DEPARTMENT OF THE AIR FORCE
AIR FORCE CIVIL ENGINEER CENTER

SEP 18 2013

MEMORANDUM FOR SEE DISTRIBUTION LIST

FROM: AFCEC/CIBE-Griffiss
706 Brooks Road
Rome NY 13441-4105

SUBJECT: Draft Remedial Action Work Plan Addendum
Area of Concern 9 Injection
Former Griffiss Air Force Base (AFB), Rome, New York
Contract Number W912DQ-09-D-3013

1. Enclosed is the "Draft Remedial Action Work Plan Addendum, Area of Concern 9 Injection" for your review and comment. Please provide comments by October 15, 2013. The field work is scheduled for shortly thereafter.

2. If you have any questions or need additional information, please contact Cathy Jerrard at (315) 356-0810, ext. 204.

RECEIVED
SEP 19 2013

MICHAEL F. MCDERMOTT
Air Force Civil Engineering Center
AFCEC/CIBE

Attachment: As Noted

PARSONS

Distribution List: AOC 9 RAWP Addendum Date: 9/18/13

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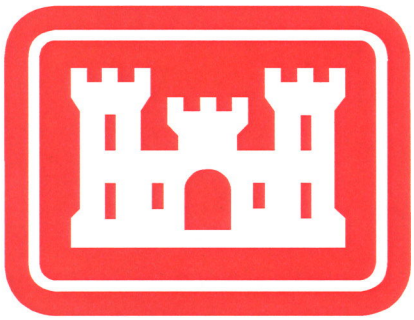
DRAFT

REMEDIAL ACTION WORK PLAN ADDENDUM
AREA OF CONCERN 9 INJECTION
FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

Prepared For:



U.S. ARMY CORPS OF ENGINEERS

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SEPTEMBER 2013

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LIST OF ACRONYMS

AFB	Air Force Base
AFBCA	Air Force Base Conversion Agency
AFCEC	Air Force Civil Engineer Center
AFFF	Aqueous Film Forming Foam
AFRPA	Air Force Real Property Agency
AOC	Area of Concern
AMSL	Above Mean Sea Level
AOI	Areas of Interest
APP	Accident Prevention Plan
ATSDR	Agency for Toxic Substances and Disease Registry
bgs	Below Ground Surface
BRAC	Base Realignment and Closure Act
CB	Chlorobenzene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CM	Construction Manager
COC	Contaminants of Concern
CPR	Cardiopulmonary Resuscitation
CQCO	Construction Quality Control Officer
CQMP	Contractor Quality Management Plan
CY	Cubic Yard
DCB	Dichlorobenzene
DCE	Dichloroethene
DER	Division of Environmental Remediation
DFAS	Defense Finance and Accounting Service
DOD	Department of Defense
E&E	Ecology and Environment, Inc.
EADS	Eastern Air Defense Sector
EEEPC	Ecology and Environment Engineering, P.C.
ESI	Expanded Site Investigation
FBI	Federal Bureau of Investigation
FeEDTA	Ferric Ethylene Diamine Tetraacetic Acid
FFA	Federal Facilities Agreement

LIST OF ACRONYMS

FS	Feasibility Study
FSP	Field Sampling Plan
GAFB	Griffiss Air Force Base
GLDC	Griffiss Local Development Corporation
GUSC	Griffiss Utilities Services Corporation
HAZWOPER	Hazardous Waste Operations and Emergency Response
IRACR	Interim Remedial Action Completion Report
IRP	Installation Restoration Program
LUC	Land Use Control
m^3	cubic meters
mg	milligram
MSDS	Material Safety Data Sheets
NAD	North American Datum
NAVD	North American Vertical Datum
NCP	National Contingency Plan
NPL	National Priorities List
NYANG	New York Air National Guard
NYCRR	New York Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
OSHA	Occupation Safety and Health Administration
PCE	Perchloroethene
PDI	Pre-design Investigation
PHSM	Project Health and Safety Manager
PISCES	Passive In-Situ Concentration/Extraction Sampler
PID	Photoionization Detector
PM	Project Manager
POTW	Publicly Owned Treatment Works
PPE	Personal Protective Equipment
ppb	Parts per billion
ppm	Parts per million
PVC	Polyvinyl Chloride
QASP	Quality Assurance Surveillance Plan

LIST OF ACRONYMS

QAPP	Quality Assurance Project Plan
QCFP	Quality Control Field Plan
QM	Quality Manager
RAM	Real-Time Aerosol Monitors
RAO	Remedial Action Objectives
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RDWP	Remedial Design Work Plan
RI	Remedial Investigation
ROD	Record of Decision
SAC	Strategic Air Command
SHARP	Safety, Health, and Risk Program
SHP	Safety and Health Plan
SI	Supplemental Investigation
SIDA	Security Identification Display Area
SM	Site Manager
SMC	Six Mile Creek
SPCC	Spill Prevention, Control and Countermeasure
SSHO	Site Safety and Health Officer
SSHP	Site-Wide Safety and Health Plan
SWPPP	Stormwater Pollution Prevention Plan
TCE	Trichloroethene
TCLP	Toxicity Characteristic Leaching Procedure
TSA	Transportation Security Administration
µg/L	micrograms per liter
UIC	Underground Injection Control
USACE	Unites States Army Corps of Engineers
USAF	United Sates Air Force
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
WP	Work Plan
WSA	Weapons Storage Area

SECTION 1

INTRODUCTION

The purpose of this Remedial Action Work Plan (RAWP) Addendum is to detail the scope of environmental remediation for Area of Concern (AOC) 9 identified in the Final Remedial Design Work Plan (RDWP) (Ecology and Environment Engineering, P.C. [EEEPC], 2010) and to provide details on the means and methods that will be utilized to accomplish the work.

This work plan is organized into eight sections and four appendices. The project purpose, scope and project goals are presented in Section 1. Section 2 provides a summary of previous investigations and physical characteristics of the site. The remediation management plan and project organization is included in Section 3. Section 4 contains permit and approval information. Discussion of all major work elements is included in Section 5. Section 6 describes project control plans. Section 7 contains the anticipated injection schedule and Section 8 provides references. Appendices included in this RAWP Addendum are:

Appendix A – Injection Well Inventory Form

Appendix B – Pre-Design Analytical Sampling Results

Appendix C – PermeOx Estimate

Appendix D – Preliminary Injection Schedule

1.1 PROJECT BACKGROUND

The former Griffiss Air Force Base (GAFB) is located in Oneida County, New York, in the City of Rome and is approximately two miles northeast of the city of Rome in Central New York State (Figure 1.1). The orientation of AOC 9 on the former base is shown in Figure 1.2. The operational history, environmental background, and site characteristic information can be found in the Final Remedial Action Work Plan AOC 9, Parsons 2010.

1.2 PROJECT OBJECTIVES

For the AOC 9 groundwater, the Remedial Action Objectives (RAOs) are from the Final Record of Decision (ROD) (EEEPC July 2010) Section 2.8 and are as follows:

- Achieve the cleanup goals for COCs specified in Table 1.1.
- Prevent potential unacceptable human risk associated with exposure to groundwater through groundwater-use restrictions until cleanup goals are achieved.
- Prevent contaminated groundwater from the site from adversely impacting surface water (in Six Mile Creek), which is defined as surface water concentrations above performance indicators for COCs specified in Table 1.1.

- Prevent the potential for unacceptable human risk under CERCLA associated with exposure to Soil Vapor until the groundwater cleanup goals identified in Table 1.1 are achieved.

Table 1.1 AOC 9 Groundwater Cleanup Goals			
Contaminants of Concern[a]	**Groundwater Cleanup Goal[b] (µg/L)**	**Contaminants of Concern[a]**	**Groundwater Cleanup Goal[b] (µg/L)**
1,2-Dichlorobenzene	3	Methylene Chloride	5
1,2-Dichloroethane	0.6	Naphthalene	10
1,2,4-Trimethylbenzene	5	n-Butylbenzene	5
1,3,5-Trimethylbenzene	5	n-Propylbenzene	5
1,3-Dichlorobenzene	3	o-Xylene	5
1,4-Dichlorobenzene	3	sec-Butylbenzene	5
Acetone	50	Trichloroethene	5
Benzene	1	tert-Butylbenzene	5
Chlorobenzene	5	Tetrachloroethene	5
cis-1,2-Dichloroethene	5	Vinyl Chloride	2
Ethylbenzene	5	Xylene (Total)	5

Notes:

a From the Final ROD July 2010

b NYSDEC Class GA groundwater standard

1.3 SELECTED REMEDY

The selected remedy for AOC 9 as detailed in the Final Record of Decision (ROD) (EEEPC, July 2010) includes:

- Removal of the source area through excavation of contaminated soil,
- Treatment of contaminated groundwater using chemical oxidation and,
- Land use controls.

1.4 DESCRIPTION OF THE REMEDY

The remedy for AOC 9 includes removal of the source area through excavation of contaminated soil, treatment of contaminated groundwater using chemical oxidation, and land use controls. The excavation of the source area is the primary treatment for groundwater at this site.

1.4.1 Source Removal

In 2010, Parsons performed an excavation at the AOC 9 site as detailed in the approved work plan (Final Remedial Action Work Plan, Area of Concern 9 Remediation, Parsons, July 2010). The work plan identified the horizontal and vertical limits of this excavation based on the selected cleanup objectives and groundwater and soil boring analytical results. Approximately 99% of the total volatile organic compounds (VOCs) contaminant mass was targeted and removed.

In addition, as a polishing step, a sodium persulfate oxidant with an iron chelate activator (persulfate oxidant) was applied to the bottom of the excavation to oxidize any low level residual contamination. Application of the oxidant is expected to reduce the number of years required to meet remedial action objectives (RAOs). The details of these previous remediation activities as well as the 2013 oxidant injection activities described in this work plan addendum will be included in the site Interim Remedial Action Completion Report (IRACR) scheduled for 2014.

Subsequent to the source removal performed in 2010, the site groundwater wells have been sampled 5 times at six-month intervals. The groundwater data indicates that, compared to the baseline samples, the chlorobenzene contaminants have been reduced by two to three orders of magnitude. In addition, the BTEX contaminants are now non-detect immediately downgradient of the source removal area (MW-14).

1.4.2 Treatment of Contaminated Groundwater

After the source removal, the selected remedy in the ROD and RD includes an oxidant injection to groundwater to further reduce contaminant levels. As stated above, persulfate oxidant was applied to the bottom of the excavation prior to backfilling the site. Based on the results of the 2011-2013 performance monitoring, the preferred oxidant for this injection is calcium peroxide (PermeOx) (see Section 5).

The PermeOx product is preferred over the persulfate product for two main reasons. First, based on the fact that the predominant (and preferred) mechanism for CB reduction is aerobic microbe degradation, the site will benefit from a return to an oxygen-rich condition. CB degrades much more rapidly under aerobic conditions, and the natural condition of the site before it was contaminated was aerobic. Secondly, the PermeOx product is more persistent and will continue to treat the site over a one-year period rather than a few weeks for persulfate.

1.4.3 Land Use Controls

Land Use Controls have not changed and are referenced in the AOC 9 RAWP.

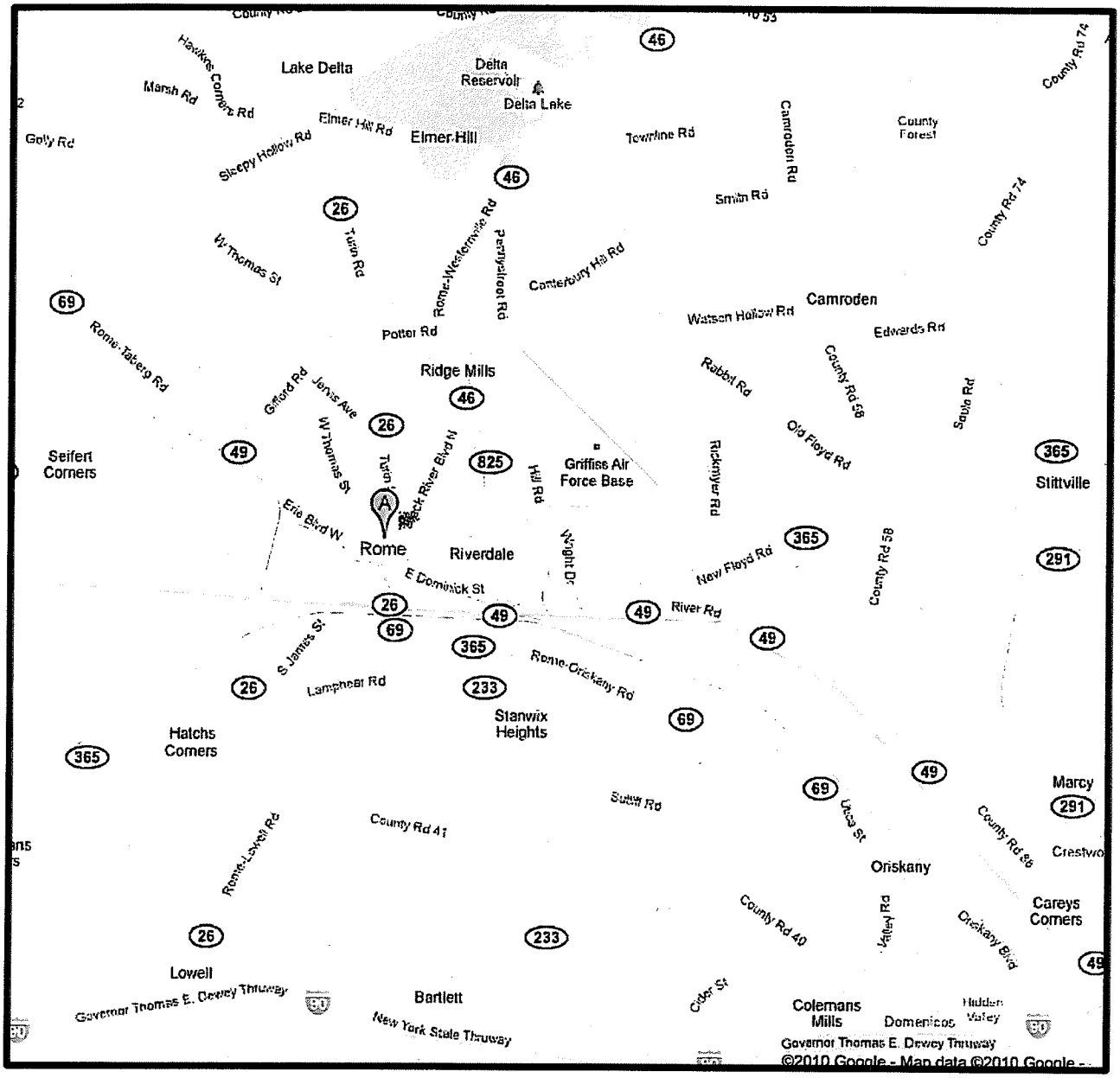

Figure 1.1
Rome, New York and Vicinity

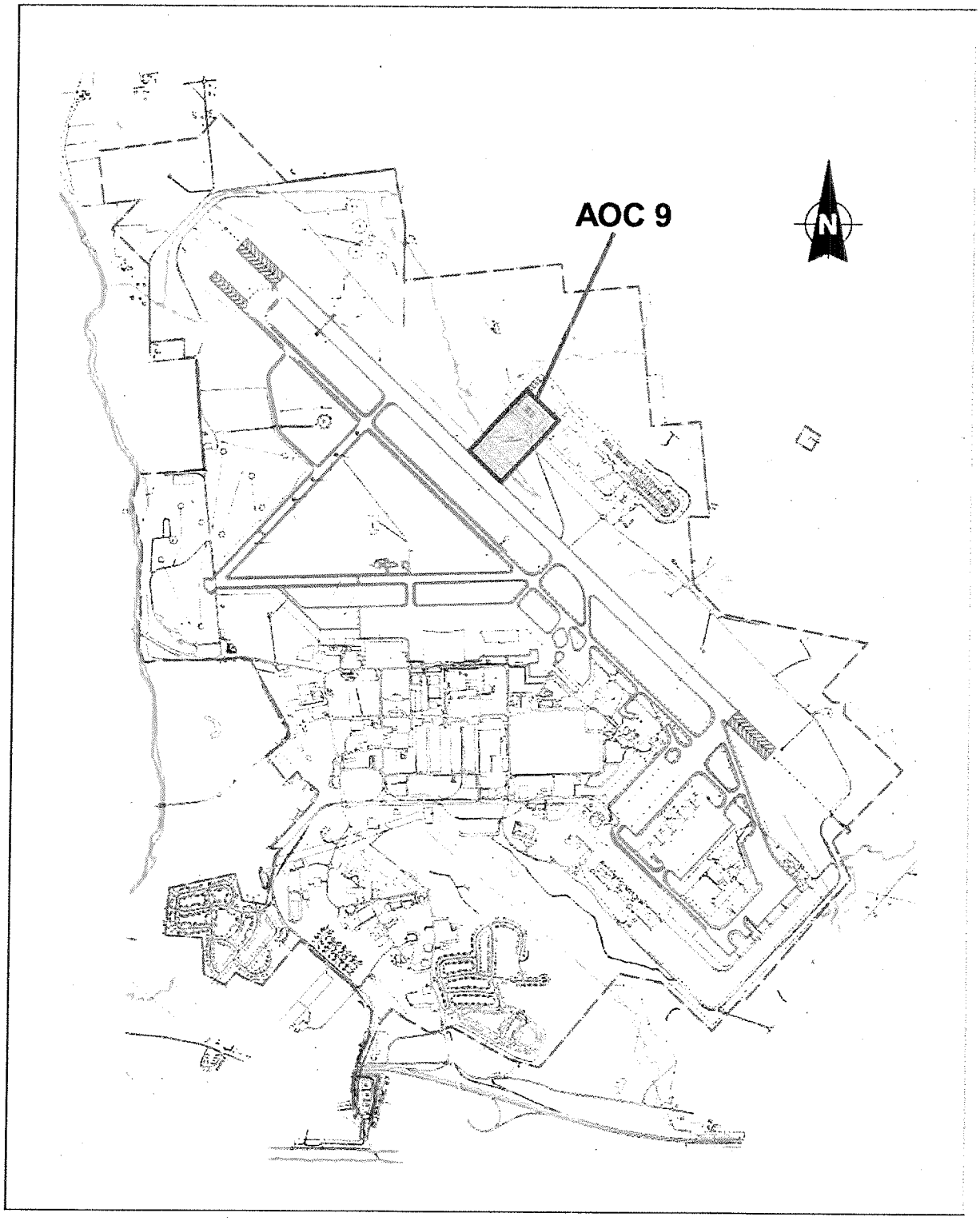

Figure 1.2 AOC 9 Site Location
Former Griffiss Air Force Base, Rome, NY

SECTION 2

SUMMARY OF PREVIOUS REMEDIAL ACTIONS AND INVESTIGATIONS

2.1 SUMMARY

The United States Air Force (USAF) prepared and submitted numerous reports to NYSDEC and USEPA for review and comment. These reports addressed remedial activities that the USAF is required to undertake under the CERCLA cleanup process.

Detailed descriptions of these investigations are presented in the individual investigation reports referenced in Table 2.1.

TABLE 2.1 SUMMARY OF ACTIONS AND INVESTIGATIONS

Year	Investigation
1995	Group I Areas of Interest (AOI) Confirmatory Sampling (Ecology and Environment, Inc. [E&E], 1996)
1997	Expanded Site Investigation (E&E, 1998a)
1997	Supplemental Investigation Sampling, which included the collection of one sample using a passive in situ concentration/ extraction sampler (PISCES) (E&E 1998b)
2000	Supplemental Investigation (E&E, 2001)
2002	Bedrock Groundwater Study (E&E, 2002)
2002-2003	Treatability Pilot Study (E&E, 2004)
2006	Pre-Design Investigation 1 (PDI 1) (EEEPC, 2007a)
2007	Pre-Design Investigation 2 (PDI 2) (Parsons, 2007)
2007	Additional AOC 9 Pre-Design Investigation (AOC 9 PDI) (EEEPC, 2007b)
2009	Proposed Plan for AOC9 Groundwater (EEEPC, 2009)
2010	Final Record of Decision for AOC 9 (EEEPC, July 2010)
2010	Baseline Monitoring Summary Report (EEEPC Jan. 2011)
2010	Remedial Action Performed (site excavation and persulfate application described in the Remedial Action Work Plan AOC 9, Parsons 2010)
2011-2013	Annual Performance Monitoring Reports (EEEPC 2011, 2012, 2013)

The results of these investigations confirmed that groundwater at the AOC 9 site is contaminated with chlorinated solvents, including perchloroethene (PCE), TCE, and aromatic hydrocarbons, primarily CB and 1,2-dichlorobenzene (1,2-DCB). The results also provided the limits of the contaminated groundwater plume and identification of the contaminated groundwater source area. The remedial action performed in 2010 and the 2013 injections described within this plan will be documented in the Interim Remedial Action Completion Report (IRACR) scheduled for 2014.

SECTION 3

REMEDIATION MANAGEMENT PLAN

3.1 PROJECT MANAGEMENT ORGANIZATION

A team of appropriately trained and qualified professionals from Parsons will conduct this project. Each member of the team has been assigned various duties related to the project. The key project team members are briefly described below in terms of their project responsibilities. Contact information for the Parsons Team and Key Program Personnel is provided in Table 3.1 and Table 3.2.

1. **Parsons Project Manager** (PM) - Mr. John Lanier will perform the duties of Project Manager. The PM will be responsible for all project activities. Mr. Lanier will also function as the primary client contact, and ensure that all project and client requirements are met.

2. **The Project Health and Safety Manager** (PHSM) - Mr. Timothy Mustard is responsible for oversight and direction to ensure full compliance with all health and safety requirements at the project site. The PHSM, or his designee will oversee/review all aspects of site safety, including the preparation of the Accident Prevention Plan (APP) (including subcontractors Safety and Health Plans [SHPs]), performance of the initial site-specific training, and the periodic auditing of site operations to verify Occupational Safety and Health Administration (OSHA), United States Army Corps of Engineers (USACE), and APP compliance. While the PHSM will not necessarily visit the site, he will ensure that personnel carry out the required activities.

3. **The Site Safety and Health Officer** (SSHO) **and Site Manager** (SM) - Mr. Dale Dolph is responsible for carrying out the provisions of the APP and the Site-Wide Safety and Health Plan (SSHP) with regards to site work, and will ensure that all personnel entering the site understand and adhere to the provisions of the APP and that personnel meet the training and medical monitoring requirements of 29 CFR §1910.120. The SSHO will be approved by the PHSM, or designee and should have the following qualifications (unless confirmed acceptable by the PHSM): Current 40-hr (8-hr refresher) Hazardous Waste Operations and Emergency Response (HAZWOPER) training; HAZWOPER Supervisor training; Parsons START/SHARP training; OSHA 10-hr or 30-hr safety training; Current medical monitoring (if applicable); Current first aid/Cardiopulmonary Resuscitation (CPR); experienced at the highest level of respiratory protection expected at the site; demonstrated proficiency in air monitoring instrumentation to be used at the site; demonstrated familiarity with company policies, procedures, and H&S program; and the ability to make decisions. Any changes in the provisions of the APP and SSHP shall be made in writing by the SSHO and shall be approved by the PHSM or Corporate Health and Safety Manager. Any personal protective equipment upgrades or downgrades shall be documented in writing by the SSHO. The SSHO

shall have the authority to stop an operation or site work if, in the opinion of the SSHO, the site conditions or the manner in which the work is being conducted, presents a hazard to site personnel, surrounding populations, or the environment. The name and contact information for the SSHO or, if the SSHO is absent, the name of the acting SSHO, shall be provided in the SSHP and posted on the bulletin board in the field office. The SSHO is responsible for all air monitoring. Additional site-specific information is provided in the SSHP. In addition to his role as SHSO, Mr. Dolph will also serve as Site Manager. The Site Manager will be responsible for the direct supervision and oversight of field activities performed by Parsons' personnel and subcontractors.

4. **Quality Manager (QM)** – Mr. Tom Kartachak will be responsible for overall project quality management, including establishing, maintaining and implementing the Contractors Quality Management Plan (CQMP). The QM has the authority to stop nonconforming work.

5. **Construction Quality Control Officer (CQCO)** – Mr. John Dupras will be responsible for conducting preliminary inspection meetings, identifying and reviewing submittal requirements, verifying injection work, ensuring field personnel are aware of client requirements and quality objectives, and general management support.

6. **Field personnel** will be involved in Parsons' work at AOC 9 as needed. The majority of field activities including mixing and injection of persulfatewill be performed by a subcontractor. Site personnel will only perform tasks for which they have received appropriate training.

TABLE 3.1 PARSONS PROJECT TEAM

Title	Name	Telephone No.
Technical Director	Mr. Ross Miller	801-572-5999
Project Manager	Mr. John Lanier	315-552-9704 716-998-3485 (cell)
Project Health and Safety Manager	Mr. Timothy Mustard Mr. Bill Bradford (Syracuse Representative)	303-564-3537 315-552-9677; 315-546-5146 (cell)
Site Health and Safety Officer and Site Manager	Mr. Dale Dolph	315-552-9684; 315-506-3939 (cell)
Quality Manager	Mr. Tom Kartachak	410-596-9178
Construction Quality Control Officer	Mr. John Dupras	315-552-9720 413-441-9724 (cell)

Environmental Remediation Sector Manager	Todd Heino	617-449-1405
PGS Project Controls Manager	Jim Buchannan	678-969-2459
Billing Manager	Deb Albert	314-819-5011
Contract Administrator	Michelle Smith	626-440-4177
Procurement Manager	Ronald Bates	256-217-2562
Field Personnel	To be determined as needed	

3.2 POINTS OF CONTACT

Parsons will take the lead role in planning, organizing, and implementing the remedy. Parsons will also take the lead role in health and safety issues, and overall quality assurance for all work under this task order. Major field work will be done by Parsons subcontractors. The Parsons Team will report to the USACE and the Air Force Civil Engineer Center (AFCEC) through a single point of contact, Parsons PM, Mr. John Lanier.

Client contact information is presented below:

USACE, KC Project Manager
Nanci Higginbotham
US Army Corps of Engineers
Kansas City District
601E. 12th Street
Kansas City, MO 64106
Phone: 816-389-3359
Email: nanci.e.higginbotham@usace.army.mil

Air Force Project Manager
Cathy Jerrard
AFCEC Griffiss Project Manager
706 Brooks Road
Rome, NY 13441
Phone: 315-356-0810 x204
Email: Catherine.jerrard@us.af.mil

3.3 PROJECT PLANS AND PROCEDURES

The project plans and procedures developed for the AOC 9 RAWP will be used in the performance of the work described in this addendum. The AOC 9 Accident Prevention Plan (Parsons December 2009) (APP) and the Quality Control Field Plan (QCFP) (Parsons April 2010) will be updated to reflect any new changes or revisions in procedures, contact information, health and safety requirements, quality control requirements, and additional modifications since initial approval.

3.4 QUALITY MANAGEMENT

Quality management goals and procedures will be in accordance with the Contractor Quality Management Plan as described in the AOC 9 RAWP. An update will be provided for the Quality Control Field Plan prior to field mobilization.

3.5 SUBCONTRACTOR MANAGEMENT

Subcontractor management will be as described in the AOC 9 RAWP. Atlantic Testing Labs (ATL) will perform the PermeOx injections. FMC Environmental Solutions is the PermeOx supplier and will provide applications support with on-site consultation and evaluation. Contact information is provided below.

TABLE 3.2 KEY SUBCONTRACTORS

SUBCONTRACTORS	POINT OF CONTACT	WORK
Atlantic Testing Laboratories	Tim Gavin 6431 US Highway 11 PO Box 29 Canton, NY 13617 (315) 386-4578	PermeOx injections.
FMC Environmental Solutions	Dr. Ravi Srirangam, Technical Manager - Site Remediation 1435 Morris Ave Suite 2C Union, NJ 07083 908-688-8543 ravi.srirangam@fmc.com	PermeOx supplier and applications support (on-site briefly).

Subcontracts and all purchase orders (PO) are managed though the procurement department in the Parsons Huntsville, AL office. Mr. Ronald Bates, Procurement Manager, can be reached at 256-217-2562.

The purchase orders and contracting documents awarded to key subcontractors for this work will be maintained in the project files on the Parsons Syracuse LAN and Parsons Syracuse office.

SECTION 4

PERMITS AND APPROVALS

Prior to the start of work, the following permits and approval activities will be conducted:

4.1 UNDERGROUND IDENTIFICATION

Dig Safely New York will be contacted at 1-800-962-7962 to locate underground utilities prior to excavation and/or drilling activities. New York State law requires that Dig Safely New York be notified at least two working days, and not more than ten working days, before subsurface work is conducted. Regulations pertaining to the protection of underground facilities in New York State are governed by 16 New York Codes Rules and Regulations (NYCRR) Part 753. All intrusive work will be coordinated with the AFCEC personnel to identify any other potential privately owned utilities prior to the start of work.

A Dig Safely New York representative will mark all buried utility lines in the work area. All proposed drilling locations and the excavation area will be marked out in white paint (or equal) prior to utility company coming onsite. In addition, alternate locations will be identified to avoid any additional mark out requirements if original locations impede on subsurface utilities. In addition, site representatives will be contacted to identify any other facility utilities, sewer lines, or other obstructions that may pose a risk to health and safety. After the existing utilities have been marked in the field, the Contractor and the USACE will inspect and photograph the markings and affected work area prior to allowing any intrusive work to begin.

Information that will be required when placing the call to Dig Safely New York:

- The excavator/driller's company name;
- The excavator/driller's address, telephone and fax number;
- The caller's name;
- Who the work is being done for, when appropriate;
- A Parsons representative and telephone number that member utilities can call with questions about the request;
- The county and place (town, village, or city) of the excavation according to legally incorporated municipal boundaries. The FULL street address of the excavation/drilling.
- The name of the nearest intersecting street on either side of the excavation;
- The date and time the excavation is scheduled to begin;
- A description of where, on the property, the work is to be performed and details about the extent of the excavation;

- The type of work being done, and the type of equipment being used to do it; and,
- Any special instructions.

Previous investigations have identified an underground high voltage electrical line that runs through the proposed injection area. This line was identified during a test pit excavation and it is within the confines of a drainage ditch south of the Building 913 driveway. This electrical utility line was marked out during the AOC 9 excavation work, and the oxidant injection wells will be installed in locations that will not disturb this line. This electric line will be marked out again for the 2013 injection work.

4.2 PROPERTY OWNERSHIP

Prior to the start of work, coordination with the property owners, must be conducted to ensure that any privately owned utilities are identified and that permission to work on the land has been granted. AOC 9 is located on property owned by the Griffiss Local Development Corporation (GLDC). All coordination with property owners will be coordinated through the AFCEC Representative:

Ms. Cathy Jerrard
AFCEC/CZRB-Griffiss Project Manager
315-356-0810 x204

Ms. Jerrard will assist in coordinating with:

City of Rome Public Works: Mr. Frank Tallarino, 315-339-7632
City of Rome Water Pollution Control Facility: Mr. Matthew Coppola, 315-339-7775
Griffiss Airpark Representative: Mr. Ed Arcuri, 315-356-1180
Griffiss Local Development Corporation (GLDC): Mr. Frank Sanzone, 315-338-0393
Griffiss Utilities Services Corporation (GUSC): Mr. Mike Davis, 315-838-4872

4.3 SURVEY

As part of the previous site excavation activities (see Section 1.2) a New York State-licensed surveyor prepared pre-excavation and post-excavation (as-built) surveys for the AOC 9 site. Parsons will utilize these drawings to prepare mark-outs for the well locations needed for the oxidant injections described in this work plan (see Figure 747054 C-001). After the injections are completed, the wells locations will be staked out and will be added to the as-built site survey.

4.4 PERMITTING AND APPROVAL AUTHORITIES

All permits and approvals will be reviewed and approved by AFCEC prior to submittal to the appropriate agencies.

4.4.1 GRIFFISS AIRPARK

Griffiss Airpark flightline personnel (Ed Arcuri at 315-356-1180, or other applicable personnel) will be informed several days in advance of the number of personnel and type of equipment that will be needed to perform the site activities. Dates and hours of activities will be conveyed to flightline personnel. Injection activities will be confined to locations north of MW-14 and should not require employees to work within the airfield fence.

If it is necessary for an employee to work within the airfield fence, it is a requirement to obtain a Security Identification Display Area (SIDA) badge from Oneida County. The application takes one week to process, and includes a Federal Bureau of Investigation (FBI) criminal background check and verification that each employee is not on the Transportation Security Administration (TSA) no-fly checklist. Alternately, if access is needed within the airfield is for a short duration, the Office of the Commissioner of Aviation (see Section 4.2) could also provide an escort instead of requiring SIDA badges.

4.4.2 Underground Injection Permitting

In New York, the USEPA is the regulatory authority that administers the Underground Injection Control (UIC) Program. Injection of the substrate at the site is considered subject to 40 CFR Part 144 because the injection points fall under the definition, "any dug hole or well that is deeper than its largest surface dimension, where the principal function of the hole is emplacement of fluids" (40 Code of Federal Regulations [CFR] 144.1(g)(1)(ii)). The injection wells are classified as Class V wells because they are not included in the descriptions of Class I, II, III, or IV wells. Class V wells are authorized by the rule contingent upon provision of basic operator information and notification of planned injection activities, as described in 40 CFR Part 144.24. Although a permit will not be required, a notification to the USEPA is required to be filed prior to injection activities.

The "Inventory of Injection Wells" USEPA Form 7520-16 (OMB No. 2040-0042) must be submitted 90 days prior to start of injection unless the UIC Program Director indicates otherwise. This notification was sent on May 24, 2013 An update to this notification increasing the number of injection points was sent on July 30, 2013 and is included in Appendix A.

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SECTION 5

SITE ACTIVITIES AND PROCEDURES

5.1 SITE ACTIVITIES

This phase of the remedy for AOC 9 includes treatment of contaminated groundwater using chemical oxidation, long-term monitoring, and land use controls. Long term monitoring and land use controls are summarized briefly in this section but have stand alone documents that describe their contents (see Section 5.8).

5.2 SITE MOBILIZATION

Mobilization activities will commence upon the receipt of all required permits and authorizations as described in Section 4, as well as upon approval of this work plan. Mobilization activities will consist of the following tasks:

- Site Specific Health and Safety training for all site workers in accordance with OSHA 1926.65(e).
- Mobilization of the selected drilling/injection subcontractor.
- Coordination of utility clearances.
- Site access coordination with Oneida County and the Griffiss Air Park Flight Personnel, (if applicable) one month before start to obtain access and approval.
- Delivery of injection materials and equipment.

5.2.1 Temporary Facilities

Temporary facilities will be available for use during the remedial injection activities as discussed in Section 6. Injection water, if needed, shall be obtained from on-site hydrants. Hydrant use will be coordinated with the City of Rome Water Department.

5.2.2 Establish Work Areas

Staging areas, contamination reduction zones, and clean areas will be established with visible barriers to maintain site safety. Barriers will be orange construction-style fencing (4-foot high) staked into the ground and have appropriate signage. Work zone fencing shall conform to applicable criteria in EM 385-1-1. The work areas shall be relocated, as needed, based on existing site conditions.

5.3 CALCIUM PEROXIDE (PERMEOX) TREATMENT

To reduce the number of years required to meet RAOs, the groundwater down gradient of the source area will be treated using an accelerated aerobic bioremediation technology that utilizes a time-release calcium peroxide product, PermeOx, to treat residual chlorobenzene and dichlorobenze contamination on the site. Calcium peroxide

has been found to aerobically degrade organic contaminants of concern identified in the soil and groundwater at AOC 9.

In May 2013 Parsons collected two groundwater samples and one soil sample from AOC 9 to provide additional pre-design data for use in designing the injection mixture. A copy of this data is provided in Appendix B. This sampling event was documented in a Daily Field Report. Parsons has worked with FMC Environmental Solutions, the manufacturer of PermeOx, to develop an estimate of the required quantity of material and mixture design for injection at AOC 9. This information is provided in Appendix C.

5.3.1 Dissolved-Phase Contamination

PermeOx will be injected within the 100-ppb total VOC contour (as identified in the 2012 AOC 9 Performance Monitoring report) immediately downgradient from the source area excavation. See Drawing 747054-C-001. The injections will be completed using 53 temporary injection points that will be installed to depths of approximately 15 to 25 feet within the treatment area. PermeOx will be mixed with potable water onsite to create a slurry consisting of approximately 20% (by weight) PermeOx with a consistency similar to oatmeal. Approximately 189 pounds of PermeOx and 113 gallons of water will be injected at each location using a grout pump located on the geoprobe rig. The rate at which the formation can accept the mixture will determine the injection duration. The MSDS data sheets will be maintained on site at Building 817 and, these, along with information on the mixing equipment/methods, are included in Appendix E.

A standard rubber-tired geoprobe rig equipped with a pressure activated injection probe and injection pump system will be used to the inject PermeOx slurry. Injections will be done using a "top down" approach to deliver the slurry to the treatment zone. The radius of influence of each injection point is anticipated to be approximately 6 feet. The injection points will be installed on a grid with overlapping zones of influence.

Each of the 53 temporary injection points will be filled with bentonite chips from a depth of 10 feet to the ground surface. The boreholes will be restored at the surface to generally correspond with existing conditions.

Several injections will be applied through the exiting roadway. In each location, the concrete will be cored using a 3-inch thin wall coring bit. Where the concrete road has been cored, cement grout will be placed in the full depth of the road area (approximately 14 inches) over the bentonite chips.

5.4 SITE RESTORATION

Even though the geoprobe equipment is on rubber-tired equipment to minimize damage to the soil as it is moved to injection locations, some soil disturbance is anticipated. All areas that are disturbed by the site activities will be returned to their pre-injection or appropriate state. Final restoration will occur after the completion of injection activities. Seeding of disturbed areas, if required, will occur either in early spring or late fall, as is suggested for ryegrass.

All grades will be restored to maintain existing surface water drainage patterns. Any topsoil imported will be virgin material and meet the following requirements:

- Organic loam, well drained, homogenous;
- pH between 4.5 and 7;
- Free of any vegetation (especially invasive species), debris or other objectionable materials; and,
- Free of stones or particles greater than 1-inch in diameter.

In addition, soil samples from imported topsoil will be collected and tested for PCBs/pesticides, metals, SVOCs and VOCs. Soil that meets the commercial/industrial use specified in NYSDEC Division of Environmental Remediation (DER)-10, Technical Guidance for Site Investigation and Remediation (NYSDEC, 2010), Appendix 5 will be considered clean and used for topsoil. Samples will be collected at the frequency specified in Table 5.4(e)10 found in DER-10.

Approximately 2 to 4 inches of topsoil will be placed on earth fill in any areas of soil disturbance, and grass seed will be at a minimum of three pounds/1000 square feet. The grass seed will be a mixture of 30% annual ryegrass and 70% perennial ryegrass. The grass seed is to be spread by hand, hydro seed, or seed spread evenly on dry to moderately dry soil. Fertilizer (commercial grade 5-10-5 mixture) will be applied in accordance with manufacturer's written directions. Soil moisture will be maintained until young plants are well established.

All restored areas will be protected from traffic, erosion, and damage until surface is stabilized.

5.5 LONG TERM MONITORING AND LAND USE CONTROLS

Following completion of work as specified in the RAWP, a monitoring program will be continued for AOC 9 in accordance with the *Final Baseline, Performance, and Long-Term Monitoring Plan at AOC 9* (EEEPC, 2010a).

The performance of the PermeOx injections will be monitored by sampling at MW-14 which is immediately downgradient of the injection zone, along with MW 08 and MW 12 which are approximately 140 and 220 feet downgradient of the injection zone. Sampling of these three wells will occur just prior to the PermeOx injections, within 30 days after the injections, and then quarterly in 2014 to measure the concentration of dissolved oxygen in the groundwater. Measurement of DO will be by flow-through cell utilizing an optical (luminescent) method. The evidence of dissolved oxygen (approximately 1.0 to 2.0 mg/L or higher) is sufficient to demonstrate that the microbe oxygen demand has been met.

5.6 EMERGENCY PLAN

5.6.1 Emergencies

Contingency plans for emergencies will be included in an appendix update to the AOC 9 Accident Prevention Plan (APP) (Parsons, October 2009).

5.7 FIELD LOG BOOKS

All field activities will be carefully documented as referenced in the AOC 9 CQMP (Parsons October 2009) and QCFP (Parsons April 2010).

5.8 DRAWING NOTES

General – The following notes appear on drawing 747054-C-002 and are included in this plan to ensure legibility.

1. The remedy for AOC 9 consists of treatment of contaminated groundwater using in-situ chemical oxidation and land use controls.
2. Locations of existing roadways, structures, and buildings shown on the drawings are appropriate, actual locations shall be field-verified prior to the commencement of work.
3. Site features and topography provided by Woolpert Consultants on September 1, 1998 and February 11, 1999, respectively.
4. Utility information is approximate, all utility locations shall be field verified prior to start of field activities.
5. Contact Dig Safely New York at 1-(800)-952-7962 or 811 to locate underground utilities a minimum of 48 hours prior to start of field activities.
6. Do not proceed with any utility interruptions without prior written approval from the property owner.
7. Comply with all applicable federal, state and local regulations, US Army Corps of Engineers Manual EM 385-1-1, September 15, 2008 edition, and protection human health and environment.
8. Secure all required applications, permits, easements, permissions, letters, agreements, right-of-way and certifications as necessary for the completion of the work.
9. Coordinate with Griffiss AFCEC flight personnel and applicable property owners on a daily basis to obtain access and approval for work to be performed.
10. Contact the City of Rome Public Works Department a minimum of 1 month prior to injection activities to coordinate the use of water from a fire hydrant.
11. Provide all temporary facilities required to complete the work.

12. Provide and maintain all required temporary traffic controls, barriers, enclosures required to complete the work.
13. Comply with all applicable laws and requirements, including New York State Department of Environmental Conservation DER 10.

Chemical Oxidation

1. The mixing and injection system piping, equipment valves, etc., shall be chemically and physically compatible with the substrate used during injection activities.
2. All injection chemicals will be purchased by Parsons and provided by FMC Corporation.
3. Mix chemicals onsite when needed in separate containers, and inject in accordance with the manufacturers recommendations.
4. During injection, monitor down gradient wells, pressures, flow rates, substrate volumes, and nearby monitoring wells and manholes. Injection pressures shall not exceed allowable pressures for the materials.
5. Monitor adjacent monitoring wells for mounding. If significant mounding is observed, reduce flow rates to limit mounding.
6. The sequence of injection locations shall be determined in the field.

Site Restoration

1. All areas disturbed during performance of the work, including but not limited to asphalt, shall be restored to pre-injection conditions.
2. Protect all restored areas from erosion and damage until surface is stabilized.
3. Contractor shall repair or replace any restored areas damaged within 6 months of project completion.
4. Restore all grades to maintain existing surface water drainage patterns.
5. Imported topsoil shall be organic loam, well drained, homogenous and meet the following minimum requirements:
    a. pH between 4.5 and 7
    b. Free of any vegetation (especially invasive species), debris or other objectionable materials.
    c. Free of any stones or particles greater than 1".
6. In areas of soil disturbance, place 3" of topsoil on earth fill and apply grass seed at a minimum of 3 pounds/1,000 square feet, protect newly seeded areas from traffic and erosion, and maintain adequate soil moisture conditions until young plants are well established.

7. Grass seed shall be a mixture of 30% annual ryegrass and 70% perennial ryegrasses.
8. Sow grass seed evenly by hand, hydroseed or seed spreader on dry or moderately dry soil.
9. Fertilizer shall be a commercial-grade 5-10-5 mixture.
10. Apply fertilizer in accordance with manufacturer's written directions.

TABLE 1 – PERMEOX SLURRY MIXUTRE & INJECTION VOLUMES

ANTICIPATED RADIUS OF INFLUENCE	6 FEET
TOTAL MASS OF PERMEOX REQUIRED	10,000 LBS
CONCENTRATION OF PERMEOX SLURRY	20% (BY WEIGHT)
TOTAL VOLUME OF WATER REQUIRED	4,794 GALLONS
TOTAL VOLUME OF SLURRY TO INJECT	5,992 GALLONS
NUMBER OF INJECTION POINTS	53
MASS OF PERMEOX (PER LOCATION)	189 LBS
VOLUME OF PERMEOX (PER LOCATION)	113 GALLONS

NOTE:
Injection volumes based on permeox manufacturers recommendation

AOC 9 PLAN

SCALE: 1"= 80"

TEMPORARY INJECTION WELLS

SCALE: 1"= 20"

LEGEND

- FENCE
- TOPOGRAPHIC CONTOUR LINE (CONTOUR INTERVAL = 5 FT)
- UNDERGROUND ELECTRIC
- WATER LINE
- SANITARY SEWER
- OVERHEAD ELECTRIC
- ABANDONED UNDERGROUND ELECTRIC
- ND NOT DETECTED
- TOTAL VOLATILE ORGANIC COMPOUNDS IN ug/L (DASHED WHERE INFERRED) DATA FROM SEP 2012 SAMPLING EVENT
- AOC9-MW01 PERMANENT MONITORING WELL LOCATION
- PZ-1 PIEZOMETER LOCATION
- TEMPORARY INJECTION POINT

20 10 0 20 40
SCALE: 1"=20'

80 0 80 160
SCALE: 1"=80'

NO.	DESCRIPTION	DATE	DRAWN	CHK'D	APPV'D
A	ISSUED FOR xxxxx	5/24/13	JHG	MBB	

DRAWN BY JHG	DATE 5/24/13	SEAL
CHECKED BY MBB	DATE 5/24/13	
APPROVED BY XXX	DATE 5/24/13	
PROJECT MGR. XXX	DATE 5/24/13	

PARSONS
ENVIRONMENT AND INFRASTRUCTURE

OFFICE
301 PLAINFIELD ROAD
SYRACUSE, NY 13212
(315) 451-9560

JOB 747054
WBS 66000

PROJECT TITLE
AREA OF CONCERN 9
GROUND WATER
REMEDIAL DESIGN
FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

DRAWING TITLE
AOC 9 SITE PLAN

SCALE AS NOTED

DRAWING NO. 747054-C-001

REV. A

FILE NAME: P:\747054 AOC 9 GRIFFISS\CAD\FIGURES\AOC 9- RAMP\BASE DWGS FROM EE\747054-C-001.DWG
PLOT DATE: 9/5/2013 3:31 PM PLOTTED BY: GOLDHAMAT, JAMES

GENERAL:

1. THE REMEDY FOR AOC 9 CONSISTS OF TREATMENT OF CONTAMINATED GROUNDWATER USING IN-SITU CHEMICAL OXIDATION AND LAND USE CONTROLS.
2. LOCATIONS OF EXISTING ROADWAYS, STRUCTURES, AND BUILDINGS SHOWN ON THE DRAWINGS ARE APPROXIMATE. ACTUAL LOCATIONS SHALL BE FIELD-VERIFIED PRIOR TO THE COMMENCEMENT OF WORK.
3. SITE FEATURES AND TOPOGRAPHY PROVIDED BY WOOLPERT CONSULTANTS ON SEPTEMBER 1, 1998 AND FEBRUARY 11, 1999, RESPECTIVELY.
4. UTILITY INFORMATION IS APPROXIMATE. ALL UTILITY LOCATIONS SHALL BE FIELD VERIFIED PRIOR TO START OF FIELD ACTIVITIES.
5. CONTACT DIG SAFELY NEW YORK AT 1-(800)-962-7962 OR 811 TO LOCATE UNDERGROUND UTILITIES A MINIMUM OF 48 HOURS PRIOR TO START OF FIELD ACTIVITIES.
6. DO NOT PROCEED WITH ANY UTILITY INTERRUPTIONS WITHOUT PRIOR WRITTEN APPROVAL FROM THE PROPERTY OWNER.
7. COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS, US ARMY CORPS OF ENGINEERS MANUAL EM 385-1-1, SEPTEMBER 15, 2008 EDITION, AND PROTECTION HUMAN HEALTH AND ENVIRONMENT.
8. SECURE ALL REQUIRED APPLICATIONS, PERMITS, EASEMENTS, PERMISSIONS, LETTERS, AGREEMENTS, RIGHT-OF-WAY AND CERTIFICATIONS AS NECESSARY FOR THE COMPLETION OF THE WORK.
9. COORDINATE WITH GRIFFISS AIRPARK FLIGHT PERSONNEL AND APPLICABLE PROPERTY OWNERS ON A DAILY BASIS TO OBTAIN ACCESS AND APPROVAL FOR WORK TO BE PERFORMED.
10. CONTACT THE CITY OF ROME PUBLIC WORKS DEPARTMENT A MINIMUM OF 1 MONTH PRIOR TO INJECTION ACTIVITIES TO COORDINATE THE USE OF WATER FROM A FIRE HYDRANT.
11. PROVIDE ALL TEMPORARY FACILITIES REQUIRED TO COMPLETE THE WORK.
12. PROVIDE AND MAINTAIN ALL REQUIRED TEMPORARY TRAFFIC CONTROLS, BARRIERS, ENCLOSURES REQUIRED TO COMPLETE THE WORK.
13. COMPLY WITH ALL APPLICABLE LAWS AND REQUIREMENTS, INCLUDING NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION DER 10.

CHEMICAL OXIDATION:

1. THE MIXING AND INJECTION SYSTEM PIPING, EQUIPMENT VALVES, ETC., SHALL BE CHEMICALLY AND PHYSICALLY COMPATIBLE WITH THE SUBSTRATE USED DURING INJECTION ACTIVITIES.
2. ALL INJECTION CHEMICALS WILL BE PURCHASED BY PARSONS AND PROVIDED BY FMC CORPORATION.
3. MIX CHEMICALS ONSITE WHEN NEEDED IN SEPARATE CONTAINERS, AND INJECT IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.
4. DURING INJECTION MONITOR DOWN GRADIENT WELLS, PRESSURES, FLOW RATES, SUBSTRATE VOLUMES, AND NEARBY MONITORING WELLS AND MANHOLES. INJECTION PRESSURES SHALL NOT EXCEED ALLOWABLE PRESSURES FOR THE MATERIALS.
5. MONITOR ADJACENT MONITORING WELLS FOR MOUNDING. IF SIGNIFICANT MOUNDING IS OBSERVED, REDUCE FLOW RATES TO LIMIT MOUNDING.
6. THE SEQUENCE OF INJECTION LOCATIONS SHALL BE DETERMINED IN THE FIELD.

SITE RESTORATION:

1. ALL AREAS DISTURBED DURING PERFORMANCE OF THE WORK, INCLUDING BUT NOT LIMITED TO ASPHALT, SHALL BE RESTORED TO PRE-CONSTRUCTION CONDITIONS.
2. PROTECT ALL RESTORED AREAS FROM EROSION AND DAMAGE UNTIL SURFACE IS STABILIZED.
3. CONTRACTOR SHALL REPAIR OR REPLACE ANY RESTORED AREAS DAMAGED WITHIN 6 MONTHS OF PROJECT COMPLETION.
4. RESTORE ALL GRADES TO MAINTAIN EXISTING SURFACE WATER DRAINAGE PATTERNS.
5. IMPORTED TOPSOIL SHALL BE ORGANIC LOAM, WELL DRAINED, HOMOGENOUS AND MEET THE FOLLOWING MINIMUM REQUIREMENTS:
   a. PH BETWEEN 4.5 AND 7
   b. FREE OF ANY VEGETATION (ESPECIALLY INVASIVE SPECIES), DEBRIS OR OTHER OBJECTIONABLE MATERIALS.
   c. FREE OF ANY STONES OR PARTICLES GREATER THAN 1".
6. IN AREAS OF SOIL DISTURBANCE, PLACE 3" OF TOPSOIL ON EARTH FILL AND APPLY GRASS SEED AT A MINIMUM OF 3 POUNDS/1,000 SQUARE FEET. PROTECT NEWLY SEEDED AREAS FROM TRAFFIC AND EROSION. MAINTAIN ADEQUATE SOIL MOISTURE CONDITIONS UNTIL YOUNG PLANTS ARE WELL ESTABLISHED.
7. GRASS SEED SHALL BE A MIXTURE OF 30% ANNUAL RYEGRASS AND 70% PERENNIAL RYEGRASSES.
8. SOW GRASS SEED EVENLY BY HAND, HYDROSEED OR SEED SPREADER ON DRY OR MODERATELY DRY SOIL.
9. FERTILIZER SHALL BE A COMMERCIAL-GRADE 5-10-5 MIXTURE.
10. APPLY FERTILIZER IN ACCORDANCE WITH MANUFACTURER'S WRITTEN DIRECTIONS.

TABLE 1 – PERMEOX SLURRY MIXTURE & INJECTION VOLUMES	
ANTICIPATED RADIUS OF INFLUENCE	6 FEET
TOTAL MASS OF PERMEOX REQUIRED	10,000 LBS
CONCENTRATION OF PERMEOX SLURRY	20% (BY WEIGHT)
TOTAL VOLUME OF WATER REQUIRED	4,794 GALLONS
TOTAL VOLUME OF SLURRY TO INJECT	5,992 GALLONS
NUMBER OF INJECTION POINTS	53
MASS OF PERMEOX (PER LOCATION)	189 LBS
VOLUME OF PERMEOX (PER LOCATION)	113 GALLONS

NOTE:

INJECTION VOLUMES BASED ON PERMEOX MANUFACTURERS RECOMMENDATION.

NO.	DESCRIPTION	DATE	DRAWN	CHK'D	APPV'D
A	ISSUED FOR xxxxx	5/24/13	JHG	MBB	

DRAWN BY JHG	DATE 5/24/13	SEAL	
CHECKED BY MBB	DATE 5/24/13		
APPROVED BY xxx	DATE 5/24/13		
PROJECT MGR. xxx	DATE 5/24/13		

PARSONS
ENVIRONMENT AND INFRASTRUCTURE

OFFICE
301 PLAINFIELD ROAD
SYRACUSE, NY 13212
(315) 451-9560

JOB 747054

WBS 66000

PROJECT TITLE
AREA OF CONCERN 9
GROUND WATER
REMEDIAL DESIGN
FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

DRAWING TITLE
AOC 9 SITE
SPECIFICATIONS, LEGEND,
& ABBREVIATIONS

SCALE AS NOTED

DRAWING NO. 747054-C-002

REV. A

FILE NAME: P:\747054 AOC 9 GRIFFISS\CAD\FIGURES\AOC 9- RAMP\BASE DWGS FROM EE\747054-C-001.DWG
PLOT DATE: 6/17/2013 11:28 AM PLOTTED BY: GOLDTHWAIT, JAMES

SECTION 6

CONTROL PLANS

In addition to plans described in Section 3.3 and bound separately, the following plans identify site specific coordination and monitoring plans.

6.1 SITE FACILITIES

Temporary facilities will be available for use during AOC 9 injection activities. These facilities will include portable toilets, and will be available for authorized personnel.

6.2 SITE SECURITY PLAN

Personnel working on-site will carry company-issued IDs at all times. Workers will sign in each day using the Daily Safety Meeting Sign-In sheet provided in the QCFP. Temporary construction fencing will be used to demarcate the work areas. It will be the responsibility of field workers to report any security breaches to the SM. The SM will initiate an appropriate response, which may consist of escorting the violator out of the work area or calling the police, if necessary.

6.3 TRAFFIC CONTROL PLAN

Injection activities are not anticipated to disrupt traffic flow or alter road conditions. If necessary, any interruptions to normal traffic patterns and parking conditions will be marked with cones, signs, flashers, and barricades to protect the public.

Site workers will access the site from the west entrance off of Perimeter Road. Traffic to the work area will be restricted by traffic cones and signage on an as-needed basis. Current tenants access to their respective areas will not be impacted by this injection event.

6.4 SPILL PREVENTION, CONTROL AND COUNTERMEASURE (SPCC) PLAN

6.4.1 Oil Pollution Plan

No oils will be stored on site.

6.4.2 Bulk Chemical Storage Plan

Chemicals used for the oxidant injection will be temporary stored on-site in the support zone. The oxidants are not considered hazardous substances as defined in New York State Bulk Chemical Storage Regulations (6 NYCRR Part 597) and therefore, the

bulk chemical regulations do not apply. MSDSs will be maintained at Building 817 for the calcium peroxide.

6.4.3 Additional Hazardous Waste/Material

There may be other hazardous materials which may be brought to the site, and details of their properties can be found in the MSDS catalog maintained at Building 817.

6.4.4 Categorization of Levels of Spills and Discharges

The SM will assess all spills and discharges. Spills will be categorized by the source from which they came.

All petroleum spills (e.g., oil, gasoline, kerosene, etc.) that occur within New York State must be reported to the NYSDEC Spill Response (1-800-457-7362) within two hours of discovery, except spills which meet all of the following criteria:

- The quantity is known to be less than five gallons;
- The spill is contained and under the control of the spiller;
- The spill has not and will not reach the State's water or any land; and
- The spill is cleaned up within two hours of discovery.

A spill is considered to have not impacted land if it occurs on a paved surface such as asphalt or concrete. A spill in a dirt or gravel parking lot is considered to have impacted land and is reportable.

6.4.5 Control Procedures and Protective Measures

In the event of accidental spillage, the following spill response measures will be implemented:

A. First aid will be administered to injured/contaminated persons. Any employee observing a spill will act immediately to remove and/or protect injured/ contaminated persons from any life-threatening situation without endangering himself or herself. Emergency Services (911) will be contacted, if necessary and first aid and/or decontamination procedures will be implemented as appropriate.

B. Warn unsuspecting person/vehicle of the hazard. Personnel will act to prevent any unsuspecting persons from coming in contact with spilled material by alerting other nearby persons and by obtaining assistance of other personnel who are familiar with spill control cleanup techniques.

C. Stop the spill at the source, if possible. Without taking unnecessary risks, personnel will attempt to stop the spill at the source. This may involve

activities such as uprighting a drum, closing a valve, or temporarily sealing a hole with a plug. Personnel will not expend more than a brief effort prior to notifying the project supervisor.

D. Notify the Site Manager. Utilizing available personal radio communications or other rapid communication procedures, the SM will be notified of the spill, including information on material spilled, quantity, personal injuries, and any immediate life-threatening hazards.

E. Spill assessment and primary containment. The SM will make a rapid assessment of the spill and direct primary containment measures. Depending upon the nature of the spill, primary containment measures may include, but are not limited to:

- Construction of a temporary containment berm utilizing on-site clay absorbent earth.
- The spill area shall be staked and isolated with the hazard tape to keep the general public away from the containment area.
- Digging a sump, installing a polyethylene liner, and diverting the spilled material to the sump.
- Placing drums under the leak to collect the spilling material before it flows over the ground.
- Transferring the material from its original container to another container.

F. Notify the Project Manager. The SM will notify the PM of the spill and steps taken to institute primary containment.

G. Spill Cleanup Procedures. The SM will develop a spill cleanup procedure taking into consideration associated hazards, quantity of spilled material, disposal methods and costs. The spill cleanup plan will be reviewed for acceptance by the PM.

H. Spill Cleanup. Personnel will clean up all spills in accordance with the spill cleanup plan developed by the project supervisor. The SM will supervise the spill cleanup. Most equipment, material, and supplies necessary to clean up a spill will be immediately available on-site. Such items may include, but are not limited to front-end loader, shovels, rakes, clay absorbent earth, polyethylene, personal safety equipment, steel drums, pumps, and miscellaneous hand tools.

I. Spill cleanup inspection. The PM and the SM jointly will inspect the spill site to determine that the spill has been adequately cleaned up.

6.5 WETLANDS MITIGATION PLAN

The AOC 9 area is designated as a checkzone area (an area around a wetland where wetlands may occur). NYSDEC was contacted regarding this project in 2010. NYSDEC stated that the work activities are outside of the wetlands and adjacent areas and should not impact the nearby wetlands. This 2010 determination on no impact to wetlands applies to the 2013 injection activities which are immediately adjacent.

6.6 STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

As per NYSDEC website guidance, this injection activity will not require a Storm Water Pollution Prevention Plan.

6.7 HEALTH AND SAFETY PLAN

Work will be performed in accordance with the approved APP (Parsons, 2009b). The APP has been prepared in accordance with the Parsons SHARP and USACE Health and Safety Requirements Manual EM 385-1-1. It is anticipated that work will be done in Level D protection, including safety glasses (goggles or side shields required during splash hazards and injection activities), steel toe boots, gloves appropriate for the work activities (e.g., sampling, injection activities, etc.) and long pants or jeans.

The APP will be updated prior to the start of remediation injection and will address any conditions that may be encountered during the duration of work. This may include electrical hazards, chemical hazards, emergency contact information, routes to hospital, and use of personal protection equipment (PPE) for various site activities.

6.8 PERFORMANCE EVALUATION

6.8.1 Performance Monitoring Work Plan and Long Term Monitoring Work Plan

Following completion of work as specified in the RAWP, a monitoring program will be continued for AOC 9 in accordance with the *Final Baseline, Performance, and Long-Term Monitoring Plan at AOC 9* (EEEPC, 2010a). Long-term monitoring will continue until the remediation goals have been reached.

The performance of the PermeOx injections will be monitored by sampling at MW-14 which is immediately downgradient of the injection zone, along with MW 08 and MW 12 which are approximately 140 and 220 feet downgradient of the injection zone. Sampling of these three wells will occur just prior to the PermeOx injections, within 30 days after the injections, and then quarterly in 2014 to measure the concentration of dissolved oxygen in the groundwater. Measurement of DO will be by flow-through cell utilizing an optical (luminescent) method. This data will be reported in future AOC 9 annual monitoring reports.

6.8.2 Data Evaluation

To measure the effectiveness of the remediation effort and ensure that the remedial goals are being met, specific performance criteria for AOC 9 has been developed (see *Final Baseline, Performance, and Long-Term Monitoring Plan at AOC9* (EEEPC, 2010)). Following the monitoring and sampling efforts, a data review will be conducted and performance reports will be prepared and submitted to the NYSDEC, USEPA, AFCEC, and USACE. As described in Section 5.5, performance monitoring will occur 30 days after injections and then quarterly in 2014 to measure dissolved oxygen levels in the groundwater.

The performance reports will include a summary of site activities, evaluation of new sampling data, and comparison to previous data. Tables, graphs, figures, progress, recommendations, and evaluation of the current efforts as appropriate will also be included in the reports.

6.9 DEMOBILIZATION AND INTERIM REMEDIAL ACTION COMPLETION REPORT

6.9.1 Demobilization

The SM will coordinate the removal of all temporary facilities and equipment. All equipment will be decontaminated prior to removal from the site.

6.9.2 Interim Remedial Action Completion Report

An Interim Remedial Action Completion Report (IRACR) demonstrating that the remedy is in place and operating successfully will be prepared and submitted to AFCEC and USACE. The report will follow the procedures provided in the document titled *DoD/USEPA Joint Guidance on Streamlined Site Closeout and NPL Deletion* (DOD and USEPA, 2005).

In accordance with the DoD/USEPA guidance, the IRACR will include an overview of the project, RAOs, remedial actions taken (both the 2010 excavation activities and persulfate applications, and the 2013 PermeOx injections), community relations, and a certification statement. Two additional sections – Demonstration of Completion and Ongoing Activities – listed in the guidance document will be provided in the final Remedial Action Completion Report.

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SECTION 7

ANTICIPATED PROJECT SCHEDULE

Injection and excavation activities for this phase of the remedial design are anticipated to be completed in October 2013. The anticipated project schedule is provided in Appendix D.

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SECTION 8

REFERENCES

Department of Defense (DoD) and Environmental Protection Agency, 2005, *DoD/USEPA Joint Guidance on Streamlined Site Closeout and NPL Deletion.*

EEEPC, 2010a, *Final Baseline, Performance and Long-Term Monitoring Plan for AOC 9, Former Griffiss Air Force Base, Rome, New York,* Lancaster, New York. March 2010.

EEEPC, 2010. *Final Record of Decision for Area of Concern 9 (SD-62) at the former Griffiss Air Force Base Rome, New York*, July 2010.

EEEPC, 2010. *Final Remedial Design Work Plan and 90% Design Drawings for Area of Concern 9, Former Griffiss Air Force Base, Rome, New York,* Lancaster, New York. June 2010.

NYSDEC, 2010. Division of Remediation (DER)-10. *Technical Guidance for Site Investigation and Remediation.* May 2010.

Parsons, 2009b. *Accident Prevention Plan, Area of Concern 9 Remediation, Griffiss Air Force Base, Rome, New York,* December 2009.

Parsons, 2009. *Contractors Quality Management Plan (CQMP)*, October 2009.

Parsons, 2010. *Quality Control Field Plan (QCFP), Griffiss Air Force Base, Rome, New York,* April 2010.

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APPENDIX A

INJECTION WELL INVENTORY FORM

PARSONS

301 Plainfield Rd., Suite 350 • Syracuse, New York 13212 • (315) 451-9560 • Fax: (315) 451-9570

Letter of Transmittal

July 30, 2013

USEPA Region 2
Main Regional Office
290 Broadway
New York, NY 10007-1866

Subject: Inventory of Injection Wells
Former Griffiss Air Force Base
Rome, NY 13440

To Whom It May Concern:

Please find enclosed the "Inventory of Injection Wells" EPA Form 7520-16 (OMB No. 2040-0042) and the required additional information prepared on the behalf of the United States Air Force Real Property Agency. These aquifer remediation wells are part of the remediation activities at the former Griffiss Air Force Base.

Please feel free to contact me at 315-451-9560 or at john.lanier@parsons.com if you have any questions or require additional information.

Sincerely,

John H. Lanier

John H. Lanier

Project Manager

Enclosure

cc: Ms. Cathy Jerrard
Ms. Nanci Higginbotham
Project File: 746809

Type or print all information. See reverse for instructions.

OMB No. 2040-0042 Approval Expires 1/31/05

INVENTORY OF INJECTION WELLS

EPA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF GROUND WATER AND DRINKING WATER

(This information is collected under the authority of the Safe Drinking Water Act)

1. DATE PREPARED *(Year, Month, Day)*: 13-07-30

2. FACILITY ID NUMBER:

PAPERWORK REDUCTION ACT NOTICE

The public reporting burden for this collection of information is estimated at about 0.5 hour per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Chief, Information Policy Branch, 2136, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460, and to the Office of Management and Budget, Paperwork Reduction Project, Washington, DC 20503.

3. TRANSACTION TYPE *(Please mark one of the following)*

- ☐ Deletion
- ☐ First Time Entry
- ☑ Entry Change
- ☐ Replacement

4. FACILITY NAME AND LOCATION

A. NAME *(last, first, and middle initial)*: GRIFFISS AIR FORCE BASE

B. STREET ADDRESS/ROUTE NUMBER: GRIFFISS AIR FORCE BASE

C. LATITUDE

DEG	MIN	SEC
43	14	1.7016

D. LONGITUDE

DEG	MIN	SEC
-75	24	25.3002

E. TOWNSHIP/RANGE

TOWNSHIP	RANGE	SECT	1/4 SECT

F. CITY/TOWN: ROME

G. STATE: NY

H. ZIP CODE: 13440

I. NUMERIC COUNTY CODE: 065

J. INDIAN LAND *(mark "x")*: ☐ Yes ☒ No

5. LEGAL CONTACT:

A. TYPE *(mark "x")*: ☐ Owner ☒ Operator

B. NAME *(last, first, and middle initial)*: MCDERMOTT, MICHAEL

C. PHONE *(area code and number)*: (315) 356-0810

D. ORGANIZATION: AIR FORCE CIVIL ENGINEER CENTER

E. STREET/P.O. BOX: 706 BROOKS ROAD

F. CITY/TOWN: ROME

G. STATE: NY

H. ZIP CODE: 13441

I. OWNERSHIP *(mark "x")*

- ☐ PRIVATE
- ☐ PUBLIC
- ☐ SPECIFY OTHER
- ☐ STATE
- ☒ FEDERAL

6. WELL INFORMATION:

A. CLASS AND TYPE		B. NUMBER OF WELLS		C. TOTAL NUMBER OF WELLS	D. WELL OPERATION STATUS				
		COMM	NON-COMM		UC	AC	TA	PA	AN
4	R	0	67	67	53	6	8		
				0					
				0					
				0					
				0					
				0					
				0					

COMMENTS *(Optional)*:

KEY:

DEG = Degree
MIN = Minute
SEC = Second

SECT = Section
1/4 SECT = Quarter Section

COMM = Commercial
NON-COMM = Non-Commercial

AC = Active
UC = Under Construction
TA = Temporarily Abandoned
PA = Permanently Abandoned and Approved by State
AN = Permanently Abandoned and not Approved by State

USEPA REGION II
ADDITIONAL INFORMATION FOR COMPLETING INVENTORY OF INJECTION WELLS UPDATE
UICID: 08NY06508014

Updates are underlined.

Brief description characterizing your facility and the types of activities conducted:

The former GAFB is located in Oneida County, New York, and is approximately two miles northeast of the city of Rome in central New York State. The base property covers approximately 3,540 acres and is situated in the relatively broad valley of the Mohawk River at an elevation of 504 feet above mean sea level (AMSL).

Griffiss Air Force Base, originally named Rom Air Depot was activated on February 1, 1942, with the mission of storage, maintenance, and shipment of material for the U.S. Army Air Corps. Upon creation of the Air Force in 1947, the depot was renamed Griffiss AFB.

Griffiss AFB was designated for realignment under the Base Realignment and Closure Act in 1993 and 1995, resulting in deactivation of the 416th Bombardment Wing in September 1995.

On July 22, 1987, the base was listed on the United States Environmental Protection Agency (USEPA) National Priority List, which brought the installation under the federal facilities provisions of Section 120 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). In August 1990, the Air Force, the USEPA, and the New York State Department of Environmental Conseravtion (NYSDEC) entered a Federal Facilities Agreement (FFA) for environment remediation at a number of sites at the former GAFB.

As part of the USEPA and NYSDEC Records of Decision (ROD), Remedial Design Work Plan (RDWP), Remedial Action Work Plans (RAWP), and RAWP Addendum, two (2) On-Base Groundwater (OGBW) Remediation sites have underground injections wells which are used as part of remediation activities. A third site, Area of Concern (AOC) 9, also requires the use of underground injection as part of the remediation activities. The remedy for the Landfill 6 Site and the Building 817/WSA Site is enhanced bioremediation. Additional injection activities are required for enhanced bioremediation at these locations. The remedy for AOC 9 includes excavation and offsite disposal of source material followed by injection to enhance bioremediation of residual contamination.

Brief description of what you use each of your injection well(s) for:

The aquifer remediation injection wells are used as part of a selected remedy for enhanced bioremediation. This is intended to increase biodegradation of the contaminants. These remedies consist of a vegetable oil emulsion injected into six existing injection wells for Landfill 6 and eight existing temporary wells at Building 817/WSA and injection of a calcium peroxide solution into 53 temporary well points at AOC 9.

Brief description of the types of fluids that enter, or have the potential to enter, each of the injection wells:

In June 2008, the U.S. Air Force Real Property Agency received authorization to inject at 6 injection wells approximately 1,200 gallons per well of a vegetable oil emulsion for enhanced bioremediation of contamination at Landfill 6. Eight injection wells at Building 817/WSA were authorized to inject

USEPA REGION II
ADDITIONAL INFORMATION FOR COMPLETING INVENTORY OF INJECTION WELLS UPDATE
UICID: 08NY06508014

approximately 3,100 gallons per well of a vegetable oil emulsion to en hance bioremediation of contamination. This authorization was in accorda nce with the Underground Injection Control wells authorized by rule, pursuant to 40 CFR 144.24. (reference UICID: 08NY0658014; Article Number: 7005 3110 0000 5928 8399).

In August 2010, a second vegetable oil injection at Landfill 6 was approved by NYSDEC and USEPA under the site ROD. This injection event utilized the 6 injection wells at Landfill 6. Approximately 1,200 gallons of emulsified oil were inject ed into each well. A second injection at 8 injection wells at Building 817/WSA was also authorized by NYSDEC and USEPA. Approximately 6,000 gallons of a vegetable oil emulsion were injected into each well. USEPA was provided notice of these activities in accordance with the Underground Injection Control wells rule.

A third vegetable oil injection at the 6 injection wells at L andfill 6 is pla nned for October 2013 in accordance with the site ROD. The sco pe of the injection will be similar to the two previous injections at the site. An addendum to the RAWP is being prepared and will be submitted to NYSDEC and USEPA for approval.

At the AOC 9 site excavation and offsite disposal of the contaminated source material was completed in 2010 in accordance with the requirements of the ROD. The selected remedy for site also requires a down-gradient chemical injection to address residual conta mination within the site groundwater. This work is planned for October 2013. The scope of this injec tion includes the injectio n of approxi mately 4,800 gallons of calcium peroxide solution into 53 temporary well points. A RAWP for this scope of work is currently being prepared and will be submitted to NYSDEC and USEPA for approval.

APPENDIX B

PRE-DESIGN ANALYTICAL SAMPLE RESULTS

PermeOx Injection Pre-design Sampling

Pre-design sampling was recommended by FMC for the purpose of collecting information related to the PermeOx design and dosage requirements. Sampling was performed at the AOC 9 site in May 2013. Groundwater samples were taken from existing monitoring wells AOC 9 MW-19 and AOC 9 MW-14 (see Drawing 747054-C-001). A soil sample AOC 9 SS001 was taken with a hand auger from a depth of 3-feet in the area of MW-14.

The results of this analysis are shown in the table below. The laboratory report follows.

Parameter	AOC9-MW14 5/2/13	AOC9-MW19 5/2/13	GAFB-AOC9-SS001 5/2/13
Alkalinity	220 mg/L	300 mg/L	--
Chemical Oxygen Demand	U10, mg/L	U10 mg/L	--
Dissolved Oxygen	6.6. mg/L	7.4 mg/L	--
Ferrous Iron	J0.053 mg/L	U0.05 mg/L	--
Hardness	200 mg/L	180 mg/L	--
Oxidation-Reduction Potential (ORP)	+241 mV	+ 276 mV	--
Total Biochemical Oxygen Demand	20.71 mg/L	J0.81 mg/L	--
Total Organic Carbon	2.6 mg/L	3.2 mg/L	--
pH (Laboratory)	7.7 pH	7.4 pH	--
TOC in Soil	--	--	910 ug/gdrywt
Total Solids	--	--	95.00%

Katahdin
ANALYTICAL SERVICES

Cert. No. E87604

May 23, 2013

Mr. Michael Broschart
Parsons
301 Plainfield Road
Suite 350
Syracuse,NY 13212

RE: Katahdin Lab Number: SG2982
Project ID: Former Griffiss Air Force Base, Rome, NY
Project Manager: Ms. Jennifer Obrin
Sample Receipt Date(s): May 03, 2013

Dear Mr. Broschart:

Please find enclosed the following information:

* Report of Analysis (Analytical and/or Field)
* Quality Control Data Summary
* Chain of Custody (COC)
* Login Report

A copy of the Chain of Custody is included in the paginated report. The original COC is attached as an addendum to this report.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact the project manager listed above. The results contained in this report relate only to the submitted samples. This cover letter is an integral part of the ROA.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in an attached technical narrative or in the Report of Analysis.

We appreciate your continued use of our laboratory and look forward to working with you in the future. The following signature indicates technical review and acceptance of the data.

Please go to http://www.katahdinlab.com/cert.html for copies of Katahdin Analytical Services Inc. current certificates and analyte lists.

Sincerely,
KATAHDIN ANALYTICAL SERVICES

Deborah J. Nadeau
Authorized Signature

05/23/2013
Date

TECHNICAL NARRATIVE

Organics Analysis

The samples of Work Order SG2982 were analyzed in accordance with Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846, 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA, and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA, and/or for the specific methods listed below or on the Report of Analysis.

8015 TPH Analysis

The TPH range was detected below ½ the reporting limit in the method blank WG123749-1. According to the DoD QSM section D.1.1.1, a method blank is considered to be contaminated if the concentration of any target analyte in the blank exceeds ½ the reporting limit. Since the method blank was acceptable, no further action was taken.

There were no other protocol deviations or observations noted by the organics laboratory staff.

KATAHDIN ANALYTICAL SERVICES - ORGANIC DATA QUALIFIERS

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U — Indicates the compound was analyzed for but not detected above the specified level. This level may be the Limit of Quantitation (LOQ)(previously called Practical Quantitation Level (PQL)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL/LOQ or "U" LOD, where the rate of false negatives is <1%.

* — Compound recovery outside of quality control limits.

D — Indicates the result was obtained from analysis of a diluted sample. Surrogate recoveries may not be calculable.

E — Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J — Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Limit of Quantitation (LOQ)(previously called Practical Quantitation Limit (PQL)), but above the Method Detection Limit (MDL).

or

J — Used for Pesticides, PCBs, Herbicides, Formaldehyde, Explosives and Method 504.1 analytes when there is a greater than 40% difference for detected concentrations between the two GC columns.

B — Indicates the analyte was detected in the laboratory method blank analyzed concurrently with the sample.

C — Indicates that the flagged compound did not meet DoD criteria in the corresponding daily calibration verification (CV).

L — Indicates that the flagged compound did not meet DoD criteria in the corresponding Laboratory Control Sample (LCS) and/or Laboratory Control Sample Duplicate (LCSD) prepared and/or analyzed concurrently with the sample.

M — Indicates that the flagged compound did not meet DoD criteria in the Matrix Spike and/or Matrix Spike Duplicate prepared and/or analyzed concurrently with the native sample.

N — Presumptive evidence of a compound based on a mass spectral library search.

A — Indicates that a tentatively identified compound is a suspected aldol-condensation product.

P — Used for Pesticide/Aroclor analyte when there is a greater than 25% difference for detected concentrations between the two GC columns. (for CLP methods only).

KATAHDIN ANALYTICAL SERVICES – INORGANIC DATA QUALIFIERS
(Refer to BOD Qualifiers Page for BOD footnotes)

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Limit of Quantitation (LOQ)(previously called Practical Quantitation Level (PQL)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL/LOQ or "U" LOD, where the rate of false negatives is <1%.

E Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Limit of Quantitation (LOQ)(previously called Practical Quantitation Limit (PQL)), but above the Method Detection Limit (MDL).

I-7 The laboratory's Practical Quantitation Level could not be achieved for this parameter due to sample composition, matrix effects, sample volume, or quantity used for analysis.

A-4 Please refer to cover letter or narrative for further information.

MCL Maximum Contaminant Level

NL No limit

NFL No Free Liquid Present

FLP Free Liquid Present

NOD No Odor Detected

TON Threshold Odor Number

H_ Please note that the regulatory holding time for _____ is "analyze immediately". Ideally, this analysis must be performed in the field at the time of sample collection. _____ for this sample was not performed at the time of sample collection. The analysis was performed as soon as possible after receipt by the laboratory.

H1	pH
H2	DO
H3	sulfite
H4	residual chlorine

T1 The client did not provide the full volume of at least one liter for analysis of TSS. Therefore, the PQL of 2.5 mg/L could not be achieved.

T2 The client provided the required volume of at least one liter for analysis of TSS, but the laboratory could not filter the full one liter volume due to the sample matrix. Therefore, the PQL of 2.5 mg/L could not be achieved.

KATAHDIN ANALYTICAL SERVICES - BOD DATA QUALIFIERS

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Limit of Quantitation (LOQ)(previously called Practical Quantitation Level (PQL)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Limit of Quantitation (LOQ)(previously called Practical Quantitation Limit (PQL)), but above the Method Detection Limit (MDL).

I-7 The laboratory's Practical Quantitation Level could not be achieved for this parameter due to sample composition, matrix effects, sample volume, or quantity used for analysis.

A-4 Please refer to cover letter or narrative for further information.

D-1 As required by Method 5210B, APHA Standard Methods for the Examination of Water and Wastewater (21st edition), the BOD value reported for this sample is 'qualified' because the check standard run concurrently with the sample analysis did not meet the criteria specified in the method (198 +/- 30.5 mg/L). The actual check standard value was ~ mg/L.

D-9 As required by Method 5210B, APHA Standard Methods for the Examination of Water and Wastewater (21stedition), the CBOD value reported for this sample is 'qualified' because the check standard run concurrently with the sample analysis did not meet the laboratory specified criteria of 198 +/- 30.5 mg/L. The actual check standard value was ~ mg/L.

D-7 The dilution water used to prepare this sample did not meet the criteria of less than 0.2 mg/L dissolved oxygen (DO) uptake over the five day period of incubation. The measured DO uptake for the dilution water was ~ mg/L for the sample. The BOD determination does not correct for DO uptake by the dilution water; therefore, when the dilution water uptake exceeds the absolute value of 0.2 mg/L, the dilution water may appear as measurable BOD in the sample and result in a negative bias to the reported value.

D-11 The dilution water used to prepare this sample did not meet the criterion of less than 0.2 mg/L dissolved oxygen (DO) uptake over the five day period of incubation. The measured DO uptake for the dilution water was ~ mg/L for the sample. The BOD determination does not correct for DO uptake by the dilution water; therefore, when the dilution water uptake exceeds 0.2 mg/L, the dilution water may appear as measurable BOD in the sample and result in a positive bias in the reported value.

D-2 Oxygen depletion exceeded the limiting value of 1 mg/L during incubation. Reported BOD result was calculated assuming a final oxygen concentration equal to 1 mg/L.

Katahdin
ANALYTICAL SERVICES

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Cert No E87604

Report of Analytical Results

Client: PARSONS
Lab ID: SG2982-1
Client ID: AOC9-MW19
Project: Former Griffiss Air Force Bas
SDG: SG2982
Lab File ID: AGE20035.D

Sample Date: 02-MAY-13
Received Date: 03-MAY-13
Extract Date: 07-MAY-13
Extracted By: JH
Extraction Method: SW846 3510
Lab Prep Batch: WG123749

Analysis Date: 08-MAY-13
Analyst: JLP
Analysis Method: SW846 M8015B
Matrix: AQ
% Solids: NA
Report Date: 16-MAY-13

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Extractable TPH C9-C36		100	ug/L	1	75	71.	8.7	53.
o-Terphenyl		99.5	%					

Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://www.katahdinlab.com

Katahdin
ANALYTICAL SERVICES

ACCREDITED IN ACCORDANCE WITH nelac
Cert No E87604

Report of Analytical Results

Client: PARSONS
Lab ID: SG2982-2
Client ID: AOC9-MW14
Project: Former Griffiss Air Force Bas
SDG: SG2982
Lab File ID: AGE20036.D

Sample Date: 02-MAY-13
Received Date: 03-MAY-13
Extract Date: 07-MAY-13
Extracted By: JH
Extraction Method: SW846 3510
Lab Prep Batch: WG123749

Analysis Date: 08-MAY-13
Analyst: JLP
Analysis Method: SW846 M8015B
Matrix: AQ
% Solids: NA
Report Date: 16-MAY-13

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Extractable TPH C9-C36		150	ug/L	1	75	71.	8.7	53.
o-Terphenyl		99.5	%					

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://www.katahdinlab.com

Method Blank Summary

Lab Name : Katahdin Analytical Services
Project : Former Griffiss Air Force Base, Rome, NY
Lab File ID : AGE20032.D
Instrument ID : GC10
Matrix : AQ

SDG : SG2982
Lab Sample ID : WG123749-1
Date Extracted : 07-MAY-13
Date Analyzed : 08-MAY-13
Time Analyzed : 15:39

This Method Blank applies to the following samples, LCS, MS and MSD:

Client Sample ID	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
Laboratory Control S	WG123749-2	AGE20033	05/08/13	16:14
Laboratory Control S	WG123749-3	AGE20034	05/08/13	16:49
AOC9-MW19	SG2982-1	AGE20035	05/08/13	17:24
AOC9-MW14	SG2982-2	AGE20036	05/08/13	17:59

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client:
Lab ID: WG123749-1
Client ID: Method Blank Sample
Project:
SDG: SG2982
Lab File ID: AGE20032.D

Sample Date:
Received Date:
Extract Date: 07-MAY-13
Extracted By: JH
Extraction Method: SW846 3510
Lab Prep Batch: WG123749

Analysis Date: 08-MAY-13
Analyst: JLP
Analysis Method: SW846 M8015B
Matrix: AQ
% Solids: NA
Report Date: 16-MAY-13

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Extractable TPH C9-C36	J	18.	ug/L	1	75	75.	9.1	56.
o-Terphenyl		86.5	%					

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Tel:(207) 874-2400 Fax:(207) 775-4029

http://www.katahdinlab.com

Katahdin
ANALYTICAL SERVICES

Cert No E87604

LCS/LCSD Recovery Report

LCS ID: WG123749-2
LCSD ID: WG123749-3
Project:
SDG: SG2982
Report Date: 16-MAY-13
LCS File ID: AGE20033.D

Received Date:
Extract Date: 07-MAY-13
Extracted By: JH
Extraction Method: SW846 3510
Lab Prep Batch: WG123749
LCSD File ID: AGE20034.D

Analysis Date: 08-MAY-13
Analyst: JLP
Analysis Method: SW846 M8015B
Matrix: AQ
% Solids: NA

Compound	Spike Amt	LCS Conc	LCS Rec (%)	LCSD Conc	LCSD Rec (%)	Conc Units	RPD (%)	RPD Limit	Limits
Extractable TPH C9-C36	500.	415.	83.0	427.	85.4	ug/L	3	30	45-118
o-Terphenyl			95.0		94.0				51-103

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Tel:(207) 874-2400 Fax:(207) 775-4029

http://www.katahdinlab.com

Katahdin
ANALYTICAL SERVICES

Accredited in accordance with nelac
Cert No E87604

Report of Analytical Results

Client: Michael Broschart
Parsons
301 Plainfield Road
Syracuse,NY 13212

Lab Sample ID: SG2982-1
Report Date: 23-MAY-13
Client PO: non-po
Project: Former Griffiss Air
SDG: SG2982

Sample Description	Matrix	Date Sampled	Date Received
AOC9-MW19	AQ	02-MAY-13	03-MAY-13

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Alkalinity	300 mg/L	5.0	0.23	4.0	STDM 2320B	WG124089	10-MAY-13 12:00:00	N/A	N/A	
Chemical Oxygen Demand	U10. mg/L	15.	3.8	10.	EPA 410.4	WG123840	07-MAY-13 14:51:00	N/A	N/A	
Dissolved Oxygen	7.4 mg/L	0	0	N/A	EPA 360.1	WG123687	03-MAY-13 12:16:00	N/A	N/A	H2
Ferrous Iron	U0.05 mg/L	0.10	0.026	.05	STDM 3500D	WG123654	03-MAY-13 10:58:00	N/A	03-MAY-13	
Hardness	280 mg/L	5.0	1.6	2.5	SM2340C	WG124457	22-MAY-13 13:15:00	N/A	N/A	
Oxidation-Reduction Potential (ORP)	+276 mV			N/A	ASTM D1498-08	WG124444	03-MAY-13 12:17:00	N/A	N/A	
Total Biochemical Oxygen Demand	J0.81 mg/L	2.0	0.23	1.0	SM 5210B	WG123684	08-MAY-13 09:18:00	SM 5210B	03-MAY-13 10:04	
Total Organic Carbon	3.2 mg/L	1.0	0.10	0.50	SM5310B	WG124431	20-MAY-13 18:20:14	N/A	N/A	
pH(Laboratory)	7.4 pH	0.10	0.10	N/A	SW846 9040B	WG123759	06-MAY-13 12:40:00	N/A	N/A	

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Michael Broschart
Parsons
301 Plainfield Road
Syracuse,NY 13212

Lab Sample ID: SG2982-2
Report Date: 23-MAY-13
Client PO: non-po
Project: Former Griffiss Air
SDG: SG2982

Sample Description	Matrix	Date Sampled	Date Received
AOC9-MW14	AQ	02-MAY-13	03-MAY-13

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Alkalinity	220 mg/L	5.0	0.23	4.0	STDM 2320B	WG124089	10-MAY-13 12:00:00	N/A	N/A	
Chemical Oxygen Demand	U10. mg/L	15.	3.8	10.	EPA 410.4	WG123840	07-MAY-13 14:54:00	N/A	N/A	
Dissolved Oxygen	6.6 mg/L	0	0	N/A	EPA 360.1	WG123687	03-MAY-13 12:16:00	N/A	N/A	H2
Ferrous Iron	J0.053 mg/L	0.10	0.026	.05	STDM 3500D	WG123654	03-MAY-13 10:58:00	N/A	03-MAY-13	
Hardness	200 mg/L	5.0	1.6	2.5	SM2340C	WG124457	22-MAY-13 13:15:00	N/A	N/A	
Oxidation-Reduction Potential (ORP)	+241 mV			N/A	ASTM D1498-08	WG124444	03-MAY-13 12:20:00	N/A	N/A	
Total Biochemical Oxygen Demand	J0.71 mg/L	2.0	0.23	1.0	SM 5210B	WG123684	08-MAY-13 09:14:00	SM 5210B	03-MAY-13 10:00	
Total Organic Carbon	2.6 mg/L	1.0	0.10	0.50	SM5310B	WG124431	20-MAY-13 18:55:46	N/A	N/A	
pH(Laboratory)	7.7 pH	0.10	0.10	N/A	SW846 9040B	WG123759	06-MAY-13 12:50:00	N/A	N/A	

Katahdin
ANALYTICAL SERVICES

Accredited in accordance with nelac
Cert No E87604

Report of Analytical Results

Client: Michael Broschart
Parsons
301 Plainfield Road
Syracuse,NY 13212

Lab Sample ID: SG2982-3
Report Date: 23-MAY-13
Client PO: non-po
Project: Former Griffiss Air
SDG: SG2982

Sample Description	Matrix	Date Sampled	Date Received
GAFB-AOC9-SS001	SL	02-MAY-13	03-MAY-13

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
TOC In Soil	910 ug/gdrywt	420	89.	320	LLOYDKAHN	WG124156	15-MAY-13 16:47:35	N/A	15-MAY-13	
Total Solids	95. %	1		N/A	SM2540G	WG123690	07-MAY-13 07:10:02	SM2540G	06-MAY-13	

Katahdin
ANALYTICAL SERVICES

ACCREDITED IN ACCORDANCE WITH
nelac
Cert No E87604

Quality Control Report

Blank Sample Summary Report

Alkalinity

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL	LOD
MBLANK	WG124089	SM2320B	10-MAY-13	N/A	J 0.41 mg/L	5.0 mg/L	4.0

Chemical Oxygen Demand

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL	LOD
MBLANK	WG123840	EPA 410.4	07-MAY-13	N/A	U 10. mg/L	15. mg/L	10.

Ferrous Iron

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL	LOD
MBLANK	WG123654	SM 3500FE D	03-MAY-13	03-MAY-13	U 0.050 mg/L	0.10 mg/L	0.050

Hardness

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL	LOD
MBLANK	WG124457	SM 2340C	22-MAY-13	N/A	U 5.0 mg/L	5.0 mg/L	N/A

TOC in Soil

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL	LOD
MBLANK	WG124156	Lloyd Kahn	15-MAY-13	15-MAY-13	U 300 ug/gdrywt	400 ug/gdrywt	300

Total Biochemical Oxygen Demand

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL	LOD
MBLANK	WG123684	SM 5210B	08-MAY-13	03-MAY-13	U 1.0 mg/L	2.0 mg/L	1.0

Total Organic Carbon

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL	LOD
MBLANK	WG124431	SM5310B	20-MAY-13	N/A	J 0.85 mg/L	1.0 mg/L	0.50

Total Solids

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL	LOD
MBLANK	WG123690	SM2540	07-MAY-13	06-MAY-13	U 1 %	1 %	N/A

Quality Control Report

Laboratory Control Sample Summary Report

Alkalinity

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG124089-2	LCS	WG124089	10-MAY-13	N/A	mg/L	120	130	110	80-120	

Chemical Oxygen Demand

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG123840-2	LCS	WG123840	07-MAY-13	N/A	mg/L	75	71.	94.9	90-110	

Ferrous Iron

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG123654-2	LCS	WG123654	03-MAY-13	03-MAY-13	mg/L	139.71	130	96	80-120	

Hardness

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG124457-2	LCS	WG124457	22-MAY-13	N/A	mg/L	150	170	117	80-120	

Oxidation-Reduction Potential (ORP)

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG124444-1	LCS	WG124444	03-MAY-13	N/A	mV	200	+191	96	80-120	

TOC In Soil

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG124156-2	LCS	WG124156	15-MAY-13	15-MAY-13	ug/gdrywt	400000.000	360000	90	80-120	
WG124156-3	LCSD	WG124156	15-MAY-13	15-MAY-13	ug/gdrywt	400000.000	340000	84	80-120	7

Total Biochemical Oxygen Demand

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG123684-2	LCS	WG123684	08-MAY-13	03-MAY-13	mg/L	198	200	101	85-115	

Total Organic Carbon

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG124431-2	LCS	WG124431	20-MAY-13	N/A	mg/L	50	42.	84	80-120	

Total Solids

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG123690-2	LCS	WG123690	07-MAY-13	06-MAY-13	%	90	94.	104	80-120	

pH(Laboratory)

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG123759-1	LCS	WG123759	06-MAY-13	N/A	pH	7	7.0	99	80-120	

Katahdin Analytical Services, Inc.

Sample Receipt Condition Report

Client: Parsons	KAS PM: ~~SW~~ JO	Sampled By: Client
Project:	KIMS Entry By: GW	Delivered By: Fed Ex
KAS Work Order#: SG2982	KIMS Review By:	Received By: GW
SDG #:	Cooler: 1 of 1	Date/Time Rec.: 5-3-13/0900

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 5.3
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea				✓	
Soil/Sediment: Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

Katahdin ANALYTICAL SERVICES

600 Technology Way
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Page 1 of 1

Client	Contact	Phone #	Fax #
Parsons	Mike Broschart	(315) 451 9560	(315) 451 957-

Address	City	State	Zip Code
301 Plainfield Rd	Syracuse	NY	13212

Purchase Order #	Proj. Name / No.	Katahdin Quote #
747054	GAFB AOC9 Site	

Bill (if different than above) Address

Sampler (Print / Sign) Dale E. Dolph DEF. Dolph

Copies To:

LAB USE ONLY WORK ORDER #: SG2982

KATAHDIN PROJECT NUMBER

REMARKS:

SHIPPING INFO: ☒ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO:

TEMP°C ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	ANALYSIS AND CONTAINER TYPE PRESERVATIVES: TOC	TPH	COD	Ferrous Iron	Hard/pH/Do/Eh/Alk	BOD				
					Filt. ☐Y ☒N	Filt. ☐Y ☒N	Filt. ☐Y ☒N	Filt. ☐Y ☒N	Filt. ☐Y ☒N	Filt. ☐Y ☒N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N
	AOC9-MW19	5-2-13 / 1420	GW	8	X	X	X	X	X	X				
	AOC9-MW14	5-2-13 / 1550	GW	8	X	X	X	X	X	X				
	GAFB-AOC9-SS001	5-2-13 / 1620	Soil	1	X									

DEF. Dolph 5-2-13

COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
DEF. Dolph	5-2-13 1750	Fedex			
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

ORIGINAL

Katahdin ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

May. 03, 2013
11:03 AM

ogin Number: SG2982

Account: PARSONS002 NoWeb
PARSONS

Project: PNGFS001
Former Griffiss Air Force Base, Rome, N

Quote/Incoming: PNGFS

Primary Report Address:
Michael Broschart
Parsons
301 Plainfield Road
Suite 350
Syracuse,NY 13212
Michael.Broschart@parsons.com

Primary Invoice Address:
Attn: Ronald Bates
PARSONS
401 Diamond Drive, NW

Huntsville,AL 35806

Report CC Addresses:
Invoice CC Addresses:

Login Information:

ANALYSIS INSTRUCTIONS	:	DOD QSM with DOD limits. ND to LOD. "J" flag between MDL and LOQ.
CHECK NO.	:	
CLIENT PO#	:	non-po
CLIENT PROJECT MANAGE	:	
CONTRACT	:	
COOLER TEMPERATURE	:	5.3
DELIVERY SERVICES	:	Fed Ex
EDD FORMAT	:	
LOGIN INITIALS	:	DM
PM	:	JO
PROJECT NAME	:	Former Griffiss Air Force Base, Rome, NY
QC LEVEL	:	II
REGULATORY LIST	:	
REPORT INSTRUCTIONS	:	Email PDF to Michael Broschart.
SDG ID	:	
SDG STATUS	:	

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SG2982-1	AOC9-MW19	02-MAY-13 14:20	03-MAY-13			22-MAY-13	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	ASTM-D1498-EH	30-MAY-13	8oz Glass		
Aqueous	S	E360.1-DO-LAB	03-MAY-13	500mL Plastic		
Aqueous	S	E410.4-COD-COLOR	30-MAY-13	250mL Plastic+H2SO4		
Aqueous	S	SM2320B-ALKALINITY	16-MAY-13	125mL Plastic		
Aqueous	S	SM2340C-HARDNESS	29-OCT-13	125mL Plastic+HNO3		
Aqueous	S	SM3500D-FERROUS IRON	03-MAY-13	1000mL Plastic		
Aqueous	S	SM5210B-TBOD	04-MAY-13	250mL Plastic		
Aqueous	S	SM5310B-TOC	30-MAY-13	40 mL Vial+H2SO4		
Aqueous	S	SW8015M-TPH	09-MAY-13	1L N-Amber Glass		
Aqueous	S	SW9040B-PH	03-MAY-13	125mL Plastic		

SG2982-2	AOC9-MW14	02-MAY-13 15:50	03-MAY-13			22-MAY-13	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	ASTM-D1498-EH	30-MAY-13	8oz Glass		
Aqueous	S	E360.1-DO-LAB	03-MAY-13	500mL Plastic		
Aqueous	S	E410.4-COD-COLOR	30-MAY-13	250mL Plastic+H2SO4		
Aqueous	S	SM2320B-ALKALINITY	16-MAY-13	125mL Plastic		
Aqueous	S	SM2340C-HARDNESS	29-OCT-13	125mL Plastic+HNO3		
Aqueous	S	SM3500D-FERROUS IRON	03-MAY-13	1000mL Plastic		
Aqueous	S	SM5210B-TBOD	04-MAY-13	250mL Plastic		
Aqueous	S	SM5310B-TOC	30-MAY-13	40 mL Vial+H2SO4		
Aqueous	S	SW8015M-TPH	09-MAY-13	1L N-Amber Glass		
Aqueous	S	SW9040B-PH	03-MAY-13	125mL Plastic		

SG2982-3	GAFB-AOC9-SS001	02-MAY-13 16:20	03-MAY-13		22-MAY-13	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Solid	S	LLOYDKAHN-TOCSOIL	16-MAY-13	4oz Glass		
Solid	S	TS	01-JUN-13	4oz Glass		

Total Samples: **3** ***Total Analyses:*** **22**

05.03.13

APPENDIX C

PERMEOX ESTIMATE

FMC

ENVIRONMENTAL SOLUTIONS

Via Email: michael.broschart@parsons.com

May 29, 2013

Michael B. Broschart
Project Manager
PARSONS
301 Plainfield Road Suite 350 ♦ Syracuse, N.Y. 13212
Phone – 315.552.9678 ♦ Mobile – 315.559.2152
michael.broschart@parsons.com ♦ www.parsons.com

Subject: Treatment of Chlorobenzenes using PermeOx Plus
Griffiss AFB, Rome, NY

UNDERSTANDING SITE CONDITIONS AND GOALS

The site is located in NY here groundwater is contaminated primarily with mono-chlorobenzene (CB) above the treatment standards. The site conditions/contaminant concentrations are summarized in **Table 1** and **Table 2** below.

Table 1: Site Overview

Project	Griffiss AFB
Background	Site was a landfill and historic operations resulted in CB contamination .
Area of Interest	▪ 6,000 ft^2, ▪ Depth to groundwater is 12 ft below ground surface (bgs), ▪ Assume the thickness of the saturated zone requiring treatment is 13 feet (12 to 25 ft bgs).
Geology	Silty fine-medium grained sand
Hydrogeology	Porosity: 0.30, Hydraulic gradient:0.25, Hydraulic conductivity: 10^{-3} cm/s, GW velocity :1.3 ft/day
Geochemical data	pH: 7-7.7, ORP -100 to +200 mV, DO :0-6 mg/L

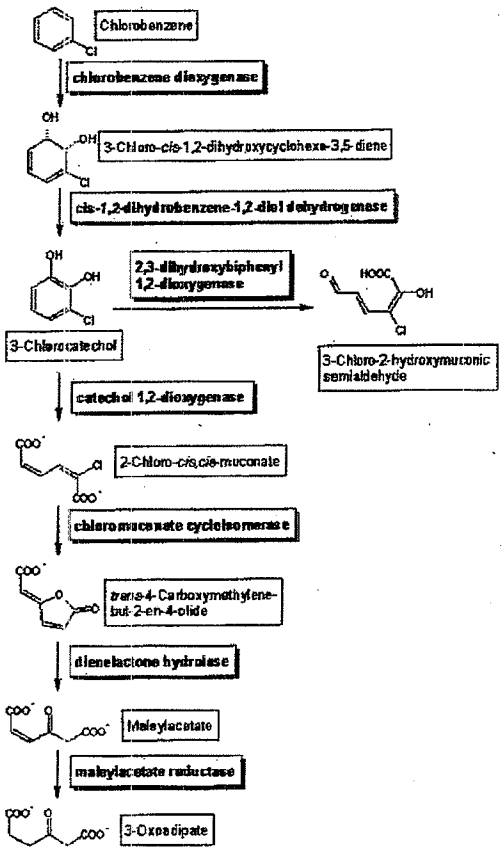
Table 2: Groundwater average CB concentrations (mg/L)

Contaminants	Average (mg/L	Treatment goal (mg/L)
CB	0.19	0.005
1,2-DCB	0.024	0.003
1,4-DCB	0.021	0.003

Aerobic degradation of chlorobenzenes

Under aerobic conditions, certain bacteria use CB as the sole source of carbon and energy but do not grow on other (chloro) aromatic compounds. CB is attacked by chlorobenzene dioxygenase, and, after re-aromatization, the resulting chlorocatechol is degraded via a modified *ortho* pathway, as described by (Werlen et al., 1996)(**Figure 1**)

Figure 1: CB aerobic biodegradation pathway
http://umbbd.msi.umn.edu/cb/cb_image_map.html



PermeOx plus will be injected into the area measuring 100 ft wide x 60 ft long x 13 ft deep (from 12 to 25 ft bgs) at an application rate of approximately 0.11% to soil mass. The material is provided in 25-lb bags as a dry powder and mixed with water on site into slurry. Assuming installation through direct push injections and a radius of influence of about 6 ft, the injection points could be spaced 12 ft apart, which results in a total of 53 injection points and 189 lbs of PermeOx plus per point. This estimate could be refined when an injection approach has been selected based on recommendations from the injection contractor. In addition, we recommend performing the injections top-down and/or to use an injection tip that directs the slurry horizontally (for example Geoprobe's pressure-activated tip). **Table 3** gives the requirements and mixing details.

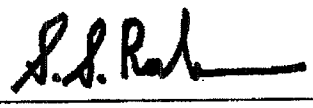
Table 3. Conceptual Estimate for area of interest

Summary of Estimate:		
Treatment Area Dimensions:		
Length of Treatment Area	60.0	ft
Width of Treatment Area	100.0	ft
Depth of Treatment Area	13.0	ft
Treatment Volume	78,000	ft3
Assumptions:		
Soil bulk density	94.0	lbs/ft3
Porosity	35%	
Fraction organic carbon	0.005	
PermeOx plus requirements based on COIs:		
PermeOx plus estimated oxygen release	18.0%	
Mass of pore water and solids	9,024,389	lbs
PermeOx plus Application rate	0.11%	
PermeOx plus Mass	10,008	lbs
Total mass PermeOx plus required	10,000	lbs
Preparation of PermeOx plus solution:		
Concentration of PermeOx plus slurry to inject	20%	by weight
Total volume of water required	4,794	USG

Approximate volume of slurry to inject	5,992	USG
Installation:		
Injection spacing	12	ft
Number of injection points	53	locations
Mass PermeOx plus per location	189	lbs/location
Volume PermeOx plus injected per location	113	USG/location
% Injection Solution to Pore Volume	3%	of pore volume

On behalf of FMC Environmental Solutions, I thank you for your interest in our products and technologies. Please contact me by telephone at (908) 688-8543 or by email at Ravi.Srirangam@fmc.com if you have any questions.

Yours truly,
FMC Environmental Solutions



Ravikumar Srirangam, Ph.D.
Technical Manager

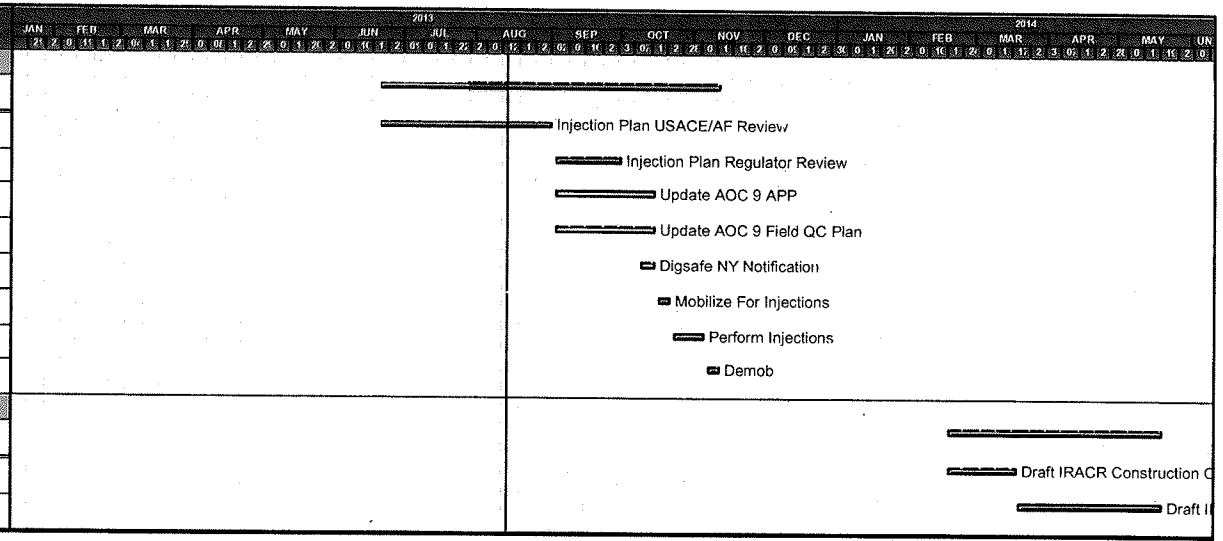
Cc: Julie Paule

PermeOx plus® is a trademark of FMC Corporation

APPENDIX D

PRELIMINARY INJECTION SCHEDULE

	Description	Orig Dur	Rem Dur	Early Start	Early Finish
PermeOx Injection Activities					
		104d	67d	20JUN13 A	13NOV13
1200	Injection Plan USACE/AF Review	22d	15d	20JUN13 A	02SEP13
1210	Injection Plan Regulator Review	22d	22d	03SEP13	02OCT13
1212	Update AOC 9 APP	32d	32d	03SEP13	16OCT13
1214	Update AOC 9 Field QC Plan	32d	32d	03SEP13	16OCT13
1216	Digsafe NY Notification	5d	5d	10OCT13	16OCT13
1220	Mobilize For Injections	5d	5d	17OCT13	23OCT13
1230	Perform Injections	10d	10d	24OCT13	06NOV13
1240	Demob	5d	5d	07NOV13	13NOV13
AOC 9 IRACR Report					
		66d	66d	18FEB14	20MAY14
1250	Draft IRACR Construction Complete USACE/AF Rev	22d	22d	18FEB14	19MAR14
1260	Draft IRACR Regulator Review	44d	44d	20MAR14	20MAY14



Start date	01OCT11
Finish date	20MAY14
Data date	13AUG13
Run date	22AUG13
Page number	1A
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Parsons
AOC 9 2013 Injection Schedule

Early bar
Progress bar
Critical bar
Summary bar
Start milestone poin
Finish milestone poi

APPENDIX E

PERMEOX INJECTION PROCEDURES AND MSDS SHEETS

Procedures for injection of PERMEOX

1. Inspect all hoses, air and injection lines for any cracks or potential spots that could break and leak.
2. Read PERMEOx MSDS sheet prior to chemical handling for any risks involved and recommended use of PPE by chemical manufacturer.
3. Inspect mixing tank for any residual chemicals. If needed flush out tank with tap water prior to injections to mitigate any adverse chemical reactions.
4. When attaching air hoses use whip-stops on both connections at the compressor and the pump.
5. While connecting injection lines, check for locking cam locks. If the cam locks are not locking, wrap connections in duct tape to keep attachments from coming loose.
6. Make sure that the specifications of the geoprobe injection pump (or an equivalent) associated valves, gauges, injection hose, injection head, and Geoprobe rods have all been reviewed and approved by a Professional Engineer. Use of additional injection hardware, piping, or hoses are not allowed unless approved by a Professional Engineer.

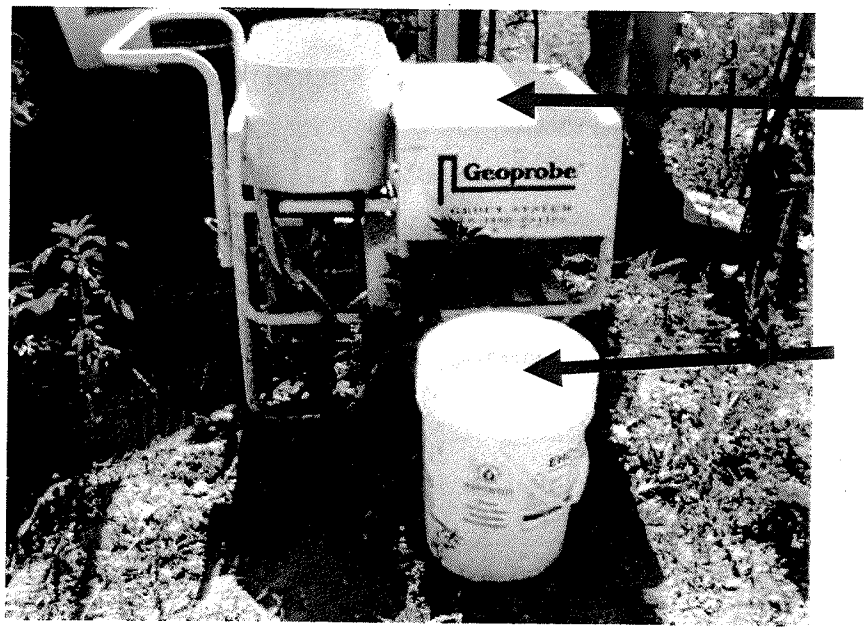


Figure 1: GeoProbe pump for PERMEOX injections

7. Don level D PPE and a respirator prior to adding chemicals to the mixing unit.

8. Add PERMEOX to the mixing unit. Continuous mixing is required to keep the PERMEOX in suspension

Figure 2: PERMEOX mixing

9. **Wear all proper PPE and safety glasses during this process.** Splashing will occur if mixing paddles are rotated too quickly. Keep hands away from the mixing paddles

10. Mix the slurry using the mixing paddles and adjusting the rotation with the control level..

11. Prepare for injection by closing off the re-circulating valve and opening up the valve to the injection line. Typical injection pressures range from 40-100 psi; however, higher pressures (from 100-200 psi).may be required based on the lithology of Site and depth of the injections. Due to the high pressures, all working personnel will wear safety glasses at all times.

Figure 3: PERMEOX Injection Set Up

12. Open the valve at the injection head and charge the line at approx 20 to 60 psi. The pump will not stop when the line is charged; therefore, control the pressure by strokes of the piston pump (2-3 strokes). Once the line is charged lift the Geoprobe rods and continue injections.

13. In between injection intervals, shut off the pump using the control level to stop injections.

14. Relieve any backpressure by opening the injection valves and the re-circulation valves together to relieve any pressure back into the tank.

15. Once the backpressure has been relieved close the re-circulation lines and wait for some time to resume injections.

16. Continue mixing the PERMEOX solution with the mixing paddles during injection.

17. Upon completion of all injections of a single chemical, clean out the tank, lines, pump and plumbing before adding a new chemical to the tank. This is best done by rinsing the tank as the last injection is finishing, the water will clean the insides of the tank and will flush the lines. Once this is complete, drain the lines and the pumps of all residual liquids in an approved area.

18. When all injection activities are completed, completely decontaminate all equipment prior to leaving the site.

19. All decontamination rinse liquids and related materials will be drummed and left on site for disposal by others..

General Recommendations

- PERMEOX is typically injected as 20% solids slurry into the sub-surface using a GeoProbe and slurry injection pumps and is not designed for injection through wells.
- Adventus recommends injecting the material so that the %injection solution to pore volume used is not more than 10 -15%. If the proposed amount of PERMEOX slurry is more than 15% of the pore space volume, we recommend injecting the proposed amount of PERMEOX slurry in multiple applications. The entire amount if injected in a single application will displace the hydrocarbon plume
- The ease of PERMEOX injections depends on the formation at the site. The GeoProbe slurry pump shown above might not be the best choice in all geological conditions. The ChemGrout unit (CG-500) shown below is a high pressure air operated pump unit suited for injecting under tight subsurface conditions.

Borehole Plugging Procedure

1. Upon completion of injection activities and removal of the Geoprobe injection rods, fill the borehole with bentonite Hole Plug. Note: Bentonite Hole Plug does not hydrate very quickly and is dense enough to fall below the water table surface and will provide a good seal. Cement grout should be avoided since it is possible to displace the grout in subsequent injections nearby.
2. Bentonite granular material may be placed in the borehole above the water table surface and is preferred when a fast-hydration is needed. Do not use below the water table because bridging will occur.

3. Fill the last few inches of the borehole with native soils or asphalt patch or cement patch in paved areas.

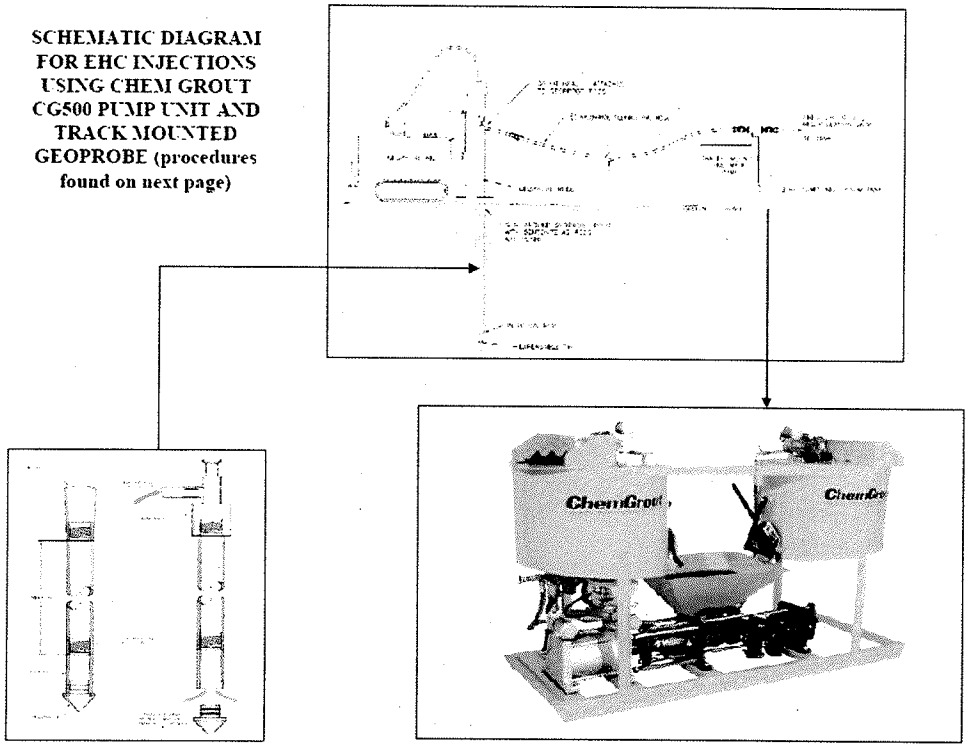


Figure 4: Chemical grout pump (CG-500)

Material Safety Data Sheet

PermeOx® Plus

MSDS #: 4365-C
Revision Date: 2010-09-29
Version 1

This MSDS has been prepared to meet U.S. OSHA Hazard Communication Standard 29 CFR 1910.1200
And Canadian Workplace Hazardous Materials Information System (WHMIS) requirements.

1. PRODUCT AND COMPANY IDENTIFICATION

Product name **PermeOx® Plus**
Synonyms PermeOx-Solid Peroxygen, Calcium Superoxide, Calcium Peroxide

Recommended use: Environmental applications

Manufacturer

FMC CORPORATION
FMC Peroxygens
1735 Market Street
Philadelphia, PA 19103
Phone: +1 215/ 299-6000 (General Information)
E-Mail: msdsinfo@fmc.com

Emergency telephone number

For leak, fire, spill or accident emergencies, call:
1 800 / 424 9300 (CHEMTREC - U.S.A.)
1 703 / 527 3887 (CHEMTREC - Collect - All Other Countries)
1 303 / 595 9048 (Medical - U.S. - Call Collect)

2. HAZARDS IDENTIFICATION

Emergency Overview

Oxidizer
Contact with combustible material may cause fire
Severely irritating (eyes)

Potential health effects

Principle Routes of Exposure: Eye contact Inhalation

Eyes Severely irritating (eyes).
Skin Non-irritating during normal use.
Inhalation Irritating to respiratory system.
Ingestion Not an expected route of exposure. Low oral toxicity.

Chronic Toxicity No known effect.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients

Chemical Name	CAS-No	Weight %
Calcium Peroxide	1305-79-9	>75
Calcium Hydroxide	1305-62-0	<25

4. FIRST AID MEASURES

Eye contact — Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If irritation persists, call a physician.

Skin contact — Wash skin with soap and water. Get medical attention if irritation develops and persists.

Inhalation — Move to fresh air. If symptoms persist, call a physician.

Ingestion — Rinse mouth with water and afterwards drink plenty of water or milk. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Get medical attention.

5. FIRE-FIGHTING MEASURES

Flammable properties — Not combustible.

Flash Point — Not flammable

Suitable extinguishing media — Use plenty of water - FLOOD IT! If water is not available, use CO_2, dry chemical or dirt.

Unsuitable Extinguishing Media — Dry chemical. Foam.

Contains a chemical that is an oxidizer

Hazardous combustion products — On decomposition product releases oxygen which may intensify fire.

Explosion Data

Sensitivity to Mechanical Impact — Oxidizable materials can be ignited by grinding and may become explosive

Sensitivity to Static Discharge — Not available

Specific hazards arising from the chemical — This is a strong oxidizer and will react vigorously or explosively with many materials including fuels. Cool drums with water spray.

Protective equipment and precautions for firefighters — As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Move containers from fire area if you can do it without risk.

NFPA	Health Hazard 2	Flammability 0	Stability 1	Special Hazards OX

6. ACCIDENTAL RELEASE MEASURES

Personal precautions — Avoid dust formation. For personal protection see section 8.

Methods for containment — Confine spill and place into container. Do not return product to the original storage container/tank due to risk of decomposition. Dilute with large quantities of water. Keep in suitable and closed containers for disposal.

Methods for cleaning up — Do not flush powdered material to sewer. Runoff to sewer may create fire or explosion hazard. Dispose of waste as indicated in Section 13.

7. HANDLING AND STORAGE

Handling — In case of insufficient ventilation, wear suitable respiratory equipment if release of airborne dust is expected. If compounded with organics or combustible materials be sure to exclude moisture. Avoid contact by using personal protective equipment. Refer to Section 8.

Storage — Keep tightly closed in a dry and cool place. Reacts with moisture. Keep away from heat and sources of ignition i.e., steam pipes, radiant heaters, hot air vents or welding sparks. .

8. Exposure controls/personal protection

Exposure guidelines Ingredients with workplace control parameters.

Chemical Name	British Columbia	Quebec	Ontario TWAEV	Alberta
Calcium Hydroxide 1305-62-0	TWA: 5 mg/m³	TWA: 5 mg/m³	TWA: 5 mg/m³	TWA: 5 mg/m³

Occupational exposure controls

Engineering measures Provide appropriate exhaust ventilation at places where dust is formed. Ensure that eyewash stations and safety showers are close to the workstation location.

Respiratory protection Whenever dust in the worker's breathing zone cannot be controlled with ventilation or other engineering means, workers should wear respirators or dust masks approved by NIOSH/MSHA, EU CEN or comparable organization to protect against airborne dust.

Eye/face protection For dust, splash, mist or spray exposure, wear chemical protective goggles or a face-shield

Skin and body protection Long sleeved clothing. Rubber or plastic boots.

Hand protection Rubber/latex/neoprene or other suitable chemical resistant gloves. Wash the outside of gloves with soap and water prior to reuse. Inspect regularly for leaks.

Hygiene measures Handle in accordance with good industrial hygiene and safety practice. Clean water, preferably an eyewash station and a safety shower, should be available for washing in case of eye or skin contamination.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	dry, free flowing granules
Color	off-white
Physical state	dry powder
Odor	odorless
Odor Threshold	Not applicable
pH	(1% solution) 10.5 - 11.8 (1% solution)
Melting Point/Range	Decomposes on heating. @ ~275 °C
Freezing point	No information available.
Boiling Point/Range	Not applicable
Flash Point	Not flammable
Evaporation rate	No data available
Flammable properties	Not combustible
Oxidizing properties	Oxidizer
Vapor pressure	No information available.
Vapor density	No information available.
Specific Gravity	2.92
Relative density	~ 2.92
Bulk density	27 lb/cu ft
Water solubility	Slightly soluble
Percent volatile	No information available.
Partition coefficient:	Not applicable
Viscosity	Not applicable

Decomposition Temperature 275 °C

10. STABILITY AND REACTIVITY

Stability	Stable under recommended storage conditions. Decomposition can occur on exposure to heat or moisture.
Conditions to avoid	To avoid thermal decomposition, do not overheat, (275)
Materials to avoid	Heavy metals. Combustible materials
Hazardous decomposition products	Oxygen which supports combustion, Calcium oxides.
Hazardous polymerization	Hazardous polymerization does not occur.
Hazardous reactions	Oxidizable material can be ignited by grinding and may become explosive.

11. TOXICOLOGICAL INFORMATION

Acute effects

Eye irritation	Severely irritating, corrosive (rabbit)
Skin irritation	Non-irritating (rabbit) May cause skin irritation in susceptible persons
LD50 Oral	> 5 g/kg (Rat)
LD50 Dermal	> 10 g/kg (Rat)
LC50 Inhalation:	> 17 mg/L 1 hr (Rat)
Sensitization	No information available.
Acute toxicity of over-exposure	Dust is irritating eyes, nose, throat, and lungs.

Chronic Toxicity

Chronic Toxicity	No known effect.
Carcinogenicity	There are no known carcinogenic chemicals in this product

12. ECOLOGICAL INFORMATION

Ecotoxicity

The environmental impact of this product has not been fully investigated

Persistence and degradability	Biodegradability does not pertain to inorganic substances.
Bioaccumulation	Does not bioaccumulate.
Mobility	No information available.
Other adverse effects	None known

13. DISPOSAL CONSIDERATIONS

Waste disposal methods	This material, as supplied, is a hazardous waste according to federal regulations (40 CFR 261). Dispose of in accordance with local regulations.
Contaminated packaging	Empty remaining contents. Empty containers should be taken to an approved waste handling site for recycling or disposal.
US EPA Waste Number	D001

14. TRANSPORT INFORMATION

DOT

UN/ID No	1457
Proper shipping name	CALCIUM PEROXIDE MIXTURE
Hazard Class	5.1
Packing group	II
49 STCC Number	49187717

TDG

UN/ID No	1457
Proper shipping name	CALCIUM PEROXIDE MIXTURE
Hazard Class	5.1
Packing group	II

ICAO/IATA Oxidizers are prohibited from aircraft.

IMDG/IMO

UN/ID No	1457
Proper shipping name	CALCIUM PEROXIDE MIXTURE
Hazard Class	5.1
Packing group	II

Other information This material is shipped in 25 lb. plastic pails, and 30 lb. and 100 lb. fiber drums.

15. REGULATORY INFORMATION

International Inventories

TSCA Inventory (United States of America)	Complies
DSL (Canada)	Complies
NDSL (Canada)	Complies
EINECS/ELINCS (Europe)	Complies
ENCS (Japan)	Complies
IECSC (China)	Complies
KECL (Korea)	Complies
PICCS (Philippines)	Complies
AICS (Australia)	Complies
NZIoC (New Zealand)	Complies

U.S. Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazard Categories

Acute Health Hazard	yes

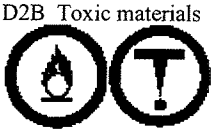
Chronic Health Hazard	no
Fire Hazard	yes
Sudden Release of Pressure Hazard	no
Reactive Hazard	no

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

International Regulations

Mexico - Grade No information available.

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.
WHMIS Hazard Class
C Oxidizing materials
D2B Toxic materials



16. OTHER INFORMATION

HMIS	Health Hazard 2	Flammability 0	Stability 1	Special precautions J

NFPA/HMIS Ratings Legend
Severe = 4; Serious = 3; Moderate = 2; Slight = 1; Minimal = 0

Protection=J (Safety goggles, gloves, apron, combination dust and vapor respirator)

Revision Date: 2010-09-29
Reason for revision: Format Change.

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End of Material Safety Data Sheet