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RESPONSE TO SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL
CONTROL COMMENTS ON RESOURCE CONSERVATION AND RECOVERY ACT FACILITY
INVESTIGATION WORK PLAN CNC CHARLESTON SC
8/30/1994
ENSAFE/ ALLEN AND HOSHALL



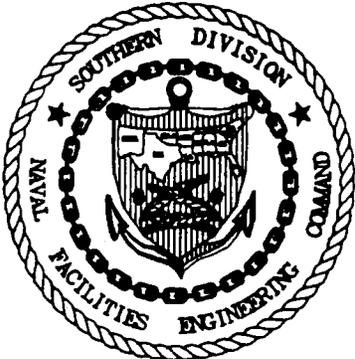
**COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY
NAVAL BASE CHARLESTON
CHARLESTON, SOUTH CAROLINA
CTO-029**

**RESPONSE TO PREVIOUS
RFI WORK PLAN COMMENTS**

Prepared for:

**DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CHARLESTON, SOUTH CAROLINA**

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Prepared by:

**ENSAFE/ALLEN & HOSHALL
5720 SUMMER TREES DRIVE, SUITE 8
MEMPHIS, TENNESSEE 38134
(901) 383-9115**

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Release of this document requires the prior notification of the Commanding Officer of the Naval Base Charleston, Charleston, South Carolina.

RESPONSE TO COMMENTS
Comments — Comprehensive RFI Work Plan
Elmer Akin to Doyle Brittain
June 6, 1994

Comment 1 — General Comments on Chapter 1: This chapter contained many examples of vague plans, some of which were not according to guidance. These plans, e.g. Kriging, Monte Carlo analysis, were never mentioned again. Chapter 1 should be rewritten with the appropriate caveats and removing references to procedures that are unlikely to be used in the risk assessment.

Response: References to Monte Carlo methods were dropped. The section subtitled **Application of Biased/Unbiased Data Sets** was rewritten to include a discussion of geostatistical methods, including kriging, that will be used in the risk assessment. Section 2 was rewritten to be consistent with the methodology presented in this section. Every effort was made to be clear and consistent with the presented approach.

Comment 2 — Page 1-1, third paragraph: It says: Using these data in human health or ecological assessments likely would result in imposing overly conservative remedial goals.

This is not necessarily true. The exposure assumptions and the location of the "hot-spots" will also affect the conservatism of the risk assessment. This language should be removed.

Response: Paragraph 1-1, No. 3 was rewritten. This language no longer appears.

Comment 3 — Page 1-2. Chemicals of Potential Concern (COPCs) and Chemical of Concern (COCs): Throughout the document, there was confusion regarding these terms. Upon detection of chemicals at a site, the list or group of chemicals should be called Chemicals in Site Sample (CPSS). The initial task of the BRA is to develop a list of COPCs. Guidelines in RAGS and Region IV Supplemental Guidance should be consulted. If, during the risk characterization step, these COPCs are determined to contribute significantly to a pathway risk have a Hazard Index of greater than 1 or a cancer risk of greater than 10^{-4} , then they become COCs. The transformation of a COPC to COC is, of course, base on the site-specific exposure assumptions.

Response: Page 1-2 was altered to mention CPSS. Section 2 was rewritten to be consistent with the progression CPSS→COPC→COC.

Comment 4 — Page 1-2, first bullet: The presence of SVOCs and VOCs should not *prima facie* be attributed to incomplete fossil fuel combustion. Generally, all organic chemicals in CPSS should be retained at COPCs. However, comparison with the appropriate background

samples may be used to exclude organic chemicals. More evidence that such samples represent true background levels typically is required for organic versus inorganic chemicals.

Response: Comment incorporated in paragraph 1, pg. 1-2.

Comment 5 — Page 1-6. Additional Background Condition Indicators: The terms "supplemental sampling program" and "supplemental comparative tools" are excessively vague. They should be replaced with more specific language.

Response: This paragraph was rewritten to remove this reference. It now appears on page 1-6, paragraph 2.

Comment 6 — Page 1-7, first paragraph after the top bullet: It says: This information will be used to compare onsite data with those generated in offsite areas in no way influenced by past or current at NAVBASE operations.

It should be changed to: ...no way influenced by past or current operations at NAVBASE.

Response: This language was changed as per comment.

Comment 7 — last two bullets, comparison with background: The procedure for comparing the concentrations of inorganic chemicals onsite with those in background samples has become known as the 2X background rule. It is more appropriately termed the "twice background criterion." The Region IV Office of Health Assessment greatly prefers this use of the twice background criterion to any statistical tests for background comparisons.

The criterion is applied as follows: If the maximum detected concentrations of an inorganic chemical onsite is greater than twice the average of the background sample concentrations, then the chemical should be included as a COPC unless it is eliminated by other appropriate criteria.

Twice background criterion can also be used to determine whether to exclude organic chemicals. However, it is generally assumed that organic chemicals are not present in background.

Response: The twice background comparison was incorporated into the document. It now appears as bullets no. 5 and 6 on page 1-7, regarding inorganics and organics, respectively.

Comment 8 — Page 1-8, Application of Biased/Unbiased Data Sets: This section was extremely confusing and in apparent disagreement with the methods presented in Chapter 2. From this discussion, the reviewer concluded that RME exposure concentration terms (i.e. the UCL₉₅ or the maximum detected concentration) would not be used as the exposure point concentration. Chapter 2 indicates these will be used. This paragraph should be removed from the document.

If there is concern about the small size of the "hot-spots" involved, an FI term (Fraction Ingested from source) should be used in the risk equations.

Response: This section was extensively rewritten. It now contains a discussion of geostatistical methods that are being planned to help analyze NAVBASE environmental data. Section 2, subsection 2.2 was rewritten to be consistent with this approach.

Comment 9 — Page 2-1, second sentence: It says: The BRA's objective is to determine the potential for adverse effects, human health hazard and/or cancer risks, and/or ecological impacts in humans exposed to hazardous substances at the site as it currently exists (i.e. assuming no further actions).

What is meant by ecological impacts in humans? Perhaps the sentence should read: ...cancer risks, and/or ecological impacts due to hazardous substances at the site...

Response: This language was changed as per comment.

Comment 10 — Page 2-2, Guidance: Attached to this memo are several guidance documents from Region IV. They include the New Interim Region IV Guidance (11 Feb 1992), Development of PRGs, RGOs and RLs (14 Apr 94), Default Oral Absorption Values and Exposure to VOCs during Domestic Water Use (3 Jun 94).

Response: Guidance documents enclosed in the reviewer's comments are now referenced on page 2-2.

Comment 11 — Page 2-3, first paragraph: It says: If no risk/hazard is predicted using this excessively conservative approach, it may be concluded that site conditions pose no threat. However, should potentially significant risk/hazard appear to exist, refinements will be made to more closely approximate reasonable potential exposure conditions, and risk/hazard will be computed.

It is highly inappropriate to change the exposure assumptions to minimize the risk. If the risk/hazard at the site is above levels of concern, then the risk manager should make a remedial decision based on the level of risk. It is wrong to change the exposure scenarios to minimize the perceived risk.

Realizing that RME exposure assumptions may result in a conservative estimate of risk, it is suggested that risk characterization based on "Central Tendency" exposure assumptions (Guidance on Risk Characterization for Risk Managers and Risk Assessors, F.H. Habicht II, EPA memorandum, 26 Feb 1992) be presented in an appendix to the BRA. The writer of this document should remain aware of the necessity for separation of risk assessment and risk management (See also comment #22).

Response: Central tendency discussion is now included as a separate paragraph in Section 2.5, page 2-26, first full paragraph.

Comment 12 — Page 2-4, first paragraph: The correct term here is "chemicals" not "parameters."

Response: This language was changed as per comment.

Comment 13 — Page 2-4, Risk-based screening: The reviewer is very much in favor of the risk-based screening approach mentioned here. A tool acceptable to Region IV for deriving the list of COPCs is the table of risk-based screening values developed by EPA Region II. This table provides concentrations in environmental media representing a cancer risk of 10^{-6} and an Hazard Index of 0.1. A copy of the most current version of this table is attached.

Response: This paragraph was removed from the document as per comment.

EPA Region III risk based screening document is mentioned explicitly in the text in the second paragraph on page 2-4, and referenced as an EPA document to be used in the risk assessment on page 2-2.

Comment 14 — Page, Calculation of CDI: Note that the lifetime weighted average is used to address childhood exposure to carcinogens.

Response: This language was clarified to be consistent with this comment.

Comment 15 — Page 2-7, Figure 2-1: The method for calculation of the UCL is incorrect. A portion of the supplemental Region IV Guidance detailing calculation of the UCL for log normal distributions is attached.

Response: This formula was kept in the document for consistency, but will not be used in the risk assessment. Discussion of reasons for this decision are on page 2-6, first section.

Comment 16 — Page 2-8, paragraph at the top of the page: The method of presenting the unadjusted CDI for carcinogenic PAHs other than benzo(a)pyrene is correct. However, the reviewer had to read the paragraph four times to understand it. It should be rewritten with clarity in mind.

Response: This paragraph was rewritten and incorporated into the former previous paragraph. The combined discussion now appears in the first full paragraph beginning on page 2-6.

Comment 17 — Page 2-9, Inhalation of VOCs from groundwater: Recent Region IV guidance in this regard is attached.

Response: This reference is now incorporated in the list of references beginning on page 2-2.

Comment 18 — Page 2-14, Figure 2-2 and elsewhere: In the BRA, childhood and adult intakes of non-carcinogens should be separated. Children maybe much more sensitive to certain chemicals due to their lower body weight.

Response: These changes were made in all relevant figures.

Comment 19 — Page 2-18, Groundwater Pathway (Direct Ingestion): The position of the EPA is that groundwater is a valuable and beneficial resource to be protected and restored wherever possible. Hence, it is appropriate to include the groundwater ingestion pathway as apparently will be done based on Figure 2-3. This section should be rewritten to reflect these considerations.

Response: Groundwater is now mentioned as a potential pathway throughout the document.

Comment 20 — Page 2-22, Section 2.3, Toxicity Assessment: In addition to IRIS, HEAST and the possibility of ECAO, the risk assessor should be aware that structurally related compounds possessing toxicity values maybe used as surrogates for compounds that have no

toxicity values. For example, the RfD for naphthalene maybe used as a surrogate value for 2-methylnaphthalene which has no RfD.

Response: Changed as per comment. Now appears on page 2-21, first paragraph.

Comment 21 — Page 2-25, first full paragraph: The percent contribution to the overall risk should be presented by chemical. Please see the attached sample RGO table.

Response: Discussion of RGO's now appears in section 2.5.1, page 2-28, with appropriate language changes as per comment.

Comment 22 — Page 2-27, last paragraph: The Region IV Office of Health Assessment prefers that risk evaluation based on mean concentrations of chemicals or mean (as opposed to RME) exposure assumptions be placed in a appendix (See also comment #11 regarding the "Central Tendency). Remedial decisions are based upon risk evaluation using RME exposure assumptions and presentation of risk calculations based on the mean may tend to made the document confusing.

Response: Changed as discussed under comment 11.

RESPONSE TO COMMENTS
U.S. Department of Commerce
National Oceanic and Atmospheric Administration
June 20, 1994

Comment Part 1.0: This section includes discussions of the determination of reference concentrations and background concentrations for the site as well as the calculation of risk to human health and the environment. It is important at this time to stress that an appropriate evaluation of risk at the site must separate the activities of risk assessors and risk managers. These two activities, although obviously dependent on each other, carry out two distinct functions which would be performed separately in order to avoid one biasing the results of the other. Keeping this in mind, although the determination of background values may be important in the risk manager's evaluation of a site comparison of analytical data to calculated background values should not enter into the calculation of risk performed by the risk assessor. Calculation of risk to environmental and ecological parameters does not involve theoretically determined values for localized background concentrations. Calculation of environmental risk does, however, include the comparison of site data with information from environmental effects databases and reports. Risk to both indigenous and migratory species is not a variable dependent on calculated background levels.

Response: The Work Plan does not state that risk management will be a function of the RFI because it is not. The risk assessment will be performed independent of risk management decisions. While the calculation of "background" may not be a variable in the determination of risk to indigenous and migratory species, it is a necessary tool when performing contamination assessment.

Comment: In the section concerning data sets and evaluation of risk, there should be some inclusion of both habitat and watershed approaches to evaluating risk. Although zones have been established already, mention should be made in this section that areas from different zones and waste sites may need to be combined in order to evaluate risk to environmental compartments, e.g. the combination of waste sites from zones A and B for evaluation of effects in Noisette Creek.

Response: Even though various assessments and data collection efforts may occur concurrently with the investigation of a zone, the ecological risk assessment is not zone specific in terms of arbitrarily drawn zone boundaries.

Comment Section 3.0: In an earlier review I commented that "In the conceptual model developed for the ERA, as depicted in a flow chart, Figure 3-1, there is a decision making step for cancellation of the ERA after Phase I activities. Given that areas are initially appropriate for inclusion in the ERA, it is premature to make any decisions concerning risk until quantitative biotic and abiotic data are gathered and assessed in Phase II activities. After this step, the characterization of risk may be accomplished, but great care must be taken even at this point in

determining that "no risk" is present." At a technical review meeting held in Atlanta on June 6, 1994, this comment was discussed and it was relayed at that time that Phase I activities will consist of a review of analytical data.

Response: This comment will be taken under advisement.

Comment: In earlier comments NOAA stated in Section 3.1.1, "it is stated that the subjective assessment of the effects of contamination will be based on observation of anomalous features.." This is not the purpose of Phase I activities for an ERA, nor are Phase I activities able to accomplish any goals concerning assessment of effects of contamination. The purpose of Phase I activities is the "paint a picture" of the site so that later site specific toxicological investigations can be put into a proper perspective and so that proper toxicological assessment endpoints may be chosen if they are deemed necessary for Phase III activities. The efforts of Phase I activities cannot be used to evaluate effects of contamination, since in general, the information gained is not sensitive enough to register contamination effects. If at this stage, contamination effects are detected, the problem is most likely of a severity that would call for immediate removal actions." These comments still apply.

Response: As the text states, Phase I will consist of a subjective assessment which is part of "painting a picture". The text has not been revised but the comment will be taken under advisement.

Comment In Section 3.2 Phase II — Contaminant Assessment: On page 3-6, there is a reference to reference concentrations "obtained from a reference location or literature". It is understood that these "reference" values are for the parameters specified in the preceding paragraph, and will be used for defining physicochemical parameters and are not related to determination of risk due to contaminant levels.

Comment: Stated earlier in our comments: In Section 3.1.3 — Migration routes; "no mention is made of contaminant migration by way of groundwater. In many instances, this may be the single most important migration route. All historical data concerning groundwater flow and transport on the base should be obtained and presented. With such information in hand, data needs can be identified and further work defined."

Response: A detailed evaluation of migration pathways will be presented in the zone specific work plan. The Navy concurs that groundwater is a very important pathway to consider.

Comment: In 3.3 the Phase III Problem Formulation Section, three types of endpoints are described: Toxicity Test, in situ community indices, and tissue burden studies. In addition to

techniques used to describe these endpoints, other assessment endpoints should be considered. These include, but are not limited to: boimarker studies, population dynamics studies, in-situ caged organism studies.

From our previous comments we stated that "In Appendix C, Toxicity Tests, it is stated that "Bioassays will be used to establish a correlative, cause effect link between observations of community alterations and contaminant concentrations." Information from bioassays alone can be used to understand both toxicity and bioavailability. Although evaluating possible correlations between community structure and bioassay results can be informative and useful at times, the current science of using community structure analysis in evaluating ecological risk due to environmental contamination is limited and questionable. The number of variables that determine the presence and abundance of species in a particular habitat are so numerous that correlating environmental contamination with community structure is extremely difficult and may depend only on the severity of the contamination, e.g. total lethality. Overall the possibility of Type 2 error is great and should be expected. Temporal changes of physical characteristics such as slight fluctuations of pH and dissolved oxygen content can have dramatic effects on invertebrate community variables. The data gained from these studies can be useful but should be evaluated with great care. For all tests conducted, NOAA requests the inclusion of all methodologies used and data obtained." These comments still apply.

Response: This comment will be taken under advisement.

Comment: In Appendix E, it should be noted that composite samples should consist of only one species per sample.

Response: Agreed.

RESPONSE TO COMMENTS
SCDHEC Comments - Comprehensive RFI Work Plan
David Walton to Doyle Brittain
June 27 1994

DAVID WALTON'S COMMENTS

Draft Comprehensive Sampling and Analysis Plan, Volume II
Specific Comments

Comment 1 — Section 9.2 Waste Sampling: This section should reference and follow the appropriate sampling methods as outlined in Test Methods for the Evaluation of Solid Wastes, SW-846, Third Edition.

Response: The SW-846 test methods are appropriately referenced in Section 16.5.3 which is the IDW sampling and analysis section rather than Section 9.2 which is only intended to describe sampling techniques.

General Comments:

Comment 2 — Section 16.0 Investigation Derived Waste: The Workplan discusses the handling of investigative derived waste (IDW). Departmental policy is that any medium or equipment that is potentially contaminated must be tested to determine if the medium or equipment exhibits any hazardous characteristics. If the medium or equipment does exhibit a hazardous characteristic, it is subject to RCRA Subtitle C requirements. If the medium or equipment is below background concentrations, than any disposal option is acceptable. If the medium does not exhibit a characteristic but is above background concentrations, then the Department recommends that medium be placed back onto the site where generated only as a last alternative, and that the constituent concentrations of the medium be protective of human health and the environment. The Department would further recommend that water not be placed back onto the site where generated but,disposed through the local POTW or some other similar means. In addition, all IDW shall be drummed and properly managed prior to testing of the material. Once the IDW is properly containerized, appropriate RCRA management procedures must be implemented.

Response: Section 16.0 has been revised per this comment.

JOE BOWERS' COMMENTS

General Comments

Comment 1: The workplan is vague with respect to establishment of background concentrations in soils, groundwater, etc. In Volume III — the Baseline Risk Assessment (BRA), there is a

JOE BOWERS' COMMENTS

General Comments

Comment 1: The workplan is vague with respect to establishment of background concentrations in soils, groundwater, etc. In Volume III — the Baseline Risk Assessment (BRA), there is a discussion of establishment of a grid system that will cover the entire base. Samples collected from the nodes of the grid may be used to determine background concentrations. However, the discussion in the workplan lacks specificity. Until a specific proposal that will result in the establishment of background concentrations is approved and completed to the satisfaction of the EPA and the Department, no conclusions can be made regarding the degree of impact to the environment, if any, by SWMUs, AOCs, etc. Since this issue will likely require several discussions between the EPA, NAVBASE and the Department, a specific condition of approval has not been included here. NAVBASE must nevertheless develop a specific proposal to establish background concentrations for the base.

Response: The Work Plan thoroughly describes the manner in which documents, photos, etc. will be researched in an attempt to select appropriate off site background locations. This material will be compiled and submitted to the regulatory agencies for review as soon as all the necessary information can be collected. This will occur as close as possible to the submittal of the first zone work plan as is feasibly possible since data interpretation will rely heavily on background data. With respect to onsite background and the grid, discussions have already been held between the Navy, SCDEHC, and USEPA regarding this matter. It is currently the Navy's understanding that the regulatory agencies are in agreement that the data will be collected and reviewed before all parties reach a consensus as to which areas of the base are believed to represent "background". Currently the grid system as it applies to individual zones proposes the collection of numerous samples in outlying areas that are not believed to have been impacted by base activities other than the deposition of dredge materials. Changes regarding the background discussion were made in several areas to incorporate comments from DHEC and USEPA. Reasons for why it is felt that a single background number will not be appropriate to characterize the entire base are clarified. Proposed methods of analysis are discussed in Section 1, subsection Application of Biased/Unbiased Data Sets. Methods for comparison with background are now consistent with the Region IV twice background rule.

Comment 2: The sample identification system proposed in the workplan is complicated and difficult to understand. In this system, a sample will be assigned an eight-character alphanumeric identification number. For example, the string "036S0028" would indicate a soil sample (S=soil sample) collected from the are of SWMU 36 ("036"), soil sampling location number 28 ("0028"). It is obvious from the anticipated magnitude of the investigation that will be completed for NAVBASE that whatever the sample identification scheme developed will, by necessity, have to be complex, simply due to the large number of samples expected to be

collected. It is also recognized that this sample identification scheme will readily allow manipulation of these data by various computer programs. A more decipherable sample identification system would facilitate review of the data generated during the RFI by all parties involved.

Response: While the sample identification system seems very complicated, it is a necessary tool that will facilitate automated data manipulation. Sample IDs will be deciphered in to more reader friendly terms whenever reports or correspondence are generated.

Volume II — Draft Comprehensive Sampling and Analysis Plan

Comment 3: The installation of temporary monitoring wells is discussed in Section 5.0 of the workplan. NAVBASE should be aware that all monitoring wells, including permanent, temporary, or non-standard monitoring wells (Hydrocone™, Hydropunch™, etc.) require approval from the Department prior to installation.

Condition of Approval

Approval for the installation of all monitoring wells including permanent, temporary and/or non-standard wells (Hydrocone™, Hydropunch™, etc.) will be obtained from the S.C. DHEC prior to installation.

Response: Text was corrected accordingly.

Comment 4: It is noted in Sections 5.4.4 and 6.1.2 that temporary wells are constructed in the same manner as permanent wells, except that a bentonite seal and grout are not installed. This is incorrect. Bentonite seals should be installed in temporary wells. Further, approval from the Department for the installation of temporary wells will be issued with time limitations, such that the temporary wells must be abandoned within certain time frames.

Condition of Approval

Temporary monitoring wells will be constructed with bentonite seals above the filter pack. The anticipated lifetime of the temporary monitoring well will be included with the request for monitoring well approval.

Response: Text was corrected accordingly.

Comment 5: Step 19 in Section 5.4.3 states "If the top of the screen is below the bottom of the confining layer, extend the filter pack to the bottom of that layer, if appropriate." Monitoring wells should not be constructed in this manner.

Condition of Approval

The filter pack will extend to approximately two feet above the top of the screen for any monitoring well installed at NAVBASE, unless a specific variance is requested by NAVBASE and is approved by S.C. DHEC.

Response: Text was corrected accordingly.

Comment 6: Section 5.5 describes in general terms the procedure for monitoring well development. Under the heading of "surging", the workplan does not specify how development will be considered complete. In fact, step three states that development will continue for "approximately 10 to 15 minutes." The following wording regarding well development is taken directly from a standard condition included in all monitoring well approvals issued by this office.

Condition of Approval

All monitoring wells must be developed until temperature, specific conductivity and turbidity measurements stabilize and the well produces clear, sediment-free water. A log of these measurements must be maintained during development and submitted with the "as-built" well construction details.

Response: Text was corrected accordingly.

Comment 7: Section 6.2 does not adequately describe the procedures to be followed during monitoring well purging. The following wording should be included as conditional approval of the workplan.

Conditional of Approval

Monitoring wells will be purged of between three and five well casing volumes. Indicator parameters temperature, turbidity, specific conductivity, and pH will be measured in a sample of groundwater prior to purging and following removal of each well casing volume. If these parameters have stabilized after removal of three well casing volumes, then the well will be sampled. If these parameters have not stabilized after removal of three well casing volumes, purging will continue until a maximum of five well casing volumes have been removed from the well. If the indicator parameters have still not stabilized after removal of five well casing volumes, then sampling will proceed.

Response: Text was corrected accordingly.

Comment 8: Section 6.3 of the workplan is vague regarding the specific type of pump to be used during sampling.

Condition of Approval

The type of pump used during sampling of monitoring wells must be a peristaltic pump, or another similar type of pump which will not chemically or physically alter groundwater samples.

Response: Text was corrected accordingly.

Comment 9: The order of sample collection was not specified in the workplan.

Condition of Approval

Groundwater samples will be collected in the following order: volatile organic compounds, dissolved gases and total organic carbon, semi-volatile organic compounds, metals and cyanide, major water quality cations and anions, and radionuclides.

Response: The order of sample collection now specified in the work plan is in accordance with the requested by Fred Sloan of USEPA.

Comment 10: It is stated in Section 10.3 that rain gauges will be installed near selected sites of interest to document rainfall influence on water levels. The workplan does not state how often the rain gauges will be read.

Condition of Approval

Rain gauges will be read after every rain event or daily, whichever time period is less. A log of these measurements will be maintained.

Response: Text was corrected accordingly.

DRAFT COMPREHENSIVE BASELINE RISK ASSESSMENT

YANGING MO'S COMMENTS

Comment 1: It is more appropriate to name the document as Draft Baseline Risk Assessment Workplan.

Response: Changed as per comment.

Comment 2: The document should be expanded to insert a section for the site description. This section should provide information on site and site vicinity including: topography; vegetative cover; surface water features; demography; climate; land use; groundwater use; and regional and local geology and hydrogeology. Additional sections on site history and investigations, and the nature and extent of the contamination should also be included. Information provided in these sections will be useful in the pathway analysis and exposure assessment.

Response: The nature of the comprehensive work plan necessitates specialization regarding where information is placed. This discussion appears in Volume II, Comprehensive Sampling and Analysis Work Plan.

Comment 3 — Page 2-3, last paragraph: The text indicates that a comparison between onsite concentrations and background concentrations will be used as a criterion to select contaminants of potential concern (COPCs). Please include a statement acknowledging the fact that this method typically is only applicable to inorganic compounds.

Response: Changed as per comment. See bullet no. 5, page 1-5.

Comment 4 — Page 2-4, last paragraph: The text states that "Preliminary Remedial Goals (PRGs) will be calculated per USEPA Region III Soil Screening Concentrations documentation...". Please provide more information on the specific reference of the document and on how to conduct the calculation.

Response: This paragraph was removed from the document.

Comment 5 — Page 2-6, first paragraph: The statement that "(e)ach contaminant will be compared to (a) reference concentration and subsequently eliminated from formal assessment on a medium-specific basis" should be revised to include generic rationales for elimination of any chemicals. Otherwise, the statement should be removed.

Response: Discussion of the derivation of the list of Chemicals of Potential Concern outlines the process for selecting or excluding chemicals from the risk assessment. This discussion now appears in section 2.1, Contaminant Identification, mostly on page 2-4.

Comment 6 — Figure 2-1 (page 2-7): The equation to be used to calculate the 95th upper confidence limit (UCL) of exposure point concentrations is different from the equation outlined in the Supplemental Region IV Risk Assessment Guidance (March 26, 1991). In the guidance, the equation is as below:

- $\ln(\text{UCL}) = x + 0.5s^2 + sH(n-1)^{0.5}$, where
UCL: 95th upper confidence limit on the arithmetic mean,
x: arithmetic mean of the log-transformed data,
s: standard deviation of the log-transformed data,
H: statistic (after Land, 1975. See the EPA Region IV March 26, 1991 guidance for reference),
n: sample size

Please follow the guidance to perform the UCL calculation. also, please define the terms "UCL_x" and "UCL".

Response: Formula was changed as per comment.

Comment 7 — Table 2-1 (page 2-9): Surface water pathway (ingestion, dermal contact, and inhalation of volatile organic compounds (VOCs) in surface water) should be considered in the workplan for current and future offsite residents. The reason for this consideration is that Noisette Creek, an onsite tidal creek, extends to an offsite residential area. Elimination for current offsite residents can be justified if sampling results indicate that the surface water in the creek has not been impacted by the site.

Inhalation of VOCs detected in surface water should be included in the workplan for current and future site/area residents based on the fact that the possibility exists for the presence of onsite surface water contamination. Exclusion of this exposure scenario needs to be justified.

Similarly, offsite soil and groundwater pathways need to be considered for current and future offsite residents. These pathways may be eliminated alter when sufficient data are available to support such an elimination.

Response: Changes made in table 2-1 as per comment.

Comment 8 — Page 2-12: The footnote "c" for Table 2-2 indicates that the skin surface area for child soil exposure scenario includes arms, hands, and legs. Feet should also be included for children could play outside with bare feet. The same revision should be made to all child dermal exposure scenarios presented in other figures and tables.

Response: Feet exposure pathway included and surface area was recalculated. New value incorporated in figure 2-1.

Comment 9 — Figure 2-2: (1)Page 2-13: Under the Dermal Contact Pathway, mistakes exist in units used in the formula to calculate the contact factor (CF).

First the unit for CF in the formula is "mg-yr/kg-day"; however, the unit is "mg-yr-event/kg-day" in the definition of CF which follows the word "where".

Second, according to the information provided on this page, the formula can be explicated as follows:

$$CF = [SA(\text{cm}^2/\text{event}) \times AF(\text{mg}/\text{cm}^2) \times ED(\text{yr})] / BW(\text{kg})$$

Therefore, the right side of formula should produce a unit of "mg-yr/kg-event" for CF rather than "mg-yr/kg-day" or "mg-yr-event/kg-day" as mentioned above

Please make appropriate corrections.

(2) Page 2-14: The two equations listed on this page should produce chronic daily intake (CDI) rather than a hazard index (HI) and risk for non-carcinogens and carcinogens, respectively.

(3) Page 2-14: According to the equations on page 2-14, the CDI obtained from all valid exposure routes (ingestion and dermal contact, in this case) are to be combined to produce a pathway-specific HT or risk level. It is suggested that a HI or risk value be calculated for the individual exposure routes. All the route-specific HI/risk values within the same pathway should then be summed to obtain a pathway-specific HI/risk value. Similarly, the sum of all pathway specific HI/risk values will result in a HI/risk value for a particular medium. This method will provide information on the significance of various exposure routes/pathways in the contribution of the total risk. This suggestion applies to all relevant calculations.

Response: (1) Formulas were all rewritten to be consistent with the comment. Ingestion, dermal contact factors now have units mg/kg, inhalation factor has units L/kg.

(2) Change made as per comment.

(3) Exposure routes are now broken out in figures 2-1 and 2-3.

Comment 10 — Page 2-16, second paragraph: Justification should be provided to the statement that "(i)nhalation of volatile or particulate-bound contaminants is not considered a major exposure pathway of concern.

Response: Change made to wording of this paragraph to be consistent with this comment.

Comment 11 — Page 2-18, first sentence under groundwater Pathway section: The statement that "...because groundwater ingestion is not used or considered to be a potable water source" should be revised. According to the South Carolina Waster Classifications and Standards 61-68, all groundwater in the state is classified as Class GB, which means all groundwater in the State is considered to be an underground source of drinking water.

Response: Change made to reflect this comment.

Comment 12 — Figure 2-3: (1)Page 2-19: Under the Groundwater Ingestion Pathway, the equation to calculate the ingestion factor (IF) contains a term "IR"; however, the definition part, which follows the work "where", contains a term "INF" (inhalation factor). This INF should be changed to "IR". A similar mistake was found under the Inhalation Pathway, where the equation contains the term "INH"; but the definition part contains the term "IR". This "IR" should be changed to "INH".

(2) Page 2-21: In the equations for CDI calculation, the constant 365 day/year should be removed because the term "AT" (averaging time) is already expressed days.

Response: (1) Change made in Figure 2-3.

(2) Change made in Figure 2-3.

Comment 13 — Page 2-23, bottom: The December 1993 version of maximum contaminant levels (MCLs) is out-of-date. Please include the most recent version of MCLs when compiling the groundwater characterization tables.

Response: Date changed as per comment.

Comment 14 — Section 2.4 (Risk Characterization): (1) First paragraph: The text indicates that if groundwater contamination poses a significant risk, but exposure to contaminated groundwater is unlikely to occur, the pathway will be excluded from risk characterization but

discussed in the uncertainty section. It is unclear how the groundwater pathway assessment can be discussed in terms of uncertainty. Two alternatives are suggested here:

1. Eliminate the groundwater pathway in the pathway analysis section via discussing the unlikelihood of the exposure;
2. Carry this pathway through all steps of the risk assessment including risk characterization. However, a discussion of the unlikelihood of this exposure is the more realistic situation. The first alternative mentioned above all save time and effort. The second alternative would provide information on the "worst-case" scenario.

(2) Second paragraph: The general objective of the discussion in this paragraph is difficult to follow. What is a "predicted" exposure concentration? Will the comparison between the predicted exposure concentrations and the ARAR/health-based levels determine the remedial goals? Please revise this paragraph.

Response: (1) The first alternative presented by the reviewer was chosen. This discussion occurs on page 2-23, second paragraph.

(2) This paragraph was rewritten to reflect the reviewer's concerns.

Comment 15 —Page 2-26, top: The unit for a cancer slope factor (SF) should be (mg/kg-day)⁻¹.

Response: Change made as per comment.

Comment 16 — Page 2-28, bottom: The meaning of the statement that "(t)he general exposure pathways and resulting risk/hazard are presented as default, but should circumstance dictate, can be changed to account for site-specific conditions" is difficult to follow. Please revise the statement.

Response: This paragraph was rewritten and no longer includes this sentence.

RESPONSE TO COMMENTS
South Carolina Department of Natural Resources
Jane Settle to Doyle Brittain
July 12, 1994

Volume I: Draft Comprehensive Project Management Plan

Comment Section 3.0 Investigative Strategy: The final paragraph in this section states that "If at any point during the investigation of a site, sufficient information becomes available to support corrective measures studies/action or to determine that no further investigation is needed at that time (with the concurrence of USEPA and SCDEHEC), investigative activities will be terminated." First, this statement does not make sense. If sufficient information becomes available to support corrective measures, then those corrective measures should be undertaken as soon as possible. If sufficient information becomes available to determine that no further investigation is needed, input from the State and Federal Natural Resource Trustees (NRT's) should be a part of that decision-making process to insure that natural resource concerns for that site no longer remain.

Response: This statement reads exactly as intended. The investigative activities are not considered part of the "investigative" or "site characterization" process. Logically, the Navy agrees that corrective measures, where necessary, should be implemented as soon as practical following the site characterization. Input from the NRTs will be welcomed regarding appropriate actions. The Navy anticipates the NRTs concerns will be transmitted to the lead regulatory agencies, USEPA and SCDEHC, who will in turn forward all applicable concerns to the Navy.

Comment Section 4.2 Remedy Selection Process: The second item identified as having "particular attention" given when evaluating remedial alternatives is land use/risk assessment and it is stated that "Risk assessment protocols will incorporate future land use in its exposure scenarios." As has been stated in correspondence from Trey Brown, NOAA Federal Facilities Coastal Resource Coordinator, risk assessment should be appropriately separated from risk management. For the purposes of risk assessment, future land use has no relation to the risk to the natural environment. The risk assessment process should be conducted independent of any use scenarios. Also, human health and ecological risk assessment processes are necessarily separate and remedies to address each will necessarily be different for some areas.

Response: The Navy concurs with this comment.

Comment Section 5.2 Meeting Schedule: As we have stated previously, if our agency, the S.C. Department of Natural Resources, is to be included on the BRAC Cleanup project Team on paper, there should be regular interaction between the BCT and the agency personnel who have been identified as participating in the process. We will make every effort to participate on any forum of this type, as we have with the Restoration Advisory Board, (RAB), to provide input. This applies as well to the reference to this Team in Section 6.4 BRAC Cleanup Team.

Response: A monthly schedule of proposed meetings, deliverables, agenda items, etc. is now being submitted by SOUTHNAVFACENGCOM to the BCT members. All members will have an opportunity to review the schedule for conflicts with their own personal schedules. This schedule will be updated as often as necessary during each month.

Volume II: Draft Comprehensive Sampling and Analysis Plan (CSAP)

Comment Section 1.0 Introduction: It is my understanding that our agency will be provided with a copy of the zone-specific reports which are proposed to be submitted to the Navy, USEPA, and SCDHEC upon completion of the work in each zone, as is to be the case with the zone-specific plans. Receipt of this information as soon as possible after it is available will greatly enhance our ability to provide timely and constructive input regarding any natural resource concerns raised by the data therein.

Response: The Navy agrees with this comment.

Section 2.2 General Sampling Requirements: The second identified general sampling procedure states that "All sampling activities in each medium will proceed from the area of least contamination to greatest contamination, if possible." What is the rationale for such sampling strategy? Typically, the reverse method of moving from most contaminated to least contaminated areas in order to most appropriately document extent and to best determine levels of remediation necessary for varying degrees of contamination is utilized. This should be addressed.

Response: This strategy applies to an individual phase of sampling at a site. Within a particular area, sampling normally proceeds from least to greatest suspected contamination to reduce the risk of potential cross contamination impacting analytical results. On a larger scale, total site characterization does normally begin in the suspected source areas and radiate outward until nature and extent are defined.

Comment Sections 4, 5, and 6 were not reviewed in detail: Where multiple sampling techniques are identified for a particular medium, we have some concerns about how determinations will be made regarding which technique is most appropriate to use for sampling on a given SWMU. We will, however, reserve comments regarding this until the reviews of the zone-specific plans.

Response: This comment will be taken under advisement.

Comment Section 7.2 Sediment Sampling: It is stated in this section that "Sediment samples generally will be collected to a maximum depth of 6 inches." This depth should be the minimum, rather than the maximum, depth to which samples will be collected. While much of the biological activity in estuarine sediments does occur in this upper layer, there are organisms which are active down to depths of 12 inches. Also, sampling depths of 12 inches have been required by the USEPA at several Superfund sites where contaminated sediment sampling was required for remedial alternative selection decisions.

Response: This is a general guideline to be followed. Specific sampling requirements with regard to ecological concerns will be presented when the Zone J work plan is developed.

Comment Section 7.3 Surface Water Sampling: Under the General Surface Water Sampling Concerns, it is stated, "Collect samples from areas of least to greatest contamination and from upstream to downstream." As previously mentioned, this is the reverse of the standard method of sample collection to determine extent of contamination and to provide the most useful information regarding remedial alternatives. This applies whatever the medium is that is being sampled. Also, in tidal areas where surface water samples will be collected, collections should be made at slack tide, preferably low slack.

Response: The first part of this comment has been explained in an earlier comment. The text has been revised accordingly per the second part of the comment.

Section 12.2 Laboratory Analysis: No mention is made in this section or Appendix D, which references the specific methods to be used, of detection limits which should be achieved if possible. As has been mentioned in previous correspondence, it is imperative that biologically relevant detection limits be achieved to the greatest extent possible to enable proper evaluation of the data generated for determination of potential impacts on natural resources. These detection limits should be consistent with USEPA and South Carolina Ambient Water Quality Criteria (AWQC's), where available, for aquatic media; with USEPA Region IV Sediment Screening Values, where available, for sediments; and with USEPA Draft Soil Screening Level Guidance Values, where available, for soils.

Response: This comment will be taken under advisement and will be addressed in greater detail in the Zone J work plan.

Comment Table 12-3 Organic Analysis Data QA Objectives: There are numerous PAH compounds (anthracene, fluorene, naphthalene, and others) which are not included in this table. The entire suite of PAH compounds must be included in analyses and precision/accuracy

information should be presented for them if it is presented for the other compounds to be analyzed.

Response: These tables appropriately present the prescribed method QA objectives and are not intended to represent lists of target constituents. The purpose of the matrix spikes and surrogate spikes are described in Section 13.2.2.

Comment Section 17: Applicable USEPA Criteria and Screening Value Documents should be referenced in this section.

Response: These documents were not used as a reference in the text of this portion of the plan.

Volume III: Draft Comprehensive Baseline Risk Assessment:

Comment Section 1.0 Grid System/Background Discussion: We agree entirely with the concerns regarding the approach proposed in this section which were expressed by Trey Brown, NOAA FedFac CRC, in his letter of 8 June 1994. It is imperative that the risk assessment aspect of this process be conducted using site data and known toxicity information and independently of background values. Once risk is determined, use scenarios can then be developed to determine how that risk should be managed.

Response: While the Navy agrees with your concerns from an ecological risk standpoint, the determination of background will play a vital role in assessing degrees of contamination impact on site media during contamination assessment.

Comment Section 1.0 Grid System/Background Discussion, Grid System Components: It is stated that the square grid system will "have a general spacing not expected to exceed 200 feet". The spacing of this grid should definitely not exceed 200 feet and should, in certain zones, have a spacing of less than 200 feet, depending on presence and types of SWMU's and AOC's.

Response: The proposed grid is to be used to collect data in areas where no SWMUs and/or AOCs are known to exist and, therefore, is somewhat independent of the types of sites present. If site boundaries are found to overlap grid nodes during site characterization, subsequent sampling locations will be spaced appropriately.

Comment Section 2.0 Human Health Risk Assessment: As previously stated, as our agency's responsibilities do not include protection of human health, we will defer review of human health-related aspects of this process to the appropriate personnel of the S.C. Department of Health and Environmental Control (SCDHEC).

Response: This comment will be taken under advisement.

Comment Section 3.0 Ecological Risk Assessment Figure 3.1: As we have stated previously, it is our opinion that insufficient information will be generated by Phase I activities to enable a "Cancel ERA" decision to be made. At least some level of contaminant assessment, which is a part of Phase II, is necessary to enable this decision to be made. This concern applies to the discussion of the Phase I Conclusions in Section 3.1.5.

Response: This comment will be taken under advisement.

Comment Section 3.1.1 Habitat Evaluation: When identifying reference areas, similar input from State and Federal agency representatives as is referenced in Section 3.1.2 will be available if desired and may be helpful.

Response: The Navy agrees with this comment.

Comment Section 3.1.3 Migration Routes and Appendix F: As we have commented previously, groundwater may, in some instance constitute the primary migration pathway for contaminant exposure to natural resource remote from a site. While some limited information regarding groundwater is required on the Checklist of Ecological Risk Assessment/Sampling included in Appendix F, a requirement to document any available data, or lack thereof, on groundwater contamination or movement at the specific location being evaluated, must be incorporated. Without this information, it will be impossible to render determinations regarding exposure and potential impacts on natural resources.

Response: The groundwater pathway will be considered and evaluated in the context of the zone specific work plans.

Comment Section 3.2.1 Preliminary Risk Characterization: In this section, is indicated that recreational catch statistics may aid in verifying predications such as whether sediment-borne contaminants may have, over time, already altered fishery resources. We have two concerns about this. First, recreational catch statistics for this area are limited to nonexistent. Secondly, there are numerous additional factors of various types, i.e., weather related demographic, etc.,

which are known to contribute to fluctuations and trends of this type. For these reasons, it is unlikely that this type of information can be used for this purpose.

Response: These statistics were referenced as an example of the type of information that will be reviewed preliminarily and the limitations are recognized.

Comment Section 3.3 Phase III Problem Formulation/Conceptual Model: As stated in NOAA's comments of 8 June 1994, other assessment endpoints, such as biomarker studies, population dynamics studies, in-situ caged organism studies and possibly others should be considered. We would like to contribute to decision making processes regarding what assessment endpoints are chosen for locations where impacts to Trust resources are being evaluated.

Response: Again these are examples are not intended to represent all the types of information and/or studies that may be necessary.

Comment Appendix C Toxicity Tests: We concur with the concern stated by NOAA regarding the limitations associated with establishing correlative, cause effect links between observations of community alterations and contaminant concentrations.

Response: This comment will be taken under advisement.

RESPONSE TO COMMENTS
Comprehensive RFI Work Plan
Fred Sloan to Doyle Brittain
July 15, 1994

Project Management Plan, Volume I

Comment: As a general comment, the Air Force is doing a comprehensive review of its records at headquarters level to turn up pertinent information regarding waste disposal. This search recently uncovered a previously unknown live bombing range at MacDill AFB. It would be advantageous to the Navy to perform a similar search, if this is not already being done.

Response: A similar type effort was completed at NAVBASE Charleston during the Environmental Baseline Survey completed as part of the BRAC process.

Comprehensive Sampling and Analysis Plan, Volume II

Comment — Comprehensive Sampling and Analysis Plan, Vol. II: Section 2.2, p. 2-2, 1st bullet: Add the following sentence to the end of the bullet: When sampling using the peristaltic pump/vacuum jug technique (often the preferred method for shallow wells where turbidity is of concern), the recommended order of collection is metals, cyanide, pesticides/PCBs, volatiles.

Response: The text has been changed accordingly.

Comment — Section 2.2, p. 2-2, 4th bullet: PVC is not acceptable material for the construction of sampling equipment, with the exception of certain limited circumstances. Strike "or polyvinyl chloride (PVC)".

Response: The text has been changed accordingly.

Comment — Section 3.1, p. 3-3: "After the Well Inventory". Add the following sentence: Monitoring wells no longer needed will also be abandoned.

Response: The text has been changed accordingly.

Comment — Section 4.0, p. 4-1, 1st pp, last sentence: Change to "... homogenized in the field."

Response: The text has been changed accordingly.

Comment — Section 4.4, p. 4-7, Step 9: Add 3rd bullet: Place the remainder of the sample in the mixing bowl and thoroughly homogenize. Place the homogenized mixture into the appropriate sample containers.

Response: The text has been changed accordingly.

Comment — Section 4.5, p. 4-9, Step 8: A more detailed explanation of this procedure is required. I am concerned about the possibility of the PVC becoming contaminated during use and reuse. If it is not necessary, I recommend dropping this step.

Response: This step as it was written has been deleted.

Comment — Section 4.5, p. 4-9, Step 9: Add the following sentence: Remove the contaminated auger bucket and replace with a decontaminated bucket.

Response: The text has been changed accordingly.

Comment — Section 4.6.1, p. 4-11, Step 15: Change to "... with a decontaminated hammer..."

Response: The text has been changed accordingly.

Comment — Section 4.6.1, p. 4-11, Step 16 (c): There are many of these sleeve and cap systems on the market. US-EPA needs assurance that the septa and cap will provide a positive seal to prevent loss of volatile compounds. In addition the following change should be made: "... and seal the VOC samples with ...". Also add the following sentence: The remainder of the sample material will be placed in a stainless steel mixing bowl and thoroughly homogenized prior to containerization.

Response: The text has been changed accordingly.

Comment — 4.6.2, p. 4-13, Step 12: The described procedure is suitable only for samples collected for geotechnical purposes (in which case the Shelby tube need not be decontaminated). For samples collected for chemical analysis remove the "aluminum foil or" wording.

Response: The text has been changed accordingly.

Comment — Section 4.6.3, p. 4-14, step 4, 2nd sentence: Add the following wording: "... collect samples after removing smeared material with a decontaminated spoon or other scraping device."

Response: The text has been changed accordingly.

Comment — Section 4.6.3, p. 4-14, step 4, 3rd sentence: Add the following wording: "... of the decontaminated backhoe bucket...". When a backhoe is used as a sampling device the bucket must undergo full decontamination.

Response: The text has been changed accordingly.

Comment — Section 5.3, p. 5-2: Replace the next to last sentence with the following: In flowing sand conditions, water will first be added to the augers to keep them clear of sand. If this fails, water rotary methods will be attempted. Mud rotary drilling techniques will be attempted only as a last resort.

Response: The text has been revised accordingly.

Comment — Section 5.4, p. 5-5, 1st bullet: Replace with the following: A tremie pipe will be used to place well construction materials if the total depth of the borehole is 20 feet or greater.

Response: The text has been revised accordingly.

Comment — Section 5.4.2, p. 5-8: Add the following between the steps 2 and 3: The drilling area will then be positively cleared using electromagnetic techniques. In highly developed areas a 5 foot pilot hole will be advanced manually prior to drilling.

Response: The text has been revised accordingly.

Comment — Section 5.4.2, p. 5-10, step 10: Change first sentence to "If the well is greater than 20 feet, install the filter pack through the tremie pipe."

Response: The text has been revised accordingly.

Comment — Section 5.4.2, p. 5-10, step 12: Change first sentence to "If well is deeper than 20 feet, tremie bentonite pellets ...".

Response: The text has been revised accordingly.

Comment — Section 5.4.2, p. 5-10, step 13: Change to "Hydrate according to manufacturers specifications or eight hours, whichever is greater."

Response: The text has been revised accordingly.

Comment — Section 5.4.2, p. 5-10, step 15: Change first sentence too "If well is deeper than 20 feet, tremie grout into ...".

Response: The text has been revised accordingly.

Comment — Section 5.4.2, p. 5-11, step 23: Change to "Brush paint bumper...".

Response: The text has been revised accordingly.

Comment — Section 5.4.3, p. 5-12, step 3: Change 2nd sentence to "The auger I.D. should be ...".

Response: The text has been revised accordingly.

Comment — Section 5.4.3, p. 5-12, step 7: Appendix E.4, p.3 of 4 of the ECBSOPQAM does not permit the use of a pure bentonite grout for the bottom seal. Cement/bentonite and cement/sand mixtures must be used. Bentonite may be used to grout the annular space. One of these methods must be chosen (**based upon site conditions**) and incorporated.

Response: The text has been revised accordingly.

Comment — Section 5.4.3, p. 5-12, step 10: Add the following after the 1st sentence: The borehole must be 4 inches larger than the casing diameter.

Response: The text has been revised accordingly.

Comment — Section 5.4.3, p. 5-13, step 19: Change to first sentence to "Tremie the filter...".

Response: The text has been revised accordingly.

Comment — Section 5.4.3, p. 5-14, step 20: Change the first sentence to "Tremie the bentonite slurry...".

Response: The text has been revised accordingly.

Comment — Section 5.4.3, p. 5-14, step 21-23: May be omitted if a pure bentonite grout is used.

Response: The text now includes a note indicating the steps may not be necessary.

Comment — Section 5.4.4, p. 5-16. Omit the first sentence of step 8.

Response: This sentence has been omitted.

Comment — Section 6.1.2, p. 6-2. There are a number of recent developments in the area of temporary well installation, development, and sampling. The following procedures are recommended: Auger the borehole to the required depth. If needed, pore filter pack sand inside the well to just above the screen height. Pump the well using a low flow peristaltic pump until turbidity is less than 10 NTU. Immediately sample the well using the peristaltic pump/vacuum jug method.

Response: This revision has been inserted in Section 5.4.4 which describes the installation of temporary wells.

Comment — Section 6.2, p. 6-2, 1st bullet: Change to "... pump."

Response: The text has been revised accordingly.

Comment — Section 6.2, p. 6-3, 1st bullet: Change to "and turbidity is 10 NTU or less."

Response: The text has been revised accordingly.

Comment — Section 6.2, p. 6-3, 4th bullet: Change first sentence to "Begin sampling when purging is complete."

Response: The text has been revised accordingly.

Comment — Section 6.2, p. 6-3, step 4: Change to "Open the well cover and monitor the breathing zone using a PID and FID to ...".

Response: The text has been revised accordingly.

Comment — Section 6.2, p. 6-5, step 7: Change to "... pump, and lower...".

Response: The text has been revised accordingly.

Comment — Section 6.2, p. 6-6, step 12: Delete.

Response: The text has been revised accordingly.

Comment — Section 6.3, p. 6-7, 2nd bullet: Change to: Peristaltic pumps will be used instead of bailers for purging and sampling when turbidity is greater than 10 NTU.

Response: The text has been revised accordingly.

Comment — Section 6.3, p. 6-7, 3rd bullet: Change last sentence to: When collecting VOC samples using a peristaltic pump, fill the tubing with sample then disconnect the tubing and cap. Withdraw the tubing from the well and uncap the tubing allowing the water to flow into the sample vial.

Response: The text has been revised accordingly.

Comment — Section 6.3, p. 6-8, step 4: Remove this step.

Response: The text has been revised accordingly.

Comment — Section 7.2.3, p. 7-5, step 6, 1st bullet: Change to "For VOC samples...". For sampling analytes, thoroughly homogenize the sample prior to containerization."

Response: The text has been revised accordingly.

Comment — Section 9.1, 2nd pp: Add "All wipes in the jar will be used."

Response: The text has been revised accordingly.

Comment — Section 11.2, p. 11-2, step 2: Change to "... pH, pour a small aliquot of the sample over a piece of pH paper."

Response: The text has been revised accordingly.

Comment — Section 11.5, p. 11-8, step 1-3: Reference Section 3.3.2 of the ECBSOPQAM.

Response: The text has been revised accordingly.

Comment — Section 13.2.2, p. 13-4. Remove the last sentence discussing field blanks.

Response: This sentence has been deleted.

Comment — Section 15.3, p. 15-2, step 2: Change to "Scrub with a ...".

Response: The text has been revised accordingly.

Comment — Section 15.4, p. 15-2, step 4: Change to "Rinse with organic free water."

Response: The text has been revised accordingly.

Comment — Section 15.4, p. 15-3, step 4: Change "ASTM Type III" to "organic free".

Response: The text has been revised accordingly.

Comment — Section 15.4: Reproduce Appendix B.7.1 of the ECBSOPQAM.

Response: This section has been revised to reflect what is stated in Appendix B.7.1 of the ECBSOPQAM.

Comment — Baseline Risk Assessment: No specific or general comments. The approach outlined for distinguishing between contaminants present in the background and those due to old disposal practices seems sound.

Response: No response is necessary.



**NAVAL BASE
CHARLESTON, SOUTH CAROLINA**

**INSTALLATION RESTORATION PROGRAM
FACT SHEET**

August 1993



■ **Introduction**

This fact sheet was developed to inform interested citizens about the Installation Restoration Program (IRP) being conducted at Naval Base, Charleston. The IRP is an ongoing environmental program of investigation and cleanup being conducted at military installations nationwide to address areas of potential contamination from past spills and waste disposal practices. The Navy has been actively engaged in restoration activities since 1980 and has taken an aggressive approach to resolving environmental issues. Fact sheets will be distributed throughout the investigation to keep the community informed of the program's progress.

■ **Background**

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 created the environmental trust called "Superfund" which provides a means to investigate and clean up abandoned hazardous waste sites. In 1986, CERCLA was amended by the Superfund Amendments and Reauthorization Act (SARA), which added provisions for federal facilities. The IRP is the Department of Defense program which addresses contamination from past spills and waste disposal practices at DOD facilities in accordance with CERCLA and SARA.

■ **Who's conducting the program?**

The Navy is conducting the IRP at Naval Base, Charleston. To manage the programs, the Naval Base works with the Southern Division, Naval Facilities Engineering Command headquartered in Charleston. The Navy also works in cooperation with the U.S. Environmental Protection Agency (EPA), the Department of Health and Environmental Control (DHEC), the federal and state regulatory agencies, respectively.

■ **Base profile**

Naval Base, Charleston encompasses more than 20,586 acres of land, making it the Navy's third largest homeport. The south complex, the current focus of investigation, encompasses approximately 2800 acres and is located on the south bank of the Cooper River. The primary mission of the U.S. Navy in Charleston is to support the war fighting capability of the U.S. Atlantic Fleet. The nature of the base's mission has required the use, storage, and disposal of hazardous materials, such as paints, solvents, waste oil, and fuel. Years ago, little was known about the long-term effects of hazardous materials, and their use was not regulated. Past handling practices of these wastes created conditions that are unacceptable by today's standards.

■ The IRP

The IRP is conducted in stages, though some stages may be combined for efficiency or to reduce cost. Information from each stage provides the basis for the next stage or actions. Each area of the base being addressed by the IRP will go through all stages unless it is determined that no further action is needed. Decisions are made on a case-by-case basis by the Navy and the regulatory agencies.

■ The Resource Conservation and Recovery Act

The investigation process established in the Resource Conservation and Recovery Act (RCRA) is very similar to the IRP process. RCRA established guidelines and standards for hazardous waste generation, transportation, treatment, storage, and disposal. Corrective action is required as a permit condition for past releases of hazardous waste or constituents from any solid waste management unit (SWMU). A SWMU, according to *The Federal Register*, is "any discernable waste management unit from which hazardous constituents may migrate, irrespective of whether that unit was intended for the management of hazardous wastes." As required by law, Naval Base, Charleston holds a RCRA hazardous waste permit and consequently is regulated under the RCRA corrective action program.

■ Stages of the IRP

The following chart shows the progression of stages in the IRP, following the RCRA corrective action process.

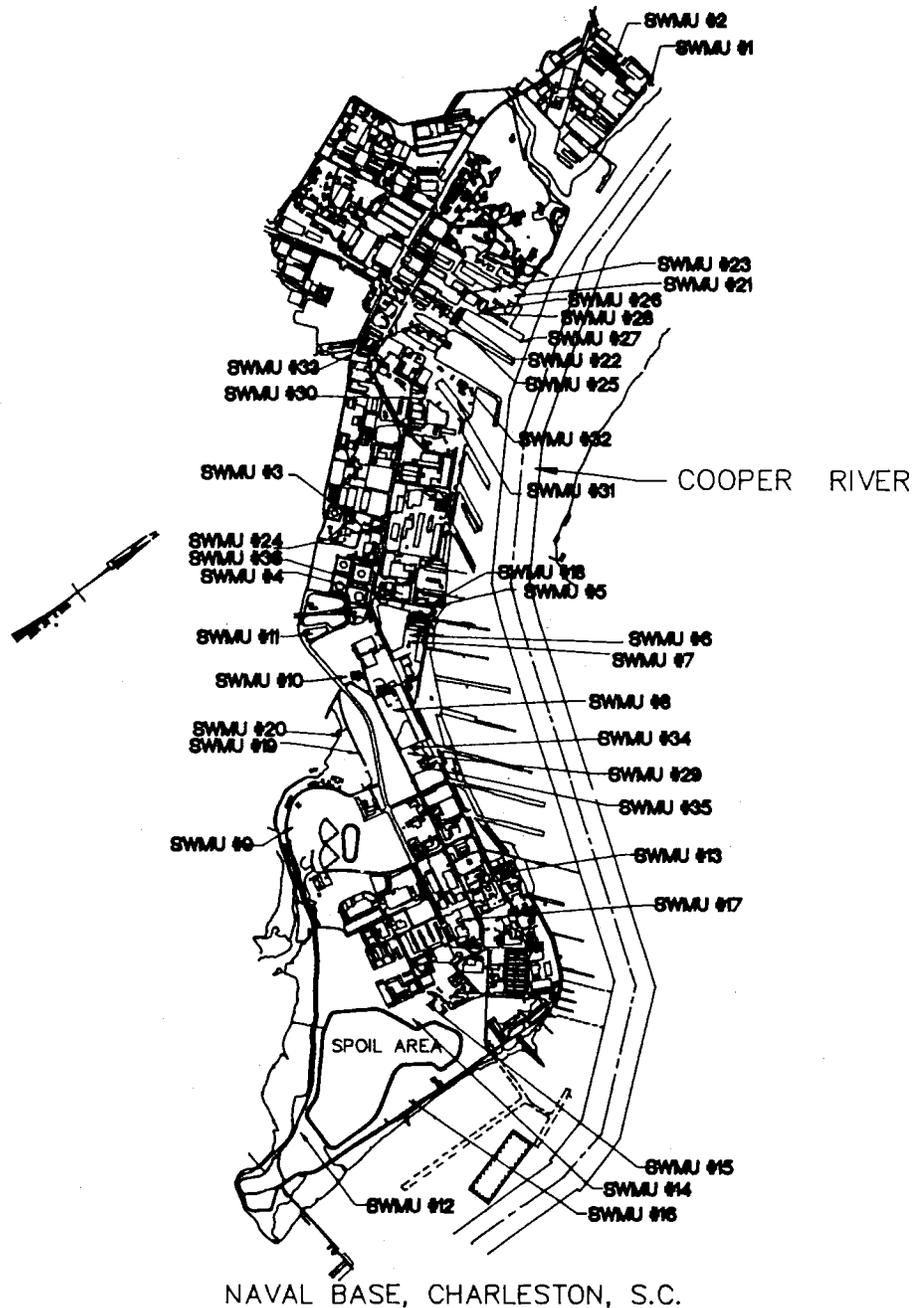
Stage	Title	Action
1	RCRA Facility Assessment (RFA)	Identifies potential or actual contamination releases through a records review and visual examination of every SWMU.
2	RCRA Facility Investigation (RFI)	Confirms contamination and determines its nature. Examines the extent of contamination.
3	Corrective Measures Study (CMS)	Develops and evaluates corrective measures alternatives.
4	Corrective Measures Implementation (CMI)	Designs, constructs, and operates maintenance and monitoring of corrective measures.
5	Interim Measures (IM)	Implements actions to stabilize, control, or limit further releases. IM can be conducted at any time.

After stage 3, public input is solicited on the proposed plan of cleanup alternatives. An alternative is then agreed upon by the Navy and regulatory agencies.

■ Status of the program

Currently, 36 SWMUs have been identified at Naval Base, Charleston. The IRP will focus on 27 of those sites. No further action is proposed for the remaining sites. An RFI work plan has been developed to evaluate the nature and extent of potential contamination at the 27 SWMUs. Naval Base, Charleston continues to review facilities for any additional SWMUs which may be included in the IRP, if necessary.

■ Identified SWMUs



■ SWMU Description Chart

SWMU No.	Name	Period of Operation	Types of Material Handled or Disposed
1	Defense Reutilization and Marketing Office Staging Area	1974 to present	Excess government materials and chemicals including Freon and used drums
2	Lead Contamination Area	1960s - 1984	Lead removed from lead-acid submarine batteries
3	Pesticide Mixing Area	Prior to 1971	Pesticide rinse
4	Pesticide Storage Building	1980 - 1985	Insecticides and rodenticides
5	Battery Electrolyte Treatment Area	1984 - 1986	Internal battery components
6	Public Works Storage Yard	Prior to 1987	Containerized hazardous wastes
7	PCB Transformer Storage Area	1970 - 1976	Transformer and associated electrical equipment storage
8	Oil Sludge Pit	1944 - 1974	Oil sludge produced by industrial activities
9	Closed Landfill	1930 - 1973	Sanitary wastes and various inorganic and organic chemicals, including asbestos, PCBs, mercury, metal sludge, acid neutralization sludge, and office wastes/rubbish
10	Hazardous Waste Storage Facility	1985 to present	Temporary storage prior to offsite disposal
11	Caustic Pond	1940s - 1970s	Calcium hydroxide
12	Old Fire Fighting Training Area	1966 - 1971	Oil, gasoline, and alcohol
13	Current Fire Fighting Training Area	1973 to present	No. 2 diesel fuel and gasoline.
14	Chemical Disposal Area	Prior to 1972 - 1977	Warfare decontaminating agents; DANC-DS-2 and DANC-N4
15	Incinerator	Presently in operation	Paper
16*	Paint Storage Bunker	1987	Paint and paint thinner
17	Oil Spill Area	1987	No. 5 heating oil
18	PCB Spill Area	1987	Insulating fluid, PCB
19	Solid Waste Transfer Station	1985 to Present	Nonhazardous solid waste
20	Waste Disposal Area	1985 to present	Cardboard boxes, wood, concrete blocks, tree stumps, sandblasting residues, and vehicle batteries

21	Old Paint Storage Area	1980 - 1986	Containerized paint wastes
22	Old Plating Shop Waste Treatment System	Prior to 1982	Wastewater from metal plating operations
23	New Plating Shop Wastewater Treatment System	1982 to present	Wastewater containing lead, chromium, cadmium, acids, and alkalies
24	Waste Oil Reclamation Facility	1979 to present	Waste oils
25	Old Plating Operation	Prior to 1983	Waste from plating operations
26	Waste Storage Area, Building 64-40, Pier C	1990	Drums of seam filler, lead waste, adhesive waste, alcohol rags, and trichloroethane rags
27	Waste Storage Area, East End, Pier C	1990	Unused paints, enamel thinners and fire retardants
28	Waste Paint Storage Area, West End, Pier C	1990	One-time waste accumulation area used for storing paint wastes
29	Building X-10	1990	Waste from submarine maintenance and repair
30	Satellite Accumulation Area, Building 13	1990	Laboratory waste
31	Waste Paint Storage Area, Dry Dock No. 5	1990	Paint and paint thinner
32	Waste Paint Storage Area, Building 195	1990	Waste paints
33	Waste Paint Storage Area, West End Dry Dock No. 2	1990	Waste paints
34	Morale, Welfare and Recreation, Building X-10	1990	55-gallon containers of paint
35	Building X-12	1990	One-time waste accumulation area, waste paint
36	Building 68, Battery Shop	1940s to present	Sulfuric acid, sodium bicarbonate, detergents, lacquers, adhesives, penetrating oil, kerosene, and hydraulic fluid

■ Community involvement in the IRP

The community can play an important role in the IRP. A Community Relations Plan (CRP) has been developed which outlines how the Navy and the regulatory agencies disseminate information and promote public participation in the program. The plan was developed by talking with local citizens and contains many of their comments and suggestions. The CRP is a public document found in the Information Repositories established to make IRP documents available to the public. Two repositories are set up at the locations listed on the following page.

■ Repository locations

REPOSITORY LOCATIONS		
Dorchester Regional Library 6325 Dorchester Road North Charleston, SC 29418	Monday-Thursday Friday-Saturday (803) 552-6466	10 a.m.- 8 p.m. 10 a.m.- 6 p.m.
Industrial Relations Office Charleston Naval Shipyard Building 76 Charleston, SC 29408-6100	Monday-Friday closed weekends (803) 743-3800 (No pass required; off base location)	8 a.m.- 5 p.m.

■ Technical Review Committee

In addition, a Technical Review Committee (TRC) has been established which is made up of private citizens, military personnel, and regulatory representatives. The committee meets periodically to discuss the IRP and developments in the program.

■ Questions?

The Naval Base, Charleston Public Affairs Officer (PAO) is the official contact person for the IRP. Questions, comments, and suggestions may be directed to the PAO. The Public Affairs Office also manages the IRP mailing list. Fact sheets like this one will be distributed to everyone on the mailing list. Anyone interested in being on the list or in need of the contact person may call the Public Affairs Office.

**Public Affairs Office
Naval Base
Charleston, SC 29408-5100
(803) 743-3940**