota surveys performed by E & E have already collected some of this information. "heir findings should be utilized whenever possible.

C. "Before an accurate sampling strategy *can* be devised for sampling a wetland, the boundaries must be delineated." While any wetlands which have potentially been affected by sites 1-39 should be identified, a detailed jurisdictional delineation of all wetlands is not needed. Please keep in mind that the purpose of this study is not to determine wetland boundaries per se, but to determine the nature and extent of contamination in the wetlands, as related to contaminant migration from sites 1-39.

Response:

A. All wetlands will be delineated according to the *Corps* of Engineers Wetland Delineation Manual *(1987).* This is strictly a field method and involves no laboratory analytical methods, and will be so stated in the work plan. The schedule will be as shown in the SMP.

B. *Agreed.* During Phase I, a qualitative description can adequately *characterize* any may have occurred. This change has been made. The work plan has been changed to reflect the incorporation of the E&E work and the work of other groups. The work has been very useful in planning the Phase I portion of the investigation at some sites.

C. To characterize the ecological effects having occurred at a wetland, their entire boundaries must be delineated. The *CSAP* is explicit in stating this delineation is not for jurisdictional purposes. However, this is the most widely accepted and

defensible method to determine wetland boundaries and should be used **for the 32 sites.**

Comment 23: Pages 8-7 through 8-8, Section 8.1.6

Please combine the contents of **Sections 8.1.1 and 8.1.7, since** both **sections share** the Same title. reorganize the remaining **contents and** subheadings **of** Section **8.1 as** needed.

Response:

Agreed. This change has been made.

Comment 24: ***Pages* 8-8 through 8-8, Section 8.1.7, Paragraph 2**

A. "Before **Phase** I sampling...". should this **read "Phase II"? The** tasks **to be** completed during **Phase** I appear **to** be directed **towards** describing the site in sufficient detail to permit the selection of sampling locations for **Phase II**. Please clarify.

B. **As** discussed and agreed **to** at the May **12-13, 1993 RPM** meeting, a better explanation or definition of the terms "station" **and** "substation" must **be** included in the text.

C. Groundwater flow direction, particularly **as** it **relates** to the movement of contaminant plumes, should **be** added **to** the list of factors **to be** used to select sampling **stations** and substations.

D. Regarding the selection of sampling **stations and substations** for **the Bay and Bayou, as** discussed and agreed **to** at the May **12-13,1993 RPM** meeting, collection **and** evaluation of the following quantitative information **on** sediment **and surface water** properties **will** be completed prior **to, and used** in the selection/refinement of, these sampling stations and substations:

sediment grain *size*
sediment TOC
generation of sediment distribution **map**
surface water **quality parameters**
water **depth** profile

Since **this** information will **be** gathered following **Phase** I, but **prior to the initiation** of full-scale sampling and **analytical** efforts, it **was** suggested that **this** preliminary **data gathering effort be** termed **"Phase IIA"** while the remainder of **Phase II data** collection efforts **be** termed **"Phase IIB"** for the **Bay** and **Bayou.**

The parties **also agreed** that a more qualitative **inspection** of sediment **and** surface water properties was sufficient for **use** in selecting sampling stations **and** substations for Wetlands.

These qualitative efforts would therefore simply comprise part of the "Phase I" investigation for the Wetlands.

Response:

A. *Agreed.* Change has been made.

B. This term has been replaced with the term "sampling zone" and is explained in the text.

C. As stated in the *CSAP,* all available information will be used when planning sampling. Section 8.1.3 states specifically if groundwater flow is known, it will be used to help locate sampling points.

D. Depth to bottom, grain size, and TOC will be incorporated into a map during Phase I. This information will be used to guide the sampling during Phase IIA and IIB. However, surface water quality will not be addressed until Phase IIA of the investigation.

This information is also necessary for use in the wetlands, but it will not be collected as extensively as in the Bay and the Bayou because of smaller size and the assumed lack of variability.

Comment 25: Page *8-9,* Paragraph 2

"These stations will be sampled in a random fashion with all locations having an *equal* probability of being selected." Rather than being totally random, sampling in downstream or downgradient areas should follow a stratified random sampling method, as discussed at the May 12 meeting. A biased sampling design should be used in areas of expected Contamination, while random sampling *can* be used in areas that are less likely to be contaminated.

Response:

Initially, sampling will be performed in a biased fashion using "hot *spot"* locations.. If contamination exceeds a benchmark at a hot spot location then sampling will be expanded using a biased random sampling approach. Although *each* sampling zone (as it is termed now) will be sampled in a random fashion, each zone will be *selected* using a completely biased fashion.

Comment 26: Page *8-9,* Paragraph 3

"For the first site sampled, each station will have *at* least eight replicate samples *taken."* Does this mean that one wetland (or portion of the Bay, *or* Bayou) will be selected as a "test" wetland,

with the results of the eight replicate samples being used to determine how many replicates are needed for the remaining wetlands to be sampled? Further explanation of the approach and justification for collecting replicate samples is needed. Will the same approach be used at all sampling stations and substations and for all habitats? Also, at the May 12 meeting, the Navy proposed to reduce the number of replicate samples from 8 to 3. The number of replicate samples collected must be kept to a minimum. However, adequate assurance that the amount of data collected will be sufficient and defensible must also be provided.

Response:

Agreed. **Per the meeting in Atlanta and internal discussions, at least** three **samples will be collected from each sampling zone instead of eight. More may be needed depending on the size of the sampling zone.**

Comment 27: Pages 8-8 through 8-10, Section 8.1.7

The following general decisions regarding sampling stations/substations were also made at the May 12 meeting:

A. Terrestrial surface soil samples shall be collected from 0-1' below land surface.

B. Sediment samples shall be collected from 0-6" below land surface. A deeper interval (0.5-2') may also be collected as needed.

C. Transect lengths for Pensacola Bay should be based upon the location of the transition zone from fine- to coarse-grained sediments. Transects should not enter the navigational channel.

Response:

A. *Agreed.* **Soil samples** will **be collected from 0-1' below the surface.**

B. **As agreed during the meeting on May 12 and 13, all sediment samples are planned to be collected from the upper 6 inches where most benthic-dwelling organisms are considered to reside. If areas of significant contamination are encountered, additional samples will be collected from 0.5 to 2 feet.**

C. **Transect lengths will be based on the where the transition zone from fine- to coarse-grained sediment** *exists.* **Transects will not extend into the navigational channel.**

Comment 28: Page 8-10, Section 8.2

While species richness/diversity analysis, chemical testing and toxicity testing are all appropriate for Phase II, it is premature to indicate that all three approaches will be required for each area of concern, or that these three are the only possible approaches.

Response:

Agreed. The sampling approach has been divided into Phase IIA and Phase IIB. Phase IIA covers samples for chemical constituents only. These results will determine whether diversity studies and toxicity tests in Phase IIB will be necessary.

Comment 29: Pages 8-10, Section 8.2.1., Paragraph 1

A. Species diversity studies of soil organisms may not be appropriate for all terrestrial sites. For example, areas with sandy soils may have a naturally low diversity. Please revise this paragraph to state that diversity studies will be used where appropriate, and that other ecological sampling approaches will be considered for terrestrial sites.

B. "Samples will be taken using a Ponar dredge or stainless steel spoon or scoop...". To eliminate variability related to the use of different sampling methods, only the Ponar sampler should be used to collect biota in standing water wetlands and offshore areas. If soil organisms are to be collected, the collection method must be standardized as much as possible. For example, a frame of known dimensions can be placed on the soil; a stainless steel spoon or scoop can be used to excavate the soil within the frame, down to a predetermined depth.

Response:

A. *Agreed.* In areas of sandy soils more emphasis will be placed on toxicity studies. The text has been revised to reflect this.

B. *Agreed.* A stainless steel hand auger will be used to sample sediments in areas within wading depth. A Ponar dredge will be used to sample sediments containing deeper standing water. A stainless steel spoon or scoop will be used to collected soils or sediments without standing water. Soil and sediment samples will be collected by measuring a certain and consistent area and excavating to a depth of 1 foot in soils and 6 inches in sediment.

Comment 30: Page 8-12, Paragraph 1

"A minimum of eight samples will be collected..". Clarify the locations of the eight samples.

Response:

This has been changed to a minimum of three samples. At this point, it is not possible to locate sampling points because it is not known which areas will require sampling or how large the area is.

Comment 31: Page 8-13, Section 8.2.2

A. "The toxicity of the reference area(s) must therefore be tested prior to the area of concern." Toxicity testing of reference area samples must be done at the same time as testing of samples from areas of concern in order to lessen the potential for variability due to test conditions.

B. "chronic toxicity in the form of behavioral and/or reproductive changes will require more expansive testing in the form of more sensitive *Species..".* For toxicity tests, EPA recommends that more than one species (i.e. representing more than one trophic level) be tested for each medium in the initial phase of toxicity testing, rather than waiting to test more sensitive species in the later testing phase. For example, the fathead minnow represents a higher trophic level (freshwater) and is a less sensitive test species. Additional freshwater test species could include alga and Ceriodaphnia dubia (a water flea). This would save time and provide an overview of toxic effects across trophic levels. Finally, EPA is concerned about potential toxic effects on macroplankton, which are the planktonic (floating) larval stages of many estuarine/marine species. EPA recommends toxicity testing of species representing these planktonic larvae (appropriate test species *can* be provided upon request).

Response:

A. *Agreed.* Toxicity testing will be performed at the same time as testing of samples from areas of concern. However, a reference area can be used for more than one site. The results of all reference areas will be archived for use when future sites are to be sampled for toxicity.

B. Contaminants of concern will be tested for toxicity to sediment-dwelling and surface water-dwelling organisms. The *CSAP* and work plans explain why benthic macroinvertebrates are favored for use in toxicity tests within the sediment.

Comment 32: Page 8-15, Section 8.3

A. Regarding the proposed use of modeling to estimate bioaccumulation of contaminants, indicate, how the lipid content of the organisms will be determined (e.g. information in the literature, laboratory results, etc.).

B. The additional toxicity testing proposed for Phase III should be combined with that proposed for Phase II. Acute endpoints are already included in Phase II).

Response:

A. The lipid content of the organisms is presented throughout the literature. This will be added to the text in the work plans.

B. There must be a break between Phase IIB and Phase III to determine whether Phase III sampling is necessary. Phase III will require a much more refined approach to determine the extent of effects on a particular organism.

Comment 33: Page 8-16, Section 8.4

Clarify whether "Benthic Diversity..." refers to benthic macroinvertebrates.

Response:

Benthic diversity refers to benthic macroinvertebrates. This will be clearly stated in the text.

Comment 34: Page 8-17, Section 8.4

See comment 29B.

Response:

Agreed. This change will be made.

Comment 35: Page 8-18, Paragraph 1

A. Clarify that the benthic macroinvertebrate samples "will be sent to a laboratory for [taxonomic identification, enumeration] species richness and diversity analysis." Taxonomic identification and enumeration provide the data used to calculate species richness and diversity.

B. Since diversity at site areas will be compared with diversity at reference areas, biota sampling at site areas and reference areas should be conducted during the same sampling period.

C. The usefulness of using the Phase II biota sampling to determine the sample site is not clear, since Phase II would already be completed at that point. EPA recommends doing a pilot study in each type of ecosystem (i.e. representative ecosystems) to be investigated during Phase II, to determine natural variability and the minimum number of samples needed to show a statistical difference.

D. The final sentence of this paragraph refers to wetlands alone. Since this is a comprehensive SAP, please review this text accordingly.

Response:

A. *Agreed.* **Samples will be analyzed for species diversity through taxonomic identification and statistical analysis.**

B. **Sampling at reference areas will be conducted at the same time. However, some reference areas can be used for more than one sampling location. Reference area results will be archived to compare with subsequent areas of concern. This will save the time and expense of additional sampling.**

C. *Agreed.*

D. **Agreed. The sentence has been revised to reflect all areas.**

Comment 36: Page 8-18, "Seining"

Please revise the text to indicate that other fish collection methods will be considered if seining is not successful (e.g. use of an otter trawl in deeper areas of Pensacola Bay).

Response:

Agreed. **It is not known whether seining will be used and thus will not be included in any current documents.**

Comment 37: Page 8-19, "Seining Procedures"

A. Step 2. focuses on the Wetlands. However, these seining procedures would seem to be appropriate for any shallow water area. Since this is a comprehensive SAP, please revise the text accordingly.

B. Should the phrase "haul with the speed of the current" be revised to read "haul against the current"? This approach would help form a pocket in the seine and facilitate capture of the fish.

C. The length and weight of individual fish are usually needed. Indicate whether this will be done in the field or the laboratory.

Response:

A. **It is not believed seining will be used, and thus will not be included in the current documents. If seining is required in the future, the procedures will be presented in a technical memorandum.**

B. See Response A.

C. See Response A.

Comment 38: Page 9-1, Section 9.1

Since temperature measurements are also needed, *state* whether the Hydrolab Data Sonde 3 will measure temperature.

Response:

The Hydrolab Data Sonde measures temperature.

Comment 39: Page 9-10, "Multi-Well Pumping Tests"

A. "...tests. ... will involve withdrawing groundwater at a constant known rate... ". A flow meter should be used for the constant rate aquifer tests *to* determine if pumping rate fluctuates during the test.

B. "...until the water level stabilizes... ". Aquifer tests performed in the unconfined surficial zone must be conducted for a minimum of 72 hours (48 hours of discharge, 24 hours recharge). Aquifer tests performed in the underlying confined aquifer, the Main Producing Zone, must be conducted for a minimum of 48 hours (24 hours discharge, 24 hours recharge). This amount of water level data is necessary for making appropriate matches to theoretical type curves.

Response:

A. *Agreed.* **A flowmeter will be used for the constant rate aquifer tests.**

B. *Agreed.* **The conditions will be met only if the well is capable of sustaining discharge significant enough to adequately stress the aquifer. Alternately, the RI analytical data will be used to determine if groundwater remediation is necessary. If groundwater remediation is required and the RI aquifer test data is insufficient**

for remedial design purposes, then the data will be used to design a high volume test for design purposes. This high volume test can be conducted on any site requiring groundwater remediation following issuance of the Record of Decision (ROD). See Attachment 1.

Comment 40: Page 9-10, "Equipment Required"

A Cs-137 sources is not as accurate, and therefore not as appropriate, for detecting RA-226. The gamma energy of Cs-137 is 662 KBV, while the gamma energy of Ra-226 is 186 KBV. If possible, a Ra source should be used.

Response:

Agreed. Cs-137 was provided by the manufacturer as a general purpose operational *check* source. It was not intended, nor is it to be used, as a calibration source for field screening equipment, All calibration is conducted by the manufacturer every six months.

Comment 41: Pages 10-8 through 10-12, Section 10.2

A. This section states that the parameters and analytical methods are presented in *Appendix* E. However, Appendix E lists the site numbers and descriptions for NAS Pensacola. Please correct as appropriate.

B. If the CLP method is used, then the Statement of Work document number should be included as a reference.

C. Periodic revisions *are* made to SW-846. If a particular method has been revised, the updated version should be used. The reference should indicate from which edition or revision the methods *are* taken.

Response:

A. Appendix E has been changed to present parameters *of* analysis, analytical methods, sample container *size,* sample container type and preservation requirements. The list of site numbers and descriptions has been moved to Appendix F. The remaining appendices will be relabeled accordingly.

B. *Agreed.* The Statement of Work document number will be provided as a reference. The Statement of Work for organic analysis currently in use is USEPA document (OLM01.8): Statement of Work for Organics Analysis, *August* 1991. The most current Statement of Work for inorganic analysis is USEPA document (ILM02.1): Statement of Work for Inorganics Analysis, September 1991.

C. *Agreed.* The updated revision or edition number of SW-846 will be referenced as appropriate.

Comment 42: Pages 12-1 through 12-2, Sections 12.1 and 12.2

These sections are unnecessarily vague. Please revise to include the following information for all analyses; sample container size, sample container type and preservation requirements.

Response:

Parameters for analysis, analytical methods, sample container size, sample container type and preservation requirements are now presented in Appendix E.

Comment 43: Page 13-1, Section 13.0

"The disposal method will be selected by the Navy based on the classification of the waste." In general, laboratory analyses will be needed to support the selected classifications, and disposal method, for investigation-derived wastes.

Response:

Agreed. Samples of the investigation-derived wastes will be collected for Toxicity Characteristic Leaching procedure (TCLP) analysis.

Comment 44: Page 15-8, "Analytical Laboratory"

Please see comment 2.

Response:

The laboratory to be used will be Naval Energy and Environmental Support Activity (NEESA)-approved. Contract Laboratory Program (CLP) analytical methods using Level IV protocol will be used by the selected laboratory.

Attachment **1**

a

DRAFT

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
2155 EAGLE OR . P O BOX 190010
NORTH CHARLESTON IC 29419 9010

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Ms. Allison Drew
U.S. EPA
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-IO) 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. 'Moreover, this letter will serve to clarify and summarize further 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 with 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, allow this 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 pH temperature and conductivity had stabilized. Contrary to regulatory opinion, 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 that it is imperative that it maintain a proactive role in the investigation and remediation of sites at NAS Pensacola. However, it is also imperative that 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) 743-0574.

Sincerely,

Linda A. Martin

LINDA A. MARTIN
Environmental Engineer
Installation Restoration I Branch