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MCRD PARRIS ISLAND
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WORK PLAN FOR ADDITIONAL INVESTIGATION AND PILOT STUDY AT SITE 45 DRY
CLEANING FACILITY SPILL AREA WITH TRANSMITTAL LETTER MCRD PARRIS ISLAND
SC
1/31/2006
TETRA TECH NUS



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PITT-01-6-053

January 31, 2006

Project Number N5260

Commander, Southern Division
Naval Facilities Engineering Command
ATTN: Mr. Art Sanford (Code ES32)
2155 Eagle Drive
North Charleston, South Carolina 29406

Reference: CLEAN Contract No. N62467-94-D-0888
Contract Task Order No. 0335

Subject: Work Plan for Additional Investigation and Pilot Study
Site/SWMU 45
MCRD Parris Island, South Carolina

Dear Mr. Sanford:

Please find attached a letter style work plan describing the upcoming activities at MCRD PI Site 45. This type of deliverable was requested by SCDHEC at our prior Partnering Team meeting. This work plan principally describes how additional data for groundwater characterization will be collected using temporary wells. Several soil samples will be collected to provide additional design data for the eventual pilot study. In order to provide context for the Partnering Team, the work plan also describes how that data will be used to develop a scope of additional MIP work and pilot testing in designated regions of Site 45. The work plan indicates that the details for the MIP work and the pilot testing will not be available until after consideration of the temporary well groundwater characterization data, and that these details will be provided in future submittals. As such, we are initially requesting a monitoring well permit from SCDHEC at this time for the temporary wells and soil sampling only, as described in the attached work plan. A later monitoring well permit request will address the MIP work and pilot testing. Since the temporary well installation and sampling will proceed according to the already approved December 2004 Site/SWMU 45 RI/RFI Addendum Work Plan, we are not aware that other approvals are necessary for these initial tasks.

The schedule for the temporary well installation and sampling (and abandonment) is during the period of 14 February to 21 February, 2006.

If you have any questions or comments, please call me at (412) 921-8216.

Sincerely,

Mark Sladic, P.E.
Task Order Manager

MS/kf
Enclosure



TETRA TECH NUS, INC.

Mr. Art Sanford
NAVFAC EFD SOUTH
January 31, 2006 – Page 2

cc: Mr. T. Harrington, MCRD Parris Island (five copies)
Ms. L. Koroma-Llamas, U.S. EPA (one copy)
Mr. J. Litton, SCDHEC (one copy)
Mr. J. Stamps, SCDHEC (one copy)
Mr. D. Hargrove, SCDHEC (one copy)
Ms. P. Wendt, SCDNR (one copy)
Mr. T. Dillon, NOAA (one copy)
Ms. D. Duncan, USFWS (one copy)
Mr. M. McRae, Tech Law (one copy)
Ms. Debra M. Humbert, TiNUS (w/o attachment)
Mr. M. Perry/File N5260, TiNUS (one copy)

**WORK PLAN FOR ADDITIONAL INVESTIGATION AND PILOT STUDY
SWMU 45 MARINE CORPS RECRUIT DEPOT, PARRIS ISLAND**

1.0 Introduction

This work plan describes the field activities for the additional investigation of the southern area of groundwater contamination at SWMU 45 where previous investigation has shown the presence of high concentrations of chlorinated volatile organic compounds (CVOCs). This work plan also describes subsequent pilot study activities following an initial task to collect additional groundwater characterization data in order to illustrate the need for this initial characterization data collection effort. The full scope of the pilot testing is still being determined, and additional details will be provided under separate cover. The following are the main field events that are addressed in this work plan:

- Temporary Well (TW) installation
- Soil borings from the saturated zone in the contaminated zone
- Membrane Interface Probe Survey (MIPS) of the source area
- Pilot Study of in-situ chemical oxidation using Regenox

The purpose of the temporary wells (TW) is to provide data for determining the extent of the southern area of groundwater contamination and to provide an indication of the location of a secondary source, if present. The area to be investigated is shown on Figure 1. The temporary wells will be sampled and analyzed in the field using a colorimetric field test kit for chlorinated VOCs (CVOCs). Selected samples will be sent to a fixed-laboratory for confirmatory analyses. Soil samples will be collected from the saturated zone within an area where high concentrations of CVOCs are shown to be present using field screening or from previously collected data. Soil samples will be collected to provide data for finalizing the requirements of the pilot study.

Following evaluation of the groundwater characterization results, a MIPS task will be scheduled to further delineate the vertical and horizontal extent of a source area within the southern area of contamination to the extent necessary to conduct a pilot study of an in-situ oxidation technology for destruction of the chlorinated VOCs. Details of the MIPS investigation will be provided in a follow-up submittal.

After the MIPS results are collected and a source area has been defined, a permanent monitoring well will be installed immediately downgradient (within approximately 5 feet) of the potential source to verify the effectiveness of the treatment on the groundwater contaminant concentrations over time. Construction details and proposed screened interval for the permanent monitoring well will be provided in a follow-up permit request after the parameters are determined following the pilot testing.

After the source area has been defined using MIPS, a pilot study of in-situ chemical oxidation of the CVOCs present in the saturated zone will be conducted. The chemical oxidation being proposed for testing will be conducted using Regenox, a hydrogen peroxide releasing chemical. Following the injection of Regenox, a followup round of MIPS will be conducted to verify the initial effects of the treatment. Several rounds of groundwater samples will be collected to provide data on the long-term effectiveness of the treatment and to provide further direction for remedial activities. Details of the pilot testing will be provided in a follow-up submittal.

2.0 Temporary Monitoring Well Installation

Figure 1 shows the proposed locations of the temporary monitoring wells. Note that these locations may vary based on field conditions, such as subsurface utilities. Table 1 summarizes the proposed analytical program and rationale that would govern the fixed-base laboratory analyses of samples from these TWs.

The TWs will be advanced to an approximate depth of 17 to 20 feet bgs using DPT. The TWs will not penetrate the peat or underlying clay confining unit. Each TW will consist of 1-inch diameter PVC wells with 5-foot slotted (0.01 inch slot size) screens placed within a drive point with a disposable tip at a pre-determined depth. The screen will be exposed to the groundwater as the drive point is withdrawn to the surface. The screen placement interval will be based on available information (previously conducted MIPS or well data) or as determined by screening soil samples using a hand-held PID. The bottom of the screen will begin at the bottom of the borehole. It is anticipated that groundwater will be collected from the TWs sampled on the same day as their installation. Therefore, the annular space around the riser will not be sealed. Temporary wells will be abandoned within five days.

Additional TWs will be installed upgradient of the initial TWs, as necessary at 50-100 foot intervals, until screening results indicate no CVOC contamination is present in groundwater. Three locations will be located upgradient of the SB-158 location where a previous MIP investigation indicated the presence of elevated CVOCs, however a 2004 temporary monitoring well (TW-158) data showed less than 200 µg/L of total CVOCs. The intent of these 3 locations would be to verify that elevated groundwater concentrations do not exist in upgradient locations and to delineate the edge of the plume. Three additional locations will be located upgradient of the PAI-45-MW04-SL location where the high concentrations of total CVOCs (exceeding 15,000 µg/L) indicate the presence of a "localized" source. The intent of these 3 locations will be to verify that this is indeed a localized area of contamination and higher concentrations are not present further upgradient. As shown on Figure 1, the area around TW-158 is nearly directly upgradient of the area around PAI-45-MW04SL. A total of up to 24 TWs may be installed, and groundwater samples will be screened using the field-screening technique described below.

Groundwater samples will be screened using a colorimetric field test kit (likely Color-Tec®) for total chlorinated VOCs. The results will be used to determine whether the location where the sample was collected is at the edge of an area of contamination as indicated by non-detect screening CVOC concentrations (the field screening detection limit is 10 µg/L of total chlorinated VOCs). Selected samples will be sent for fixed-laboratory analysis to confirm the findings.

The TWs will be sampled using disposable tubing lowered to the approximate depth of the mid point of the well screen length, and a peristaltic pump will be used to sample the wells. Disposable PE tubing will be deployed down the well and disposable silicone tubing will be used at the peristaltic pump. Turbulence will be minimized while collecting the samples.

Field forms (boring logs, well construction logs, purging/sampling records) will be completed onsite during the field work. For additional information on the installation of the TWs, please see the Site/SWMU 45 RI/RFI Addendum Work Plan (TtNUS, December 2004).

3.0 Source Area Soil Sampling

Samples of soil will be collected from the saturated zone at 4 locations within the potential source indicated by the TW data. The soil samples will be collected from locations where TW data indicates elevated levels of CVOCs in the groundwater. The proposed locations of the soil samples will be within the area proposed for investigation using TWs.

The soil borings will be sampled continuously for lithology up to a maximum depth of 20 feet (without penetrating the peat/clay layer) and field screened for the presence of chlorinated VOCs. Two soil samples from each location will be selected from the saturated zone for analyses of total organic carbon (TOC) and chlorinated VOCs. The samples will be collected from the saturated zone at each location. Samples for analysis will be collected from 4-foot Macro Core® samplers with plastic liners. Samples for Total Oxidant Demand (TOD) will be collected from each location and may require additional attempts in order to meet the volume requirement (2x 8-oz jars per sample).

Field forms (boring logs, sampling records, etc.) will be completed onsite during the field work. For additional information on the soil boring advancement and sampling, please see the Site/SWMU 45 RI/RFI Addendum Work Plan (TtNUS, December 2004).

4.0 Membrane Interface Probe Survey (MIPS)

The Membrane Interface Probe is a down hole tool that heats the soils and groundwater adjacent to the probe to 120 degrees C. This increases volatility and the resulting vapor phase diffuses across a membrane into a closed, inert gas loop that carries these vapors to a series of detectors housed at the surface. Continuous chemical logs or profiles are generated from each hole. Physical parameters such as soil conductivity are also measured.

At Site 45, MIPS will be conducted at several locations within the area delineated by the TW information. Approximately 40 locations will be probed to a maximum depth of 20 feet (without penetrating the peat/clay layer) within the southern area of elevated chlorinated solvents to determine the 3-d profile of the plume. If the TW data indicate that the area of contamination is larger than currently envisioned, then additional locations will be probed. On the other hand if the plume is smaller, then fewer locations will be probed.

Following the in-situ treatment phase, a second round of MIPS will be conducted to verify the effectiveness of the treatment. Within the same general area where the initial MIPS delineation (pre-treatment) was conducted, this second round of MIPS will be targeted and data will be collected for comparability.

Following the deployment of the MIP during each event and recording of the data, the tool will be withdrawn and the borehole pressure grouted from the bottom of the penetration to the surface. The surface of the hole will be covered with a layer of sand.

Data from the field recording of the MIP results will be presented as plume maps and a written report. Vertical profiles, transects, 3D pictures and maps will be made from the electronic data generated by the MIP logs.

The MIP study is not able to be completely designed until the temporary monitoring wells groundwater characterization results (Section 2.0) and the source area soil sampling results (Section 3.0) are available. Therefore, final details for the MIP study will be provided in a follow up submittal.

5.0 DPT Probing for Injection of Insitu Treatment Chemical

Insitu treatment (oxidation) of the chlorinated solvents in the groundwater will be conducted using a proprietary technology offered by Regenesis, called RegenOx™. Approximately 50 locations to a maximum depth of 20 feet (without penetrating the peat/clay layer) in the area of contamination will be targeted for insitu treatment. Figure 1 shows the currently envisioned outer limits of the area proposed for in-situ treatment, subject to revision based on the temporary well groundwater characterization task (Section 2) and the MIP characterization (Section 4).

The RegenOx reagents will be injected using a DPT rig in two parts consisting of a slurry (oxidizer complex) followed by a viscous liquid (activator complex). The RegenOx oxidizer contains a sodium percarbonate compound that provides the source of oxygen (hydrogen peroxide) and the RegenOx activator contains ferrous sulfate that causes the release and catalyzes the reactivity of the peroxide. Based on the limited preliminary data available in the vicinity of the southern source area from prior investigations, Regenesis estimates that the target chlorinated organic contaminant's initial

concentrations for treatment are equivalent of 30 mg/L of PCE. Using this target initial concentration, Regenesis estimates 3.4 lb per injection depth are each required for the oxidizer and the activator. Assuming a 50-foot by 50-foot source area, and a contaminated saturated zone thickness of 10 feet, a treatment zone pore volume of 10,000 cubic feet was estimated. Assuming an injection density of 10 feet between points, a total 4,000 lb of the oxidizer and an equivalent mass of activator would be injected at 25 locations within a grid.

The injection would occur in two or three rounds. The effects of the oxidation will be verified using a post-injection MIPS and groundwater sampling from one or more permanent monitoring wells located near the source area.

The estimates will be refined after the source area is more precisely delineated and adjustments can be made for natural oxidant demand. Details will be provided in a follow up submittal. The Material Safety Data Sheets (MSDS) sheets for the RegenOx pilot study are provided in Attachment 1.

6.0 Drilling and Borehole Abandonment Requirements

A South Carolina certified driller(s) will perform the soil borings and temporary well installation. The TWs and soil borings will be abandoned after sampling by pressure grouting from the bottom of the boring to the surface. The surface of the hole will be covered with a layer of sand.

7.0 Other Field Activities

The other supporting field activities to be performed are as follows:

- Buried Utility Survey
- Survey of TWs (by SC licensed land surveyor)
- Investigation-Derived Waste (IDW) management
- Site Restoration

These field activities will be performed in accordance with the requirements presented in the Site/SWMU 45 RI/RFI Addendum Work Plan (TtNUS, December 2004).

8.0 Quality Assurance Plan and Data Quality Requirements

The quality assurance plan and fixed-laboratory data quality requirements provided in the Site/SWMU 45 RI/RFI Addendum Work Plan (TtNUS, December 2004) will be

followed as appropriate to this project. The same fixed-base laboratory has been subcontracted by TtNUS to provide analytical services, consistent with the RI/RFI addendum work.

9.0 Project Schedule

The Section 2.0 TW installation and Section 3.0 soil boring advancement is currently scheduled for February 13- February 22, 2006. The schedule for the Section 4.0 and Section 5.0 tasks described under this work plan is to be determined.

TABLE 1
SUMMARY OF SAMPLE COLLECTION AND ANALYTICAL PROGRAM
SWMU 45 SUPPLEMENTAL INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

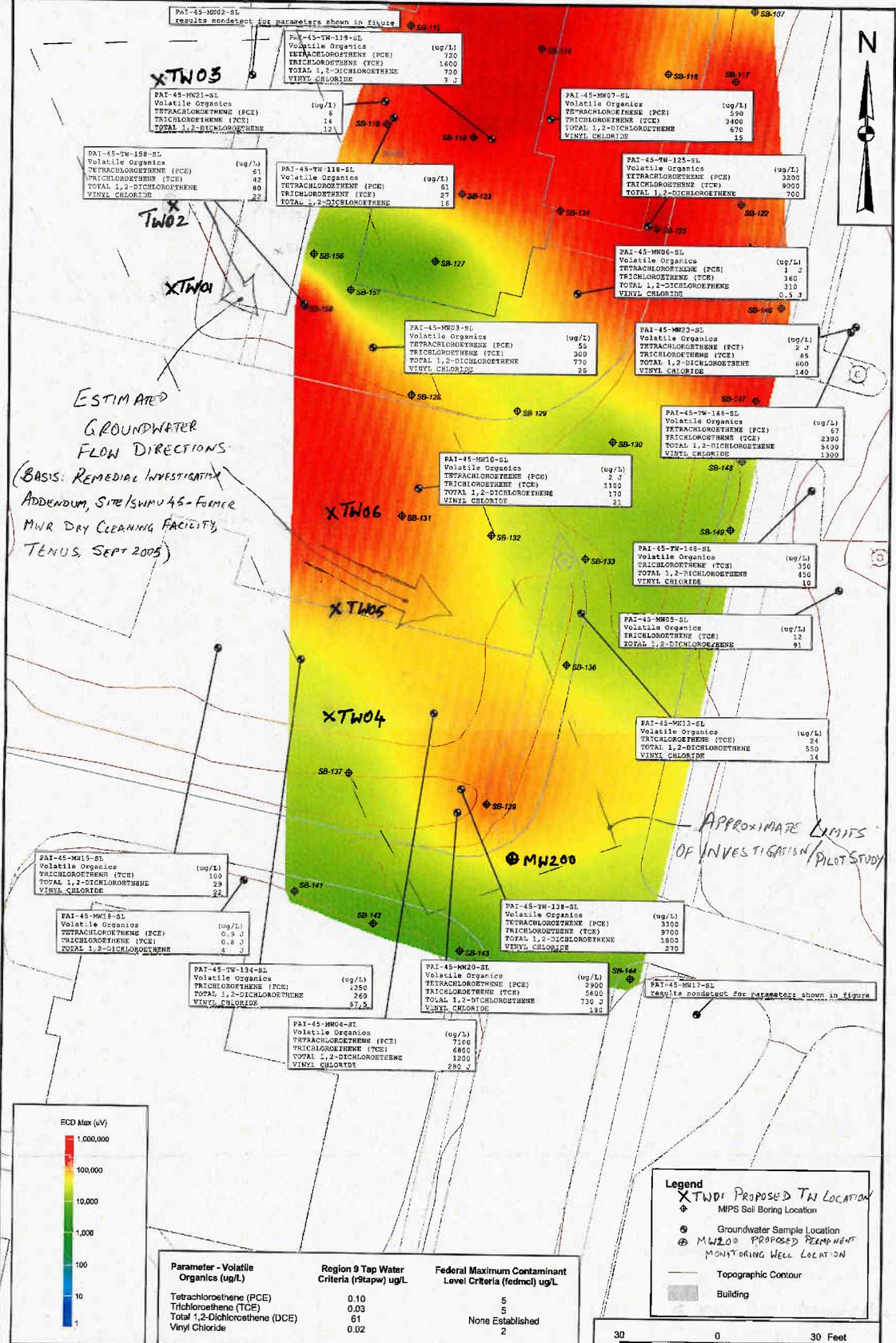
TEMPORARY WELL/ SOIL BORING LOCATION	TEMPORARY WELL / SOIL BORING ID	SCREENING INTERVAL/ SAMPLING DEPTH	LOCATION RATIONALE AND ANALYTICAL PROGRAM
1	PAI-45-TW-201-SL	11 to 16 feet bgs	Groundwater samples to verify either edge of contamination, or source area. All samples to be field screened using Color-Tec. Approximately 50 percent of samples will be selected for analysis of chlorinated VOCs at fixed-base laboratory based on evaluation of Color-Tec data.
2	PAI-45-TW-202-SL	11 to 16 feet bgs	
3	PAI-45-TW-203-SL	11 to 16 feet bgs	
4	PAI-45-TW-204-SL	10 to 15 feet bgs	
5	PAI-45-TW-205-SL	10 to 15 feet bgs	
6	PAI-45-TW-206-SL	11 to 16 feet bgs	
Additional locations (up to 18)	PAI-45-TW-207-SL through PAI-45- TW-224-SL	10-15 feet bgs (to be verified by soil screening with PID)	Groundwater samples to expand the area of investigation based on results from initial 6 locations. All samples to be field screened using Color-Tec. Approximately 50 percent of samples will be selected for analysis of chlorinated VOCs at fixed-base laboratory based on evaluation of Color-Tec data.
Soil Boring SB-201 through SB-204 (actual locations TBD)	PAI-45-SB-201- xxyy through PAI- 45-SB-204-xxyy	(xxyy designates sampling depth-TBD based on soil screening with PID)	Soil samples from saturated zone at 4 locations within source area delineated by MIPS for analysis of chlorinated VOCs, fraction of organic carbon (foc) and total oxidant demand (TOD). Data to be used for evaluating source area contaminant mass for pilot study treatment.

Notes:

1. Groundwater samples will be collected using 2x 40 mL glass vials (per sample) provided with Teflon-lined septa with zero head space, cooled to 4 °C and preserved with HCl to pH< 2.0. Holding time is 48 hours until preservation by laboratory and a maximum of 14 days to analysis.
2. Soil samples will be collected using Encore™ samplers (3x 50-g aliquots per sample) and cooled to 4 °C. Holding time will be 48 hours until preservation by laboratory and a maximum of 14 days to analysis.
3. Chlorinated VOCs will be analyzed using SW-846 Method 8260 B. All samples will be placed on hold at the laboratory until field screening results are evaluated and approximately 50 percent of the samples are selected for analysis.
4. Fraction of Organic Carbon will be analyzed using Lloyd Kahn technique (SW-846 Method 9060). Samples will be collected in 8-oz glass jars and cooled to 4 °C. Holding time will be a maximum of 14 days until analysis.
5. TOD is a non-standard analysis that will be conducted by a laboratory specified by Regenesys. Soil samples will be collected in 2 x 8 oz glass jars (without preservative) from each sampling interval and sent to a separate laboratory.

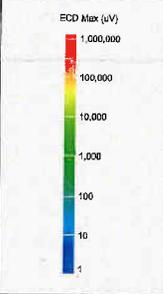
FIGURE 1

-Proposed Well Locations and Limits of Investigation



ESTIMATED
GROUNDWATER
FLOW DIRECTIONS
(BASIS: REMEDIAL INVESTIGATION
ADDENDUM, SITE/SWMU 45-FORMER
MWR DRY CLEANING FACILITY,
TENUS, SEPT 2005)

APPROXIMATE LIMITS
OF INVESTIGATION PILOT STUDY



Parameter - Volatile Organics (ug/L)	Region 9 Tap Water Criteria (rtapw) ug/L	Federal Maximum Contaminant Level Criteria (fcmcl) ug/L
Tetrachloroethene (PCE)	0.10	5
Trichloroethene (TCE)	0.03	5
Total 1,2-Dichloroethene (DCE)	61	None Established
Vinyl Chloride	0.02	2

Legend

- XTW01 Proposed TW Location
- MPS Soil Boring Location
- Groundwater Sample Location
- MW200 Proposed Remedial Monitoring Well Location
- Topographic Contour
- Building

DRAWN BY
C. SPEHAR

DATE
01/06/06

CHECKED BY

DATE

COST/SCHEDULE AREA

SCALE
AS NOTED



PROPOSED TW AND PW LOCS FOR SUPPLEMENTAL INVESTIGATION
LOWER SURFICIAL PLUME WITH MIPS OVERLAY
SWMU 45 - MWR DRY CLEANING FACILITY
RIR/RI ADDENDUM
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER
N6260

APPROVED BY _____ DATE _____

APPROVED BY _____ DATE _____

DRAWING NO.
FIGURE 1

REV
0

ATTACHMENT 1
(MSDS of Regenox Chemicals)

Regen OX – Part A (Oxidizer Complex)

Material Safety Data Sheet (MSDS)

Last Revised: April 12, 2005

Section 1 – Supplier Information and Material Identification

Supplier:


REGENESIS
1011 Calle Sombra
San Clemente, CA 92673
Telephone: 949.366.8000
Fax: 949.366.8090
E-mail: info@regenesis.com

Chemical Description: A mixture of sodium percarbonate [$2\text{Na}_2\text{CO}_3 \cdot 3\text{H}_2\text{O}_2$], sodium carbonate [Na_2CO_3], sodium silicate and silica gel.

Chemical Family: Inorganic Chemicals

Trade Name: Regen Ox – Part A (Oxidizer Complex)

Product Use: Used to remediate contaminated soil and groundwater (environmental applications)

Section 2 – Chemical Information/Other Designations

<u>CAS No.</u>	<u>Chemical</u>
15630-89-4	Sodium Percarbonate
497-19-8	Sodium Carbonate
1344-09-8	Silicic Acid, Sodium Salt and Sodium Silicate
63231-67-4	Silica Gel

Section 3 – Physical Data

Form: Powder

Color: White

Odor: Odorless

Melting Point: NA

Boiling Point: NA

Section 3 – Physical Data (cont)

Flammability/Flash Point:	NA
Vapor Pressure:	NA
Bulk Density:	0.9 – 1.2 g/cm ³
Solubility:	Min 14.5g/100g water @ 20 °C
Viscosity:	NA
pH (3% solution):	~ 10.5
Decomposition Temperature:	Self-accelerating decomposition with oxygen release starts at 50 °C.

Section 4 – Reactivity Data

Stability:	Stable under normal conditions
Conditions to Avoid/Incompatibility:	Acids, bases, salts of heavy metals, reducing agents, and flammable substances
Hazardous Decomposition Products:	Oxygen. Contamination with many substances will cause decomposition. The rate of decomposition increases with increasing temperature and may be very vigorous with rapid generation of oxygen and steam.

Section 5 – Regulations

TSCA Inventory Listed:	Yes
CERCLA Hazardous Substance (40 CFR Part 302)	
Listed Substance:	No
Unlisted Substance:	Yes
SARA, Title III, Sections 313 (40 CFR Part 372) – Toxic Chemical Release Reporting: Community Right-To-Know	
Extremely Hazardous Substance:	No
WHMIS Classification:	C, D2B
Canadian Domestic Substance List:	Appears

Section 6 – Protective Measures, Storage and Handling

Technical Protective Measures**Storage:**

Oxidizer. Store in a cool, well ventilated area away from all sources of ignition and out of the direct sunlight. Store in a dry location away from heat and in temperatures less than 40 °C.

Keep away from incompatible materials and keep lids tightly closed. Do not store in improperly labeled containers.

Protect from moisture. Do not store near combustible materials. Keep containers well sealed.

Store separately from reducing materials. Avoid contamination which may lead to decomposition.

Handling:

Avoid contact with eyes, skin and clothing. Use with adequate ventilation.

Do not swallow. Avoid breathing vapors, mists or dust. Do not eat, drink or smoke in the work area.

Label containers and keep them tightly closed when not in use.

Wash hands thoroughly after handling.

Personal Protective Equipment (PPE)**Engineering Controls:**

General room ventilation is required if used indoors. Local exhaust ventilation, process enclosures or other engineering controls may be needed to maintain airborne levels below recommended exposure limits. Avoid creating dust or mists. Maintain adequate ventilation at all times. Do not use in confined areas. Keep levels below recommended exposure limits. To determine actual exposure limits, monitoring should be performed on a routine basis.

Respiratory Protection:

For many conditions, no respiratory protection is necessary; however, in dusty or unknown conditions or when exposures exceed limit values a NIOSH approved respirator should be used.

Hand Protection:

Wear chemical resistant gloves (neoprene, rubber, or PVC).

Section 6 – Protective Measures, Storage and Handling (cont)

Eye Protection:	Wear chemical safety goggles. A full face shield may be worn in lieu of safety goggles.
Skin Protection:	Try to avoid skin contact with this product. Chemical resistant gloves (neoprene, PVC or rubber) and protective clothing should be worn during use.
Other:	Eye wash station.
Protection Against Fire & Explosion:	Product is non-explosive. In case of fire, evacuate all non-essential personnel, wear protective clothing and a self-contained breathing apparatus, stay upwind of fire, and use water to spray cool fire-exposed containers.

Section 7 – Hazards Identification

Potential Health Effects

Inhalation:	Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath, and irritations to mucous membranes, nose and throat.
Eye Contact:	Causes irritation, redness and pain.
Skin Contact:	Causes slight irritation.
Ingestion:	May be harmful if swallowed (vomiting and diarrhea).

Section 8 – Measures in Case of Accidents and Fire

After Spillage/Leakage:	Eliminate all ignition sources. Evacuate unprotected personnel and never exceed any occupational exposure limit. Shovel or sweep spilt material into plastic bags or vented containers for disposal. Do not return spilled or contaminated material to the inventory.
Extinguishing Media:	Water
First Aid	
Eye Contact:	Flush eyes with running water for at least 15 minutes with eyelids held open. Seek a specialist.
Inhalation:	Remove affected person to fresh air. Seek medical attention if the effects persist.
Ingestion:	If the individual is conscious and not convulsing, give two-four cups of water to dilute the chemical and seek medical attention immediately. Do Not induce vomiting.

Section 8 – Measures in Case of Accidents and Fire (cont)

Skin Contact: Wash affected areas with soap and a mild detergent and large amounts of water.

Section 9 – Accidental Release Measures

Precautions:

Cleanup Methods: Shovel or sweep spilt material into plastic bags or vented containers for disposal. Do not return spilled or contaminated material to the inventory.

Section 10 – Information on Toxicology

Toxicity Data

LD50 Oral (rat): 2,400 mg/kg
LD50 Dermal (rabbit): Min 2,000 mg/kg
LD50 Inhalation (rat): Min 4,580 mg/kg

Section 11 – Information on Ecology

Ecology Data

Ecotoxicological Information: NA

Section 12 – Disposal Considerations

Waste Disposal Method

Waste Treatment: Dispose of in an approved waste facility operated by an authorized contactor in compliance with local regulations.

Package (Pail) Treatment: The empty and clean containers are to be recycled or disposed of in conformity with local regulations.

Section 13 – Shipping/Transport Information

D.O.T. Shipping Name: Oxidizing Solid, N.O.S. [A mixture of sodium percarbonate [2Na₂CO₃·3H₂O₂], sodium carbonate [Na₂CO₃], sodium silicate and silica gel.]

UN Number: 1479

Hazard Class: 5.1

Labels: 5.1 (Oxidizer)

Packaging Group: III

Section 14 – Other Information

HMIS® Rating	Health – 1 (slight)	Reactivity – 1 (slight)
	Flammability – 0 (none)	Lab PPE – goggles, gloves, and lab coat

HMIS® is a registered trademark of the National Painting and Coating Association.

Section 15 – Further Information

The information contained in this document is the best available to the supplier at the time of writing, but is provided without warranty of any kind. Some possible hazards have been determined by analogy to similar classes of material. The items in this document are subject to change and clarification as more information become available. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person. Individuals receiving this information must exercise their independent judgment in determining its appropriateness for a particular purpose.

Regen OX – Part B (Activator Complex)

Material Safety Data Sheet (MSDS)

Last Revised: March 8, 2005

Section 1 – Supplier Information and Material Identification

Supplier:



1011 Calle Sombra
San Clemente, CA 92673
Telephone: 949.366.8000
Fax: 949.366.8090
E-mail: info@regenesis.com

Chemical Description: A mixture of sodium silicate solution, silica gel and ferrous sulfate

Chemical Family: Inorganic Chemicals

Trade Name: Regen Ox – Part B (Activator Complex)

Product Use: Used for environmental remediation of contaminated soils and groundwater

Section 2 – Chemical Information/Other Designations

<u>CAS No.</u>	<u>Chemical</u>
1344-09-8	Silicic acid, sodium salt; sodium silicate
63231-67-4	Silica Gel
7720-78-7	Ferrous Sulfate
7732-18-5	Water

Section 3 – Physical Data

Form: Liquid

Color: Blue/Green

Odor: Odorless

Melting Point: NA

Boiling Point: NA

Flammability/Flash Point: NA

Vapor Pressure: NA

Section 3 – Physical Data (cont)

Specific Gravity	1.39 g/cm ³
Solubility:	Miscible
Viscosity:	NA
pH (3% solution):	11
Hazardous Decomposition Products:	Oxides of carbon and silicon may be formed when heated to decomposition.

Section 4 – Reactivity Data

Stability:	Stable under normal conditions
Conditions to Avoid:	none
Incompatibility:	Avoid hydrogen fluoride, fluorine, oxygen difluoride, chlorine trifluoride, strong acids, strong bases, oxidizers, aluminum, fiberglass, copper, brass, zinc, and galvanized containers.

Section 5 – Regulations

TSCA Inventory Listed:	Yes
CERCLA Hazardous Substance (40 CFR Part 302)	
Listed Substance:	No
Unlisted Substance:	Yes
SARA, Title III, Sections 302/303 (40 CFR Part 355) – Emergency Planning and Notification	
Extremely Hazardous Substance:	No
SARA, Title III, Sections 311/312 (40 CFR Part 370) – Hazardous Chemical Reporting: Community Right-To-Know	
Hazard Category:	Acute
SARA, Title III, Sections 313 (40 CFR Part 372) – Toxic Chemical Release Reporting: Community Right-To-Know	
Extremely Hazardous Substance:	No

Section 6 – Protective Measures, Storage and Handling

Technical Protective Measures

Storage: Keep in a tightly closed container (steel or plastic) and store in a cool, well ventilated area away from all incompatible materials (acids, reactive metals, and ammonium salts). Store in a dry location away from heat and in temperatures less than 24 °C.

Handling: Avoid contact with eyes, skin and clothing. Avoid breathing spray mist. Use with adequate ventilation.
Do not use product if it is brownish-yellow in color.

Personal Protective Equipment (PPE)

Engineering Controls: General room ventilation is required if used indoors. Local exhaust ventilation, process enclosures or other engineering controls may be needed to maintain airborne levels below recommended exposure limits. Safety shower and eyewash station should be within direct access.

Respiratory Protection: Use NIOSH-approved dust and mist respirator where spray mist exists. Respirators should be used in accordance with 29 CFR 1910.134.

Hand Protection: Wear chemical resistant gloves.

Eye Protection: Wear chemical safety goggles. A full face shield may be worn in lieu of safety goggles.

Skin Protection: Try to avoid skin contact with this product. Gloves and protective clothing should be worn during use.

Other:

Protection Against Fire & Explosion: Product is non-explosive and non-combustible.

Section 7 – Hazards Identification

Potential Health Effects

Inhalation:	Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath, and irritations to mucous membranes, nose and throat.
Eye Contact:	Causes irritation, redness and pain.
Skin Contact:	Causes irritation. Symptoms include redness, itching and pain.
Ingestion:	May cause irritation to mouth, esophagus, and stomach.

Section 8 – Measures in Case of Accidents and Fire

After Spillage/Leakage (small):	Mop up and neutralize liquid, then discharge to sewer in accordance with local, state and federal regulations.
After Spillage/Leakage (large):	Keep unnecessary personnel away; isolate hazard area and do not allow entrance into the affected area. Do not touch or walk through spilled material. Stop leak if possible without risking injury. Prevent runoff from entering into storm sewers and ditches that lead to natural waterways. Isolate the material if at all possible. Sand or earth may be used to contain the spill. If containment is not possible, neutralize the contaminated area and flush with large quantities of water.
Extinguishing Media:	Material is compatible with all extinguishing media.
Further Information:	
First Aid	
Eye Contact:	Flush eyes with running water for at least 15 minutes with eyelids held open. Seek a specialist.
Inhalation:	Remove affected person to fresh air. Give artificial respiration if individual is not breathing. If breathing is difficult, give oxygen. Seek medical attention if the effects persist.
Ingestion:	If the individual is conscious and not convulsing, give two-four cups of water to dilute the chemical and seek medical attention immediately. DO NOT induce vomiting.
Skin Contact:	Wash affected areas with soap and a mild detergent and large amounts of water. Remove contaminated clothing and shoes.

Section 9 – Accidental Release Measures

Precautions:**PPE:**

Wear chemical goggles, body-covering protective clothing, chemical resistant gloves, and rubber boots (see Section 6).

Environmental Hazards:

Sinks and mixes with water. High pH of this material may be harmful to aquatic life. Only water will evaporate from a spill of this material.

Cleanup Methods:

Pick-up and place in an appropriate container for reclamation or disposal. US regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities.

Section 10 – Information on Toxicology

Toxicity Data**Sodium Silicate:**

When tested for primary eye irritation potential according to OECD Guidelines, Section 405, a similar sodium silicate solution produced corneal, iridal and conjunctival irritation. Some eye irritation was still present 14 days after treatment, although the average primary irritation score has declined from 29.7 after 1 day to 4.0 after 14 days. When tested for primary skin irritation potential, a similar sodium silicate solution produced irritation with a primary irritation index of 3 to abraded skin and 0 to intact skin. Human experience confirms that irritation occurs when sodium silicates get on clothes at the collar, cuffs, or other areas where abrasion may exist.

The acute oral toxicity of this product has not been tested.

Ferrous Sulfate:

LD50 Oral (rat): 319 mg/kg not a suspected carcinogen.

Section 11 – Information on Ecology

Ecology Data

Ecotoxicological Information:

Based on 100% solid sodium silicate, a 96 hour median tolerance for fish of 2,320 mg/l; a 96 hour median tolerance for water fleas of 247 mg/L; a 96 hour median tolerance for snail eggs of 632 mg/L; and a 96 hour median tolerance for Amphipoda of 160 mg/L.

Section 12 – Disposal Considerations

Waste Disposal Method

Waste Treatment:

Neutralize and landfill solids in an approved waste facility operated by an authorized contractor in compliance with local regulations.

Package (Pail) Treatment:

The empty and clean containers are to be recycled or disposed of in conformity with local regulations.

Section 13 – Shipping/Transport Information

D.O.T.

This product is not regulated as a hazardous material so there are no restrictions.

Section 14 – Other Information

HMIS® Rating

Health – 2 (moderate)	Reactivity – 0 (none)
Flammability – 0 (none)	Lab PPE – goggles, gloves, and lab coat
Contact – 1 (slight)	

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Section 15 – Further Information

The information contained in this document is the best available to the supplier at the time of writing, but is provided without warranty of any kind. Some possible hazards have been determined by analogy to similar classes of material. The items in this document are subject to change and clarification as more information become available. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person. Individuals receiving this information must exercise their independent judgment in determining its appropriateness for a particular purpose.

