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LETTER AND SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL
CONTROL CONDITIONS FOR APPROVAL OF CORRECTIVE MEASURE STUDY WORK
PLANS FOR SOLID WASTE MANAGEMENT UNITS (SWMU) 38, 47, 66, 67, 68, 69, 72, 73, 74
AND 77, AND FINAL REMEDIAL FEASIBILITY INVESTIGATIONS MCRD PARRIS ISLAND SC

3/26/2012

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

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Division of Waste Management

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March 26, 2012

Mr. Hayes Patterson
Joint Base Charleston - Weapons
2316 Red Bank Road Bldg 36
Goose Creek, SC 29445

Facility: Joint Base Charleston (JB CHS) Weapons
SC8 170 022 620

Re: **Conditional Approval for**

- Final RFI for IM Sites SWMUs 38, 47, 66, 67, 68, 69, 72, 73, 74, 77, 78 with Response to comments for the RFI for IM Sites SWMUs 38, 47, 66, 67, 68, 69, 72, 73, 74, 77, 78
- **Comments for**
- CMS for IM Sites SWMUs 38, 47, 66, 67, 68, 69, 72, 73, 74, 77

Dear Mr. Patterson:

The South Carolina Department of Health and Environmental Control (The Department) received the above mentioned reports on April 29, 2011 and August 9, 2011.

The Department reviewed the documents as a RFI and CMS with respect to applicable sections of the South Carolina Hazardous Waste Management Regulations (SCHWMR) and Joint Base Charleston-Weapon's Hazardous Waste Management Permit (the Permit). Based on this review, the Department has comments please refer to the engineering comments and memos from Billy Britton and Kent Krieg.

The Department is Conditionally Approving the RFI with the idea that the additional comments to the RFI will be addressed as part of a new CMS Work Plan. The Department does not want either of the above mentioned documents to be modified.

- The comments to the Final RFI should be addressed in a new CMS Work Plan.
- The comments to the CMS should be addressed in a new CMS Work Plan.

The new CMS Work Plan should provide a copy of the Department's comments along with your responses to each of the comments. If you have any questions regarding this issue, please contact me at (803) 896-4131 or picketcn@dhec.sc.gov.

Sincerely,

Christi Pickett
Corrective Action Engineering Section

cc: Billy Britton, RCRA Hydrogeology
Mark Hiott, EQC Region 7
Linda Klink, Tetra Tech (via email)
Peggy Churchill, Tetra Tech (via email)



South Carolina Department of Health
and Environmental Control

ENGINEERING COMMENTS

Joint Base Charleston – Weapons
RCRA Facility Investigation (RFI) Report and
RCRA Draft Corrective Measures Study (CMS)
For 11 Interim Measures Sites
SWMUs 38, 47, 66, 67, 68, 69, 72, 73, 74, 77, 78
Dated April 29, 2011 and August 9, 2011

Prepared by:

Christi Pickett, Environmental Engineer Associate
Corrective Action Engineering Section
Division of Waste Management
Bureau of Land and Waste Management

March 26, 2012

General Comments

1. At several SWMUs there was soil and groundwater data that included detections that are common lab contaminants. In order for the Department to determine if the detections are truly a lab contaminant or site related please include a data quality section to all reports in the future. The section needs to include the validation of the data along with the conclusions. If a contaminant is detected in a blank a discussion of which blank needs to be included, along with how it will try to be prevented in the future.
2. Several of the SWMUs as part of the CMS Report recommend no further action (NFA) for soil while continuing to monitor ground water. Please note, the Department does not grant a NFA decision for specific media. A NFA determination is granted for the site as a whole, which will include all investigated media at the site.
3. Many of the Figures within the Corrective Measures Study (CMS) need to be modified as part of future submittals. In order to show the proximity of SWMUs to one another please include all SWMUs that fall within the scale of a specific SWMU map. Also, as defined in permit condition I.D.20 SWMUs include areas that have been contaminated by routine and systematic releases of hazardous waste management activities (e.g. product or process spills). Therefore, the boundaries of some SWMUs need to be modified to include all contaminated areas.
4. In order to complete the administrative process outlined in the Permit and to determine the best path forward, the Department concurrently reviewed the following:
CMS for IM Sites SWMUs 38, 47, 66, 67, 68, 69, 72, 73, 74, 77
Final RFI for IM Sites SWMUs 38, 47, 66, 67, 68, 69, 72, 73, 74, 77, 78 and
Response to comments for the RFI for IM Sites SWMUs 38, 47, 66, 67, 68, 69, 72, 73, 74, 77, 78.

To clarify the Department's concerns, the table below was developed. Please note, it is apparent that some of the recommendations expressed in the Executive Summary of the RFI are not consistent with the recommendations of presented as part of the CMS. According to the Executive Summary from the RFI after completing the RFI several sites recommended further investigation. This is confusing in the administrative record, as there is no explanation provided for the change in recommendations. As stated in section VII.G.3 "The CMS Report must contain adequate information to support the

Department's decision on the recommended remedy, described under Permit Condition VII.H. The requirements of a CMS can be found in the Permit in Appendix C.

Specific Comments

1. Page 1-3, Section 1.3.1

The last sentence in this section states "...however, the subject project was initiated during the transition and has been implemented under Navy direction. Have these remedies gone through the Air Force for review? Do they concur with the recommendations?

2. Page 2-2, Section 2.2.2

The last paragraph on this page states that conformation samples were taken after a soil excavation. It states that this data is summarized in the RFI. If any of the data that is included in the RFI has any impact on the proposed remedy it needs to be included as part of the rationale for the remedy selection process in the CMS.

3. See the table below for specific comments to each SWMU:

SWMU	RFI Recommendations	CMS Proposed Remedy	Department thoughts
38 – Southside Bldg 37 Battery Shop	No Further Investigations until base or Bldg 37 closes - wants LUCs	<ul style="list-style-type: none"> LUCs 	<ol style="list-style-type: none"> A discussion of the current building's use, along with former operations of the building need to be provided. Also be sure that the discussion clarifies if former use and current use are the same. Please provide some rationale for the benefit of putting LUCs on the site now along with how they are going to be maintained. If LUCs are placed on the site because of the current use, inspections will be required annually (per the permit) and they will have to provide any documentation of spills, etc. SWMU 38 is defined as Bldg 37 Battery Shop; however, Figure 2-1 does not include Bldg 37 as part of the SWMU boundary. Please describe how the boundary was determined. The Boundary may need to be modified.
47 – Southside Drum Disposal Area	Additional remedial work and data are needed to support NFA – remove half drum of what appeared to be solidified old roofing tar and underlying stained soil. Collection of a soil conformation	<ul style="list-style-type: none"> Excavation and removal of contaminated soil along with the remnants of the drums and any underlying stained soil 	<ol style="list-style-type: none"> The Department agrees that drums and contaminated soil needs to be removed from the site. However, more work needs to be done at the site. An investigation needs to be conducted to determine if there are any buried drums present at the SWMU. Provide figures with the location of the drums to be removed along with the proposed excavation area and any subsurface findings. Provide rationale to support the proposed excavation locations and how it is going to help address any contaminated soil.

	sample(s) will be analyzed for VOCs, SVOCs, and TAL Metals		A new CMS Work Plan can be submitted to address the above concerns. Then a new CMS Report can be submitted with an updated remedy recommendation.
66 – South Annex Bldg 3221 Old Entomology Wash rack Septic Tank	Removal of contaminated soil surrounding the wash pad. Impacts to eco receptors as a result of the recommended “hot spot” removal will be address in CMS or IM WP - gw table is shallow and appears contaminants have migrated from soil to gw	<ul style="list-style-type: none"> Excavation and removal of contaminated surface soil LUCs for ground water LTM (10 yrs) of ground water 	<ol style="list-style-type: none"> The Department agrees that additional contaminated soil needs to be removed from the site. However, a discussion of how the proposed excavation locations were identified needs to be provided. It is also unclear if all associated piping has been removed from the site (Figure 4-2), please clarify. See Billy Britton’s Specific Comment #3. Why are storm water overflow ponds being constructed and where are they located in relation to SWMU 66? <p>A new CMS Work Plan can be submitted to address the above concerns. Then a new CMS Report can be submitted with an updated remedy recommendation.</p>
67- South Annex Bldg 3674 Old Laboratory Waste Tank	No further investigation of soil and installation of permanent gw monitoring well for COC in soil, ground water and surface water <ul style="list-style-type: none"> site was difficult to access b/c of utilities and so residual soil contamination may be migrating to gw 	<ul style="list-style-type: none"> LUCs for ground water STM (5 yrs) of ground water 	<ol style="list-style-type: none"> Based on recommendations in the RFI, “residual soil contamination may be migrating to groundwater.” The Department does not concur with leaving residual soil contamination in place if it is migrating to groundwater. An investigation of the subsurface soil needs to be conducted. Addition subsurface soil samples need to be taken around the tank to the depth of the tank to help determine the horizontal and vertical extent of contamination. <p>A new CMS Work Plan can be submitted to address the above concerns. Then a new CMS Report can be submitted with an updated remedy recommendation.</p>
68 -- South Annex Bldg 3637 General Purpose Warehouse Waste Tank	<ul style="list-style-type: none"> No further investigation for surface and subsurface soil Monitoring for arsenic along with additional investigation to delineate plume is recommended for ground water – says 	<ul style="list-style-type: none"> LUCs for groundwater LTM (10 yrs) of ground water 	<ol style="list-style-type: none"> The Department feels that more investigation is warranted at this SWMU. A more in depth investigation of the current use of the waste tank needs to be discussed. Additional surface and subsurface soil samples may need to be taken. An investigation on the integrity of the tank also needs to be conducted. Does it appear to have any cracks that would have indicated leaks? It states in the Executive Summary of the RFI that SWMU 20 could be the source of the arsenic at SWMU 68. SWMU 20 is the Old South Annex Munitions Wash Area and it is currently being investigated under the MRP program. Please provide

	<p>arsenic exceedances also encountered at SWMU 20, east of swum 68. The original perceived tank may not be the source - additional ground water invest should encompass up gradient area – more soil sampling should also be done in this area</p>		<p>data along with more rationale to support the statement that SWMU 20 could be contributing to the arsenic source at SWMU 68.</p> <ol style="list-style-type: none"> 2. SWMU 20 needs to be included on all Figures for SWMU 68. 4. Figure 6-1 depicts the SWMU 68 boundary about 80 ft to the east of Building 3637. Please discuss how the boundary was created. <p>A new CMS Work Plan can be submitted to address the above concerns. Then a new CMS Report can be submitted with an updated remedy recommendation.</p>
<p>69 – South Annex POL Decanning Facility Septic Tank</p>	<ul style="list-style-type: none"> • No further investigation for soil. • Monitoring for VOCs in ground water. • Recommend to install permanent monitoring wells. • The source of the VOC contamination in ground water was discovered to be from the northern end of Bldg 3489 likely the drain. • Recommend to expand swum 69 boundary. 	<ul style="list-style-type: none"> • STM (3 years) of ground water monitoring 	<ol style="list-style-type: none"> 1. The Department agrees with the recommendation from the RFI to make the SMWU 69 boundary larger. The proposed boundary change is depicted on Figure 7-3. However, it should be noted that with this recommendation the drain becomes part of SWMU 69, not another source. 2. Further delineation of SWMU 69 including the drain at the northern end of former Bldg 3489 needs to occur. This investigation should at a minimum include surface and subsurface soil samples. Investigation of where the pipe discharges along with how it received waste. Additional investigation of the building may also be warranted. <p>A new CMS Work Plan can be submitted to address the above concerns. Then a new CMS Report can be submitted with an updated remedy recommendation.</p>
<p>72 – South Annex Abandoned Drum Area</p>	<ul style="list-style-type: none"> • No further investigation for subsurface soil. 	<ul style="list-style-type: none"> • Removal of contaminated surface soil • STM (3 yrs) of 	<ol style="list-style-type: none"> 1. The Department agrees with the recommendation of removing contaminated surface soil hotspots at S72-08 and S72-10. However, more work needs to be done at the site.

	<ul style="list-style-type: none"> • Want to remove 2 PAH-contaminated surface soil hot spots @ S72-08 and S72-10. • Will address eco risks as part of the CMS or IM WP. • Recommend to monitor ground water 	ground water	<ol style="list-style-type: none"> 2. An investigation needs to be conducted to determine if there are any buried drums present at the SWMU. 3. Provide rationale to support the proposed excavation locations and how it is going to help address any contaminated soil. 4. Page 8-2, Section 8.2.2 - The 4th paragraph, was the oily liquid found in the drum ever tested? <p>A new CMS Work Plan can be submitted to address the above concerns. Then a new CMS Report can be submitted with an updated remedy recommendation.</p>
73 – South Annex Bldg 3440 Battery Shop Septic Tank	<ul style="list-style-type: none"> • Need to conduct a hot spot removal for exceedance of chromium but say a better option may be to resample for hexavalent chrome to support NFA • Monitoring for arsenic and lead along w/ additional investigation to delineate plume is recommended for GW • Think arsenic plume may be coming from more up gradient source b/c never could find tank at bldg 3440 	<ul style="list-style-type: none"> • Excavation and Removal of contaminated surface soil • LUCs for ground water • LTM (5 yrs) 	<ol style="list-style-type: none"> 1. The Department needs a better discussion about the location of the tank and rationale along with evidence to support why there may be an up gradient source. 2. If the tank cannot be located, has an investigation of another source been conducted? 3. Why were the sample locations on Figure 9-3 so far away from the SWMU? If samples were taken on the opposite end of the building from where the tank is thought to be was the tank ever looked for at that end of the building? 4. The SWMU boundary may need to be modified. <p>A new CMS Work Plan can be submitted to address the above concerns. Then a new CMS Report can be submitted with an updated remedy recommendation.</p>
74 – South Annex Boiler Slag Pile	Recommend removal of slag that was left during the IM. Want to scrape	<ul style="list-style-type: none"> • Excavation of small pieces of slag left behind after IM 	<ol style="list-style-type: none"> 1. The Department agrees with removal of surface slag that was left during the IM. <p>A new CMS Work Plan can be submitted to address the above concerns. Then a new CMS Report can be</p>

	<p>surface soil and remove slag in affected areas.</p> <ul style="list-style-type: none"> Want to discuss the need for LUCs b/c of slag that remains in place under concrete pad 		<p>submitted with an updated remedy recommendation.</p>
77- North Steam Locomotive Area	<p>Want to remove contaminated PAH surface soil @ S77-01, S77-07, S77-10, and S77-15. Sounds like they will do eco assessment in the CMS.</p> <ul style="list-style-type: none"> Conducted IM ground water sampling and sampled for VOCs, SVOCs, explosives, TAL metals. After IM only going to sample for arsenic, chromium, cobalt, and lead 	<ul style="list-style-type: none"> Excavation and removal of contaminated surface soil STM (3 yrs) ground water monitoring 	<ol style="list-style-type: none"> The Department agrees with the recommendation of removing contaminated PAH surface soil at S77-01, S77-07, S77-10, and S77-15. However, more work may need to be done at the site. Explosives were detected in groundwater so is this an explosives site? It is unclear if all 3 concrete pads have been demolished. It states on Pg 11-2 "Tolest demolished both concrete structures and footers.." But on Figure 11-2 it shows 3 concrete structures. It states on page 11-1 that SWMU 2 is east of SWMU 77. Please include SWMU 2 on a figure to show the proximity of the two SWMUs. <p>A new CMS Work Plan can be submitted to address the above concerns. Then a new CMS Report can be submitted with an updated remedy recommendation.</p>
78 – Northside Demil Facility Bldg	<ul style="list-style-type: none"> NFA for soil and groundwater b/c only got BEHP in groundwater above human health screening criteria but is known common lab cont so they think it is ok 	<ul style="list-style-type: none"> NFA 	<ol style="list-style-type: none"> It appears as though BEHP was detected in a ground water sample at the site. Please see General Comment #1. It states on page 12-1 that SWMU 78 was discovered during field observations at SWMU 2. Please include SWMU 2 and SWMU 77 on figures to show the proximity of the three SWMUs. It seems as though SWMU 2, SWMU 77, and SWMU 78 are all related. They seemed to have buildings or areas that were all involved in the same process. Is there a reason that all three of these sites were not investigated together? Because of detections of explosives in subsurface soil and the history of the site the Department does not have enough information to NFA the sight at this time.

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Coleman F. Buckhouse, MD

MEMORANDUM

TO: Christi Pickett, Engineering Associate
Corrective Action Engineering Section
Division of Waste Management
Bureau of Land and Waste Management

FROM: William Britton, Jr, P.G., Hydrogeologist *William Britton*
Federal Facilities Groundwater Section
Division of Waste Management
Bureau of Land and Waste Management

DATE: March 22, 2012

RE: *Responses to Comments on Draft Resource Conservation and Recovery Act Facility Investigation of Interim Measures Solid Waste Management Units (SWMUs) 38, 47, 66, 67, 68, 69, 72, 73, 74, 77, and 78 and Revised Resource Conservation and Recovery Act Facility Investigation of Interim Measures Solid Waste Management Units (SWMUs) 38, 47, 66, 67, 68, 69, 72, 73, 74, 77, and 78, dated April 2011*
Joint Base Charleston-Weapons
SC8 170 022 620
Charleston County

The Federal Facilities Groundwater Section (FFGS) reviewed the referenced documents with respect to the South Carolina Hazardous Waste Management Regulations (R.61-79), Hazardous Waste Permit SC8 170 022 620, and appropriate guidance documents.

The Naval Weapons Station and the Charleston Air Force Base were recently combined into one facility and renamed Joint Base Charleston (JBC). However, they are subdivided into the JBC-Air and JBC-Weapons facilities, respectively. SWMUs 38, 47, 66, 67, 68, 69, 72, 73, 74, 77, and 78 are situated at various locations across the Joint Base Charleston (JBC)-Weapons facility.

The Responses to Comments were submitted by JBC-Weapons to address the comments made by the FFGS that were included in the memorandum from Danielson to Petrus dated January 11, 2011. The Revised Resource Conservation and Recovery Act (RCRA)

Facility Investigation (RFI) incorporated the changes requested in the FFGS' comments on the Draft RFI.

Based on the review, the FFGS Section has the following comments to make on the documents.

- 1) Comment 11 of the FFGS' comments on the Revised RFI for Interim Measures Sites agreed with the recommendation made by JBC-Weapons in the Draft RFI to investigate whether the Historical Open Storage Area is the source for the arsenic contamination detected in the groundwater at SWMU 68. The Corrective Measures Study (CMS) does not include a provision to determine whether the Historical Open Storage Area or SWMU 68 is the actual source of the groundwater contamination. However, the CMS does propose corrective measures to address SWMU 68. Defining the source of groundwater contamination is a fundamental part of determining the nature and extent of contamination at hazardous waste sites under the RCRA program. Please submit a workplan designed to determine whether the Historical Open Storage Area is the source for the groundwater contamination detected at SWMU 68. SCDHEC will not approve any proposed corrective measures at SWMU 68 until the source of the groundwater contamination is determined.
- 2) The Revised RFI speculated that a drain located in former Building 3489 may be the source of groundwater contamination detected at SWMU 69. Comment 14 of the FFGS' comments on the Revised RFI for Interim Measures Sites requested that JBC-Weapons either extend the boundary for SWMU 69 to include former Building 3489 or investigate former Building 3489 under a new SWMU designation to determine whether the drain is the source of contamination at SWMU 69. The response to Comment 14 agreed to include a recommendation that added additional monitoring wells and to extend the boundary of SWMU 69 to include the drain at former Building 3489. However, the Corrective Measures Study (CMS) does not include provisions for installing additional monitoring wells or evaluating whether the drain in former Building 3489 is the actual source of the groundwater contamination. As stated above in Comment 1, SCDHEC will not approve any proposed corrective measures at SWMU 69 until the source of the groundwater contamination is determined. Please submit a workplan designed to determine whether the drain in former Building 3489 is the source for the groundwater contamination detected at SWMU 69.
- 3) Comment 19 in the FFGS' comments regarding the Revised RFI requested that JBC-Weapons extend the groundwater monitoring well network further to the south-southeast to further define the groundwater contamination at SWMU 72. JBC-Weapons' response to Comment 19 agreed with this request. However, the CMS does not include a provision to install more monitoring wells to further

define the groundwater contamination to the south-southeast of SWMU 72.
Please submit a workplan to address this oversight.

If you have any questions or comments, please contact me at (803) 896-4031.



C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

MEMORANDUM

TO: Laurel Petrus, Environmental Engineering Associate
Corrective Action Engineering Section
Division of Waste Management
Bureau of Land and Waste Management

FROM: Kent Krieg, Risk Assessor
Corrective Action Engineering Section
Division of Waste Management
Bureau of Land and Waste Management

DATE: June 3, 2011

RE: Naval Weapons Station
Charleston, South Carolina

Document:
RCRA Facility Investigation (RFI) Report for
Interim Measures (IM) Sites: 38,47,66,67,68,69,72,73,74,77, and 78
Dated April 2011

The above referenced document by Tetra Tech NUS, Inc. has been reviewed. The Department does not have any risk related comments at this time. If you need any further information, feel free to contact me at (803) 896-4262.

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MEMORANDUM

TO: Christi Pickett, Engineering Associate
Corrective Action Engineering Section
Division of Waste Management
Bureau of Land and Waste Management

FROM: William Britton, Jr, P.G., Hydrogeologist *William Britton*
Federal Facilities Groundwater Section
Division of Waste Management
Bureau of Land and Waste Management

DATE: March 9, 2012

RE: *Corrective Measures Study for Interim Measures Solid Waste Management Units (SWMUs) 38, 47, 66, 67, 68, 69, 72, 73, 74, 77, and 78, dated August 2011*
Joint Base Charleston-Weapons
SC8 170 022 620
Charleston County

The Federal Facilities Groundwater (FFGW) Section reviewed the referenced corrective measures study (CMS) with respect to the South Carolina Hazardous Waste Management Regulations (R.61-79), Hazardous Waste Permit SC8 170 022 620, and appropriate guidance documents.

The Naval Weapons Station and the Charleston Air Force Base were recently combined into one facility and renamed Joint Base Charleston (JBC). However, they are subdivided into the JBC-Air and JBC-Weapons facilities, respectively. SWMUs 38, 47, 66, 67, 68, 69, 72, 73, 74, 77, and 78 are situated at various locations across the Joint Base Charleston (JBC)-Weapons facility.

Based on the review, the FFGW Section has the following comments to make on the document. Although the FFGW made comments on the CMS, SCDHEC understands that the comments will not be addressed in a revised document. Instead, the comments will be addressed in comment responses made under a separate cover.

General Comments:

- 1) The CMS attempts to provide a physical description, present the individual history of each SWMU, summarize the results of multiple phases of previous investigations, identify media cleanup standards (MCSs), develop corrective measures objectives that identify constituents of concern (COCs), and present preferred corrective measures for 11 SWMUs in one document. That is simply too much information to adequately present in one document that consists of a single two-inch thick three ring binder. SCDHEC requests that, in the future, JBC-Weapons prepare documents that address multiple sites only if they have some relationship to each other (excluding contractual relationships). For example, JBC-Weapons should consider preparing documents that group SWMUs together into one document if they share similar characteristics such as underground septic tanks or other relationships such as proximity to one another.
- 2) The document is titled as a CMS and Section 1.2 states that Sections 2.0 through 12.0 of the document “provide a description of current conditions, corrective measures objectives (CMOs) and MCSs, identification and screening of corrective measure technologies, the development and evaluation/comparative analysis of the corrective measures alternative, and recommended corrective measures alternatives” for each SWMU. However, no evaluation or comparative analysis of corrective measures alternatives is presented in the document for any of the SWMUs. Instead, the document simply presents the corrective measures that JBC-Weapons prefers to implement at each SWMU. Even a “streamlined” CMS must present, at a minimum, a comparative analysis between a “No Action” remedial alternative and at least one other remedial alternative. As such, the current document does not meet the requirements of a CMS. Please revise the document to provide adequate evaluations of remedial alternatives to support SCDHEC’s selection of corrective measures.
- 3) The CMS states that no corrective measures are required to address groundwater contamination at any of the SWMUs. However, the CMS later proposes Land use controls (LUCs) to address groundwater contamination at several of the SWMUs. LUCs are corrective measures. Please revise the text, as appropriate, to reflect that corrective measures are necessary to achieve CMOs for groundwater at some of the SWMUs .
- 4) The document presents LUCs with groundwater monitoring as the preferred corrective measures to address groundwater contamination at several of the SWMUs. SCDHEC does not consider LUCs or groundwater monitoring alone to be effective corrective measures to address groundwater contamination, unless they are components of a comprehensive natural attenuation strategy. Please revise the preferred corrective measures to state that natural attenuation with LUCs and monitoring are recommended to address groundwater contamination.

- 5) Several of the preferred corrective measures propose specific periods of groundwater monitoring. SCDHEC does not accept corrective measures for groundwater based on a natural attenuation strategy that proposes a specific period of groundwater monitoring. Groundwater monitoring would continue at sites with groundwater contamination until the concentrations of all of the MCSs are attained at all of the groundwater monitoring wells and remain below MCSs for three years.
- 6) Please include a provision to conduct five-year reviews evaluating the effectiveness of the corrective measures at each SWMU where corrective measures are proposed and include estimated costs to provide the five-year reviews in the projected costs for the proposed corrective measures.
- 7) There are no estimates regarding how long JBC-Weapons predicts that it will take natural attenuation to restore groundwater at the sites where groundwater monitoring is proposed. Furthermore, no evaluation is presented to support whether a remedial action based on natural attenuation would be an effective strategy nor are any clear criteria proposed to judge the effectiveness of natural attenuation at these sites. Please provide this information to support the preferred corrective measures presented in the CMS.

Specific Comments:

- 1) Page 3-1 states that a drum was discovered at SWMU 47 after Interim Measures were completed at the site because leaf cover concealed the presence of the drum. Given that SWMU 47 was reported to be a drum disposal area, no geophysical survey was performed during the RFI, and a drum was recently found on the ground at the site, SCDHEC requests that JBC-Weapons conduct a geophysical survey to evaluate whether additional drums are present at SWMU 47.
- 2) Section 4.2.2 describes the activities associated with removing the 1,000-gallon concrete underground septic tank that received discharge from pesticide/herbicide filling and cleaning operations at SWMU 66. SCDHEC was not able to determine by reading the description of the removal activities whether the drain field associated with the septic tank was removed. If the drain field from the septic tank was not removed it should be evaluated to determine whether it is a continuing source of pesticide contamination in the groundwater at SWMU 66. Please include a CMO that proposes to evaluate whether the drain field is still present and, if still present, to determine whether it is a likely to be a continuing source of groundwater contamination at SWMU 66.
- 3) Page 4-6 states that groundwater contaminant plume containing dieldrin at SWMU 66 appears to have increased in size between the RCRA Facility

Investigation (RFI) and the interim monitoring. However, JBC-Weapons attributed the apparent change in plume size as being caused by an increase in the number and distribution of data points used during the RFI. Please note that SCDHEC does not typically agree to implement natural attenuation-based remedial actions to restore groundwater at sites in which groundwater contaminant plumes consisting of persistent contaminants (such as dieldrin) are expanding in size. JBC-Weapons will need to determine the extent of the dieldrin contamination at SWMU 66 and determine whether the plume is expanding, remaining stable, or decreasing in size before SCDHEC can review or consider natural attenuation at SWMU 66.

- 4) Please revise the second corrective measures objective (CMO) on page 3-4 so that it reads "Will attain MCSs". Please make the same revision to the corresponding CMO on pages 4-7, 5-5, 6-5, 7-5, 8-5, 9-5, 10-3, and 11-5.
- 5) Please revise the fifth CMO on page 4-7 to read "Monitor groundwater until MCSs are achieved". Please make the same revision to the corresponding CMO on pages 5-5, 6-5, 7-5, 8-5, 9-5, and 11-5.
- 6) SCDHEC does not agree with the proposal to monitor the groundwater contamination at SWMU 67 using temporary groundwater monitoring wells. Permanent groundwater monitoring wells should be installed to provide to serve as monitoring points for the long-term monitoring program. Please revise the corrective measures to include installing permanent groundwater monitoring wells.
- 7) An additional permanent groundwater monitoring well will be necessary to help define the groundwater contaminant plume boundary between existing monitoring wells 72MW03 and 72MW05 at SWMU 72. Please include a provision to install the additional monitoring well in the Corrective Measures Implementation (CMI) Work Plan.
- 8) Please include a CMO that proposes to install groundwater monitoring wells 73MW07 and 73MW08 to define the arsenic groundwater contaminant plume during the CMI at SWMU 73.

If you have any questions or comments, please contact me at (803) 896-4031.



2600 Bull Street
Columbia, SC 29201-1708

MEMORANDUM

TO: Christi Pickett, Environmental Engineering Associate
Corrective Action Engineering Section
Division of Waste Management
Bureau of Land and Waste Management

FROM: Kent Krieg, Risk Assessor
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Bureau of Land and Waste Management

KMK

DATE: March 6, 2012

RE: Joint Base Charleston - Weapons
Charleston, South Carolina

Document: Corrective Measures Study for Interim Measures
SWMUs 38, 47, 66, 67, 68, 72, 73, 74, 77, and 78
Dated August 2011

The above referenced document by Tetra Tech NUS, Inc. has been reviewed. The Department has the following risk related comments:

General Comments:

1. The Department would like to emphasize that the selection of chemicals of concern, cleanup goals, and remedy selection is a site specific decision and should not be automatically set to cancer risk levels greater than 10^{-4} . Per USEPA RAGs, the 10^{-6} risk level is the point of departure, with a risk management decision being necessary by the risk managers when the ILCR is within 10^{-6} to 10^{-4} risk range.
2. The Department does not agree that a basewide MCSs be calculated for all soil at the IM sites. This value should be calculated using site-specific parameters based on the exposure point concentration and calculated site risk. Please update the calculations in Appendix C as well as the text and tables throughout the document to reflect the necessary changes.
3. The State would like to reiterate the suggestion that chromium sampling include both hexavalent and total chromium analysis to distinguish between the potential risks associated with each isotope. Further, the referenced chromium background data values are believed to correlate to total chromium analysis, not that of hexavalent chromium. The type of analysis should be clearly labeled on tables and data summary sheets for future review and reference.

Specific Comments:

RCRA Facility Investigation and Interim Monitoring Findings and Conclusions and Media Cleanup Standards for Soil.

To assist in future review and the risk manager's decision making process, the Department requests that the receptor risks be listed if it falls within or above the ILCR USEPA risk management range of 10^{-6} to 10^{-4} or above an HI of 1. (i.e. The cancer risk for future residents (6×10^{-4})...in surface soil exceeds the USEPA target risk range of 1×10^{-6} to 1×10^{-4}). This can be stated in either the RFI summary section, Media Cleanup Standards section, or both sections throughout the document. Please refer to General Comment #2 above.

9.4 – Recommended Action, pg. 9-7

As stated in the document, if the results indicate total or hexavalent chromium at concentrations below the background concentration for chromium, or result in acceptable cancer risk, no removal action is necessary. The Department disagrees with this statement since total **and** hexavalent chromium should not be compared to the same screening criteria. DHEC believes that if the total chromium concentration value is below the background concentration for chromium, or result in acceptable cancer risk, no removal action is necessary as long as the hexavalent chromium value is also below the RSL screening value, or results in acceptable risk based on hexavalent chromium toxicity values.

11.3.2 – Media Cleanup Standards for Soil, pg. 11-6

If the proposed soil removal action includes the removal of trees, please remember to address potential ecological effects.

Appendix C – Risk Assessment Spreadsheets

These tables are difficult to follow. Subsequent titles reading "page two of two" do not distinguish which "page one" it corresponds with. Additionally, it appears that the soil concentration box is cut off leaving off some of the chemicals (correct on lifetime resident but third page still reads "page two of two" – even though there are three pages). Please refer to general Comment #2 when correcting the tables.

If you need any further information, feel free to contact me at (803) 896-4262.

