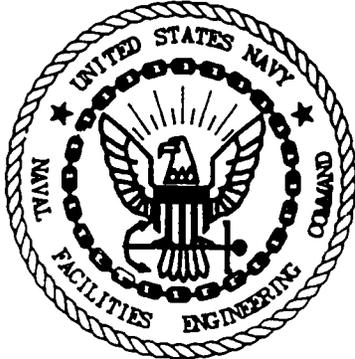


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RESPONSE TO SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL  
CONTROL COMMENTS ON RESOURCE CONSERVATION AND RECOVERY ACT FACILITY  
INVESTIGATION OFF SITE GROUNDWATER SAMPLING STRATEGY ZONE K CNC  
CHARLESTON SC  
9/5/2000  
ENSAFE INC.

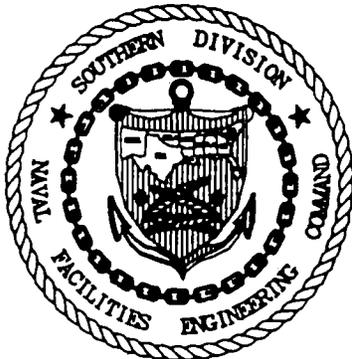
**ZONE K – NAVAL ANNEX RCRA  
FACILITY INVESTIGATION OFF-SITE  
GROUNDWATER SAMPLING STRATEGY  
RESPONSE TO COMMENTS  
CHARLESTON NAVAL COMPLEX  
CHARLESTON, SC**



**SOUTH DIV CONTRACT  
NUMBER: N62467-89-D-0318**

**Prepared for:**

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



**Prepared by:**

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**September 5, 2000**

**Response to the SCDHEC Comments on the *Zone K*  
*Naval Annex RCRA Facility Investigation Off-Site*  
*Groundwater Sampling Strategy*  
*Charleston Naval Complex, July 14, 2000*  
Comments Dated August 4, 2000**

**Comments by Mihir Mehta**

**Comment 1:**

Page 3, Section 2.0, Problem Formulation.

The referenced section describes the “Navy Hypothesis” about the environmental condition of the area in question. The information presented is adequate for developing a sampling strategy to answer the question presented in Section 3.0. The approval of this document should not be interpreted as approving the “Navy Hypothesis”.

**Response 1:**

**The Navy acknowledges that approval of the document does not represent approval of the Navy hypothesis. The Navy is instead seeking the Department’s approval of the proposed sampling strategy which is designed to collect the data necessary to test the hypothesis with the goal of answering the question in Section 3.0. The Navy believes the data collected will be adequate to conclusively answer the question but, the Navy also realizes that the risk is always present that new data could raise more questions and the hypothesis would need to be refined accordingly to direct the collection of additional data.**

**Comment 2:**

Page 11, Section 3.0, Decision Needing to be Made.

The referenced section states, “Did the contamination detected at sample point GDKGP011 originate from a source on the Navy property or is it a result of contamination migrating onto the Navy property from an off-site source?” Please add to this question, “.....from an off-site source *or is there a potential for more than one source on Navy property as well as off-site.*”

**Response 2:**

**The question has been revised (Page 10, Section 3.0) to include the possibility that the presence of the contamination may be the result of both on-site as well as off-site sources rather than just one or the other.**

**Comment 3:**

Page 13, Section 6.0, Sampling Plan to Obtain the Data.

The last sentence of the first paragraph states that, "All sampling will be performed in accordance with the Comprehensive Sampling and Analysis Plan (EnSafe, 1996)." Please reference the regulatory (EPA and/or SCDHEC) guidance for conducting adequate sampling and analysis.

**Response 3:**

**The text has been revised (Page 12, Section 6.0, last sentence) to include a reference to the EPA Region IV *Environmental Investigation Standard Operating Procedures and Quality Assurance Manual (EISOPQAM)*.**

**Comment 4:**

Page 13, Section 6.0, Sampling Plan to Obtain the Data.

The referenced section suggests that the sample locations OFFGP003 and OFFGP006 will be used to obtain the continuous soil cores/lithologic borings necessary to develop lithostratigraphic data. Also, the same two locations are proposed for collecting data to determine the groundwater flow directions. Please provide the rationale for the selection of the number (two out of ten) of sample and their locations that are proposed in this plan for gathering the above information.

**Response 4:**

**The primary basis for selecting the two locations was to create a triangular pattern that would facilitate the extrapolation of groundwater flow data between the existing shallow/deep piezometer pair at grid point 12 on the Naval Annex property in addition to other points on the Navy's property. The proposed borings are also in locations that will facilitate the correlation of lithostratigraphic units observed in the existing deep borings on the Navy property. The Navy believes that two proposed locations combined with the existing data from the Naval Annex will provide the necessary information to facilitate the interpretation of the chemical data that will be collected. The Navy would also like to point out that the proposed work activities were prioritized in Section 6 so that information from the two locations could be evaluated prior to proceeding with the groundwater sampling. If the data from the two locations indicate that subsurface conditions on the CAFB property are anomalous with respect to the trends established on the Naval Annex property, it may become necessary to collect additional cores or install additional piezometers to make sure groundwater samples are collected from locations that will yield the data necessary to meet the objectives of this investigation.**

**Comment 5:**

Page 16, Section 6.0, Sampling Plan to Obtain the Data.

The fourth line states that, "Groundwater samples will be collected from eight depth intervals (one every five feet) per location with the target being the clayey sand overlying the Ashley." Please clarify what is the starting depth from the ground surface of this sampling interval.

**Response 5:**

**The text has been revised (Page 15, Section 6.0, 3<sup>rd</sup> bullet) to state that groundwater samples will be collected starting at approximately 10 feet below ground surface and every 5 feet thereafter until the top of the Ashley is encountered. Please note that Section 6 of the strategy mentions that the sampling intervals may need to be adjusted based on the conditions observed during the completion of the continuous soil borings and that proposed DPT locations could change depending on the new groundwater flow data that will be collected. The Department and CAFB will be made aware of any proposed adjustments that might be warranted by the data obtained in the initials steps of the investigation.**

**Comment 6:**

Page 17, Section 8.0, Schedule and Reporting.

The technical memorandum or the report that will be submitted to the Department for review and approval should summarize the conclusions and discuss future path forward or decisions. As the referenced sampling strategy is a joint effort between the CNC and the CAFB, the technical memorandum or the report should be discussed and agreed upon by the CNC and the CAFB prior to its submittal to the Department.

**Response 6:**

**The Navy agrees that a mutual understanding of the conclusions presented in technical memorandum/report should be reached with the CAFB prior to submittal of the document.**

**Specific Comments by Paul M. Bergstrand**

**Comment 1:**

Pages 9 and 10, Figures 4 and 5

The end points of the transects, GDKGP004 and GDKGP013, did not terminate at the top of the Ashley Formation. This information was not included in the work plan and could significantly alter the analytical data and subsequent interpretation. This comment should not hinder the approval of the sampling plan, but should be considered in the report.

**Response 1:**

**The depth to the top of the Ashley Formation will be considered in the report with respect to interpretation of the analytical data.**

**Comment 2:**

Page 12.

The property boundaries of the Air Force and Navy are represented as ending on Air Street. Sample have been proposed on land between Air Street and Air Park Road where the property ownership has not been defined. Discussions with Todd Haverkost produced the following e-mail on 26 July 2000:

*We went over to the tax assessors office today to look at the tax maps to try to figure out who owns the property. They don't differentiate between the Navy and Air Force, but rather show the entire tract as "US Government" property all the way over to Air Park Road. So, I don't know exactly whose property we will be on in that narrow strip of land but I feel confident we will at least be working on government property. Todd*

Please note that a monitoring well approval from this office for the off-site locations is not an imperative or directive to install wells without the property owners approval. The Navy must be certain that all appropriate property owners approvals have been obtained. The owner of the property between Air Street and Air Park Road must be determined before this work plan and well permits can be approved.

**Response 2:**

**The point made by the comment is well founded; however, the context in which the e-mail is used within the comment is inappropriate since it seemingly misrepresents the intended purpose of the e-mail. The e-mail was written simply to give the Department an update on the Navy and EnSafe's effort to determine who owned a portion of the property in question and nothing more. Providing the Department a status update on our efforts to determine ownership of the property in no way implies that the Navy or EnSafe would construe a monitoring well approval as permission to enter property not owned by the Navy without the landowner's permission. The property boundaries have been established through a thorough**

**search of Navy, Air Force and public real estate records. Figure 7 in the sampling strategy has been revised to illustrate that the property previously in question between Air Street and Air Park Road (where sampling locations OFFGP003, OFFGP007, and OFFGP010 are proposed) belongs to CAFB. Acknowledgment of ownership of this property is documented a separate letter from CAFB to SCDHEC (Easterby to Scaturro, August 31, 2000).**

### **Comments by Stacy French**

#### **Comment 1:**

Page 13, Section 6.0, Sampling Plan to Obtain the Data.

The third sentence in the first paragraph states that unknown operations were taking place at the site prior to construction of residential housing. The term site used in this sentence seems to be referencing operation at the CAFB. The term site is used in previous sections to refer to the Charleston Naval Annex. Please better define the term site in this sentence for clarification.

#### **Response 1:**

**The sentence has been revised (Page 12, Section 6.0, 3<sup>rd</sup> sentence) to clarify that the area being referred to is the CAFB property.**

#### **Comment 2:**

Figure 6, 1949 Aerial Photograph Naval Annex.

This figure should be revised to include a highlight of the various unknown operations referenced in Sections 6.0.

#### **Response 2:**

**The “unknown operations” already appear on the map as light colored areas where the vegetation has been disturbed and are readily distinguishable on the figure. The next page is a recent photo illustrating the proposed sample locations which can be easily cross referenced with the 1949 photo to determine the areas of primary interest for this sampling event. The Navy prefers not to include any additional information on the photo since the effort will not have any effect on the overall design of the sampling strategy.**

**Comment 3:**

Figure 7 Zone K Proposed Off-Site DPT Locations.

This figure identifies the Air Force Property Boundary in the Legend. The base should be identified as Charleston Air Force Base for clarification. Additionally, in order for the Department to make the determination as to whether the contamination is related to Charleston Naval Annex or CAFB, the Department must have the exact property boundaries identified. Based on this figure and the boundary for zone K provided in Figure 4, the property between Air Street and Air Park Road to the southwest is not identified as being part of CAFB or the Charleston Naval Annex. Sample number OFFGP003, OFFGP007, and OFFGP010 are located within this property, and in order for the Department to draw conclusions from these samples; the boundaries must be properly identified. This discrepancy should be resolved and the true boundaries should be presented in this Figure. Please revise this figure to include the Charleston Naval Annex boundary as well as the CAFB property boundary.

**Response 3:**

**Figures 1 and 7 has been revised to indicate both the Charleston Naval Annex and Charleston Air Force Base property boundaries as determined by a South Carolina Registered Land Surveyor. The boundaries shown on Figures 2, 3, 4, and 5 reflect the Zone K investigation boundary and not the actual Naval Annex property boundary. The Zone K boundary will be corrected on any figures submitted in the report.**

**Comments by Tim Hornosky**

**Comment 1:**

Section 1.0, Introduction, second paragraph.

The fourth sentence does not make sense. Please revise the text for clarity.

**Response 1:**

**The sentence has been revised (Page 1, Section 1.0, 4<sup>th</sup> sentence).**

**Comment 2:**

Page 8, Section 2.0, Problem Formulation.

The text indicates that the vertical hydraulic gradient was measured, but does not give this information. Please include the measured values for both vertical and horizontal hydraulic gradients in order to support the suggestion made here that vertical migration is negligible.

**Response 2:**

**The text has been revised (Page 7, 1<sup>st</sup> bullet, last sentence) to include a reference to Appendix B which now contains excerpts from the *Draft Zone K RFI Report* that summarize the requested information.**