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EMAIL OF TRANSMITTAL AND REVISIONS TO SITE CHARACTERIZATION WORK PLAN FOR SITE 45 DRY CLEANING FACILITY SPILL AREA MCRD PARRIS ISLAND SC
4/14/2008
U S EPA REGION IV

From:	Koroma-Llamas.Lila@epamail.epa.gov
To:	charles.cook2@navy.mil; art.sanford@navy.mil; koroma-llamas.lila@epa.gov; Sladic, Mark; timothy.j.harrington@usmc.mil; mmcrae@TechLawInc.com; AmickMS@dhec.sc.gov; darrel.pittman@usmc.mil; Kelly.Taylor2@ch2m.com; barkerjs@dhec.sc.gov; kraemerd@tampabay.rr.com; wendtp@dnr.sc.gov; tom.dillon@noaa.gov; vroblesk@usgs.gov
Subject:	Fw: Revised workplan
Date:	Monday, April 14, 2008 5:16:28 PM
Attachments:	Parris Island Site Characterization Workplan_version 2.doc

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Revised revision for review.

----- Forwarded by Lila Koroma-Llamas/R4/USEPA/US on 04/14/2008 05:17 PM -----

Scott Huling/ADA/USEPA/US 04/14/2008 04:20 PM	To	Lila Koroma-Llamas/R4/USEPA/US@EPA
	cc	Bruce Pivetz/ADA/USEPA/US, Ann Keeley/ADA/USEPA/US@EPA
	Subject	Revised workplan

Lila, attached is the revised workplan. It includes revisions soil IDW, "uncontaminated" core analysis, and liquid IDW. These revisions are included in the last 3 paragraphs in section II.A.1 Aquifer Cores.
Scott

(See attached file: Parris Island Site Characterization Workplan_version 2.doc)

Scott G. Huling, Ph.D., P.E.
Environmental Engineer
U.S. Environmental Protection Agency
Robert S. Kerr Environmental Research Center
P.O. Box 1198 (or, 919 Kerr Lab Drive)
Ada, OK 74820
Phone: (580) 436-8610; Fax: (580) 436-8614
e-mail: Huling.Scott@epa.gov
website: http://www.epa.gov/ada/research.html

Parris Island Site Characterization Workplan – Phase I
(C:\Projects\Oxidation\SERDP ISFO\second proposal\Parris Island\Site Characterization\Parris Island Site Characterization Workplan – Phase I_version 2.doc, 4/14/08)

I. Introduction

The site characterization workplan is a detailed presentation of proposed site characterization activities at the Parris Island Marine Corp Recruit Depot, Solid waste management unit (SWMU) 45 (Former MWR Dry Cleaning Facility). This site was selected by the Peroxygen Team based on an analysis of site selection criteria in conjunction with site specific details of SWMU 45 (Appendix A). The overall objective involves the collaboration between the Department of Defense, Environmental Security Technology Certification Program (DOD-ESTCP), Washington State University (WSU), Environmental Research Management (ERM), FMC Corp., and the Environmental Protection Agency-Robert S. Kerr Environmental Research Center (EPA-RSKERC).

Truck-mounted and/or Hydrotrax-mounted Geoprobe rigs owned by the EPA-RSKERC will be used for the subsurface investigation activities. Personnel from the EPA RSKERC, and possibly other collaborators will be performing these activities.

Proposed pre-oxidation site characterization activities occur in two phases, Phase I and II. The objective of Phase I is to (1) obtain aquifer materials for the laboratory studies to be conducted by Dr. RickWatts (Washington State University (WSU)), (2) obtain aquifer materials for microbial characterization to be conducted by Dr. Ann Keeley (US EPA) (3) perform preliminary characterization of chlorinated volatile organic compounds (CVOCs) distribution at the site by sampling and analyzing aquifer material, (4) establish the lithology (sand, silt, clay), and stratigraphy (layering, lenses, orientation), (5) assess the presence of NAPL, and/or heavily contaminated sludge and soil near the suspected source area (cracked/leaking sanitary sewer drain pipe), and (6) make a general assessment of site accessibility issues.

Preliminary data and information (TetraTech NUS, 2004; Vroblesky, 2007; 2008) involving site characterization at SWMU 45 has been used to scope Phase I and II site characterization activities. A plan-view map of the contaminant plume has been prepared based on ground water samples collected and analyzed for CVOCs (Vroblesky, 2007; 2008). This plan-view map has served as the basis for the preliminary site conceptual model of CVOCs at the site. Data and information from Phase I will be used to further develop the site conceptual model that will guide the design and deployment of in-situ chemical oxidation (ISCO) at the site. Phase I site characterization data and information will be used to refine the existing site conceptual model by further delineating the longitudinal and transverse axes of the plume, the vertical profile of contaminant distribution, and to establish the background (pre-oxidation) microbial content of the aquifer. Data gaps identified after the Phase I investigation will be used to help guide site characterization activities in Phase II. The collective data and information from Phase I

and II will serve as the CVOC baseline conditions upon which to further refine the site conceptual model and to establish pre-oxidation conditions.

II. Phase I Site Characterization Activities

Samples used by the USGS in the development of the plan-view maps of the CVOCs plume were derived from conventional ground water monitoring wells, ground water monitoring wells installed with direct push technology, and real-time samples collected and analyzed via membrane interface probe (MIP) technology.

Currently, an investigation by the USGS (Vroblesky, 2008) is planned at site 45 involving site characterization and a critical analysis of the fate and transport of CVOCs. The proposed activities in the ISCO Team's workplan have been and will continue to be coordinated with the Parris Island Partnering Team and Dr. Vroblesky. This will avoid potential situations where multiple field activities occur simultaneously. Through the coordination of these two independent studies, high quality data and information can be obtained to guide future decisions at the site regarding environmental protection and remediation in general, and specifically ISCO activities.

A. Media Characterization

1. *Aquifer cores.* Aquifer cores will be collected along the longitudinal and transverse axes of the southern plume (Figure 1). MIP data presented by Vroblesky (2007) indicate that the contamination is predominantly distributed between 8-16' below ground surface (bgs) (Vroblesky, 2007). There is one location where the contamination appears to exist at depths > 16' bgs and is located approximately at mid-point in the plume. The region of interest will be 8-18' bgs.

All exploratory borings performed in this investigation will be filled with a bentonite slurry using forced injection through Geoprobe rod to the bottom of the boring, gradually injecting at shallower depths until the borehole is filled. Ideally, this will help assure the direct emplacement of bentonite in the abandoned exploratory boring. The objective of sealing these borehole locations is to (1) prevent vertical conduits which may allow the escape of injected oxidant and reagent solutions during ISCO, and (2) to prevent the potential preferential pathway for vertical contaminant transport (cross contamination of contaminated ground water and/or DNAPL).

It is proposed that aquifer cores be collected at 6 transects (T1-T6) along the longitudinal axis, and 3 cores be collected per transect (Figure 1). Locations along each transect will be labeled A-C. These cores will be collected using the closed-piston (protected sampling) method where discrete intervals are sampled.

Core locations will be on 20' centers and aquifer core location "B" will be on the longitudinal axis of the PCE ground water plume at each transect. Therefore, the core locations on each transect will span approximately 40' with the middle core (i.e., core B, Table 1) to be located on the longitudinal transect. A duplicate aquifer core will be

collected at location "B" and provided to WSU. Cores collected for WSU will be off-set by 0.5-1' from the other core location "B". To establish baseline conditions, it is proposed that continuous cores be collected from 10-18' bgs. This will involve 2-4' cores (10-14', and 14'-18' bgs). At each core location, 4 samples will be collected at the midpoint of the four 2' intervals. For example, in the intervals of 10-12', 12-14', 14-16', and 16-18', samples will be collected at 11, 13, 15, and 17' bgs (Figure 1, Table 1). Assuming the CVOC data suggests contaminant concentrations extend to an elevation above the highest or lowest sampling point in each interval, additional samples (in storage) can be analyzed to refine contaminants at this interval. The field investigation being conducted by the USGS (Vroblesky, 2008) may provide information on the depth of the clay layer that exists at approximately 20' bgs. Assuming this clay layer is found to exist at a more shallow depth, (i.e., 18' bgs), the aquifer core sampling interval will be modified to include shallower intervals (8-10', 10-12', 12-14', 14-16') to prevent penetration into the clay layer. Aquifer cores will be sealed, placed in an ice chest with blue ice blocks and transported to WSU (Pullman, WA) and the EPA RSKERC (Ada, OK).

The first transect closest to the new dry cleaner building will have to be located based on a visual observation. This is mainly attributed to the presence of septic sewer and storm sewer lines in that proximity. The location of this transect will also be coordinated with the USGS to assess whether any new information on contaminant distribution and subsurface utilities in this area has been obtained. Arrangements will be made to limit access to the drive-through driveway for the new dry cleaner operation. Each transect will be located approximately 33' downgradient from the previous transect.

Core sample collection will begin at the southeastern-most transect (i.e., transect no. 6), and move towards the source area for the southern plume. One of the field objectives during aquifer core sample collection is to avoid penetration into the confining unit that separates the surficial and lower aquifers. Aquifer cores will be extruded into transparent acetate sleeves which permit the visual inspection of the core. This approach will be used to help assess whether the core has penetrated into the confining unit. Assuming the confining unit is encountered, subsequent cores will be advanced over a shorter interval to avoid the confining unit. Proposed USGS field activities (Vroblesky, 2008) include 3 new wells into the lower aquifer. These activities will precede our field activities and therefore, may provide information on the depth to the top of the confining unit. This information will be used to refine this workplan before field activities commence.

The 18 core locations (4 samples/core) results in 72 core samples (Table 1). Each core sample will be sampled and analyzed for CVOCs (PCE, TCE, DCE, VC). Nested wells installed during a subsequent trip to the site will approximately correspond with the same depth interval of the aquifer cores. Wells will also be installed for oxidant injection purposes during Phase II. Data analysis from Phase I site characterization will be used to help assess well locations to be installed during Phase II. The data and information derived from Phase I site characterization will be presented in the workplan for Phase II site characterization and submitted to the Parris Island Partnering Team.

Table 1. Summary of aquifer core sample collection and proposed analysis. [1]			
Transect	Core Location on Transect		
	A	B	C
1	4	4	4
2	4	4	4
3	4	4	4
4	4	4	4
5	4	4	4
6	4	4	4
[1] Summary: 18 core locations, 4 samples per core (locations A, B, C), 72 core samples.			

Aquifer cores will be used to help establish the lithology (sand, silt, clay) and stratigraphy (layering, lenses, orientation) to improve the hydrologic conceptual model. Geologic cross-sections of the southern plume area will be prepared in conjunction with other data available from earlier investigations. Cross-sections diagrams will provide a detailed conceptual model used to assist in the design the ISCO treatment system and in post-oxidation treatment performance evaluation. Uncontaminated cores (2-3) collected over the 8-18' bgs interval in the southwest (background) portion of the plume will be collected and analyzed for textural analysis and total organic carbon (TOC). The background cores will first be analyzed for CVOCs to assure they are uncontaminated. The "uncontaminated" cores will be analyzed for CVOCs and other compounds that may be present. All peaks that can be identified and quantified in the extract analyzed via gas chromatography/mass spectroscopy. Uncontaminated cores are proposed for this purpose to avoid potential contact with CVOCs during sample handling and analysis. Specific intervals for textural analysis will be selected after the CVOC data has been analyzed. The objective of this effort is to refine the contaminant transport and hydrologic conceptual model.

VOC data will be used to identify the most contaminated aquifer cores that will be screened for DNAPL using the FLUTe® ribbon or hydrophobic dye tests. Visual inspection for pyrite and quantification of manganese oxides will be performed during the laboratory investigations at WSU.

The GeoProbe rods will be decontaminated between core locations. This will be performed using two side-by-side containers. Rods will be scrubbed with water in the first container, and rinsed clean with high pressure jet washing in the second container. Rods will have a final rinse with clean water in the second container and laid on wracks to dry. CVOC concentrations are expected to be very low in the residual decontamination water. It is estimated that approximately 200 gallons of decon water will be produced and will be stored in barrels at Site 45. Triplicate samples will be collected from each drum and analyzed at the EPA R.S. Kerr Environmental Research Center. Results will be communicated to Jim Clark who will evaluate whether concentrations are below RCRA action levels. Assuming concentrations are below the action levels, the

water will be transported and disposed in the on-site waste water treatment system at the Parris Island MCRD. Assuming the concentrations are not below the action levels, the waste will be disposed appropriately. Under this condition, input will be requested from the Parris Island Partnering Team regarding guidance on disposal options. All soil cores removed from the subsurface will be transported to research laboratories in Ada, OK (EPA) or Pullman, WA (Washington State University). No investigation derived soil wastes are expected.

2. ***Analytical.*** A subsample of the aquifer core will be collected and placed in a sample vessel and amended with methanol. The methanol/water (mixture) extraction solution will be removed and analyzed for CVOCs using EPA RSKOP 259.1 (CVOCs by GC/MS headspace). The residual aquifer material and methanol/water mixture will be dried and weighed and the analytical results will be reported on a dry weight basis. Ground water samples will be collected and analyzed for CVOCs using EPA RSKOP 299.0. Total organic carbon (TOC) analysis of aquifer samples collected in background cores will be analyzed using EPA RSKOP 120.3.

B. Facilities Management.

1. Electrical/water. Available at the site.
2. Security. The US Marine Corp Recruit Depot is a secure area. It is planned to leave one of the GeoProbe rigs at the Parris Island MCRD for temporary storage and has been tentatively approved.

C. Coordination.

The successful execution of this project involves the coordination of the following organizations.

Parris Island Partnering Team (PIPT)

Department of Defense - On-site Environmental Staff

Charles Cook, Naval Air Station, JAX, Navy Facilities Engineering SE Installation Restoration, SC IPT, PO Box 30, North Ajax Street, Bldg 135, Jacksonville, FL 32212-0030, Phone (904) 542-6409, Fax (904) 542-6104, e-mail charles.cook2@navy.mil

(Darrel) Heber Pittman, US Marine Corps Recruit Depot, Natural Resources & Env. Affairs, PO Box 5028, Parris Island, SC 29905-9001, phone: (843) 228-3615, fax: (843) 228-2616, e-mail: darrel.pittman@usmc.mil, Fed Exp: Building 864 NREAO

Art Sanford, OPT2, NAVFAC EFD SOUTH, 2155 Eagle Drive, North Charleston, SC 29406-9010, phone: (843) 820-7482, fax: (843) 820-7465, e-mail art.sanford@navy.mil

EPA

Lila Llamas, USEPA, Region 4, Sam Nunn AFC, 61 Forsyth Street, Atlanta, GA 30303-3104, phone: (404) 562-9969, fax: (404) 562-8518, e-mail: Koroma-Llamas.Lila@epa.gov

South Carolina Department of Health and Env. Control

Meredith Amick, Project Manager, SC Department of Health & Env. Control
Bureau of Land & Waste Management, Division of Waste Management, 2600 Bull St
Columbia, SC 29201, phone: (803) 896-4218, fax: (803) 896-4002, e-mail AmickMS@dhec.sc.gov

USGS

Don A. Vroblesky, 720 Gracern Road Suite 129, Columbia, SC 29210, Phone: (803) 750-6115, e-mail: vroblesk@usgs.gov

In-Situ Chemical Oxidation (Peroxygen) Team

Washington State University

Richard J. Watts (Principle Investigator (PI)), Washington State University, Pullman, WA, 99163-2910, phone: (509) 335-3761, fax: (509) 335-7632, e-mail rjwatts@wsu.edu

Amy Teel, Washington State University, Pullman, WA, 99163-2910, e-mail amyteel@yahoo.com

U.S. Environmental Protection Agency

Pat Clark, U.S. Environmental Protection Agency, Office of Research and Development, National Risk Management Research Laboratory, USEPA Facilities 26 West Martin Luther King Drive, Mail Code: 421, Cincinnati, OH 45268 Phone: (513) 569-7561, e-mail clark.patrick@epa.gov

Scott Huling, U.S. Environmental Protection Agency, Office of Research and Development, National Risk Management Research Laboratory, Robert S. Kerr Environmental Research Center, P.O. Box 1198, Ada, OK, 74820, Phone: (580) 436-8610, Fax: (580) 436-8614, e-mail huling.scott@epa.gov

Ken Jewell, U.S. Environmental Protection Agency, Office of Research and Development, National Risk Management Research Laboratory, Robert S. Kerr

Environmental Research Center, P.O. Box 1198, Ada, OK, 74820, Phone: (580) 436-8985, Fax: (580) 436-8703, e-mail jewell.ken@epa.gov

Ann Keeley, U.S. Environmental Protection Agency, Office of Research and Development, National Risk Management Research Laboratory, Robert S. Kerr Environmental Research Center, P.O. Box 1198, Ada, OK, 74820, Phone: (580) 436-8890, Fax: (580) 436-8703, e-mail keeley.ann@epa.gov

Bruce Pivetz, Shaw Environmental (EPA Contractor) P.O. Box 1198, Ada, OK, 74820, Phone: (580) 436-8998, e-mail pivetz.bruce@epa.gov

ERM

Dick Brown, 250 Phillips Blvd., Suite 280, Ewing NJ 08618, Direct Dial: 609-403-7530, Office Phone: 609-895-0050, Cell 609-647-4119, Fax: 609-895-0111 e-mail dick.brown@erm.com

Rick Lewis, 399 Boylston Street, 6th Floor, Boston, MA, 02116, USA, (617) 646-7863, rick.lewis@erm.com

Tim Pac, 171 Forbes Blvd., Suite 5000, Mansfield, MA 02048, (617) 646 7862 Fax: (508) 261 7777, Mobile: (617) 285 4466, tim.pac@erm.com

FMC Corp.

Phillip Block, 215-299-6645, philip_block@fmc.com

D. Health and Safety Plan (HASP), and quality Assurance Project Plan (QAPP)

The Health and Safety Plan (US EPA, 2008a) prepared for this project will be implemented during field activities at this site. Currently, the draft HASP is under review at EPA RSKERC by the Health and Safety Manager.

The Quality Assurance Project Plan (US EPA, 2008b) prepared for this project will be adhered to during this study. Scheduled audits may be performed by the EPA RSKERC Quality Assurance Manager, Mr. Steve Vandegrift. Currently, the draft QAPP is under review at EPA RSKERC by the Quality Assurance Manager.

Both the HASP and QAPP will be provided to the Parris Island Partnering Team when they have been approved.

E. References

TetraTech NUS, 2004. Remedial Investigation RCRA Facilities Investigation for Site /WMU 45 Former MWR Dry Cleaning Facility (Contract No. N62467-94-D-0888).

US EPA, 2008a. Health and Safety Plan for the Field Demonstration and Validation of Peroxygen-Based ISCO for the Remediation of Contaminated Groundwater Using Rational and Mechanism-Based Design at Solid Waste Management Unit 45, Marine Corps Recruit Depot, Parris Island, South Carolina.

US EPA, 2008b. GWERD Quality Assurance Project Plan for Field Demonstration and Validation of Peroxygen-Based ISCO for the Remediation of Contaminated Groundwater Using Rational and Mechanism-Based Design at Solid Waste Management Unit 45, Marine Corps Recruit Depot, Parris Island, South Carolina.

Health and Safety Plan for the Field Demonstration and Validation of Peroxygen-Based ISCO for the Remediation of Contaminated Groundwater Using Rational and Mechanism-Based Design at Solid Waste Management Unit 45, Marine Corps Recruit Depot, Parris Island, South Carolina.

US EPA RSKOP Method 259.1. Determination of Volatile Organic Compounds (Fuel Oxygenates, Aromatic and Chlorinated Hydrocarbons) in Water Using Automated Headspace Gas Chromatography/Mass Spectrometry (TEKMAR 7000 HS-Varian 2100T GC/MS System-ION Trap Detector).

US EPA RSKOP Method 299.0. Determination of Volatile Organic Compounds (Fuel Oxygenates, Aromatic and Chlorinated Hydrocarbons) in Water Using Automated Headspace Gas Chromatography/Mass Spectrometry (Agilent 6890/5973 Quadrupole GS/MS System)

US EPA RSKOP Method 120.3 Determination of Total Carbon and Total Organic Carbon in Solids using the LECO CR-412 Carbon Analyzer.

Vroblesky, D. 2007. “Preliminary Results: USGS Investigation of Site 45 MCRD, Parris Island, April-July, 2007. Power Point presentation given to the Parris Island Environmental Team on July 30, 2007.

Vroblesky, D. 2008. Progress Report for US Geological Survey FY 2007 Activities and Workplan for FY 2008 Field Activities at Site 45, Marine Corps Recruit Depot, Parris Island, South Carolina. U.S. Geological Survey, 720 Gracern Road, Suite 29, Columbia, SC, 29210-7651.

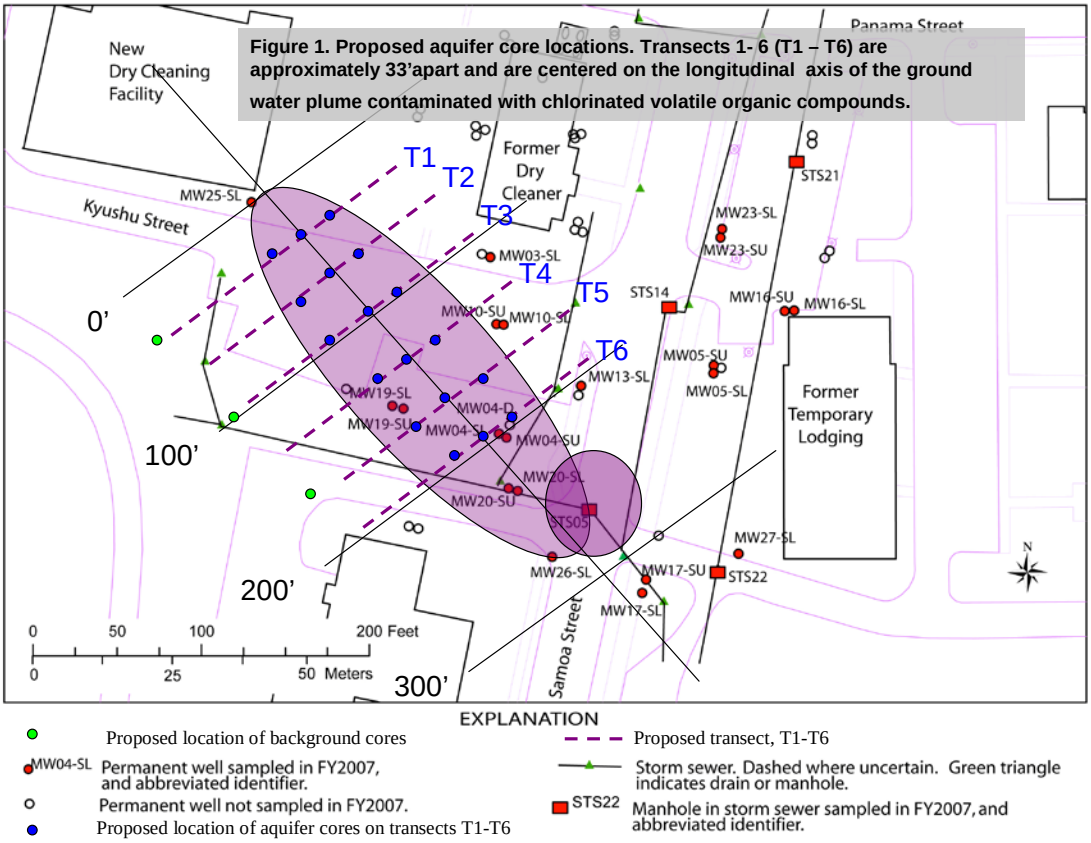

Figure 1. Proposed aquifer core locations. Transects 1- 6 (T1 – T6) are approximately 33'apart and are centered on the longitudinal axis of the ground water plume contaminated with chlorinated volatile organic compounds.