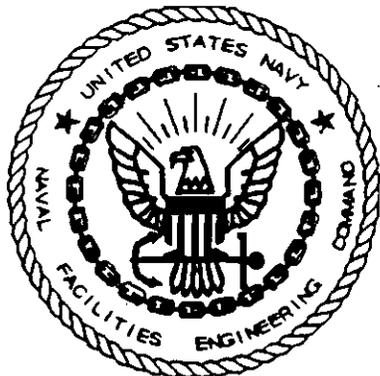


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RESPONSE TO REPLIES TO RESPONSE TO COMMENTS FOR DRAFT ZONE C  
CORRECTIVE MEASURES STUDY WORK PLAN DATED 23 JUNE 1998 CNC CHARLESTON  
SC  
8/20/1999  
ENSAFE

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



**RESPONSE TO REPLIES TO RESPONSE  
TO COMMENTS FOR**

**DRAFT ZONE C  
CORRECTIVE MEASURES STUDY  
WORK PLAN  
DATED JUNE 23, 1998**

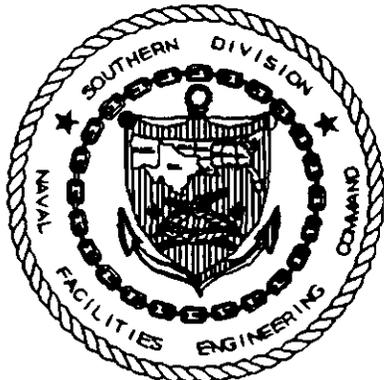
**Prepared for:**

**Department of the Navy  
Southern Division  
Naval Facilities Engineering Command  
Charleston, South Carolina**

**SOUTHDIV Contract Number:  
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**August 20, 1999  
Revision: 0**

**Responses to Replies to Responses to Comments  
Zone C CMS Work Plan Dated June 23, 1998  
(Revised December 18, 1998)**

**General Comment 4:**

During the review of the work plan it was observed that the information presented as part of the Nature and Extent of contamination summary, is written in a context that tries to justify the presence of every contaminant, by using averages, speculating in the contaminant distribution, and reaching conclusions on the unit by looking at irrelevant information. This section, in some cases, fails to include detections that exceed standards which in the first place are the basis for a Corrective Measures Study. The Risk Assessment Summary section should also include all relevant information. Comparison with other zones background values or twice these values serves no purpose but confuses the issue. These sections of the work plans should present a summary of the contaminants found, their extent and risk associated. The Work Plan should be a reflection of the RFI report in every sense, plus additional data collected since the report was produced.

**Navy Response 4:**

The Navy questions which detections exceeding standards were not included. It is the Navy's understanding that for soil, cleanup goals (or standards) are risk levels for industrial and residential reuse scenarios (i.e., 1E-06). For groundwater, the goal or standard is MCLs, or BSHWM cleanup criteria for constituents without MCLs. The Navy has attempted to use these values to determine remedial action.

Comparisons to mean concentrations have been deleted from the work plan. In addition, please refer to the response Mr. Bergstrand's Comment 1.

**Reply 4:**

As an example, Nickel on SWMU 44 exceeded MCL. Well 11 on SWMU 47 exceeded the MCL value for As. The comment was related with nature and extent identification not with risk or cleanup levels.

**Navy Response to the Reply to General Comment 4:**

Constituents identified as COCs in the RFI Report (EnSafe, 1998) and those whose identifications were based on CMS sampling results will be addressed in the CMS report. Sample data from the RFI and the CMS will be included in the CMS report.

As noted in the revised response to comments (December 18, 1998), the work plan has been extensively revised to remove all text that could be construed as "comparative language." The CMS will not use comparisons to means or averages.

**Specific Comments**

**SWMU 44**

**Comment 10:**

Section 5.5.1, page 5-7:

This section does not include a discussion on contaminated sediments found on Noisette Creek. This should be included in the work plan. Sediments must be addressed as part of the CMS.

**Navy Response 10:**

The CMS will address the potential impact (e.g., cross-media transfer potential) to sediments in Noisette Creek through the comparison of existing Zone J sediment sampling results with existing SWMU 44 data and data to be acquired during the proposed CMS sampling for SWMU 44. The work plan has been modified accordingly.

**Reply 10:**

Section 5.5.2 compares sediment detections to SSL for the protection of groundwater. This is not a doable comparison. SSV from Region IV should be used.

**Navy Response to the Reply to Comment 10:**

Any adverse impacts to Noisette Creek due to SWMU 44 (e.g., storm water) will be addressed in the CMS report. Sediment sample results from drainage ditches associated with SWMU 44 will be compared to Region IV SSVs in the CMS.

**Comment 14:**

Section 5.8, Pages 5-13 to 5-18:

The Department agrees with the approach of collecting more soil samples to determine current exposure to Infaunal Invertebrates, Terrestrial Wildlife and Vegetation, due to the implementation of the interim removal action at the site. However, the current risk to aquatic receptors has not changed. The previously identified contamination in sediments remain. Further sampling to determine risk to aquatic receptors should be also proposed. Additionally, the risk numbers presented in this section need clarification.

**Navy Response 14:**

The Navy does not agree that the current risk to aquatic receptors has not changed. Based on the removal, potential for impact from sediments at the former coal storage yard has changed. The risk numbers for pre-interim measure sampling results presented in the CMS work plan are from the approved RFI Report. Data for post-interim measure samples were determined based on pre-interim measure risk calculation methods excluding the background contribution. The request for further sampling was addressed in the last sentence of the text in Section 5.8 and the first bullet under Surface Water and Sediment in Section 5.11, indicating the need for sediment sampling to address environmental impacts. With regard to impact on Noisette Creek sediments, please see the response to Specific Comment 10.

**Reply 14:**

Contaminants that migrated to Noisette creek before and during the IM remain in place (at the creek), therefore, current risk still remains. It is possible that the potential (future) risk has changed (reduced) since the source of contaminants have been removed. The Navy missed the point of this comment.

**Navy Response to the Reply to Comment 14:**

**Please see the Navy Response to the Reply to Comment 10.**

**SWMU47/AOC 516**

**Comment 18:**

Section 6.5.1, Page 6-5:

The Department does not agree with the statement made that BEQs levels found at SWMU 47/AOC 516 are indicative of naturally occurring levels. According to the locations of these samples, they could be influenced by asphalt applications, however this fact is not natural nor is the fact that these units were used for incineration operations in the past. Therefore BEQ levels may very well be the result of Navy activities. This statement should be changed.

- It is not appropriate for comparative purposes, to use mean concentrations or to eliminate the highest concentrations that ultimately would be used to conclude that an area is clean. All these is speculation and should be avoided in the work plan, it does not serve any purpose.
- The second paragraph in this same page is in the least speculative. Only facts should be reported. TPH hits referred as "hot spots" are located within the area of SWMU 47. The distance between them can not be used to justify that there are not present in a wider area or "discontinuous spatial distribution" as referred to in the work plan. Again, averages mean nothing at all when we have detection exceeding accepted levels. Please rewrite this paragraph to report only the facts without speculation. See general comment #4.
- The same section on page 6-6, first paragraph, should be corrected. The lead detection was on soil boring 047-SB-007 instead of 047-SB-00I and should be clarified that surface and subsurface soil exceeded 400 ppm. If this area, as reported, has the potential to be used as a residential area, there is the possibility that a localized and direct action is needed in this area for this concern.

**Navy Response 18:**

**First paragraph:** The text has been modified to include the potential for asphalt applications as the source of BEQ detections, and distinguish these potential impacts from naturally occurring or background contributions. In addition, please see the second paragraph of the response to the first paragraph of Mr. Bergstrand's Comment 22.

**Second paragraph:** Comparisons to mean concentrations have been deleted.

**Third paragraph:** The justification for discontinuous spatial distribution is the fact that sample locations exceeding threshold values are separated by locations below the threshold or non-detect. Comparisons to mean concentrations have been deleted.

**Fourth paragraph:** The text has been corrected to reference boring 047-SB-007 instead of 047-SB-001 and to specify that surface and subsurface concentrations exceed the RBC. As part of the CMS, additional sampling has also been proposed for lead in the area surrounding 047-SB-007.

**Reply 18:**

The intention of the comment by SCDHEC was not to provide justification (asphalt) for the presence of BEQs. The Navy seems that misinterpreted the comment as the justification to be included in the work plan, without really acknowledging the concern that past site activities at SWMU 47 may have been the cause of the presence of BEQs and other organics.

**Navy Response to the Reply to Comment 18:**

The Navy acknowledges that BEQs may be attributable to site-specific sources and road construction. The CMS report will address BEQs and the potential for site-specific sources other than asphalt roads.

**Comment 21:**

Section 6.7.2, "Groundwater Risk", Page 6-12:

- The phrase "... the unlikely potential that the residential reuse scenario at zone C would occur,..." contradicts previous statements where it is admitted that the Redevelopment Authority has planned Zone C to be reused as a residential area. Please rectify this.
  
- The second paragraph on this section is very confusing. Although the information contained here is technically true, it fails to mention information that is important for a complete understanding of environmental problems. It should be clarified that arsenic, although decreasing in concentration during the last three quarters of sampling, they still are above the MCL value. In addition, it is not understood how could be statistically defended that MCL for arsenic is not exceeded in the groundwater at the unit, nor how can it be stated that this contamination is attenuating naturally if there is no proof of it, and then concluding that it does not need to be addressed. Please revise this paragraph thoroughly. This problem does need consideration.

**Navy Response 21:**

**First paragraph:** The references to non-residential reuse have been removed from the text.

**Second paragraph:** Please see the second paragraph of the response to Mr. Bergstrand's Comment 8.

**Reply 21:**

The response does not answer the questions or concerns:

- Arsenic is present at levels exceeding MCLs.
- How statistics is going to show that is not really exceeding MCLs

- On what basis is stated that there is naturally attenuating? and isn't this a potential remedial measure?, which could be only used if there is contamination present.

**Navy Response to the Reply to Comment 21:**

The CMS report will address arsenic in SWMU 47/AOC 516 groundwater.

Statistics were mentioned in the revised work plan in the context of site risk and the potential for a statistically defensible position that site risk is within the acceptable range of risk. While arsenic exceeded its MCL in one well (NBCC-047-G-W011) for three sampling rounds, its concentration has decreased with time and the samples collected during the base-wide study were below the MCL for both filtered and unfiltered samples. The work plan did not imply that natural attenuation was being implemented as a remedial alternative, but that concentrations were decreasing without assistance (attenuating naturally). Based on the most recent sample results, an additional sample using low-flow sampling techniques will be taken from the well and analyzed for arsenic. If it continues to remain below the MCL, no further action will be justifiable in the CMS report in the Navy's opinion. If the concentration exceeds the MCL, then a project team decision for further action will likely be required.

**AOC 512**

**Comment 29:**

Section 8.9, "Remedial Objectives":

This section needs to be modified. Remedial objectives for AOC 512 soil, need to be re-evaluated based on BEQs and beryllium detections. Please revise.

**Navy Response 29:**

The project team has agreed that soil cleanup objectives will be based on risk (or hazard if applicable). The calculated risk and hazard above background did not produce risk greater than  $1E-06$  or a hazard index greater than 1, therefore remedial objectives for surface soil are not warranted at AOC 512. In addition, and as previously stated, beryllium is well below its RBC of 160 mg/kg. With regard to BEQs, please see the second paragraph of the response to the first paragraph of Mr. Bergstrand's Comment 22.

**Reply 29:**

Add statement before section that answers AOC 512 comments to acknowledge the December 1998 NFA decision. Answers to comments can be left as is.

**Navy Response to the Reply to Comment 29:**

The fact that AOC 512 has been designated for no further action by the project team will be included in Section 1.0, Introduction, of the Zone C Minor Sites CMS Report.

**AOC 518**

**Comment 31:**

Section 9.5, "Contaminant Nature and Extent Summary":

- Again this section makes comparisons that serve no purpose. Beryllium is compared to a "base-wide reference concentration". There is no such value that has been approved or discussed with the Department. Also lead is compared to "twice the reference concentration". This is not acceptable. Please revise.
  
- This section fails to mention important information such as: there are 4 additional surface soil samples which SQL exceeded the RBC.
  
- The Department does not agree with the conclusion reached that the site was not impacted by previous activities. The detection of inorganics proves it. In addition, about 50% of the samples taken failed to sample the subsurface soil, which could also be considered a data gap and therefore any conclusion reached would be premature. The work plan and this section should acknowledge this facts. Please revise.

**Navy Response 31:**

**First paragraph:** The comparisons have been deleted. Beryllium concentrations did not exceed the RBC of 160 mg/kg and risk calculations were only above the residential 1E-06 risk threshold at one point due to chlordane.

**Second paragraph:** Please clarify. The Navy does not understand the purpose of this comment in the context of the CMS Work Plan.

**Third paragraph:** The conclusion is from the RFI Report indicating that the only soil COC is chlordane. Lead in soil in the vicinity of 518SB010 will be addressed during the CMS. The Navy disagrees that only 50% of the samples locations included subsurface samples. This comment appears to contradict the information provided in the RFI Report (Table 10.6.5.3, page 10.6.5.5) showing five of seven subsurface soil samples acquired. Therefore, approximately 70% of available subsurface samples were obtained for subsequent analysis. The conclusion regarding site impact is based on the fact that only one sample point resulted in a residential risk estimate above 1E-06, and as previously stated the risk is being driven by chlordane and not inorganics.

**Reply 31:**

The comment on the third paragraph made reference to the conclusion reached on the site-related impact and the definition of **contaminant nature and extent**. In total (two rounds) ten samples were collected from the surface soil, but only five from the subsurface soil. Copper and lead did exceed RBCs and UTLs in surface soil. Can we say the same about the subsurface soil with the same degree of certainty??

**Navy Response to the Reply to Comment 31:**

As discussed in the revised response to comments and CMS work plan, lead contamination in surface and subsurface soil will be addressed in the CMS report. As part of the CMS, additional soil samples

(upper and lower intervals) were procured during March 1999. The results of this supplemental CMS sampling effort will be used during the CMS to determine excavation volumes of chlordane and lead-impacted soil.

**Comment 32:**

Section 9.6.1, Page 9-4:

One of the main concerns at AOC 518 remains. There were no groundwater samples taken and the subsurface soil samples for the constituents with potential for soil-to-groundwater migration is very limited. The work plan should acknowledge this fact and propose additional sampling to fulfill the RFI investigation, specially for organic compounds. The work plan and the conclusion reached at the end of this section should be revised.

**Navy Response 32:**

The Navy disagrees. Per the SCDHEC-approved RFI Report, no fate and transport issues were identified for subsurface soil. This report includes a thorough discussion of fate and transport processes and issues at AOC 518. In addition, subsurface samples were taken at the five locations where two rounds of surface samples were collected.

**Reply 32:**

Limited subsurface data and no gw data give a poor F & T evaluation. Duplicates, which are usually taken at 10% of the samples in surface soil, are analyzed for appendix IX parameters. From this limited # of samples conclusions are reached on nature and extent and F & T. If the parameters detected are only analyzed for in these duplicate samples, then the conclusion reached is premature and presents a data gap of knowledge.

**Navy Response to the Reply to Comment 32:**

As previously stated, excavation volumes of chlordane and lead-impacted soil will be determined in the CMS report. Based on the acquisition of additional data during the CMS, it is the Navy's opinion that contaminant fate-and-transport concerns will be adequately addressed by presenting RFI and supplemental CMS data in the CMS report.

**Comment 33:**

Section 9.11, "CMS Data Needs":

This section should be modified in accordance with comment #32, to fill the mentioned data gaps.

**Navy Response 33:**

Please see the response to Comment 32.

**Reply 33:**

If there is a data gap, then CMS data needs are present. Look at response to comment # 32.

**Navy Response to the Reply to Comment 33:**

**It is the Navy's opinion that additional sampling completed during the CMS will address SCDHEC concerns.**

**AOC 700**

**Comment 34:**

Section 10.5.1, Page 10-1:

This section failed to report detections of inorganics in soil, such as chromium and beryllium in excess of both, RBCs and reference concentrations. Additionally, the fact that groundwater will be addressed as part of SWMU 44 should not preclude this section from presenting the summary of findings at AOC 700. Please revise and include appropriate information.

**Navy Response 34:**

**Based on the approved RFI report, there were no fate and transport issues for soil and groundwater in AOC 700. These results were based on comparison with groundwater data from the nearest downgradient well (NBCC-044-GW-008). A summary of soil detections has been added to the work plan. In addition, beryllium did not exceed its RBC of 160 mg/kg. Furthermore, the project team agreed by consensus on 16 October 1997 that soil at AOC 700 was designated as "no further action" and that groundwater in its proximity would be addressed as part of the SWMU 44 CMS groundwater unit. The work plan will include the results of the most recent (January 1998) water level measurements conducted by the Navy in Zone C and the adjacent area in Zone E. If unavailable, a place in the work plan will be reserved and the maps will be provided when available. The CMS will address the results of these measurements with respect to the direction of groundwater flow from AOC 700.**

**Reply 34:**

There were two part to this comment:

1. Detections not reported. Based on the RFI data, Cr exceeded both, RBC and reference concentration. This was noted in the RFI report but not in the CMS WP, and also was not included in the risk assessment calculations. This was an oversight on the review by the Department that needs to be corrected.
2. The reference to GW tries to bring up the concern that because GW at AOC 700 may be addressed in conjunction with SWMU 44 does not mean that the soil impacts are the same. The response misses the concern with F & T issues.

The use of well 044 gw 008 to determine groundwater contamination a this unit is in question. There is no recollection of the mentioned agreement on October 1997, specially since the RFI data for AOCs 522 and 700 was seen first in the final RFI report dated Nov. 1997. This later fact and any previous agreement is irrelevant if there is contamination present that needs to be addressed.

In summary the final Zone C RFI report had several oversights (nature and extent, F & T and risk assessment) that now are more clear. In addition, AOC 700 was designated for CMS in the letter approving the RFI report. Cr and Ni exceeded SSLs and RC

**Navy Response to the Reply to Comment 34:**

According to the Zone C RFI report conditional approval letter from SCDHEC dated May 5, 1998, AOC 700 is designated as "CMS (to be addressed as part of SWMU 44 CMS effort)". The AOC 700 surface soil chromium and nickel detections and AOC 700 groundwater will be addressed in the SWMU 44/AOC 700 CMS report. During the CMS, a well has been installed in AOC 700 to address fate-and-transport concerns. Groundwater sample results from this well will be included in the SWMU 44/AOC 700 CMS report.

**Comment 35:**

Section 10.6.1, "Contaminant Fate and Transport":

The department was under the understanding that any groundwater contamination at AOC 700 would be addressed as part of the SWMU 44 groundwater contamination, however, this section in relation to Soil-to-Groundwater potential migration still should evaluate potential threats as identified in the RFI report for the AOC 700 area. For example, chromium, cobalt, cooper, dieldrin, all were identified as having potential for soil to groundwater migration, which are not necessarily the same identified for SWMU 44. This information should be included and considered for further evaluation as appropriate.

**Navy Response 35:**

Based on the RFI comparisons of soil data with groundwater data at the nearest downgradient well to AOC 700, no fate and transport issues were identified. However, the work plan will include the results of the most recent (January 1998) water level measurement conducted by the Navy in Zone C and the adjacent area in Zone E. The CMS will address the results of these measurements with respect to the direction of groundwater flow from AOC 700.

**Reply 35:**

GW was not really evaluated. Well used is questionable. See response to comment # 34.

**Navy Response to the Reply to Comment 35:**

A well has been installed at AOC 700 to address groundwater concerns at the site. Please see the Navy Response to the Reply to Comment 34.

**Comment 36:**

Section 10.7, Page 10-4:

The last paragraph of this section states that concentrations of contaminants in soil were below background reference concentrations. This statement is erroneous. Chemicals as chromium exceeded both, reference concentrations and SSLs. This paragraph and its conclusion needs to be revised.

**Navy Response 36:**

While inorganic detections in soil were identified in the RFI, the risk assessment did not result in a residential hazard greater than one or a residential risk greater than 1E-06. The sentence containing the comparison to reference concentrations has been deleted. In addition, the project team agreed by consensus on 16 October 1997 that soil at AOC 700 was designated as "no further action" and that

groundwater in its proximity would be addressed as part of the SWMU 44 CMS groundwater unit. The work plan will include the results of the most recent (January 1998) water level measurement conducted by the Navy in Zone C and the adjacent area in Zone E. The CMS will address the results of these measurements with respect to the direction of groundwater flow from AOC 700.

**Reply 36:**

Chromium was not in the risk assessment. See response to comment # 34.

**Navy Response to the Reply to Comment 36:**

Please see the Navy Response to the Reply to Comment 34. Chromium and nickel in soil and groundwater will be addressed in the SWMU 44/AOC 700 CMS report.

**Comment 37:**

Section 10.9, "Remedial Objectives":

This section should be revised as appropriate, to account for comments #34, and 36 related to AOC 700. The remedial objectives should address these concerns.

**Navy Response 37:**

Please see the response to Specific Comments 34 and 36.

**Reply 37:**

This comment should be answered in accordance with comments for AOC 700.

**Navy Response to the Reply to Comment 37:**

Please see the Navy Response to the Reply to Comment 34. The remedial objectives developed in the SWMU 44/AOC 700 CMS report will address chromium and nickel in AOC 700 soil and groundwater.

**Comment 38:**

Section 10.10, "Potential Remedial Alternatives":

Potential remedial alternatives for soil should be considered based on previous comments for the findings at AOC 700 soil. Please revise.

**Navy Response 38:**

Please see the response to Specific Comments 34 and 36.

**Reply 38:**

This comment should be answered in accordance with comments for AOC 700.

**Navy Response to the Reply to Comment 38:**

**The potential remedial alternatives for SWMU 44/AOC 700 soil will consider chromium and nickel contributions to risk and hazard in addition to the COCs identified in the RFI.**

**Comment 39:**

Section 11, "Zone-wide Groundwater":

- Page 11-1: This section states that a zone-wide monitoring well network (six shallow and two deep) are depicted on Figure 4.1. This is not the case, please revise the figure as appropriate.
  
- Section 11.1, "Zone-wide COC Detections": It is the first time the Department sees this proposal on paper, therefore it should be justified appropriately with tables, figures, etc., that show isoconcentration maps for the contaminants that seem to be present zone-wide. Current information on groundwater flow direction is imperative, and proposed points of compliance for specific contaminants is required. Please revise.
  
- Section 11.3, " Zone-Wide Groundwater CMS Recommendations": The sampling strategy proposed in this section should be more comprehensive. It is the Department's understanding that the uncertainty in groundwater contamination is the driver behind this proposal, therefore wells to be sampled should consider the presence of nearby units, possible contamination (site-specific and zone-wide ), etc., as well as potential problems. This section should be expanded to the measure that all parties understand its purpose and the means to obtain it.

**Navy Response 39:**

**First paragraph: The figure reference has been changed to Figures 4.7 and 4.8.**

**Second paragraph: The sporadic detections do not provide for development of concentration contour maps. Representative groundwater flow direction is shown in Figure 4.4. Assessment of proposed points of compliance is not feasible based on the sporadic detections and inability to develop concentration contour maps of impact to groundwater. Furthermore, it was agreed upon by project team consensus on 16 October 1997 to address groundwater as a single entity at AOCs 510, 512, 513, 517, 518, 520, and 523. With the exception of AOC 518, the project team agreed by consensus to designate the soil at these seven sites as "no further action." Groundwater at SWMU 44 and SWMU 47/AOC 516 was to be addressed as site-specific entities. Interestingly though, AOC 508/AOC 511 was designated as "no further action" for both soil and groundwater during the same project team meeting. AOC 508/AOC 511 is included in the CMS work plan at the recent request of SCDHEC. Please see the second paragraph of the response to Mr. Bergstrand's Comment 8 and the response to Mr. Bergstrand's Comment 43.**

**Reply 39:**

Not true. Agreement was based on the presentation and review of Navy's proposal. Nothing to date. The Department has maintained that NFA is only for the unit as a whole, not by-media.

**Third paragraph: Please see the response to Mr. Bergstrand's Comment 42.**

**Reply 39:**

The response to Mr. Bergstrand's comment # 42 does nothing to do with this comment.

**Navy Response to the Reply to Comment 39:**

The CMS report will present the data collected from the six wells included in the zone-wide groundwater assessment. Based on the presentation of this data, it is the Navy's opinion that the report will satisfy SCDHEC groundwater concerns.