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U S NAVY RESPONSE TO U S EPA COMMENTS TO RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION WORK PLAN CNC CHARLESTON SC
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ENSAFE

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION CHARLESTON NAVAL SHIPYARD CHARLESTON, SOUTH CAROLINA

RESPONSE TO EPA RFI WP COMMENTS CHARLESTON NAVAL SHIPYARD

Prepared for:

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PART V
RCRA FACILITY
INVESTIGATION
BINDER 82 OF 91

EPA COMMENTS ON CHARLESTON NAVAL SHIPYARD'S RFI WORK PLAN

Comment 1:

While a detailed site history need not be submitted with each document, a summary of the shipyard's primary missions, and how they are accomplished with approximate dates would be useful.

Response:

The text will be modified to include a brief discussion of the CNSY's primary missions, how they are or were accomplished, and approximate dates.

Comment 2:

A risk assessment is required by Condition II.C.6 and Appendix B.II, of the Hazardous and Solid Waste Amendment (HSWA) portion of the RCRA Permit, effective June 4, 1990. This risk assessment must be performed in accordance with CERCLA Risk Assessment Guidance. This should be closely coordinated with the Federal and State Fish and Wildlife Commissions as well as EPA and SCDHEC.

Response:

As part of the RFI, a baseline risk assessment (BRA) will be performed for constituents of concern for each SWMU where contamination is present rather than addressing the CNSY as a whole. In particular instances where multiple contaminated SWMUs share common or overlapping boundaries, a BRA which treats the group of SWMUs as a single area of concern will be developed.

Comment 3:

Conspicuous by their absence are the identification of SWMUs in the process areas of the industrial complex. During the August 20-22, 1990, compliance inspection conducted by EPA and the South Carolina Department of Environmental Conservation (SCDHEC), ten additional

areas were identified where hazardous wastes were managed. During the week of May 18-21, 1993, EPA identified several major areas where hazardous wastes are managed, e.g., the dry docks, sewer system, and sewer system outfalls. On July 15, 1993, EPA accompanied CNS and SCDHEC representatives in investigating 41 additional SWMUs. It is EPA's understanding that approximately 100 additional areas are being evaluated which may be identified as SWMUs later this month. A strong possibility remains that radio active mixed wastes have been managed but these management areas have not been identified. There is also the likelihood that a dry cleaners operated at the Shipyard but there is no information to confirm the presence or absence of a dry cleaning operation or its waste management practices. There is the strong probability that material surface preparations, (i.e., blasting, sanding, painting and paint clean-up operations,) still operate at the shipyard. All areas where hazardous wastes have been or are being managed need to be identified and an environmental assessment performed. This information is required by condition II.B.1 of the HSWA portion of the RCRA Permit. Assuming the Shipyard continues with current plans for closure, this information will be required by Community Environmental Response Facilitation Act (CERFA) Section 120(h)(3).

Response:

A list of 118 additional potential solid waste management units has been compiled by the CNSY for evaluation. In accordance with Condition II.B. of the RCRA Part B Permit for the facility, an RFA will be completed for each of these potential SWMUs and submitted to SCDHEC and EPA Region IV within 90 days of written notification of discovery. Pursuant to discussion during the August 18, 1993 meeting between representatives of EPA Region IV, SCDHEC, SOUTHDIV, CNSY, and EnSafe/Allen & Hoshall regarding submittal of RFAs, an extension of the 90 day deadline may be necessary. Submittal of the RFAs for the new sites may not be possible within the time frame specified in the Part B permit since contractually, E/A&H has not been tasked to perform the RFA. Mr. Doyle Brittain (EPA) and Mr. Joe Bowers (SCDHEC) stated that an extension of the RFA due date could be granted if it appears the deadline for the RFA can not be met due to a lack of funding for the contract which has delayed the start date. The CNSY must be able to document specific reasons for the delay and demonstrate that significant progress is being made towards completing the RFA. The information should be provided in the form of a letter originating from Captain Porter's office.

Comment 4:

The aquifers of concern are the surficial aquifer and the Santee Limestone aquifer. The surficial aquifer is composed of sand, silt, and clay and averages about 30 feet thick. The potential for

contamination to migrate to the underlying Santee Limestone is small because the overlying confining bed (Cooper Marl) is approximately 200 feet thick in the area of the Shipyard. Also, the vertical direction of groundwater flow is from the Santee Limestone to the surficial aquifer.

According to page 2-25 of the RFI Work Plan, groundwater is not being utilized as a potential source of drinking water within a 4 mile radius of the Shipyard. As outlined by the Guidelines for Groundwater classification under the EPA Groundwater Protection Strategy, Final Draft, December 1986 the surficial aquifer is classified as Class IIB, Potential Source of Drinking Water.

Class IIB groundwaters are subject to stringent clean-up standards based upon protection of human health (MCLs or proposed MCLs). The SCDHEC Equivalent in the Water Classifications and Standards R. 61-68, under which all groundwater is classified as "GB", that is, drinking water quality.

Response:

The statement regarding the use of groundwater within a 4 mile radius was for informational purposes only. The CNSY concurs the surficial aquifer is a Class IIB (EPA) or GB (SCDHEC) aquifer subject to stringent clean up levels protective of human health and the environment.

Comment 5:

For each of the SWMUs listed, groundwater, soil, and sediment samples are proposed to be analyzed for a limited list of constituents depending on the type of known contaminants at the SWMU. This type of analysis is not acceptable because most of the SWMUs have never been sampled, and a baseline of constituents present has not been established. At each SWMU, at least one round of groundwater, soil, and sediment samples must be analyzed for the Target Compound List/Target Analyte List (TCL/TAL) group of possible contaminants. Once this baseline is established for the type of contaminants present in each medium, the list may be modified accordingly for future sampling events.

Response:

Pursuant to the meeting held August 18, 1993 between representatives of EPA, SCDHEC, SOUTHDIV, CNSY, and EnSafe/Allen & Hoshall, where appropriate all USEPA references

to CERCLA terminology in the RFI Workplan comments should be replaced by the RCRA equivalent. Analytical parameters for the RFI include volatiles, semivolatiles, pesticides/PCBs, and the TAL constituents. Analysis for these constituents will be performed in accordance with DQO Level IV as a cost effective means determining (via a library search for TICs) whether any constituents not included on the TCL/TAL list but which are included on the Appendix IX list are present. Also per the meeting, it is the CNSY's understanding that if sufficient knowledge exists regarding the nature of constituents present at a particular SWMU, analysis for a limited list of constituents is appropriate.

Comment 6:

The proposed action levels for soils presented in Appendix C [40 CFR Section 264.521 (a)(2)(i-iv) Subpart S] were never finalized. These numbers were based on human exposure and are now toxicologically obsolete. A method for establishing soil clean-up goals that are protective of groundwater should be proposed. The methods and sources utilized to determine partitioning coefficients should be provided.

Response:

The reference to the proposed Subpart S action levels will be deleted. During the RFI, an attempt will be made to establish natural background conditions for constituents of concern at each site. A statistical analysis of the data for each site will be performed to ascertain whether appropriate background concentrations can be determined. Where practical, an attempt will be made to assess contaminated media relative to background. If true background conditions do not exist or if clean up to background is demonstrated not to be feasible, an alternative remediation goal will be established by a baseline risk assessment (BRA) based on direct soil exposures and/or soil to groundwater cross media transfer potential. Preliminary risk based action levels for the alternative approach were presented in the document *Proposed Risk-Based Action Levels, Charleston Naval Shipyard* prepared by EnSafe/Allen & Hoshall which was submitted for agency review in September 1992. The preliminary risk based action levels were established in accordance with RAGS Part A & B using the existing data. Final remediation goals will be established following the referenced guidance document using the data generated during the RFI.

Comment 7:

A well inventory should be conducted at the facility to ascertain the integrity of each well. A table should be composed that lists the wells and describes their construction.

Response:

A well inventory has already been proposed for the existing monitoring wells at the CNSY to determine if any of the wells can be used in the RFI. The proposed scope of work will be expanded to include an attempt to locate well records for any production wells on the CNSY.

Comment 8:

Throughout chapter three, it is stated that the wells will be surveyed and measured for each site. From these data potentiometric surface maps will be generated for the surficial aquifer. It is assumed that these maps will be created for each SWMU. It is recommended that at some point select wells across the facility be measured simultaneously during high tide and low tide so that regional flow for the facility may be established. It is important to know where the groundwater divide(s) occur(s) at the facility. This information will indicate which SWMUs have the potential for impacting rivers, creeks, and wetlands at the facility.

Response:

Groundwater levels will be measured during each of the quarterly sampling events at both high and low tides to obtain a better understanding of both seasonal and tidal effects on ground water flow. Groundwater data will be input into a GIS data management program that will facilitate evaluation of groundwater flow on both a local and regional basis.

Comment 9:

A comprehensive sampling program for the Cooper river, Shipyard Creek, and the wetlands should be proposed. Although, the extent of groundwater contamination has not been determined, a large number of the SWMUs are highly contaminated. Groundwater surrounding several SWMUs has been contaminated. Therefore, a high potential exists for dissolved

contaminants to migrate to these surface water bodies. Surface water runoff alone could adversely affect the rivers and wetlands. Background samples should be proposed in the Copper River and the Noisette Creek. A sufficient number of sampling locations should be proposed along and downgradient to the area of the facility. Surface water and sediment samples should be concentrated in areas adjacent to SWMUs that are located near the rivers and wetlands. A U.S. Geological Survey topographic map showing the Shipyard before and after filling-in would be helpful.

Response:

At the present time, insufficient information is known about each of the sites to outline the number of samples that may be required or their precise locations. To address ecological concerns, a phased ecological assessment procedure will be developed to address ecological risks posed by individual sites. Phase I is a habitat and biota survey that includes a review of site history, a TES survey, wetalnds delineation, and sediment mapping within surface water bodies including wetlands. Completion of phase I is necessary to select sampling locations for samples collected in phase II. If contamination warrants further study, complete delineation of the contamination will be accomplished in a third phase. Based on the results of the initial phases, a fourth phase which includes toxicity and diversity studies will be implemented. Phase V addresses any data gaps which may exist. A 1948 U.S.G.S topographic map of the CNSY has been obtained.

Comment 10; Section 2:

Section 2.3.6. Even if the shallow groundwater is not developed for use, it can pose a threat to on-base personnel, particularly construction workers.

Response:

The CNSY concurs with this viewpoint. Contaminated groundwater will be addressed in accordance with the response to comment 4.

Comment 11:

Section 2.6. SWMU soils consisting of fill material (typically dredge spoil material at the Shipyard) will probably have to be evaluated as potentially contaminated material. If "background" concentrations of hazardous constituents for this material are required, it will be necessary to sample sediments of the Cooper River upgradient of the site (perhaps far upgradient). The high levels of contaminants occurring in this material are unlikely to be natural, but are a result of industrial activities in the area, including the Shipyard.

Response:

Regardless of origin, soil containing high levels of contaminants will be addressed at each SWMU (or group of SWMUs) in accordance with the response to comment 6.

Comment 12:

Section 2.6.1, SWMU 1. This former storage area should be re-sampled with a small number of samples (e.g., 5 surface soil, 5 subsurface soil) analyzed for the TCL/TAL at DQO Level IV. Previous samples were not analyzed for PCB's pesticides, PAH's, benzene, xylene, etc. In addition, there is no indication in the RFI Work Plan as to the quality of the data presented. A small number of high quality samples will serve to confirm the earlier work.

Response:

A total of 58 samples have already been collected from an area approximately 40 x 75 feet in size and analyzed for all constituents known to have been stored in the shed. Sample analyses were performed in accordance with SW-846 methodologies with duplicates analyses and matrix spikes analyzed at a frequency of 10%. From these analyses it was determined that diethyl ether and metals are the only constituents of concern. To confirm the earlier work, two (5 borings is excessive based on the dimensions of the shed) soil borings will be drilled at the former shed location with samples collected at the intervals (0 to 1, 3 to 5, and 8 to 10 feet below ground surface) described in the response to comment 18 below. The samples will be analyzed for volatiles, semivolatiles, pesticide/PCBs, and TAL metals at DQO Level IV.

Comment 13:

Section 2.6.3, SWMU 3. No analytical results for PCB's could be found in the referenced Appendix E. In addition, none of the 14 pesticides or 4 rodenticides listed in table 2-5 were analyzed for, and only 2 of the 6 listed herbicides (see below, SWMU3).

Response:

PCB results are presented for each of the soil samples and both wells on the back of page 3 of Appendix E. Many of the pesticides listed in Table 2-5 have a relatively short persistance in the environment and are still in use today. These compounds are not included in either the Appendix XIII or Appendix IV lists of hazardous constituents. However, removal action levels (RALs) have been established by the Office of Solid Waste and Emergency Response (OSWER) Directive 9360.1-02, *Final Guidance on Numeric Action Levels for Contaminated Drinking Water Sites* for the remaining pesticides. SWMUs 3 and 4 which are the only areas where these compounds are likely to have been present in significant quantity where a release would pose a threat to human health and the environment. Media samples will be analyzed for the compounds listed in Table 2-5 for which SW-846 Methods exist.

Comment 14:

Section 2.6.15, SWMU 15. Where and how is fuel for this incinerator kept? Was this incinerator ever fired with waste material?

Response:

The incinerator is fired with propane. Waste material has never been used as fuel.

Comment 15:

Section 2.6.24, SWMU 24. EPA recommends that the soils and groundwater in the vicinity of the operation be tested. The soils and groundwater in this area are good candidates for field and analytical screening.

Response:

As stated in the RFI Workplan, the piping which serves the above ground storage tanks is annually pressure tested. At the present time there is no reason to suspect a leak in the piping has occurred and no leaks in either of the tanks has been documented. The CNSY maintains that additional investigation at this SWMU is unnecessary at this time.

Comment 16; Section 3:

Page 3-1 states that if significant levels of contaminants are detected in groundwater a constant rate aquifer test or slug tests will be conducted. It should be pointed out that from product is present at SWMU 8 which constitutes significant levels of contaminants to warrant remediation at the site. For this reason a constant rate aquifer test should be conducted at the facility to determine to hydraulic properties of the surficial aquifer. Conducting only slug tests will be acceptable since these tests provide hydraulic properties of the near well bore material for a discrete interval in the aquifer. Information obtained from these tests are not sufficient for designing an efficient extraction system. An aquifer test is necessary to determine transmissivity, storage, boundary conditions, and degree of heterogeneity. Aquifer test design should be provided.

Response:

Pursuant to the August 18, 1993 meeting, slug tests will be performed on a representative number of wells from each site to estimate the hydraulic conductivity and transmissivity within an order of magnitude. If necessary, a constant rate aquifer test will be designed and conducted during implementation of remedial actions.

Comment 17:

SWMUs 1 and 6. The RFI Work Plan states that closure for soil is based on risk based scenarios. These are being closed under approved closure to health-based concentrations as determined by risk assessment.

Response:

The CNSY agrees with this observation.

Comment 18:

SWMU 2. The RFI Work Plan proposes that soil samples will not be collected below the 1 foot interval. It is recommended that soil samples be collected every 2 feet after the first foot until the water table is reached. This is especially important for areas where high concentrations of lead were reported.

EPA cannot agree with the statement that previous studies show that lead contamination exists at extremely low concentrations below the surface. The average concentration of lead from 8.5 to 10 feet below surface was 509 mg/kg in an earlier study of this site (p. 2-30 of this document). It will be necessary to determine at what depth this contamination ends, or groundwater is encountered. If these lead concentrations are due to contaminated fill, this should be determined with soil borings, and the extent of fill then mapped. In addition, the sediment samples should be tied to a comprehensive evaluation of the sediment quality of the Cooper River in the vicinity of the Shipyard. The ground water and subsurface soils at this site are good candidates for analytical and field screening.

Response:

The Workplan will be revised to include a standardized sampling scheme for all sites (unless specifically stated otherwise in the Workplan) which will adhere to the following protocol: samples will be collected from the 0 to 1 foot interval (to support the BRA) at each soil sampling location; collection of additional samples from the 3 to 5 foot interval and 8 to 10 foot interval will be contingent upon depth to groundwater. Collection of samples for chemical analysis will be terminated once the water table is encountered. Previous investigative activities indicate groundwater typically ranges from 4 to 7 feet below ground surface. This sampling scheme is proposed in lieu of continuous sampling which the CNSY feels is excessive and the cost out weighs the benefit given the limited thickness of the soil horizon that will not be sampled. If corrective measures are necessary, the proposed sample intervals will provide sufficient data to design the corrective action. Also, additional samples are typically collected for confirmation following corrective action to verify clean up has been achieved.

Comment 19:

SWMU 3. The text states that laboratory analysis will be performed on near surface soil samples first and continue with depth, if necessary. TCL/TAL analysis of the first round of soil samples should be performed. This includes soil samples collected from below land surface to the water table.

Sediment and surface water samples should be collected in the marsh located southwest of SWMU 3.

The proposed monitoring well on the northern corner of the site should be moved to the eastern corner, as this is more likely to be downgradient. Soil and groundwater samples collected in this area must be analyzed for the constituents listed in Table 2-5, along with the TCL/TAL. Because of difficulties with analyzes for these type constituents, this site is not a good candidate for analytical and field screening. In addition, these type contaminants are not likely to have migrated a great distance beyond their disposal area.

Response:

Pursuant to the August 18, 1993 meeting, sufficient knowledge exists regarding this site to limit the list of analytical parameters. Samples will be analyzed for chlorinated pesticides, herbicides, TAL inorganics, and reactivity. The constituents in Table 2-5 will be analyzed in accordance with the response to comment 13 above. Also, as mentioned during the referenced meeting, there is no marsh in close proximity to SWMU3, therefore it will not be tested. In response to SCDHEC comments, a third monitoring well was proposed for this site to address the eastern corner of the denuded area. If access conditions necessitate installing the well in or very near the denuded area, a section of surface soil isolation casing will be installed prior to advancing the boring past the water table.

Comment 20:

SWMU 4. An equipment rinse area/wash rack is located adjacent to the storage administration facility. This area should be located on Figure 3-3. It is assumed that soil samples will be collected in the rinse area.

As stated previously soil samples should be collected to the water table and analyzed for the TCL/TAL group of contaminants.

The connections to the floor drains should be traced. If they connect to sumps, the sumps must be sampled. If contaminants are found in the sumps, groundwater monitoring should be conducted. Samples must be analyzed for the materials handled in the building. If sumps are present, EPA recommends hat they be closed.

Because of difficulties with analyzes for these type constituents, this site is not a good candidate for analytical and field screening. In addition, these type contaminants are not likely to have migrated a great distance beyond their disposal area.

Response:

The proposed soil sampling program is designed to address surface releases in addition to releases to the sanitary sewer. Samples will be collected in the vicinity of the equipment rinse area. In addition the equipment rinse area will be located on Figure 3-3. Similar to SWMU 3, samples will be analyzed for the compounds listed in Table 2-5. Soil samples will be collected in accordance with the response to comment 18. The reference to the blind sumps is inaccurate and will be deleted from the Workplan. Construction plans of building 381, which do not indicate the presence of sumps, have been submitted previously to both EPA and SCDHEC.

Comment 21:

SWMU 5. The soil samples should be collected to the water table and analyzed for the TCL/TAL group of contaminants. Sediment and surface water samples should be collected in the Cooper river adjacent to the site area.

It does not seem to be necessary to sample closer than 5 feet to the tank, since earlier sampling established contamination at that distance. EPA recommends beginning sampling at 10 feet. The soils and groundwater at this SWMU are good candidates for analytical and field screening.

Response:

The list of analytical parameters proposed for this SWMU already includes volatiles, semivolatiles, total lead, and pH. The list will be expanded to include the TAL inorganics. Based on the history of this SWMU, there is not an apparent need to analyze samples for pesticides/PCBs. Even though a PCB spill occurred at SWMU 18 which is located

northwest of SWMU 5, documentation exists which indicates the spill was cleaned up in accordance with TSCA.

The Workplan will be revised to indicate the initial soil borings will be installed at a distance of 10 feet from the edge of the tank.

Comment 22:

SWMU 7. Additional soil samples are necessary to delineate the extent of contamination at the site. The text states that nature and extent of soil contamination has been adequately characterized during previous studies. However, soil samples were collected only to a depth of 3 feet. Soil samples should be collected near source areas to the top of the water table. The type of contaminants present at the site include paint waste, waste oil and cleaning solvents. Waste oil and cleaning solvents tend to collect and mound on the water table and just above the capillary fringe.

Seven monitoring wells are proposed for SWMUs 6 and 7 to delineate and extent of contamination at the sites. Figure 3-5 indicates that 3 upgradient wells will be installed. Explanation should be provided for installing the wells at these locations. The data obtained from the wells will be more useful if one or two of the upgradient wells are located down gradient of the source areas.

Response:

The Workplan has proposed the collection of additional samples at this SWMU. Using the sampling scheme proposed in response to comment 18, the extent of pesticide and PCB contamination will be adequately delineated in the vadose zone. Groundwater flow is presumed to be toward the Cooper River at this site; however, insufficient data exists to determine which direction is upgradient at this time. Additionally, given the close proximity to the Cooper River, tidal influence may cause temporary reversals in groundwater flow direction. Therefore, the CNSY feels the current well configuration is necessary to adequately detect any groundwater contamination that may be present.

Comment 23:

SWMU 6. In Appendix F, which contains the raw data for previous studies of the SWMU, many of the data sheets identify the Anderson Excavating and Wrecking Co. and Environmental and Safety Designs, Inc. as the client. What company collected these samples? Also, as with SWMU 3, the documentation is incomplete as to the quality of the analytical work, and many samples were analyzed only for cadmium and lead. EPA recommends that a small number of soil samples (surface and subsurface) be analyzed for the TCL/TAL to confirm this earlier work, The groundwater at this SWMU is a good candidate for analytical and field screening. Groundwater samples for confirmation sampling should also be analyzed for the TCL/TAL.

Response:

The samples were collected by the Anderson Excavating Company and EnSafe respectively. Samples were analyzed in accordance with SW-846 methodologies; therefore, it is reasonable to assume that at a minimum, the data meets the definition of DQO Level II which is suitable for site characterization. QA/QC samples (duplicates and matrix spikes) were analyzed a frequency of 10%. As proposed in the Workplan SWMUs 6 and 7 are being investigated as one site; therefore, the soil sampling program outlined for SWMU 7 will address part of SWMU 6. The Workplan will be revised to state duplicate samples (10% frequency) collected at SWMU 7 will be analyzed at DQO Level IV for volatiles, semivolatiles, pesticide/PCBs, and TAL inorganics.

Comment 24:

SWMU 7. EPA recommends that 5 percent of the soil samples be analyzed for the TCL/TAL (DQO Level IV), based on past findings of contaminants other than PCBs at this site. Soils at this site are a good candidate for analytical screening for PCBs.

Response:

Based on past analytical results, site constituents are pesticides, PCBs, and metals. The analytical parameters will be expanded to include pesticides and the TAL metals in addition to the PCBs. As stated above, duplicate samples will be analyzed for an expanded list of parameters at DQO Level IV.

Comment 25:

SWMU 8. Previous data from the pits should be used to develop a working list of contaminants present. Using that list, the soils and groundwater at this site are good candidates for field and analytical screening.

It is not acceptable to analyze a minimum of one soil sample per boring to confirm the presence of contamination before analyzing all the samples collected. It is also proposed that the actual retrieval depths will depend on materials encountered. Soil samples should be collected to the water table especially since the type of contaminants present at this site tend to mound and spread out at the saturated zone. All samples must be analyzed for TCL/TAL.

Response:

Soil samples will be collected from the borings in accordance with the sampling scheme outlined in the response to comment 18. The Workplan will be revised to state all samples will be analyzed for volatile organics, semivolatile organics, pesticides/PCBs, and TAL inorganics.

Comment 26:

SWMU 9. The SCDHEC had many comments on the proposed assessment of SWMU 9. EPA concurs with those comments.

Response:

The following comments and responses were excerpted from the response to the SCDHEC comments:

SWMU #9 - CLOSED LANDFILL

This SWMU is a landfill used from the 1930's until 1973 for the disposal of many types solid wastes generated at the CNSY. The area was originally marshland. The RFI Workplan proposed several phases of investigation of this area, including geophysical surveys consisting of a magnetometer survey and a resistivity survey. These will be followed by trenching into suspect areas identified during the geophysical surveys. Soil samples are to be collected during

trenching and installation of monitoring wells. In the Department's previous review of the Workplan, comments were generated requesting additional information and detail regarding the investigations of this SWMU. However, the Workplan is still vague and lacking in technical detail with respect to the proposed work at this SWMU. Several comments have been generated as a result of this review, as outlined below.

A. The Workplan proposed to conduct two (2) geophysical surveys of SWMU #9, the first of which will be a magnetometer survey and the second a resistivity survey. The Workplan states that a variable grid spacing will be used, with tighter spacing in areas where conductivity irregularities or anomalies are found by the resistivity survey. The following comments have been generated concerning this proposed work.

   i. It is recognized that a variable grid spacing may be the most efficient manner by which to investigate this SWMU. However, the Workplan did not include a discussion of even an approximate grid spacing, or within what limits the spacing would vary, nor the exact area which the grid would cover. This type of detail must be included in the revised RFI Workplan to allow a thorough review of the technical merits of such a geophysical survey program.

RESPONSE:

The grid spacing chosen for the geophysical survey was 10x10 feet over as much of the landfill as practical. The grid spacing was kept constant in order to facilitate Fourier data processing. Several tests were conducted over limited areas at a tighter grid spacing to establish the applicability of the 10x10 foot spacing.

   ii. In Section 3.14.1 (Geophysical Surveys) the Workplan states the initial geophysical survey will be conducted with a magnetometer. In the paragraph describing the magnetometer survey, the workplan states that the grid spacing of the magnetometer survey will be dependent, in part, on the results of the resistivity survey. The Workplan should be revised to clarify this discrepancy.

RESPONSE:

The Workplan will be revised accordingly. The magnetics grid was chosen independently of the conductivity results.

B. CNSY's response to the Department's previous review states that the propose of a soil gas sampling program is to qualitatively determine whether constituents are present in appreciable concentrations in soil gas. However, the Workplan remains vague regarding the number of soil gas sampling points that will be emplaced and the exact constituents for which analyses will be conducted. Two comments have been generated regarding this work.

i. The Workplan states that the landfill will be surveyed with a 100 by 100 foot grid system used to transect the site and for locating soil gas sampling points. The Workplan further states that sample station locations will be selected based on information gathered from the geophysical survey, historical information on the landfill operations, and aerial photographs of the site, if possible. However, the Workplan does not propose a minimum number of soil gas sampling points. Also, historical information and information from aerial photographs should have been reviewed and used to plan the upcoming phase of work described in the current version of the RFI Workplan. It is impossible to determine the technical adequacy of such a program without this information. The Workplan must be revised to provide this information.

RESPONSE:

During the soil gas survey conducted by Target in June 1992, a total of 440 locations were sampled utilizing the 100 x 100 foot grid system described in the Workplan. The grid system was employed over the entire landfill as defined by the geophysical survey and a review of aerial photos. The sampling scheme and results of the soil gas survey were described in the document *Draft-Final Preliminary RFI Field Activity (Soil-Gas, Geophysics)* prepared by EnSafe/Allen & Hoshall dated March 26, 1993. This document has been submitted for regulatory agency review.

ii. With respect to analyses of soil gas sampling using a field Gas Chromatograph with a Electron Capture Detector (GC/ECD) and a Flame Ionization Detector (FID), the Workplan states that "the actual compound list [able to be detected with such equipment] will be variable to the subcontractor selected". If this is the case, then the value of a soil gas survey cannot be determined. Due to the lack of detail included in the Workplan, it is impossible to determine whether it is worthwhile to complete this survey. Instead, it appears that effort should be placed in areas that will provide the most information, such as conducting a grid-based soil sampling program and installation of groundwater monitoring well system.

RESPONSE:

The compound list for the soil gas survey included 1,1-DCE; methylene chloride; trans-1,2-DCE; cis-1,2-DCE; chloroform; 1,1,1 TCA; carbon tetrachloride; TCE; 1,1,2 TCA; PCE; benzene; toluene; ethylbenzene; meta, para, and ortho xylene. While conducting a soil sampling program may provide the most information about the site, attempting to do so would be both cost prohibitive for the extensive analytical testing and labor required to collect the samples. The soil gas survey has provided a very cost effective approach to generate screening data that can be combined with the geophysical and historical data to develop a more refined soil and groundwater investigation.

C. The RFI Workplan does not include adequate technical detail regarding the proposed soil sampling program for this SWMU. Section 3.14.4 (Soil Sampling) of the Workplan states that the number of soil samples to be collected during assessment of this SWMU will be dependent on the results of the soil gas survey and the geophysical survey. It is proposed that soil samples will be collected during soil trenching and installation of groundwater monitoring wells, with a minimum of one soil sample collected from each trench and from "material leaking from drums or containers, sludge or fill material or any suspect material in the excavation." This is inadequate due to the fact that the number of trenches is not specified. Further, a successful soil sampling program must include collection of a representative minimum number of soil samples from the area under investigation. The number of samples should be based on available guidance (see Region IV Standard Operating Procedure). The Workplan should be revised accordingly.

RESPONSE:

Based on the results of the soil gas survey, geophysical survey, and a review of historical documentation, an appropriate soil sampling program will be designed to encompass areas of concern around SWMU #9.

D. The Workplan is unclear with respect to the monitoring wells to be used in investigation of this SWMU. First, the Workplan states that monitoring wells LF1 through LF10, SLF1 and SLF2 were installed previously in the vicinity of the SWMU. The locations of these wells are depicted in Figure 2-19 (Closed Landfill Area Plan). Then it is noted in section 3.14.5 (Groundwater Sampling) of the Workplan that "a site survey conducted in the area of SWMU #9 did not identify all the wells installed under previous investigation. Therefore, during the RFI ten (10) additional wells will be installed (Figure 3-8)." Figure 3-8 (SWMUs #9 and #20 Proposed Sampling Locations - Closed

Landfill and Waste Disposal Area) depicts wells labeled as those described above (LF1 through LF10, SLF1 and SLF2). The RFI Workplan must be revised to indicate whether the monitoring wells described above actually exist or not. If any of these monitoring wells cannot be located and/or their well construction details verified, then abandonment and/or installation of replacement wells is required. Further, any wells installed per this investigation should not have the same designation as a well installed during previous work; its designation must be unique. The Workplan must be revised accordingly.

RESPONSE:

During the geophysical survey only two of the existing wells, CSY-FMW2 and CSY-FMW4, were located. These wells are documented to have been installed in 1991 in accordance with the well permits issued by SCDHEC and are currently the only wells at the landfill to be used in the RFI. As previously stated, all wells for which well construction details can be verified will be properly abandoned during the RFI. A revised figure which illustrated the proposed well locations was submitted for regulatory agency review with the *Draft-Final Preliminary RFI Field Activity Report (Soil Gas/Geophysics)* prepared by EnSafe/Allen & Hoshall.

Comment 27:

SWMU 12. See comment above for SWMU 8.

The groundwater samples should be collected during Phase I since the potential for groundwater contamination is high at this site.

EPA recommends locating the pit prior to collecting samples for chemical analysis. The pit should be collectable using a hand auger and examining retrieved material for bottom ash and/or oily materials. Once the pit is located and its boundaries established, the material in the pit could be characterized with a few samples of the waste material, with the great majority of the samples collected to determine the extent of contamination. It may also be possible to determine the location of the pit using geophysical techniques. The soils and groundwater in the vicinity of the pit are good candidates for field and analytical screening. If analytical screening is conducted, it should include benzene.

Response:

Field personnel will attempt to locate the pit prior to establishing the grid and collecting samples for chemical analysis. The Workplan will be revised to include the installation of three shallow monitoring wells at this site.

Comment 28:

SWMU 13. The SWMU must also be inspected to determine if cracks are present in the pavement. If the pavement is obscured by grease and oil, it must first be cleaned (steam and soap may be sufficient).

Response:

The pavement will be inspected for cracks. If substantial cracks in the asphalt are identified samples will be collected from beneath the pavement for chemical analysis.

Comment 29:

SWMU 14. See comment for SWMU 8.
Based upon the submitted site history, it is unlikely that 25 soil samples and 3 monitoring wells will reveal the extent of contamination at this site. The soils and groundwater at this site are good candidates for field and analytical screening.

Response:

The soil sampling scheme will be modified in accordance with the response to comment 18. The CNSY agrees that the proposed number of samples may not adequately delineate the extent of contamination. If this is the case, additional sampling will be conducted based on data gaps identified in phase I. At a minimum, analysis of all samples will meet DQO Level III.

In addition, 10% of the samples will be analyzed at DQO Level IV.

Comment 30:

SWMU 17. Remediation efforts that were used to remove all floating oils from the water table after the 1987 spill should be explained in detail.

Response:

A detailed account of the remediation efforts used to clean up the oil spill will be presented in 2.6.17 of the Workplan. These efforts consisted primarily of excavating contaminated soil along the building foundation and the installation of three sumps from which a total of 6300 gallons of oil were recovered.

Comment 31:

Page 3-36. The location of the underground pipe rupture below Building No. FHM61 should be indicated on a figure.

Additional soil samples are necessary at the SWMU to delineate the extent of contamination in this medium. Samples should be collected northeast of Building No. FHM 61 downgradient of the underground pipe rupture. Also, according to page 2-71 the quantity and source of PCBs are unknown beneath the building. Comprehensive soil sampling that surrounds the building should be conducted to delineate where hot spots are located (if any) in the vicinity of the building.

See comment for SWMU 8.

Methods exist to collect samples from beneath buildings, although they can be costly in terms of the sampling itself, lost work time in the building, etc. If it is necessary to determine what concentrations of PCBs still remain beneath the building, analytical screening is <u>not</u> recommended. EPA agrees with the Navy assumption that this material is unlikely to migrate a great distance in the groundwater. The soils and groundwater surrounding this site are not good candidates for field and analytical screening.

Response:

Pursuant to the response to the SCDHEC comments, 6 soil borings will be placed adjacent

to the building foundation in addition to the proposed monitoring wells. Samples will be analyzed for TAL constituents in addition to the currently proposed analytical parameters.

Comment 32:

SWMU 21. See comment for SWMU 8.

The soils beneath the concrete pad must be sampled at joints, fractures, etc. One monitoring well should be installed downgradient, even if this means drilling though the pad. The pad should be observed during the next storm event, and sample locations adjusted to areas receiving pad run off. The groundwater at this site is not a good candidate for field and analytical screening. The soil around the pad is a good candidate for field and analytical screening.

Response:

In response to a SCDHEC comment regarding this SWMU, spacing of sample locations have been revised to allow samples to be collected at distances of 1, 10, and 25 feet from the edges of the pad. Collection of soil samples will be in accordance with response to comment 18. Based on previous discussions, proposed sampling locations as indicated on the figures closely approximate sampling locations but do not necessarily represent the actual sampling point. Sampling personnel will use best professional judgement to locate sampling points in the most appropriate locations (in this case where obvious drainage patterns exist).

Comment 33:

SWMUs 22 and 25. See comment for SWMU 8. The soils and groundwater at these SWMUs are good candidates for field and analytical screening.

Response:

Soil sampling will be conducted in accordance with comment 18.

Comment 34:

SWMU 27. An inspection of the pavement must be performed to ensure that no cracks are present. If cracks (or joints) are present, soil sampling must be performed.

Response:

The pavement will be inspected for significant cracks. If significant cracks exist, soil samples will be collected from beneath these cracks.

Comment 35:

SWMUs 29, 34, and 35. It is not clear in the figure where leaks and spills have occurred at these SWMUs. It is assumed that the soil locations proposed for these SWMUs are in areas where drums were reported leaking (page 2-93). Also samples should be collected near a diesel tank that was observed leaking (page 2-94, SWMU 34).

An inspection of the pavement must be performed to ensure that no cracks are present. If cracks (or joints) are present, soil sampling must be performed in these areas. The soils and groundwater at this site are good candidates for field and analytical screening.

Response:

Sample locations were selected based on historical information regarding spills and leaks at these sites. Also, soil samples will be collected in accordance with the response to comment 18. At a minimum, samples will be analyzed a DQO Level III. In addition, 10% of the samples collected will be analyzed at DQO Level IV.

Comment 36:

SWMU 30. The soil at the observed cracks in the asphalt should be sampled also. These samples are good candidates for field and analytical screening.

Response:

Soil samples will be collected beneath cracks in the asphalt from areas topographically downgradient of this SWMU. Note that the response to SCDHEC comments concerning this SWMU indicates samples will be analyzed for volatile organics, semivolatiles, PCBs, and TAL metals. Also, the response to the SCDHEC comments incorrectly stated a visual inspection of the asphalt has not been conducted which contradicts the Workplan.

Comment 37:

SWMU 32. These soil samples are good candidates for field and analytical screening.

Response:

Analysis of soil samples collected from SWMU 32 will be conducted to meet DQO Level III at a minimum. In addition, 10% of the samples collected will be analyzed at DQO Level IV.

Comment 38:

SWMU 36. Approximate dates for the sulfuric acid spills should be provided.

Because such a large volume of sulfuric acid was released, additional soil samples should be collected northeast of the Building 68. All soil samples should be collected to the water table and analyzed for TCL/TAL group of possible contaminants.

The soils and groundwater at this SWMU are good candidates for field and analytical screening.

Response:

The revised Workplan will include approximate dates for the spills. The CNSY concurs with the need to expand the metals analysis to include all TAL inorganics; however, based on the type of activities conducted at this site and the nature of the release, there is no reason to suspect the presence of any TCL compounds. Sampling to the water table is not feasible were the surface soil locations are proposed due to these sample points being

situated directly beneath the acid tanks. As proposed, sampling personnel will be required to enter a crawl space which represents a confined space entry with limited clearance (<3 feet) to collect the samples.

Comment 39:

Section 4.5.1, p. 4-11. Use of both an FID and PID are recommended during drilling.

Response:

The CNSY will take the recommendation into consideration; however, it is likely only one or the other of the instruments will be utilized depending on the contamination expected.

Comment 40:

Section 4.6, p. 4913. The EPA Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual, February 1, 1991, (ECBSOPQAM), must take precedence over the SOUTHDIV guidance, where there is conflict.

Response:

The CNSY concurs with this comment.

Comment 41:

Section 4.6.4, p. 4-19. If PVC is selected, it must meet the requirements of NSF Standard 14wc. In addition, PVC must not be steam cleaned, or solvent rinsed. Further, EPA recommends that PVC wells use a cold wet grout such as a pure bentonite grout to ensure a good grout seal to the casing and to keep the casing from being subjected to heat.

Response:

The Workplan will be revised to specify the well material will meet the requirements of NSF 14wc (equivalent to ASTM F480). Prior to installation, the PVC will not be steam cleaned or solvent rinsed; however, the pipe may be decontaminated using a liquinox wash, a potable water rinse, and a final organic free-deionized water rinse. All PVC monitoring wells will be grouted using a high solids, pure bentonite grout.

Comment 42:

Section 4.7, p. 4-22. It is recommended that permanent wells be allowed to recover for a least 2 weeks prior to sampling. It is also recommended that monitoring wells be purged with low flow pumps and sampled with peristaltic pumps as outlined in the ECBSOPQAM to avoid false positives with inorganic analyses.

Response:

Section 4.7 will be revised to state permanent monitoring wells will be allowed to recover 2 weeks prior to sampling rather than stating wells will be sampled within one week of installation and development. In addition, newly installed wells will not be developed within 24 hours of installation. Purging and sampling of monitoring wells will be conducted with either peristaltic pumps in accordance with Section F.1 of the ECBSOPQAM or a Grunfos Redi-Flo II which is also capable of a very low flow rate..

Comments 43:

Section 4.10, p. 4-23. Isopropanol is the recommended solvent. Unless samples are being analyzed for metals only, organic free water is required for the final waste rinse. The decontamination pad should be located in a central location.

Response:

Pesticide grade isopropanol will be used as the solvent in the decontamination procedure. A deionized/organic free water system will be installed to supply the rinse water for the

decontamination procedure. A centralized decontamination pad will be constructed adjacent to the fenced compound that currently surrounds the office trailer.

Comment 44:

Section 4.15, p. 4-34. Blanks must also be collected of the organic free water, the sand and grout materials, potable water used on the drill rig and preservatives used in sample preservation. Field blanks are not required by EPA. These samples must be analyzed for the same constituents as the environmental samples.

Response:

Blanks of the organic free water, sand, grout, potable water, and sample preservatives will be analyzed for volatile organics, semivolatile organics, pesticide/PCBs, and the TAL inorganics. All samples will be analyzed to meet DQO Level IV objectives.

Comment 45:

Section 4.21, p. 4-50. EPA recommends containment of IDW, followed by analysis. Disposal options should be chosen after analysis.

Response:

For clarification Section 4.21.2 will be revised to state IDW will be containerized and stored within the boundaries of the respective SWMU from which it was generated rather than accumulated and stored. Section 4.21.3 includes analytical testing as a means of determining whether or not the IDW are a listed or characteristic hazardous waste.

Comment 46:

The RFI Work Plan lacks a definition of chain-of-custody.

Response:

The chain-of-custody is described in detail in Section 4.11.1.

Comment 47:

Sewer lines and outfalls known or suspected to have carried hazardous materials should be evaluated.

Response:

The sewer lines have been included in the list of potential SWMUs identified in Comment 3 above and will be handled in accordance with the response to Comment 3.

Comment 48:

Samples must not be "archived". Holding times must be met.

Response:

The Workplan does not describe archiving of samples beyond holding times for extraction and analysis. Table 4-3 identifies the sample holding times for the appropriate analytical methods.

Comment 49:

Many of the SWMUs have proposed sediment sampling in the Cooper River. EPA recommends that a more comprehensive study of these sediments be performed to evaluate the impact of the entire facility, rather than individual SWMUs. Again, analytical and field screening is a good candidate.

Response:

Please refer to the response to comment 9 which has already addressed this issue. The analytical and field screening methods have been addressed in the responses to comments 50 through 53.

Comment 50:

Many recommendations for the above SWMUs state that the soil and/or groundwater is/is not a good candidate for field and analytical screening. EPA considers field and analytical screening as alternative sampling and analytical methods utilized to reduce time and costs with the objective of determining the horizontal/vertical extent of contamination. This method is, however, useless by itself. A rationale for reducing this data in the field to determine the location of permanent monitoring wells and soil sampling for confirmation must be integrated into this. Following is a description of how these might be used at this facility.

Response:

The response to this comment has been incorporated in to the responses of each of the following suggestions.

Comment 51; Analytical Screening:

"Field headspace analyses" as defined in this Work Plan are subject to a large number of interferences and are too inaccurate to be of any use. A number of screening methods using GC's have been developed which are much more suitable for volatiles. For PCBs, a number of field kits are available. Specific metals of interest can be analyzed using an AA instrument, or if concentrations are sufficiently high, X-ray fluorescence.

The method chosen should reflect the objectives of the study, that is basically determine the extent of the contamination(s) of interest.

Response:

The field headspace analysis as defined in the Workplan is a strictly qualitative method to help field personnel select which samples will be submitted for chemical analysis were multiple samples were collected from the same location to be analyzed for volatile organics. The proposed sample scheme outlined in the response to comment 8 will not rely on field screening to select which samples are submitted for chemical analysis. The objectives of the study will be met with data acquired at DQO Level III at a minimum. In addition, 10% of the samples collected will be analyzed at DQO Level IV.

Comment 52; Field Screening:

Temporary monitoring wells installed with hand augers or powered augers can be a quick and effective method of obtaining shallow groundwater samples. The amount of sediment in these type wells can often be reduced to acceptable levels by the use of a peristaltic pump if metals are a concern.

The GeoProbe is a device that can be used in unconsolidated materials to collect groundwater samples to a depth of 30 feet. It is generally faster than a temporary well as outlined above, but the volume retrieved often restricts its use characterizing VOC contamination. For many sites, however, this is sufficient. One advantage of this device is that it generates very little if any IDW. In addition, because no cuttings are brought to the surface, sampling personnel can often collect samples of highly contaminated media with no protective clothing or respiratory protection.

The Piezocone and the Hydrocone are devices for logging lithology and obtaining groundwater samples. Like the GeoProbe, no cuttings are brought to the surface. The Piezocone can report lithology, sense groundwater, and even tell if two units are connected. This is a highly recommended method for collecting samples to determine where permanent wells should be located.

The HydroPunch is mounted on a conventional drill rig. The temporary well is essentially pushed to the desired depth and a sample can then be collected. It can generally reach a much greater depth than the methods outlined above.

It is often desirable to obtain information about abandoned landfills, such as the depth to buried materials, boundaries of the fill material, types and locations of buried materials, total depth of buried material, etc.

This type of information is not necessary so much for assessment, but may be needed for the FS, or the remedial action. While trenching with a backhoe can provide the useful information by providing a visual profile of the buried material and can aid in selecting sampling location, safety considerations often preclude this option, there is a high likelihood of accidental exposure of a number of people living and/or working in the areas proposed for trenching. For safety reasons, EPA discourages use of this technique in this specific situation.

Response:

During the August 18, 1993, representatives of both EPA and SCDHEC indicated that the screening data would eventually have to be followed up with data collection efforts which meet DQO Level III objectives. Additionally, a percentage of the samples submitted for analysis must meet DQO Level IV objectives. If this is the case, collection of screening data would only result in a later duplication of effort which would be an inefficient use of time and funds available. For this reason all soil, sediment, surface water, and ground water samples will be collected and analyzed in a manner to meet DQO Level III criteria at a minimum. The characterization of the landfill has been initiated based on a review of historical data, a soil gas and geophysical survey (described in detail in the document *Draft-Final Report, Preliminary RFI Field Activity-Soil Gas and Geophysics Survey*, EnSafe/Allen & Hoshall, 1993), and invasive trenching activities which were completed without incident due to careful planning.

Comment 53:

In general, an expeditions investigation of a facility might proceed as follows:

First, an assessment of the site to determine the major constituents of the site. This has already been accomplished for most of the SWMUs at this facility. If it has not been done, it can be accomplished by collecting a small number of highly biased waste or soil samples. Temporary wells (hand auger) should be considered. The analytical work (should be or high quality (DQO Level IV). If contaminants have been released to the environment, this data can be used to design the analytical screening.

Second, the field and analytical screening should be performed. this type of study is most effective if data previously obtained is used to determine the contaminants of concern and probable remedial levels. This is not the risk assessment, the risk assessment is performed after confirmation samples are collected. This information can <u>significantly</u> reduce analytical costs and sampling effort, and time. Quick turnaround data for <u>limited</u> analytes is essential. The

number of samples cannot be determined before hand, sample effort is determined by the extent of contamination. This requires a good working relationship between EPA, the State, the Navy and the Navy contractor. Basically, the quick turnaround data is fed directly back into the ongoing field study to guide sampling and field QA/QC. Permanent wells are not installed at this time (although pre-existing wells will probably be sampled). It is critical that the analytical screening is continually checked throughout this process. This is done with split samples (usually 5 percent) and PE samples (blanks and spikes).

Third, confirmation sampling provides the high quality decision making data required for the risk assessment and remediation. Validation of the analytical screening provides this to some extent, but more is required. At the end of the analytical and field screening, there are two ways to proceed. Either the navy and its contractor can use and agreed upon rational to decide upon final soil/sediment sampling locations and location so permanent monitoring wells. These can then be installed and sampled according to a previously agreed QAPP, and the draft report submitted. Alternatively, a report summarizing the findings of the field and analytical screening can be submitted, along with a proposal for the final sampling locations. The advantage of to first is speed, the latter has the advantage of control.

Response:

The RFI Workplan and the CAMP outline what the CNSY feels is the most logical approach to conducting the investigation in both a timely and cost effective manner. As outlined in the response to comment 52, the use of field screening will invariably result in a duplication of effort which will not result in an expeditious investigation. The cost of generating screening data and associated QA/QC samples with an expedited turnaround time (which typically involves a 100% surcharge) outweighs the benefit. The CNSY prefers to collect data which meets DQO Level III at a minimum during the initial phase of the investigation. This will provide highly reliable information on which successive phases of field work (if necessary) can be designed with relative certainty. If the CNSY and its contractor conduct the investigation in accordance with a QAPP that describes rationale approved by EPA and SCDHEC the element of control is present in addition to the advantage of speed. Previous experience has indicated review time of documents has been excessive and the CNSY feels that if successive phases of the investigation are dependent on review of interim submittals of data, further delays are likely to be incurred.