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MCRD PARRIS ISLAND  
5090.3a

LETTER REGARDING SOUTH CAROLINA DEPARTMENT OF HEALTH AND  
ENVIRONMENTAL CONTROL CONDITIONAL APPROVAL OF THE PROPOSED PLAN, U S  
NAVY RESPONSES TO COMMENTS ON THE CONDITIONAL APPROVAL OF THE  
FEASIBILITY STUDY AND THE FEASIBILITY STUDY ADDENDUM FOR SITE 45 AN  
1/28/2013  
SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL



Catherine B. Templeton, Director

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

January 28, 2013

Commanding Officer  
NAVFAC Southeast  
ATTN: Mr. Dan Owens  
PO Box 30  
Ajax Street North, Bldg 135  
Jacksonville, Florida 32212

and

Commanding General  
NREAO  
ATTN: Ms. Lisa Donohoe  
PO Box 5028  
Parris Island, SC 29905

RE: Conditional Approval of the

- MCRD PI Site 45 and 32 D2 Proposed Plan
- RTCs to the Conditional Approval of the FS
- FS Addendum

Marine Corps Recruit Depot (MCRD)  
Parris Island  
SC6 170 022 762

Dear Mr. Owens and Ms. Donohoe:

The Division of Waste Management of the South Carolina Department of Health and Environmental Control (Department) received the above reference documents on December 14, 2012. The Department approves the documents with conditions. Please see the attached engineering and hydrogeology memoranda.

The Department's review is based on the information presented by MCRD to date. Any information found to be contradictory may require further action. If you have any questions regarding this issue, please contact me at (803) 896-4218.

Sincerely,

A handwritten signature in black ink, appearing to read "Meredith Amick", with a long horizontal flourish extending to the right.

Meredith Amick, P.E., Environmental Engineer  
Corrective Action Engineering Section  
Division of Waste Management

cc:

Lila Llamas, EPA Region 4  
Annie Gerry, Hydrogeology  
Priscilla Wendt, SCDNR

Russell Berry, EQC Region 8, Beaufort  
Peggy Churchill, TtNUS

Engineering Memo  
Prepared by Meredith Amick   
Marine Corp Recruit Depot (MCRD)  
January 28, 2013

Conditions of the Approval:

1. Please see the attached revision to the calculated Leachability Cleanup Levels. The correction in the DAF formula provides for a new DAF of approximately 3.6. Additionally the Koc value for indeno(123-cd)pyrene should be revised as provided in the attachment, as this is based on USEPA's most recent Regional Screening Level Table. Please correct the Leachability Cleanup Levels in the Proposed Plan. Additionally this calculation should be documented in the administrative record.
2. If the manholes and storm sewer lines are not slip lined, the manholes should always be monitored during injections for remediation. The response to Gerry comment #3 does not indicate this will be done; however, as stated in Amick comment #18 "...Also please note that until injections cease the manholes and outfall should continue to be monitored." This can be further documented and planned in the RD.
3. In order to be consistent with previous Proposed Plans, the Department prefers both the LUCs and the LUC Objectives bulleted out in the Proposed Plan. Additionally the implementation of the LUCs and LUC Objectives should be discussed in the LUC RD.

**Soil Protective of Groundwater**  
**Source: Soil Screening Guidance**

Relevant Equation: 
$$C_t = C_w \times \left[ K_d + \left( \frac{\theta_w + \theta_a \times H'}{P_b} \right) \right]$$

Parameter	Value	Definition
Cw	Chemical specific	Target groundwater level (mg/L).
H'	Chemical specific	Dimensionless Henry's Law Constant.
Kd	Koc x foc	Soil-water partition coefficient (L/kg)
Koc	Chemical specific	Soil organic carbon partition coefficient (cm <sup>3</sup> /g).
foc	0.006	Fraction organic carbon in soil (g/g).
qw	0.3	Water-filled soil porosity (L <sub>pore</sub> /L <sub>soil</sub> ).
Pb	1.5	Dry soil bulk density (kg/L).
Ps	2.65	Soil particle density (kg/L)
n	0.43	Soil porosity (L <sub>pore</sub> /L <sub>soil</sub> ).
qa	0.134	Air-filled soil porosity (L <sub>air</sub> /L <sub>soil</sub> ).

Chemical	Cw (mg/L)	Koc or Kd (L/kg)	H'	SSL			
				DAF=1 (mg/kg)	DAF=3 (mg/kg)	DAF=8 (mg/kg)	DAF=20 (mg/kg)
Trichloroethene	0.005	6.07E+01	4.03E-01	3.0E-03	9.0E-03	2.4E-02	6.0E-02
Tetrachloroethene	0.005	9.49E+01	7.24E-01	4.2E-03	1.3E-02	3.3E-02	8.3E-02
benzo(a)anthracene	0.0002	1.77E+05	4.91E-04	2.1E-01	6.4E-01	1.7E+00	4.2E+00
benzo(a)pyrene	0.0002	5.87E+05	1.87E-05	7.0E-01	2.1E+00	5.6E+00	1.4E+01
benzo(b)fluoranthene	0.0002	5.99E+05	2.69E-05	7.2E-01	2.2E+00	5.8E+00	1.4E+01
benzo(k)fluoranthene	0.0002	5.87E+05	2.39E-05	7.0E-01	2.1E+00	5.6E+00	1.4E+01
dibenzo(ah)anthracene	0.0002	1.91E+06	5.76E-06	2.3E+00	6.9E+00	1.8E+01	4.6E+01
indeno(123-cd)pyrene	0.0002	1.95E+06	1.42E-05	2.3E+00	7.0E+00	1.9E+01	4.7E+01
cis-1,2-Dichloroethene	0.07	3.96E+01	1.67E-01	3.2E-02	9.5E-02	2.5E-01	6.3E-01
trans-1,2-Dichloroethene	0.1	3.96E+01	1.67E-01	4.5E-02	1.4E-01	3.6E-01	9.0E-01

DAF = 3 is based on site-specific values.

DAF = 8 corresponds to the value recommended for sandy soils in SCDHEC's "South Carolina Risk-Based Corrective Action for Petroleum Releases" (May 2001)

foc is based on site-specific data

Koc and H' values are from the May 2012 USEPA Regional Screening Level Table.

Cw is USEPA MCL.

*3.47E+06*

<b>CLIENT:</b> PARRIS ISLAND, SOUTH CAROLINA		<b>JOB NUMBER:</b> 112G02738
<b>SUBJECT:</b> DERIVATION OF DILUTION ATTENUATION FACTOR		
<b>BASED ON:</b> USEPA, SUPPLEMENTAL GUIDANCE FOR DEVELOPING SOIL SCREENING LEVELS FOR SUPERFUND SITES, DECEMBER 2002		
<b>BY:</b> R. JUPIN	<b>CHECKED BY:</b>	<b>DATE:</b> 12/5/2012

**PURPOSE:** To calculate a site-specific dilution attenuation factor.

**EQUATIONS:**

$$DAF = 1 + \frac{K \times i \times d}{d_a (1 - \exp[-(L \times i) / (K \times L \times d_a)])}$$

*should be i*

Where:

- DAF = Calculated dilution attenuation factor (unitless)
- K = 890 aquifer hydraulic conductivity (m/yr)
- i = 0.005 hydraulic gradient (m/m)
- L = 0.25 infiltration rates (m/yr)
- d = Calculated mixing zone depth (m)
- L = 37 source length parallel to groundwater flow (m)
- d<sub>a</sub> = 4 aquifer thickness (m)

**CALCULATION OF MIXING ZONE DEPTH**

$$d = (0.0112 \times 37^2)^{0.5} + 4(1 - \exp[-(37 \times 0.25) / (890 \times 0.25 \times 4)])$$

*L = 0.005*

d = ~~3.96 m~~ 5.5368 m

**CALCULATION OF DILUTION ATTENUATION FACTOR**

$$DAF = 1 + \frac{890 \times 0.005 \times 3.96}{0.25 \times 37}$$

*5.5368*

DAF = ~~2.8~~ 3.66

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Catherine B. Templeton, Director

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## MEMORANDUM

**TO:** Meredith Amick, P.E., Engineering Associate  
Department of Defense Corrective Action Section  
Division of Waste Management  
Bureau of Land and Waste Management

**FROM:** Annie M. Gerry, Hydrogeologist   
Department of Defense Corrective Action Section  
Division of Waste Management  
Bureau of Land and Waste Management

**DATE:** January 28, 2013

**RE:** Marine Corps Recruit Depot  
SC6 170 022 762

**Conditional Approval to the Site 45 and 32 Proposed Plan (PP)  
Review of Conditional Approval to Feasibility Study (FS) and  
Review of the FS Addendum, Marine Corp Recruit Depot (MCRD), Parris  
Island, South Carolina dated December 2012**

The above referenced document has been reviewed with respect to the conditions of the Federal Facility Agreement (FFA) that the Department entered into with the Navy and EPA Region 4 in January 2005. Site 45 is a former dry cleaner where in March 1994, a tetrachlorethene (PCE) spill of unknown quantity was released into soil near the above ground PCE storage tanks in the northern portion of Site 45. A new dry cleaning facility was constructed in 1997, and operations were switched to a non-hazardous hydrocarbon-based cleaner in place of PCE. However, in 2005, a second groundwater plume of chlorinated solvents was discovered near the new dry cleaner. The two plumes of contaminated groundwater are intermingled.

Based on review of these documents, the following conditions were generated.

### CONDITIONS

1. **Page 11- Groundwater Cleanup Alternatives-** The text reads, "*Prohibit all uses of groundwater from the surficial aquifer (to a depth of 40 feet below ground surface underlying Site 45 (including, but not limited to, human consumption, dewatering, irrigation and industrial processes) unless written approval is obtained from the Navy, U.S. EPA, and SCDHEC.*"

File # 50492

This sentence should be changed to say “Prohibit all uses of groundwater unless written approval is obtained from the Navy, U.S.EPA, and SCDHEC.” To date, it has not been demonstrated that a recharge area does not exist at Site 45, which could transport contaminants to the deeper aquifer where some concentrations of contaminants are already present. In addition, installing any type of monitoring well through the contamination could be a potential pathway of contamination into the deeper aquifer. Therefore, groundwater use at this site should be prohibited, and the potential for contaminated groundwater to migrate downward to the deeper aquifer should be evaluated.

2. **Response to Condition #5 on the Proposed Plan-** Please change the sentence to eliminate the frequency of monitoring and please state that a post-remedy monitoring schedule will be determined in the Remedial Design (RD).

Should you have any questions regarding this memo, please contact me via email at [GerryAM@dhec.sc.gov](mailto:GerryAM@dhec.sc.gov) or by phone at (803) 896-4018



Catherine B. Templeton, Director

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

## MEMORANDUM

TO: Meredith Amick, 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: January 15, 2013

RE: Marine Corps Recruit Depot  
Parris Island, South Carolina

Document:

***Site 45 Proposed Plan and***

***Response to Conditional Approval of the Site 45 RI Addendum and FS and  
Draft FS Addendum for Site 45***

Dated December 2012

The above referenced documents by Tetra Tech NUS, Inc. have been reviewed. The Department does not have any risk related comments.

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