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FINAL WORK PLAN ENHANCED BIOREMEDIATION OPERABLE UNIT 3 AREAS F AND G PHASE I (PREDESIGN) TRACER TEST NAS JACKSONVILLE FL
07/01/2015
AGVIQ

Final Work Plan

Enhanced Bioremediation – Operable Unit 3
Areas F and G
Phase I (Pre-Design) Tracer Test

Naval Air Station Jacksonville
Jacksonville, Florida

Revision No. 00

Contract No. N62470-12-D-7004
Task Order No. JM19

Submitted to:

U.S. Naval Facilities Engineering Command
Southeast

Prepared by:

2809 S. Lynnhaven Rd.
Suite 200
Virginia Beach, VA 23452

July 2015

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Eric Davis, Project Manager — July 7, 2015 Date

Approved By:

Paul Rakowski, PE, Deputy Program Manager — July 7, 2015 Date

Client Acceptance:

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DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USN, cn=WILSON.ADRIENNE.TOWNSEL.1228825723
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- Inspection Report
- Waste Tracking Log

Acronyms and Abbreviations

ABB-ES	ABB Environmental Services, Inc.
AGVIQ	AGVIQ, LLC
AHA	activity hazard analysis
APP	Accident Prevention Plan
ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMT	continuous multichannel tubing
CO	Contracting Officer
DCE	dichloroethene
DFOW	definable feature of work
DPT	direct-push technology
EE	Engineering Evaluation
EPA	U.S. Environmental Protection Agency
ERD	enhanced reductive dechlorination
FDEP	Florida Department of Environmental Protection
FRCSE	Fleet Readiness Center Southeast
FS	Feasibility Study
gpm	gallons per minute
HLA	Harding Lawson Associates
ISCO	in-situ chemical oxidation
IWTP	industrial wastewater treatment plant
µg/L	micrograms per liter
mg/L	milligrams per liter
MNA	monitored natural attenuation
MSDS	material safety data sheet
MVS	Mining Visualization System
NADEP	Naval Aviation Depot
NAS	Naval Air Station
NAVFAC SE	U.S. Naval Facilities Engineering Command Southeast
OU	Operable Unit
PFD	process flow diagram
PPE	personal protective equipment
PSC	Potential Source of Contamination
psi	pounds per square inch
PVC	polyvinyl chloride
QC	quality control
RA	remedial action
RAO	Remedial Action Objective
RI	Remedial Investigation

ROD	Record of Decision
ROI	radius of influence
RPM	Remedial Project Manager
SDS	safety data sheet
SSHP	Site Safety and Health Plan
T&D	transportation and disposal
TCE	trichloroethene
TCLP	Toxicity Characteristic Leaching Procedure
TO	Task Order
TtNUS	Tetra Tech NUS, Inc.
UIC	Underground Injection Control
VOC	volatile organic compound

1.0 Introduction

AGVIQ, LLC (AGVIQ) has been contracted by the U.S. Naval Facilities Engineering Command, Southeast (NAVFAC SE) to implement an enhanced bioremediation (herein referred to as enhanced reductive dechlorination [ERD]) system at Operable Unit (OU) 3, Areas F and G, Naval Air Station (NAS) Jacksonville, under Contract No. N62470-12-D-7004, Task Order (TO) No. JM19. This Work Plan presents the scope of work for a tracer study that will be implemented to collect hydrogeologic and hydraulic data for the pilot-scale ERD system design, which will be prepared as a separate deliverable.

1.1 Site Location and Description

NAS Jacksonville is located approximately 9 miles south of downtown Jacksonville, Florida, in Duval County. NAS Jacksonville encompasses approximately 3,800 acres located along the western bank of the St. Johns River (Figure 1-1). The Station was commissioned in 1940 for pilot training and as a Navy Aviation Trades School for ground crewmen. The mission of NAS Jacksonville is to provide facilities, service, and managerial support for the operation and maintenance of naval weapons and aircraft to operating forces of the United States Navy, as designated by the Chief of Naval Operations. As a result of documented past releases of hazardous waste at the facility, NAS Jacksonville has been listed on the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA) National Priority List since December 1989 (Harding Lawson Associates [HLA], 2000a).

OU3 is a 134-acre area located on the eastern side of NAS Jacksonville, south of the flightline and adjacent to the St. Johns River. The major tenant of the OU3 area is the Fleet Readiness Center Southeast (FRCSE), formerly the Naval Aviation Depot (NADEP). FRCSE has been the major industrial complex at NAS Jacksonville since its inception in 1940 when its predecessor operated as the Assembly and Repair Department. FRCSE's primary mission has been to perform in depth re-work, repair, and modifications on aircraft, engines, and aeronautical components. Land use in the vicinity of OU3 is predominantly industrial and commercial. In addition to the industrial components, the OU3 area also contains the helicopter flightline and its associated hangars. Currently, the majority of the OU3 area is covered with thick asphalt or concrete pavement or buildings (Tetra Tech NUS, Inc. [TtNUS], 2013).

The hydrogeologic setting at OU3, characterized during the Engineering Evaluation (EE) conducted by (ABB Environmental Services, Inc. [ABB-ES], 1998), consists of silty to clayey sands interbedded with layers of clay and sandy clay. In the northern half of OU3 a clay layer separates the upper and lower portions of the surficial aquifer, while in the southern half of OU3 this clay layer is discontinuous or contains less fine grained materials. Areas F and G are located in the southern half of OU3. Additionally, there are generally continuous fine grained layers present in the lower portion of the surficial aquifer throughout OU3.

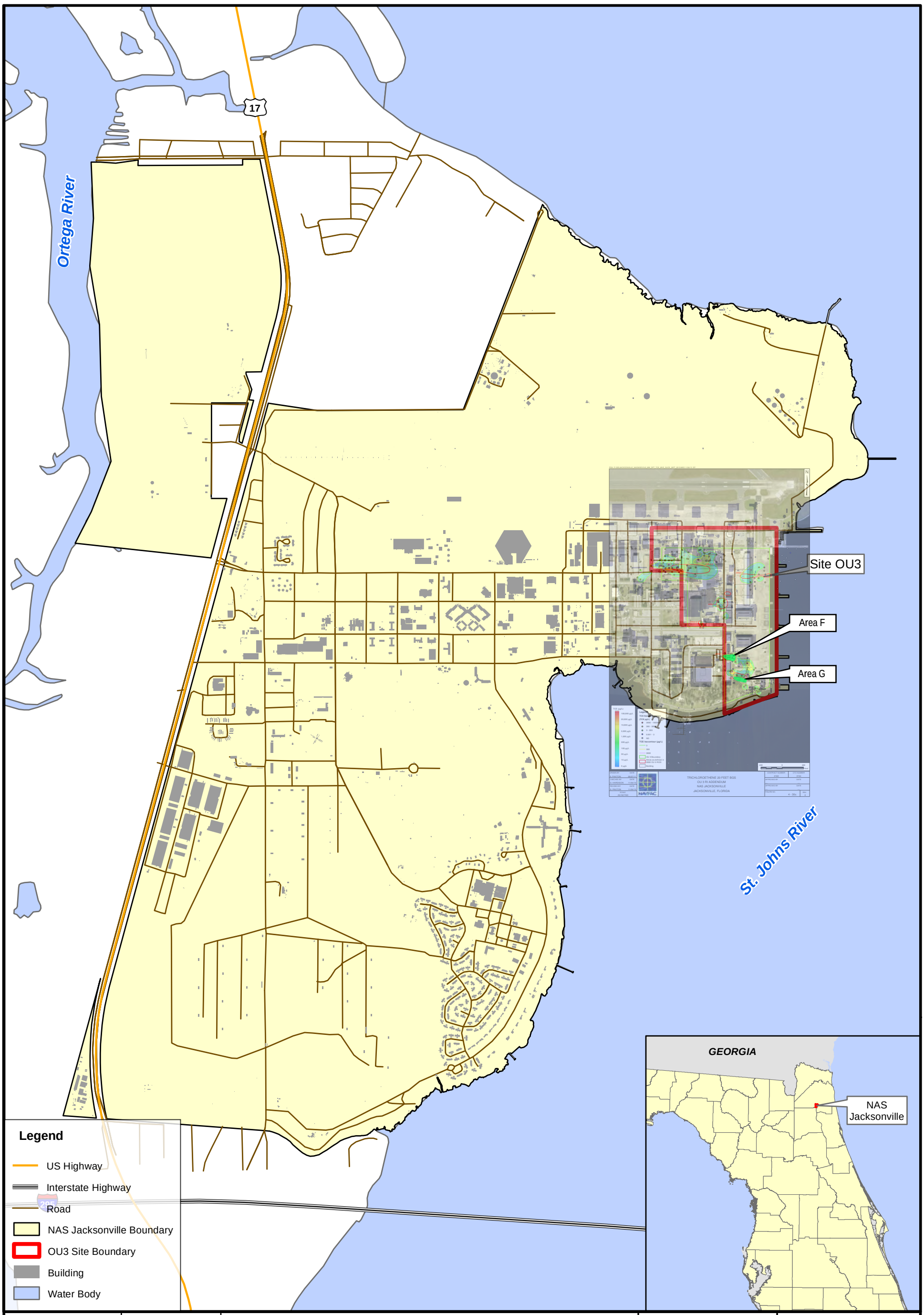

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Figure 1-1
Site Vicinity Map
OU3 Areas F and G
NAS Jacksonville, Florida

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1.1.1 Area F Overview

The military construction project P-615 site (Area F) is located near Building 800 within OU3, on the east side of Wright Street, approximately 600 feet south of the intersection with Enterprise Avenue (Figure 1-2). In March 1992, ABB-ES conducted an investigation in this area that included sampling of shallow soil and groundwater. At the time of the investigation, the site was the planned location of a new industrial wastewater treatment plant. The 1992 site investigation was conducted "to evaluate the presence, magnitude, and characteristics of hazardous substances, if any, on the site prior to construction activities" (ABB ES, 1992). Six temporary monitoring wells were advanced as part of the investigation. The site investigation indicated that trichloroethene (TCE) was present in the shallow groundwater at three of the six temporary monitoring well locations, with a maximum concentration of 1,300 micrograms per liter (µg/L).

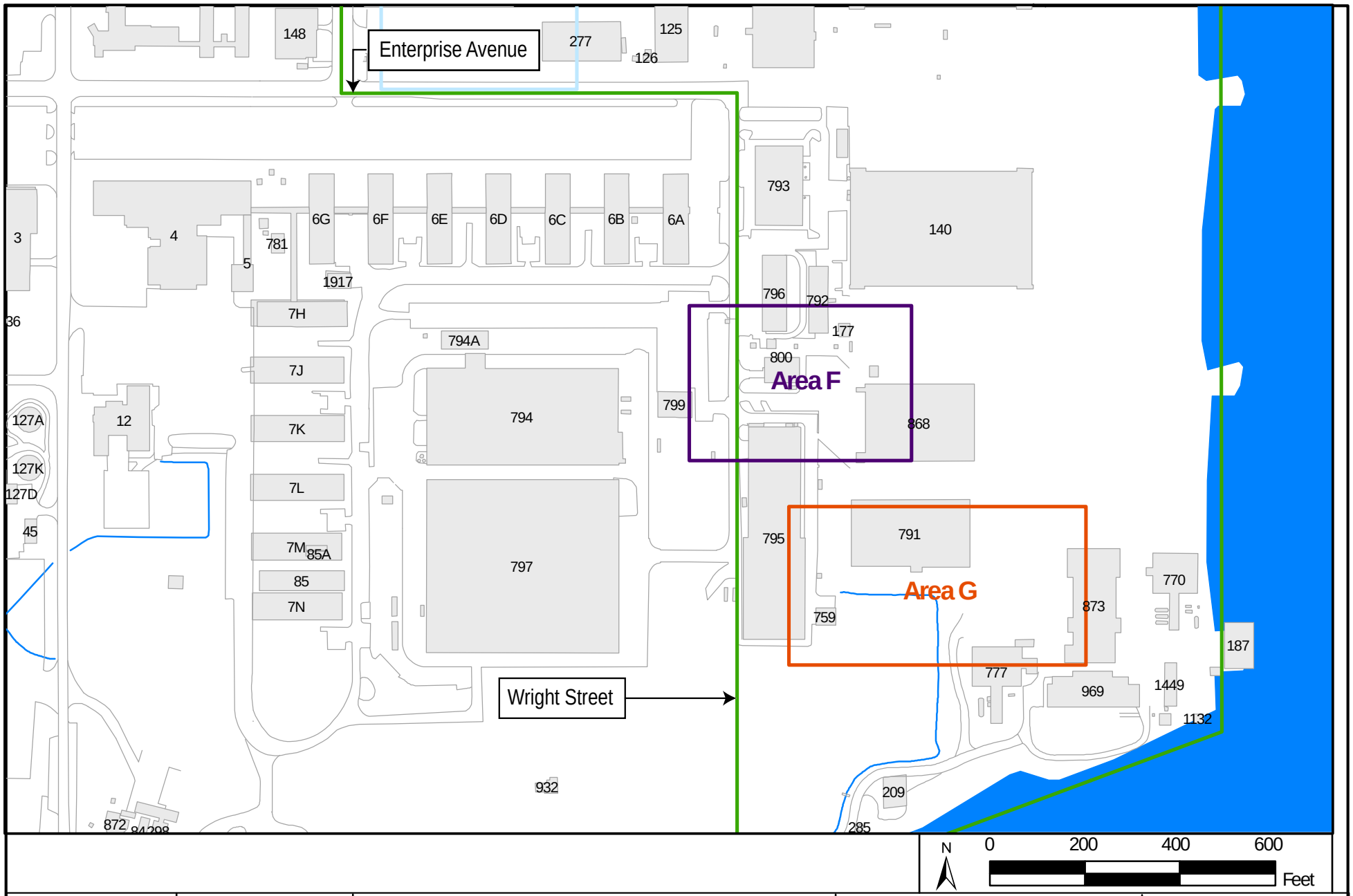
A Remedial Investigation (RI)/Feasibility Study (FS) (HLA, 2000a) conducted in 2000 identified the likely sources for the contamination at Area F as either a single discharge/spill event and/or preferential transport from an undefined upgradient source. A groundwater plume with TCE as the predominant volatile organic compound (VOC) was estimated to be 10 feet thick over an approximate 28,900-square-foot area. Completed in 2000, the Record of Decision (ROD) for OU3 identified the selected remedial action (RA) for Area F as in-situ chemical oxidation (ISCO) (HLA, 2000b).

Mantech conducted Area F baseline soil and groundwater sampling activities in 2001 in support of the ISCO RA specified in the 2000 ROD. TtNUS conducted additional Area F groundwater investigations in 2002. In 2004, CH2M HILL conducted an investigation in Area F west of Building 868 to collect soil and groundwater analytical data to supplement the Mantech and TtNUS investigations in support of the RA specified in the ROD. Data were collected to select monitoring well locations and develop the ISCO design. Results from this sampling effort suggested that groundwater contamination was potentially present east of Building 868, and additional monitoring events were completed in Area F prior to the ISCO implementation to further evaluate the groundwater plume. Data suggested the plume was both stable and decreasing in concentration due to natural attenuation processes. As a result, the NAS Jacksonville partnering team agreed to evaluate a monitored natural attenuation (MNA) approach in lieu of ISCO.

Continued groundwater monitoring confirmed groundwater contamination east of Building 868 was limited to depths above 50 feet bgs as defined by an underlying fine grained sedimentary layer. A similar layer was identified beneath Area G at 56 feet bgs. VOC concentrations in groundwater sampled along the southern boundary of Area F suggested the plume extended into Area G and to the south-southeast. A combined Areas F and G direct-push technology (DPT) investigation was recommended in 2006.

1.1.2 Area G Overview

Potential Source of Contamination (PSC) 15 (Area G), a former solvent and paint sludge disposal area, is located in the immediate area of Buildings 791 and 795 within OU3, approximately 70 feet south of Area F (Figure 1-2). A removal action was conducted in 1997, primarily to address shallow soils containing Radium-226, but soils impacted with VOCs were also removed. Some VOC-impacted soils beneath utilities and a concrete pad were left in place because of structural stability concerns.



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Legend

- OU-03
- OU-03 - AREA F
- OU-03 - AREA G
- Stream
- Water Body
- Structure Existing Area

Figure 1-2
Site Location Map
OU3 Areas F and G
NAS Jacksonville, Florida

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A focused investigation was conducted at Area G as part of the 1998 EE. Based on three cone penetrometer technology logs, the subsurface strata at Area G, although predominantly sandy from 10 feet to 60 feet below ground surface (bgs) was found to include a well-defined uniform sand, encountered between approximately 16 and 30 feet bgs. Above and below this uniform sand layer, the sandy stratum was observed to contain increased amounts of clay and silt. The RI/FS for OU3 was completed in 2000 (HLA, 2000a). A groundwater plume with TCE as the predominant VOC was estimated to be 10 feet thick over an approximate 23,900-square-foot area. Completed in 2000, the ROD for OU3 identified the preferred cleanup action for Area F as MNA (HLA, 2000b).

Subsequently, eight multilevel wells (JAX-OU3-G1 through JAX-OU3-G8) were installed to support the Area G monitoring requirements established in the ROD. As specified in the long-term monitoring plan (TtNUS, 2001), semi-annual sampling was conducted between July 2002 and January 2005. Based on data collected during the 2002 and 2003 sampling events, an additional investigation was recommended to further define the extent of contamination (TtNUS, 2004). TtNUS implemented a supplemental groundwater assessment in the fall of 2004 and reported the results in January 2006. The results of the groundwater sampling indicated additional investigation was needed to define the lateral and vertical extent of VOCs in the northern-central and western-central portions of Area G groundwater (TtNUS, 2006).

1.1.3 Areas F and G DPT Groundwater Investigation – June 2007

In 2007, a DPT groundwater investigation was conducted at Areas F and G. The investigation included analysis of groundwater samples collected at discrete-depth intervals to delineate VOC distribution in the shallow aquifer. Groundwater samples were obtained by DPT and analyzed by an onsite laboratory to provide real-time data to guide the investigation. Data indicated that all chlorinated VOCs detected were generally within the historical interpreted extent of TCE at both Areas F and G. Data were integrated to provide an overview of interrelated site conditions in the southern portion of OU3.

The Areas F and G TCE plumes appeared to commingle in the area north of the southern OU3 seawall east of the PSC 16 outfall, and the distribution of chlorinated VOCs in groundwater in Areas F and G were consistent with groundwater flow direction and preferential pathways resulting from the underlying stratigraphy and the existing subsurface utilities (storm sewer) at the sites. The Partnering Team recommended additional assessment of the storm sewer system within OU3 as a whole, including Areas F and G, based on these results. A map of the storm sewer system is provided as Figure 1-3.

1.1.4 Long-Term Monitoring, Area G

Long-term monitoring has been performed at Area G since 2005. Results of the monitoring program confirm the presence of TCE, cis-1,2- dichloroethene (DCE), 1,2-DCE, and vinyl chloride at concentrations exceeding FDEP groundwater cleanup target levels. Data indicate limited to adequate signs of biologically mediated natural attenuation (i.e., reductive dechlorination) within the source well (JAX-OU3-G1).

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Figure 1-3
Storm Sewer and Outfall Locations
OU3 Areas F and G
NAS Jacksonville, Florida

Figure Source: *RI Addendum, 2013*

1.1.5 RI Addendum – December 2013

Implementation of post-ROD actions at OU3 resulted in optimization of environmental response actions, and based on an optimization study and Five Year Review in 2005, the NAS Jacksonville Partnering Team determined that additional actions should be implemented. An RI Addendum for OU3 was prepared to document current site conditions and to support the development of a new ROD and global risk-based corrective action in 2013 (TtNUS, 2014).

The RI Addendum documented post-ROD reports of lower TCE concentrations than originally reported for Area F and the recommendation to not implement the remedy (i.e., ISCO) identified in the 2000 ROD. The RI Addendum also documented that the monitoring well network at Area G did not encompass all of the groundwater contamination and that the remedial action objective (RAO) for Area G was not being met via natural attenuation as TCE concentrations were increasing in portions of the site.

Groundwater data collected during DPT and monitoring well sampling in 2013 were modeled using CTech's Mining Visualization System (MVS) software. Figures depicting the groundwater contaminant plumes at Areas F and G were generated using the kriging method to interpolate the data. Figures 1-4 to 1-8 provide the MVS-generated figures illustrating the distribution of TCE within the groundwater plume at 10-foot intervals to 50 feet bgs. The aerial extent of the TCE contaminant plume at Areas F and G is greatest in the 20-foot and 30-foot depth intervals.

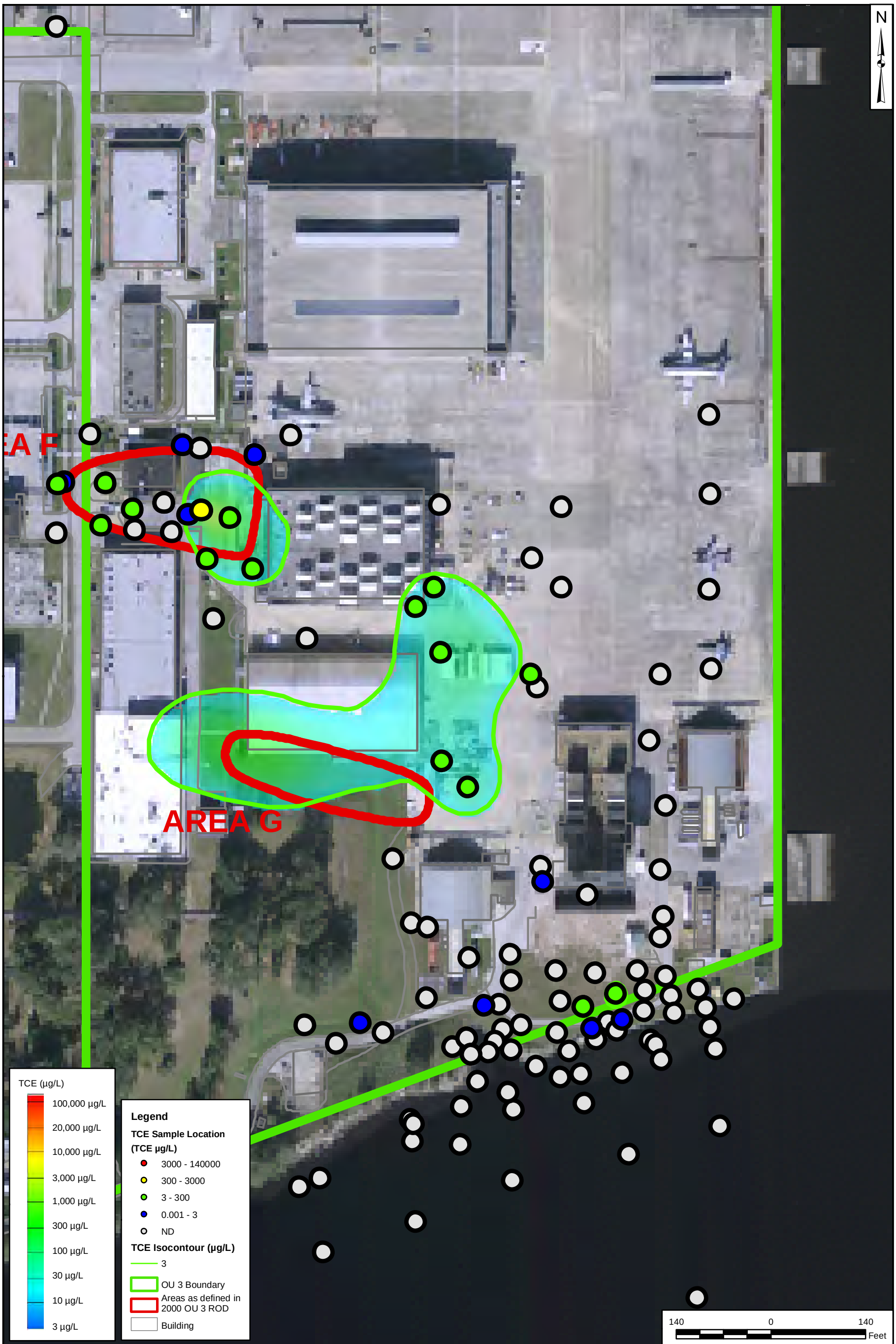
The RI Addendum provides recommended RAOs for future evaluation during preparation of a FS Addendum, including addressing groundwater with concentrations of chlorinated VOCs exceeding applicable or relevant and appropriate requirements (ARARs).

1.2 Regulatory Framework

Response actions at OU3 are performed in accordance with CERCLA, Executive Order 12580, the National Oil and Hazardous Substances Pollution Contingency Plan, and applicable and appropriate Department of Defense guidance and policy for the Navy Environmental Restoration Program. Post-ROD actions and optimization studies prompted the completion of the RI Amendment for OU3, completed in 2014 (TtNUS, 2014). The RI Amendment recommended an enhanced reductive dechlorination treatability study for contaminated groundwater at Areas F and G.

1.3 Enhanced Reductive Dechlorination, Areas F and G

Reductive dechlorination is a biological process in which chlorine atoms are sequentially removed from chlorinated organic compounds under reducing conditions. The process can be enhanced (ergo, ERD) with the injection of carbon substrates (biostimulation) and/or laboratory-cultured halorespiring microorganisms (bioaugmentation). Given the evidence of natural attenuation at Areas F and G, ERD is a suitable technology, and therefore the Navy has proactively selected this technology to reduce the remediation timeframe.



DRAWN BY	DATE	AGVIQ	Figure 1-4 Trichloroethene 10 feet bgs OU3 Areas F and G *NAS Jacksonville, Florida*	CONTRACT NUMBER / CTO NUMBER
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Figure Source: *RI Addendum, 2013*

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Figure Source: *RI Addendum, 2013*

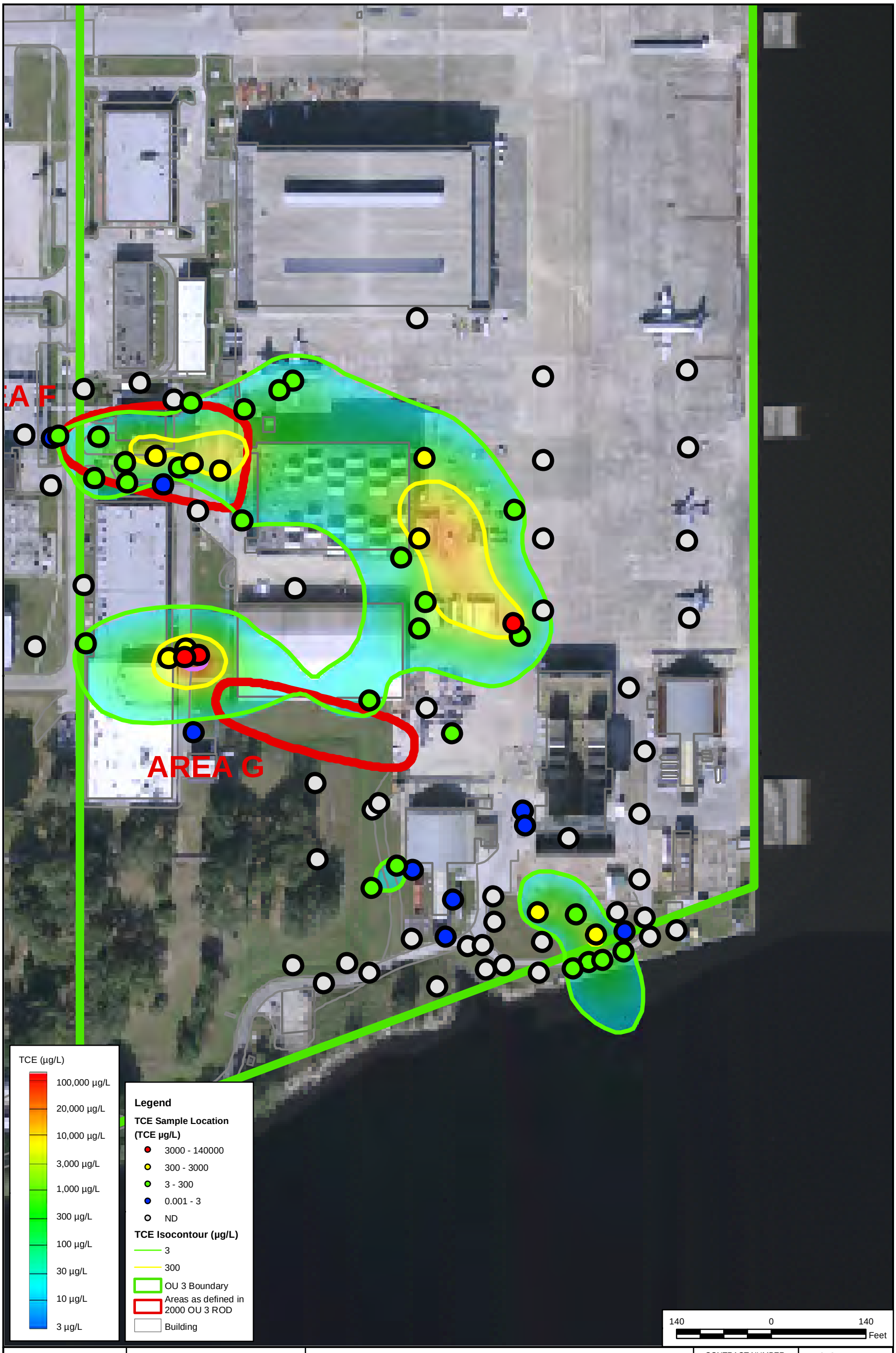

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Figure 1-6
Trichloroethene 30 feet bgs
OU3 Areas F and G
NAS Jacksonville, Florida

Figure Source: *RI Addendum, 2013*

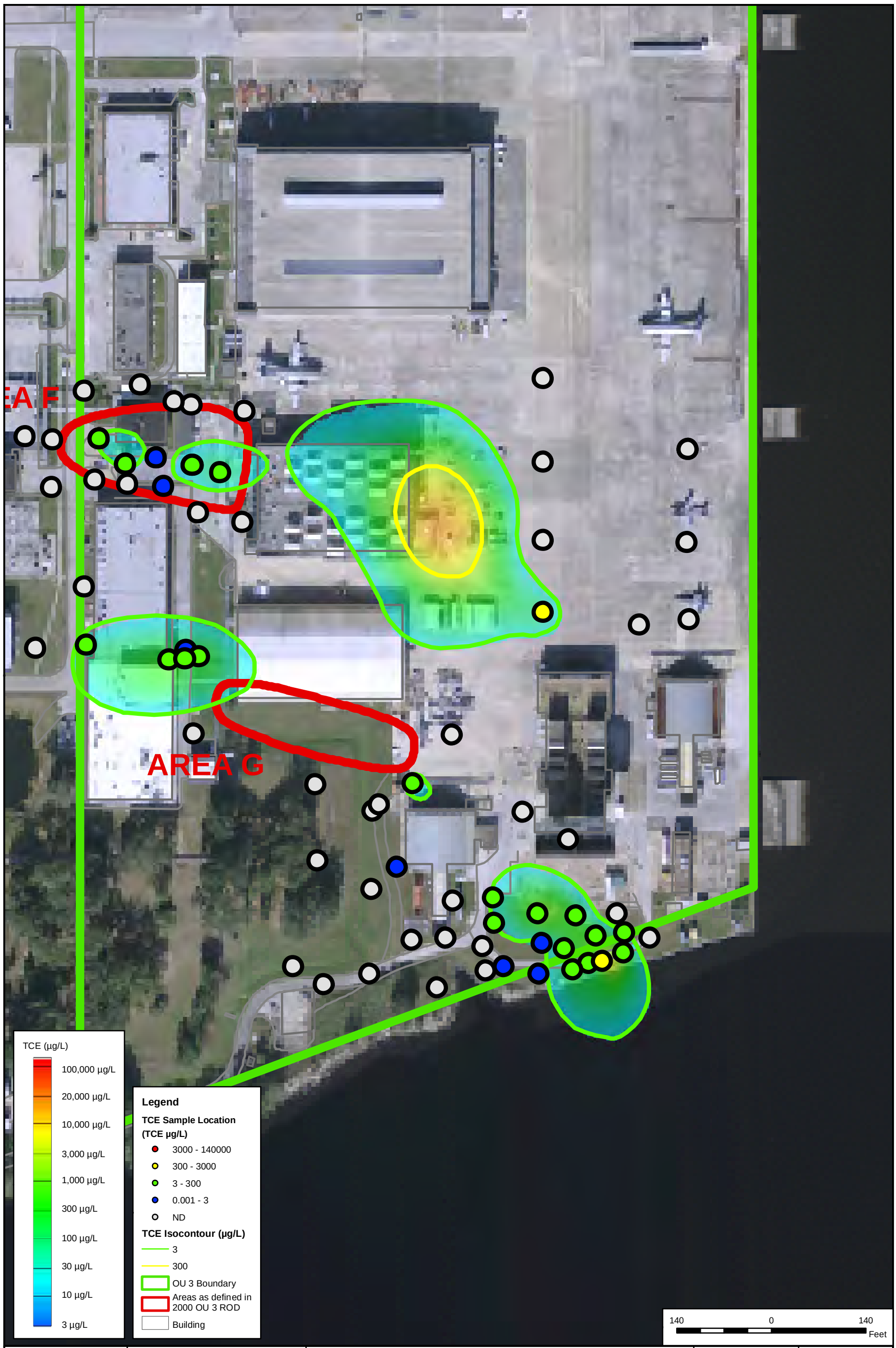

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Figure Source: *RI Addendum, 2013*

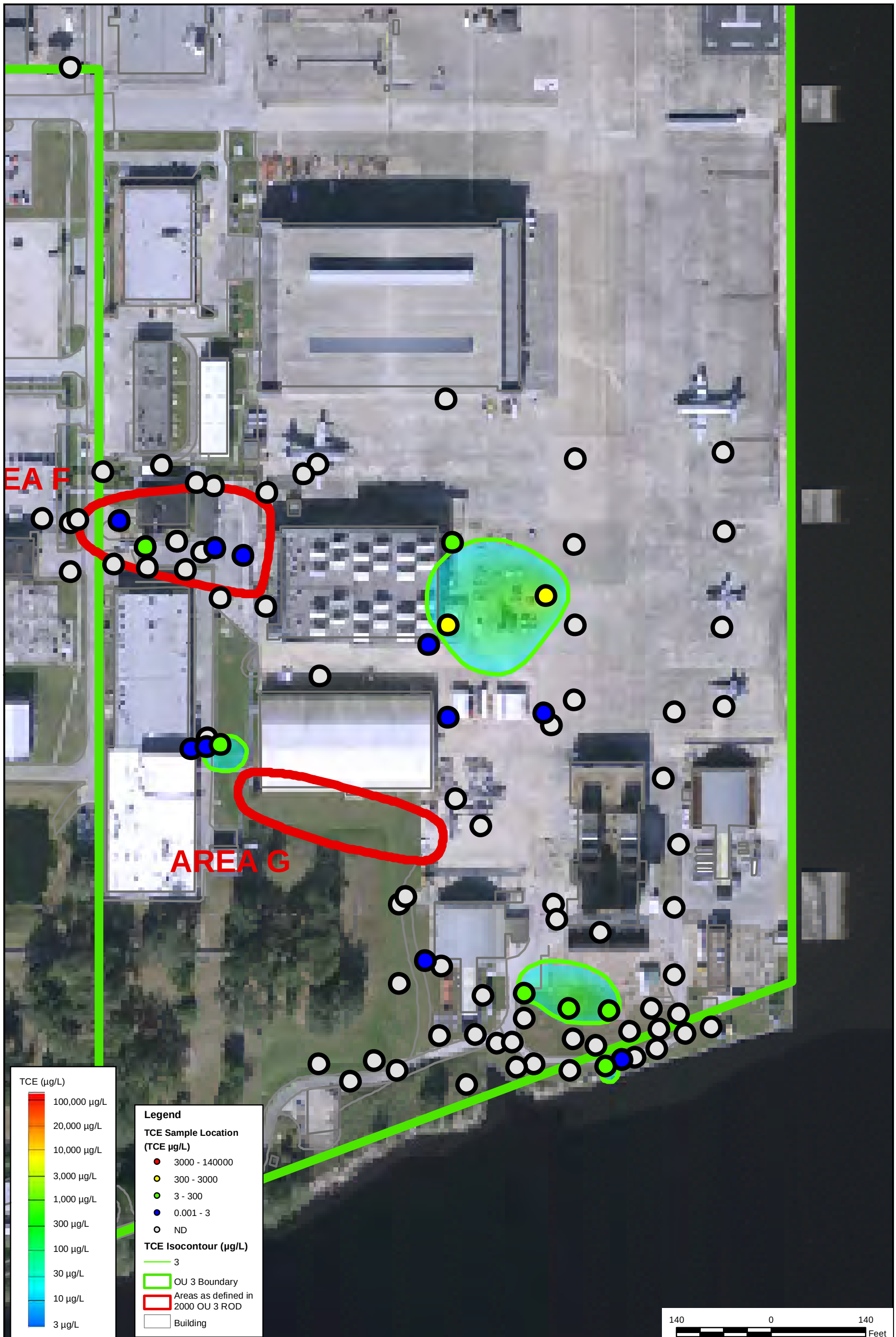

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Figure Source: *RI Addendum, 2013*

Prior to implementing ERD across both sites, a pilot-scale study will be implemented to evaluate the effectiveness of the technology at Areas F and G (Figure 1-9) and accelerate mass reduction in this portion of the Station. However, before the pilot-scale study is designed and implemented, a tracer study will be conducted to assess two substrate delivery methods (direct injection and recirculation), and evaluate hydrogeologic and hydraulic properties of the aquifer.

1.4 Project Objectives

The objective of the project is to conduct a tracer test that will provide pre-design data for the pilot-scale Area F and G ERD system. The objectives include:

- Estimating the mobile porosity in the injection zone
- Determining the injection rates, radius of influence (ROI), and overall effectiveness of the grid-based permanent well approach in the field
- Determining the effectiveness of recirculation using a series of injection and extraction wells for the delivery of ERD

Hydraulic data will be used to interpret aquifer characteristics (hydraulic conductivity, effective porosity) and flow patterns within the proposed injection areas, as well as assess distribution effectiveness. Data will also be used to select the optimal timing between injections for the ERD pilot test. Injection and extraction rates and pressures will be used to develop the well design and provide a basis for the overall injection program design.

1.5 Work Plan Organization

This Work Plan is organized to provide descriptions of the key elements of the project. It consists of the following sections and appendices:

- **Section 1.0** Introduction
- **Section 2.0** Project Execution Plan
- **Section 3.0** Waste Management Plan
- **Section 4.0** Environmental Protection Plan
- **Section 5.0** Quality Control Plan
- **Section 6.0** References

Appendices to the Work Plan include the following:

- **Appendix A** Accident Prevention Plan with Site Safety and Health Plan
- **Appendix B** Project Schedule
- **Appendix C** UIC Notification Memorandum (and Approval Order)
- **Appendix D** Quality Control Forms and Documentation

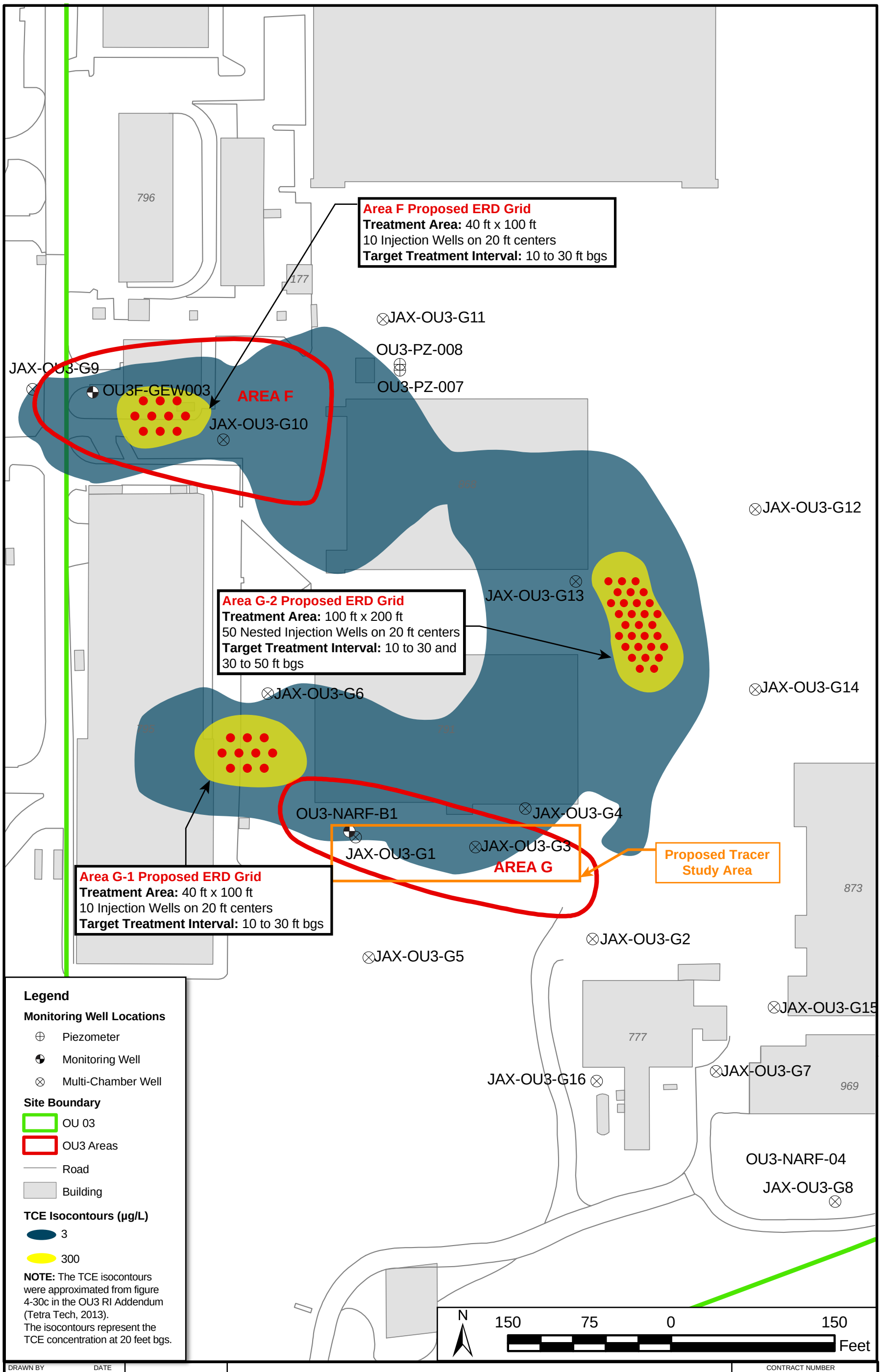

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Figure 1-9
Site Detail, Proposed Tracer Study Area, and Proposed Injection Array
OU3 Areas F and G
NAS Jacksonville, Florida

2.0 Project Execution Plan

This section includes the scope of work, project schedule, and traffic control plan for completing a tracer test to provide pre-design data for the implementation of the ERD pilot-scale study.

2.1 Scope of Work

The scope of work for this project will be completed in accordance with the pre-design field effort portion of Navy authorized TO No. JM19. Pre-Design field tasks will include:

- Mobilization
- Installation of an injection well screened from 10 to 30 feet bgs and an injection well screened from 30 to 50 feet bgs
- Installation of an extraction well screened from 10 to 50 feet bgs and two adjacent nested injection well pairs, screened from 10 to 20 and 40 to 50 feet bgs
- Implementation of two tracer tests using the injection well pair and the extraction/injection well array
- Waste characterization, waste handling/storage, and waste disposal
- Demobilization

Detailed descriptions of the field tasks are provided below. All work will be completed in accordance with the Accident Prevention Plan (APP) and Site Safety and Health Plan (SSHP) (Appendix A) and applicable regulations.

2.1.1 Mobilization and Site Preparation

This task consists of mobilizing personnel and equipment to the project site to perform the work. Prior to mobilization, NAVFAC SE, NAS Jacksonville, Florida Department of Environmental Protection (FDEP), and the U.S. Environmental Protection Agency (EPA) will be notified to allow for appropriate oversight and coordination. Before beginning any phase of work, AGVIQ and its subcontractors will conduct pre-construction meetings to discuss the work items and worker responsibilities, and to familiarize workers with the APP. Mobilization for the field effort will include procurement of needed field equipment and initial transport of equipment, supplies, and the AGVIQ field team. During this effort, AGVIQ will establish areas for equipment storage, waste storage, and decontamination, and will locate connection points to potable water and electrical power as needed. Project management tasks will include coordination with Station personnel to obtain the necessary authorization, clearances, training, and credentials so both AGVIQ and its subcontractors can perform work within Areas F and G.

Prior to commencement of intrusive work, AGVIQ will contact the state of Florida utility protection center (Sunshine State One Call of Florida), the NAS Jacksonville Public Works

Department, and the NAS Jacksonville Environmental Division to complete a site utility survey, acquire utility layout plans, and complete the excavation ("dig") permit. In addition, AGVIQ will subcontract a private utility locate firm to identify and confirm underground utilities in the area of the proposed injection and monitoring wells. Utilities in the work area will be marked with paint and stakes, as appropriate. Any damage to underground utilities or subsurface structures will be reported immediately to the NAS Jacksonville Environmental Facilities Department and Sunshine State One Call of Florida.

2.1.2 Tracer Test Layout

Figure 2-1 depicts the planned layout of two tracer test arrays. The tests will be performed in the grassy area immediately adjacent to Building 791 to take advantage of existing monitoring wells located in that area and to minimize disruptions to FRCSE operations. One test array is designed to assess ERD implementation using direct injection only. This array will consist of two adjacent injection wells (IW-1A and IW-1B) installed 5 feet apart and screened from 10 to 30 and 30 to 50 feet bgs, respectively. The second test array is designed to assess ERD implementation using recirculation. This array will consist of one centrally located extraction well (EW-1A) screened from 10 to 50 feet bgs. Two nested injection wells (IW-2A/B and IW-3A/B) will be installed to the southwest and southeast of the extraction well and screened from 10 to 20 and 40 to 50 feet bgs, respectively. The injection wells will be installed 20 feet from the extraction well and 35 feet apart. The spacing of the injection wells and placement of the screen intervals was selected to uniformly distribute the tracer throughout the targeted zone.

In addition, two new monitoring wells (MW-1A and multilevel JAX-OU3-G17) will be installed to assess the distribution of the tracer. Table 2-1 provides a summary of the new and existing tracer test wells.

TABLE 2-1
Well Construction Details
OU3, Areas F and G, NAS Jacksonville

Well ID	Total Depth (feet bgs)	Screened Interval (feet bgs)	Notes
Direct Injection Array			
IW-1A	50	10-30	New injection well
IW-1B	50	30-50	New injection well
JAX-OU3-G1	58	8-9; 11-12; 17-19; 27-28; 37-38; 47-48; 57-58	Existing multilevel monitoring well 5 feet from IW-1A and IW-1B
OU3-NARF-B1	16.5	13-16	Existing monitoring well 7.5 feet from IW-1A
MW-1A	45	35-45	New monitoring well 10 feet from IW-1B
Recirculation Array			
IW-2A/B	50	10-20; 40-50	New nested injection well pair
IW-3A/B	50	10-20; 40-50	New nested injection well pair
EW-1A	50	10-50	New extraction well
JAX—OU3-G3	50	8-9; 11-12; 17-19; 27-28; 37-38; 47-48; 57-58	Existing multilevel monitoring well 10 feet from IW-2A/B

TABLE 2-1
Well Construction Details
OU3, Areas F and G, NAS Jacksonville

Well ID	Total Depth (feet bgs)	Screened Interval (feet bgs)	Notes
JAX-OU3-G17	20	8-9; 11-12; 17-19; 27-28; 37-38; 47-48; 57-58	New multilevel monitoring well 5 feet from IW-3A/B

bgs –below ground surface
Wells IW-2A/B and IW-3A/B are nested.

2.1.3 Well Construction

All wells will be installed using rotasonic drilling techniques by a driller licensed in the state of Florida.

Injection/Extraction/Monitoring Well Construction

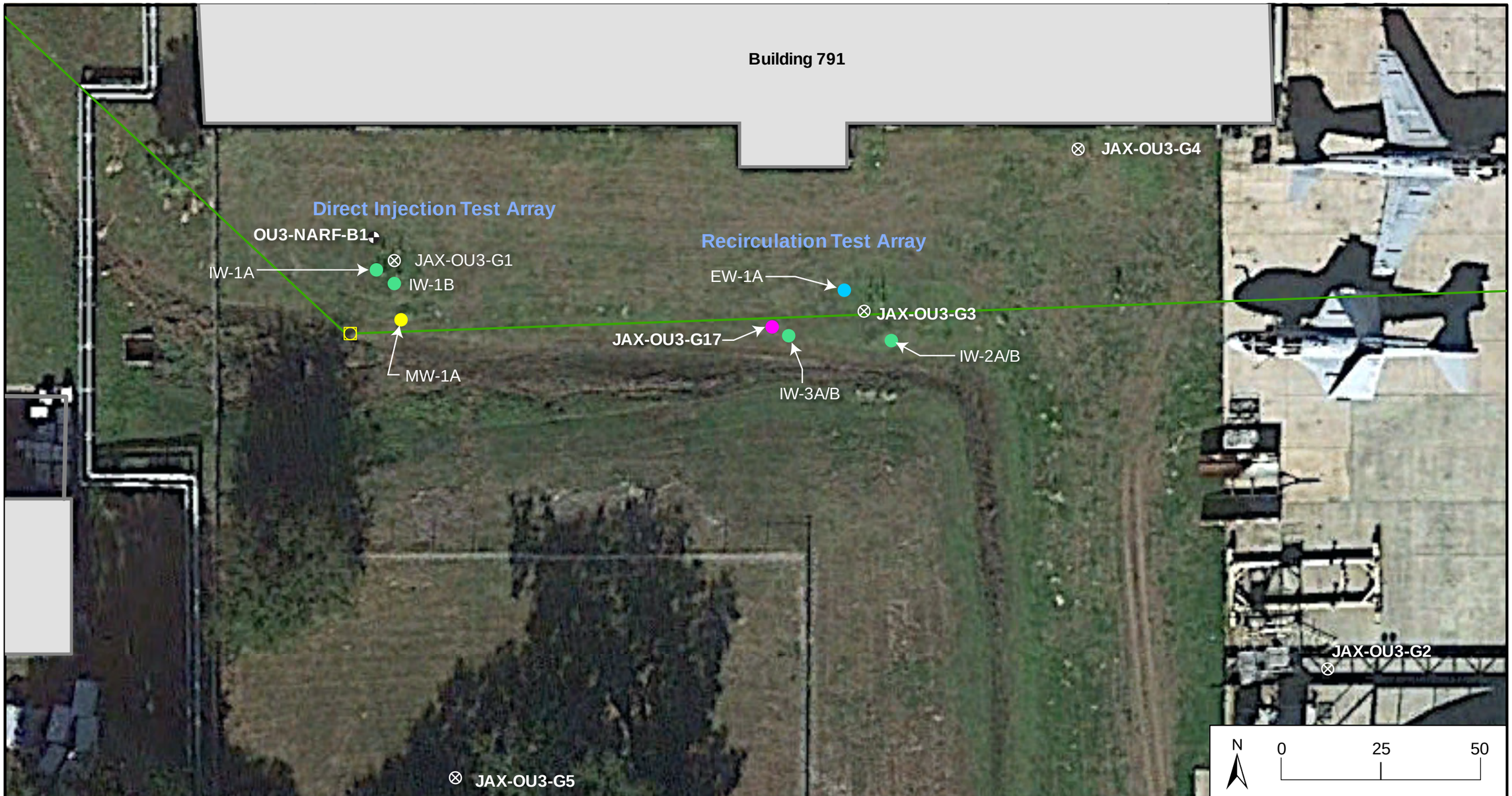
Injection and extraction wells will be constructed of 2-inch diameter Schedule 40 polyvinyl chloride (PVC) casing and 0.040-inch circumference slot well screen at the depths specified in Table 2-1. The monitoring well will have a 0.010-inch circumference slot well screen but will otherwise be constructed in the same manner as the injection and extraction wells. A filter pack will be installed from the base of the borehole to approximately 6 inches above the well screen and 6 inches below the well screen, and a 2-foot-thick bentonite seal will be placed over the filter pack. The annular space will be grouted to the ground surface. For the nested injection wells, a 19-foot-thick bentonite seal will be placed between the top of the bottom sand filter pack and the bottom of the top interval sand filter pack. Wells will be completed as flush mounts, with traffic-rated, steel protective covers set within surface pads made of concrete that are at least 4 inches thick and 1 foot diameter centered upon the well.

Wells will be developed using a surge block and pump until the water produced is relatively clear and free of sediment.

All drill cuttings will be contained in 55-gallon drums or roll-off or sludge boxes and development water will be contained in 55-gallon drums or a larger, approved container-type such as a poly tank or vacuum box pending sampling for characterization and proper disposal offsite in accordance with the Waste Management Plan (Section 3.0).

Multilevel Well Construction

The multilevel well will be installed using rotasonic (minimum 6-inch inside diameter and 10-inch outside diameter or rotasonic [6-inch diameter outer core barrel]) drilling technique. Construction of the intake ports and 1-foot screen at discrete depths of 8, 11, 17, 27, 37, 47, and 57 feet bgs for the new well will be performed by a drilling contractor before the Solinst continuous multichannel tubing (CMT) system (or equivalent) is inserted into the borehole. The well will be constructed within the rotasonic outer core barrel as it is withdrawn from the borings. The well casing will remain suspended in the borehole until the annular materials have been installed.



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SCALE AS NOTED			

AGVIQ

Legend

Monitoring Well Locations
- Monitoring Well
- Multi-Chamber Well
- Manhole
- Newly Installed Extraction Well
- Newly Installed Injection Well
- Newly Installed Monitoring Well
- Newly Installed Multilevel Well

Site Boundary
- Road
- Storm Sewer
- Building

Figure 2-1
Proposed Tracer Test Arrays
OU3 Area G
NAS Jacksonville, Florida

CONTRACT NUMBER	
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. 2-1	REV 0

Before the Solinst CMT system (or equivalent) is placed on the bottom of the borehole, 6 inches of filter pack material will be placed at the borehole bottom to serve as a firm footing for the well. A sand filter pack will also be placed around each sample port extending 1 foot above and 1 foot below the sample port. A bentonite seal will be placed on top of each filter pack screen. The bentonite seal will be placed above each sand filter pack to the bottom of the next sample port's filter pack. Cement-bentonite grout will be used to seal the well annulus from the top of the upper bentonite seal of the shallowest sample port to within 2 feet of the ground surface. This well will be completed as a flush mount, with a traffic-rated, steel protective cover set within a surface pad made of concrete that is at least 4 inches thick and 1 foot diameter centered upon the well.

These wells will be developed using a peristaltic pump until the water produced is clear and visually free of sediment.

All drill cuttings will be contained in 55-gallon drums or roll-off or sludge boxes and development water will be contained in 55-gallon drums or a larger, approved container-type such as a poly tank or vacuum box pending sampling for characterization and proper disposal offsite in accordance with the Waste Management Plan (Section 3.0).

2.1.4 Tracer Test Implementation

Tracer Selection

Rhodamine WT, a commonly used tracer dye for potable water in the United States, will be used for this tracer test. The target concentration of the tracer solution at the well head will be 32 milligrams per liter (mg/L). The dye has high visibility, which will facilitate observations of initial breakthrough in monitoring wells. In addition to visual observation, the concentration of the fluorescing dye will be monitored in the field with a handheld fluorometer.

The tracer solution will be injected into the injection wells and tracked as it migrates from the injection zone. Tracer concentration breakthrough curves (concentration vs. injected volume) will be developed from observation at wells along the expected groundwater flow path, as well as at side-gradient positions. Existing (OU3-NARF-B1 and JAX-OU3-G1, and JAX-OU3-G3) and planned new monitoring wells (MW-1A and JAX-OU3-G17), shown on Figure 2-1, will to be used as observation wells. Additionally, the sewer manhole along the sewer system shown on Figure 2-1 will be monitored for the presence of tracer using the same method and frequency as the observation wells. Any presence of tracer in the storm sewer will be noted within the logbook and the tracer test will be stopped. If the field team determines that sufficient data has been acquired, then the test will not be resumed. If additional data are required, the test will be restarted with different operational parameters.

The tracer test will be performed during daylight hours and will be temporarily suspended overnight, as needed. Temporary suspension of the test is not expected to impact the results because changes in subsurface conditions during downtime (i.e., when not injecting fluid) will be insignificant.

Tracer Test Equipment Set-Up

For the direct injection approach, the water for the tracer test will be provided from the nearest fire hydrant to the tracer test area. A hose, ball valve, and backflow preventer will be

connected to the hydrant before any water is transferred to the system trailer. A 300-gallon polyethylene tank will be mounted to the trailer for mixing the Rhodamine WT tracer dye. An in-line Dosatron® will be used to meter the concentrated dye solution in as a fixed percentage of the total water flow. The Dosatron® operates without electricity, using the in-line water pressure to activate the Dosatron® injector, which takes up the required percentage of substrate directly from a 300-gallon concentrated dye solution tank. Inside the injector, the dye is mixed with the water, and the water pressure forces the solution downstream and into a manifold with two legs with a flow meter and ball valve on each. The water will finally flow through an injection header with a pressure gauge, ball valve, and cam fitting that will be attached to the injection well head. A process flow diagram (PFD) for this setup is provided on Figure 2-2.

The recirculation approach will use the same equipment that was used for the direct injection approach. However, a Grundfos Redi-Flo2 or equivalent submersible pump will be installed into extraction well EW-1A to provide the water for this tracer test. The same injection well headers will be used for the injection wells. A PFD for this setup is shown on Figure 2-3.

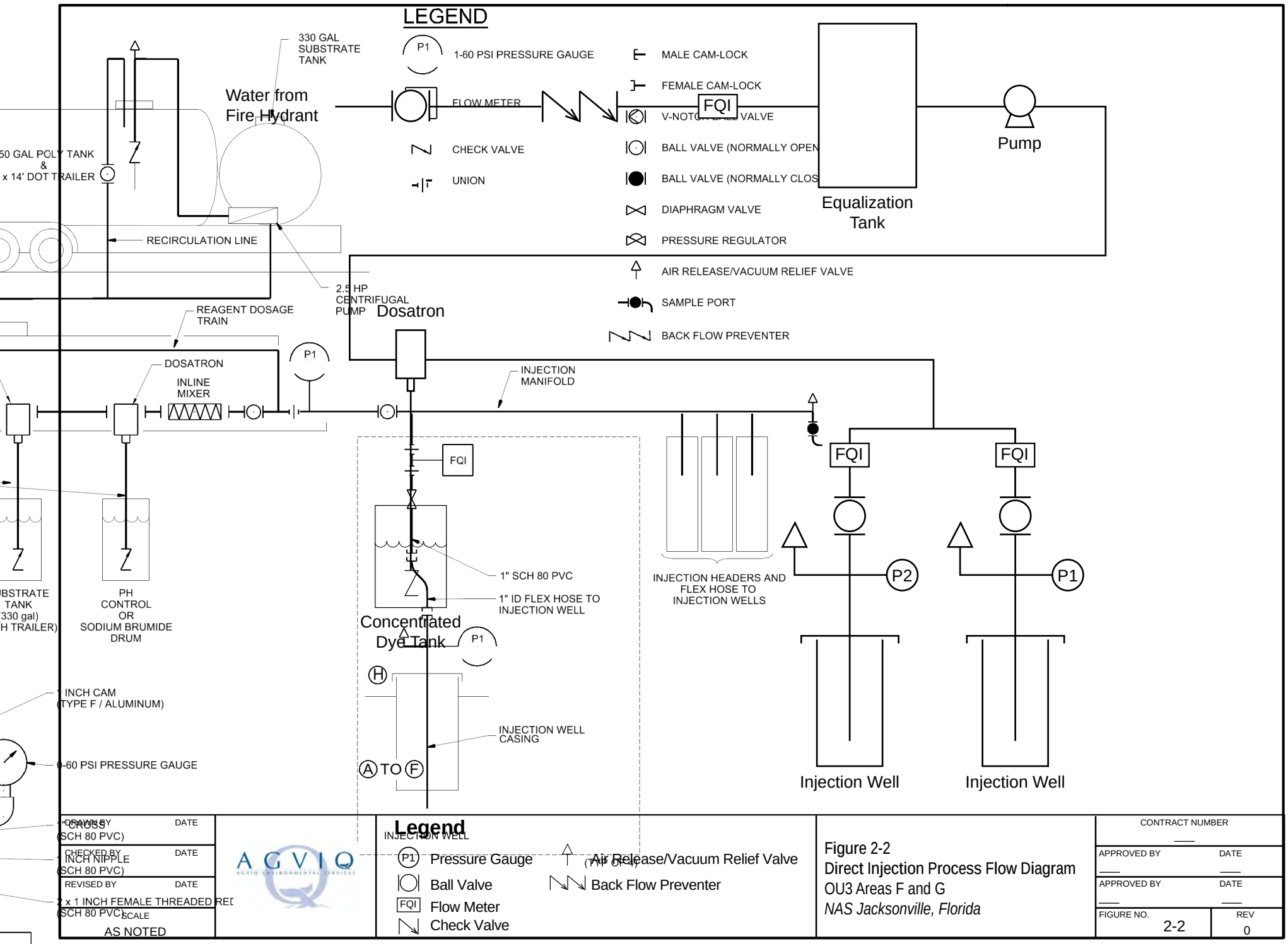
The concentrated dye solution will be prepared in a 300-gallon polyethylene substrate tank by diluting 1.5 gallon of 20 percent Rhodamine WT into 150 gallons of water. This will result in a stock dye solution of 2,000 mg/L. The dilution ratio of the Dosatron® will be approximately 1.6 percent, which will yield an injected concentration of 32 mg/L. Additional batches of this concentrated dye solution will be prepared until the target volume of water is injected for both test arrays.

Direct Injection Approach

Implementation within the direct injection array will include injection of up to 4,700 gallons of a 32 mg/L solution of Rhodamine WT into each of the two injection wells, IW-1A (screened from 10 to 30 feet bgs) and IW-1B (screened from 30 to 50 feet bgs). Tracer injection at the two depth intervals will be conducted simultaneously. The injection volume is enough for a ROI of approximately 10 feet from the injection wells, assuming a mobile porosity of 10 percent. Up to twice the design volume may be injected in case breakthrough is not observed in any well within the design volume. Conversely, the direct injection tracer test will be terminated early if sufficient data are collected from the observation wells that are 5 and 7.5 feet from the injection wells.

A sample will be collected from the injection line and tested with the fluorometer to verify the concentration of the tracer before injection into the subsurface. The sample concentration range that the fluorometer can measure is 0.4 µg/L to 0.400 µg/L. Therefore, up to 100-fold dilution may be needed for the samples that may have a relatively high dye concentration. Distilled water and pipettors will be used for sample dilution, as needed.

With the anticipated injection rate of 1 to 2 gallons per minute (gpm) per well, injection of 9,400 gallons will take 1 to 4 days, depending on when the tracer is observed in the surrounding observation wells. However, higher injection rates will be attempted by increasing the injection pressure up to approximately 10 pounds per square inch (psi) for the shallow well and 20 psi for the deep well. The work area will be carefully monitored for daylighting at the ground surface when these higher injection rates are attempted.


LEGEND
1-60 PSI PRESSURE GAUGE
FLOW METER
CHECK VALVE
UNION
MALE CAM-LOCK
FEMALE CAM-LOCK
V-NOTCH BALL VALVE
BALL VALVE (NORMALLY OPEN
BALL VALVE (NORMALLY CLOS
DIAPHRAGM VALVE
PRESSURE REGULATOR
AIR RELEASE/VACUUM RELIEF VALVE
SAMPLE PORT
BACK FLOW PREVENTER
330 GAL SUBSTRATE TANK
Water from Fire Hydrant
50 GAL POLY TANK & x 14' DOT TRAILER
RECIRCULATION LINE
2.5 HP CENTRIFUGAL PUMP
Dosatron
FQI
Equalization Tank
Pump
REAGENT DOSAGE TRAIN
DOSATRON
INLINE MIXER
INJECTION MANIFOLD
UBSTRATE TANK (330 gal) H TRAILER)
PH CONTROL OR SODIUM BRUMIDE DRUM
1" SCH 80 PVC
1" ID FLEX HOSE TO INJECTION WELL
Concentrated Dye Tank
INJECTION HEADERS AND FLEX HOSE TO INJECTION WELLS
P1
P2
INJECTION WELL CASING
A TO F
Injection Well
Injection Well
1 INCH CAM (TYPE F / ALUMINUM)
0-60 PSI PRESSURE GAUGE
CROSS (SCH 80 PVC)
1 INCH NIPPLE (SCH 80 PVC)
2 x 1 INCH FEMALE THREADED REC (SCH 80 PVC)
DRAWN BY DATE
CHECKED BY DATE
REVISED BY DATE
SCALE AS NOTED
AGVIQ
Legend
Pressure Gauge
Ball Valve
Flow Meter
Check Valve
Air Release/Vacuum Relief Valve
Back Flow Preventer
Figure 2-2
Direct Injection Process Flow Diagram
OU3 Areas F and G
NAS Jacksonville, Florida
CONTRACT NUMBER
APPROVED BY DATE
APPROVED BY DATE
FIGURE NO. 2-2
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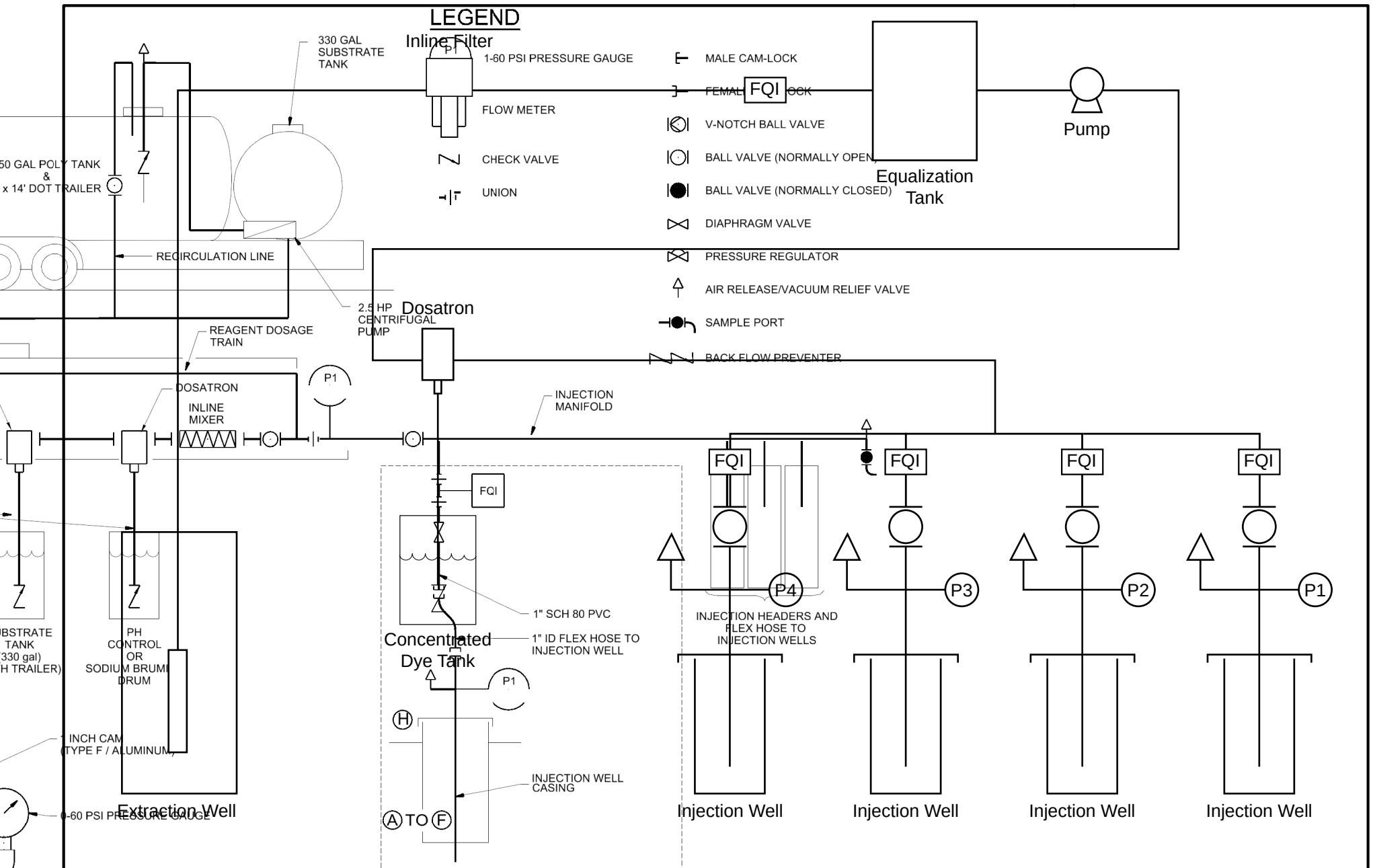
LEGEND
Inline Filter
1-60 PSI PRESSURE GAUGE
FLOW METER
CHECK VALVE
UNION
MALE CAM-LOCK
FEMALE CAM-LOCK
V-NOTCH BALL VALVE
BALL VALVE (NORMALLY OPEN)
BALL VALVE (NORMALLY CLOSED)
DIAPHRAGM VALVE
PRESSURE REGULATOR
AIR RELEASE/VACUUM RELIEF VALVE
SAMPLE PORT
BACK FLOW PREVENTER
FQI
330 GAL SUBSTRATE TANK
50 GAL POLY TANK & x 14' DOT TRAILER
RECIRCULATION LINE
Equalization Tank
Pump
2.5 HP CENTRIFUGAL PUMP
Dosatron
REAGENT DOSAGE TRAIN
DOSATRON
INLINE MIXER
INJECTION MANIFOLD
P1
P2
P3
P4
1" SCH 80 PVC
1" ID FLEX HOSE TO INJECTION WELL
Concentrated Dye Tank
INJECTION HEADERS AND FLEX HOSE TO INJECTION WELLS
PH CONTROL OR SODIUM BRUMI DRUM
1 INCH CAM (TYPE F / ALUMINUM)
0-60 PSI PRESSURE GAUGE
INJECTION WELL CASING
A TO F
Extraction Well
Injection Well
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Injection Well
Injection Well
CROSS (SCH 80 PVC)
1 INCH NIPPLE (SCH 80 PVC)
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DRAWN BY
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REVISED BY
SCALE
AS NOTED
AGVIQ
Legend
Pressure Gauge
Ball Valve
Flow Meter
Check Valve
Air Release/Vacuum Relief Valve
Back Flow Preventer
Figure 2-3
Recirculation Array Process Flow Diagram
OU3 Areas F and G
NAS Jacksonville, Florida
CONTRACT NUMBER
APPROVED BY
DATE
FIGURE NO.
2-3
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0

Direct Injection Monitoring

The tracer solution will be injected steadily, logging injection flow rates using the in-line flow meters, cumulative injected volume, and concentrations observed at the observation wells. Groundwater elevation responses should be monitored across the array to assess potential mounding near the injection well and the hydraulic continuity within the injection/treatment zone (Payne et al., 2008).

Monitoring of dye concentrations in JAX-OU3-G1 and MW-1A will continue until a maximum dye concentration plateau in one of these wells is observed, the design volume is injected, and/or sufficient data have been collected from these wells; then injection will be terminated. If the design injection volume is not sufficient to develop a tracer breakthrough curve for the observation wells, injection will continue until either a maximum dye concentration plateau is observed in JAX-OU3-G1 or MW-1A or a maximum tracer volume of twice the design volume (9,400 gallons) is injected. Monitoring at the other observation wells will also continue until the end of the injection process.

A dedicated polyethylene bailer will be used to collect grab samples at the screened interval from each monitoring well with tracer concentrations analyzed immediately using the fluorometer. A peristaltic or dual-valve bladder pump will be used to collect samples from the multilevel well. A sample should be collected from the wells after every 120 gallons of tracer solution is injected (about every 60 minutes). Once breakthrough of tracer in the JAX-OU3-G1 or MW-1A is detected, tracer concentrations in this well will continue to be recorded every 60 minutes. Visual observations may be started sooner in all wells to detect evidence of preferential pathways. Sampling time, cumulative injection volume, and dye concentration data will all be logged. As indicated above, up to 100-fold dilution may be needed for the samples that may have a relatively high dye concentration. Distilled water and pipettors will be used for sample dilution.

Water levels in all wells will be observed and monitored closely throughout the entire tracer study. Hydraulic mounding may be observed because of the pressurized injection. If significant hydraulic mounding is observed during the study, injection flow rates may be decreased, and hydraulic recovery will be monitored by checking the water levels at these wells periodically after the tracer study is complete.

Recirculation Approach

Implementation within the recirculation array will involve the use of an electrical submersible pump in the extraction well to extract water from the injection wells before being recirculated back towards the injection wells. Approximately 9,400 gallons of the 42.5 mg/L solution of Rhodamine WT will be injected into each of the two injection well pairs (or 4,700 gallons per screened interval), well IW-2A/B (two 10-foot screens), and well IW-3A/B (two 10-foot screens). Tracer injection will occur at both wells simultaneously at both depth intervals. The injection volume is enough to cover a ROI of approximately 10 feet from the injection wells. Similar to the direct injection test, up to twice the design volume may be injected in case breakthrough is not observed in any well within the design volume. Conversely, the direct injection tracer test may be terminated early if sufficient data are collected from the observation well that is 5 feet from the injection wells.

Similar to the direct injection test, samples will be collected from the injection line and tested with the fluorometer to verify the concentration as noted above in the direct injection approach.

With the anticipated injection rate of 1 to 2 gpm per well, injection of 18,800 gallons will take 2 to 8 days, depending on when the tracer is observed in the surrounding observation wells. However, higher injection rates will be attempted by increasing the injection pressure up to approximately 10 psi for the shallow well and 20 psi for the deep well. The work area will be carefully monitored for daylighting at the ground surface when these higher injection rates are attempted.

Recirculation Monitoring

For the recirculation system, dye concentrations in JAX-OU3-G3 and JAX-OU3-G17 will be monitored until a maximum dye concentration plateau in one of these wells is observed, the design volume has been injected, and/or sufficient data have been collected from these wells; then injection will be terminated. If the design injection volume is not sufficient to develop a tracer breakthrough curve for the observation wells, injection will continue until either a maximum dye concentration plateau is observed in JAX-OU3-G3 or JAX-OU3-G17, or a maximum tracer volume of twice the design volume (37,600 gallons) is injected. Monitoring at the other observation well will also continue until the end of the injection process.

A dedicated polyethylene bailer will be used to collect grab samples at the screened interval from each well with tracer concentrations analyzed immediately using the fluorometer. A peristaltic or dual-valve bladder pump will be used to collect samples from the multilevel well. A sample should be collected from the wells after every 120 gallons of tracer solution is injected (about every 60 minutes). Once breakthrough of tracer in the JAX-OU3-G3 or JAX-OU3-G17 is detected, tracer concentrations in this well will be recorded every 60 minutes. Visual observations may be started sooner in all wells to detect evidence of preferential pathways. Sampling time, cumulative injection volume, and dye concentration data will be logged. As above, up to 15-fold dilution may be needed for the samples that may have a relatively high dye concentration. Distilled water and pipettors will be used for sample dilution.

Water levels in all wells will be observed and monitored closely throughout the entire tracer study. Hydraulic mounding may be observed due to the pressurized injection. If significant hydraulic mounding is observed during the study, injection flow rates may be decreased, and hydraulic recovery will be monitored by checking the water levels at these wells periodically after the tracer study is complete.

2.1.5 Decontamination and Demobilization

Personnel and equipment will be properly decontaminated to remove all contamination that may be adhering to personnel or equipment as a result of tracer test activities. Any water accumulated during the decontamination process will be containerized in 55-gallon drums and managed in accordance with the Waste Management Plan (Section 3.0) of this Work Plan. Decontamination of personnel and equipment will be performed in accordance with the APP in Appendix A and the applicable provisions of 29 Code of Federal Regulations (CFR) 1910.120.

Following completion of the tracer test, all support equipment and waste materials will be removed, and the work areas will be restored to pre-construction conditions.

2.1.6 Preparation and Submittal of a Technical Memorandum

Following completion of this field effort, a technical memorandum will be prepared to document the findings from the tracer test study.

2.2 Project Schedule

The primary project activities and estimated durations are provided in Appendix B. During project execution some of the project activities may be completed concurrently. The work hours for remediation activities are between 0700 hours and 1700 hours, Monday through Friday. Equipment, supplies, and materials will be received during the defined work hours. Federal holidays will be observed and there will be no exceptions to work hours or federal holidays unless pre-approved by the Navy. This proposed schedule may vary depending on the actual conditions encountered.

2.3 Communications Plan

A communications matrix summarizing the lines of communications for NAVFAC SE and AGVIQ is presented in Table 2-2. Table 2-3 provides a project personnel directory.

TABLE 2-2
Communications Matrix
OU3, Areas F and G, NAS Jacksonville

AGVIQ Position	Navy Direct Report
Paul Rakowski, Deputy Program Manager	Donna Ruzicka, Contract Specialist
Eric Davis, TO Project Manager	Adrienne Wilson, Remedial Project Manager
	Thomas Tryon, FEAD

FEAD - Facility Engineering and Acquisition Division

TABLE 2-3
Project Personnel Directory
OU3, Areas F and G, NAS Jacksonville

Contact	Company and Address
Donna Ruzkicka, Contracting Officer donna.ruzicka@navy.mil	Naval Facilities Engineering Command Southeast (NAVFAC SE) Building 903, Box 30 Jacksonville, FL 32212 (904)-542-6917
Adrienne Wilson, RPM adrienne.wilson@navy.mil	Naval Facilities Engineering Command Southeast (NAVFAC SE) Ajax Street 135N, P.O. Box 30 Jacksonville, FL 32212 (904)-542-6418

TABLE 2-3
Project Personnel Directory
OU3, Areas F and G, NAS Jacksonville

Contact	Company and Address
Eric Davis, Project Manager eric.davis@ch2m.com	CH2M HILL 6600 Peachtree Dunwoody Road, Suite 600 Atlanta, GA 30328 770- ext 55713 850-393-0306
Sidney Allison, Senior Program Manager sidney.allison@tikigaq.com sidney.allison@ch2m.com	AGVIQ, LLC 2809 S. Lynnhaven Road, Suite 200 Virginia Beach, VA 23452 757-213-8581
Larry Westphal, Contracts Manager lwestphal@tikigaq.com	AGVIQ, LLC 2809 S. Lynnhaven Road, Suite 200 Virginia Beach, VA 23452 757-318-9427
Rachel Francis, H&S Administrator rfrancis@tikigaq.com	AGVIQ, LLC 2809 S. Lynnhaven Road, Suite 200 Virginia Beach, VA 23452 757-213-8592
Taylor Sword, Program QA/QC Manager tsword@tikigaq.com	AGVIQ, LLC 2809 S. Lynnhaven Road, Suite 200 Virginia Beach, VA 23452 757-213-8599

2.4 Traffic Control Plan

Traffic control will be the responsibility of AGVIQ. AGVIQ will minimize disturbance to surrounding area traffic patterns during project execution. All construction transport will be pre-cleared and have facility access granted through AGVIQ and approved by NAS Jacksonville to enter and exit through the prescribed entrance and to proceed to the site. Truck drivers will be instructed to follow the approved route map, and access and depart NAS Jacksonville as quickly and efficiently as possible. AGVIQ and its subcontractors will coordinate with NAS Jacksonville prior to field mobilization to identify site personnel and establish gates of entry and haul routes. The delivery personnel assigned to the site will drive directly to the site by the route specified by NAS Jacksonville.

3.0 Waste Management Plan

This Waste Management Plan describes the waste management requirements and procedures for pre-design study activities at OU3 Areas F and G at NAS Jacksonville. The work to be performed at the site includes injection and extraction well installation and implementation of a tracer dye study that includes using an offsite fixed base laboratory for waste characterization purposes. Waste generated during the work will include soil cuttings removed during well drilling, groundwater accumulated during well development, and decontamination fluids generated from equipment cleaning.

The following additional waste items will also be generated and disposed as municipal debris:

- Personal protective equipment (PPE)
- Uncontaminated general construction debris (such as caution tape and concrete debris)

3.1 Waste Characterization

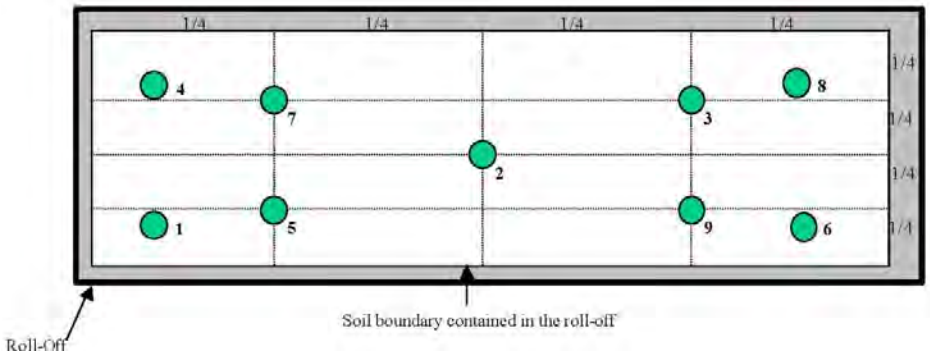
It is estimated that up to 15 cubic yards of soil and 1,500 gallons of groundwater/ decontamination water will be generated during the study activities at Areas F and G. Waste generated from these sites are classified as listed hazardous waste by the generator and will carry the RCRA waste code of F002.

3.1.1 Drill Cuttings

Procedure for Bulk Storage Container Sampling

One composite sample and one grab sample for VOC analysis will be collected per bulk storage container as described below and shown on the following diagram:

1. A grid will be established on soil within the roll-off or sludge box area by dividing the pile into quarters on length and width (see the following figure).
2. Grab samples will be collected in equal volumes from the surface of the soil pile (points 1 through 3), half depth (points 4 through 6), and bottom (points 7 through 9).
3. Grab samples from the nine locations should be combined and mixed for a total of one composite sample for analysis. Note: VOCs will be collected only from the half-depth (points 4 through 6) as grab samples. VOCs may not be composited.



Procedure for Drum Sampling

One composite sample and one grab sample for VOC analysis will be collected per 10 drums as follows:

Procedure for Collecting Volatile Fractions

1. Using a hand auger or other device, retrieve a core from the source to be sampled.
2. Remove the core from the auger or other device. Using a disposable Terra Core™ sampler, place the sample into pre-preserved 40-milliliter glass vials. The transfer operation should ideally be completed in 1 minute to minimize the loss of volatile components.

Procedure for Collecting Non-Volatile Fractions

3. From five randomly selected sample locations, collect several spoonfuls of soil into a stainless steel bowl.
4. Homogenize the five grab samples by the quartering techniques using the stainless steel spoon.
5. Fill the appropriate sample jars completely full with the homogenized sample.

Offsite treatment or disposal facilities may have different sampling requirements, and should be consulted prior to collection of waste characterization sample collection. Potential waste characterization analysis parameters for soil cuttings are listed below:

Parameter	Analytical Method
Volatile Organic Compounds (VOCs)	SW-846 8260B
TCLP Semivolatile Organic Compounds (SVOCs)	SW-846 1311/8270D
TCLP Pesticides	SW-846 1311/8081B
TCLP Herbicides	SW-846 1311/8151A
TCLP Metals	SW-846 1311/6010C/7470A
Polychlorinated biphenyls (PCBs)	SW-846 8082
Ignitability	SW-846 1010
Corrosivity	SW-846 9045D

3.1.2 Development and Decontamination Waste Water

Waste characterization samples will be collected to evaluate the handling and transportation and disposal (T&D) requirements of accumulated development water, decontamination water, and any other miscellaneous collected water. Water characterization samples will be collected from the drums prior to disposal. One composite sample (and one grab for VOC analysis) will be collected from five representative grab samples per 10 drums. Water samples will be collected as follows and analyzed for the parameters listed below:

1. Using a bailer or dip jar, collect a water sample from its containment.

2. Fill the sample containers for volatile analyses first (grab sample). The 40-ml vials will be filled so that there is no headspace in each vial.
3. Then fill the sample containers for the remaining analyses by collecting equal water samples from each of the five drums.
4. Label and package the samples for shipment to the laboratory.

Offsite treatment or disposal facilities may have different sampling requirements, and should be consulted prior to collection of waste characterization sample collection. Likely waste characterization analysis parameters for development and decontamination waste water are listed below:

Parameter	Analytical Method
VOCs	SW8260B
SVOCs	SW8270D
8 RCRA Metals	SW6010C/7174A
Ignitability	SW1010/1020
Corrosivity	SW9040/9045

3.2 Waste Management

3.2.1 Waste Storage Time Limit

All waste generated during the pre-design investigation is hazardous. Wastes will be removed from the site within 75 days from generation. The accumulation start date is the day waste is first added to the container.

3.2.2 Labels

The labeling of waste containers will be in accordance with 49 CFR 172, 173 and 178. Labels will include the type of waste, location from which the waste was generated, and accumulation start date. Containers used to store/accumulate waste (including soil and water) will include the following label:

Hazardous waste will be labeled with the following information:

- Accumulation start date (when the first drop of waste is placed into the container)
- Generator Name
- Generator EPA identification number
- RCRA Waste codes
- Proper DOT Shipping name
- Prior to transport the manifest number must be added (for containers of less than 110-gallon capacity)

Where applicable, drums will be labeled with the major hazards (e.g., flammable, oxidizer, and carcinogen).

3.2.3 Waste Management Area Requirements

Incompatible wastes (e.g., flammable and corrosive wastes) will be segregated. Wastes of the same matrix, contamination, and the same source may be aggregated to facilitate storage and disposal. Wastes will be accumulated in an area identified and approved by the Navy.

Waste accumulation areas will contain appropriate emergency response equipment. The APP (Appendix A) identifies the specific emergency response procedures and equipment.

All containers, drums, and tanks will be inspected upon arrival at the site for disrepair and any residual contamination or contents. If container contains waste upon arrival or is in disrepair, it will be immediately rejected and documented.

All wastes will be contained in a manner that prevents the spread of contamination. The Navy has designated the grassy hill south of the study area and outside the flightline as the waste accumulation/storage area. The waste storage area is under AGVIQ's control within the secure OU3/FRCSE boundary.

Drums/Small Containers

The following procedures will be followed when using drums:

- All drums will be inspected and inventoried upon arrival onsite for signs of contamination and/or deterioration.
- Adequate aisle space (e.g., 30 inches) between drums will be provided to allow the unobstructed movement of personnel and equipment. A row of drums should be no more than two drums wide. Drums will be furnished by AGVIQ.
- Each drum will be provided with its own label, with labels visible.
- Drums will remain closed except when removing or adding waste to the drum. Closed means lids are on and bolts area tightened down.
- Drums will be disposed of with the contents.
- Drums containing liquid hazardous waste will be provided with secondary containment and not be placed near a stormwater inlet or conveyance.

Roll-off or Sludge Boxes

The following guidelines relate to boxes that will be used on-site for the temporary storage of waste prior to transport for off-site disposal:

- Old labels will be removed, and each roll-off box will be provided with its own label, which will be placed in a visible location. Multiple labels may be used for full visibility.
- Boxes will be labeled with the information described in Section 3.2.2.
- Roll-off boxes for contaminated waste will be provided with covers, bows, and disposable liners. Liners will be disposed of as contaminated debris.
- When waste is not being added or removed, covers will be properly secured.
- Roll-off containers will be inspected by the transporter after removing the liner, and decontaminated should liner failure be discovered.

- Free liquids will not be added to waste in a roll-off box.
- Saturated soils will be placed in a roll-off box provided with sealable containment or a container otherwise designed for free liquids (for example, dewatering box, sludge box, or vacuum box).
- Roll-off containers will be filled until half-full or otherwise monitored to ensure that they will meet United States Department of Transportation (DOT) weight restrictions.
- Roll-off boxes will not be located near a stormwater inlet or conveyance.

Inspection of Waste Storage Areas

Waste accumulation areas will be inspected for malfunctions, deterioration, discharges, and leaks that could result in a release. The following inspection schedule will be followed:

- At least weekly inspection of containers (for leaks, signs of corrosion, or signs of general deterioration).
- Secondary containment will be inspected for berm failure and/or tears or holes in the liner.
- All areas will be inspected to ensure that good housekeeping practices are maintained.

Any deficiencies observed or noted during inspection will be rectified immediately. Appropriate measures may include transfer of waste from leaking container to new container, replacement of liner or cover, or repair of containment berm.

If operations are suspended for more than 7 days, contact the regulatory compliance manager and alternate inspection arrangements will be made. Prior to demobilization, all hazardous wastes will be removed from the site.

Inspections will be recorded in the Daily Quality Control Report and include any deficiencies and how issue was rectified. Copies of the report will be maintained onsite, and available for review.

3.3 Employee Training

Field staff that will manage hazardous waste will meet the training requirements of 40 CFR 262.34(a)(4) and 265.16 and UAC R315-8-2.7 through the following:

- OSHA 1910.120 HAZWOPER training, and
- On-the-job training, which includes
  - Site-specific Health and Safety Plan review (requires each site worker and guests to review and sign the plan),
  - Activity hazard analysis and daily “tailgate” meetings, and
  - Project-specific Work Plan review (e.g., this Plan)

3.3.1 Waste Tracking Log

The Waste Tracking Log is used to track waste from generation to final disposition. Wastes will be logged into the Waste Tracking Log the day waste is generated and placed into containers. Transportation of wastes will be inventoried the day of transportation from the site using the Waste Tracking Log. Final disposal will be documented on the Waste Tracking Log using the Certificate of Disposal. A blank Waste Tracking Log is attached in Appendix D.

3.4 Offsite Transportation

All loads will be covered and the trucks inspected to ensure the loads are secure, proper placarding is provided as necessary, and shipping documentation is accurate.

3.4.1 Transportation and Disposal Documentation

Prior to offsite transportation of any waste, a waste approval package for each waste stream will be prepared. This package will include a waste profile naming the Navy as the generator of the waste, analytical summary tables applicable to the waste, Land Disposal Restriction notification for hazardous wastes, a completed waste manifest and any other applicable information necessary for the Navy to complete its review of the disposal package and signature as the generator.

The signed profile will then be submitted to the offsite facility for acceptance and approval. Once the approval profile or letter is received from the offsite facility, transportation can be scheduled.

Each load of waste will be manifested using the Uniform Hazardous Waste Manifest before leaving the site. At a minimum, the manifest form will include the following information:

- Generator information, including name, address, contact, and phone number, and EPA ID number
- Transporter information, including name and EPA ID number
- Designated facility information, including name, address, phone number, and EPA ID number
- Site name, including street and mailing address
- DOT proper shipping name
- Type and number of container
- Quantity of waste (volumetric estimate)
- Task order or job number
- Profile number
- 24-hour emergency phone number

The generator and the transporter must sign the hazardous manifest prior to the load of waste leaving the site.

If the signed hazardous waste manifest from the designated facility is not received within 35 days, AGVIQ as representative of the Navy must contact the transporter or the designated facility to determine the status of the waste. If the signed hazardous waste manifest has not been received within 45 days, the Navy, with support from AGVIQ, must issue an "Exception Report" to FDEP, as required under 40 CFR 262.42.

3.4.2 Department of Transportation Requirements

Requirements under 49 CFR 171 will apply to all offsite shipments of hazardous materials. The information contained in this section is provided as a general guide. It is the responsibility of a DOT-trained individual to ensure that the requirements of 49 CFR 171 are met. Transporters may not mix or combine incompatible hazardous waste within a common container.

Shipping Name

Material that exhibits one of the nine DOT hazard class characteristics (e.g., explosives, gases, flammable liquids, flammable solids, oxidizing substances, toxics/poisons, radioactive materials, corrosive substances, or miscellaneous hazards) is regulated under DOT rules for the transportation of hazardous material.

Each shipment of hazardous material will be provided with a proper shipping name using the Hazardous Materials Table in 49 CFR 172.101. All determinations will be made by DOT-trained personnel.

The DOT shipping name for this project waste is as follows. This will be confirmed prior to shipment and manifest generation.

- NA3077, Hazardous waste, solid, n.o.s. (Trichloroethylene), 9, PGIII
- NA3082, Hazardous waste, liquid, n.o.s. (Trichloroethylene), 9, PGIII

Packaging, Marking, and Labeling

The shipping name, hazard class, identification number, technical names (if applicable), EPA markings and waste code numbers, and consignee/consignor designations will be marked on packages for shipment (49 CFR 172.301). Once a waste is characterized, reference will be made to the Hazardous Materials Table in 49 CFR 172.101 to determine the appropriate label.

Placards

Appropriate placards will be determined by DOT-trained personnel. Specific placard descriptions are found starting at 49 CFR 172.521. If a placard is required, it will be affixed on each side and each end of the vehicle.

A Class 9, NA3077 or NA3082 will be required for shipment. Note, regarding drummed waste, the placard is only required for shipments greater than 1000 pounds.

3.4.3 Transporter Requirements

Each transportation vehicle and load of waste will be inspected before leaving the site and documented. The quantities of waste leaving the site will be recorded on a transportation and disposal log. The transporter will have a valid DOT number, appropriate hazardous material certifications and a valid EPA ID number. The transporter will comply with

transportation requirements outlined in 49 CFR 171-179 (DOT) and 40 CFR 263.11 and 263.31 (Hazardous Waste Transportation).

The transporter will be responsible for weighing bulk loads at a certified scale. For each load of waste, weight measurements will be obtained for each full rolloff/sludge box. Bulk disposal quantities will be based on the known empty truck or container weight and measured (at the disposal facility) truck or container weight after loading. Weights will be recorded on the waste manifest and weight ticket.

The transporter will observe the following practices when hauling and transporting wastes offsite:

- Minimize impacts to general public traffic.
- Repair road damage caused by construction or hauling traffic.
- Line and cover trucks and trailers used for hauling hazardous or regulated waste, including asbestos, to prevent spills or releases.
- Ensure seals on trucks transporting liquids are in good condition.
- Wastes or materials from other sites may not be combined with wastes generated during this project.

All personnel involved in offsite disposal activities will follow safety and spill response procedures outlined in the Health and Safety Plan.

3.4.4 Spill Response

The transporter will clean up any spill or release of waste (including soil or water) that occurs during transportation in accordance with such action as may be required or approved by federal, state, or local officials. Spilled waste will be immediately cleaned up, including soils on the outside of the trucks, the truck or container, and the road surface. Where appropriate, the spilled material will be returned to the original waste container. In any case, the spilled material will be properly contained and disposed of.

3.5 Disposition of Waste Streams

Offsite treatment, disposal, or recycling facilities will use the waste profile and supporting documentation (e.g., analytical data) to determine whether a waste will be accepted.

Soil cuttings will be sampled and analyzed to determine if waste meets treatment standards (40 CFR 268.40 and 40 CFR 268.49). Waste that does meet these standards will be disposed directly at a permitted Subtitle C landfill as a hazardous waste. Waste that does not meet these standards will be treated as required by the disposal facility and disposed at a permitted Subtitle C landfill. PPE and used sampling debris will be disposed of with the soil.

Development and decontamination liquids will be sampled and analyzed to determine waste disposal options. It is likely waste will be disposed of at a permitted Subtitle C facility as hazardous waste.

3.5.1 CERCLA Offsite Rule

Contaminated waste (i.e., CERCLA waste) from the site may be shipped only to an offsite facility that has been approved by EPA under the Offsite Rule (40 CFR 300.440). Prior to offsite waste transport, EPA will be contacted to verify that the facility is approved for receiving waste from CERCLA sites. For this project, it is assumed that the Offsite Rule does not apply to water treatment facilities permitted under the Clean Water Act (including the IWTP).

3.6 Recordkeeping

The following records and documents will be maintained by AGVIQ:

- Transportation and offsite disposal records, including the following:
  - Signed profiles and associated characterization data
  - Copies of fully-executed manifests, LDR notifications and certifications (for hazardous waste), and weight tickets
  - Offsite facility waste receipts, certificates of disposal, destruction, or recycle
  - Waste Tracking Log
- Training records
- Inspection records

4.0 Environmental Protection Plan

The purpose of this plan is to provide specific requirements and procedures to protect the environment during response action activities within OU3.

4.1 Regulatory Requirements

Remedial activities are regulated under CERCLA, and although no project-specific ARARs have been developed, this project will be implemented in a manner that is consistent with the ARARs identified in the OU3 ROD. Onsite remedial actions are exempt from permitting (e.g., Underground Injection Control [UIC]) and other administrative requirements under CERCLA 121(e), but must comply with the ARARs. However, a UIC Notification Memorandum was submitted to the FDEP for review on July 18, 2014, and the FDEP subsequently issued a UIC Approval Order on July 31, 2014. The UIC Notification Memorandum has been provided in Appendix C of this Work Plan. Appendix C includes the Approval Order, the completed UIC Notification Memorandum form, a Rhodamine WT product cut sheet, a material safety data sheet (MSDS), and a Rhodamine WT toxicology report.

In addition, offsite transportation and disposal of wastes will comply with all federal and State of Florida regulations, as appropriate.

4.2 Protection of Air Resources

Construction activities will be kept under surveillance, management, and control to minimize the discharge of any air pollutants. The following general practices will be implemented to protect air resources:

- Construction equipment will be maintained within manufacturer's design limits to ensure minimal discharge of exhaust emissions.
- Dust emissions will be controlled during earth disturbing activities using water truck or hose nozzle spray applications of water.
- Traffic routes will be designated to limit the area that is disturbed.
- Haul roads will be maintained and watered to reduce dust, as necessary.
- Travel speeds over unpaved areas will be limited to reduce dust levels.
- If necessary, work areas will be seeded or otherwise stabilized to reduce dust levels.
- Burning will not be allowed as a means of clearing.
- Equipment will be operated in such a manner as to minimize airborne particulates whenever possible (e.g., the drop height of excavators will be limited).

4.3 Protection of Water Resources

Spills and releases of injection solutions, and migration of injection solutions into waterways

(e.g., via migration into storm sewers) are the primary threats to water resources. Because of the potential of the tracer to intercept the existing stormwater system within the direct injection test array, the manhole near this area will be monitored as noted in Section 2.1.4.1. Spill prevention is discussed below.

4.4 Protection of Land Resources

Land resources (e.g., trees and shrubs) will be preserved in their present condition or restored as near as possible to their natural appearance. Trees outside of any clearing limits will be protected during excavation or filling activities within the root zone, wherever possible. No ropes, cables, or guy lines will be fastened to or attached to any existing trees for anchorage unless specifically authorized by the Navy. Where trees or shrubs may be defaced, bruised, injured, or otherwise damaged by equipment or construction operations, boards, planks, or poles may be placed around them for protection. Monuments, markers, or other similar structures will be protected before beginning construction operations.

4.5 Protection of Wildlife

Construction operations will be managed in such a manner as to minimize interference with wildlife habitat. Care will be taken to ensure that temporary erosion and sediment controls are installed to prevent stormwater discharges to any adjacent rivers or wetlands. Construction operations will be monitored and reorganized as necessary to prevent negative effects to identifiable wildlife activity.

4.6 Chemical Inventory and Control

Consistent with the requirements of Section 311 of the Emergency Planning and Community Right-to-Know Act (EPCRA), AGVIQ will maintain an inventory of chemicals and hazardous materials that may be brought onsite.

If necessary, the project manager will request Material Safety Data Sheet (MSDS) or Safety Data Sheets (SDSs) from the subcontractors for chemicals to which AGVIQ and any subcontractor employees are potentially exposed. The Site Health and Safety Officer will perform the following activities:

- Train employees on required site-specific hazard communication.
- Confirm that the inventory of chemicals brought on the site by subcontractors is available.
- Obtain an MSDS for each hazardous chemical before or as other chemicals arrive on the site.
- Label chemical containers with the identity of the chemical and with hazard warnings, if applicable.

Detailed procedures for chemical and hazardous material inventory and control are provided in the APP/SSHP.

4.7 Spill Reporting, Prevention and Control

The definition of release includes any "spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of barrels, containers, and other closed containers)" of any potentially hazardous chemical, substance, and/or material.

4.7.1 Spill Prevention

All fuel, chemical, and waste storage areas will be properly protected from onsite and offsite vehicle traffic. If fuel is stored onsite, fuel tanks or containers (including fuel storage and waste storage) will be equipped with secondary containment. These tanks or containers will be inspected routinely for signs of leaks. Accumulated water must be inspected for signs of contamination (e.g., product sheen, discoloration, and odor) before being discarded. Fire protection provisions outlined in the APP/SSHP will be adhered to.

Onsite vehicle and equipment will be refueled onsite at designated fueling areas, located on level ground. Spill kits, drip pans and absorbent spill cleanup materials will be available in the fueling area. These materials will be properly disposed of after use. No vehicle or equipment maintenance will be performed at the remediation area.

Chemical products must be properly stored, transferred, and used. The MSDS or SDS for each chemical product brought onsite, will be available. Chemical containers will be labeled with the identity of the chemical and any hazard warnings, if applicable. If chemical product use occurs outside areas equipped with spill control materials, adequate spill control materials will be maintained at the local work area.

Good housekeeping procedures will be followed to reduce risks associated with remediation materials and chemicals. These procedures include, but are not limited to, keeping materials in their original containers whenever possible, maintaining original labels and MSDSs, and using proper disposal methods for surplus materials.

4.7.2 Spill Containment and Control

Spill control materials will be maintained in the support zone, at fuel storage and dispensing locations, and at waste storage areas. Incidental spills will be contained with sorbent and disposed of properly. Spilled materials must be immediately contained and controlled.

An Emergency Response Plan is included in the APP/SSHP. The information contained in these sections details how AGVIQ will address spill control and prevention activities onsite. Spill response procedures include:

- Immediately inform the AGVIQ PM and the Navy. Notify the Program Environmental Manager once spill area has been assessed for safety and is secure.
- Assess the spill area to ensure that it is safe to respond.
- Evacuate area if spill presents an emergency.
- Ensure any nearby ignition sources are immediately eliminated.
- Use proper PPE in responding to spills.

- Stop source of spill (i.e., plug holes when possible, shut off valves, etc.).
- Establish site control for spill area.
- Contain and control spilled material through use of sorbent booms, pads, or other material.
- Control any water from running onto or running off the spill area.

4.7.3 Spill Reporting

All spills will be reported to the AGVIQ Project Manager (PM) who will report it to the Navy as indicated in the incident notification requirements of the APP/SSHP of this Work Plan. Refer to this plan for emergency response procedures and further reporting requirements.

It is important that the Program Environmental Manager also be immediately notified of spills/releases and other environmental compliance-related incidents (e.g., regulatory non-compliance) or near-loss environmental incidents. The Program Environmental Manager will evaluate a spill/release or non-compliance to determine agency reporting requirements. Immediate internal spill reporting is critical to advise the Navy to assure that the Navy and AGVIQ comply with EPA and Navy spill reporting requirements (EPA requires reporting certain spills/releases within 15 minutes). **Unless directed otherwise by the Contracting Officer (CO) or the AGVIQ PM, the Navy will report spills/releases to external agencies.**

Federal Spill Reporting

Spill/releases of oil to waters of the US (including storm sewers) that cause a sheen, or spills of a hazardous substance above a Reportable Quantity must be **immediately** reported to the National Response Center at

800-424-8802

Florida Spill Reporting

The state of Florida requires reporting the following to the State Watch Office:

- Petroleum Based Spills
  - Spills into or involving state waterways (any amount, and including discharges to storm sewers)
  - - Spills greater than 25 gallons (or potential > 25 gallons)
  - - Spills requiring any state/federal notifications or assistance
- Chemical Spills
  - All SARA/EHS/CERCLA Releases
  - All spills threatening population or the environment
  - All spills requiring evacuation

State Watch Office
(800) 320-0519 (24 Hours)

REPORT THE FOLLOWING INFORMATION:

1. Name, address, and telephone number of person reporting
2. Name, address, and telephone number of person responsible for the discharge or release, if known
3. Date and time of the discharge or release
4. Type or name of substance discharged or released
5. Estimated amount of the discharge or release
6. Location or address of discharge or release
7. Source and cause of the discharge or release
8. Size and characteristics of area affected by the discharge or release
9. Containment and cleanup actions taken to date
10. Other persons or agencies contacted

4.8 Spill Cleanup and Removal

All spilled material, contaminated sorbent, and contaminated media will be immediately cleaned up and containerized, if safe and as appropriate for the spilled medium (liquid or solid). Contaminated spill material will be drummed, labeled, and properly stored until material is disposed of. Contaminated spill material will be managed as waste (see Section 3.0 Waste Management Plan) and disposed of according to applicable, federal, state, and local requirements.

4.9 Noise

Provisions for preventing excessive noise levels are addressed in the APP/SSHP.

4.10 Environmental Conditions Report

The environmental conditions survey for this work will be conducted by AGVIQ during the pre-construction activities. Photographs will be taken to document the existing environmental conditions of the site.

4.11 Site Restoration

In general, site restoration activities will include the following activities:

- Decontaminate facilities, equipment, and materials prior to final removal from the site.
- Upon completion of final decontamination, remove any decontamination support features. Properly dispose of any items that cannot be decontaminated and/or materials (such as plastic sheeting) used in decontamination activities.

- Remove all temporary construction features, such as work areas, stockpiles, structures, fencing, and waste staging or storage areas in accordance with project requirements and directions provided by Navy representative.

5.0 Quality Control Plan

This Quality Control Plan details the quality administrators, the project organization, and the construction inspections associated with the work to be completed at Areas F and G, NAS Jacksonville.

AGVIQ, the Navy, or others will approve submittals as identified in the Submittal Register (to be updated prior to the next revision), included in Appendix D. All approved submittals will be distributed by AGVIQ to the appropriate Navy personnel, the project site, and to the project file.

The project organization chart (Figure 5-1) depicts the chain-of-command for this TO and the individuals responsible for executing the work as indicated. Individual roles and responsibilities of TO personnel are summarized in Table 5-1.

5.1 Project QC Manager

The Project QC Manager for this project is Osaguona Ogbebor. The appointment letter for Mr. Ogbebor is included in Appendix D.

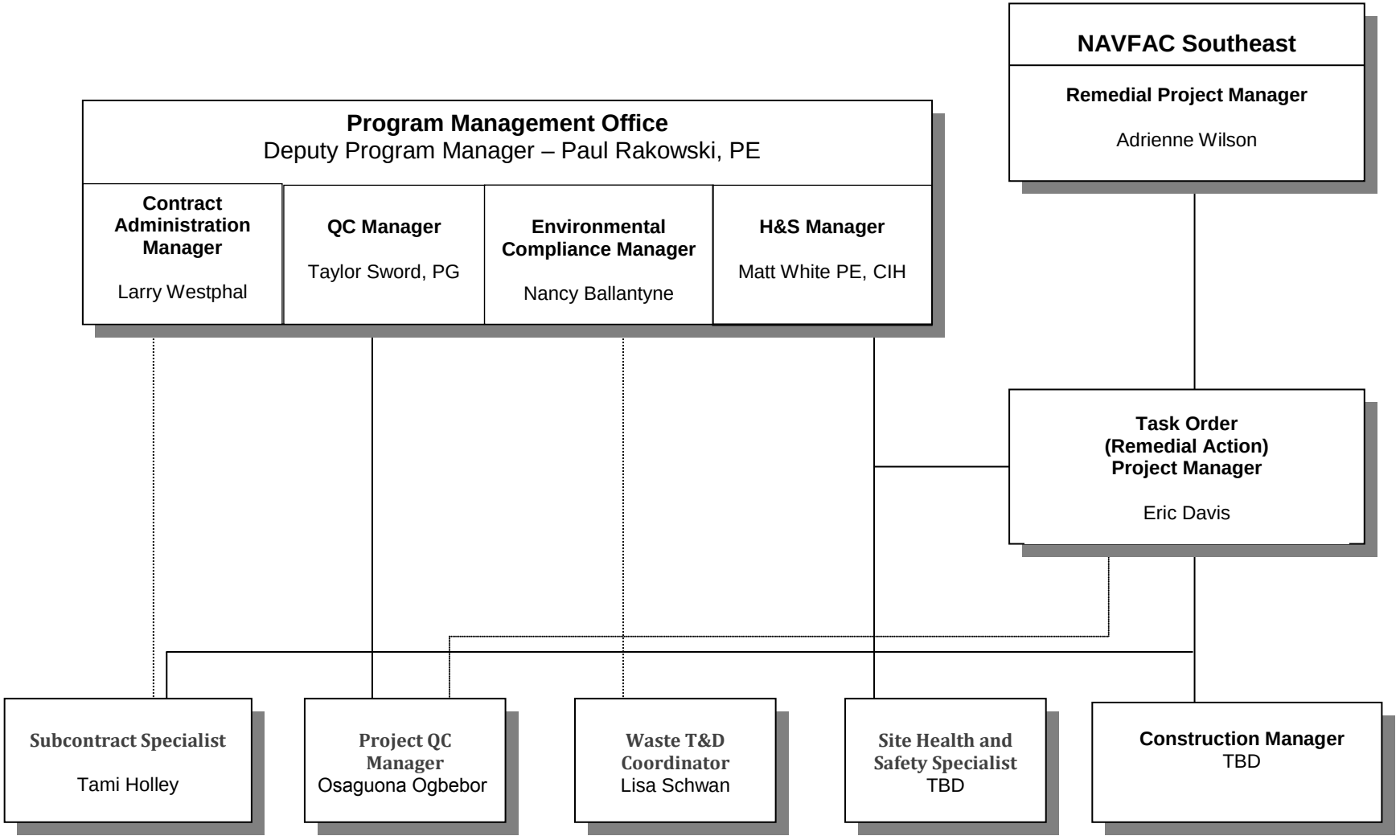
5.2 Testing Requirements

In accordance with the Waste Management Plan, laboratory testing will be performed for soil and liquid waste characterization samples.

The tracer tests will not require laboratory testing. All sample measurements will be recorded in the field. Equipment will be calibrated and observations recorded in accordance with the appropriate standard operating procedures.

5.3 Construction Inspections

The Project QC Manager will perform final inspections of the materials and overall work activities. The inspections are performed to verify safe, efficient, high quality work is performed, while meeting the objectives and requirements of the plans and specifications.



Note: separate task-specific charts may be issued and be provided to the Navy prior to mobilization.

DRAWN BY	DATE	Figure 5-1 Project Organization Chart OU3 Areas F and G *NAS Jacksonville, Florida*	CONTRACT NUMBER ___
CHECKED BY	DATE		APPROVED BY ___ DATE ___
REVISED BY	DATE		APPROVED BY ___ DATE ___
SCALE ___			FIGURE NO. 5-1 REV 0

TABLE 5-1
Roles, Responsibilities, and Authorities of Key Project Personnel
OU3, Areas F and G, NAS Jacksonville

Role	Responsibility	Authority
Project Manager	• Management and Technical Direction of work • Communication with NAVFAC SE RPM and Navy Technical Representative (NTR) • Overview subcontractor performance • Select TO staff • Develop TO Work Plan and supporting plans • Meet TO Performance Objectives • Prepare status reports • Prepare Field Change Requests	• Approve subcontractor selection • Approve invoices to NAVFAC SE • Approve TO baseline schedule • Stop work at the site for any reason • Approve payment to vendors and suppliers • Approve payment to subcontractors • Review technical qualifications of subcontractors • Respond to Design Change Notices
Site Superintendent	• Responsible for all site activities • Provide direction to subcontractors • Act for Project Manager • Provide daily status reports • Prepare TO Work Plan • Conduct daily safety meetings • Review subcontractor qualifications • Stop work for unsafe conditions or practices	• Stop work for subcontractors • Approve corrective action for site work-arounds • Approve materials and labor costs for site operations • Resolve subcontractor interface issues • Approve daily and weekly status reports
Project QC Manager	• Monitor and oversee subcontractor compliance with scope of work • Review requests for changes in scope of work • Recommend improvements in work techniques or metrics • Recommend work-around to Site Superintendent • Monitor and report on subcontractor quality and quantities • Audit subcontractors offsite fabrication • Maintain Submittal Register • Participate in Incident-Free Operations conference call • Conduct QC meeting	• Complete daily compliance report • Maintain Rework Items list • Stop work for non-compliant operations/items • Approve resumption of resolved non-compliant operations/items
Site Health and Safety Specialist	• Monitor and report on subcontractor safety and health performance • Record and report safety statistics • Conduct needed site safety and health orientation • Maintain Environmental Log • Stop work for unsafe practices or conditions	• Approve subcontractor site specific health and safety plan • Set weekly safety objectives • Approve resumption of work for resolved safety issues

TABLE 5-1
Roles, Responsibilities, and Authorities of Key Project Personnel
OU3, Areas F and G, NAS Jacksonville

Role	Responsibility	Authority
Subcontract Specialist	• Prepare bid packages • Purchase disposable materials • Maintain subcontract log • Approve payables for disposable items • Maintain government property records	• Provide project scheduling coordination • Responsible for site cost tracking and reporting • Maintain record of site purchases

5.4 Definable Features of Work

Definable features of work (DFOWs) associated with these activities are identified for the purpose of developing and executing the pre-design work, implementing health and safety requirements, and QC inspections. The DFOWs associated with the execution of the pre-design scope of work are outlined as follows:

- Mobilization, site preparation, and underground utility survey
- Well installation
- Tracer test implementation
- Waste sampling, handling, storage, transportation, and disposal
- Decontamination and demobilization

The definable features of work will be inspected in accordance with the three phases of control. The three phases include Preparatory, Initial, and Follow-up. An overview of the inspection provisions is outlined in the subsections that follow.

5.4.1 Mobilization, Site Preparation, and Underground Utility Survey

As part of the mobilization activity, a pre-construction meeting will be held to review the preparedness to begin the project, the overall project scope and schedule, communications and reporting. The preparedness check will verify that site preparation provisions such as permitting/approvals, utility clearances, demarcating the work zones, and staging of equipment and material, as needed, are in place to begin the intrusive work activities. Additionally, equipment and materials will be verified functional and in good working condition prior to starting the project.

Preparatory Phase

The preparatory phase will include a review of the relevant activity hazard analyses (AHAs), the Work Plan including the communications plan and project schedule, submittal status, and confirmation of appropriate materials and equipment are onsite or are in the process of mobilizing to the site.

Initial Phase

Inspections will be made as necessary to verify well locations are accessible using drilling equipment, utilities marked, and material staged in the designated areas.

Follow-up Phase

The Project QC Manager will provide oversight of site preparation activities to verify that the work is completed in accordance with the requirements provided in this Work Plan. Deficiencies will be noted and corrected.

Table 5-2 lists the quality controls that will be implemented during mobilization and site preparation activities.

TABLE 5-2
QC Procedures for Mobilization, Site Preparation, and Underground Utility Survey
OU3, Areas F and G, NAS Jacksonville

Task	Procedures/Construction Details
Pre-construction Meeting	• Verification of excavation permit and utility clearance from NAS Jacksonville Environmental Facilities Department • Verification of designated locations of equipment layout, material and waste staging, and decontamination
Site Walk	• Verification of site layout plan • Verification that sample locations are easily accessible by drilling equipment • Verification of Environmental Conditions Report
Pre-construction Submittals	• Subcontractor plans and specifications • Subcontractor personnel qualification and certifications
Temporary Facilities	• Verification of temporary facilities for conformance with NAS Jacksonville Environmental Facilities Department requirements • Verification of temporary utility hookups for conformance with the utility and the Station requirements • Verify implementation of environmental protection measures, as needed

5.4.2 Well Installation

Preparatory Phase

The preparatory phase will include a review of the relevant AHAs, the requirements provided in the Work Plan, the proposed well installation plan, detailed review of specific planned well construction by well type, verification of utility clearance; confirmation of acceptability of the tracer test well system assembly, wellhead fittings and other required materials; and confirmation that appropriate equipment (PPE, water handling, etc.) and field personnel are available to complete the work. The oversight geologist will be identified, and the logistical approach to conducting the work will be discussed.

Prior to the commencement of any intrusive activity, site controls including construction barricades, roadway signs, and security fencing will be inspected and installed as necessary.

Initial Phase

Prior to Tracer Test well installation activities, the Project QC Manager will complete the initial inspection to verify that the first set of well installation, construction and development activities meet the requirements of the plans and specifications for the wells as indicated in the subcontractors' scope of work. Deficiencies will be documented and corrected as necessary.

Follow-up Phase

The Project QC Manager will be responsible for the overall daily surveillance of the well installation activities. The daily surveillance will verify that the work is being completed according to the work plan provisions as necessary.

Table 5-3 lists the quality controls that will be implemented during tracer test well installation activities.

TABLE 5-3
QC Procedures for Well Installation
OU3, Areas F and G, NAS Jacksonville

Task	Procedures/Construction Details
Monitoring Well Installation	• Verify driller's qualifications (licensed in the State of Florida) • Verify utility clearance • Verify appropriate equipment and materials • Verify installation per FDEP regulations • Well identification/labeling • Review well construction design with the driller • Inspection of equipment and decontamination between wells • Verify completion of well completion logs and records • Verify well installation record submission • Verify appropriate means, methods and materials used to install the well. • Verify recording forms, including all of the test documentation requirements, have been prepared and are accurate and complete • Verify surveyor coordinate system to be used

5.4.3 Tracer Test Implementation

Tracer tests will be conducted within two arrays. Data will be collected to support the design of the ERD pilot-scale study that will be implemented within the areas of the groundwater plume with the highest VOC concentrations at Areas F and G, OU3.

Preparatory Phase

The preparatory phase for tracer tests include establishment of injection method (dye concentration, injection volume and rate) and locations as well as observation points, to include existing monitoring wells and locations along the sewer system to evaluate potential breakthrough locations. This phase will also include verification of field instrumentation testing procedures, including calibration, preparing dilutions, and maintenance of equipment.

Initial Phase

Injection within the two arrays will be implemented and samples will be collected and observations documented. Sample collection locations and activities will be properly documented during this phase. Field instrumentation will be calibrated. Verify that the PM is reviewing daily reports daily and the STC is reviewing data as generated in the field.

Follow-up Phase

Field documentation will be reviewed for accuracy and completeness. If required, data will be reviewed to clarify potential discrepancies. Data will be reviewed for accuracy and comprehensive coverage. This phase will also include verification of field instrumentation testing procedures, including calibration, preparing dilutions, and maintenance of equipment. Verify that the PM is reviewing daily reports daily and the STC is reviewing data as generated in the field.

Table 5-4 lists the quality controls that will be implemented during implementation of the tracer test.

TABLE 5-4
QC Procedures for Tracer Test Implementation Activities
OU3, Areas F and G, NAS Jacksonville

Task	Procedures/Construction Details
Water Sample Collection and Field Documentation	• Verify appropriate sampling equipment • Verify tracer concentration • Verify injection rate and pressure • Verify appropriate locations • Verify the field instruments are calibrated in accordance with manufacturers' recommendations and procedure • Verify recording forms, including all of the test documentation requirements, have been prepared and are accurate and complete

5.4.4 Decontamination and Demobilization

Personnel and equipment used to perform intrusive work will be decontaminated in accordance with the provisions of the APP (Appendix A). Pre-final inspection of cleanliness will be performed by the Site Superintendent and the Site Health and Safety Specialist. Final equipment inspections will be performed and documented by the Project QC Manager, or his/her designee.

Equipment and personnel will demobilize from the site following the completion of the work activities identified in this Work Plan. The Project QC Manager will verify that the objectives of associated investigation activities have been met. A final inspection will be conducted to verify completion of all project activities. Findings, should any be identified, will be tracked, resolved and documented during a final site walk through inspection.

Preparatory Phase

The preparatory phase will include a review of decontamination procedures, the APP (Appendix A), Section 3.0 Waste Management Plan, and relevant AHAs.

Initial Phase

The Site Superintendent will perform inspections to confirm that the objectives of the decontamination activities have been met and that the rework items, if any, have been completed to the satisfaction of AGVIQ and the Navy.

Follow-up Phase

The Project QC Manager will provide continuous oversight of the decontamination and demobilization to verify that the work is completed in accordance with the requirements provided in this Work Plan. Deficiencies will be noted and corrected.

Table 5-5 lists the quality controls that will be implemented during decontamination and demobilization activities.

TABLE 5-5
QC Procedures for Decontamination and Demobilization
OU3, Areas F and G, NAS Jacksonville

Task	Procedures/Construction Details
Decontamination and Demobilization	• Pre-final site inspection and develop punch-list items • Work areas to ensure all temporary facilities, equipment and materials are safely removed from the site • Work areas to ensure project housekeeping and cleaning • Decontamination of personnel and equipment • Completion inspection when work is substantially complete • Punch lists on outstanding items • Project housekeeping and final project cleaning • Final Inspections • Orderly Site Demobilization • Collation of Site Records & Documents • Final Reports and Deliverables • Complete Resolution of Punch-list items • Final Site Inspection • Orderly Site Demobilization

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Appendix A

Accident Prevention Plan/Site Safety and Health Plan

Accident Prevention Plan

Enhanced Bioremediation – OU3 Areas F and G
Naval Air Station Jacksonville
Jacksonville, Florida

Revision No. 00

Contract No. N62470-12-D-7004
Contract Task Order No. JM19

Submitted to:

U.S. Naval Facilities Engineering Command
Southeast

Prepared by:

June 2014

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4 Project H&S Forms/Permits
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7 Chemical Specific Training Form and Project Specific Chemical Product Hazard Communication Form
8 Pre-Task Safety Plan (PTSP)
9 Loss Prevention Observation (LPO) Form
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Acronyms and Abbreviations

AGVIQ	AGVIQ, LLC
AHA	Activity hazard analysis
APP	Accident Prevention Plan
ARAR	applicable or relevant and appropriate requirement
BBLPP	Behavior Based Loss Prevention Program
bgs	below ground surface
CBNR	Chemical, Biological, Nuclear, or Radioactive
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
COC	chemical of concern
COI	Certificate of Insurance
CSE	Confined Space Entry
CSIR	Contractor Significant Incident Report
DART	Days Away, Restricted or Transferred
DEET	N, N-diethyl-meta-polyamide
DFOW	defineable feature of work
DFWP	Drug Free Work Place
DoD	Department of Defense
DOT	Department of Transportation
EPA	U.S. Environmental Protection Agency
FA-CPR	First Aid and Cardio-Pulmonary Resuscitation
FAR	Federal Acquisition Regulations
FDEP	Rhode Island Department of Environmental Protection
FEMA	Federal Emergency Management Administration
FISC	Fleet Industrial Supply Center
FRCSE	Fleet Readiness Center Southeast
FTL	Field Team Leader
GFCI	ground fault circuit interrupter
GPR	ground penetrating radar
HAZCOM	Hazard communication
HAZWOPER	Hazardous Waste Operations and Emergency Response
H&S	Health and Safety
HIV	Human Immunodeficiency Virus
HLA	Harding Lawson Associates
HS&E	Health, Safety, and Environment
HSM	Health and Safety Manager
HSO	Health and Safety Officer
HSP	Health and Safety Program
HSPA	H&S Program Administrator
IDLH	Immediately dangerous to life and health
IRA	Interim Remedial Action
IR	Incident Rate
ISCO	in situ chemical oxidation

L/NLI	Loss and Near Loss Investigations
LNAPL	light non-aqueous phase liquid
LPO	Loss Prevention Observation
µg/L	micrograms per liter
MNA	monitored natural attenuation
mph	mile(s) per hour
MSDS	Material Safety Data Sheet
NAICS	North American Industry Classification System
NAS	Naval Air Station
NAVFAC SE	U.S. Naval Facilities Engineering Command Southeast
NOAA	National Oceanic and Atmospheric Administration
OELs	Occupational Exposure Limits
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
OWS	oil/water separator
POC	Point of Contact
PPE	Personal protective equipment
PSC	Potential Source of Contamination
PTSP	Pre-Task Safety Plans
QC	quality control
QCM	Quality Control Manager
RAO	Remedial Action Objective
RAP	Remedial Action Pan
RCA	Root Cause Analysis
RF	radio frequency
RFP	Request for Proposal
RI/FS	Remedial Investigation/Feasibility Study
RMP	Risk Management Process
RMSF	Rocky Mountain Spotted Fever
ROD	Record of Decision
ROICC	Resident Officer in Charge of Construction
RQ	Reportable Quantity
SBRAC	Small Business Remedial Action Contract
SOH	Safety and Occupational Health
SOP	Standard Operating Procedure
SOW	Statement of Work
SSHO	Site Health and Safety Officer
STARI	Southern Tick-Associated Rash Illness
SWO	Stop Work Order
TCE	trichloroethene
TO	Task Order
TtNUS	Tetra Tech NUS, Inc.
UL	Underwriters Laboratory
USACE	U.S. Army Corps of Engineers
USBLS	United States Bureau of Labor Statistics
VOC	volatile organic compound
WBGT	Wet Bulb Globe Temperature

1.0 Signature Sheets

Plan Prepared By:

Name: Rachel Francis
Title: Health and Safety Administrator
Company: AGVIQ, LLC (AGVIQ)
Telephone: (757) 213-8592/(757) 354-5820

Signature: _____

Rachel Francis
Health and Safety Administrator
AGVIQ

Approved By:

Name: Matt White
Title: Health and Safety Director
Company: AGVIQ
Telephone: (907) 748- 2730

Signature: _____

[illegible], CSH, P. E.
Health and Safety Director
AGVIQ

Plan Concurrence:

Name: Eric Davis
Title: Project Manager
Company: AGVIQ
Telephone: (678) 530-4085 (cell)
Date:

Signature: _____

Eric Davis
Project Manager
AGVIQ

1.1 Revisions

Revisions Made By: **Date:**

Revisions to Plan:

Revisions Approved By: **Date:**

1.2 Introduction

AGVIQ, LLC (AGVIQ) has been contracted by the U.S. Naval Facilities Engineering Command, Southeast (NAVFAC SE) to perform remedial action activities at Naval Air Station (NAS) Jacksonville under Contract No. N62470-12-D-7004, Task Order (TO) No. Jm19. The remedial activities include enhanced reductive dechlorination of areas F and G.

2.0 Background Information

2.1 Facility and Site Background

NAS Jacksonville occupies approximately 3,896 acres on the western bank of the St. Johns River in southeastern Duval County, Jacksonville, Florida. NAS Jacksonville was commissioned in October 1940 to provide facilities for pilot training and a Navy Aviation Trades School for ground crewmen. Its current mission is to provide facilities and support for the operation and maintenance of naval weapons and aircraft. Support facilities include an airfield for air operations and pilot testing, a Fleet Readiness Center Southeast (FRCSE) for performing repair and modification of aircraft, engines, and aeronautical components, a naval hospital, a Fleet Industrial Supply Center (FISC), a Fleet and Family Support Center, and recreational facilities.

2.1.1 Operable Unit 3

Operable Unit 3 (OU3) is a 134-acre parcel located in the eastern part of NAS Jacksonville, south of the flight line and adjacent to the St. Johns River. The operational history of OU3 consists mainly of activities associated with FRCSE, formerly known as the Naval Aviation Depot. FRCSE has been the major industrial complex at the facility since its inception in 1940. FRCSE operations remain mostly unchanged and consist primarily of performing in-depth rework, repair, and modification of aircraft engines and aeronautical components. Because of the aircraft and industrial activities, over 90 percent of OU3 is covered with buildings and thick (typically greater than 1 foot) concrete pavement.

Industrial activities at OU3 have resulted in spills and releases of hazardous substances onto or into the ground over time. Several investigations and removal actions have been undertaken at OU3 since 1982 in order to identify and assess the impacts of past activities. A Record of Decision (ROD), completed by Harding Lawson and Associates (HLA) in 2000, documents remedial action objectives (RAOs) to address groundwater contamination at Areas F and G where concentrations of volatile organic compounds (VOCs) exceed the applicable or relevant and appropriate requirements (ARARs).

A number of physical features and conditions significantly affect the transport of contaminants at OU3. As stated earlier, over 90-percent of the area within OU3 is either covered by buildings or pavement. In general, the only exposed soil is at the southern end of the OU, or in small, generally un-vegetated strips adjacent to a few of the buildings. Because of the presence of buildings and pavement, no surface water bodies, wetlands, or drainage courses are located on OU3. Stormwater runoff is captured in drainage inlets or catch basins and directed to the storm sewer system.

OU3 is underlain by interbedded layers of sand, clayey sand, sandy clay, and clay, with the upper 5 to 10 feet consisting mainly of sand that is likely reworked fill material from years of construction activities. In the northern half of OU3 (i.e., in the vicinity of Buildings 106 and 780), a clay layer separates the upper and lower portions of the surficial aquifer, while in the southern half of OU3 (Areas F and G), this clay layer is discontinuous or contains less

fine-grained materials. There are generally continuous fine-grained layers present in the lower portion of the surficial aquifer throughout OU3.

The average depth-to-groundwater at OU3 is 5 feet below ground surface (bgs) and can be as shallow as 2 feet bgs along the eastern boundary near the St. Johns River. The migration of contaminants in groundwater is controlled by a complex stratigraphy. The upper zone of groundwater (referred to as the shallow portion of the surficial aquifer) extends from 5 feet to approximately 20 feet bgs, and the lower zone extends from approximately 30 feet to 85 feet bgs.

Groundwater flow in OU3 is generally from west to east, toward the St. Johns River. However, groundwater flow in the upper layer is strongly influenced by leakage into the storm sewer system and by the presence of the seawall along the St. Johns River.

2.1.2 Area F Overview

In March 1992, ABB-ES conducted an investigation to evaluate the presence of hazardous substances, in the area prior to construction activities associated with a proposed industrial wastewater treatment plant. The investigation included sampling of shallow soil and groundwater. The most significant analytical finding from the site investigation was the presence of trichloroethene (TCE) in groundwater at concentrations as high as 1,300 micrograms per liter (µg/L).

A Remedial Investigation/Feasibility Study (RI/FS) completed by HLA in 2000 identified the likely sources for groundwater contamination at Area F as either a single discharge/spill event and/or preferential transport from an undefined up gradient source. Chemical oxidation was selected in the ROD as the preferred remedial alternative for groundwater at Area F.

Tetra Tech NUS, Inc. (TtNUS) conducted additional Area F groundwater investigations in 2002, and in 2004 and 2006 investigations were conducted in Area F west of Building 868 to collect supplemental soil and groundwater analytical data in support of the remedial action. Subsequent monitoring events completed in Area F prior to in situ chemical oxidation (ISCO) implementation suggested that the plume was both stable and decreasing through natural attenuation. Based on this evidence, the NAS Jacksonville Partnering Team agreed to evaluate a monitored natural attenuation (MNA) approach in lieu of ISCO at Area F.

Continuing investigations identified groundwater contamination east of Building 868, limited to depths above 50 feet by an underlying finer grained sedimentary layer. A similar layer was identified beneath Area G at 56 feet bgs. Concentrations along the southern boundary of Area F suggested the VOC Plume extended into Area G and to the south southeast.

2.1.3 Area G Overview

Potential Source of Contamination (PSC) 15, a former solvent and paint sludge disposal area located in the vicinity of Buildings 791 and 795, was identified as the likely source for groundwater contamination in Area G. The location of Area G is shown on Figure 1. A removal action conducted in 1997 to remove shallow soil containing Radium-226 identified soils impacted with VOCs that were also removed, although some of the VOC-impacted soil was left in place due to structural stability concerns.

The 2000 ROD for Areas F and G identified MNA as the selected remedial alternative for groundwater at Area G. Eight multi-channel wells were installed to support the Area G monitoring requirements established in the ROD. The locations of these wells, identified as JAX-OU3-G1 through JAX-OU3-G8, are shown on Figure 2. Semi-annual sampling was conducted between July 2002 and January 2005, and additional investigations were completed in 2006 to delineate the plume laterally and vertically in the northern-central and western-central portions of Area G. Currently, Area G wells are sampled on a biannual basis, in accordance with the ROD.

2.2 Project Scope of Work Summary

The remedial action scope of work for this project at NAS Jacksonville will be completed in accordance with the Navy authorized TO No. JM19 Scope of Services. Definable features of work (DFOWs) associated with these activities are identified for the purpose of developing and executing the project, implementing health and safety requirements and Quality Control (QC) inspections. The DFOWs associated with the execution of the scope of work are outlined as follows:

- Mobilization and Demobilization
- Site Survey/Utility Locate
- Groundwater Sampling
- Installation of Monitoring Wells
- Treatment of Plumes

2.3 Health and Safety Plan Assumption Set

The assumption set for the development of this APP is that AGVIQ site personnel actions, and actions by subcontractors controlled by AGVIQ who may be covered by this APP, should be based on the following:

- There is no potential Chemical, Biological, Nuclear, or Radioactive (CBNR) weapon/agent or waste exposure to AGVIQ or subcontractor personnel who may be associated with the execution of this contract work.
- Site personnel shall execute good personal hygiene practices to facilitate a negative exposure to dust/particulate, water, or waste materials via incidental dermal or ingestion exposure vectors.
- Where use of personal protective equipment (PPE) equipment is specified, it will be used in accordance with this APP.
- Where the use of air monitoring equipment is specified, it shall be in accordance with this APP. Action levels and action level responses defined by this APP shall be adhered to. Air monitoring data collected during the execution of the task order work phases shall be documented and included for the project file.
- Where content in this Accident Prevention Plan (APP) is marked as “Reserved,” or otherwise defined as not applicable, such activities associated with these areas, activities, or hazards are not specifically covered under this APP and must not be performed unless this APP is amended as necessary.

In the event that the above assumption set is not verified, the conditions of this APP will be re-evaluated and amended as necessary to address applicable hazards that may be associated with newly encountered project conditions or newly defined project tasks. In the event that it is determined that site soil, ground water, or sediment may be impacted by chemicals of concern (COCs) concentrations in excess of established Occupational Exposure Limits (OELs) or CBNR exposure at any level, work shall cease until such engineering or administrative control measures and/or PPE are implemented to reduce potential worker exposures to acceptable levels.

Adjustments to this APP to address or mitigate potential OEL/CBNR exposure to workers or involving modifications to worker PPE or worker/site exposure monitoring (air monitoring) requirements will require review and approval by the Program Certified Industrial Hygienist (CIH). All amendments to this APP must be performed by a designated AGVIQ Health and Safety (H&S) Program Administrator (HSPA), the Program CIH, or other duly authorized professional.

2.4 HAZWOPER-Regulated Tasks

We do anticipate having Hazardous Waste Operations and Emergency Response (HAZWOPER) regulated tasks, if we come into contact with contaminated waste due to certain work tasks including the handling, removal, containment, investigation or other physical site management of waste/material or other regulated materials, execution of such tasks and potential employee exposure to chemical hazards associated with these tasks may be regulated under 29 Code of Federal Regulations (CFR) 1910.120/29 CFR 1926.65.

- Site Survey/Utility Locate
- Groundwater Sampling
- Installation of Monitoring Wells
- Treatment of Plumes

2.5 Non-HAZWOPER-Regulated Tasks

HAZWOPER regulations under 29 CFR 1910.120/29 CFR 1926.65 may not be applicable. Where this is considered, it must be demonstrated that the assigned tasks can be performed without the possibility of exposure to chemical hazards in order to use personnel who do not meet the criteria established by these standards. A determination from the AGVIQ Program CIH is required before project tasks are conducted by personnel who do not meet the requirements of 29 CFR 1910.120/29 CFR 1926.65 and where there is question to potential exposure to chemical hazards by site workers. Where it is unlikely or not possible that workers could not be exposed to site chemical hazards during the normal execution of assigned tasks, the task can be considered a Non-HAZWOPER Regulated Task. For this project, the all activities summarized in Section 2.4 can be considered Non-HAZWOPER Regulated Tasks.

- Site mobilization
- Site Demobilization

3.0 Statement of Safety and Health Policy

The measurement of a successful program includes our ability to execute profitably, on time, without violations and safely. Success can only be achieved when all four components are integrated; therefore, health and safety must be part of every operation, at every responsibility level. It is the intent of AGVIQ to comply with established standards concerning the health and safety of our employees and create work environments that are free of recognized hazards that may result in an accident, injury or illness. To do this, we must be vigilant in the identification and elimination of acts and conditions that can produce or lead to accidents, injuries, and illnesses in our workplace.

Knowledge of an unsafe act or condition does not make the work safe. When an act or work area condition is identified that is not consistent with the established practices of AGVIQ Health and Safety Program (HSP), it is the inherent responsibility of each employee to report such inconsistencies to a supervisor so the act or condition may be evaluated, corrected, controlled, or engineered to a status that does not pose a significant threat. Where an act or condition in the workplace is determined to be Immediately Dangerous to Life and Health (IDLH) of AGVIQ employees, work must stop until the condition has been abated.

Management, supervisory, and worker personnel are all entrusted with implementing the policies and procedures of the AGVIQ APP and prepared site specific health and safety documents. Prevention of accidents, injury, and illness is an achievable objective for all employees, at all responsibility levels, for all program operations. It is a basic requirement that each manager and supervisor make the safety of employees under their tenure an integral component of his or her regular management practices. Additionally, it is the duty of each employee to accept and follow established safety policies and procedures established by AGVIQ

No employee shall be required to work at a location that would jeopardize their life or health. Employee cooperation in detecting, controlling, and reporting workplace hazards is a condition of participation in AGVIQ. It is critical for AGVIQ personnel to immediately inform their supervisor of any situation or work area condition that is beyond their ability to correct or control. AGVIQ personnel will not be disciplined or suffer any retaliation for reporting acts or conditions that are not consistent with the policies and procedures required by the AGVIQ HSP or project specific health and safety documents.

Every effort should be made to provide adequate training to our program participants; however, if an employee is ever in doubt about how to do a job or task safely, it is his or her duty to ask a qualified person for help. Fellow team members that need help should be assisted. Program participants are expected to assist management in accident prevention activities. Everyone is responsible for executing their assigned duties in a safe manner. Every incident (including a near-miss) that occurs in the workplace shall be reported to a first-line supervisor, as soon as possible. Under no circumstances, except in the instance of emergency medical care, should an employee leave the work site without reporting an accident, injury, or illness that occurs in the workplace. When a workplace accident, injury, or illness occurs, everyone is affected. The success and longevity of our program is directly related to maintaining a healthy and safe working environment for everyone.

3.1 Objective

The objective of AGVIQ is to provide a place of employment free of all recognized hazards that are causing or will likely cause death or serious physical harm to our employees. This objective can be facilitated by developing and administering an overall health and safety program, which establishes written policies and procedures to serve as vehicles through which the program requirements will be implemented.

3.2 Purpose

The purpose of this project APP in conjunction with the project specific or program health and safety documents, is to define the policies, procedures, and requirements that must be implemented for AGVIQ and to establish the requirements, responsibilities and expectations for management, supervisors, employees, and subcontractors that may participate in the execution of the program projects. It is the intent of this APP to address applicable requirements set forth by 29 CFR 1910, 29 CFR 1926, EM 385 1-1, and AGVIQ policies and procedures incorporated by reference, herein.

3.3 Goals

The health and safety goal for this project, and the overall goal for the AGVIQ program, is to eliminate workplace accidents, gain worker acceptance through cooperation and training, and provide our clients with a responsible, well-trained, safety-oriented work force.

AGVIQ considers safety the highest priority during work at all project sites and its business offices and has established a goal of zero incidents. Projects will be conducted in a manner that minimizes the probability of near misses, injury, illness, and equipment/ property damage.

4.0 Responsibilities and Lines of Authority

The following listed AGVIQ personnel will have the authority to intervene and suspend work in the interest of ensuring adherence to Health and Safety policies and procedures defined by the APP and/or AGVIQ.

AGVIQ Program Manager
Sid Allison: (843) 242-8018 (cell)

AGVIQ Senior Program Manager
Paul Rakowski: (757) 213-8581 / (757) 544-6744 (cell)

AGVIQ Project Manager
Eric Davis: (678) 530-4085 (office)/(404) 323-1600 (cell)

AGVIQ H&S Program CIH
Matt White, CIH, P.E.: (907) 748-2730

AGVIQ Site Supervisor
TBD

AGVIQ SSHO
TBD

AGVIQ H&S Program Administrator
Rachel Francis: (757) 213-8592 / (757) 354-5820 (cell)

4.1 Organization and Responsibility for Health and Safety

The safety and protection of employees, clients, and the community is the first priority. If an activity or condition at a location under control of AGVIQ is determined to be inconsistent with our health and safety policies and procedures, all efforts shall be made to correct the situation immediately or as soon as feasibly possible. At no time should any AGVIQ personnel perform or be allowed to perform duties in a work environment that is IDLH or in an imminently dangerous situation. In these situations, the task will not proceed until the situation is corrected.

4.1.1 Program Manager

The AGVIQ Program Manager is the primary operational and safety official of AGVIQ and has overall responsibility for ensuring that AGVIQ program participants implement the established health and safety policies and procedures adopted by AGVIQ. The Senior Program Manager supports the execution of all operations required of the Program Manager.

4.1.2 Project Manager

The AGVIQ Project Manager is responsible for providing adequate resources (budget and staff) for project-specific implementation of the Health, Safety, and Environment (HS&E) management process. The Project Manager has overall management responsibility for the project tasks identified herein and reports to Program Management on all matters and to the Program CIH on matters involving the health and safety of program participants, project incidents or other health and safety related matters. The Project Manager may explicitly delegate specific tasks to other staff, but retains ultimate responsibility for completion of the following in accordance with this APP or other established health and safety requirements. Designated project coordinators, technical leads, engineers, and other administrative staff support the execution of all operations required of the Project Manager. In general, the Project Manager's responsibilities include but are not limited to the following:

Include standard terms and conditions, and contract-specific HS&E roles and responsibilities in contract and subcontract agreements (including flow-down requirements to lower-tier subcontractors).

Select safe and competent subcontractors by:

- Obtaining, reviewing, and accepting or rejecting subcontractor pre-qualification questionnaires
- Ensuring that acceptable certificates of insurance (COIs), including AGVIQ as named additional insured, are secured as a condition of subcontract award
- Including HS&E submittals checklist in subcontract agreements, and ensuring that appropriate site-specific safety procedures, training, and medical monitoring records are reviewed and accepted prior to the start of subcontractor field operations

Maintain copies of subcontracts and subcontractor COIs (including AGVIQ as named additional insured), bond, contractor's license, training and medical monitoring records, and site-specific safety procedures in the project file accessible to site personnel.

Provide oversight of subcontractor HS&E practices per the site-specific safety plan.

Manage the site and interface with third parties in a manner consistent with contract and subcontract agreements and the applicable standard of reasonable care.

Ensure that both the overall and job-specific HS&E goals are fully and consistently implemented.

4.1.3 Certified Industrial Hygienist

The AGVIQ Program CIH meets the established qualification, training, and experience criteria requirements and exhibits sufficient knowledge in health, safety, and/or industrial hygiene matters to manage and oversee AGVIQ health and safety program. The CIH acts as the responsible program officer to review and approve all developed project specific APPs and provides consultation, recommendations, or requirements with regard to project worker protection and exposure issues. The CIH may also be required to perform the project/program roles and responsibilities of the HSPA, where required. The Program CIH's responsibilities include, but are not limited to, the following:

- Review and approve the project specific APP for field implementation.

- Be available for consultation/direction with regard to project Industrial Hygiene and worker exposure matters, as may be required by the project team, Site Health and Safety Officer (SSHO), or the AGVIQ HSPA; and review and approve any changes to the APP which alters established requirements for worker exposure or perimeter air monitoring or PPE.
- Perform the same roles and responsibilities as the HSPA, where required.
- Meet the requirements of a Health and Safety Manager, where required.
- Coordinate with the Program Manager, Senior Program Manager, and the Project Manager (Program CIH, HSPA, or SSHO, as necessary) on all site or worker health and safety matters.

4.1.4 Health and Safety Program Administrator(s)

The AGVIQ HSPAs administer the overall health and safety program for the AGVIQ program and report directly to the Program Management and the Program CIH with regard to AGVIQ program or significant project matters. The HSPA is responsible for supporting and assisting the AGVIQ program staff in executing the required health and safety policies and procedures adopted by the program, for implementation. The HSPA responsibilities include, but are not limited to, the following:

- Develop and/or review the project APP for final approval by the CIH.
- Provide review and comment on subcontractor pre-qualification questionnaires that fall outside the performance range delegated to the Contracts Administrator and request corrective actions are made, where required.
- Provide review and comment subcontractor training records and site-specific safety procedures prior to start of subcontractor field operations and request corrective actions are made, where required.
- Support SSHO oversight of subcontractor (and lower-tier subcontractors) HS&E practices and interfaces with third parties, as necessary.
- Support and assist program staff in executing the HS&E policies and procedures adopted by the program for implementation, including the program Behavior Based Loss Prevention System (BBLPS) and overall Risk Management Process (RMP).
- Provide consultation and direction to project staff with regard to HS&E project and program requirements and industrial hygiene practices.

4.1.5 Site Supervisors

Site supervisors are entrusted with special duties concerning the safety and health of employees. They are critical links to the success of the injury and illness prevention program and are key components to achieve Loss Prevention goals. For this project, the site supervisor reports to the AGVIQ overall Project Manager on all project matters. Site supervisor responsibilities include but are not limited to the following:

- Provide adequate pre-project planning to allow for the effective procurement of appropriate equipment, materials, safety-related systems, or documents to facilitate the execution of individual project tasks in a safe and efficient manner.

- Coordinate the equipment and material needs to be procured by AGVIQ for the proper execution of the project.
- Promote proper field communication and coordination with the overall project manager, field staff and client, as necessary, to personnel assigned to promote the proper execution of the project.
- Implement the health and safety aspects of the AGVIQ program and ensuring that any onsite AGVIQ personnel adhere to the requirements of this APP, host facility conditions or other applicably health and safety requirements relayed to project personnel as part of the execution of this project.
- Convey hazard information, to which they are advised of, to subordinate employees at the contract project site or facility locations.
- Investigate AGVIQ accidents, injuries, and illnesses that occur under their supervision at the contract project site, in accordance with the accident investigation procedures identified for the program.
- Implement the components of the AGVIQ BBLPS including the execution of routine pre-job safety overviews at AGVIQ contract project locations as the project begins, as new tasks are planned, as new project hazards are identified or when new project team members are assigned to the project site.
- Take prompt action to correct identified acts or conditions which are personally observed by a supervisor or brought to the attention of a supervisor that are not consistent with the conditions of this APP or AGVIQ HSP requirements.
- Promote and ensure an appropriate project safety culture for subordinate site personnel by positive example.
- Stop or correct questionable acts or identified conditions that are under a supervisor's responsibility and which are inconsistent with established safety standards, AGVIQ policies, and procedures and requirements established by this APP.

4.1.6 Site Safety and Health Officer

The SSHO is responsible for verifying that the project is conducted in a safe and healthy manner and includes the following specific obligations:

- Verify this APP remains current and amended when project activities or conditions change.
- Coordinate with the Site Supervisor and the Project Manager (overall) on all site matters and reports to the Program CIH (or HSPA as an alternate) on all health and safety matters.
- Verify AGVIQ site personnel and subcontractor personnel read, or have been briefed on the contents of this APP, and sign **Attachment 2**, APP Acknowledgement Form prior to commencing field activities.
    - Verify AGVIQ site personnel and subcontractor personnel have completed any required specialty training (e.g., fall protection, confined space entry) and medical

surveillance as identified in Section 6.0, and maintain the Subcontractor H&S Tracking Form, where applicable (see Attachment 3).

- Verify adherence with the requirements of this APP and applicable subcontractor's health and safety plan(s).
- Act as the project Hazard Communication Coordinator.
- Act as the project Emergency Coordinator and perform the responsibilities outlined in this APP or as maybe required to properly coordinate the onsite response of emergencies, as they arise.
- Verify that safety meetings are conducted at least daily or more frequently as project tasks or hazards change and documented for the project record in accordance with the requirements of the BBLPS.
- Verify that project H&S forms and permits, found in Attachment 4, are being used as intended.
- Verify that the Drug-Free Workplace Program is being implemented.
- Verify that project files available to site personnel include copies of executed subcontracts and subcontractor COIs (including named additional insured), bond, contractor's license, training and medical monitoring records, and site-specific safety procedures prior to start of subcontractor's field operations.
- Manage interface with third parties in a manner consistent with our contract/ subcontract agreements and the applicable standard of reasonable care.
- Coordinate with the HSPA(s) or Program CIH regarding AGVIQ and subcontractor operational performance and third-party interfaces.
- Ensure that the overall, job-specific, HS&E goals are fully and continuously implemented.
- Coordinate with the AGVIQ individual responsible for site operations (i.e., Site Supervisor/Manager or Field Team Leader) and Project Manager, as necessary. In general, the Project Manager will contact the client in the event accidents, injuries or property damage occurs on the project site. The Program CIH or HSPA(s), as necessary, should be contacted by the SSHO as appropriate.

4.1.7 AGVIQ Program Participants

All AGVIQ Program participants (e.g., employees), regardless of job title, share the responsibility for executing their assigned tasks in a healthy and safe manner and must report any or acts or conditions that are not consistent with established health and safety procedures and protocols at the project site without fear of reprisal. It is imperative that AGVIQ Program participants observe the following minimum requirements in order to achieve a safe and healthy workplace:

- Each employee must familiarize themselves with the contents of this APP and the general safety rules herein.
- Each employee will practice procedures and follow all safety rules and regulations for the successful completion of any job task.

- All employees will wear the necessary PPE required for the job or task as specified by the APP or other applicable program requirements.
- The employee will notify their immediate supervisor of any potential workplace hazard or work practice that is not consistent with AGVIQ health and safety policies and procedures and could result in an accident, injury, illness, environmental releases or destruction of property.
- The employee will report all accidents to an immediate supervisor regardless of whether injury or property damage resulted. This includes all near misses (accidents without injury or damage). This requirement serves to bring unsafe conditions to the attention of management.
- Each employee will be subject to contraband search for safety purposes and for the safety of fellow employees.
- Violations of published safety policies and procedures may be cause for disciplinary actions up to and including dismissal.
- Each employee that is taking any prescription or over the counter medications that could alter the manner in which they could be treated in an emergency or effect their job performance/safety of the employee or other employees in the work environments (i.e., via heavy equipment operations) shall notify their supervisor prior to beginning work.

4.2 Employee Competency

Employee competency, as defined by 29 CFR 1926.32(f) and for areas of executable contract work for which an employee has responsibility, shall be established by the appropriate employer only (i.e., AGVIQ). Employee competency is determined by employee training, total work experience and/or on the job training, professional certification, and/or educational degrees.

It is the opinion of AGVIQ that the professionals identified in this APP are competent in their areas of expertise with regard to the management, field execution of the specified contract work, or in the implementation of AGVIQ site specific or program health and safety requirements, as applicable.

Executable onsite contract work for which there is a specific requirement for a competent person to oversee (i.e., excavation, scaffolding, etc.) will not be conducted unless a competent person is available onsite.

In addition to the above, AGVIQ HSP utilizes a team of Health and Safety Professionals who are qualified by experience, training, educational degrees, and professional certification (CIH, CSP, CHST, ASP) to act as the responsible program officers with regard to the overall project specific and program wide implementation of the AGVIQ Health and Safety policies and procedures.

4.3 Requirements for Pre-task Safety and Health Analysis

Requirements for completing Pre-Task Safety and Health Analysis prior to the execution of onsite work must be, at a minimum, in accordance with Section 10 of this APP. Activity

Hazard Analysis (AHA) documents applicable to this project are included in Attachment 1 of this APP.

The AGVIQ site supervisor/FTL or SSHO will conduct daily safety meetings at the start of each work shift for onsite personnel and periodic work phase meetings (i.e., AHAs) in accordance with Section 10 of this APP. The site supervisor/FTL or SSHO must require subcontractors to follow similar meeting procedures or participate in the AGVIQ daily safety meetings or work phase meetings, as necessary. It is expected that for the execution of this particular contract, conducting joint AGVIQ and subcontractor daily safety and work phase meeting will be integral to the proper implementation of established general and specific health and safety procedures.

4.4 Primary Lines of Authority

Safety responsibilities, accountability, and lines of authority for this project are identified in Sections 4.1 through 4.2 of this APP and graphically represented on Figure 4-1.

4.5 Non Compliance with Requirements

The duty for employee disciplinary action must be exercised by the employee's company line manager, supervisor, or corporate official only, as appropriate. Verbal or written reprimands, suspensions, or terminations shall be in accordance with the requirements established by the AGVIQ Corporate Employee Handbook**,** or internal policies and procedures and Standard Operating Procedures (SOPs). The content of these documents applies to employees of the specific employer and its authorized subsidiaries.

To ensure seamless project operations and the best possible work environment for AGVIQ personnel, AGVIQ expects its employees to follow rules of conduct and established site procedures that will protect the health and safety of all AGVIQ personnel.

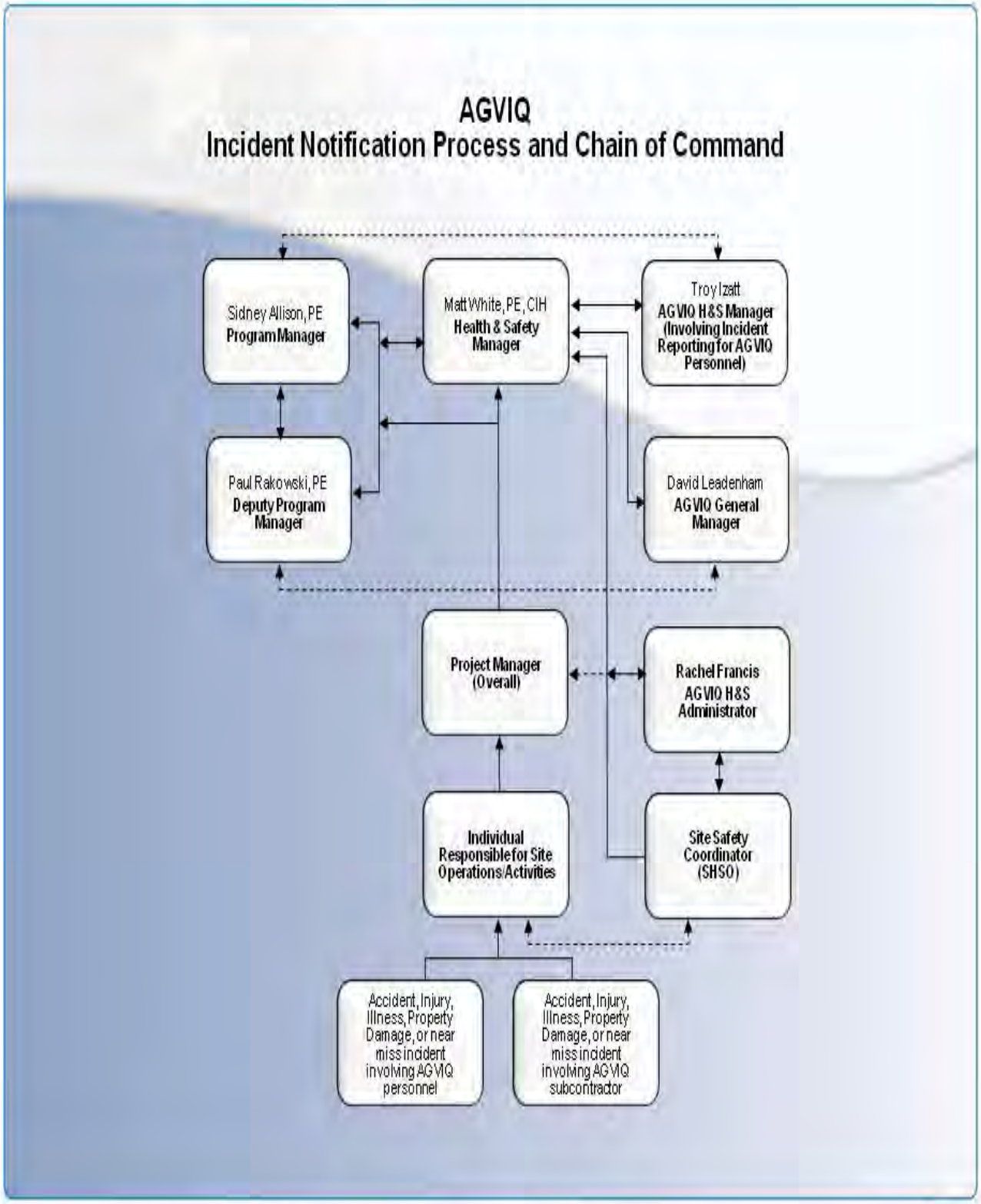
Where unacceptable employee behavior or workplace actions are identified, it is the intent of the employer to administer equitable and consistent disciplinary actions. It is in the best interest of AGVIQ to ensure fair treatment of all employees by making certain that disciplinary actions are prompt, uniform, and impartial. The major purpose of any disciplinary action is to correct the problem, prevent recurrence, and prepare the employee for satisfactory service in the future.

Employee disciplinary actions are typically exercised in a three-step process:

- Verbal warning
- Written warning
- Suspension with or without pay or up to termination of employment, depending on the severity of the problem and re-occurrences of similar unacceptable employee behavior or workplace actions

AGVIQ recognizes that there are certain types of employee problems that are serious enough to justify either a suspension, or, in extreme situations, termination of employment, without going through the usual progressive discipline steps.

By using progressive discipline, most employee problems can be corrected at an early stage, benefiting both the employee and AGVIQ.


AGVIQ
Incident Notification Process and Chain of Command
Sidney Allison, PE
Program Manager
Matt White, PE, CIH
Health & Safety Manager
Troy Izatt
AGVIQ H&S Manager (Involving Incident Reporting for AGVIQ Personnel)
Paul Rakowski, PE
Deputy Program Manager
David Leadenham
AGVIQ General Manager
Project Manager (Overall)
Rachel Francis
AGVIQ H&S Administrator
Individual Responsible for Site Operations/Activities
Site Safety Coordinator (SHSO)
Accident, Injury, Illness, Property Damage, or near miss incident involving AGVIQ personnel
Accident, Injury, Illness, Property Damage, or near miss incident involving AGVIQ subcontractor

4.6 Managers and Supervisors Safety Accountability

It is the duty of the first line supervisor to motivate employees to adhere to AGVIQ's safety policy and procedures and established hazard control measures for each work environment. A first line supervisor, for these purposes, is defined as that person designated to give immediate onsite supervision to personnel involved in a task.

All manager and supervisors must endeavor to implement complete established health and safety policies, procedure for and hazard control measures for all projects and tasks under their supervision. When in doubt, they should seek the assistance of the Program CIH/HSPA, or other authorized program safety professional, prior to initiating a task. This is the only acceptable manner in which to perform the task. If the task cannot be accomplished in a manner that is consistent with established program, regulatory or contract health and safety requirements, it will not be attempted.

Managers and supervisors will:

- Explain the safety procedure involved with a task to each employee and check frequently to see that the employee understands and works as instructed.
- Allocate sufficient time for the training and coaching of all employees to ensure that everyone knows the correct procedure for safely accomplishing required tasks.
- Prevent new employees from performing any tasks until required training is completed.
- Immediately correct unsafe conditions that involve AGVIQ employees or contractors.
- Ensure that the employees are outfitted with and wear PPE as specified by this APP, other AGVIQ procedures, or as directed by the Program CIH, HSPA, Project Manager, or SSHO.
- Set a good safety example.
- Obtain the cooperation of employees and contractors.
- Provide a safe work environment for employees and contractors.
- Confirm contractor safety performance records have been verified prior to contract award and monitor contractor performance during operations.
- Report all accidents, near misses, and property damage in accordance with the Incident Management and Reporting Procedure.
- Establish a safety culture, using the elements of the AGVIQ Safety Improvement process, which promotes awareness, encourages participation, and recognizes excellence.

5.0 Subcontractors and Suppliers

5.1 Subcontractor/Supplier Coordination and Control

AGVIQ subcontractor safety performance and adherence to established industry standards and project policies and procedures will be reviewed prior to being issued a contract for Site work. AGVIQ subcontractors must be required to comply with the most stringent requirement defined by the Subcontractor's own policies and procedures, or requirements outlined in this APP, regulations or other requirements applicable to a project, such as contract flow-down requirements.

All subcontractors who may be required to execute this contract may not be identified at the time that health and safety documents are prepared for submission or implementation. Because of the potentially dynamic and evolving nature of contract requirements and resultant project scheduling at many points during the project evolution, only partial identification of potential subcontractors who may be selected for our project is likely. To this end, continuously updating and amending this APP with potentially selected, newly selected subcontractors would not be practical or cost effective for all parties concerned.

The AGVIQ procurement/contracting team maintains an extensive and detailed process for subcontractor procurement with the Federal Acquisition Regulations (FAR) as the primary driver. Subcontractor selection is based on scope of work pricing, qualifications, current and historical safety performance data and best value evaluations.

5.2 Subcontractor/Supplier Responsibilities

All subcontractor personnel actively engaged in onsite operations will be required to sign in daily at AGVIQ controlled project sites (see **Attachment 2** of the APP) and either attend an AGVIQ sponsored daily safety meeting and work phase meeting (or be required to conduct their own) which addresses daily operations, site specific hazard awareness, or other pertinent issues associated with the scheduled work or complete their own meeting of similar intent.

The details of the each daily or work phase meeting will be documented prior to the start of work at the daily site operations. At the discretion of the AGVIQ Site supervisor, this function may be completed by the SSHO to facilitate the requirement. However, where AGVIQ and subcontractor personnel are engaged in integral site operations, it is recommended that joint meetings are conducted. In addition, Subcontractors must develop and provide AHAs for their work activities to AGVIQ for review, which, depending upon contract conditions, may also be required to be forwarded to the project Owner for review as well.

Typically, the subcontractor reports directly to the AGVIQ Project Manager. The AGVIQ Project Manager may designate subcontractor reporting requirements to the AGVIQ site supervisor (i.e., Superintendent, foreperson, Field Team Leader, or other appropriate designee).

All incidents involving subcontractor personnel must be reported to the AGVIQ site supervisor and a copy of the subcontractor's incident or injury/illness report will be submitted to the AGVIQ site supervisor, Project Manager, Program Manager, and Program CIH as soon as possible (within 24 hours of incident/illness).

AGVIQ subcontractors may be required to acknowledge and adhere to the requirements of the AGVIQ APP. Subcontractors covered by this APP must be provided a copy of it to read and accept prior to initiating work on this Site or be provided a briefing of its contents. However, if the AGVIQ APP does not address specific hazards associated with specialty tasks and equipment that the subcontractor has expertise in (e.g., electrical, scaffold erection, demolition), a subcontractor must be required to develop or implement their own APP which is equally or more stringent than AGVIQ APP or prime contract documents.

Subcontractors are responsible for the health and safety procedures specific to the work, but it is critical that subcontractor work be performed in a manner that is consistent with applicable Occupational Safety & Health Administration (OSHA) standards (29 CFR 1910, 29 CFR 1926, as applicable), EM 385 1-1, or other applicable health and safety plan(s)/protocols. Identified subcontractor health and safety performance or site conditions that are not consistent with established procedures must be corrected.

Subcontractor personnel must not be allowed to ride on tractors, forklifts, or similar vehicles unless specific seats are provided. They must follow project hot work rules if hot work is required for vehicle or equipment maintenance. Subcontractor haul trucks must be loaded and unloaded in a safe and effective manner and materials must be stored safely in designated locations only. Associated packaging will be properly disposed and litter will not be permitted to be scattered or blown from truck beds. Operators of mobile onsite equipment must observe all traffic rules such as speed limits and pedestrian rights-of-way.

AGVIQ continuously endeavors to observe subcontractor safety performance. This process should be reasonable and include observing site hazards, practices and procedures that are not consistent with established HS&E requirements that are both readily observable and occur in common work areas. AGVIQ oversight does not relieve subcontractors of their responsibility for effective implementation and compliance with the established plan(s), protocols, or established safety regulations or contract conditions.

In addition to this level of observation, the site supervisor or SSHO should confirm AGVIQ subcontractor performance against both the subcontractor's safety plan and standard industry procedures or contractual requirements.

Health and safety related communications with AGVIQ subcontractors should be conducted as follows:

- Request subcontractor personnel to read this APP and then require them to sign the APP Acknowledgement Form included in **Attachment 2** of this APP, as applicable.
- Request subcontractor(s) to brief the project team on the hazards and precautions related to their work.
- Verify that applicable subcontractor employee training documents, as applicable, are valid.

- When apparent conditions, actions, or practices are observed that are not consistent with this APP, AGVIQ Health and Safety Program protocols or project/regulatory requirements, notify the subcontractor safety representative and require corrective action—the subcontractor is responsible for determining and implementing necessary controls and corrective actions.
- When identified conditions or practices/actions that are not consistent with AGVIQ health and safety policies and procedures, or other applicable Health and Safety protocols or project/regulatory requirements, are repeated or persist, notify the subcontractor safety representative, individual responsible for site operations and/or Project Manager and stop affected work until adequate corrective measures are implemented. See Stop Work Order (SWO) Form in **Attachment 4** of the APP.
- When an apparent imminent danger exists, immediately remove all affected AGVIQ employees and subcontractors, notify subcontractor safety representative, individual responsible for site operations and/or Project Manager and stop affected work until adequate corrective measures are implemented (see SWO form). Notify the Project Manager (overall) and Program CIH (or HSPA if necessary), as appropriate.
- Document all oral health and safety related communications in project field logbook, daily reports, or other records.
- All subcontractor employees are subject to the same training (or medical surveillance requirement, where applicable) as AGVIQ personnel, depending on job activity and OSHA requirements.

6.0 Training

6.1 New Hire SOH Orientation Training

New Hire Safety and Occupational Health (SOH) orientation will be performed by an employee's line supervisor, human resource representative, intranet training, or by employee review of information provided by the employer. In general, new hire SOH orientation training would most likely include the following components, depending on the employee's hire category:

- Completion of new hire evaluation and any employer specific Drug Free Work Place (DFWP) requirements
- Introduction to company/corporate history
- Organizational structure
- Briefing on job functions and employee performance expectations
- Time keeping and/or expense reporting
- Provision, review, and acknowledgement of Corporate Policies and Procedures Manual (aka Employee Manual) or equivalent
- Provision, review, and acknowledgement of Corporate Health and Safety Program Plan or equivalent
- Verification and update (as necessary) of prerequisite training and medical surveillance testing, where applicable for field work (HAZWOPER/Construction)
- Management and Supervisor training, as applicable

In order to promote the seamless operation of the AGVIQ program as a single entity, orientation to management and supervisory personnel who have not previously participated in AGVIQ programs is provided. This orientation typically would include, but not be limited to the following:

- Background history of the development and functionality of AGVIQ Small Business Remedial Action Contract (SBRAC) II
- Organizational structure
- Project and Program reporting requirements (incident, financial, and chain of command)
- Fund allocation, cost tracking, forecasting, and invoicing procedures
- Review processes for Client Request For Proposal (RFP) responses and project deliverables
- Project concurrence or changed conditioned processes

- Expectations with regard to Client/Customer and project team communications, project performance, Client/Customer expectations, health and safety, and quality control performance
- Resource allocation

All designated AGVIQ personnel who are engaged in site operations, regardless of assignment responsibilities, must review or be provided a detailed briefing on the contents of site specific health and safety plans, APPs, task specific AHAs, and daily safety briefings and must acknowledge such documents by signature.

6.2 Requirements for Mandatory Training and Certificates

AGVIQ engages in construction, environmental remediation, and other consulting services and endeavors to comply with the health and safety training requirements mandated by governmental agencies, internal policies, and client requirements.

Personnel will be provided sufficient training to execute their jobs in a safe and healthy manner. It is the responsibility of AGVIQ to ensure that their employees maintain the appropriate training requirements to complete their assigned duties.

Direct supervisors, with support by the Senior Management and Health and Safety professionals, are responsible for determining the training requirements for a specific project or task and ensure that personnel assigned to AGVIQ operations have the necessary training to complete the project/task safely. Senior management and the Program CIH or HSPAs (or outside vendors) will assure with the delivery of identified required training.

Designated employer personnel and electronic databases facilitate the maintenance of training records and applicable experience documentation. When an employee training is identified being insufficient to perform an assigned task, every effort will be made to provide the necessary training or to provide a trained and experienced alternate until the employee has achieved the required criteria.

Employee training records are available at corporate offices, by electronic means, and generally maintained on the project site. Depending on the size of the project crew and because of work crew dynamics and scheduling, the provision of hard copy employee training records (and medical surveillance records where applicable) for all anticipated personnel who may be assigned to this project, within the content of this APP is impractical. AGVIQ endeavors to maintain these documents onsite for review and will provide them to government officials for verification, upon request.

All AGVIQ personnel performing HAZWOPER regulated tasks are enrolled in a comprehensive health and safety program, which at a minimum, meets the requirements of 29 CFR 1910.120/29 CFR 1926.65 or 29 CFR 1910.134. The medical surveillance and training requirements associated with this project are summarized below.

Training or Medical Surveillance Requirement	Applicability
29 CFR 1910.120(e)(3)/29 CFR 1926.65(e)(3) Note: 40-hour or 24-hour training as applicable to employee assigned duties.	All site personnel performing HAZWOPER regulated activities identified in Section 2.4 of this APP

Training or Medical Surveillance Requirement	Applicability
No periodic refresher performance so long as the requirements of 29 CFR 1910.120(e)(8)/ 29 CFR 1926.65(e)(8) are maintained.	
29 CFR 1910.120(e)(8)/29 CFR 1926.65(e)(8) Refresher training required on an annual basis	All site personnel performing HAZWOPER regulated activities identified in Section 2.4 of this APP
29 CFR 1910.120(e)(4)/29 CFR 1926.65(e)(4) No specific recertification requirements.	All site manager, supervisory or SSHO personnel performing HAZWOPER regulated activities identified in Section 2.4 of this APP
First Aid/CPR 1st Aid – typically 3 year renewal CPR – 1 or 2 year renewal (depending on sponsor)	All designated manager, supervisory or SSHO site personnel (2 per site)
29 CFR 1910.120(f)/29 CFR 1926.65(f) On an annual basis under the supervision of a licensed physician, preferably one knowledgeable in occupational medicine	All site personnel performing HAZWOPER regulated activities identified in Section 2.4 of this APP
29 CFR 1910.134(e) On an annual basis under the supervision of a licensed physician, preferably one knowledgeable in occupational medicine	All site personnel performing HAZWOPER regulated activities identified in Section 2.4 of this APP and required to utilize respiratory protection
OSHA 30 hour Construction Safety Training (or equivalent) No specific recertification requirements.	SSHO Site Supervisor
49CFR172.700 Renewal, every 3 years	Each person who offers for transportation in commerce or transports in commerce hazardous materials

Initial training required by 29 CFR 1910.120(e)(3)/29 CFR 1926.65(e)(3) shall be 40-hour or 24-hour training initial training, and 3-day/1 day on-the-job experience in accordance with employee's normal assigned duties and anticipated site conditions as applicable to the requirements of 29 CFR 1910.120(e)(3)(i)-(iv)/29 CFR 1926.65(e)(3) (i)-(iv). Site personnel performing operations falling under the requirements of 29 CFR 1910.120/29 CFR 1926.65 shall also have 8 hours of refresher training on an annual basis, in accordance with 29 CFR 1910.120(e)(8)/29 CFR 1926.65(e)(8).

Onsite management and supervisors directly responsible for, or who supervise employees engaged in, hazardous waste operations and individuals designated as an SSH) shall also have an additional 8 hours of management and supervisor training defined by 29 CFR 1910.120(e)(4)/29 CFR 1926.65(e)(4).

It is our intent to require site personnel designated with management, site supervisor, or SSHO responsibilities to maintain current American Red Cross or American Heart Association sponsored First Aid and Cardio-Pulmonary Resuscitation (FA-CPR) certifications. When a medical facility or physician is not accessible within 5 minutes of an injury to a group of two or more employees for treatment of injuries, at least two employees on each shift shall be trained to administer FA-CPR. These individuals have also been provided training in exercising universal precautions against exposure to blood borne pathogens as a component to FA-CPR training which meets the intent of 29 CFR 1910.1030. This employee training is also regularly complemented by other regularly scheduled employer training curriculums that are typically executed for the HAZWOPER industry, regulated under 29 CFR 1910.120/29 CFR 1926.26.

All employees who perform work at hazardous waste sites or perform emergency response operations meeting the criteria of 29 CFR 1910.120(a)(1)(i)-(v)/ 29 CFR 1926.65(a)(1)(i)-(v) standards will be subject to the individual employer medical surveillance program requirements. AGVIQ and CH2M HILL medical surveillance programs conform to the requirements established by 29 CFR 1910.120(f)/1926.65 (f) and/or 29 CFR 1910.134(e).

In addition, each AGVIQ project site manager or supervisor with SSHO responsibilities or construction oversight responsibilities on construction related projects shall have received an OSHA 30-hour Outreach Construction Safety training course (OSHA 30hr).

Certain key project site personnel that may be responsible for packaging and labeling hazardous materials for transportation will have received training in accordance with 49 CFR 172.700

Employees being exposed to certain air borne chemicals or contaminants may require medical monitoring requirements defined by OSHA standards but outside of the medical monitoring requirements defined by 29 CFR 1910.120(f) or 29 CFR 1910.134(e), as applicable to anticipated site conditions.

Where it is determined that employees will be performing certain assigned tasks (e.g., confined-space entry, scaffold, fall protection, forklift operations etc.), then training, additional to that identified above, will be applicable and must be provided by the employer.

6.3 Procedures for Periodic Safety and Health Training of Supervisors and Employees

Supervisor and employee training is established as a routine training provided by AGVIQ as a method of adhering to OSHA, Department of Transportation (DOT), or other which is required to be provide by an employer to an employee. The types and frequency of routine training provided to AGVIQ program participants by AGVIQ is identified in Section 6.2 of this APP.

Additional supervisor and employee training is supplemented by the implementation of the RMP implemented by AGVIQ, which is detailed in Section 10.0 of this APP. Execution of the AGVIQ RMP provides a means and method to achieve overall project goals established by the project/program. Implementation of AHAs and daily safety meetings as part of the RMP provides a method for routine supervisor and employee awareness training. The desired result of the implementation of the RMP is to facilitate the identification and control of certain risks (or liabilities) that may be encountered during the execution of the project. Additionally, the implementation of our RMP processes establishes and maintains a level of expectation with regard to overall project and program health and safety performance.

6.4 Requirements for Emergency Response Training

There are no specific requirements for emergency response training for this project other than the following:

- 29 CFR 1910.120(e)(3)/29 CFR 1926.65(e)(3) standard
- On the job experience associated with operations regulated by 29 CFR 1910.120(e)(3)/ 29 CFR 1926.65(e)(3) standard
- FA-CPR training and blood borne pathogen training
- Note: Confined Space Entry (CSE) rescue training under 29 CFR1910.146(k)(2(iii-iv) for CSE operations is not applicable to this project

7.0 Safety and Health Inspections

The AGVIQ site supervisor or SSHO are required to perform site inspections using the checklists/forms included in **Attachment 4** of this APP. The forms included in **Attachment 4**, are not intended to be an all-inclusive detail of inspection forms/checklists which may be needed during the execution of this project, but is intended to represent a submittal basis only.

Site inspections/evaluations will be made by the site supervisor, SSHO or other designated AGVIQ representative, depending on assigned job function. Discrepancies or HS&E inconsistencies identified during the inspection and evaluation process will be corrected as soon as practicable and documented on the Loss Prevention Observation (LPO) form and/or Deficiency Tracking System form included in **Attachment 9** of this APP. Serious inconsistencies that represent potential immediate harm or danger to an employee will be corrected immediately or controlled to a condition where it does not represent a threat to the employee. Inspections that identify IDLH situations will require that work be immediately stopped and personnel removed from the work area until the situation is abated, corrected, or controlled to a non-hazardous condition.

The site supervisor or SSHO (when designated by the Project Manager or site supervisor) is responsible for conducting and preparing reports of inspections of work processes, site conditions and maintaining these documents for the project record, as necessary. Heavy equipment operators who are assigned to operate onsite heavy equipment are responsible for inspecting their assigned equipment on a daily basis. Corrective actions resulting from discrepancies identified during inspections will be reviewed with the Project Manager and implemented, as necessary. Copies of these reports are maintained on file at the project locations.

A member of AGVIQ senior management or their designated representative may periodically conduct site visits and perform additional assessments of project health and safety performance, at their own discretion or at the request of a corporate official employee, site supervisor or manager. Any discrepancies identified as part of these inspection processes will be addressed with the Project Manager by the senior management team and may be corrected in the field if minor in nature.

The following page provides a typical list of the type and frequency of inspections that may be associated with this project and what individuals should perform such inspections.

Inspection Type	Designated Person	Frequency
Loss Prevention Observation	Any site personnel, but typically the Site Supervisor, SSHO, or Quality Control Manager (QCM)	Weekly
Deficiency Tracking Log (includes general site inspection)	Any site personnel, but typically the Site Supervisor, SSHO, or QCM	Entered Daily
Fire Extinguishers	Any site personnel, but typically the Site Supervisor, SSHO, or QCM	Once Monthly Once Annually
First Aid Kits	Any site personnel, but typically the Site Supervisor, SSHO, or QCM	Before onsite use and at least every 3 months or more frequently depending on use
Hand and Power Tools	Individual using tool	Before Use
Electric Cords and Ground Fault Circuit Interrupters (GFCIs)	Individual using electric cord and GFCI	Before Use
Waste Containers	Site Supervisor or SSHO/QCM	Daily

7.1 External Inspections/Certifications

The following is a list of potential external inspections that may be or will be required by NAVFAC:

- None

8.0 Accident Reporting and Investigation

8.1 Exposure Data (man-hours worked)

AGVIQ records and reports information related to annual labor hours and workplace injuries and illnesses as required by 29 CFR 1904. Where annual summary postings are required under 29 CFR 1904.32(b)(6), they will be posted by AGVIQ, in our appropriate workplace environment(s).

Designated employee representatives from AGVIQ tabulate and track labor hours posted to the AGVIQ program and lost work day and recordable incident information attributable to the execution of all AGVIQ contracts and issued TOs. This process is executed for the purpose of establishing a safety performance history. AGVIQ safety performance data is extrapolated from the following:

- Tabulated Employer Labor Hours
- Established Incident Reporting Processes
- Incident Investigation Reports
- Formal Project Audits

For the Construction (North American Industry Classification System [NAICS] code -23) and Remediation Services (NAICS code – 56291) industries, which is typical of the contract work that AGVIQ typically executes, the AGVIQ calculated Days Away, Restricted or Transferred (DART) and OSHA Recordable Incident Rates for our entire operating period, are currently well below DART Incident Rate (IR) and OSHA Recordable Incident Rate tabulated by the 2008 United States Bureau of Labor Statistics (USBLS) for these industries (see below).

- USBLS IR Construction Benchmark (2009): 4.2 [1]
- USBLS DART Construction Benchmark (2009): 2.3 [1,2]
- USBLS IR Remediation Services Benchmark (2009): 3.2 3
- USBLS DART Remediation Services (NAICS Code 56291) Benchmark (2009): 1.5 [2,3]

[1] NAICS Code 23
[2] DART total all sizes
[3] NAICS Code 56291

8.2 Accident Investigations, Reports and Logs

Completion of incident and near-miss incident investigation reports for AGVIQ shall be performed using the forms in **Attachment 10** of this APP and generally via the procedures identified herein. The AGVIQ Program CIH, HSPA, or their designee (SSHO, site supervisor, project manager) conducts accident/incident investigations and prepares the required incident or near-miss incident investigation reports for the following conditions:

- Near miss incidents

- DART or other OSHA recordable cases
- Spills, releases, discharges, or environmental violations
- Property damage incidents resulting in over $1,000 of loss
- Fatal injury *
- Hospitalization of three or more people resulting from a single occurrence *
- Weight-handling equipment incident
- Permanent total disability
- Permanent partial disability

  * Within 8 hours after the death of any employee from a work-related incident or the in-patient hospitalization of three or more employees as a result of a work-related incident, you must orally report the fatality/multiple hospitalization by telephone or in person to the area OSHA that is nearest to the site of the incident. You may also use the OSHA toll-free central telephone number, 1-800-321-OSHA (1-800-321-6742).

Completed incident and near miss incident investigation reports are to be reviewed by the CIH/HSPA, Project Manager (overall), site management (SSHO, site Supervisor) team and Program Management team. Incident and near-miss incident reports must be submitted to the Project Manager, Program CIH/HSPA, and the Program Management team as soon as possible and within 24 hours. At a minimum the Project Manager and Program Management personnel, including the Program CIH must be verbally notified immediately, or, in a case where emergency medical treatment is required, as soon as injured personnel have been transported to and received by a medical treatment facility.

In addition to the above, the Project Manager (or site supervisor when designated by the Project Manager or Program Management team) must also be responsible for reporting all injuries to NAVFAC as soon as reasonably possible but no later than 24 hours. Where an incident has, or appears to have, any of the consequences listed below, these incidents shall be <u>immediately</u> reported to NAVFAC.

- Fatal injury/illness
- Permanent totally disabling injury/illness
- Permanent partial disabling injury/illness
- Three or more persons hospitalized as inpatients as a result of a single occurrence
- $200,000 or greater accidental property damage or damage in an amount specified by U.S. Army Corps of Engineers (USACE) in current accident reporting regulations
- Arc Flash Incident/Accident

Except for rescue and emergency measures, the accident scene shall not be disturbed until it has been released by the investigating official. The Contractor is responsible for obtaining appropriate medical and emergency assistance and for notifying fire, law enforcement, and regulatory agencies. The Contractor shall assist and cooperate with personnel conducting investigations on behalf of NAVFAC.

Attachment 10 of this APP, for all OSHA recordable accidents where property damage is in In addition to the incident and near-miss incident investigation report forms contained in excess of $2,000, a Contractor Significant Incident Report (CSIR) must also be completed. If the CSIR is being used as initial notification of a Fatality or High Visibility Mishap, the initial form is due within 4 hours of the serious accident. A CSIR form marked "Follow-up" or "Final" is required within 5 days.

8.2.1 Best Management Practices for Incident Investigation

The causes of loss and near-loss incidents can be similar, so by identifying and correcting the causes of loss and near-loss incidents, future loss incidents may be prevented. When loss or near-loss incidents occur, identifying and correcting conditions or acts that create these incidents can be achieved by engaging the following processes:

- Gather all relevant facts, focusing on fact-finding, not fault-finding, while answering the who, what, when, where, and how questions.
- Draw conclusions, putting facts together into a probable scenario.
- Determine the incident root cause(s) and contributing factors of incidents. These are basic factors on why or how conditions or acts are created that result in incidents.
- Develop and implement solutions, matching all identified root causes and contributing factors with solutions so that future conditions or acts that have attributed to incidents are eliminated in the future.
- Communicate incident as a lesson learned to all project personnel.
- File follow-up on implemented corrective action to confirm solution is appropriate.

The purpose of an incident investigation is to understand how the incident happened, analyze the root causes, and prevent recurrence by implementing corrective actions. To conduct an effective investigation, all information must be as detailed and comprehensive as possible. The investigation must be based on facts that clearly identify the sequence of events and the factors that contributed to the incident. The investigation team should not be involved with any punitive actions resulting from the investigation. Fairness and impartiality are essential. The following provides general Best Management Practice guidance in completing incident investigations.

- An unbiased approach is necessary to obtain objective findings.
- Visit the accident scene as soon as possible while the facts are fresh and before witnesses forget important details.
- If possible, interview the injured worker at the scene of the accident and talk through re-enactment.
- Conduct all interviews as privately as possible. Interview witnesses individually and separately. Talk with anyone who has knowledge of the accident/incident, even if he/she did not actually witness it. Only retrieve witness statement from individuals who actually observed the accident/incident. Document witness interviews.
- Document details graphically. Use the IRF as well as sketches, diagrams, and photographs as needed. Take measurements where appropriate.

- Focus on the causes and hazards leading to the accident/incident. Develop an analysis of what happened, how it happened and how it could have been prevented. Determine what caused the accident/incident itself, not just the injury.
- Include a Corrective Action plan in every investigation. Describe how you will prevent such accidents in the future. Completion of the Root Cause Analysis may assist in the formulation of such plans.
- Save any evidence if a third party or defective product contributed to the accident/incident. It should be critical to the recovery of claims costs.

9.0 Plans Required by the Safety Manual

9.1 Layout Plans

Site locus maps, layout plans, haul route maps, drawings, or sketches are included in the project WP, for which this APP is an integral component of and need not be duplicated in this section of this APP.

9.2 Emergency Response Plans

9.2.1 Emergency Planning

(Reference SOP # HSE&Q 106, Emergency Planning)

The site supervisor and/or SSHO performs the applicable pre-emergency planning tasks before starting field activities and coordinates emergency response with identified onsite parties, the NAVFAC POCs, and local emergency-service providers, as necessary. These pre-emergency planning activities include the following:

- Review the facility emergency and contingency plans where applicable.
- Determine what onsite communication equipment is available (e.g., two-way radio, cellular phones, air horn).
- Verify that the Buddy System will and is being used for all assigned work.
- Determine what offsite communication equipment is needed (e.g., nearest telephone, cell phone).
- Confirm and post emergency telephone numbers, evacuation routes, assembly areas, and route to hospital. Communicate the information to onsite personnel.
- Review changed site conditions, onsite operations, and personnel availability in relation to emergency response procedures.
- Where appropriate and acceptable to the client, inform emergency room and ambulance and emergency response teams of anticipated types of site emergencies.
- Designate one vehicle as the emergency vehicle; place hospital directions and map inside and keep keys in ignition during field activities.
- Inventory and check site emergency equipment, supplies, and potable water.
- Communicate emergency procedures for personnel injury, exposures, fires, explosions, and releases.
- Rehearse the emergency response plan before site activities begin, including driving route to hospital.
- Brief new workers on the components of the APP and emergency response plan.

9.2.2 Emergency Equipment and Supplies

The site supervisor/SSHO shall verify the availability and readiness of emergency support equipment listed below.

Emergency Equipment and Supplies	Location
20 LB (or two 10-lb) fire extinguisher (A, B, and C classes) w/annual maintenance and monthly inspection tags	Support Area
First aid kit/CPR Shield	Support Area
Eye wash	Support Area
Potable water	Support Area
Blood borne-pathogen kit	Support Area
Additional equipment (specify): Mobile phone and contact information	Support Area for site supervisor/site management and SSHO at a minimum
Spill Control/Clean-up Materials/Proper Spill Response PPE	Support Area

9.2.3 Evacuation

The Site Supervisor/SSHO will direct the coordination of response to emergency or medical support situations. Response considerations include the following elements:

- Evacuation routes and assembly areas will be specified at the commencement of field work. Evacuation route(s) and assembly area(s) will be designated by the site supervisor or SSHO before work begins and posted at the designated evacuation rally point or construction support facility.
- Personnel shall be advised of the assembly and accounting process during emergency conditions, able to understand evacuation signals and know where final evacuation assembly areas are located. The site supervisor or SSHO will account for personnel assembly area(s).
- Designation of a vehicle to be available to support emergency conditions or response actions.
- Evaluation of existing and potential hazards that may be associated with any experienced emergency condition and mitigation measures necessary to control hazards so the response measures can be executed without additional danger.
- Assessment of the situation and condition of any victims.
- Determination of the resources needed for victim stabilization and transport and additional emergency support.
- Enforcement of the Buddy System. No one will be permitted to perform a response to an emergency condition alone.
- Removal of injured personnel from the area and/or control of the emergency condition.

- Decontamination of injured parties will be accomplished after stabilization of their medical conditions, where necessary. Gross decontamination may be required if their condition poses immediate threat to the victim's life. If decontamination may cause additional harm to an injured person, then alternate measures such as wrapping the injured person in material to prevent the spread of contamination during extrication and transport may be required. In this situation, emergency medical transport personnel and the receiving medical facility must be advised of potential contamination issues of injured personnel, as early as possible.

Evacuation signals for the project site are listed below.

Signal	Meaning
Grasping throat with hand	Emergency-help me.
Thumbs up	OK; understood.
Grasping buddy's wrist	Leave area now.
Continuous sounding of vehicle horn/air horn **(Verify signal does not coincide with evacuation signals for government personnel in close proximity to the site)**	Emergency; leave site now.
Air raid-type siren	Leave Site immediately
Severe Weather Warnings (radio, TV, internet)	Leave the region in accordance with the facility evacuation orders or directives from program/project management team

Figure 9-1 depicts an Evacuation Route Map for Site 8, Middletown, RI. This evacuation route map could be used for evacuation due to pending severe weather conditions, site emergency, or in the event that was being evacuated and secured due to a national emergency.

9.2.4 Procedures and Tests

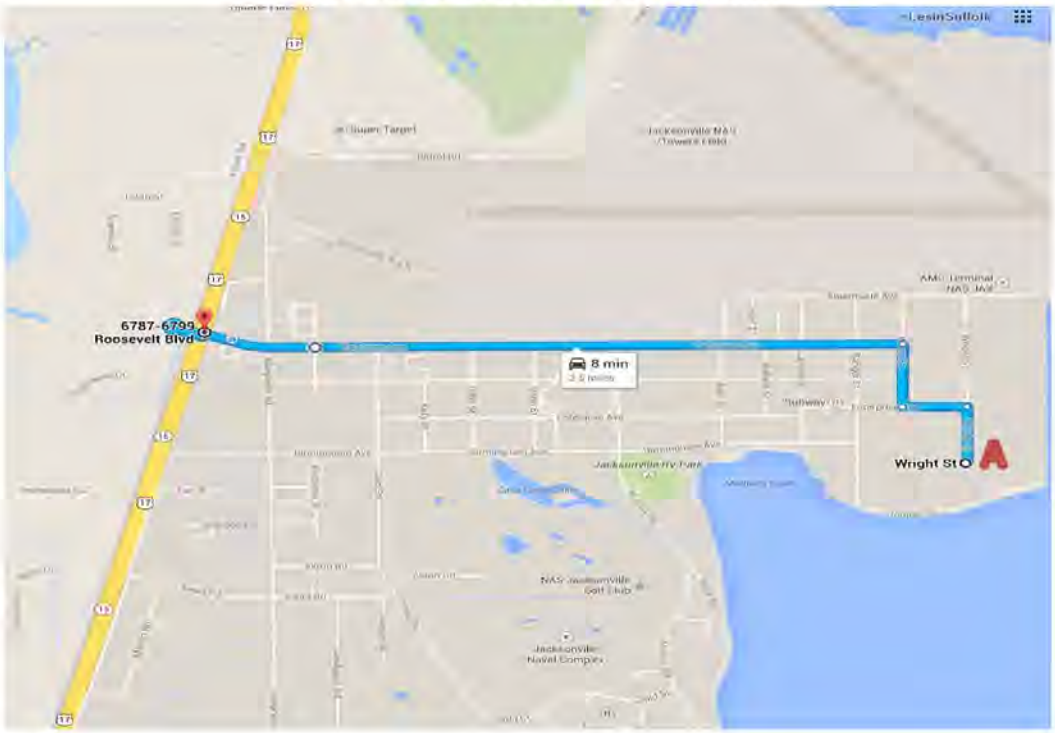
It is the intention of the project team to verify that emergency response processes are in place and capable of being executed, prior to the start of field assignments. However, because of the nature of the facility, response to medical or fire emergencies will most likely be by outside public responders with secured or escorted access. As such, it may be impractical and disruptive to the primary mission of these responders to perform procedural response testing. In this case, the designated site supervisor or SSHO shall verify that emergency services are available for response, that contact information is appropriate, and that responders know how to access anticipated work areas.

FIGURE 9-1

Evacuation Route Map - NAS Jacksonville, Areas F&G, OU3

NAS Jacksonville, Areas F&G, OU3 Evacuation Route Map

(Total Distance about 2.5 miles @ ~ 8 minutes)



Directions

When an emergency evacuation signal is given or required, all site personnel shall shut down operations and equipment, complete any personnel decontamination procedures, secure the work areas to the extent possible and proceed to rally point (approx. Point A). All site personnel shall be accounted for before leaving the site location. From the rally point, utilize the directions below to follow evacuation route. Notify the AGVIQ management team in accordance with Figure 10-3 "Incident Reporting Process and Chain of Command" and Attachment 10 "Emergency Contact List" of this APP and secure further instructions. If just a site emergency occurs the Evacuation Point shall be the Site Construction Entrance (approx. Point A).

Directions	Distance
1. Take Yorktown Ave to Roosevelt Blvd	~ 2.50 miles
2. Turn North or South onto Roosevelt Blvd (U.S. Rt. 17) according to Site Supervisor's directions.	~ 0.00 miles
	~ 2.50 miles

Baptist Medical Center
800 Prudential Dr.
Jacksonville, FL 32207
(904) 202-2000
911 for local EMS/Fire

AGVIQ Project - Emergency Contacts

Sidney Allison - Program Manager: Phone (843) 242-8018 / (843) 813-2672 (cell)
Paul Rakowski - Deputy Program Manager: Phone (757) 213-8581 / (757) 544-6744 (cell)
Eric Davis - Project Manager: Phone (678) 530-4085 / (404) 323-1600 (cell)
TBD - Site Supervisor

9.2.5 Spill Plans

The initial response to any spill or discharge will be to protect human health and safety, and then the environment. Identification, containment, treatment, and disposal assessment will be the secondary response.

If for some reason a chemical spill is not contained, within a dike or sump area, an area of isolation must be established around the spill. The size of the area will generally depend on the size of the spill and the materials involved. If the spill is large (greater than 55 gallons) and involves a tank or a pipeline rupture, an initial isolation of at least 100 feet in all directions should be used, depending on the hazards posed by the spilled or released material. Small spills (less than or equal to 55 gallons) or leaks from a tank or pipe, depending on the hazards posed by the spilled or released material, will require evacuation of at least 50 feet in all directions to allow cleanup and repair and to prevent exposure. When any spill occurs, only those persons involved in overseeing or performing emergency operations will be allowed within the designated hazard area and must maintain appropriate training, and be enrolled in a medical surveillance program in accordance with the requirements of 29 CFR 1910.120 and possess proper experience and PPE, to do so. If possible, the area will be roped off or otherwise blocked to provide restricted access to authorized personnel only.

If the spill results in the formation of a toxic vapor cloud (by reaction with surrounding materials or by outbreak of fire) or creates a toxic or IDLH situation, then further evacuation and response procedures must be engaged. In general, an area at least 500 feet wide and 1,000 feet long will be evacuated downwind if volatile materials are spilled. Consult the DOT Emergency Response Guide for isolation distances for listed hazardous materials.

If an incident may threaten the health or safety of the surrounding community, the public will be informed (via proper local and state emergency management planning agencies) and possibly evacuated from the area. The onsite emergency coordinator will inform the proper agencies in the event this is necessary. A Project Emergency Contact List is provided in **Attachment 5** of this APP. For work at NAS Jacksonville, AGVIQ understands that such chemicals or materials that could create such a situation are not present on site nor will AGVIQ bring such materials onsite as part of its scheduled work.

Reporting of spills or releases of oil or hazardous materials to appropriate agencies and stakeholders (i.e., NAVFAC, U.S. Environmental Protection Agency [EPA], Florida Department of Environmental Protection [FDEP], etc.) must be reported when spilled or released quantities of oil or hazardous materials are in excess of established Reportable Quantities (RQs) for the material in question. Contractor will report to the client and the client will inform the necessary government agency.

In a spill or release response/containment, personnel shall take the following measures:

- Immediately warn any nearby workers and notify individual responsible for site operations.
- Assess the spill area to ensure that it is safe to respond.
- Evacuate area if spill presents an emergency.

- Provide notification to project stakeholders.
- Ensure all unnecessary persons are removed from the hazard area.
- Put on protective clothing and equipment.
- If a flammable material is involved, remove all ignition sources, and use only spark- and explosion-proof equipment for recovery of material.
- Remove all surrounding materials that could be especially reactive with materials in the waste. Determine the major components in the waste at the time of the spill.
- Stop source of spill and establish site control for spill area.
- If wastes reach a storm sewer, dam the outfall by using sand, earth, sandbags, etc. Pump this material out into a temporary holding tank or drums as soon as possible.
- Place all small quantities of recovered liquid wastes (55 gallons or less) and contaminated soil into drums for incineration or removal to an approved disposal site.
- Spray the spill area with foam, if available, if volatile emissions may occur.
- Apply appropriate spill control media (e.g., clay, sand, lime) to absorb discharged liquids.
- For large spills, establish diking around leading edge of the spill using booms, sand, clay, or other appropriate material. If possible, use diaphragm pump to transfer discharged liquid to drums or holding tank. Follow proper ground and bonding procedures of equipment during recovery efforts. Intrinsically safe equipment must be used in recovery operations.
- For small fires or chemical releases, take the following actions:
    1. Shut down operations and evacuate the immediate work area
    2. Notify appropriate response personnel
    3. Account for personnel at the designated assembly area(s)
    4. Assess the need for site evacuation, and evacuate the site as warranted

Instead of implementing a work-area evacuation, small fires or spills posing minimal safety or health hazards may be controlled by onsite personnel, assuming that personnel who respond to these emergencies are properly trained to do so and wearing appropriate PPE to protect themselves against hazards that may be associated with the response.

In addition to the above, AGVIQ will have project field staff that are trained in accordance with 29 CFR 1910.120, are enrolled in a medical surveillance program meeting the criteria of 29 CFR 1910.120(f) and have previous experience training to mitigate unanticipated small releases of materials that could occur on this project (i.e., Petroleum, Oil or Lubricants) with heavy equipment and spill materials that will be readily available at the project site.

9.2.5.1 Anticipated Hazardous Materials

There are no anticipated hazardous materials for this TO.

9.2.5.2 Notification

In the event a spill occurs that requires notification, a project person shall follow the AGVIQ Incident Notification Process and Lines of Authority organizational chart identified in Section **4.4** of this APP.

In addition, the AGVIQ Project Manager shall make notification to the designated project NAVFAC Point of Contact (POC) and environmental compliance representative(s) or other designated NAVFAC personnel, such that additional appropriate community and/or federal/state agencies may be engaged and notified, as applicable. The AGVIQ overall Project Manager shall coordinate with the designated project NAVFAC POC for support with regard to adhering to local, state, or federal regulations for spill notification clean-up and closure requirements.

It is understood that appropriate NAVFAC notification contacts shall be identified at the project Pre-Construction Conference and incorporated for reference, herein in the Emergency Contact List, in the implemented final version of this APP, available for onsite reference.

9.2.6 Firefighting Plan

AGVIQ personnel are not considered Firefighting Organizations or Fire Brigades. Only small/containable fires that are containable by the use of first response fire protection equipment (i.e., 2.5- to 10-pound ABC fire extinguishers) may be controlled by AGVIQ personnel. All other response shall be considered firefighting measures and shall be conducted by facility provided or public agency firefighting teams.

Fire prevention measures and first response fire protection equipment shall be conducted in accordance with the information identified in Section 9.7 Health and Safety Hazard Control Program – Fire Prevention, and Section 9.2 Emergency Response Plans of the APP, respectively.

9.2.7 Posting of Emergency Telephone Numbers

Emergency contact numbers appropriate to project operations are included in **Attachment 5** of this APP and are referenced as the Emergency Contact List. Where temporary construction support facilities are established at the project site, this Emergency Contact List shall be posted in a conspicuous location. Where temporary construction facilities are not allowed or provided, the list shall be available for quick reference by the AGVIQ personnel via this APP and location shall also be made known to designated site personnel.

9.2.8 Man Overboard / Abandon Ship

(Reserved)

9.2.9 Medical Support

Location and direction to medical support facilities shall be posted in a conspicuous location where temporary construction facilities or support are established at the project site. Where temporary construction facilities or a designated administrative/support office are not allowed or provided, the list shall be available for quick reference by site supervisor or SSHO personnel executing site operations and its location shall also be made known to other site personnel.

In addition, the project shall be outfitted with first aid kits of suitable size and quality (contents) to meet health and safety requirements for onsite first aid and CPR response. Personal protective devices shall be provided such that universal precautions against blood borne pathogens can be exercised while administering CPR or first aid. Eye wash stations, either portable or stationary, will be available.

An effective means of communication and to summon transportation of injured workers to medical treatment facilities must be evaluated and established prior to the start of field activities. Communication devices shall be tested in the area of use to assure functionality. When a medical facility or physician is not accessible within 5 minutes of an injury to a group of two or more employees for the treatment of injuries, at least two employees on each shift shall be qualified to administer first-aid and CPR.

AGVIQ employee injuries and illnesses must also be reported to the Project and Program Management team identified in Section 4.0 this and APP Human Resources contacts in **Attachment 5**, once the notification requirements identified in Section 4.4 of this APP have been fulfilled. If there is doubt about whether medical treatment is necessary, or if the injured person is reluctant to accept medical treatment, contact the designated medical consultant or site Emergency Response Support personnel, as applicable.

It must be understood that for life threatening emergencies, get or summon medical attention immediately.

During non-emergencies, follow these procedures as appropriate.

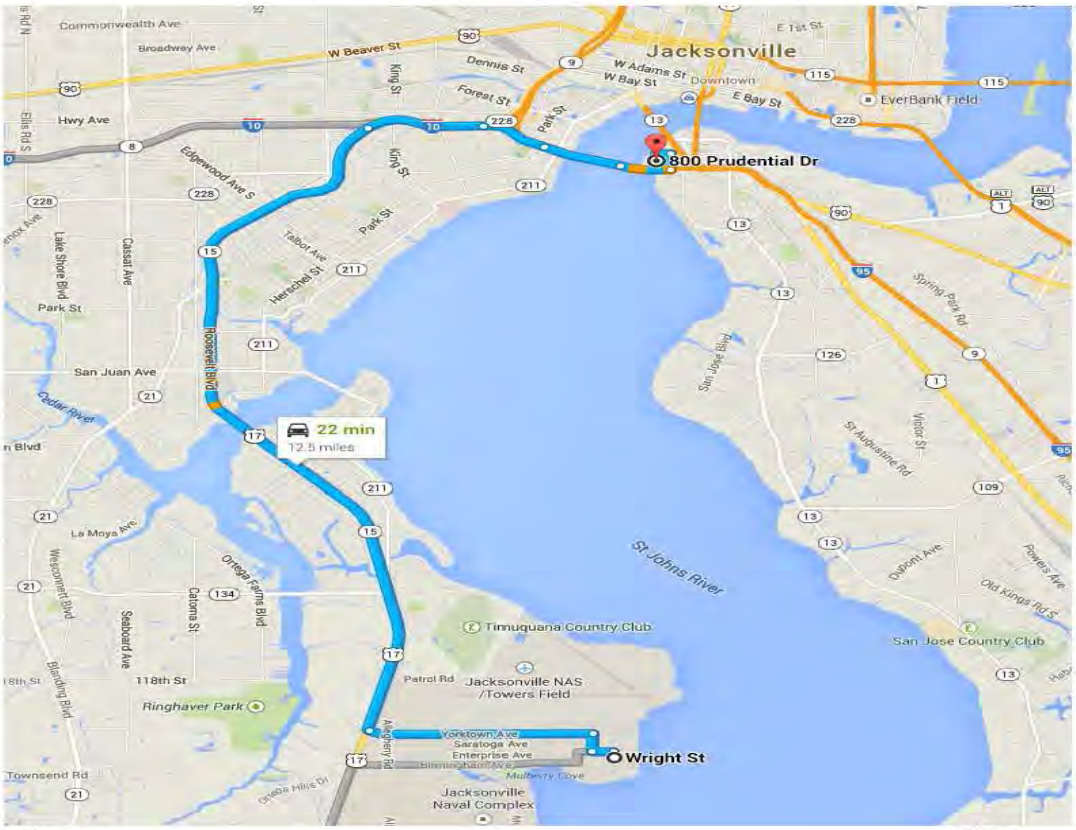
- Notify appropriate emergency response authorities (e.g., 911).
- The site supervisor or SSHO will assume charge during a medical emergency until the ambulance arrives or until the injured person is admitted to the emergency room.
- Prevent further injury.
- Initiate first aid and CPR where feasible and where worker Universal Precautions to Blood borne Pathogens can be completed.
- Perform decontamination where feasible; lifesaving and first aid or medical treatment take priority.
- Make certain that the injured person is accompanied to the emergency room.
- When contacting the medical consultant, give your name and telephone number, the name of the injured person, the extent of the injury or exposure, and the name and location of the medical facility where the injured person was taken.
- Report incident as outlined in Section 8.0 and in accordance with the Primary Lines of Authority identified in Section 4.4 of this APP.

  A map showing the route to the local hospital is shown on Figure 9-2.

FIGURE 9-2
Hospital Route Map - NAS Jacksonville, Areas F&G, OU3

Directions to Hospital

(Total Distance about 12.5 miles @ ~ 21 minutes)



Directions	Distance
1. Take Yorktown Ave to Roosevelt Blvd	~ 2.10 miles
2. Continue on Roosevelt Blvd to Palm Ave. Take exit 350B from I-95 S	~ 10.10 miles
3. Continue on Palm Ave. Drive to Prudential Dr	~ 0.00 miles
4. Turn left onto Prudential Dr	~ 0.20 miles
5. Destination will be on the left	~ 0.10 miles
	~ 12.5 miles

Baptist Medical Center
800 Prudential Dr.
Jacksonville, FL 32207
(904) 202-2000
911 for local EMS/Fire

AGVIQ Project - Emergency Contacts

Sidney Allison - Program Manager: Phone (843) 242-8018 / (843) 813-2672 (cell)
Paul Rakowski - Deputy Program Manager: Phone (757) 213-8581 / (757) 544-6744 (cell)
Eric Davis - Project Manager: Phone (678) 530-4085 / (404) 323-1600 (cell)
TBD - Site Supervisor

9.3 Plan for prevention of Alcohol and Drug Abuse

The AGVIQ policy statement on alcohol and drug abuse is provided in Section 10.5 of the APP, and will not be elaborated further upon in this section.

9.4 Site Sanitation Plan

Toilet facilities for this project shall be of the pre-manufactured, temporary/portable type chemical toilets typical of construction projects and shall be constructed so the occupants are protected against weather and falling objects (reasonably sized); all cracks shall be sealed; and the door shall be tight-fitting, self-closing, and capable of being latched. Adequate ventilation (natural via vents) shall be provided and all windows and vents shall be screened. Toilet facilities will be lighted via natural lighting.

Provisions for routinely servicing and cleaning all toilets and properly disposing of the waste shall be established before placing toilet facilities into operation. The method of sewage disposal shall be managed by the temporary/portable toilet vendor. Separate toilet rooms for each sex need not be provided if toilet rooms can only be occupied by one person at a time, can be locked from the inside, and contain at least one toilet seat.

Washing facilities shall be provided within or adjacent to the temporary/portable type chemical toilet facilities and as needed to maintain healthful and sanitary conditions. Each washing facility shall be maintained in a sanitary condition and provided with tepid water, suitable for hand washing, soap, and individual means of drying. If it is not practical to provide a water source for hand washing using running water due to low ambient air temperatures (~32ºF) then hand sanitizers may be used as a substitute. Washing facilities shall be on the project work site.

Trash and garbage generated by the normal site operations must be properly stowed, containerized, and secured such that vermin will not be attracted and disposed of offsite on a regular basis. Trash and garbage generated as a result of executed site operations shall not be disposed of in base receptacles.

9.5 Access and Haul Road Plan

At this time it is anticipated that project haul operations will be limited to the delivery or pick-up of waste containers required for the disposal of generated waste, delivery of backfill material (topsoil, backfill, riprap), and delivery of field supplies. The site access and haul road have not yet been defined or authorized by the Base. It is assumed that the project haul route will be established on or before the project pre-construction meeting and project kick-off. At this time, the project haul can only be approximated as the route identified on Figure 9-1, Evacuation Route Map.

9.6 Respiratory Protection Plan

(Reference SOP # HSE&Q 121, Respiratory Protection)

Reserved

9.7 Health and Safety Hazard Control Program

Exposure to certain project specific hazards in the work place may include injury/accidents, occupational illnesses or property damage due to execution of a variety of assigned tasks or as a result of existing site conditions. This section of the APP is provided to aid employees in the recognition of potential specific and general project hazards and provide procedures and practices to be implemented on the project site that may facilitate the reduction or elimination of occupational incidents that may be attributed to identified project hazards. All AGVIQ personnel are required to contact the designated Project Manager, SSHO, Program CIH/HSPA identified in this APP regarding any questions or concerns to ensure the execution of this task order in a healthy and safe manner.

9.7.1 Adverse Weather

Sudden inclement weather can rapidly encroach upon field personnel. Because of the time of year that this project is being executed and its geographical region, field crew members could experience a variety of adverse weather conditions during the course of a normal work assignment.

Personnel performing work outdoors should carry clothing appropriate for foul weather conditions (rain gear, etc.) that may be expected. In severe weather conditions, (i.e., high wind, rain squalls, electrical storms), the field crews must evacuate from an outdoor work environment area and find safe shelter until the weather abates and until a decision is made to resume the field activities. The following information is provided for field personnel subject to outdoor work environments as procedures must be exercised where adverse weather is encountered or is expected to occur during an assigned work day.

Frequently observe the skyline for developing rain squalls, thunder storms or other severe weather systems that may be developing. Check internet, local TV weather or radio channels for daily forecasts and plan daily work activities accordingly. Have a portable radio available onsite to monitor local weather or marine forecasts. If onsite internet or radio monitoring are not available, check with the home office support personnel who may be able to determine the severity of developing storm systems through internet access or other methods.

Use the 30-30 rule for lightning. When you see lightning, count the time until you hear thunder. If this time is 30 seconds or less- seek shelter. If you can't see the lightning, just hearing the thunder is a good back-up rule. Wait 30 minutes or more after hearing the last thunder before leaving the shelter.

Shut down operations during heavy rain/lightning events, high wind or heavy snow conditions and identify safe haven location. Safe haven locations should be identified prior to the start of work. Safe haven structures must be grounded where there is a potential for a lightning event.

9.7.2 Aerial Lifts

(Reference SOP # HSE&Q-301, Aerial Lifts)

(Reserved)

Aerial lifts will not be used on this project.

9.7.3 Air Compressor Operations

(Reserved)

Compressed air sources will not be used on this project.

9.7.4 Asbestos

(Reference SOP # HSE&Q-502, Asbestos)

(Reserved)

9.7.5 Biological Hazards and Controls

The following sections provide information on potential biological hazards. Site personnel shall notify their overall supervisors and their project site supervisor of any potential allergic reactions that may occur as a result of contact with biological hazards in the workplace. If employee antidotes are required to counteract allergic reactions from biological hazard exposure, employees shall make personnel, who may be required to administer personal antidotes, aware of the location, type, and quantity of antidotes needed to counteract any potential allergic reaction(s).

9.7.5.1 Alligators

The habitat of the American Alligator includes coastal regions of much of the southeastern United States. As such, personnel performing field activities must be aware of the potential to encounter alligators. The following safe work practices must be followed when accessing areas that can potentially be considered a viable alligator habitat.

- Always use the buddy system.
- With a buddy, survey the area for alligators or signs of alligators prior to entering areas that can be considered potential alligator habitats.
- Maintain radio and cellular phone communications with other team members.
- Avoid approaching the edge of the creek which could potentially be within striking distance of a submerged alligator.
- If an alligator is observed in the work area or signs of alligator presence is observed (tracks, nests, eggs) evacuate the work area immediately.
- Notify the project supervisor /project manager if alligators or signs of an alligator habitat are observed.

9.7.5.2 Venomous Snakes

Snakes typically are found in underbrush, tall grassy areas, near cover such as fallen logs, brush piles, rock walls, abandoned foundations, or rock ledges. They may be resting or waiting for prey. Watch where you place your hands and feet. Walk around, rather than over, fallen logs. When traveling through areas thought to contain venomous snakes, you can minimize the possibility of an encounter by using common sense. If you encounter a snake do your best to stay calm and look around as there may be other snakes. Turn around and walk away on the same path you used to approach the area. If a person is bitten by a snake, wash and immobilize the injured area, keeping it lower than the heart if possible. Seek medical attention immediately. **DO NOT apply ice, cut the wound, or apply a tourniquet**. Try to identify the type of snake: note color, size, patterns, and markings to assist medical personnel with proper treatment measures (see below – Identification of Poisonous Snakes).

Six species snakes native to the NSA Jacksonville area are venomous and are as follows:

1. Copperhead

2. Canebrake Rattlesnake

3. Eastern Diamondback Rattlesnake

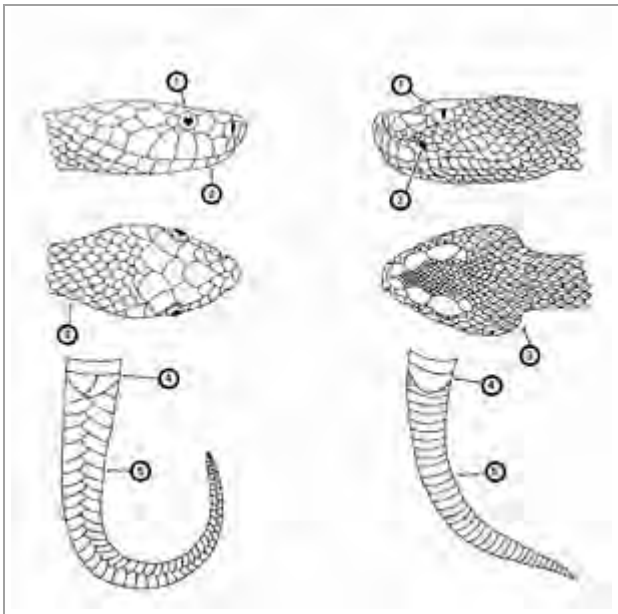
4. Pigmy Rattlesnake

5. Cottonmouth

6. Coral Snake

Identification of Poisonous Snakes

Major Identification Features **Non-venomous Snake**	**Major Identification Features** **Venomous Snake**
1. Round pupils	1. Elliptical pupils
2. No sensing pit	2. Sensing pit between eye and nostril
3. Head slightly wider than neck	3. Head much wider than neck
4. Divided anal plate	4. Single anal plate
5. Double row of scales on the underside of the tail	5. Single scales on the underside of the tail



9.7.5.3 Poisonous Plants

Poison ivy, poison oak, and poison sumac typically are found in brush or wooded areas, which are common to the site. They are more commonly found in moist areas or along the edges of wooded areas. Shrubs are usually 12 to 30 inches high, or can also be a tree-climbing vine, with triple leaflets and short, smooth hair underneath. Plants are red and dark green in spring and summer, with yellowing leaves anytime especially in dry areas. Leaves may achieve bright reds in fall, but plants lose its (yellowed, then brown) leaves in winter, leaving toxic stems. All parts of the plant remain toxic throughout the seasons.

Become familiar with the identity of these plants (see below). Wear protective clothing that covers exposed skin and clothes. Avoid contact with plants and the outside of protective clothing. If skin contacts a plant, wash the area with soap and water immediately. If the reaction is severe or worsens, seek medical attention.

Poison Ivy

Poison Sumac

Poison Oak

Exposure

Contamination with poison oak, ivy or sumac can happen through several pathways. These include:

- Direct skin contact with any part of the plant
- Contact with clothing that has been contaminated
- Contact from removing shoes that have been contaminated, as your shoes may be coated with oil)
- Sitting in a vehicle that has become contaminated
- Contact with any objects or tools that have become contaminated

Exposure to poison oak, ivy or sumac often becomes an OSHA recordable illness. Take proper action if you are potential contaminated. The dermatitis is so severe that many people seek medical care and get prescription cortisone creams or steroid shots to reduce the suffering caused by the itch.

Best Work Practices

If you must work on a Site that has been identified to potentially contain poison oak, ivy or sumac, the following precautions are necessary:

- Identify plants containing urushiol – The best way to prevent exposure is to recognize the plant and avoid working in areas where poison oak, ivy or sumac is present.
- If you must work in areas with urushiol containing plants, contact you project manager and health and safety manager to determine the best procedures to prevent contamination.
- Do not drive vehicles onto the Site where it will come into contact with poison oak, ivy or sumac. Vehicles which need to work in the area, such as drill rigs or heavy equipment must be washed and decontaminated as soon as possible after leaving the Site.
- All tools used in the area, including those used to cut back the plants, surveying instruments used in the area, air monitoring equipment or other test apparatus must be decontaminated before they are placed back into the Site vehicle. If onsite

decontamination is not possible, use plastic to wrap any tools or equipment until they can be decontaminated. If working on or near the ground surface, place plastic on the ground to cover the grass and foliage.

- PPE including Tyvek® coveralls, gloves, and boot covers must be worn. PPE and plastic used to cover the ground must be placed into separate plastic bags and sealed if they are not disposed immediately into a trash receptacle.
- Shower as soon as possible to remove any potential contamination. Any body part with suspected or actual exposure should be washed with Tecnu® or other product designed for removing urushiol. If you do not have Tecnu wash with cold water. Do not take a bath, as the oils can form and invisible film on top of the water and contaminate your entire body upon exiting the bath.
- Zanfel™ may also be used to treat exposed areas that are experiencing signs and symptoms of poison oak, ivy or sumac contamination. Refer to the Zanfel™ information guide below for specific product and contact information.
- Use products such as IvyBlock™ to prevent poison oak, ivy and sumac contamination. IvyBlock™ is approved by the Food and Drug Administration to prevent the rash caused by poison oak, ivy and sumac.
- If there is exposure use the following first aid procedures, or others you may find to alleviate the pain and itching.

Poison Oak, Ivy, and Sumac First Aid

Self-Care/First Aid

- Wash (decontaminate) all affected areas with warm water and a strong soap.
- Keep your hands away from your eyes, mouth and face.
- Do not scratch or rub the rash.
- Apply any of these to the skin rash:
  - Calamine (not Caladryl) lotion
  - Zanfel™ lotion
  - Zinc oxide ointment
  - Paste made with baking soda - mix 3 teaspoons of baking soda with 1 teaspoon of water
- Take an over-the-counter antihistamine such as Benadryl, as stated on the label.
- If self-care/first aid measures don't bring relief, call your doctor.

Urushiol Plant Facts

Urushiol Oil is Potent.

- Only 1 nanogram (billionth of a gram) needed to cause rash
- Average is 100 nanograms for most people
- ¼ ounce of urushiol is all that is needed to cause a rash in every person on earth

- 500 people could itch from the amount covering the head of a pin
- Specimens of urushiol several centuries old have found to cause dermatitis in sensitive people
- 1 to 5 years is normal for urushiol oil to stay active on any surface including dead plants
- Derived from urushi, Japanese name for lacquer

New Cream to Treat Exposure to Poison Plants

Exposure to poison oak, ivy and sumac can be uncomfortable, and in some cases the rash can become so severe that medical care is required. A relatively new product is available Zanfel™ (www.zanfel.com) that helps prevent blistering and itching from becoming severe. If you are working in an area with poison oak, ivy or sumac, you can obtain this cream by contacting and notifying your supervisor of the need to purchase this material.

Please remember, the cream does not replace preventative measures, including:

- Avoiding contact with poison oak, ivy and sumac
- Wearing Tyvek™ coveralls and gloves to prevent contact
- Washing with Tecnu® (or a similar product) after potential exposure
- Washing clothing and decontaminating equipment with an oil-cutting detergent

More information about Zanfel™ (from Zanfel):

Zanfel™ is an effective wash for urushiol-induced contact dermatitis. Urushiol is the toxin known to cause the itching and rash associated with poison oak, ivy, sumac, poisonwood, and related plants. Zanfel works by surrounding urushiol and bonding with it, thereby enabling it to be rinsed away. Unlike some products that require use within 10 to 20 minutes of contact or that required continued use until the rash is gone (which can take up to 5 weeks), Zanfel offers relief at any stages of the reaction and often with only one wash. Individuals with particularly severe reactions may require additional washes. Most individuals experience relief from the itching within 30 seconds of application. The rash will begin to subside within hours if the reaction is mild to moderate. Severe and systemic cases will still require medical attention. Severe cases are defined as breakouts that are present on more than 15-percent of the body, and new breakouts continue to develop after day 4.

9.7.5.4 Ticks

Ticks typically are in wooded areas, bushes, tall grass, and brush. Ticks are black, black and red, or brown and can be up to one-quarter inch in size. Wear tightly woven light-colored clothing with long sleeves and pant legs tucked into/taped to boots; spray only outside of clothing with permethrin or permanone and spray skin with only N, N-diethyl-meta-polyamide (DEET); and check yourself frequently for ticks. Where exposure to ticks is verified, personnel shall consider wearing bug-out suits to minimize potential exposures to ticks or other biting insects (i.e., chiggers). However, when these suits are used when ambient air temperatures are elevated (> 70 degrees) heat stress preventive measures and monitoring protocols must be implemented. See the Heat Stress section in this APP for additional information.

Hazard Control

The methods for controlling exposure to ticks include, in order of most-preferred to least:

- Avoiding tick habitats and ceasing operations in heavily infested areas
- Reducing tick abundance through habitat disruption or application of acracide
- Personal protection through use of repellants and protective clothing
- Frequent tick inspections and proper hygiene
- Vaccinations are not available and preventive antibiotic treatment after a bite is generally not recommended.

Tick Identification

There are five varieties of hard-bodied ticks that have been associated with tick-borne pathogens. These tick varieties include:

- Deer (Black Legged) Tick (eastern and pacific varieties)
- Lone Star Tick
- Dog Tick (American and Brown)
- Rocky Mountain Wood Tick
- Western Black-legged tick

Illnesses and Signs/Symptoms

There are six distinguishable tick-borne pathogens that cause human illness in the United States. These pathogens may be transmitted during a tick bite – normally hours after attachment. The illnesses, presented in approximate order of most common to least, include:

- Lyme (bacteria)
- Rocky Mountain Spotted Fever (RMSF) (bacteria)
- Ehrlichiosis (bacteria)
- Southern Tick-Associated Rash Illness (STARI) (bacteria)
- Tularemia (Rabbit Fever) (bacteria)
- Babesia (protozoan parasite)

Symptoms will vary based on the illness, and may develop in infected individuals typically between 3 and 30 days after transmission. Some infected individuals will not become ill or may develop only mild symptoms. These illnesses present with some or all of the following signs and symptoms: fever, headache, muscle aches, stiff neck, joint aches, nausea, vomiting, abdominal pain, diarrhea, malaise, weakness, and small solid, ring-like, or spotted rashes. The bite Site may be red, swollen, or develop ulceration or lesions. A variety of long-term symptoms may result when untreated, including debilitating effects and death.

Tick Removal

- Use fine-tipped tweezers or shield your fingers with a tissue, paper towel, or nitrile gloves.
- Grasp the tick as close to the skin surface as possible and pull upward with steady, even pressure. Do not twist or jerk the tick; this may cause the mouthparts to break off and remain in the skin. (If this happens, remove mouthparts with tweezers. Consult your healthcare provider if infection occurs.)

- Do not squeeze, crush, or puncture the body of the tick because its fluids (saliva, hemolymph, and gut contents) may contain infectious organisms. Releasing these organisms to the outside of the tick's body or into the bite area may increase the chance of infectious organism transmission.
- Do not handle the tick with bare hands because infectious agents may enter through mucous membranes or breaks in the skin. This precaution is particularly directed to individuals who remove ticks from domestic animals with unprotected fingers. Children, elderly persons, and immune-compromised persons may be at greater risk of infection and should avoid this procedure.
- After removing the tick, thoroughly disinfect the bite site and wash your hands with soap and water.
- You may wish to save the tick for identification in case you become ill. Your doctor can use the information to assist in making an accurate diagnosis. Place the tick in a plastic bag and put it in your freezer. Write the date of the bite on a piece of paper with a pencil and place it in the bag. See First Aid and Medical Treatment information below.

Previously infected individuals are not conferred immunity – re-infection from future tick bites can occur even after a person has contracted a tick-borne disease.

First-Aid and Medical Treatment:

Tick bites should always be treated with first-aid. Clean and wash hands and disinfect the bite Site after removing embedded tick. Consult a healthcare professional if infection or symptoms and effects of tick-borne illnesses are developing.

Medical treatments for tick-borne infections include antibiotics and other medical interventions. Diagnosis of specific illness involves both clinical and laboratory confirmations. Preventive antibiotic treatment in non-ill individuals who have had a recent tick bite is recommended in specific cases only.

Tick Analysis Procedure for Lyme disease:

For tick removal, follow the instructions in your tick removal kit using a fine pointed pair of tweezers. If the tick is alive, place it in two layered zip-lock bags. It is highly recommended that you wear gloves when removing the tick from the skin to avoid infection.

It is important to remove the entire tick and place it in a zip-lock bag. Place the zip-lock bag in an envelope and contact your applicable health care representative, project manager and health and safety representative for instructions on where to send the tick for analysis of certain tick-borne pathogens.

9.7.5.5 Spiders - Brown Recluse

It is regarded by many as the most dangerous spider in the United States. The Brown Recluse can be present as a result of interstate shipping/transportation the Brown Recluse spider can be found most anywhere in the United States.

Brown Recluse Spiders are usually 1 inch or larger in size, including the legs and can grow as large as 3 inches. Young Brown Recluse spiders are smaller and somewhat lighter in color. Brown recluse spider bites don't always hurt right away.

In fact, you may not know that you have been bitten until other symptoms appear. Symptoms of a brown recluse spider bite may include the following:

- Reddened skin followed by a blister that forms at the bite site
- Mild to intense pain and itching for 2 to 8 hours following the bite
- An open sore with a breakdown of tissue (necrosis) that develops within a few hours to 3 to 4 days following the bite and the area may become painful, itchy, hot, swollen, red and tender. An irregular ulcerous sore, caused by necrosis, will often appear that is from 1/4 inch to 10 inches in diameter. Prompt attention is the best defense against preventing the necrosis. The wound is often described as being reddish and surrounded by a bluish area with a narrow whitish separation in between the red and the blue. This gives it the famous bull's eye pattern. In just hours, a bite from the highly venomous Brown Recluse spider can create blisters and cause tissue damage.

Some people have a severe, systemic (whole-body) reaction to brown recluse spider bites, including the rapid destruction of red blood cells and anemia. Signs and symptoms include:

- Fever and chills
- Skin rash all over the body with many tiny, flat purple and red spots
- Nausea or vomiting
- Joint pain

If you think you have been bitten by a brown recluse spider:

- Remain calm. Too much excitement or movement will increase the flow of venom into the blood.
- Try to collect the spider, without being bitten, (even a mangled specimen has diagnostic value), if possible, for positive identification by a spider expert. A plastic bag, small jar, or pill vial is useful and no preservative is necessary, but rubbing alcohol helps to preserve the spider.
- Apply a cool, wet cloth to the bite or cover the bite with a cloth and apply an ice bag to the bite.
- Do not apply a tourniquet. It may cause more harm than benefit.
- Try to positively identify the spider to confirm its type.
- Seek prompt medical attention.

A brown recluse bite can be serious and will likely require immediate medical care. Seek medical attention if you believe you have been bitten by a recluse spider, especially if severe symptoms develop throughout your body or an open sore and necrosis develop. A brown recluse spider bite is diagnosed through a physical examination and questions about the bite. You should be prepared to describe the spider, where and when the bite took place, and what you were doing at the time. Your health professional will ask what your main symptoms are, when they began, and how they have developed, progressed, or changed since the bite.

- Before utilizing outdoor temporary sanitary facilities, be sure to check the unit to verify there are not any spiders.

9.7.5.6 Spiders - Widow

Black Windows can potentially be encountered at the site. Females range from 8 to 15 millimeters in body length; males are smaller, sometimes very small (2 mm). Most have globose, shiny abdomens that are predominantly black with red markings (although some may be pale and/or have lateral stripes), with moderately long, slender legs. These spiders are nocturnal and build a three-dimensional tangled web, often with a conical tent of dense silk in a corner where the spider hides during the day. In nature, most species are found under rocks and logs, but they readily adapt to human-altered environments, where they are most commonly found in outbuildings (sheds, barns, privies), water meter holes, nursery cans, and under any item or structure (e.g., barbeque grill, slide, sand box) that has been undisturbed for a lengthy period.

Formerly, many bites by black widows (usually by female spiders) occurred in outhouse structures, but widow bites occur most frequently when the spider is trapped against human skin, either by reaching under objects where the spider is hiding or when putting on clothing, gloves or shoes containing the spider. Widow spiders are generally very timid and only bite in self-defense when they accidentally contact humans.

Northern Black

Northern Widow

Note: The northern widow is similar to the southern widow except the telltale red markings are shaped slightly different.

Bite symptoms are systemic, spreading through the lymphatic system, and usually start about 1 to 3 hours after the bite. The most common symptoms are intense pain, rigid abdominal muscles, muscle cramping, malaise, local sweating, nausea, vomiting, and hypertension. Other symptoms may include tremors, labored breathing, restlessness, increased blood pressure, and fever. If left untreated, widow bite symptoms usually last 3 to 5 days.

If bitten, remain calm, and immediately seek medical attention (contact your physician, hospital and/or poison control center). Apply an ice pack directly to the bite area to relieve swelling and pain. Try to collect the spider, without being bitten, (even a mangled specimen has diagnostic value), if possible, for positive identification by a spider expert. A plastic bag, small jar, or pill vial is useful and no preservative is necessary, but rubbing alcohol helps to preserve the spider. A hospital stay may be recommended, particularly for those with a heart condition or with health problems. A physician may administer a specific antivenin to counteract the venom or calcium gluconate to relieve pain. Calcium gluconate and/or antivenin may be administered to relieve or counteract symptoms.

- Before utilizing outdoor temporary sanitary facilities, be sure to check the unit to verify there are no spiders.

9.7.5.7 Blood Borne Pathogens

Blood borne pathogens are pathogenic microorganisms present in human blood or other potentially infectious material that can cause disease. These pathogens include, but are not limited to, the Hepatitis B Virus (HBV) and the Human Immunodeficiency Virus (HIV). Other potentially infectious material includes any human body fluid that is visibly contaminated with blood, such as saliva or vomit. It also includes all body fluids in situations where it is difficult or impossible to differentiate between body fluids, such as during an emergency response and any unfixed tissue (other than intact skin) from a human (living or dead).

In emergency medical situations, certain employees may need to render first aid as a collateral duty in response to workplace accidents or injuries. This category includes the SSHO, site managers/supervisors, or individuals certified in FA and CPR and shall have received training in exercising universal precautions against exposure to blood borne pathogens as a component to FA/CPR training, which meets the intent of 29 CFR 1910.1030. However, additional worker training programs in to blood borne pathogens may also be required when it is expected that employees could contact landfill waste or other waste streams containing potentially infectious material. This situation is not reasonably expected for this project. Blood borne pathogen employee training is also complemented by other regularly scheduled employer training curriculums that are typically executed for the HAZWOPER industry, regulated under 29 CFR 1910.120/29 CFR 1926.26. The only worker exposure to blood borne pathogens anticipated for this project will potentially be to those individuals providing FA/CPR to an injured or down worker.

To eliminate or minimize employee exposure to blood borne pathogens, workers who may be exposed to blood borne pathogens or potentially infectious material must implement the following hazard control measures.

Employees expected to render first aid shall be cognizant of and adhere to the following with regard to potential exposure to blood borne pathogens:

- First aid kits and a Blood borne Pathogens Protection Kit shall be immediately available at the Site. The kit is commercially available through most safety or medical supply vendors.

- These kits shall contain gloves, masks, CPR protectors, biohazard disposal bags, antiseptic cleanser, splash-proof goggles, towels, wipes, and an absorbent powder to clean up spills. Gloves, masks, and other PPE measures must be donned by personnel responding to emergency or first aid situations where exposure to Blood borne Pathogens could occur.

A portable eye wash station or means of conducting eye washing or flushing shall be readily available at the project site location.

- Always wash your hands and face with antiseptic soap and running water after contacting potentially infectious material. If washing facilities are unavailable, use an antiseptic cleanser with clean paper towels or moist towelettes. When antiseptic cleansers or towelettes are used, always rewash your hands and face with soap and running water as soon as available. Do not consume food or beverages, smoke, chew tobacco, or perform another hand to eye/face/mouth activity until after thoroughly cleaning your hand (with antiseptic soap and water), then your face and only after the employee has removed themselves from the designated work area that contains materials that can be reasonably considered being contaminated with blood borne pathogens.
- Use universal precautions when dealing with materials or situations where there is a potential for blood borne pathogens. Universal precaution is an approach to infection control whereby all human blood and potentially infectious material are treated as if known to be infectious for HIV, HBV, and other blood borne pathogens.
- Personnel who may be exposed to Blood borne Pathogens should review and implement all applicable components of # HSE&Q 202, Blood borne Pathogens.

9.7.5.8 Mosquito Bites

Because of the detection of the West Nile Virus throughout the United States, it is recommended that preventive measures be taken to reduce the probability of being bitten by mosquitoes whenever possible. Mosquitoes are believed to be the primary source for exposure to the West Nile Virus as well as several other types of encephalitis. The following guidelines should be followed to reduce the risk of these concerns for working in areas where mosquitoes are prevalent.

- Stay indoors at dawn, dusk, and in the early evening.
- Wear long-sleeved shirts and long pants whenever you are outdoors.
- Spray clothing with repellents containing pyrethrum or DEET because mosquitoes may bite through thin clothing.
- Apply insect repellent sparingly to exposed skin. An effective repellent will contain 35 percent DEET. DEET in high concentrations (greater than 35 percent) provides no additional protection.
- Repellents may irritate the eyes and mouth, so avoid applying repellent to the hands.
- Whenever you use an insecticide or insect repellent, be sure to read and follow the manufacturer's DIRECTIONS FOR USE, as printed on the product.

- Note: Vitamin B and ultrasonic devices are NOT effective in preventing mosquito bites.

Symptoms of Exposure to the West Nile Virus:

Most infections are mild, and symptoms include fever, headache, and body aches, occasionally with skin rash and swollen lymph glands. More severe infection may be marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, paralysis, and, rarely, death.

The West Nile Virus incubation period is from 3 to 15 days.

If you have any questions or to report any suspicious symptoms, contact our line supervisor, project health and safety representative and/or designated corporate occupational physician, as per your employers policy, for support with suspect exposures to West Nile Virus.

9.7.5.9 Rabid Animals

Encounters with a rabid animal can lead to rabies transmission when virus from the animal's saliva, brain tissue, or spinal fluid enters open cuts or wounds in skin or mucous membranes. Therefore, not every encounter with a rabid animal is a true exposure requiring intervention. Treatment is often provided unnecessarily to people who have encountered but had no true exposure to a potentially rabid animal.

Any penetration of the skin by an animal's teeth is considered a "bite exposure." Local wound care should be performed immediately on anyone bitten by an animal. Local treatment of wounds involving immediate and extensive washing of all bite wounds, scratches, or other Sites of potential exposure for 10 minutes with soap and water is arguably the most important measure for preventing rabies following an exposure to a rabid animal. Experiments done in animals suggest that thorough and vigorous cleansing to the depth of the wound with a 20 percent soap solution can reduce the risk of developing rabies. Tetanus booster vaccine (Td) should be given if indicated. A health care provider should be consulted to determine whether other measures are necessary. When a bite exposure has been determined, laboratory testing of the animal, if available, may be indicated depending upon the circumstances of the exposure (such as whether it was provoked or not) and the species involved. The risks associated with bites from different animals vary from place to place. For work on this particular contract, contact with rabid dogs, cats, raccoons, and rats could be possible.

Non-bite exposures include any scratches, abrasions, or contamination of mucous membranes by an infected animal's saliva, brain tissue, or spinal fluid. Other types of contacts (such as with the blood, urine, feces, or fur of an animal) would not by themselves be considered exposures capable of transmitting rabies even if the animal were known to be rabid. The virus is not hardy; once dry, saliva containing rabies virus is considered non-infectious.

9.7.6 Buried Objects/Utilities (Locating)

Do not begin subsurface construction activities (e.g., excavation or drilling) or other ground disturbing activities until a check for underground utilities and similar obstructions has been conducted. Contact the local utility mark-out or locating service identified for the area of operations.

Local Utility Mark-Out Service
Name: Sunshine State One Call of Florida, Inc.
Phone: http://www.callsunshine.com/corp/index.html
Website: (800) 432-4770

The use of as-built drawings and utility company searches must be supplemented with a geophysical or other survey by a qualified, independent survey contractor to identify additional and undiscovered buried utilities. Examples of the type of geophysical technologies include:

- Ground Penetrating Radar (GPR), which can detect pipes, including both metallic and non-metallic gas pipes, tanks, conduits, and cables, at depths up to 30 feet depending on equipment. Sensitivity for both minimum object size and maximum depth detectable depends on equipment selected, soil conditions, etc.
- Radio Frequency (RF) involves inducing an RF signal in the pipe or cable and using a receiver to trace it. Some electric and telephone lines emit RF naturally and can be detected without an induced signal. This method requires knowing where the conductive utility can be accessed to induce RF field if necessary.
- Dual RF is a modified version of RF detection using multiple frequencies to enhance sensitivity but with similar limitations to RF.
- Ferromagnetic Detectors are metal detectors that will detect ferrous and non-ferrous utilities. Sensitivity is limited, e.g., a 100-mm iron disk to a depth of about one meter or a 25-mm steel paper clip to a depth of about 20 centimeters.
- Electronic markers are emerging technologies that impart a unique electronic signature to materials such as polyethylene pipe to facilitate location and tracing after installation. Promising for future installations but not of help for most existing utilities already in place.

9.7.6.1 Procedure

The following procedures shall be used to identify and mark underground utilities during subsurface construction activities on the project.

- The survey subcontractor shall determine the most appropriate geophysical technique or combinations of techniques to identify the buried utilities on the project.
- based on the survey contractor's experience and expertise, types of utilities anticipated to be present, and specific Site conditions.
- The survey contractor shall employ the same geophysical techniques used on the project to identify the buried utilities, to survey the proposed path of subsurface construction work to confirm no buried utilities are present.
- Identify customer specific permit and/or procedural requirements for excavation and drilling activities. For military installations, contact the Base Civil Engineer and obtain the appropriate form to begin the clearance process.
- Contact utility companies or the state/regional utility protection service at least three working days prior to excavation activities to advise of the proposed work, and

ask them to establish the location of the utility underground installations prior to the start of actual excavation.

- Schedule the independent survey.
- Obtain utility clearances for subsurface work on both public and private property.
- Clearances are to be in writing, signed by the party conducting the clearance.
- Underground utility locations must be physically verified by hand digging using wood or fiberglass-handled tools when any adjacent subsurface construction activity (e.g., mechanical drilling, excavating) work is expected to come within 5 feet of the marked underground system. If subsurface construction activity is within 5 feet and parallel to a marked existing utility, the utility location must be exposed and verified by hand digging every 100 feet.
- Protect and preserve the markings of approximate locations of facilities until the markings are no longer required for safe and proper excavations. If the markings of utility locations are destroyed or removed before excavation commences or is completed, the Project Manager must notify the utility company or utility protection service to inform them that the markings have been destroyed.
- Conduct a Site briefing for employees regarding the hazards associated with working near the utilities and the means by which the operation will maintain a safe working environment. Detail the method used to isolate the utility and the hazards presented by breaching the isolation.
- Monitor for signs of utilities during advancement of intrusive work (e.g., sudden change in advancement of auger or split spoon during drilling or change in color, texture, or density during excavation that could indicate the ground has been previously disturbed).
- In addition to the information contained in this section, personnel performing hand augering operations should use a fiberglass ground probe to search ahead to the next sample interval prior to advancing the hand auger. When performing environmental sampling, decontamination of the fiberglass ground probe shall apply.

When the client or other onsite party is responsible for determining the presence and locations of buried utilities, the AGVIQ site supervisor shall confirm the arrangement and be available onsite to verify the location of underground utilities or identified subsurface anomalies that may be in question and require further investigation measures.

9.7.6.2 Unknown or Suspect Buried Objects/Materials

If unknown or suspect objects/materials are encountered (i.e., exposed or partially buried drums, biological waste, cylinders, munitions and explosives of concern, unexpected stained/discolored soil) are encountered during site operations, ongoing activities shall be immediately suspended. AGVIQ or subcontractor personnel encountering unknown or suspect objects/materials shall:

- Secure the area and identify the location of the object/material to the extent possible, without causing bodily injury to yourself or others and without disturbing the object
- Evacuate the work area

- Immediately notify the project manager of the encountered condition
- Not provide additional disturbance or otherwise handle the suspect object/material

The site supervisor/Field Team Leader (FTL) or SHSO shall contact the Project Manager and the CIH/HSPAs to evaluate potential hazards associated with the specific situation encountered. The project team will then address the need for the use of special procedures, engineering controls, PPE or specialized subcontract personnel to safely mitigate the situation.

9.7.7 Chemical Injections

Chemical injections are not anticipated for this TO.

9.7.8 Concrete Work

(Reference SOP # HSE&Q-302, Concrete & Masonry)

Concrete work for this TO is possible as it pertains to subslap sampling. Because of the limited type and low complexity of concrete work scheduled for the site, the requirements of EM 385 1-1, Section 27 "Concrete, Masonry, Steel Erection and Residential Construction" does not lend applicability to the work and 29 CFR 1926, Subpart Q "Concrete and Masonry Construction" appears to be only minimally applied. However, for this work, key general procedures shall be applicable to working with concrete, concrete delivery vehicles and the curb and gutter placement equipment as follows:

- Protect exposed skin and eyes from chemical burns contact or splash from concrete during placement of concrete, finishing and truck washout operations. Do not place hands or arm in concrete. Wear rubber boots if stepping in concrete is necessary to finish the concrete surface. If eyes or bare skin comes in contact or is splashed by wet concrete, wash skin and flush eyes immediately.
- Nonessential personnel to stand clear of concrete chute during concrete placement. Designate one ground person to operate concrete chute if not controlled by truck driver inside cab (front loading).
- Do not walk under a concrete chute. Stand clear of concrete chute when it is discharging concrete.
- Ground support personnel should not position themselves between the concrete and chute and any other object while the truck is engaged.
- Understand and review hand signals. Designate one person to provide hand signals to concrete truck operator.
- Ensure concrete truck has an operable back-up alarm.
- Ensure concrete trucks are on stable level ground when discharging concrete and do not traverse up/down steep inclines.
- Step away from concrete truck when adjustments to concrete chutes are made (positioning).
- Ensure concrete truck operator has spotter for obstructed views and backing up.

- Employees should stay off approach areas of concrete truck. When approaching a concrete truck employees should make eye contact and communicate their intentions directly with the operator.
- Stay out of the operating envelop of haul trucks. Do not walk in front of or in back of haul trucks.
- Ensure you are in the concrete truck operator's field of vision.
- If any protruding reinforcing steel (rebar), onto which personnel could fall, must be adequately guarded to eliminate the hazard of impalement.
- Keep all hands/fingers and feet out of pinch points from the concrete curb and gutter machine and ensure that all guards remain in place while the curb and gutter machine(s) are in place, while being operated.

9.7.9 Confined Space

(Reference SOP # HSE&Q-203, Confined Space)

(Reserved)

9.7.10 Cranes

(Reference SOP # HSE&Q-303, Cranes)

(Reserved)

Crane operations/activities will not be performed as part of this task order.

9.7.11 Dismantling Operations

(Reference SOP # HSE&Q-305, Demolition)

As part of this TO, fence removal will be necessary. Hazards associated with fence removal are listed below and should be followed at all times:

- Review AHA for fence removal prior to performing task
- Wear proper PPE
- Take caution when using hand power tools if required to remove fence
- Use good manual lifting techniques
- Be aware of controlling the webbing associated with the fence as it could become a flying object
- Always wear gloves when removing fencing as it is usually contaminated with rust.
- If heavy equipment needed following the safety precautions in Section 9.7.21

9.7.12 Cutting Operations

(Reference SOP # HSE&Q 314, Welding & Cutting)

(Reserved)

9.7.12.1 Compressed Gas Cylinders

(Reserved)
No compressed gas cylinders will be used during cutting operations.

9.7.13 Drilling/Direct Push Technology

(Reference SOP # HSE&Q 204, Drilling)

During the execution of this work drilling will be used to advance soil borings for subsurface soil sample collection. When drilling operations are implemented at the site, at a minimum, the following practices must be implemented.

- Prior to conducting any onsite intrusive activities, it must be verified that subsurface utilities will not be impacted by proposed site operations. See procedures for Buried Objects/Utilities (locating) Locating in this APP.
- PPE and air monitoring requirements shall be executed in accordance with Tables 9-2 and 9-3, respectively, of this APP in an effort to minimize potential dermal and inhalation exposures to identified site contaminants of concern during all drilling activities. In addition, good personal hygiene practices and procedures must be maintained (see Section 9.33.10 of this APP).
- Drill rig inspections and maintenance and documentation of such inspections and maintenance shall be performed daily prior to the start of onsite work.
- The drill rig should not to be operated in inclement weather. Drill rigs with a rotary "cat-head" mechanism shall not be operated during precipitation events.
- Suspended drill rods, tools or wash tub shall not be passed over ground personnel and ground personnel shall not be allowed to walk under or in front of suspending drilling rods, tools, or wash tub.
- The drill rig operator is to verify that the rig is properly leveled and stabilized (extension of stabilizers on firm ground) before raising the mast.
- Personnel should be cleared from the sides and rear of the rig before the mast is raised.
- The drill rig operator shall not to drive the rig with the mast in the raised position.

The drill rig operator must check for overhead power transmission lines or other overhead utilities before raising the mast. A minimum distance of 10 feet between mast and overhead lines <50 kilovolts (kV) is required. Increased separation will be required for lines greater than 50 kV. To determine proper clearance from energized overhead, electric lines, consult the reference table below.

Nominal System Voltage (kV)	Minimum Rated Clearance (feet)
0-50	10
51 - 200	15
201 - 300	20
301 – 500	25
501 – 750	35
751 – 1000	

- Do not raise drill rig masts underneath or adjacent toward overhead utilities. Do not drive drill rig mast raised. Be cognizant of utility pole guy wires and above ground transformers in relation to operating drill rigs.
- If the drill rig comes into contact with electrical wires and becomes electrically energized, do not touch any part of the rig or any person in contact with the rig and stay as far away as possible. Notify emergency personnel immediately.
- Personnel must stand clear before equipment startup.
- Make and maintain eye contact with operator prior to/while approaching drill rig. Do not disturb the driller while the driller is actively engaged in drilling operations (i.e., operating controls, hoisting or lowering drill rods/tools/equipment).
- The drill rig operator shall keep the drill rig at a zero energy state when not at the drill rig controls.
- Do not wear loose-fitting clothing, watches, or have long hair etc., that may get caught in moving parts of the drill rig.
- Do not smoke or permit other spark-producing equipment around drill rig.
- The drill rig shall be equipped with a kill wire or switch and personnel associated with the drilling operation are to be informed of its location.
- When lines are pressurized on or adjacent to the drill rig as a result of the drilling or grouting operations, safety lashings/whip line checks, clips or other suitable restriction means must be in place on hoses/connections to prevent injury in the event connections become dislodged or hoses rupture.
- The drill rig operator is to verify that all machine guards are in place while the rig is in operation.
- The drill rig operator should be equipped with at least one fire extinguisher.
- Where it may be required to limit access and prevent inadvertent entrance of unauthorized and untrained personnel into the active drilling operation areas, the erection of warning tape, suitable signage, orange safety fencing or other appurtenances around the active drilling area may be necessary, in accordance with the requirements of Section 9.33.10 Site Control Measures of this APP.

9.7.13.1 Machine Guarding

Machine guarding procedures for the anticipated work will be applicable to the execution of the subsurface drilling operations, excavation equipment, well abandonment/cutting and removal of well casing, fencing, and soil stabilization structure. For this activity, the following machine guarding precautions will be applicable to the work.

- Ensure that all machine guards are in place to prevent contact with drive lines, belts, pinch points, mechanically energized equipment, or any other sources of mechanical injury.
- Maintenance and repair of equipment that results in the removal of guards or would otherwise put anyone at risk requires that mechanic parts be brought to a aero energy state and locked/blocked so the equipment cannot be energized.

9.7.14 Electrical Safety

(Reference SOP # HSE&Q-206, Electric Safety)

Several types of electrical hazards may be encountered during the execution of the project. These hazards might include, but not be limited to, hazards associated with the operation of heavy haul trucks adjacent to overhead or underground utilities, use of generators, power chords and electric hand tools used during, mobilization, and demobilization.

Where the electrical exposure hazards are possible in the work environment, the following standard work practices must be implemented.

- Review and implement all applicable components of SOP # HSE&Q-206, Electrical Safety, except where other requirements may be more stringent.
- Maintain safe clearance distances between overhead power lines and haul trucks picking up waste containers unless the power lines have been verified as being de-energized and grounded or unless insulating barriers have been installed to prevent physical contact. To determine proper clearance from energized overhead electric lines, consult the reference table below.

Nominal System Voltage (kV)	Minimum Rated Clearance (feet)
0-50	10
51 - 200	15
201 - 300	20
301 – 500	25
501 – 750	35
751 – 1000	45

- Do not allow haul trucks operators to raise haul chassis underneath or in close proximity to overhead utilities or pull toward overhead utilities with dump bodies raised. Be cognizant of utility pole guy wires in relation to operating haul trucks.
- Do not connect electrically operated tools directly to 12-volt vehicle/tractor/boat batteries as an electrical power source. Use generators and power cords equipped with GFCIs.
- Only qualified personnel (by training, experience, and/or licensure) are permitted to work on electrical systems.
- Do not tamper with or access electrical wiring and equipment unless qualified to do so. All electrical wiring and equipment must be considered energized until hazardous energy control procedures (i.e., lock-out/tag-out) are implemented.
- Inspect electrical equipment, power tools, and extension cords for damage prior to use. Do not use defective electrical equipment and remove from service.

- All temporary wiring, including extension cords and electrical power tools, must have GFCIs installed.
- Extension cords must be:
  - Equipped with third-wire grounding.
  - Covered, elevated, or protected from damage when passing through work areas.
  - Protected from pinching if routed through doorways.
  - Not fastened with staples, hung from nails, or suspended with wire.
- Electrical power tools and equipment must be effectively grounded or double-insulated and Underwriters Laboratory (UL) approved.
- Operate and maintain electric power tools and equipment according to manufacturers' instructions.
- Protect all electrical equipment, tools, switches, and outlets from environmental elements.

9.7.15 Fall Protection

(Reference SOP # HSE&Q-310, Fall Protection)

The anticipated fall protection hazards are associated with the execution of this TO is the use of aerial lifts during cleaning processes. Fall protection measures built into the aerial lifts will be used after they are inspected for soundness. All requirements of EM 385 1-1, section 21.A and 21.I will be followed.

- Anchorage strength shall be a minimum of 5,000 pounds
- The connector between the front D-ring of the harness and the ladder cable, rope or sleeve shall be 9 inches (20 centimeters) long.
- The free fall distance shall not exceed 2 feet.
- There shall be 100 percent transition at the top of the ladder for safe access to above work surface or roof.

Below are the hazard controls and safe work practices to follow when personnel or subcontractors are exposed to unprotected heights such as pipeline replacement at the top of the groundwater treatment facility. Ensure the requirements in the referenced SOP are followed.

- Fall protection systems must be used to eliminate fall hazards when performing construction activities at a height of 6 feet (1.8 meters) or greater and when performing general industry activities at a height of 4 feet (1.2 meters) or greater.
- AGVIQ staff exposed to fall hazards must complete initial fall protection training by completing either the 10-Hour Construction Safety Awareness training course or the Fall Protection computer-based training module. Staff must also and receive project-specific fall protection training using the fall protection evaluation form attached to this APP. Staff shall not use fall protection systems for which they have not been trained.

- The SSHO or designee must complete the Project Fall Protection Evaluation Form and provide project-specific fall protection training to all AGVIQ staff exposed to fall hazards.
- The company responsible for the fall protection system shall provide a fall protection competent person to inspect and oversee the use of fall protection system. AGVIQ staff shall be aware of and follow all requirements established by the fall protection competent person for the use and limitation of the fall protection system.
- When AGVIQ designs or installs fall protection systems, staff shall be qualified as fall protection competent persons or work directly under the supervision of an AGVIQ fall protection competent person.
- When horizontal lifelines are used, the company responsible for the lifeline system shall provide a fall protection qualified person to oversee the design, installation, and use of the horizontal lifeline.
- Inspect personal fall arrest system components prior to each use. Do not use damaged fall protection system components at any time, or for any reason. Fall protection equipment and components shall be used only to protect against falls, not to hoist materials. Personal fall arrest systems that have been subjected to impact loading shall not be used. SC shall periodically inspect AGVIQ fall protection equipment using the Fall Protection Inspection Log form.
- Personal fall arrest systems shall be configured so that individuals can neither free-fall more than 6 feet (1.8 meters) or contact any lower level.
- Only attach personal fall arrest systems to anchorage points capable of supporting at least 5,000 pounds (2,268 kilograms). Do not attach personal fall arrest systems to guardrail systems or hoists.
- Remain within the guardrail system when provided. Leaning over or stepping across a guardrail system is not permitted. Do not stand on objects (boxes, buckets, bricks, blocks, etc.) or ladders to increase working height on top of platforms protected by guardrails.
- Only one person shall be simultaneously attached to a vertical lifeline and shall also be attached to a separate independent lifeline.

9.7.16 Excavation Activities

(Reference SOP # HSE&Q-307, Excavation & Trenching Safety)

(Reserved)

9.7.17 Fall Protection

(Reference SOP # HSE&Q-310, Fall Protection)

(Reserved)

There are no anticipated fall protection hazards associated with the execution of this task order under the requirements of EM 385 1-1, Section 21.A that must be addressed in this APP.

9.7.18 Fire Prevention

The information provided below is the minimum Fire Prevention procedures that must be engaged for the project site.

- Before conducting any hot work operations, the area shall be surveyed to ensure it is free of the following hazards:
  - Proximate combustible materials
  - The presence or possible generation of potentially explosive atmospheres (flammable gases, vapors, liquids, or dusts)
  - The presence or nature of an oxygen-enriched atmosphere
- All flammable or combustible materials from where welding, cutting or other hot work operations are to occur shall be removed to the extent possible.
- Institute the Hierarchy of Fire Control. Objects to be welded, cut, or heated shall be:
  - Moved to a location free of dangerous combustibles
  - If the work cannot be moved, all moveable fire hazards in the vicinity shall be taken to a safe place (moved at least 35 feet (10.6 meters) horizontally from the welding or cutting area) or the combustible material and construction shall be protected from the heat, sparks, and slag of welding
  - When welding or cutting must be done in a location where combustible or flammable materials are located, inspection and authorization shall be required before such operations are begun (the location shall be checked for latent fires by qualified fire watch personnel after the work is completed)
- Personnel shall ONLY be allowed to smoke in designated areas, where allowed at all. Designated area must be free of combustible, flammable or potentially explosive materials.
- Flammable/combustible liquids must be kept in approved containers, and must be stored in an approved storage cabinet. Use only metal safety cans for storage and transfer of fuel and use funnels and nozzles during fueling operations.
- Fire extinguishers will be provided so that the travel distance from any work area to the nearest extinguisher is less than 100 feet. When 5 gallons or more of a flammable or combustible liquid is being used, an extinguisher must be within 50 feet. Extinguishers must:
  - Be maintained in a fully charged and operable condition.
  - Be visually inspected each month.
  - Undergo a maintenance check each year.
  - The area in front of extinguishers must be kept clear.
  - Appropriately sized, easily accessible ABC fire extinguisher in work area. Fire extinguishers must be inspected monthly (inspection tag) and have an annual maintenance/inspection certification (tag) attached to the extinguisher.

  - Fire extinguishers shall be approved by a nationally recognized testing laboratory and labeled to identify the listing and labeling organization and the fire test and performance standard that the fire extinguisher meets or exceeds.

- Combustible materials stored outside should be at least 10 feet from any building.
- Solvent waste and oily rags must be kept in a fire-resistant, properly labeled covered container until removed from the site.
- Personnel shall consider their safety when engaging only incipient stage fires. Fires resulting from residual product in lines or tanks should be handled by Fire and Emergency Services.

9.7.18.1 Fire Watch

In any instance where flammable or combustible materials have been exposed to fire hazards (such as cutting operations requiring a hot work), a fire watch shall be assigned to remain at the location for at least 1 hour after the exposure has ended. These instances may include, but not be limited to the following;

- Slag, weld splatter, or sparks might pass through an opening and cause a fire.
- Fire-resistant guards or curtains are not used to prevent ignition of combustible materials on or near decks, bulkheads, partitions, or overheads.
- Combustible material closer than 35 feet (10.7 meters) to the hot work in either the horizontal or vertical direction cannot be removed, protected with flame-proof covers, or otherwise shielded with metal or fire-resistant guards or curtains.
- The hot work is carried out on or near insulation, combustible coatings, or sandwich-type construction that cannot be shielded, cut back, or removed, or in a space within a sandwich type construction that cannot be inerted.
- Combustible materials adjacent to the opposite sides of bulkheads, decks, overheads, metal partitions, or sandwich-type construction may be ignited by conduction or radiation.
- The hot work is close enough to cause ignition through heat radiation or conduction on the following:

– Insulated pipes, bulkheads, decks, partitions, or overheads
– Combustible materials and/or coatings

- The work is close enough to unprotected combustible pipe or cable runs to cause ignition.

9.7.19 Flight Line Safety

There are no activities on or adjacent to flight line operations associated with the execution of this TO.

9.7.20 General Practices and Housekeeping

Maintaining proper site housekeeping measures promotes the elimination of slip, trip and fall hazards and exhibits a perception of pride in our work product and habits. Poor housekeeping can result in the basis of citations under 29 CFR 1926.25(a) or other applicable regulations. Good housekeeping practices must be implemented on every AGVIQ controlled project site and at a minimum shall be as follows:

- Maintain good housekeeping at all times in all project work areas.
- During the course of executed project operations, construction, alteration, or repairs, form and scrap lumber with protruding nails, and all other debris, shall be kept cleared from work areas, passageways, and stairs, in and around buildings or other structures.
- Combustible scrap and debris shall be removed at regular intervals during the course of construction. Safe means shall be provided to facilitate such removal.
- Containers shall be provided for the collection and separation of waste, trash, oily and used rags, and other refuse. Containers used for garbage and other oily, flammable, or hazardous wastes, such as caustics, acids, harmful dusts, etc., shall be equipped with covers and appropriately labeled. Garbage and other waste shall be disposed of at frequent and regular intervals.
- Establish common paths of travel and keep them free from the accumulation of materials.
- Keep access to aisles, exits, ladders, stairways, scaffolding, and emergency equipment free from obstructions.
- Provide slip-resistant surfaces, ropes, and/or other devices to be used.
- Designate specific areas for the proper storage of materials.
- Store tools, equipment, materials, and supplies in an orderly manner.
- As work progresses, neatly store scrap and unessential materials or remove them from the work area.
- Provide containers for collecting trash and other debris and remove them at regular intervals.
- Clean up all spills quickly. Clean oil and grease from walking and working surfaces.

9.7.21 Hand and Power Tools

(Reference SOP # HSE&Q 210, Hand and Power Tools)

Hand (and possible power tools) will be used during most all operations. When the use of hand and power tools is necessary to properly complete assigned tasks, the following work practices must be implemented, where applicable.

- Review and implement all applicable components of SOP # HSE&Q 210, Hand and Power Tools except where other requirements may be more stringent.
- Tools will be inspected prior to use, and damaged tools will be tagged and removed from service.

- Hand tools will be used for their intended use and operated in accordance with manufacturer instructions and design limitations.
- Maintain all hand and power tools in a safe condition.
- Do not set power tools down in muddy or wet areas, which may damage the tool and/or or create a potential for electric shock.
- Use PPE (such as gloves, safety glasses, earplugs, and face shields) when exposed to a hazard from a tool.
- Do not carry or lower a power tool by its cord or hose.
- Portable power tools will be plugged into GFCI-protected outlets.
- Portable power tools will be UL listed and have a three-wire grounded plug or be double insulated.
- Disconnect tools from energy sources when they are not in use, before servicing and cleaning them, and when changing accessories (such as blades, bits, and cutters).
- Safety guards on tools must remain installed while the tool is in use and must be promptly replaced after repair or maintenance has been performed.
- Store tools properly in a place where they will not be damaged or come in contact with hazardous materials.
- If a cordless tool is connected to its recharge unit, both pieces of equipment must conform strictly with electrical standards and manufacturer's specifications.
- Tools used in an explosive environment must be rated for work in that environment (that is, intrinsically safe, spark-proof).
- When using a knife or blade tool, stroke or cut away from the body with a smooth motion. Be careful not to use excessive force that could damage the tool, the material being cut or unprotected hands.

Working with manual and pistol-grip hand tools may involve highly repetitive movement, extended elevation, constrained postures, and/or awkward positioning of body members (for example, hand, wrist, arm, shoulder, neck, etc.). Consider alternative tool designs, improved posture, the selection of appropriate materials, changing work organization, and sequencing to prevent muscular, skeletal, repetitive motion, and cumulative trauma stressors.

9.7.21.1 Knife Use

Knives (fixed/utility) shall not be used. If it is demonstrated that a knife is the right tool for the job, this plan will be amended and the activity that knife use will be used for shall be reviewed. An AHA shall also be developed to address hazards and subsequent controls, PPE, and training.

9.7.21.2 Knife Use

Knives (fixed/utility) shall not be used. If it is demonstrated that a knife is the right tool for the job, this plan will be amended and the activity that knife use will be used for shall be reviewed. An AHA shall also be developed to address hazards and subsequent controls, PPE, and training.

9.7.21.3 Responsibilities

- Supervisors with assistance from the SSHO are responsible for funding and ensuring the correct tool is being used, employees wear the proper PPE when using knives, and they have reviewed this policy.
- Employees are responsible for having and utilizing the proper PPE while performing an activity requiring the use of a knife. Employees are also responsible for understanding the proper use of a knife.

9.7.21.4 Glove Requirements

- In general, Kevlar cut resistant gloves are to be worn when using a knife in an occupational setting.
- Other types of gloves may be required and will be identified within the AHA / written procedure. Example - Leather gloves may be worn when using the acetate sleeve cutter.

9.7.21.5 Standard Control Measures for Knife Use

- All employees that will use a knife must be trained or have experience with the proper use of a knife, prior to using it.
- When using a knife or blade tool, stroke or cut away from the body with a smooth motion. Be careful not to use excessive force that could damage the tool, the material being cut, or unprotected hands.
- When using a knife always cut away from yourself.
- Many tasks using a utility knife require a knife edge but not a sharp point. For these tasks you can add protection against puncture wounds by using a rounded-tip blade.
- If you use a folding knife, it must be a locking blade type.
- Never use a knife that will fold under pressure.
- If you use a fixed blade knife, make sure there is a handle guard to keep your hand from slipping forward. Also, make sure the handle is dry and non- greasy/slippery to assure a better grip.
- When cutting, make the force of the cut carry the blade away from any part of your body. If you have a peculiar situation where this is not possible, protect yourself with a leather apron, or other material placed between you and the blade. Consider putting the material to be cut in a vise, or other holding device.
- If you carry a fixed blade knife, use a sheath or holder.
- Store utility knives safely, retract the blade or sheath an open blade before storing. Never, leave a knife with the blade exposed on the floor, on a pallet, on a work surface, or in a drawer or cabinet.

- Keep your knife sharp. A dull blade requires you to use more force to cut, and consequently increases the risk of slip or mistake.
- Knives used on the job, but not carried with you, must be properly stored when not in use.
- Never use a defective knife.
- Utility knife blades must be used, recognize that they are brittle and can snap easily. Don't bend them or apply side loads to them by using them to open cans or pry loose objects. Use the knife only to cut. It was not designed to work as a pry bar, screw driver, hole punch, and other assorted things that make it seem so easy.
- Stay focused on the cutting job. It only takes a second of inattention with a sharp blade to produce a serious cut. Letting the mind wander or talking with others while using a knife greatly increases the risk of an accident and injury. If you are interrupted while working with a knife, stop cutting, retract the blade, and place the knife down on a secure surface before dealing with the interruption. You should never continue cutting while distracted! As always, utilize the hierarchy of controls and first attempt to engineer out the hazard and frequently ask ourselves do we have the right tool for the job.

9.7.21.6 Examples of Preferred Tools and Kevlar Cut Resistant Gloves

A safety spring provides for automatic blade shoot-back into the handle when contact with cutting surface is lost.

9.7.22 Haul Trucks

It is anticipated that haul trucks will be used for the delivery of empty waste containers used to store generated waste material and debris generated during the execution of the task order or for the pick-up of full containers of waste material/debris upon the completion of the project. When haul trucks are used in this manner, the following work practices shall be implemented.

- All haul trucks must follow the designated for the project site project. At this time it is anticipated that the project haul route details will be the route identified on Figure 9-1, Evacuation Route Map.
- Haul truck operators should be familiar with their equipment and inspect all equipment before use.
- Haul truck operators shall not be allowed to raise the haul chassis underneath or within 10′ of overhead utilities. Depending on the voltage of the overhead utilities, more separation may be required. Refer to the Electrical Safety section of this APP for specific separation distances from overhead electrical utilities.
- Haul truck operators should ensure all persons are clear before operating trucks or equipment. Before moving, operators should sound horn or alarm. All equipment should be equipped with an operational backing alarm.
- Haul trucks or equipment with restricted visibility should be equipped with devices that eliminate blind spots.
- Employees should stay off haul roads. When approaching a haul area, employees should make eye contact and communicate their intentions directly with the equipment operator.
- Where haul truck operators must exit the truck within the site boundary, the driver must be in the same level of PPE as other site personnel.
- If possible, minimize steep grades on haul roads.
- Where grades are steep, provide signs indicating the actual grade as well as measures for a runaway truck.

9.7.23 Heavy Equipment

(Reference SOP # HSE&Q 306, Earth Moving Equipment)

Small heavy earthmoving equipment (track excavator, skid steer etc.) will be used to complete this TO. When heavy equipment is used on the project, the following work procedures shall be exercised by AGVIQ personnel who may be designated to operate or supervise the operation of site heavy equipment.

- AGVIQ authorizes only those employees qualified by training or previous experience to operate heavy equipment.
- Equipment must be checked at the beginning of each shift to ensure the equipment is in safe operating condition and free of apparent damage. The check should include service brakes, parking brakes, emergency brakes, tires, horn, back-up alarm, steering mechanism, coupling devices, seat belts, and operating controls. All defects will be corrected before the equipment is placed in service.
- Documentation of this inspection must be maintained onsite at all times.
- Refer to the Earthmoving Equipment Inspection Form
- Equipment must be on a stable foundation such as solid ground or cribbing; outriggers are to be fully extended.
- Seat belts shall be used by all personnel operating AGVIQ equipment.
- Equipment must not be used to lift personnel; loads must not be lifted over the heads of personnel.
- Equipment, or parts thereof, which are suspended must be substantially blocked or cribbed to prevent shifting before personnel are permitted to work under or between them. All controls will be in a neutral position, with the motors stopped and brakes set.
- Equipment that is operating in reverse must have a reverse signal alarm distinguishable from the surrounding noise or a signal person when the operator's view is obstructed.
- When equipment is used near energized power lines, the closest part of the equipment must be at least 10 feet from power lines <50 kV. Check the electric safety section of this APP for separation distances when working adjacent to overhead energized power lines in excess of 50 kVA person must be designated to observe clearances and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means. All overhead power lines must be considered energized until the electrical utility authorities indicate that it is not an energized line and it has been visibly grounded.
- Underground utility lines must be located before excavation begins. See "Procedures for Locating Buried Utilities" contained in this APP for additional information.
- Operators loading/unloading from vehicles are responsible for seeing that vehicle drivers are in the vehicle cab or in a safe area.
- The parking brake will be set whenever equipment is parked; wheels must be chocked when parked on inclines.

- When heavy equipment is not in operation, the blade/bucket must be blocked or grounded; the master clutch must be disengaged when the operator leaves the cab. When equipment is unattended, power must be shut off, brakes set, blades/buckets landed, and shift lever in neutral.

9.7.24 Land Clearing Operations

(Reserved)

9.7.25 Manual Lifting

(Reference SOP # HSE&Q 112, Manual Lifting)

Manual lifting is likely to occur during many phases of the project, but especially during mobilization and demobilization events and during the installation of erosion and sediment control features. Personnel executing assigned tasks where manual lifting is required should use the following procedures to help reduce the potential for personal injury.

- AGVIQ personnel should notify supervisors or designated safety representatives of pre-existing medical conditions that may be aggravated or re-injured by lifting activities, such that AGVIQ may evaluate safe operational procedures with regard to the required task.
- Proper lifting techniques (use of knees and not back) must be used when lifting any object.
- Plan storage and staging to minimize lifting or carrying distances.
- Use drum dollies/carts with a latching mechanism when handling full/loaded drums. Avoid "chimming" drums wherever possible.
- Split heavy loads into smaller loads.
- Use mechanical lifting aids whenever possible.
- Have someone assist with the lift— especially for heavy (>40 pounds) or awkward loads. Note: If AGVIQ personnel are not capable of lifting 40 lbs., seek assistance from a team member to split the load.
- Make sure the path of travel is clear prior to the lift.

9.7.26 Noise

(Reference SOP # HSE&Q 108, Hearing Conservation Program)

Unprotected exposure to excessive noise levels may lead to gradual and permanent hearing loss. The greater the intensity of a noise and the longer a person is exposed to the noise, the greater the chance of hearing loss. A hearing loss can be permanent or temporary. After certain noise exposures, a person may experience a temporary threshold shift (hearing loss) that results in the inability to hear certain sounds. The ability to hear will usually return. However, repeated or intense noise exposure can prevent this recovery, resulting in permanent hearing loss.

Employee hearing conservation is particularly important when working around haul trucks or during the operation of electric rotary, impact or reciprocating powered hand tools.

Each employee is responsible for the following:

- Notify the site supervisor or SSHO of high-noise-level areas.
- Wear hearing protection when required.
- Complete noise training and audiometric testing (as required).
- Hearing protection is required in work environments exceeding 85 decibels (dB).
- Hearing protection will be worn when operations occur within or adjacent to high-noise sources (i.e., potentially exceeding 85 dB).

9.7.27 Pressure Washing Operations

Pressure washing operations are anticipated. Whenever pressure washing operations are performed at the site, the following procedures must be implemented.

- Rain gear (disposal coated chemical suits for HAZWOPER operations), 16-inch-high, steel-toed rubber boots, safety glasses, hard hat with face shield, and inner and outer nitrile gloves should be worn, at a minimum during pressure washing operations.
- Only trained, authorized personnel may operate the high-pressure washer.
- Rinse waste from pressure washing operations must be collected and properly disposed.
- Follow manufacturer's safety and operating instructions.
- Inspect pressure washer before use and confirm dead man switch fully operational.
- The wand must always be pointed at the work area.
- The trigger should never be tied down.
- Never point the wand at yourself or another worker.
- The wand must be at least 42 inches from the trigger to the tip.
- The operator must maintain good footing.
- Non-operators must remain a safe distance from the operator.
- No unauthorized attachment may be made to the unit.
- Do not modify the pressure washer wand.
- All leaking or malfunctioning equipment must be repaired immediately or the unit taken out-of-service.
- Capture, containerize and label all fluids during decontamination operations for proper transportation and disposal.

9.7.28 Sample Handling

Sampling and sample handling are a component of this task order. Proper work practices and procedures to be followed during these activities include:

- Skin contact with water, soil, sediment or debris of undetermined chemical characterization shall be avoided at all times.

- PPE and Air Monitoring requirements shall be executed in accordance with this APP to minimize potential dermal and respiratory exposures to identified site contaminants of concern while conducting sample collection or characterization of potentially contaminated media (soil, water, drilling fluids/cuttings, PPE, soil vapor, etc.). In addition, good personal hygiene practices and procedures must be maintained of this APP).
- Sample only labeled drums/container whose content is known. Unknown drums or containers that show evidence of excessive buckling/bulging, corrosion, vapors, crystallization, unusual discoloration or other abnormalities may not be sampled without the evaluation of engineering controls, proper PPE, air monitoring equipment and the use of properly trained personnel familiar with the sampling of unknown drum contents.
- Sample drums/containers without leaning over the drum/container opening.
- Transfer the content of container being sampled using a method that minimizes contact with material.
- PPE and Air Monitoring requirements shall be executed in accordance with this APP in an effort to minimize potential dermal and respiratory exposures to identified site contaminants of concern. In addition, good personal hygiene practices and procedures must be maintained.
- Spill-containment procedures specified in Section 9.2.5 must be appropriate for the material to be handled.
- Caution should be exercised when filling bottles containing acid or base preservatives. Both liquid and vapor phases of acid can cause severe burns.
- Following sample collection, sample container lids should be tightened securely to prevent any leaks, and the containers should be rinsed with clean water to ensure that they are free of chemical constituents. Sample activities, sample collection, and equipment decontamination procedures.

9.7.29 Slips, Trips, and Falls

Slip, trip and fall hazards exist in virtually ALL work environments. Even though slip, trip and fall hazards are typically thought of as posing low risk to workers, they account for a large percentage of worker injuries. As such, workers should be exercise caution about becoming complacent to recognizing and removing slip, trip and fall hazard from designated work areas. To eliminate slip, trip and fall hazards from the work place the following should be implemented.

- Walk or climb only on equipment and/or surfaces designed for personnel access.
- Maintain three points of contact when climbing or working from ladders.
- Observe and avoid areas of unprotected holes, ramps, and ground penetrations or protrusions (stumps, roots, holes curbs, utility structures etc.). If these conditions cannot be corrected, mark these hazards (i.e., high visibility pant, traffic cones etc.) so that workers may recognize and avoid them.

- Employees walking in ditches, uneven surfaces, swales and other drainage structures adjacent to roads, across undeveloped land or in controlled industrial work/process areas must use caution to prevent slips and falls, which can result in twisted or sprained ankles, knees, and backs.
- Whenever possible work from areas which have flat, stable surfaces and do not enter steep sided ditches/excavations.
- Sturdy, hard toe boots that provide sufficient ankle support shall be used on AGVIQ project site.

9.7.30 Stairways and Ladders

(Reference SOP # HSE&Q 214, Stairways and Ladders)

(Reserved)

9.7.31 Munitions and Explosives of Concern

(Reference SOP # HSE&Q 610, Explosives Usage and Munitions Response)

(Reserved)

9.7.32 Vehicular Traffic (Exposure to)

(Reference SOP # HSE&Q 216, Traffic Control)

All the sites will have vehicular traffic in close proximity to them. The information provided below is intended to provide standard work practices that must be exercised when personnel are working in or around traffic or around haul truck routes or as general requirements for vehicle operation while on Department of Defense (DoD) facilities.

- When parking your vehicle, park in a manner that will allow for safe exit from vehicle, and where practicable, park vehicle so it can serve as a barrier.
- Shut off and secure site vehicles prior to exiting them. Park on level ground where possible. If parking on an incline, engage parking brake. If the vehicle has a manual transmission, ensure the transmission is in gear (not neutral) and the parking brake is engaged before exiting the vehicle.
- Exercise caution when exiting traveled way or parking along street— avoid sudden stops, use flashers, etc.
- All staff working adjacent to traveled way or within work area must wear reflective/high-visibility safety vests.
- Eye protection should be worn to protect from flying debris.
- Remain aware of factors that influence traffic-related hazards and required controls— sun glare, rain, wind, limited sight-distance, hills, etc.
- Always remain aware of an escape route, such as behind an established barrier or parked vehicle.
- Always pay attention to moving traffic – never assume drivers are looking out for you.

- Work as far from traveled way as possible to avoid creating confusion for drivers.
- When workers must face away from a haul truck to perform assigned duties, a buddy system should be used, where one worker is looking toward traffic.
- Work area should be protected by a physical barrier.
- Lookouts should be used when physical barriers are not available or practical.

In addition to the above work practices, AGVIQ personnel and AGVIQ subcontractors shall adhere to the following procedures while operating motor vehicles or other motorized equipment on military/government facilities.

- Always use a seat belt while driving on military/government controlled facilities.
- Always observe posted speed limits, traffic signs and signals.
- Never use a cell phone or two-way radio while driving on military/government controlled facilities.

Violating these requirements may result in loss of military/government facility driving privileges.

9.7.33 Visible Lighting

Site work should be performed during daylight hours whenever possible. Work conducted during hours of darkness (including dusk and dawn) requires the set-up of supplemental lighting equipment. (Note: A general rule of thumb is that the illumination intensity must be sufficient to read a newspaper without difficulty). At this time, it is thought that no work executed under this task order will be performed at night. If work is to be performed at night, a night operations lighting plan shall be developed to ensure that all activities are completed safely. Although it is not anticipated that work executed under this task order will be performed during dusk, dawn or night time periods, the chart below provides a reference for illumination requirements for various construction related work environments.

Illumination (Foot Candles)	Illumination (Lux)	Area of Operation
5	~ 55	General construction area lighting
3	~ 33	General construction areas, concrete placement, excavation and waste areas, access ways, active storage areas, loading platforms, refueling, and field maintenance areas
5	~ 55	Indoors: warehouses, corridors, hallways, and exit ways
5	~ 55	Tunnels, shafts, and general underground work areas: (Exception: minimum of 10 foot-candles is required at tunnel and shaft heading during drilling, mucking, and scaling. Bureau of Mines approved caplights shall be acceptable for use in the tunnel heading)
10	~ 108	General construction plant and shops (e.g., batch plants, screening plants, mechanical and electrical equipment rooms, carpenter shops, rigging lofts and active store rooms, mess halls and indoor toilets and workrooms.)
30	~ 323	First aid stations, infirmaries, and offices

Notes:

A **foot candle** is a unit of illumination on a surface that is everywhere one foot from a point source of one candle.
A **lux** is a unit of measurement of the intensity of light. It is equal to the illumination of a surface 1 meter away from a single candle.

CONVERSIONS

Foot Candles (FC) = Lux x .0929

Lux = Foot candles x 10.76 - (i.e., 50 FC = 538 LUX)

The following safe work practices shall be considered with regard to lighting in the workplace.

- Do not enter poorly lit areas without first providing portable illumination.
- Do not use non-explosion proof lighting in areas of flammable or combustible gases or liquids.

9.7.34 Working Alone

(Reserved)

No site personnel will be allowed to work alone on this project, although certain elements of this project will consist of one staff member working on site with subcontractor personnel to oversee activities.

9.7.35 Working Around Material Handling Equipment

The operation of material handling equipment will be an integral component to the completion of the remedial objectives for the project and it is important to observe the following measures when working in the same areas as heavy equipment and haul trucks.

- Never approach operating equipment/vehicles from the rear. Always make positive contact with the operator, and confirm that the operator has stopped the motion of the equipment.
- Never approach the side of operating equipment; remain outside of the swing and turning radius.
- Maintain distance from pinch points of operating equipment/vehicles.
- Never turn your back on any operating equipment/vehicles.
- Never climb onto operating equipment or operate subcontractor/client equipment/vehicles.
- Never ride equipment/vehicles unless authorized to do so and unless it is designed to accommodate passengers (equipped with firmly attached passenger seat).
- Never work or walk under a suspended load.
- Never use equipment as a personnel lift; do not ride excavator buckets, crane hook, or material handling equipment forks.
- Always stay alert and maintain a safe distance from operating equipment, especially equipment/vehicles on cross slopes and unstable terrain.

- Suspended loads will not pass over workers at any time.
- Site personnel are prohibited from passing under suspended loads.

9.7.35.1 Rigging

SOP # HSE&Q 316, Rigging

(Reserved)

It is not anticipated that the use of rigging will be required to execute this TO.

9.7.35.2 Powered Industrial Trucks

(Reference HSE-309, Forklifts)

(Reserved)

It is not anticipated that the use of Powered Industrial trucks will be used on this TO.

9.7.36 Working On or Over Water

(Reserved)

No site personnel shall be working on or over water during the execution of this TO.

9.8 Hazard Communication Program

A hard copy of the AGVIQ Hazard Communication program information and Material Safety Data Sheet (MSDS) material shall be provided at the project site.

In general, the site supervisor or SSHO will be the main contact in any onsite emergency coordination or communication situation and will ensure offsite emergency agencies have been contacted prior to the start of and verify that emergency contact numbers contained in this APP are accurate/operational work. The site supervisor or SSHO will communicate with all potential emergency response organizations that would respond to an onsite emergency condition. In the event that during an emergency situation, the primary site supervisor or SSHO is not available or not capable of performing this function, an alternate site supervisor or SSHO or Site Supervisor can fulfill these duties. The site supervisor or SSHO or designee will serve as the Hazard Communication Coordinator, and will perform the following:

- Review the COCs and other applicable hazard communication information contained this APP.
- Request or confirm locations of MSDSs from the client, contractors, and subcontractors or material vendors for chemicals to which AGVIQ employees are potentially exposed. Maintain MSDSs in this APP (**Attachment 6**).
- Complete an inventory of chemicals brought onsite. See **Attachment 7** of this APP. Give employees required chemical-specific Hazard Communication (HAZCOM) training information using the format included in **Attachment 7** of this APP.
- Confirm that an inventory of chemicals brought onsite is available.
- Prior to, or as chemicals arrive onsite, obtain an MSDS for each hazardous chemical.

- Label chemical containers with the identity of the chemical and with hazard warnings, and store properly.
- Store all materials properly, giving consideration to compatibility, quantity limits, secondary containment, fire prevention, and environmental conditions.

9.8.1 Shipping and Transportation of Chemical Products

Chemicals brought to the site might be defined as hazardous materials by the DOT. All staff who ship the materials or transport them by road must receive training in shipping dangerous goods. All hazardous materials that are shipped (e.g., via Federal Express) or are transported by road must be properly identified, labeled, packed, and documented by trained staff. Contact the AGVIQ Project Manager and program regulatory specialist for additional information.

9.9 Process Safety Management

(Reserved)

The requirements of EM 385 1-1, Section 06.B.04 are not applicable to this TO.

9.10 Lead Abatement Plan

(Reserved)

The requirements of EM 385 1-1, Section 06.B.05 are not applicable to this TO.

9.11 Asbestos Abatement Plan

(Reserved)

It is not anticipated to encounter asbestos for this TO.

9.12 Radiation Safety Program

(Reserved)

There are no expected radiological hazards associated with the execution of this task order.

9.13 Abrasive Blasting

(Reserved)

There are no abrasive blasting operations associated with the execution of this task order.

9.14 Heat/Cold Stress Monitoring Program

9.14.1 Heat Stress Monitoring and Prevention

Because the work may be performed during periods where high ambient air temperatures could be prevalent, there is a potential for the development of heat stress related disorders. Workers should be aware of necessary procedures to prevent heat related disorders, be cognizant of the signs and systems that indicate heat related disorders are occurring and

know when first aid or medical treatment may be required to treat heat related disorders. The following information is provided as procedural information to monitor and prevent heat related injuries to site workers, while performing assigned tasks.

- It is recommended that personnel drink 16 ounces of water before beginning work. Water maintained at 50°F to 60°F shall be available. Under severe conditions, drink one to two cups every 20 minutes, for a total of 1 to 2 gallons per day. Do not use alcohol in place of water or other non-alcoholic fluids. Decrease your intake of coffee and caffeinated soft drinks during working hours.
- Acclimate yourself by slowly increasing workloads.
- Use cooling devices, such as cooling vests, to aid natural body ventilation.
- Use mobile showers or hose-down facilities to reduce body temperature and cool protective clothing.
- Conduct field activities in the early morning or evening and rotate shifts of workers, if possible.
- Whenever possible, avoid direct sun, which can decrease physical efficiency and increase the probability of heat stress. Take regular breaks in a cool, shaded area. Use a wide-brim hat or an umbrella when working under direct sun for extended periods.
- Provide adequate shelter/shade to protect personnel against radiant heat (sun, flames, hot metal).
- Maintain good hygiene standards by frequently changing clothing and showering.
- Observe one another for signs of heat stress. Persons who experience signs of heat syncope, heat rash, or heat cramps should consult the SSHO to avoid progression of heat-related illness.
- To counteract the onset of heat stress symptoms, a work-break regimen must be established during the executed work.

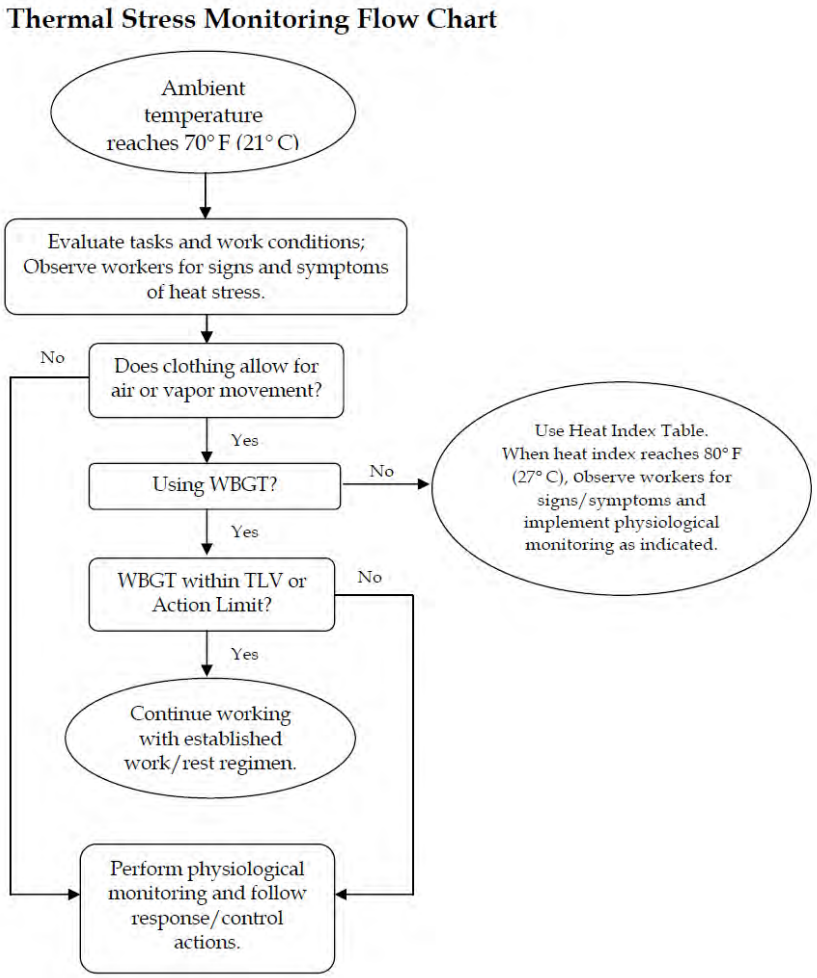
  For employees in permeable work clothing, Wet Bulb Globe Temperature (WBGT) Index or physiological monitoring shall be conducted and work/rest regimens established.

SYMPTOMS AND TREATMENT OF HEAT STRESS					
	Heat Syncope	**Heat Rash**	**Heat Cramps**	**Heat Exhaustion**	**Heat Stroke**
Signs and Symptoms	Sluggishness or fainting while standing erect or immobile in heat.	Profuse tiny raised red blister-like vesicles on affected areas, along with prickling sensations during heat exposure.	Painful spasms in muscles used during work (arms, legs, or abdomen); onset during or after work hours.	Fatigue, nausea, headache, giddiness; skin clammy and moist; complexion pale, muddy, or flushed; may faint on standing; rapid steady pulse and low blood pressure; oral temperature normal or low	Red, hot, dry skin; dizziness; confusion; rapid breathing and pulse; high oral temperature (104°F or above).
Treatment	Remove to cooler area. Remove outer impermeable protective clothing. Rest victim lying down in supine position (on back,	Remove to cooler area. Remove outer impermeable protective clothing. Remove to cooler area. Remove outer impermeable	Remove to cooler area. Remove outer impermeable protective Rest victim lying down in supine position (on back, facing up)	Remove to cooler area. Rest victim lying down in supine position (on back, facing up) with head shoulders slightly	Remove to cooler area. Rest victim lying down in supine position (on back, facing up) with head shoulders slightly elevated. Where effected person is

SYMPTOMS AND TREATMENT OF HEAT STRESS					
	facing up) with head shoulders slightly elevated. Increase fluid intake. Recovery usually is prompt and complete. Where effected person is conscious, have them loosen their clothing to promote cooling surface between clothing/body.	protective clothing. Rest victim lying down in supine position (on back, facing up) with head shoulders slightly elevated. Use mild drying lotions and powders, and keep skin clean for drying skin and preventing infection. Where effected person is conscious, have them loosen their clothing to promote cooling surface between clothing/body.	with head shoulders slightly elevated. Increase fluid intake. Where effected person is conscious, have them loosen their clothing to promote cooling surface between clothing/body.	elevated. Administer fluids by mouth. Seek medical attention immediately. Where effected person is conscious, have them loosen their clothing to promote cooling surface between clothing/body.	conscious, have them loosen their clothing to promote cooling surface between clothing/body. Call ambulance, and get medical attention immediately! Provide sips of cool water to if fully conscious and not nauseous or vomiting. Cool rapidly by soaking clothing in cool–but not cold–water. This procedure shall only be performed where directed by someone with medical training/ licensure (i.e., EMT, physician) and only as a lifesaving precaution. Evaluate employee's condition by an occupational physician prior to resuming normal assigned duties.

9.14.2 Monitoring Heat Stress

Thermal Stress Monitoring



Thermal Stress Monitoring – Permeable or Impermeable Clothing

When permeable work clothes are worn (street clothes or clothing ensembles over street clothes), regularly observe workers for signs and symptoms of heat stress and implement physiological monitoring as indicated below. This should start when the heat index reaches 80° F (27°C) [see Heat Index Table below], or sooner if workers exhibit symptoms of heat stress indicated in the table above. These heat index values were devised for shady, light wind conditions; exposure to full sunshine can increase the values by up to 15°F (8°C). Also, strong winds, particularly with very hot, dry air, can be extremely hazardous.

When wearing **impermeable clothing** (e.g., clothing doesn't allow for air or water vapor movement such as Tyvek), physiological monitoring as described below shall be conducted when the ambient temperature reaches 70° F (21° C) or at a lower temperature when workers begin to exhibit signs and symptoms of heat stress.

Heat Index	Possible Heat Disorders	Minimum Frequency of Physiological Monitoring
80°F - 90°F (27°C - 32°C)	Fatigue possible with prolonged exposure and/or physical activity	Observe Workers for signs of heat stress and implement physiological monitoring if warranted.
90°F - 105°F (32°C - 41°C)	Sunstroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity	Every 2 hours, or sooner, if signs of heat stress are observed.
105°F - 130°F (41°C - 54°C)	Sunstroke, heat cramps, or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity.	Every 60 minutes or sooner if signs of heat stress are observed.
130°F or Higher (54°C or Higher)	Heat/Sunstroke highly likely with continued exposure.	Every 30 minutes or sooner if signs of heat stress are observed.
Source: National Weather Service		

Procedures for when Heat Illness Symptoms are experienced:

- **Always** contact the SSHO when any heat illness related symptom is experienced so that controls can be evaluated and modified, if needed.
- In the case of cramps, reduce activity, increase fluid intake, move to shade until recovered.
- In the case of heat stroke symptoms, call 911, have a designee give location and directions to ambulance service if needed, follow precautions under the emergency medical treatment of this HSP.

9.14.3 Cold Stress Monitoring and Prevention

Be aware of the symptoms of cold-related disorders, and wear proper, layered clothing for the anticipated fieldwork. Appropriate rain/foul weather gear is a must in cool/cold weather, especially where precipitation events are occurring.

Consider monitoring the work conditions and adjusting the work schedule using guidelines developed by the U.S. Army (wind-chill index) and the National Safety Council (NSC).

Wind-chill index is used to estimate the combined effect of wind and low air temperatures on exposed skin. The wind-chill index does not take into account the body part that is exposed, the level of activity, or the amount or type of clothing worn. For those reasons, it should only be used as a guideline to warn workers when they are in a situation that can cause cold-related illnesses.

NSC Guidelines for Work and Warm-Up Schedules can be used with the wind-chill index to estimate work and warm-up schedules for fieldwork. The guidelines are not absolute; workers should be monitored for symptoms of cold-related illnesses. If symptoms are not observed, the work duration can be increased.

Wind Chill Chart

Wind (mph) \ Temperature (°F)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5		36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10		34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15		32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20		30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25		29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30		28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35		28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40		27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45		26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50		26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55		25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60		25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

- Persons who experience initial signs of immersion foot, frostbite, hypothermia should consult the SHSO to avoid progression of cold-related illness.
- Observe one another for initial signs of cold-related disorders.
- Obtain and review weather forecast— be aware of predicted weather systems along with sudden drops in temperature, increase in winds, and precipitation.

SYMPTOMS AND TREATMENT OF COLD STRESS			
	Immersion (Trench) Foot	Frostbite	Hypothermia
Signs and Symptoms	Feet discolored and painful; infection and swelling present.	Blanched, white, waxy skin, but tissue resilient; tissue cold and pale.	Shivering, apathy, sleepiness; rapid drop in body temperature; glassy stare; slow pulse; slow respiration.
Treatment	Seek medical treatment immediately.	Remove victim to a warm place. Re-warm area quickly in warm–but not hot water. Have victim drink warm fluids, but not coffee or alcohol. Do not break blisters. Elevate the injured area, and get medical attention.	Remove victim to a warm place. Have victim drink warm fluids, but not coffee or alcohol. Get medical attention.

9.15 Crystalline Silica Monitoring Plan

(Reserved)

Exposures to crystalline silica are not anticipated during the execution of this project.

9.16 Night Operations Lighting Plan

(Reserved)

At this time, no work executed under this task order will be performed at night. If work is to be performed at night, a night operations lighting plan shall be developed to ensure that all activities.

9.17 Fire Prevention Plan

Fire prevention shall be conducted in accordance with the information identified in Section 9.7.17 of the APP, Health and Safety Hazard Control Program - Fire Prevention.

9.18 Wild Land Fire Management Plan

(Reserved)

The requirements of EM 385 1-1, 09.K are not applicable to this task order.

9.19 Hazardous Energy Control Plan

(Reserved)

At this time, there are no anticipated situations where the components of a hazardous energy control (HEC) program would be required to be implemented during the execution of this task order.

9.20 Critical Lift Plan

(Reserved)

No cranes will be utilized during the execution of this task order.

9.21 Contingency for Severe Weather Plan

Generally, only personnel and vehicles will need to be demobilized from the site in the event a severe weather event was expected. Drums of generated waste that may be generated as part of ongoing work will be secured by being strapped together. For the executable work associated with this task order, the adverse weather procedures identified in section 9.7.1 Adverse Weather of this APP should be sufficient for the work.

9.22 Float Plan

(Reserved)

The requirements of EM 385 1-1, 19.F.04 are not applicable to this TO.

9.23 Site Specific Fall Protection and Prevention Plan

(Reserved)

There are no anticipated significant fall protection hazards under the requirements of EM 385 1-1 Section 21.A that must be addressed by this APP.

9.24 Demolition Plan

(Reserved)

Demolition activities will not be performed during the execution of this TO.

Excavation/Trenching Plan

(Reserved)

9.25 Emergency Rescue (Tunneling)

(Reserved)

No tunneling will be performed during the execution of this TO.

9.26 Underground Construction Fire Prevention and Protection Plan

(Reserved)

No underground construction that could cause a fire will be performed during the execution of this TO.

9.27 Compressed Air Plan

(Reserved)

The requirements of 26.I.01 are not applicable to this TO.

9.28 Formwork Shoring and Removal Plan

(Reserved)

The requirements of EM 385 1-1, Section 27 Concrete, Masonry, Steel Erection, and Residential Construction are not applicable to this TO.

9.29 Precast Concrete Plan

(Reserved)

The requirements of EM 385 1-1, Section 27 Concrete, Masonry, Steel Erection, and Residential Construction are not applicable to this TO.

9.30 Lift Slab Plans

(Reserved)

The requirements of EM 385 1-1, Section 27 Concrete, Masonry, Steel Erection, and Residential Construction are not applicable to this TO.

9.31 Steel Erection Plans

(Reserved)

The requirements of EM 385 1-1, Section 27 Concrete, Masonry, Steel Erection, and Residential Construction are not applicable to this TO.

9.32 Site Safety and Health Plan of HRTW

A Site Specific Safety and Health Plan addressing the requirements of section 28.B of EM 385 1-1 is located in **Attachment 1** (SSHP) of this APP.

9.33 Blasting Safety Plan

(Reserved)

No blasting operations will be conducted during the execution of this TO.

9.34 Diving Plan

(Reserved)

No diving operations will be conducted during the execution of this TO.

9.35 Confined Space Program

(Reference SOP # HSE&Q 203, Confined Space)

(Reserved)

10.0 Risk Management Process

AGVIQ utilizes a BBLPS to support the implementation of our RMP by identifying, analyzing and controlling certain risks (or liabilities) that may be encountered during the execution of its assigned projects. The BBLPS is a system to prevent or reduce losses using behavior-based tools and proven management techniques to focus on behaviors or acts that could lead to losses.

The basic loss prevention tools that will be used to implement the BBLPS on this project include:

- Activity Hazard Analysis (AHA)
- Pre-Task Safety Plans (PTSP)
- Loss Prevention Observations (LPO)
- Loss and Near Loss Investigations (L/NLI)
- Drug Free Workplace Program (DFWP)

The Project Manager and site superintendent are responsible for implementing the BBLPS on the project site. These personnel typically delegate authority to the SSHO for the project specific implementation of the BBLPS, but the Project Manager and Site Superintendent/Supervisor or Field Team Leader remains accountable for its implementation.

In an effort to provide a safe and healthy workplace for all program participants, AGVIQ promotes and implements a DFWP. AGVIQ personnel must participate in and adhere to the requirements of the DFWP.

10.1 Activity Hazard Analysis

One of the key elements in executing the BBLPS, and subsequently reducing project risk, is the use of an AHA for each major phase of work. An AHA defines the activity being performed, the hazards posed, and control measures required to perform the work safely. Workers are briefed on the AHA before doing the work and their input is solicited before, during, and after the performance of work to further identify the hazards posed and control measures required. Details of our AHA process and Completed AHAs can be found in Section 1.3 and Attachment 1 of the SSHP.

10.2 Pre-Task Safety Plans

Daily safety meetings are held with all designated project site personnel in attendance in order to review the potential hazards that may be associated with daily work assignments, reevaluate required H&S procedures or information presented in task specific AHAs. The purpose of these daily meetings is to set-forth various hazard control measures or policies and procedures which must be implemented by project staff to facilitate the reduction or elimination of work place incidents that could be associated with the scheduled work.

The topics developed and delivered during each production day are documented on a PTSP.

At the start of each day's activities, the site supervisor, SSHO or other qualified and designated person completes the PTSP, provided in Attachment 8, with input from the work crew, during their regular daily safety meeting. The day's tasks, personnel, tools, and equipment that will be used to perform these tasks are listed, along with the hazards posed and required H&S procedures, as identified in the AHA. The use of PTSPs better promotes worker participation in the hazard recognition and control process, while reinforcing the task-specific hazard and required H&S procedures with the crew each day.

After the delivery of each PTSP, all personnel in attendance at the daily safety meeting shall acknowledge the delivered material with the addition of their printed name, signature and date that the material was delivered to them on the last page of the form. These completed PTSPs shall be kept onsite in a neat and organized manner for review by management or project Owner, as deemed necessary.

The use of safety meetings via the use of a PTSP or other similar format is a common safety practice in the construction industry.

10.3 Loss Prevention Observations

LPOs are a tool to be used by management, site supervisor the SSHO to determine whether workplace behaviors, acts and conditions are consistent or not consistent with established health and safety procedures, site specific APP requirements, or other established safety standards. An LPO may also be completed by individual work crew members to initiate a necessary corrective action, to identify a work crew members positive performance or contribution or undesirable act that would endanger the employee or other co-workers. Completion of the LPO provides a mechanism for management to reinforce positive actions for work practices performed correctly, while also identifying and eliminating work procedures, site conditions, or behaviors that could result in eventual losses.

At a minimum, at least one LPO each week for tasks/operations addressed in the project-specific APP or AHA will be completed by the AGVIQ site supervisor or SSHO to compare the actual work process against established work procedures identified in the project-specific APP and AHAs. The LPO form in **Attachment 9** will be used for this process.

10.3.1 Deficiency Tracking System

On NAVFAC contracts where adherence to the USACE EM 385-1-1, Safety and Health Requirements Manual is required in addition to OSHA regulations, the site supervisor is responsible for ensuring that the a Deficiency Tracking System or log is maintained. The deficiency tracking system is used to identify and monitor the status of safety and health deficiencies observed at the project-specific location, in chronological order. The deficiency tracking system includes the following information:

- Date deficiency identified
- Description of deficiency
- Name of person responsible for correcting deficiency
- Projected resolution date
- Date actually resolved

The deficiency tracking system or log is posted on a project bulletin board or other conspicuous place commonly accessed by project or facility personnel, updated daily, and available for review by the NAVFAC POCs or by AGVIQ Project Management, Senior Management or Health and Safety Representatives. At project or facility sites where the use of a Deficiency Tracking System is required, this log supplements the LPO process.

At the end of the project, or when facility operations are completed, hard copies of the deficiency tracking system data or logs are included in the final record.

10.4 Loss/Near-Loss Investigations

L/NLIs are detailed in Section 8.0 Accident Reporting and Investigation of this APP and will not be further elaborated upon in this section.

10.5 Drug-Free Workplace Program

AGVIQ does not tolerate illegal drugs, or any use of drugs, controlled substances, or alcohol that impairs an employees work performance or behavior. AGVIQ has established a policy that its employees and subcontractors will not be involved in any manner with the unlawful manufacture, distribution, dispensation, possession, sale, or use of illegal drugs in the workplace. The use or possession of alcohol in the workplace is also prohibited. Any violation of these prohibitions may result in discipline or immediate discharge.

Attachment 1
Site Safety and Health Plan

Site Safety and Health Plan

Enhanced Bioremediation – OU3, Areas F and G
Naval Air Station Jacksonville
Jacksonville, Florida

Revision No. 00

Contract No. N62470-12-D-7004
Contract Task Order No. JM19

Submitted to:

U.S. Naval Facilities Engineering Command
Southeast

Prepared by:

June 2014
Revision No. 00

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1 Completed AHAs

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Acronyms and Abbreviations

AHA	Activity Hazard Analysis
APP	Accident Prevention Plan
BBLPS	Behavior Based Loss Prevention System
CBRNE	Chemical, Biological, Nuclear, Radiological, Explosive
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
COC	Chemicals of Concern
CRZ	Contamination Reduction Zone
DFOW	Definable Feature of Work
DFWP	Drug Free Workplace Program
EMS	Emergency Medical Services
EZ	Exclusion Zone
GDA	Government Designated Authority
HAZWOPER	Hazardous Waste Operations and Emergency Response
H&S	Health and Safety
HS&E	Health, Safety, and Environment
HSPA	Health and Safety Program Administrator
HTRW	Hazardous, Toxic, and Radioactive Waste
LLC	Limited Liability Company
mg/m^3	milligrams per cubic meter
OEL	Occupational Exposure Limit
OSHA	Occupational Safety and Health Administration
PAHs	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
PEL	Permissible Exposure Limit (OSHA)
PPE	Personal Protective Equipment
ppm	Parts per million
PTSP	Pre-Task Safety Plan
RAC	Risk Assessment Code
SBRAC	Small Business Remedial Action Contract
SOH	Safety and Occupational Health
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SZ	Support Zone
TO	Task Order
TSD	Treatment, Storage, and Disposal
WZ	Work Zone

1.0 Site Safety and Health Plan of Hazardous, Toxic, and Radioactive Waste (HTRW) Work (28.B)

1.1 Occupational Safety and Health Hazards with Site Clean-up 28.B.01.a

Several occupational physical hazards are associated with the execution of this Task Order (TO) and are as follows:

- Contact with site chemicals of concern (COCs) on the surface and subsurface during sampling activities
- Physical hazards associated with slips, trips, and falls or manual lifting
- Physical hazards associated with heavy equipment operations
- Physical hazards associated with elevated remedial system decommissioning work

All site work shall be performed in accordance with the project Accident Prevention Plan (APP) and this Site Safety and Health Plan (SSHP). In accordance with the allowance of EM 385 1-1, Section 28.B.02 "*general information adequately covered in the APP (introduction, site background, SOH organization and lines of authority, general site control and layout and general site safety procedures, logs, reports and inspections) need not be duplicated.*" Health and safety hazard control measures policies and procedures, and means and methods or other information presented throughout this APP that sufficiently addresses the requirements of EM 385 1-1, Section 28.B.02 will not be further elaborated upon in this SSHP.

1.2 Site Description and Contamination Characterization 28.B.02.a

A site description for the project site is provided in Section 2.0 "Background Information" of the APP and will not be further elaborated upon in this section of the SSHP. Information on all potential site COCs is listed below in Table 1-1. Only potential contaminants with listed occupational exposure limits are listed.

TABLE 1-1
Site Chemicals of Concern

Contaminant	Location and Maximum[a] Concentration	Exposure Limit[b]	IDLH[c]	Symptoms and Effects of Exposure	PIP[d] (eV)
Benzene	GW: 6.8 UG/L	0.5 ppm	500 Ca	Eye, nose, skin, and respiratory irritation; headache; nausea; dermatitis; fatigue; giddiness; staggered gait; bone marrow depression	9.24
1,1-Dichloroethane	GW: 224 UG/L	100 ppm	3,000	CNS depression, skin irritation; liver, kidney, and lung damage	11.06
1,2-Dichloroethane (Ethylene Dichloride)	GW: 20 UG/L	1 ppm	50 Ca	CNS depression, nausea, vomiting, dermatitis, eye irritation, liver, kidney, and CNS damage; corneal opacity	11.05
Trichloroethylene (TCE)	GW: 3,740	10 ppm	1,000 Ca	Headache, vertigo, visual disturbance, eye and skin irritation, fatigue, giddiness, tremors, sleepiness, nausea, vomiting, dermatitis, cardiac arrhythmia, paresthesia, liver injury	9.45
Vinyl Chloride	GW: 38.8 UG/L	1 ppm	NL Ca	Weakness, abdominal pain, gastrointestinal bleeding, enlarged liver, pallor or cyanosis of extremities	9.99

Footnotes:

[a] Specify sample-designation and media: SB (Soil Boring), A (Air), D (Drums), GW (Groundwater), L (Lagoon), TK (Tank), SS (Surface Soil), SL (Sludge), SW (Surface Water).
[b] Appropriate value of permissible exposure limit (PEL), recommended exposure limit (REL), or threshold limit value (TLV) listed.
[c] IDLH = immediately dangerous to life and health (units are the same as specified "Exposure Limit" units for that contaminant); NL = No limit found in reference materials; CA = Potential occupational carcinogen.
[d] PIP = photoionization potential; NA = Not applicable; UK = Unknown.

eV = electron volt
mg/kg = milligram per kilogram
mg/m^3 = milligrams per cubic meter
ug/m^3 = micrograms per cubic meter

Potential Routes of Exposure		
Dermal: Contact with contaminated media. This route of exposure is minimized through use of engineering controls, administrative controls and proper use of PPE.	**Inhalation:** Vapors and contaminated particulates. This route of exposure is minimized through use of engineering controls, administrative controls and proper use of respiratory protection when other forms of control do not reduce the potential for exposure.	**Other:** Inadvertent ingestion of contaminated media. This route should not present a concern if good hygiene practices are followed (e.g., wash hands and face before drinking or smoking).

1.2.1 Chemical, Biological Radiological, or Nuclear Hazards and Controls

Hazards	Controls
Not Applicable	Not Applicable

1.2.2 Potential Routes of COC Exposure

Dermal: Contact with contaminated media (soil, used Personal Protective Equipment (PPE), or heavy equipment impacted by COCs). This route of exposure is minimized through proper use of PPE, as specified in Section 9.33.7.

Inhalation: Airborne particulates impacted by COCs. This route of exposure is minimized through proper dust control, respiratory protection and air monitoring, as specified in Sections 9.33.7 and 9.33.8, respectively.

Other:

Inadvertent ingestion of contaminated media: This route should not present a concern if good hygiene practices are followed (e.g., wash hands/face before eating, drinking, or smoking).

Inadvertent injection of contaminated media: This route should not present a concern unless a puncture of contaminated PPE were to occur, which resulted in breaking the employees skin and the resulting wound was impacted by contaminated media.

1.3 Hazard/Risk Analysis 28.B.02.b

A health and safety risk analysis (Table 1-2) has been performed for each task. In the order listed below, the Health and Safety Program Administrator (HSPA) considers the various methods for mitigating the hazards.

Employees are trained on this hierarchy of controls during their hazardous waste training and reminded of them throughout the execution of projects:

- Elimination of the hazards (use remote sampling methodology to avoid going into a confined space)
- Substitution (reduce exposure to vapors by use of a geoprobe instead of test pitting)
- Engineering controls (ventilate a confined space to improve air quality)
- Warnings (establish exclusion zones to keep untrained people away from hazardous waste work)
- Administrative controls (implement a work-rest schedule to reduce chance of heat stress)
- Use of PPE (use of respirators when action levels are exceeded)

The hazard controls and safe work practices are summarized in the following sections of this APP/SSHP:

- General hazards and controls
- Project-specific hazards and controls
- Physical hazards and controls
- Biological hazards and controls
- Chemicals of concern

Potential Hazard	Site Mobilization and Demobilization	Site Survey Utility Locate	Groundwater/ Soil Sampling	Installation of monitoring wells	Treatment of Plumes
Adverse Weather	X	X	X	X	X
Air Compressors					
Asbestos					
Biological	X	X	X	X	X
Buried Utilities		X			
Chainsaws/ Brushcutters					
Chemical Hazard: Dermal / Inhalation			X		
Compressed Gas Cylinders					
Concrete and Masonry				X	
Confined Space					
Cranes & Rigging					
Cutting/Cuts& Abrasions	X	X	X	X	X
Demolition/Dismantling					
Electrical Safety					
Drilling			X		
Excavations					
Fire/Explosion Hazards	X	X	X	X	X
Fire Prevention	X	X	X	X	X
Hand & Power Tools		X		X	
Haul Truck Operations	X	X			
Heat Stress/Cold Stress	X	X	X	X	X
Heavy Equipment					
Housekeeping	X	X	X	X	X
Ladders & Stairs					
Lockout /Tagout					
Manual Lifting	X			X	
Mechanical Guarding Hazards					
Material Handling Hazards					
MEC/MPPEH					
Noise					
Pinch/Struck by	X	X	X	X	X
Pressure Washing					X
Pressurized Lines/ Equipment					
Sampling			X	X	
Slips/Trips/Falls	X	X	X	X	X
Spill Prevention	X	X	X	X	X
Suspended Loads					
Vehicle Traffic	X	X	X	X	X
Visible Lighting					
Welding/ cutting					
Working Alone					

1.3.1 Activity Hazard Analysis

An Activity Hazard Analysis (AHA) must be developed for each AGVIQ job activity. The AHA shall define the work tasks required to perform each activity, along with potential Health, Safety, and Environment (HS&E) hazards and recommended control measures for each hazard. In addition, a listing of the equipment to be used to perform the activity, inspection requirements to be performed and training requirements for the safe operation of the equipment listed must be identified. Workers are briefed on the AHA before performing the work and their input is solicited prior, during, and after the performance of work to further identify the hazards posed and control measures required. The AHA shall identify the work tasks required to perform each activity, along with potential HSE hazards and recommended control measures for each hazard.

Hazard controls, applicable AGVIQ core standards, and SOPs should be used as a basis for preparing AHAs. AHAs prepared for AGVIQ activities are included as Attachment 1 to this SSHP.

1.3.2 Subcontractor Activity Hazard Analysis

AGVIQ subcontractors are required to provide AHAs specific to their scope of work on the project for acceptance by AGVIQ. Each subcontractor shall submit AHAs for their field activities, as defined in their scope of work, along with their project-specific safety plan and procedures. Additions or changes in field activities, equipment, tools, or material used to perform work or hazards not addressed in existing AHAs requires either a new AHA to be prepared or an existing AHA to be revised.

1.4 Staff Organization, Qualifications, and Responsibilities 28.B.02.c

Staff organization, qualifications and responsibilities is identified in Section 4.0 “Responsibilities and Lines of Authority” and Section 6.0 “Training” of the APP and will not be elaborated upon further in this section.

Qualifications of key site personnel must be provided to the government designated authority (GDA), under separate cover for review well in advance

1.4.1 Training, General and Project-Specific 28.B.02.d

General and project specific training is identified in Section 6.0 “Training” of the APP and will not be elaborated upon further in this section.

1.5 Medical Surveillance 28.B.02.f

Site worker medical surveillance requirements is identified in Section 6.0 “Training” of the APP and will not be further elaborated upon in this section of the SSHP.

1.6 Personal Protective Equipment and Exposure Monitoring 28.B.02.e

(Reference SOP HSE-117, *Personal Protective Equipment*)

Where site workers are engaged in the excavation, handling of soil, or dust particles impacted by potential site COCs, the use of worker PPE in addition to the other hazard control measures presented in this APP is required for the duration of the task (see task schedule in Work Plan). The proper use of PPE is essential to ensure personnel safety. All site workers will be trained on the proper fitting, use, donning and doffing procedures, limits of use, and inspection, maintenance, cleaning, and storage requirements. The SSHO shall perform an inspection of the use of PPE to ensure the continued effectiveness of this program.

- PPE must be worn by employees when actual or potential hazards exist and engineering controls or administrative practices cannot adequately control those hazards.
- A PPE assessment has been conducted by the HSPA based on project tasks (see PPE specifications below). Verification and certification of assigned PPE by task is completed by the HSPA or designee.
- The use of PPE adds physical stress (heat/cold stress) to the wearer. Follow procedures in Section 9.14 of the APP to reduce these hazards.
- Employees must be trained to properly wear and maintain the PPE.
- In work areas where actual or potential hazards are present at any time, PPE must be worn by employees working or walking through the area.
- Areas requiring PPE should be posted or employees must be informed of the requirements in an equivalent manner.
- PPE must be inspected prior to use and after any occurrence to identify any deterioration or damage.
- PPE must be maintained in a clean and reliable condition.
- Damaged PPE shall not be used and must either be repaired or discarded.
- PPE shall not be modified, tampered with, or repaired beyond routine maintenance.
- If a task other than the tasks described in this table needs to be performed, contact the HSPA so this table can be updated.

Table 1-3 below outlines PPE to be used according to task based on project-specific hazard assessment. If a task other than the tasks described in this table needs to be performed, contact the HSPA so this table can be updated.

1.7 Exposure Monitoring/Air Sampling 28.B.02.g

(Reference SOP HSE-207, Exposure Monitoring for Airborne Chemical Hazards)

Required monitoring is listed in Table 1-4 below. When performing site monitoring, record all the information, such as in a field logbook. Note date and time, describe monitoring location (for example, in breathing zone, at source and site location), and what the reading is. If any action levels are reached, note it in the field logbook and note the action taken.

TABLE 1-3 Personal Protective Equipment Requirements[a]

Task	Level	Body	Head	Respirator [b]
• Mobilization • Survey/Utility Locate • Demobilization	D	• Designated and appropriate work clothes • Steel toe work boots that provide sufficient ankle support • Work gloves (cut resistant), reflective safety vest, chainsaw chaps, and snake guards • Reflective traffic vest	• Hardhat [c] • Safety glasses • Hearing protection (as applicable) [d]	• None required
Any function identified in this APP where potential dermal contact with site COCs is limited to the hands only. • Ground water/Soil sampling • Monitoring well abandonment • Treatment of Plumes	Modified D1	• Designated and appropriate work clothes; • Steel toe work boots that provide sufficient ankle support (preferable leather) • Work gloves (cut resistant) • Reflective safety vest; • Inner surgical-style nitrile and outer chemical resistant nitrile gloves.	• Hardhat [c] • Safety glasses • Ear protection (as applicable) [d] • Face shields (as applicable)	None required.
Any function identified in this APP where potential dermal contact with site COCs is **NOT** limited to the hands only.	Modified D2	• Coveralls: Poly coated or uncoated Tyvek® chemical resistant disposable coveralls. Poly coated will be used for exposure to liquid chemicals or other dangerous splash hazards. • Boots: Hard toe work boots that provide sufficient ankle support (preferable leather); with outer rubber boot covers or hard toe chemically resistant rubber boots with steel shank • Gloves: Inner and Outer surgical-style nitrile chemical-resistant nitrile gloves.	• Hardhat [c] • Safety glasses (non chemical injections) • Ear protection (as applicable) • Face shields and goggles (as applicable)	None required.
Any function identified in this APP where inhalation of carbon fiber or site COCs above action levels is a potential. • Site conditions where defined Action Levels are exceeded and confirmed by AGVIQ program CIH that Level C PPE is required to ensure a negative exposure to site workers.	C	• Coveralls: Tyvek® • Boots: Steel-toe, chemical-resistant boots OR steel-toe leather work boots with outer rubber boot covers • Gloves: Inner surgical-style nitrile and outer chemical resistant nitrile gloves.	• Hardhat [c] • Ear protection (as applicable) • Spectacle inserts (as applicab	Air Purifying, full face re with, GME/ P100 cartrid equivalent.[e]

Reasons for Upgrading or Downgrading Level of Protection

Upgrade[f]	Downgrade
• Request from individual performing tasks. • Change in work tasks that will increase contact or potential contact with hazardous materials. • Occurrence or likely occurrence of gas or vapor emission. • Known or suspected presence of dermal hazards. • Instrument action levels exceeded (when implemented).	• New information indicating that situation is less hazardous than originally thought. • Change in site conditions that decrease the hazard. • Change in work task that will reduce contact with hazardous materials.

[a] Modifications are as indicated. AGVIQ will provide PPE only to AGVIQ employees.
[b] No facial hair that would interfere with respirator fit is permitted.
[c] Hardhat and splash-shield areas are to be determined by the SSHO.
[d] Ear protection should be worn when conversations cannot be held at distances of 3 feet or less without shouting.
[e] Cartridge change-out schedule is at least every 8 hours (or one work day), except if relative humidity is > 85%, or if organic vapor measurements are > midpoint of Level C range --then at least every 4 hours.
If encountered conditions are different than those anticipated in this APP, contact the HSPA/CIH. Where AGVIQ personnel are required to use a respirator to provide respiratory protection, AGVIQ personnel shall receive respiratory protection awareness training. Contact the Program CIH to receive this training, prior to using any respiratory protective device.
[f] Performing a task that requires an upgrade to a higher level of protection (e.g., Level D to Level D modified/Level C) is permitted only when the PPE requirements have been approved by the HSPA/CIH, and an SSHO qualified at that level is present.

TABLE 1-4 Air Monitoring Requirements

Instrument	Tasks	Action Levels[a]	Level of Protection/ Response Action	Frequency [b]	Calibration [c]
PID: MultiRAE or equivalent (10.6 eV lamp) **Or** **FID**	• Groundwater/soil sampling • Monitoring well abandonment • Treatment of Plumes	< 0.5 ppm (above background) (in worker BZ)	Level D, Modified D and continue work.	• Initially and periodically during the execution of activities where PID/FID monitoring is required. • Any activity where free phase product is observed/encountered during the execution site activities. • Continuously upon re-start of any ceased work to verify PID/FID readings are below Action Levels in worker BZ.	Daily
		0.5-5 ppm (above background) (sustained 5 minutes in worker BZ)	Begin compound specific air monitoring for Benzene (as described below). If Benzene is not present continue in Modified Level D and continue work up to 5 ppm.		
		> 0.5 ppm with Benzene present (above background, sustained 5 minutes in worker BZ)	Stop work. Evacuate area for 10 minutes and recheck BZ and work area. If levels persist, consult Program RHSM for additional engineering and/or administrative controls and PPE upgrade requirements.		
		>5 ppm (above background, sustained 5 minutes in worker BZ)	Stop work. Evacuate area for 10 minutes and recheck BZ and work area. If levels persist, consult Program RHSM for additional engineering and/or administrative controls and PPE upgrade requirements.		
Draeger Chip Measurement System (CMS) Benzene = Chip # 64 06030	• Groundwater/soil sampling • Treatment of Plumes	See action levels above	Follow actions above for PID/FID monitoring	Where the PID/FID action level is exceeded.	Not applicable
Dust Monitor: Visual	• All Tasks	No visible dust	Level D	Continuously during sampling	Not applicable
		Visible dust	Reduce dust producing activities, if dust continues stop work and contact RHSM		

[an] Action levels apply to sustained breathing-zone measurements, above background.
[b] The exact frequency of monitoring depends on field conditions and is to be determined by the SSHO; generally, every 5 to 15 minutes is acceptable; more frequently may be appropriate. Monitoring results shall be recorded in the Air Monitoring Log contained in Attachment 4 of APP and included in the final project record. Documentation shall include instrument and calibration information, time, measurement results, personnel/area monitored, and place/location where measurement is taken (e.g., "Breathing Zone/MW-3", "at surface/SB-2", etc.).
[c] Note: Worker calibration results for air monitoring equipment must also be logged on an Air Monitoring Log (See Attachment 4 of APP).

TABLE 1-5 Air Monitoring Equipment Calibration Requirements

(Refer to the respective manufacturer's instructions for proper instrument-maintenance procedures)

Instrument	Gas	Span	Reading	Method
PID: MiniRAE, 10.6 eV bulb	100 ppm isobutylene	CF = 100	100 ppm	0.5 lpm reg

Calibrate air monitoring equipment daily (or prior to use) in accordance with the instrument's instructions. Document the calibration in the field logbook (or equivalent) and include the following information:

- Instrument name
- Serial Number
- Owner of instrument (for example, Pine Environmental, HAZCO)
- Calibration gas (including type and lot number)
- Type of regulator (for example, 1.5 lpm)
- Type of tubing (for example, direct or T-tubing)
- Ambient weather condition (for example, temperature and wind direction)
- Calibration/instrument readings
- Operator's name and signature
- Date and time

Exposure records (air sampling) must be preserved for the duration of employment plus 30 ears. Ensure that copies of the field logbook are maintained in the project file.

Copies of all project exposure records (e.g., copies of field logbook pages where air monitoring readings are recorded and associated calibration) shall be maintained in the project files.

An exposure assessment has been conducted by the HSPA and reviewed by the Certified Industrial Hygienist (CIH) based on project tasks. Below is the required air monitoring required to be performed during the completion of this TO.

1.8 Heat and Cold Stress 28.B.02.h

The procedures for heat and cold stress monitoring are presented in Section 9.14 "Heat and Cold Stress Monitoring Program" of the APP and will not be further elaborated upon in this section of the SSHP.

1.9 Standard Operating Safety Procedures, Engineering Controls, and Work Practices 28.B.02.i

1.9.1.1 Site Rules and Prohibitions 28.B.02.i(1)

Site rules and prohibitions and requirements are defined by the sections identified below and will not be further elaborated upon in this section of this SSHP.

Section 8.0 of the APP	Accident Reporting and Investigation
Section 9.2 of the APP	Emergency Response Plans
Section 9.7 of the APP	Health Hazard Control Program
Section 1.12 of the SSHP	Site Control Measures
Section 10.5 of the APP	Drug Free Work Place Program

1.10 Work Permit Requirements 28.B.02.i(2)

Any work permit requirements necessary to execute the assigned work is identified in Section 7.1 "External Inspections/Certifications" of the APP and will not be further elaborated upon in this section of the SSHP.

1.11 Material Handling Procedures 28.B.02.i(3)

Hazard Control Measures for haul truck activities, rigging and working around material handling equipment are included in Section 9.7 "Health and Safety Hazard Control Program" of the APP and will not be further elaborated upon in this SSHP.

1.12 Drum, Container, Tank Handling 28.B.02.i(4)

(NA)

1.13 Comprehensive AHA of Treatment Technologies 28.B.02.i(5) (NA)

1.14 Site Control Measures – General 28.B.02.j

Access to the site will be limited to only those authorized personnel designated to work at the site. Site workers and visitors shall sign-in and sign-out as they enter and exit the site work boundaries (see Attachment 4 of APP). In addition to these procedures, the following measures shall be implemented as general site control processes.

- Project managers and team leaders are to:
  - Evaluate and ensure worker safety in remote/secluded work areas
  - Confirm if potentially dangerous activities could be occurring in or adjacent to any AGVIQ work areas that may jeopardize worker health and safety
  - Reschedule field activities when potentially dangerous activities are not occurring adjacent to AGVIQ work locations. Ensure proper two communications with workers in remote work areas. Utilize buddy system.
- Evaluate and ensure worker safety in remote/secluded work areas.
- Confirm if potentially dangerous activities could be occurring in or adjacent to any AGVIQ work areas that may jeopardize worker health and safety.
- Reschedule field activities when potentially dangerous activities are occurring adjacent to AGVIQ work locations. Ensure proper two-way communications with workers in remote work areas.
- Establish and maintain the "Buddy System."
- Designate an emergency evacuation route (see Figure 9-1 of the APP).
- Designate an evacuation assembly area.

- Topics for briefing on site safety: Review the site Accident Prevention, site-specific hazards, locations of work zones, site contaminants, PPE and air requirements, equipment, special procedures, emergencies.
- The SSHO records safety briefing attendance in a logbook and documents the topics discussed.
- Ensure that applicable AGVIQ personnel have received the behavior based loss prevention system (BBLPS) training.
- Be aware of any potential for hazardous chemical exposure and know what precaution/training is required.
- Establish support and work zones. Delineate with flags or cones as appropriate. Support zone should be in an area absent of construction hazards. Use access control at entry and exit from each work zone.
- Know how an emergency should be reported.
- Identify exact facility location and position (where possible) when contacting Emergency Medical System (EMS)/Fire Dispatch.
- Have readily available copy of the Hospital Route Map.
- Establish onsite communication consisting of the following:
  - Line-of-sight and hand signals
  - Air horn
  - Two-way radio or cellular telephone if available
- Establish offsite communication.
- Know how, what, when injuries/accidents are reported and treated.

The site supervisor, SSHO or other authorized designee is to conduct periodic inspections of work practices and site conditions to determine the effectiveness of this plan. Such inspections should identify site conditions or actions that are not consistent with the policies and procedures of the Health and Safety (H&S) program, report to the AGVIQ Project Manager (overall) and the AGVIQ CIH or Health and Safety Program Administrator (HSPA). The project team shall develop and implement corrective action procedures in a timely manner.

1.14.1 Site Control Measures

To prevent both exposure of unprotected personnel and migration of potential contamination, work areas and personal protective equipment requirements will be clearly identified. This APP recommends that the area surrounding each of the work areas be divided into three (3) distinct zones; the exclusion zone (EZ), the contamination reduction zone (CRZ), and the support zone (SZ).

Only individuals who meet the requirements of 29 CFR 1910.120/29 CFR1926.65 and who are authorized by AGVIQ for site operations or the SSHO shall be allowed entry into the EZ and CRZ. Suitable means and methods (high visibility fencing, caution tape signage, traffic cones, traffic delineators or other physical barriers) shall be employed to demarcate the EZ and CRZ

boundaries at this site to prevent unauthorized entry into these controlled work zones. A CRZ for decontamination shall be established adjacent to the EZ. The SZ shall be kept free from contamination.

A typical EZ/CRZ/SZ representation is illustrated in Section 1.15 "Personal Hygiene and Decontamination" of this APP.

1.14.2 Exclusion Zone

An EZ will be constructed to surround each work area where the greatest potential for worker exposure to potential site COCs or other recognized hazards may exist. The EZ may need to be transient as the work progresses, depending upon the type of work that is being executed. Because of potential site space limitations, the exclusion zone fencing may also include any available "permanent" perimeter fencing or other established physical barriers. Note that the term "permanent" is often used to describe the outer limits (or perimeter) of a work site or designated site area. Other temporary barriers (i.e., caution tape, high visibility construction fencing); maybe used to supplement existing permanent barriers to demarcate the EZ to identify the restricted access. Access to the EZ will be restricted to personnel wearing the prescribed level of protective equipment and meeting the training and medical criteria of this plan.

1.14.3 Contamination Reduction Zone

Each CRZ zone should be established as a clearly marked corridor between the EZ and the SZ in which tools and equipment are decontaminated and personnel can don, doff and dispose of and/or decontaminate PPE. The CRZ for each area will be located immediately adjacent to the EZ. This area should also demarcated/identified from support areas with yellow tape, high visibility construction fencing or other suitable barriers.

The CRZ is where personnel will begin the sequential decontamination process when exiting the EZ. To prevent cross contamination and for accountability purposes, all personnel must enter and leave the EZ through the CRZ.

Contaminated personnel tools and equipment will exit the EZ directly to the CRZ. Each CRZ will contain a constructed decontamination stations for personnel and equipment. If possible, the CRZ will be located upwind of each EZ, however due to site constraints this may not be possible. Temporary support zones for each work area will be located adjacent to the CRZs.

1.14.4 Support Zone

Temporary support zones and staging areas will be established at the entrance of each control area. Potable water, an eye wash, and first aid supplies will be located at each temporary support zone. No hazardous or potentially hazardous materials will be allowed in the support zone unless it is in a properly labeled container that has no external contamination. Eating, drinking and smoking will only be allowed in this area, at designated locations.

1.14.5 HAZWOPER Compliance Plan

Certain parts of the site work are covered by state or federal Hazardous Waste Operations and Emergency Response (HAZWOPER) standards and therefore require training and medical monitoring. Anticipated HAZWOPER tasks (Section 2.3 of the APP) might occur consecutively or concurrently with respect to non-HAZWOPER tasks. This section outlines procedures to be

followed when approved activities specified in Section 2.3 of this APP do not require 24- or 40-hour training. Non-HAZWOPER-trained personnel also must be trained in accordance with all other state and federal Occupational Safety and Health Administration (OSHA) requirements.

- In many cases, air sampling, in addition to real-time monitoring, must confirm that there is no exposure to vapors, particulates, or mist before non-HAZWOPER-trained personnel are allowed on the site, or while non-HAZWOPER-trained staff are working in proximity to HAZWOPER designated activities. Other data (e.g., soil) also must document that there is no potential for exposure. The Program CIH must approve the interpretation of these data.
- When non-HAZWOPER-trained personnel are at risk of exposure, the site Supervisor or SSHO must post the exclusion zone and inform non-HAZWOPER-trained personnel of the:
  - Nature of the existing contamination and its locations
  - Limitations of their access
  - Emergency action plan for the site
- Periodic air monitoring with direct-reading instruments conducted during regulated tasks also should be used to ensure that non-HAZWOPER-trained personnel (e.g., in an adjacent area) are not exposed to airborne contaminated media.

When exposure is possible, non-HAZWOPER-trained personnel must be removed from the site until it can be demonstrated that there is no longer a potential for exposure to health and safety hazards.

1.15 Personal Hygiene and Decontamination 28.B.02.k

Regardless of whether a CRZ or other decontamination zones must be established to ensure proper decontamination or personnel or equipment, established procedures must be adhered to ensure that direct and indirect worker contact with COCs or hazardous materials does not occur. This is generally achieved by workers adhering to good personal hygiene practices. These practices include but are not limited to the following:

- Eating, drinking, smoking, and tobacco use shall only be conducted in designated areas and not in areas where there is any exposure to hazardous material/waste, flammable/combustible liquids and gases may exist.
- Wash hands and face before eating, drinking, smoking or using tobacco and at the end of the work-shift.
- Shower as soon as feasible after completing field activities.

The site supervisor or SSHO shall establish areas for eating, drinking, and smoking at the site so that incident exposure to site COCs does not possibly occur.

1.15.1 General Decontamination Specifications

When the establishment of an EZ and CRZ is required, the site supervisor or SSHO must establish and monitor the decontamination procedures and their effectiveness. Decontamination procedures found to be ineffective will be modified by site supervisor or SSHO. The site supervisor or SSHO must ensure that procedures are established for disposing of materials generated on the site. Where the establishment of EZ(s) or CRZ(s) are required on the site, the

use of contact lenses are not permitted in exclusion or decontamination zones. For this project, the use of Modified Level D2 PPE may or may not be required, depending on the actual site conditions that are encountered and whether direct contact with material is needed to execute site operations. If it is determined that the establishment of decontamination coordinators (i.e. EZ/CRZ) are needed, and respirator cleaning stations will be warranted, than it is essential for workers to maintain good positive personal hygiene practices and proper containerization, labeling, storage, disposal and overall management of spent disposable PPE. Where the establishment of an EZ and CRZ decontamination corridors are required the detail below identifies a typical worker/equipment decontamination sequence. Figure 1-1, below, graphically represents personnel and equipment decontamination processes.

FIGURE 1-1 Typical Decontamination Process

Personnel	Sample Equipment	Heavy Equipment
– Boot wash/rinse – Glove wash/rinse – Outer-glove removal – Body-suit removal – Inner-glove removal – Respirator removal – Hand wash/rinse – Face wash/rinse – Shower ASAP – Collect, properly containerize, label and dispose of all spent PPE – Collect, properly containerize, label and dispose of all spent decontamination fluid contain for offsite disposal **(Do not dispose of spent PPE or similar waste in government disposal receptacles.)**	– Wash/rinse equipment – Solvent-rinse equipment – Contain solvent waste for offsite disposal – Collect, properly containerize, label and dispose of all spent decontamination fluid and residual solids for offsite disposal	– Power wash – Steam clean – Collect, properly containerize, label and dispose of all spent decontamination fluid or residual solids

Work Area - Set up appropriately based on wind direction

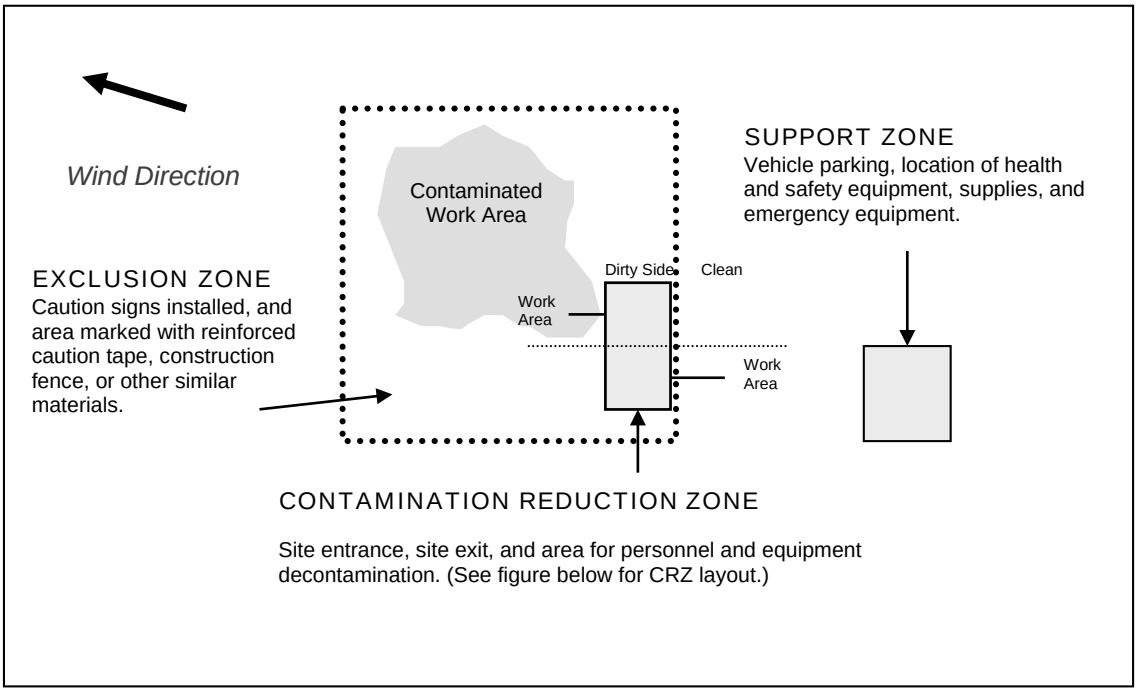
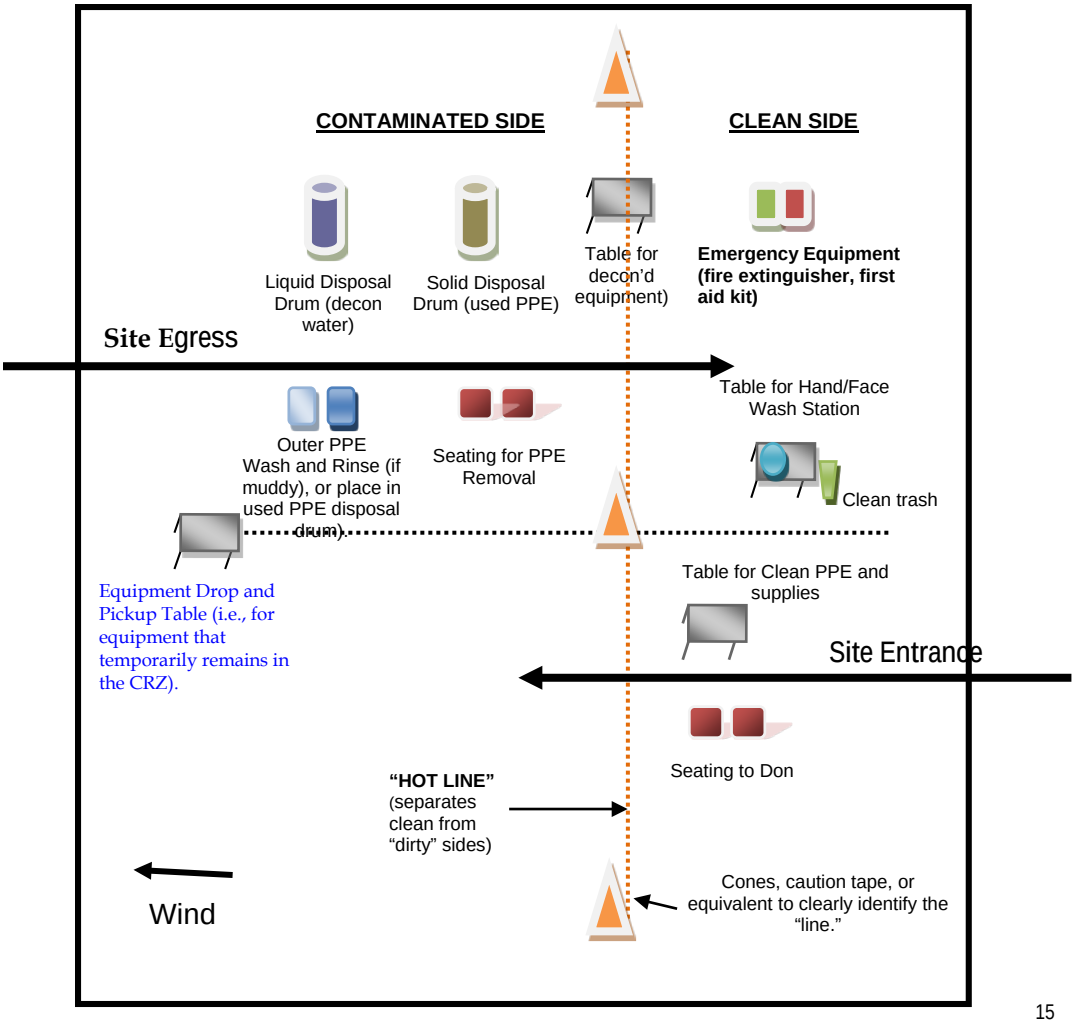


Figure 1-1. Typical Contamination Reduction Zone



1.16 Equipment Decontamination 28.B.02.l

The sequence and location of equipment decontamination is defined by Section 1.2.10.1 and Figure 1-1, Decontamination Procedure. Procedures for establishment of site control zones, such as EZ or CRZ, as related to equipment decontamination processes are defined in Section 1.14 of this SSHP.

1.17 Emergency Equipment and First Aid 28.B.02.m

The requirements for emergency preparedness, equipment and supplies are provided in Section 9.2 "Emergency Response Plans" of the APP and will not be elaborated upon further in this SSHP.

1.17.1 Emergency Response and Contingency Procedures 28.B.02.n

The requirements for emergency preparedness, equipment and supplies are provided in Section 9.2 "Emergency Response Plans" of the APP and will not be elaborated upon further in this SSHP.

1.17.1.1 Pre-Emergency Planning 28.B.02.n(1)

The requirements for emergency response and contingency procedures are provided in Section 9.2 "Emergency Response Plans" of the APP and will not be elaborated upon The requirements for pre-emergency planning are provided in Section 9.2 "Emergency Response Plans" of the APP and will not be elaborated upon further in this SSHP.

1.17.1.2 Personnel and Lines of Authority - Emergency Situations 28.B.02.n(2)

Personnel and lines of authority for both chain of command and emergency situations are included in Section 4.0 "Responsibilities and Lines of Authority" of the APP and will not be elaborated upon further in this SSHP.

1.17.1.3 Criteria and Procedures for Emergency Recognition and Site Evacuation 28.B.02.n(3)

Procedures of emergency recognition and site evacuation are outline in Section 9.2 "Emergency Response Plans" of the APP and will not be elaborated upon further in this SSHP.

1.17.1.4 Decontamination and Medical Treatment of Injured Personnel 28.B.02.n(4)

In the event a worker in an EZ needs medical assistance primary consideration must be given to remove all site contaminants before transfer of the employee to an uncontaminated area or atmosphere or before being handled by untrained/protected medical response personnel.

Decontamination of personnel exposed to site COCs should be decontaminated as quickly as possible via the following procedures:

- After removal from the contaminated area, the exposed individual(s) will be decontaminated by washing the contaminated areas with appropriate decontamination solutions and flushing with potable water. In particular, direct skin (dermal) contact must be addressed via decontamination with soapy water. Decontamination operations must be performed as quickly as possible, as time is off the essence in emergency medical situations. Field team personnel shall utilize

disposable PPE wherever possible to promote rapid decontamination of personnel in the EZ.

- If a respirator is used in the EZ, the respirator mask is left on the exposed individual until decontamination has been completed unless it has been determined that areas of the face were contaminated and the mask must be removed to decontaminate.
- After decontamination, the contaminated clothing is removed and skin contamination washed away. If possible, decontamination is completed before the exposure individual is taken to a medical facility.
- ONLY potable water will be used when flushing the eyes or mouth.
- All receptacles used for containing protective clothing shall be equipped with lids that can be closed to prevent the release of contaminants and the introduction of rainfall.
- Initiate first aid and CPR, upon completion of decontamination operations.
- Make certain that the injured person is accompanied to the emergency room.
- When contacting the medical consultant, give your name and telephone number, the name of the injured person, the extent of the injury or exposure, and the name and location of the medical facility where the injured person was taken.
- Report incident as outlined in Section 8.0 "Accident Reporting and Investigation" of the APP.
- A map showing the route to the local hospital is shown on Figure 9-2 of the APP and will not be reproduced in this SSHP.

1.17.2 Route Map to Emergency Medical Facilities 28.B.02.n(5)

The route map to area emergency medical facilities is provided by Figure 9-2 of Section 9.2.9 "Medical Support" of the APP and need not be reproduced in this SSHP.

1.17.3 Criteria for Alerting Medical Facilities 28.B.02.n(6)

There are no specific or unusual hazards [i.e. Chemical, Biological, Radiological, Nuclear, Explosive (CBRNE)] that requires notification to area responders prior to the start of site operations. Any unanticipated medical, fire or security issue that may result during the execution of this

1.17.4 Responsibilities 28.C

The responsibilities for HAZWOPER regulated activities will be the same as for non-HAWOPER regulated activities. Both project level and AGVIQ program level responsibilities for all operations are included in Section 4.0 "Responsibilities and Lines of Authority" of the APP and will not be further elaborated upon in this SSHP.

1.17.5 Training 28.D

All training requirements for this project are discussed in Section 6.0 "Training" of the APP and will not be elaborated upon further in this SSHP.

1.17.6 Medical Surveillance 28.E

All worker surveillance requirements for this project are discussed in Section 6.0 "Training" of this APP and will not be elaborated upon further in this SSHP.

1.17.7 Resource Conservation and Recovery Act (RCRA) TSD Facilities 28.F

N/A

The criteria of EM 385 1-1, Section 28 are not applicable to the site operations nor are Treatment, Storage and Disposal (TSD) facility conditions under the requirements of 40 CFR 264/265 applicable to this project.

1.17.8 Facility/Construction Project Emergency Response 28.G

Facility/construction project emergency response emergency procedures are outlined in Section 9.2 "Emergency Response Plans" of the APP and will not be elaborated upon further in this SSHP.

Attachment 1
Completed AHAs

Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	**Mobilization/Demobilization**	Overall Risk Assessment Code (RAC) (Use highest code)			**M**
	SIGNATURES	Activity #	1	AHA #	**1**
PWD/OICC/ROICC OFFICE		**Risk Assessment Code (RAC) Matrix**			
NAME & DATE ACCEPTED BY GDA:					
CONTRACT NUMBER:	**N62470-12-D-7004**	**Severity**	**Probability**		
TASK ORDER/DELIVERY #:	**JM19**				
PRIME CONTRATOR:	**AGVIQ LLC.**				
SUBCONTRATOR:	**NA**				
DATE OF PREPARATORY MEETING:					
DATE OF INITIAL INSPECTION:					
CONTRATOR COMPETENT PERSON:	NA				
SITE SAFETY and HEALTH OFFICER					

Severity	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)	Review each **"Hazard"** with identified safety **"Controls"** and determine (RAC)
E = EXTREMELY HIGH (PWO/OICC/ROICC)	Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity
H = HIGH RISK (FEAD DIRETOR)	**"Severity"** is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place
M = MODERATE RISK (CM or ET or PAR)	
L = LOW RISK (ET or PAR)	**"Probability"** is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.

Job Steps	Hazards	Controls	RAC
Mobilizing to Site **Driving** **Vehicle Backing**	• Traffic accident • Driver fatigue • Poor driving skills • Load shift • Traffic accident • Property damage	▪ Keep alert of your surroundings. Do not try to complete other tasks while driving that can distract your attention ▪ Do not drive when tired. Pull off at a safe location and walk around your vehicle and take a break if getting tired. ▪ Use your mirrors while driving. Do not use evasive driving actions. Obey traffic laws. ▪ Secure loads before starting your trip. Make frequent stops to check your load to make sure nothing has become loose. Retighten any loose straps. ▪ Check your surroundings before backing. When possible use a spotter. ▪ Check for obstructions before backing. Walk around vehicle to make sure area is clear.	**L**

IAW EM 385 01.A.13 CONTRACTOR-REQUIRED AHA "WORK WILL NOT BEGIN UNTIL THE AHA FOR THE WORK ACTIVITY HAS BEEN ACCEPTED BY THE GDA"
THE AHA SHALL BE REVIEWED AND MODIFIED AS NECESSARY TO ADDRESS CHANGING SITE CONDITION, OPERATIONS OR CHANGE OF COMPETENT/QUALIFIED PERSON'S

Job Steps	Hazards	Controls	RAC
Unloading/placing equipment.	• Back strain • Hand Injuries; cuts, bruises, pinch points • Slips, Trips, & Falls • Contact with Heavy Equipment while in use.	• Use proper lifting techniques at all times. Request assistance from other personal when weight limits exceed 50lbs. Mechanical means shall be used for gate relocation whenever possible rather than manual means to avoid the risk of strains and sprains. • Wear protective gloves; Use hand tools in a safe manner and keep hand tools in good working condition. • Use extreme caution when walking in work areas, working on or around truck beds and around equipment during unloading and staging activities. • Only trained and experienced personnel will be allowed to stage and unload heavy equipment. • Only certified operators will be authorized to operate equipment. Certifications must be on site at all times. • High visibility vests will be worn at all times while working in or around heavy equipment, trucks or other mechanized equipment. • All ground personal etc. must maintain eye contact with operators at all times. Do not proceed toward, or into blind spots of equipment without authorization to do so by operator. • All ground personal will stay outside the swing radius of equipment while in operation.	**L**
Site Preparation and Setup	Hand Tools	• Select and use the proper tool for the task. • Do not use tools that have been damaged or repaired in a manner which is not consistent with manufacturer's requirements.	**L**
	Manual Lifting	• AGVIQ personnel must notify supervisors or safety representatives of preexisting medical conditions that may be aggravated or re-injured by lifting activities, especially lifting operation involving repetitive motions. • When lifting objects, lift using knees not back. For repetitive lifting tasks, the use of lifting braces/supports may be considered. Use heavy equipment to transfer heavy or awkward loads wherever possible. Have someone assist with the lift— especially for heavy (> 40lbs.) or awkward loads. Do not attempt to manually lift objects that should otherwise be lifted with heavy equipment. • Plan storage and staging to minimize lifting or carrying distances. Make sure the path of travel is clear prior to the lift. Avoid carrying heavy objects above shoulder level.	**L**
	Shallow Hand Excavation	• Use proper hand tools. • Evaluate area for potential unidentified utilities or buried objects.	**L**
	• Accidents due to lack of training	▪ Copies of records will be kept by the SSO. ▪ Worker will be trained prior to performing new activities. Copies of records will be kept by the SSO. This includes signature sheets for AHAs. HASP and any other training documents.	**L**

Job Steps	Hazards	Controls	RAC
General Construction Hazards		▪ A daily tailgate safety meeting will be held prior to starting each shift. All personnel must attend review and sign the Safety Tailgate log before beginning work. ▪ All site workers must understand all Emergency procedures, AHA and HASP procedures.	
	• Electrical Hazards	• Do not open panels or cabinets that contain live electrical parts. • NFPA 70e training is required to work on or near live electrical parts.	**L**
	• Hearing Damage	• Workers will wear hearing protection whenever voices must be raised above normal conversational speech or when noise levels exceed 85 decibels due to a load noise source; such as working around heavy equipment. • Hearing protection will be worn by equipment operators when working in open cab equipment, or when doors/windows are open.	**L**
	• Injuries from slips, trips, and falls	• Walking/working surfaces will be kept free of clutter, debris, and congestion to the greatest extent possible. • Personnel will be briefed on the hazards of wet, muddy soil hazards and traversing uneven grades. • Walk or climb only on equipment and/or surfaces that are designed for personnel access. • Be aware of potential for poor footing while working on un-compacted backfill materials. • Use three-point contact when climbing onto equipment.	**L**
	• Accidents due to poor lighting	• Work at the site is only expected to take place during daylight hours. If work after daylight hours or in dark areas of buildings, provide supplemental lighting.	**L**
	• Injury due to inclement weather	• Outdoor work will cease during extreme weather conditions, such as electrical storms, high wind rain, and extreme temperatures. • Shut all equipment down when lightning is visible and wait for “all-clear” from the SSHO. • Workers will take cover indoors or in vehicle. • Supervisors will monitor local forecasts for warnings about specific weather hazards. • Workers will comply with all evacuation orders regarding rough weather directives.	**L**
	• Heat Stress	▪ Workers will be trained in the recognition of heat stress and appropriate actions to take. ▪ Workers are encouraged to increase fluid intake while working. ▪ Workers should minimize or avoid alcohol intake the night before working in heat stress situations. ▪ Workers will increase the frequency and duration of rest breaks while working in heat stress situations. ▪ Workers will watch each other for signs and symptoms of heat exhaustion and fatigue.	**L**

Job Steps	Hazards	Controls	RAC
	• Controlling work areas	• Fencing, tape, cones or other SSHO-approved boundaries will be erected to warn approaching personnel of the hazardous area. • Appropriate signs will be posted at the boundary to instruct personnel in entry requirements.	**L**
	• Injuries associated with insects, snakes, spiders and poisonous plants	• Workers will tuck pants into socks and wear long sleeves and sturdy leather boots when walking in tall grass. • Workers will use insect repellent when needed. • Workers will use buddy system to check for signs of insect and spider bites, such as redness, swelling, and flu-like symptoms if bitten. • If workers have known or suspected allergies, they will carry an Epi-Pen at all times and will notify supervision and co-workers of allergies. • If bitten by any insect notify the SSHO. This includes any type of injury that would require any type of First Aid.	**L**
Construction of Logistical Supplies	• Injuries associated with power tools	• Tools shall be carried in a safe and proper manner. • Tools shall not be carried up a ladder by hand; tools should be raised or lowered in a tool bag. • Defective tools shall be tagged immediately and removed from service. • Tools shall be used correctly and only for their intended purpose. • Hand tools will be inspected for mushroomed heads, broken or cracked handles, or loose heads prior to use.	**L**
Installation of Generators and Light Plants	• Electrical Hazards	• Do not open panels or cabinets that contain live electrical parts. • NFPA 70e training is required to work on or near live electrical parts. • Only qualified electrical personnel are allowed to connect generators to trailers or other facilities. • Ground generators and light plants in accordance with the operations manual	**L**
	• Property damage	▪ Secure generators and light plant as needed to protect from wind and snow accumulation. ▪ Lower light plant masts if wind is greater than 25 mph sustained	**L**
	• Spills	• Place generators and light plants in a plastic lined bermed area. • Follow spill control section of APP. Use drip pans and absorbents when fueling. • Place fire extinguisher no further than 70 feet but no closer than 25 feet from generators and light plants.	**L**
	• Material handling, lifting, and placement	▪ Delivery vehicle will place tank or light plants in place. ▪ No lifting of equipment/materials with heavy equipment via rigging without crane and rigging plan. ▪ Do not allow personnel under or near object while being placed.	**L**

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
• Fire extinguisher (with fuel and electrical sources) • Eye wash (small portable type) • Miscellaneous power and manual hand tools. • First Aid/BBPK/CPR shield • Track excavator(s) with material handling attachment and/or skid steer • Spill Kit • Communication devices	• Review APP by new site personnel. • 1st Aid/CPR (2 per site when medical attention a medical facility or physician is more than 5 minutes away to two or more employees. • Supervisors - BBLPS, 30 hour OSHA Construction Safety Training or equivalent • Heavy equipment operators qualified by previous training or experience. • Competent Person Requirement & Name: NA	• Visual Inspections of designated work areas identify and address hazardous conditions. • Equipment inspections and maintenance. • Chainsaw/brushcutter inspection/maintenance. • Chipper maintenance, if used. • Emergency Response equipment Inspections • (Fire Extinguishers, Eye wash First Aid/CPR etc.)

PRINT NAME	SIGNATURE	
Supervisor Name: _____	_____	**Date/Time:**_____
Safety Officer Name:_____	_____	**Date/Time:**_____
Employee Name(s): _____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
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_____	_____	Date/Time:_____

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THE AHA SHALL BE REVIEWED AND MODIFIED AS NECESSARY TO ADDRESS CHANGING SITE CONDITION, OPERATIONS OR CHANGE OF COMPETENT/QUALIFIED PERSONS

Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	**Site Survey/ Utility Locate**	Overall Risk Assessment Code (RAC) (Use highest code)					**L**
	SIGNATURES	Activity #	2	AHA #			**1**
PWD/OICC/ROICC OFFICE		**Risk Assessment Code (RAC) Matrix**					
NAME & DATE ACCEPTED BY GDA:							
CONTRACT NUMBER:	**N62470-12-D-7004**	**Severity**	**Probability**				
TASK ORDER/DELIVERY #:	**JM19**						
PRIME CONTRATOR:	**AGVIQ**		Frequent	Likely	Occasional	Seldom	Unlikely
SUBCONTRATOR:	**NA**						
DATE OF PREPARATORY MEETING:		Catastrophic	**E**	**E**	**H**	**H**	**M**
DATE OF INITIAL INSPECTION:		Critical	**E**	**H**	**H**	**M**	**L**
CONTRATOR COMPETENT PERSON:	NA	Marginal	**H**	**M**	**M**	**L**	**L**
SITE SAFETY and HEALTH OFFICER		Negligible	**M**	**L**	**L**	**L**	**L**
ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)		Review each **"Hazard"** with identified safety **"Controls"** and determine (RAC)					
E = EXTREMELY HIGH (PWO/OICC/ROICC)		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity					
H = HIGH RISK (FEAD DIRETOR)		**"Severity"** is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place					
M = MODERATE RISK (CM or ET or PAR)							
L = LOW RISK (ET or PAR)		**"Probability"** is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.					

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	Hazards	Controls	RAC
Site Survey/ Utility Locate	• Biological	• Prior to starting field activities, notify supervisors of known allergies to stinging insects and location of antidotes. • Use insect repellant with DEET or other insect repellent to deter being bit by mosquitoes or other stinging/biting insects. • Avoid exposure to blood borne pathogens if first aid must be provided. Use universal precautions against exposure to blood borne pathogens. • Observe ground surfaces, enclosed structures, ground water well heads, surrounding vegetation other site features for presence of spiders, bee/wasp hives, ticks, chiggers and other stinging/biting insects. • Where exposure to poisonous plants that have oils, berries or needle-like projects could cause skin irritations, infections or allergic reactions use disposable coveralls for protection. • Tape pant legs to boots and ensure there are no open seams between boots and pant legs to minimize potential for access points for stinging/biting insects.	L
	• Driving	• Always using a seat belt while driving on military/government facilities. Always observe posted speed limits, traffic signs and signals. Never using a cell phone or two way radio while driving. Violating these rules may result in loss of military/government facility driving privileges.	L
	• Fire Prevention	• Appropriately sized, easily accessible ABC fire extinguisher in work area. • Fire extinguishers must be inspected monthly (inspection tag) and have an annual maintenance/inspection certification (tag) attached to the extinguisher.	L
	• Manual Lifting	• AGVIQ or subcontract personnel must notify supervisors or safety representatives of preexisting medical conditions that may be aggravated or re-injured by lifting activities, especially lifting operation involving repetitive motions. • When lifting objects, lift using knees, not back. For repetitive lifting tasks, the use of lifting braces/supports may be considered. Use heavy equipment to transfer heavy or awkward loads wherever possible. Have someone assist with the lift— especially for heavy (> 40lbs.) or awkward loads. Do not attempt to manually lift objects that should otherwise be lifted with heavy equipment.	L

	Hazards	Controls	RAC
		• Plan storage and staging to minimize lifting or carrying distances. Make sure the path of travel is clear prior to the lift. Avoid carrying heavy objects above shoulder level.	
	• Slips, Trips, Falls/ housekeeping	• Be aware of poor footing, potential slipping/tripping hazards in the work area, such as wet surfaces, and where unprotected holes, drainage areas, rip rap, utilities, ground protrusions exist. Observe, mark and avoid any potential slip, trip and fall hazards. • Use sturdy hard-toe work boots with sufficient ankle support. • Institute and maintain good housekeeping practices. Clean Work Areas as activities proceed. Remove and store materials from pathways and commonly traveled areas as soon as possible. • Three points of contact when enter/exiting equipment.	L
	▪ Vehicular Hazards	• When parking your vehicle, park in a manner that will allow for exit from vehicle, park vehicle so it can serve as a barrier, where practicable. • Shut off and secure site vehicles prior to exiting them. Park on level ground where possible. If parking on an incline, engage parking brake. If the vehicle has a manual transmission, ensure the transmission is in gear (not neutral) and the parking brake is engaged before exiting the vehicle. • Exercise caution when exiting traveled way or parking along street— avoid sudden stops, use flashers, etc. • All staff working adjacent to traveled way or within work area must wear reflective/high-visibility safety vests. • Eye protection should be worn to protect from flying debris. • Remain aware of factors that influence traffic-related hazards and required controls— sun glare, rain, wind, limited sight-distance, hills etc. • Always remain aware of an escape route, such as behind an established barrier or parked vehicle.	L

	Hazards	Controls	RAC
		• Always pay attention to moving traffic – never assume drivers are looking out for you. • Work as far from traveled way as possible to avoid creating confusion for drivers. • When workers must face away from a haul truck to perform assigned duties, a "buddy system" should be used, where one worker is looking toward traffic. • Work area should be protected by a physical barrier. • Lookouts should be used when physical barriers are not available or practical.	

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
• Miscellaneous power and manual hand tools. • First Aid/BBP/CPR shield • Communication devices	• Review APP by new site personnel. • 1st Aid/CPR (2 per site when medical attention a medical facility or physician is more than 5 minutes away to two or more employees. • Supervisors - BBLPS, 30 hour OSHA Construction Safety Training or equivalent	• Visual Inspections of designated work areas identify and address hazardous conditions. • Equipment inspections and maintenance. • Emergency Response equipment Inspections • (Fire Extinguishers, Eye wash First Aid/CPR etc.)

PRINT NAME	SIGNATURE	
Supervisor Name: _____	_____	**Date/Time:**_____
Safety Officer Name:_____	_____	**Date/Time:**_____
Employee Name(s): _____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
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_____	_____	**Date/Time:**_____
_____	_____	Date/Time:_____

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Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	**Ground Water Sampling**	Overall Risk Assessment Code (RAC) (Use highest code)					**L**
	SIGNATURES	Activity #	3		AHA #		**1**
PWD/OICC/ROICC OFFICE		**Risk Assessment Code (RAC) Matrix**					
NAME & DATE ACCEPTED BY GDA:							
CONTRACT NUMBER:	**N62470-12-D-7004**	**Severity**	**Probability**				
TASK ORDER/DELIVERY #:	**JM19**						
PRIME CONTRATOR:	**AGVIQ LLC.**		Frequent	Likely	Occasional	Seldom	Unlikely
SUBCONTRATOR:	**NA**						
DATE OF PREPARATORY MEETING:		Catastrophic	**E**	**E**	**H**	**H**	**M**
DATE OF INITIAL INSPECTION:		Critical	**E**	**H**	**H**	**M**	**L**
CONTRATOR COMPETENT PERSON:	NA	Marginal	**H**	**M**	**M**	**L**	**L**
SITE SAFETY and HEALTH OFFICER		Negligible	**M**	**L**	**L**	**L**	**L**
ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)		Review each **"Hazard"** with identified safety **"Controls"** and determine (RAC)					
E = EXTREMELY HIGH (PWO/OICC/ROICC)		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity					
H = HIGH RISK (FEAD DIRETOR)		**"Severity"** is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place					
M = MODERATE RISK (CM or ET or PAR)							
L = LOW RISK (ET or PAR)		**"Probability"** is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.					
Job Steps	**Hazards**	**Controls**					**RAC**
Material Sampling - General hazards with sampling							
Sampling with long handled tools	• Muscle/back strain, over-exertion, body torque, improper position, fatigue • Hand fatigue, blisters • Handle striking body or head • Exposure to COC vapors	• Do not twist at the waist, maintain an upright posture, handle should be between the workers thigh and lower chest. • Do not over exert, do not jerk • Take breaks • Wear proper PPE listed in the SSHP • Monitor breathing zone in accordance with the SSHP					**L**

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Job Steps	Hazards	Controls	RAC
Sample Preparation & Packaging Preparation of sample containers	• Handling of chemicals/spilling of chemicals on skin, clothes or eyes.	• Never leave open chemicals unattended. • Know location of nearest eyewash station. • Wear proper PPE. (nitrile gloves, safety glasses, acid apron) • Keep prep and pack area well ventilated (open window) • Know location of MSDS, absorbent spill cloth, Hazmat spill kit • Make sure all caps are secure • Know location of MSDS forms	**L**
Receiving pre-preserved bottles	• Glass containers/broken glass, cuts to hands • Packaging material / acid leak	• Use caution when opening package • Wear proper PPE (nitrile gloves, safety glasses)	**L**
Receiving coolers from the field	• Heavy coolers/back injury • Ticks, insects/Lyme Disease, spider bites and stings • Poison Ivy, Sumac/ rash	• Bend at knees, ask for assistance • Use handtruck when necessary • Use caution when taking contents out of cooler. Inspect coolers for ticks/spiders • Apply ivy block	**L**
Preparing coolers for delivery	• Strapping machine/ tripping over unrolled tape. • Tape gun/cuts to hands • Heavy coolers/back injury	• Make sure strapping machine is properly rolled. • Use caution, be aware of cutting edge; To extent possible, break tape by pushing tape gun away from you; ensure hands and legs are not in the path of the tape gun • Bend at knees, ask for assistance • Use handtruck as necessary	**L**
Material Sampling Soil Sampling	• Excavations	• Inspect the excavation every day and after everyday hazard increasing event. Documentation of this inspection must be maintained daily and available as part of the project record. Documentation should be available on-site for inspection. • Slope excavations in accordance with the APP. • Do not enter excavation until the compete person gives you permission.	**L**
Water Sampling	• Confined Spaces	• Do not enter Frac-tanks or other holding tanks.	**L**
	• Exposure to Liquids	▪ Follow air monitoring requirement in the SSHP ▪ Follow PPE listed in the SSHP, if there is a potential for splash don face shields, goggles, and coated tyvek.	**L**

Job Steps	Hazards	Controls	RAC
Debris Sampling	• Concrete dust	• Use dust control methods such as water spray. • Follow air monitoring section of the SSHP.	**L**
	Manual Lifting	• AGVIQ personnel must notify supervisors or safety representatives of preexisting medical conditions that may be aggravated or re-injured by lifting activities, especially lifting operation involving repetitive motions. • When lifting objects, lift using knees not back. For repetitive lifting tasks, the use of lifting braces/supports may be considered. Use heavy equipment to transfer heavy or awkward loads wherever possible. Have someone assist with the lift—especially for heavy (> 40lbs.) or awkward loads. Do not attempt to manually lift objects that should otherwise be lifted with heavy equipment. • Plan storage and staging to minimize lifting or carrying distances. Make sure the path of travel is clear prior to the lift. Avoid carrying heavy objects above shoulder level.	**L**

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
• Fire extinguisher (with fuel and electrical sources) • Eye wash (small portable type) • Miscellaneous power and manual hand tools. • First Aid/BBPK/CPR shield • Spill Kit • Communication devices	• Review APP by new site personnel. • 1st Aid/CPR (2 per site when medical attention a medical facility or physician is more than 5 minutes away to two or more employees. • Supervisors - BBLPS, 30 hour OSHA Construction Safety Training or equivalent • Heavy equipment operators qualified previously • Competent Person Requirement & Name: TBD	• Visual Inspections of designated work areas identify and address hazardous conditions. • Equipment inspections and maintenance. • Emergency Response equipment Inspections • (Fire Extinguishers, Eye wash First Aid/CPR etc.)

PRINT NAME	SIGNATURE	
Supervisor Name: _____	_____	**Date/Time:**_____
Safety Officer Name:_____	_____	**Date/Time:**_____
Employee Name(s): _____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
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Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	Installation of Monitoring Wells	Overall Risk Assessment Code (RAC) (Use highest code)					**M**
	SIGNATURES	Activity #	1		AHA #		**1**
PWD/OICC/ROICC OFFICE		**Risk Assessment Code (RAC) Matrix**					
NAME & DATE ACCEPTED BY GDA:							
CONTRACT NUMBER:	**N62470-12-D-7004**	**Severity**	**Probability**				
TASK ORDER/DELIVERY #:	**JM19**						
PRIME CONTRATOR:	**AGVIQ LLC**		Frequent	Likely	Occasional	Seldom	Unlikely
SUBCONTRATOR:							
DATE OF PREPARATORY MEETING:		Catastrophic	**E**	**E**	**H**	**H**	**M**
DATE OF INITIAL INSPECTION:		Critical	**E**	**H**	**H**	**M**	**L**
CONTRATOR COMPETENT PERSON:		Marginal	**H**	**M**	**M**	**L**	**L**
SITE SAFETY and HEALTH OFFICER		Negligible	**M**	**L**	**L**	**L**	**L**
ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)		Review each **"Hazard"** with identified safety **"Controls"** and determine (RAC)					
E = EXTREMELY HIGH (PWO/OICC/ROICC)		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity					
H = HIGH RISK (FEAD DIRETOR)		**"Severity"** is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place					
M = MODERATE RISK (CM or ET or PAR)							
L = LOW RISK (ET or PAR)		**"Probability"** is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.					

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Job Steps	Hazards	Controls	RAC
Installation of Monitoring Wells	Buried Utilities or Unknown Objects	• Contact **DIGSAFE SYSTEM, INC.** to secure a utility owner verification request number at **(800) DIG SAFE or 811 or www.digsafe.com** for utility clearance verification. Keep copies of any written documentation (faxes, email printouts) regarding utility location verification provided by utilities owners in the office project file and in a working field file onsite. • Photo document owner provided field utility mark-outs as related to proposed limits of ground disturbing activities prior to the start of work. • Conduct “third” party utility clearance when the locations of utilities may be in question and document results of third party utility location. • Determine if a NAVFAC “Excavator Permit” is required prior to performing any ground disturbing activities. • Hand dig around identified utilities (within 5’) or as otherwise required by a NAVFAC issued excavation permit. • Review base engineering records or drawings against utility owner or third party utility mark-out to verify any potential differences. • Protect and preserve the markings of approximate locations of facilities until the markings are no longer required for safe and proper excavations. If the markings of utility locations are destroyed or removed before excavation commences or is completed, utilities must be relocated/marked.	L

Job Steps	Hazards	Controls	RAC
		• Where unknown or unanticipated buried objects are encountered (i.e. drums, tanks, cylinders, munitions of explosive concern, soil with unusual staining or odor) AGVIQ or subcontractor personnel shall 1) secure equipment to the extent possible, without causing bodily injury, 2) evacuate the work area and 3) immediately notify the site manager, SSHO or PM of the encountered condition. Work may only resume with appropriate documentation/notification that exposure hazards (physical or chemical) do not exist. Notify AGVIQ Project Manager and program officials (and applicable NAVFAC POCs via the Project Manager) and do not resume work until authorized to do so.	
Installation of Monitoring Wells (cont.)	Chemical Exposure	• All personnel performing this task shall be trained in accordance with 29CFR1910.120 and been rolled in a medical monitoring program. • Regulated or hazardous waste or materials shall not be transported by company or employee's vehicle. • Be cognizant of the potential of harmful gas or vapor build-up in the well head areas or worker breathing zone. • Adhere to PPE and action monitoring level requirements identified in APP. • Review contaminants of concern for the project and consult project specific APP. • Practice "no hand-face" contact at all times. • Always wash hands before eating, drinking, smoking and leaving site.	L

Job Steps	Hazards	Controls	RAC
		• Do not allow dermal contact or incidental ingestion of impacted groundwater or recovered free product. Skin contact with contaminated water, debris, or equipment shall be avoided at all times. Do not kneel or step in potentially contaminated media without first donning proper PPE. • Exercise good hygiene practices. Always wash hands before eating, drinking, smoking and leaving site. Only eat, drink, smoke or chew tobacco in designated areas. • When mixing concrete for the installation of concrete pads or bollard footings, don not breath cement dust or get concrete dust or mixed concrete on your skin or in your eyes.	
	Drilling Operations	• Drill rig inspections and maintenance and documentation of such inspections and maintenance shall be performed daily prior to the start of on-site work. • The drill rig should not to be operated in inclement weather. A “cat-head” drive mechanism shall not be operated during precipitation events. • Suspended drill rods shall not be passed over ground personnel and ground personnel shall not be allowed to walk under or in front of suspending drilling rods. • The drill rig operator is to verify that the rig is properly leveled and stabilized (extension of stabilizers on firm ground) before raising the mast. • Personnel should be cleared from the sides and rear of the rig before the mast is raised. • The driller is not to drive the rig with the mast in the raised position.	M

Job Steps	Hazards	Controls	RAC
		• The driller must check for overhead power lines before raising the mast. A minimum distance of 10 feet between mast and overhead lines (<50 kV) is recommended. Increased separation will be required for lines greater than 50 kV. See Electric Safety in this APP for proper separation requirements and other standard operating procedures associated with working near power transmission lines. • Do not raise drill rig masts underneath or adjacent toward overhead utilities. Do not drive drill rig mast raised. Be cognizant of utility pole guy wires and above ground transformers in relation to operating drill rigs. • Personnel should stand clear before equipment startup. Maintain eye contact with operator prior to/while approaching drill rig. • The driller is to verify that the rig is in neutral when the operator is not at the controls. • Become familiar with the hazards associated with the drilling method used. • Do not wear loose-fitting clothing, watches, etc., that may get caught in moving parts. • Do not smoke or permit other spark-producing equipment around drill rig. • The drill rig must be equipped with a kill wire or switch and personnel associated with the drilling operation are to be informed of its location.	

Job Steps	Hazards	Controls	RAC
		• When lines are pressurized on or adjacent to the drill rig as a result of the drilling or grouting operations, safety lashings/whip line checks, clips or other suitable restriction means should be in place on hoses/connections to prevent injury in the event connections become dislodged or hoses ruptures. • Be aware and stand clear of heavy objects that are hoisted overhead by the drill rig. • The driller is to verify that all machine guards are in place while the rig is in operation. • The drill rig should be equipped with at least one fire extinguisher. • If the drill rig comes into contact with electrical wires and becomes electrically energized, do not touch any part of the rig or any person in contact with the rig and stay as far away as possible. Notify emergency personnel immediately. • Ensure that all machine guards are in place to prevent contact with drive lines, belts, pinch points, mechanically energized equipment, or any other sources of mechanical injury. • Unplugging jammed equipment will only be performed when equipment has been shut down, blocked, all sources of energy have been isolated and tested. Maintenance and repair of equipment that results in the removal of guards or would otherwise put anyone at risk requires lockout of that equipment prior to work.	
Installation of Monitoring Wells (cont.)	Slips, Trips, Falls	• Clear walkways work areas of objects Institute and maintain good housekeeping practices. Observe/avoid debris in a work area.	L

Job Steps	Hazards	Controls	RAC
		• Only walk or climb only on surfaces designed for personnel access. • Be aware of poor footing and potential slipping and tripping hazards in the work area (holes, ditches, rip rap, utilities, and wet surfaces). Observe and avoid areas of unprotected holes and ground penetrations or protrusions. Employees walking in ditches, swales and other drainage structures adjacent to roads, across undeveloped land or in controlled industrial work/process areas must use caution to prevent slips and falls, which could result in twisted or sprained ankles, knees, and backs. • Sturdy, hard toe work boots that provide ankle support shall be used during field operations.	
	Visible Lighting	• Perform tasks in daylight hours.	L
	Cuts/Abrasions	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects. • Do not use razor knives. • Cut away from the body and never towards another worker. • Maintain all hand and power tools in a safe condition. Remove damaged hand and power tools from service.	L
	Fire - Explosion Prevention	• Use only metal safety cans for storage and transfer of fuel. • Use funnels and nozzles during fueling operations. • Appropriately sized, easily accessible ABC fire extinguisher in work area. Fire extinguishers must be inspected monthly (inspection tag) and have an annual maintenance/inspection certification (tag) attached to the extinguisher.	L

Job Steps	Hazards	Controls	RAC
		• Fire extinguishers shall be approved by a nationally recognized testing laboratory and labeled to identify the listing and labeling organization and the fire test and performance standard that the fire extinguisher meets or exceeds.	
Installation of Monitoring Wells (cont.)	Sample Handling	• Caution should be exercised when filling bottles containing acid or base preservatives. Both liquid and vapor phases of acid can cause severe burns. • Following sample collection, sample container lids should be tightened securely to prevent any leaks, and the containers should be rinsed with clean water to ensure that they are free of chemical constituents. Sample activities, sample collection, and equipment decontamination procedures. • Minimize transportation of drums or other containers with IDW. • Sample only labeled drums or drums known to contain IDW. Unknown drums or drums that show evidence of excessive buckling/bulging, corrosion, vapors, crystallization, unusual discoloration or other abnormalities may not be sampled without the evaluation of engineering controls, proper PPE air monitoring equipment and the use properly trained personnel familiar with the sampling of unknown drum contents.	L
	Hand & Power tools	• Select and use the proper tool for the task. • Do not use tools that have been damaged or repaired in a manner which is not consistent with manufacturer's requirements.	L

Job Steps	Hazards	Controls	RAC
		• Tools inspected before use. Maintain all tools in a safe condition • Electric cords must be free from defects. • All required guards shall be in place and functional. • Hand held powered tools equipped with constant pressure switch. • Tools disconnected from energy source when not in use. • Do not leave hand held power in standing water/liquid. • Electrical power tools and equipment must be effectively grounded or double-insulated UL approved.	
	Manual Lifting	• Personnel to notify supervisors or safety representatives of pre-existing medical conditions that may be aggravated or re-injured by lifting activities such that an evaluation of operational procedures may be performed with regard to the required task. • When lifting objects, lift using knees not back. For repetitive lifting tasks, the use of lifting braces/supports should be considered. • Plan storage and staging to minimize lifting or carrying distances. • Split heavy loads into smaller loads. • Have someone assist with the lift— especially for heavy (> 40lbs.) or awkward loads. (Note: If AGVIQ-CH2MHILL employee is not capable of carrying 40 lbs., seek assistance.). • Make sure the path of travel is clear prior to the lift. • Do not lift manhole covers, open/lift hatches or other access points to vessels, tanks or subsurface structures without proper authorization to do so, proper tools and proper personnel protective equipment.	L

Job Steps	Hazards	Controls	RAC
		• Use carts, hand trucks additional personnel etc. to move large, awkward loads. • Avoid carrying heavy objects above shoulder level.	
Installation of Monitoring Wells (cont.)	High Ambient Temperature	• Provide and drink fluids to prevent worker dehydration. • Minimize intake of caffeinated fluids. • Institute a proper work-break regiment in a cool area to avoid heat stress symptoms and overexertion. • Monitor for signs and symptoms of heat stress (maintain use of buddy system) when the ambient air temperature exceeds 70˚F, the relative humidity is high (>50 percent), or when workers exhibit symptoms of heat stress and especially when wearing disposable or other types of coveralls. 1) Heat Syncope = Sluggishness or fainting while standing erect or immobile in heat. *Treatment = Remove to cooler area. Rest lying down. Increase fluid intake. Recovery usually is prompt and complete*. 2) Heat Rash = Profuse tiny raised red blister-like vesicles on affected areas, along with prickling sensations during heat exposure. *Treatment = Use mild drying lotions and powders, and keep skin clean for drying skin and preventing infection.* 3) Heat Cramps = Painful spasms in muscles used during work (arms, legs, or abdomen); onset during or after work hours. *Treatment = Remove to cooler area. Rest lying down. Increase fluid intake.*	L

Job Steps	Hazards	Controls	RAC
		4) Heat exhaustion = Fatigue, nausea, headache, giddiness; skin clammy and moist; complexion pale, muddy, or flushed; may faint on standing; rapid thready pulse and low blood pressure; oral temperature normal or low. *Treatment = Remove to cooler area. Rest lying down, with head in low position. Administer fluids by mouth. Seek medical attention.* 5) Heat Stroke = Red, hot, dry skin; dizziness; confusion; rapid breathing and pulse; high oral temperature. *Treatment = Cool rapidly by soaking in cool–but not cold–water. Call ambulance, and get medical attention immediately!*	
	Low Ambient Temperature	• Be aware of the symptoms of cold-related disorders, and wear proper, layered clothing for the anticipated fieldwork. Appropriate rain gear is a must in cool weather. • Frequent intake of non-caffeinated fluids to maintain body core temperature. • Frequent intake of non- caffeinated to prevent dehydration. • Obtain and review weather forecast— be aware of predicted weather systems. • Observe one (buddy system) another for initial signs of cold-related disorders. • Frequent observance of Wind Chill Chart (APP) to assist with work warming regiment determination and frostbite avoidance	L
Installation of Monitoring Wells (cont.)	Vehicular Traffic	• Shut off and secure site vehicles prior to exiting them. Park on level ground where possible. If parking on an incline, engage parking brake. If the vehicle has a manual transmission, ensure the transmission is in gear (not neutral) and the parking brake is engaged before exiting the vehicle.	L

Job Steps	Hazards	Controls	RAC
		• Exercise caution when exiting traveled way or parking along street— avoid sudden stops, use flashers, etc. • Park in a manner that will allow for safe exit from vehicle, and where practicable, park vehicle so that it can serve as a barrier. • All staff working adjacent to traveled way or within work area must wear reflective/high-visibility safety vests. • All road control devices and signs are to be obeyed. • ANY vehicle on plant displaying a flashing red light or ANY forklift truck (loaded or empty) shall be given the right-of-way. • When meeting a vehicle so equipped or a forklift truck, pull to the right edge of the road and stop until the approaching vehicle passes. • When approaching from the rear, maintain a 100-foot distance. DO NOT PASS.	
	Electrical Safety	• If/when electrical extension cords are required to complete work, extension cords must be: - Equipped with third-wire grounding. - Covered, elevated, or protected from damage when passing through work areas. - Protected from pinching if routed through doorways. - Not fastened with staples, hung from nails, or suspended with wire. - Extension cords and electrical power tools, must have ground fault circuit interrupters (GFCIs) installed. - Inspected all extension cords daily for structural integrity, ground continuity, and damaged insulation. - Kept out of water/liquids. - Electrical power circuits should be inspected before plugging in extension cords.	M

Job Steps	Hazards	Controls	RAC
		- Maintain proper separation between Power Transmission Lines/over overhead utilities and drill rig masts. See Electric Safety Section in HSP for references to proper separation between operating equipment and power transmission lines/overhead utilities.	
	Other	• **Verify that EMS services are available and can respond in a prompt manner prior to the start of work.** • Always using a seat belt while driving on military/government facilities. Always observe posted speed limits, traffic signs and signals. Never using a cell phone or two way radio while driving on military/government facilities. Violating these rules may result in loss of military/government facility driving privileges. • Base or Local Emergency medical Service and Fire Dispatch numbers programmed into cellular phones. Have hospital route maps readily available. • Report all unsafe conditions and acts, injury/illness or property damage to supervisors immediately.	L

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Fire extinguisher (with fuel and electrical sources) • Eye wash (small portable type) • Miscellaneous power and manual hand tools. • First Aid/BbPK/CPR shield • Extension chords • Spill Kit • Haul trucks (delivered heavy equipment or materials) • Dolly, wheelbarrow, trash cans with casters to move removed debris to roll-off container • Communication devices • Pumps/controllers • Water quality meters • Water level indicators	• Visual Inspections of designated work areas identify and address hazardous conditions. • Equipment inspections and maintenance. • Emergency Response equipment Inspections • (Fire Extinguishers, Eye wash First Aid/CPR etc.) • Inspections of hand tools (power) and extension cords if used.	• Review AHA with all task personnel • Review of APP for new site personnel. • 1st Aid/CPR (2 per site when medical attention a medical facility or physician is more than 5 minutes away to two or more employees. • Supervisors - SC-HW (29CFR1910.120(e)(4), 30 hour OSHA Construction Safety Training or equivalent • All personnel have training and medical surveillance per 29CFF1910.120. • Competent Person Requirement & Name: NA

PRINT NAME	SIGNATURE	
Supervisor Name: _____	_____	**Date/Time:**_____
Safety Officer Name:_____	_____	**Date/Time:**_____
Employee Name(s): _____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____

Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	Treatment of Plumes	Overall Risk Assessment Code (RAC) (Use highest code)					**M**
	SIGNATURES	Activity #	1		AHA #		**1**
PWD/OICC/ROICC OFFICE		**Risk Assessment Code (RAC) Matrix**					
NAME & DATE ACCEPTED BY GDA:							
CONTRACT NUMBER:	**N62470-12-D-7004**	**Severity**	**Probability**				
TASK ORDER/DELIVERY #:	**JM19**						
PRIME CONTRATOR:	**AGVIQ LLC**		Frequent	Likely	Occasional	Seldom	Unlikely
SUBCONTRATOR:							
DATE OF PREPARATORY MEETING:		Catastrophic	**E**	**E**	**H**	**H**	**M**
DATE OF INITIAL INSPECTION:		Critical	**E**	**H**	**H**	**M**	**L**
CONTRATOR COMPETENT PERSON:		Marginal	**H**	**M**	**M**	**L**	**L**
SITE SAFETY and HEALTH OFFICER		Negligible	**M**	**L**	**L**	**L**	**L**
ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)		Review each **"Hazard"** with identified safety **"Controls"** and determine (RAC)					
E = EXTREMELY HIGH (PWO/OICC/ROICC)		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity					
H = HIGH RISK (FEAD DIRETOR)		**"Severity"** is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place					
M = MODERATE RISK (CM or ET or PAR)							
L = LOW RISK (ET or PAR)		**"Probability"** is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.					

IAW EM 385 01.A.13 CONTRACTOR-REQUIRED AHA "WORK WILL NOT BEGIN UNTIL THE AHA FOR THE WORK ACTIVITY HAS BEEN ACCEPTED BY THE GDA"
THE AHA SHALL BE REVIEWED AND MODIFIED AS NECESSARY TO ADDRESS CHANGING SITE CONDITION, OPERATIONS OR CHANGE OF COMPETENT/QUALIFIED PERSON'S

Job Steps	Hazards	Controls	RAC
Treatment of Plumes	Buried Utilities or Unknown Objects	• Contact **DIGSAFE SYSTEM, INC.** to secure a utility owner verification request number at **(800) DIG SAFE or 811 or www.digsafe.com** for utility clearance verification. Keep copies of any written documentation (faxes, email printouts) regarding utility location verification provided by utilities owners in the office project file and in a working field file on-site. • Photo document owner provided field utility mark-outs as related to proposed limits of ground disturbing activities prior to the start of work. • Conduct “third” party utility clearance when the locations of utilities may be in question and document results of third party utility location. • Determine if a NAVFAC “Excavator Permit” is required prior to performing any ground disturbing activities. • Hand dig around identified utilities (within 5’) or as otherwise required by a NAVFAC issued excavation permit. • Review base engineering records or drawings against utility owner or third party utility mark-out to verify any potential differences. • Protect and preserve the markings of approximate locations of facilities until the markings are no longer required for safe and proper excavations. If the markings of utility locations are destroyed or removed before excavation commences or is completed, utilities must be relocated/marked.	L

Job Steps	Hazards	Controls	RAC
		• Where unknown or unanticipated buried objects are encountered (i.e. drums, tanks, cylinders, munitions of explosive concern, soil with unusual staining or odor) AGVIQ or subcontractor personnel shall 1) secure equipment to the extent possible, without causing bodily injury, 2) evacuate the work area and 3) immediately notify the site manager, SSHO or PM of the encountered condition. Work may only resume with appropriate documentation/notification that exposure hazards (physical or chemical) do not exist. Notify AGVIQ Project Manager and program officials (and applicable NAVFAC POCs via the Project Manager) and do not resume work until authorized to do so.	
Treatment of Plumes	Chemical Exposure	• All personnel performing this task shall be trained in accordance with 29CFR1910.120 and been rolled in a medical monitoring program. • Regulated or hazardous waste or materials shall not be transported by company or employee's vehicle. • Be cognizant of the potential of harmful gas or vapor build-up in the well head areas or worker breathing zone. • Adhere to PPE and action monitoring level requirements identified in APP. • Review contaminants of concern for the project and consult project specific APP. • Practice "no hand-face" contact at all times. • Always wash hands before eating, drinking, smoking and leaving site.	L

Job Steps	Hazards	Controls	RAC
		• Do not allow dermal contact or incidental ingestion of impacted groundwater or recovered free product. Skin contact with contaminated water, debris, or equipment shall be avoided at all times. Do not kneel or step in potentially contaminated media without first donning proper PPE. • Exercise good hygiene practices. Always wash hands before eating, drinking, smoking and leaving site. Only eat, drink, smoke or chew tobacco in designated areas. • When mixing concrete for the installation of concrete pads or bollard footings, don not breath cement dust or get concrete dust or mixed concrete on your skin or in your eyes.	
Treatment of Plumes	Slips, Trips, Falls	• Clear walkways work areas of objects Institute and maintain good housekeeping practices. Observe/avoid debris in a work area. • Only walk or climb only on surfaces designed for personnel access. • Be aware of poor footing and potential slipping and tripping hazards in the work area (holes, ditches, rip rap, utilities, and wet surfaces). Observe and avoid areas of unprotected holes and ground penetrations or protrusions. Employees walking in ditches, swales and other drainage structures adjacent to roads, across undeveloped land or in controlled industrial work/process areas must use caution to prevent slips and falls, which could result in twisted or sprained ankles, knees, and backs. • Sturdy, hard toe work boots that provide ankle support shall be used during field operations.	L
	Visible Lighting	• Perform tasks in daylight hours.	L

Job Steps	Hazards	Controls	RAC
	Cuts/Abrasions	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects. • Do not use razor knives. • Cut away from the body and never towards another worker. • Maintain all hand and power tools in a safe condition. Remove damaged hand and power tools from service.	L
	Fire - Explosion Prevention	• Use only metal safety cans for storage and transfer of fuel. • Use funnels and nozzles during fueling operations. • Appropriately sized, easily accessible ABC fire extinguisher in work area. Fire extinguishers must be inspected monthly (inspection tag) and have an annual maintenance/inspection certification (tag) attached to the extinguisher. • Fire extinguishers shall be approved by a nationally recognized testing laboratory and labeled to identify the listing and labeling organization and the fire test and performance standard that the fire extinguisher meets or exceeds.	L
Treatment of Plumes	Sample Handling	• Caution should be exercised when filling bottles containing acid or base preservatives. Both liquid and vapor phases of acid can cause severe burns. • Following sample collection, sample container lids should be tightened securely to prevent any leaks, and the containers should be rinsed with clean water to ensure that they are free of chemical constituents. Sample activities, sample collection, and equipment decontamination procedures. • Minimize transportation of drums or other containers with IDW.	L

Job Steps	Hazards	Controls	RAC
		• Sample only labeled drums or drums known to contain IDW. Unknown drums or drums that show evidence of excessive buckling/bulging, corrosion, vapors, crystallization, unusual discoloration or other abnormalities may not be sampled without the evaluation of engineering controls, proper PPE air monitoring equipment and the use properly trained personnel familiar with the sampling of unknown drum contents.	
	Hand & Power tools	• Select and use the proper tool for the task. • Do not use tools that have been damaged or repaired in a manner which is not consistent with manufacturer's requirements. • Tools inspected before use. Maintain all tools in a safe condition • Electric cords must be free from defects. • All required guards shall be in place and functional. • Hand held powered tools equipped with constant pressure switch. • Tools disconnected from energy source when not in use. • Do not leave hand held power in standing water/liquid. • Electrical power tools and equipment must be effectively grounded or double-insulated UL approved.	L
	Manual Lifting	• Personnel to notify supervisors or safety representatives of pre-existing medical conditions that may be aggravated or re-injured by lifting activities such that an evaluation of operational procedures may be performed with regard to the required task. • When lifting objects, lift using knees not back. For repetitive lifting tasks, the use of lifting braces/supports should be considered.	L

Job Steps	Hazards	Controls	RAC
		• Plan storage and staging to minimize lifting or carrying distances. • Split heavy loads into smaller loads. • Have someone assist with the lift— especially for heavy (> 40lbs.) or awkward loads. (Note: If AGVIQ-CH2MHILL employee is not capable of carrying 40 lbs., seek assistance.). • Make sure the path of travel is clear prior to the lift. • Do not lift manhole covers, open/lift hatches or other access points to vessels, tanks or subsurface structures without proper authorization to do so, proper tools and proper personnel protective equipment. • Use carts, hand trucks additional personnel etc. to move large, awkward loads. • Avoid carrying heavy objects above shoulder level.	
Treatment of Plumes	High Ambient Temperature	• Provide and drink fluids to prevent worker dehydration. • Minimize intake of caffeinated fluids. • Institute a proper work-break regiment in a cool area to avoid heat stress symptoms and overexertion. • Monitor for signs and symptoms of heat stress (maintain use of buddy system) when the ambient air temperature exceeds 70˚F, the relative humidity is high (>50 percent), or when workers exhibit symptoms of heat stress and especially when wearing disposable or other types of coveralls. 1) Heat Syncope = Sluggishness or fainting while standing erect or immobile in heat. *Treatment = Remove to cooler area. Rest lying down. Increase fluid intake. Recovery usually is prompt and complete*.	L

Job Steps	Hazards	Controls	RAC
		2) Heat Rash = Profuse tiny raised red blister-like vesicles on affected areas, along with prickling sensations during heat exposure. *Treatment = Use mild drying lotions and powders, and keep skin clean for drying skin and preventing infection.* 3) Heat Cramps = Painful spasms in muscles used during work (arms, legs, or abdomen); onset during or after work hours. *Treatment = Remove to cooler area. Rest lying down. Increase fluid intake.* 4) Heat exhaustion = Fatigue, nausea, headache, giddiness; skin clammy and moist; complexion pale, muddy, or flushed; may faint on standing; rapid thready pulse and low blood pressure; oral temperature normal or low. *Treatment = Remove to cooler area. Rest lying down, with head in low position. Administer fluids by mouth. Seek medical attention.* 5) Heat Stroke = Red, hot, dry skin; dizziness; confusion; rapid breathing and pulse; high oral temperature. *Treatment = Cool rapidly by soaking in cool–but not cold–water. Call ambulance, and get medical attention immediately!*	
	Low Ambient Temperature	• Be aware of the symptoms of cold-related disorders, and wear proper, layered clothing for the anticipated fieldwork. Appropriate rain gear is a must in cool weather. • Frequent intake of non-caffeinated fluids to maintain body core temperature. • Frequent intake of non- caffeinated to prevent dehydration.	L

Job Steps	Hazards	Controls	RAC
		• Obtain and review weather forecast— be aware of predicted weather systems. • Observe one (buddy system) another for initial signs of cold-related disorders. • Frequent observance of Wind Chill Chart (APP) to assist with work warming regiment determination and frostbite avoidance	
Treatment of Plumes	Vehicular Traffic	• Shut off and secure site vehicles prior to exiting them. Park on level ground where possible. If parking on an incline, engage parking brake. If the vehicle has a manual transmission, ensure the transmission is in gear (not neutral) and the parking brake is engaged before exiting the vehicle. • Exercise caution when exiting traveled way or parking along street— avoid sudden stops, use flashers, etc. • Park in a manner that will allow for safe exit from vehicle, and where practicable, park vehicle so that it can serve as a barrier. • All staff working adjacent to traveled way or within work area must wear reflective/high-visibility safety vests. • All road control devices and signs are to be obeyed. • ANY vehicle on plant displaying a flashing red light or ANY forklift truck (loaded or empty) shall be given the right-of-way. • When meeting a vehicle so equipped or a forklift truck, pull to the right edge of the road and stop until the approaching vehicle passes. • When approaching from the rear, maintain a 100-foot distance. DO NOT PASS.	L
	Electrical Safety	• If/when electrical extension cords are required to complete work, extension cords must be: - Equipped with third-wire grounding. - Covered, elevated, or protected from damage when passing through work areas. - Protected from pinching if routed through doorways. - Not fastened with staples, hung from nails, or suspended with wire.	M

Job Steps	Hazards	Controls	RAC
		- Extension cords and electrical power tools, must have ground fault circuit interrupters (GFCIs) installed. - Inspected all extension cords daily for structural integrity, ground continuity, and damaged insulation. - Kept out of water/liquids. - Electrical power circuits should be inspected before plugging in extension cords. - Maintain proper separation between Power Transmission Lines/over overhead utilities and drill rig masts. See Electric Safety Section in HSP for references to proper separation between operating equipment and power transmission lines/overhead utilities.	
	Other	• **Verify that EMS services are available and can respond in a prompt manner prior to the start of work.** • Always using a seat belt while driving on military/government facilities. Always observe posted speed limits, traffic signs and signals. Never using a cell phone or two way radio while driving on military/government facilities. Violating these rules may result in loss of military/government facility driving privileges. • Base or Local Emergency medical Service and Fire Dispatch numbers programmed into cellular phones. Have hospital route maps readily available. • Report all unsafe conditions and acts, injury/illness or property damage to supervisors immediately.	L

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Fire extinguisher (with fuel and electrical sources) • Eye wash (small portable type) • Miscellaneous power and manual hand tools. • First Aid/BbPK/CPR shield • Extension chords • Spill Kit • Haul trucks (delivered heavy equipment or materials) • Dolly, wheelbarrow, trash cans with casters to move removed debris to roll-off container • Communication devices • Pumps/controllers • Water quality meters • Water level indicators	• Visual Inspections of designated work areas identify and address hazardous conditions. • Equipment inspections and maintenance. • Emergency Response equipment Inspections • (Fire Extinguishers, Eye wash First Aid/CPR etc.) • Inspections of hand tools (power) and extension cords if used.	• Review AHA with all task personnel • Review of APP for new site personnel. • 1st Aid/CPR (2 per site when medical attention a medical facility or physician is more than 5 minutes away to two or more employees. • Supervisors - SC-HW (29CFR1910.120(e)(4), 30 hour OSHA Construction Safety Training or equivalent • All personnel have training and medical surveillance per 29CFF1910.120. • Competent Person Requirement & Name: NA

PRINT NAME	SIGNATURE	
Supervisor Name: _____	_____	**Date/Time:**_____
Safety Officer Name:_____	_____	**Date/Time:**_____
Employee Name(s): _____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____
_____	_____	**Date/Time:**_____

IAW EM 385 01.A.13 CONTRACTOR-REQUIRED AHA "WORK WILL NOT BEGIN UNTIL THE AHA FOR THE WORK ACTIVITY HAS BEEN ACCEPTED BY THE GDA"
THE AHA SHALL BE REVIEWED AND MODIFIED AS NECESSARY TO ADDRESS CHANGING SITE CONDITION, OPERATIONS OR CHANGE OF COMPETENT/QUALIFIED PERSONS

Attachment 2
Accident Prevention Plan
Acknowledgement Form

ACCIDENT PREVENTION PLAN

ACKNOWLEDGEMENT FORM

AGVIQ

Task Order JM19

AGVIQ project employees and subcontractors listed below have been provided with a copy of this Accident Prevention Plan, have read or been briefed on its contents and agree to abide by its provisions.

Project Name: **Task Order:**

EMPLOYEE NAME (Please print)	**EMPLOYEE SIGNATURE**	**COMPANY**	**DATE**

Attachment 3
Subcontractor H&S Tracking Form

Subcontractor H&S Tracking Form

Project Name: **Task Number:** **Date:**

Subcontractor		Completed as Needed						Completed Within the Last 12 Months		
Name	Company	40-hour Training	8-hour Site Supervisor Training	Confined Space Entry Training	FA/CPR /BBP	Hazard Specific Training	Equipment Specific Training	Med Clearance	Fit Test	8-hour Refresher Training
		Enter "√" if Completed						Enter Date Last Completed		

Hazard Specific Training may include Hazard Communication (HAZCOM), asbestos, lead, fall protection, electrical, lock-out tag-out, drilling, demolition, etc.
Equipment Specific Training may include Industrial (fork) truck, aerial lift, crane, portable extinguisher, respirator, scaffolding, etc.
Medical Clearance documents must **not** include actual medical reports. Only accept a signed physician's statement of fitness to work.

Attachment 4
Project H&S Forms/Permits

AGVIQ – Task Order JM19
NAS, Jacksonville, FL – Site Sign In Sheet

DATE	NAME	COMPANY	IN	OUT	IN	OUT

AGVIQ – Task Order JM19
NAS, Jacksonville, FL – Site Sign In Sheet

Date	Time	Activity	Location	Mercury Vapor	%O_2	%LEL	CO

Stop Work Order Form

REPORT PREPARED BY:

Name:	Title:	Signature:	Date:

ISSUE OF NONPERFORMANCE

Description:_____	Date of Nonperformance:
	_____

SUBCONTRACTOR SIGNATURE OF NOTIFICATION:

Name:	Title:	Signature:	Date:

** Corrective action is to be taken immediately. Note below the action taken, sign and return to CCI.*

SUBCONTRACTOR'S CORRECTIVE ACTION

Description:_____	Date of Corrective Actions:
	_____

SUBCONTRACTOR SIGNATURE OF CORRECTION:

Name:	Title:	Signature:	Date:

Attachment 5
Emergency Contact List

Emergency Contact List

Emergency Fire, EMS: 911	**AGVIQ Medical Consultant(s)** Refer to AGVIQ VB office for a detailed list of Medical Facilities/contacts.
AGVIQ Program Director Name: Dave Leadenham AGVIQ Phone: (757) 213-8580/ (757) 544-6958	**AGVIQ Program Manager** Name: Sid Allison Phone: (843) 242-8018 **AGVIQ Senior Program Manager** Name: Paul Rakowski Phone: (757) 213-8581/(757) 544-6744 **AGVIQ Project Manager** Name: Eric Davis Phone: (678) 530-4085
AGVIQ Site Superintendent/Alternate SSHO Name: Cell Phone: **AGVIQ HSPA** Name: Rachel Francis - AGVIQ Cell Phone: (757) 354-5820 (757) 213 8592	**AGVIQ Program CIH** Name: Matt White Phone: (907) 748-2730 **AGVIQ SSHO/QCM** Name: Cell Phone:
AGVIQ Corporate HSM Name: Troy Izatt Office phone # (907) 365-6182 Cell phone # (907) 748-3697	**Federal Express Dangerous Goods Shipping** Phone: 800/238-5355 **Emergency Number for Shipping Dangerous Goods** Phone: 800/255-3924
Hospital Name/Address: (See Figure 9-2 of this APP)	

Attachment 6
Material Safety Data Sheets
(provided onsite)

Attachment 7
Chemical Specific Training Form and Project Specific Chemical Product Hazard Communication Form

CHEMICAL-SPECIFIC TRAINING FORM

Location:	Task Order: JM19
UST Site 2406:	Trainer:

TRAINING PARTICIPANTS:

NAME	SIGNATURE	NAME	SIGNATURE

REGULATED PRODUCTS/TASKS COVERED BY THIS TRAINING:

The SSC will use the product MSDS to provide the following information concerning each of the products listed above.

☐ Physical and health hazards

☐ Control measures that can be used to provide protection (including appropriate work practices, emergency procedures, and personal protective equipment to be used)

☐ Methods and observations used to detect the presence or release of the regulated product in the workplace (including periodic monitoring, continuous monitoring devices, visual appearance or odor of regulated product when being released, etc.)

Training participants will have the opportunity to ask questions concerning these products and, upon completion of this training, will understand the product hazards and appropriate control measures available for their protection.

Copies of MSDSs, chemical inventories, and the written hazard communication program will be made available for employee review in the facility/project hazard communication file.

Attachment 8
Pre-Task Safety Plan

EXAMPLE ONLY

DAILY PRE-TASK SAFETY PLAN (PTSP)

Project: _____ Location: _____ Date:_____

Site Safety & Health Officer: _____ Job Activity: _____ Site #:_____

Task Personnel:

_____

_____

_____

List Tasks:

_____

Tools/Equipment/Materials required (ladders, scaffolds, fall protection, cranes/rigging, heavy equipment, power tools, cords, generators, compressed gases, regulated chemical products, etc.):

_____

Potential H&S Hazards, including chemical, physical, safety, biological and environmental (Check all that apply):

_X_ Chemical burns/contact Dermal protection (hands), eye protection. See APP for PPE requirements per task.	__ Trench, excavations, cave-ins	__Ergonomics
__ Pressurized lines/equipment Drilling equipment support vehicles (skidsteer)	X_ Overexertion Work/break regiment as dictated by task. Maintain fluid intake for hydration	_X_ Chemical splash Use PPE in accordance with the APP. Protect hands from splash during decon. activities.
_X_Thermal burns Watch for warm engine/muffler components on generators.	__ Pinch points	X Poisonous plants/insects Review APP for identification of poisonous snakes in the geographic area. Long sleeves in areas where poison ivy, sumac or oak may exist. Use insect repellent. Tape pant legs to boots (ticks).
X_ Electrical GCFIs for generators, Inspect. & protect extension cords, cords rated for use & have 3rd wire grounding	X_Cuts/abrasions Do not use razor knives. Cut away from body. Identify and avoid rusty/jagged or sharp surfaces from above ground features (brush, pipe chases/supports, utility structures, doors)	X_ Eye hazards/flying projectile Use eye protection at all times. Ensure head protection is used in areas where heavy brush, trees, thorns, vines exist when accessing well heads.
__ Weather conditions Foul and cold weather clothing as dictated by expected conditions	X_ Spills Use funnels & nozzles during fueling of generators.	__ Inhalation hazard
__Heights/fall> 6’	__ Overhead Electrical hazards	X_ **Heat**/cold stress Work/break regiment as dictated by heat exposure Provide sufficient fluids for employee intake. Recommended employees begin with 16 oz. of water before initiating field work.
X_Noise Use hear protection in loud work environments	__ Elevated loads	__ Water/drowning hazard
X_Explosion/fire Metal safety cans for fuel storage, No open flame, sparks ignition in hazardous/flammable/ combustible storage areas. Let engine surfaces cool before fueling.	X_ Slips, trip and falls Exercise good general housekeeping practices Identify/remove slip/trip falls hazards in work area. Watch for and avoid holes, ground protrusions. Watch for entanglement of feet around vines and brush.	__ Heavy equipment
X_ Radiation Solar. UV protection on skin and UV eye protection. ANSI rated safety eye protection only.	X_Manual lifting >50 lbs or awkward loads, get assistance. If employee not capable of lifting 40 lbs. seek assistance.	__ Aerial lifts/platforms
__ Confined space entry	__Welding/cutting	__ Demolition

Continue on page 3 of 3 (if necessary)

Hazard Control Measures (Check all that apply):

PPE	Protective Systems	Fire Protection	Electrical
X_ Head protection	__ Locate buried utilities	__ Fire extinguishers	__ Lockout/tagout
__ Face protection	__ Competent person	__ Fire watch	__ Grounded
X_Hard toe work boots	__ Daily inspections	__ Non-spark tools	__ Panels covered
__ Thermal/lined	__ Sloping	__ Grounding/bonding	X_GFCI/extension cords
X_ Eye	__ Shoring	__ Intrinsically safe equipment	__ Power tools/cord inspected
X_Dermal/hand	__ Trench box	__Combustible materials storage	__Insulated tools/gloves
__ Hearing	__ Barricades	__Chemical Storage	
__ Respiratory			
X_Reflective vests			
Fall Protection	**Air Monitoring**	**Proper Equipment**	**Welding & Cutting**
__ Harness/lanyards	__ PID/FID	__ Aerial lift/ladders/scaffolds	__ Cylinders secured/capped
__ Adequate anchorage	__ Detector tubes	__ Forklift/ Heavy equipment	__ Cylinders separated/upright
__ Guardrail system	__ Radiation	__ Backup alarms	__ Flash-back arrestors
__ Covered opening	__ Personnel sampling	__ Hand/power tools	__ No cylinders in CSE
__ Fixed barricades	__ LEL/O2	__ Crane w/current inspection	__ Flame retardant clothing
__ Warning system	__ Other	__ Proper rigging	__ Appropriate goggles
		__ Operator qualified	
Confined Space Entry	**Medical/Emerg. Response**	**Heat/Cold Stress**	**Vehicle/Traffic**
__ Isolation	X_ First-aid & BBP kit	X_Work/rest regime	__ Traffic Awareness
__ Air monitoring	X_Eye wash	X_ Rest area	__Traffic control
__ Trained personnel	X_FA-CPR training	X_Liquids available	__ Barricades
__ Permit completed	X_Route to hospital	X_Monitoring	__ Flags
__ Rescue provisions		__ Training	__ Signs
Permits	**Demolition**	**Inspections**	**Training**
__ Hot work	__ Pre-demolition survey	__ Ladders/aerial lifts	X_ Hazwaste
__ Confined space	__ Structure condition	__ Lanyards/harness	__ Construction
__ Lockout/tagout	__ Isolate area/utilities	__ Scaffolds	__Equipment
__ Excavation	__ Competent person	__ Heavy equipment	__ Competent person
__ Demolition	__ Hazmat present	__Cranes and rigging	X_Task-specific (AHA)
__ Energized work		__Other per Field Safety Plan	X_ Hazcom
__Local/Environmental			

Field Notes:

_____

_____

_____

Additional Space for Project Specific Hazard Awareness (if necessary):

1) Observe government/military facility posted speed limits.
2) Wear seat belts in vehicles while on government/military facilities.
3) Do not use cell phones or two way radios while driving or actively operating equipment on government/military facilities.
4) Failure to do so may result in loss of driving privileges on government/military facilities.
5) Report all accidents/injuries and property damage to the Project Manager and Program CIH immediately.
6) Maintain hospital route maps in site vehicles. Know facility EMS, Fire and Security dispatch #s.
7) Secure any loads to hauling vehicle (pick-up truck) with appropriate rated tie down straps.
8) Use reflective vests/ high visibility clothing in high traffic areas or in areas were material handling operations are occurring.

Attendees:

Name (Printed):	Signature:

Meeting Conducted By:

Name Printed	Signature

Attachment 9
Loss Prevention Observation Form

Loss Prevention Observation Form

Project:	Observer:
Position/Title of worker observed:	Background Information/comments:
Task/Observation Observed:	Date:

- Identify and reinforce safe work practices/behaviors
- Identify and improve on at-risk practices/acts
- Identify and improve on practices, conditions, controls, and compliance that eliminate or reduce hazards
- Proactive PM/Site Manager support facilitates eliminating/reducing hazards (material/personnel resources)
- Positive, corrective, cooperative, collaborative feedback/recommendations

Actions & Behaviors	**Consistent w/ H&S Program**	**Not Consistent w/ H&S Program**	**Observations/Comments**
Current & accurate Pre-Task Planning/Briefing (Project safety plan, AHA, PTSP, tailgate briefing, c., as needed)			**Positive Work Practices Observed:**
Personnel properly trained/qualified/experienced			
Tools/equipment available and adequate			
Proper use of tools			**Questionable Activity/Condition Observed:**
Barricades/work zone control			
Housekeeping			
Communication			
Work Approach/Habits			
Attitude			
Focus/attentiveness			**Actions/Comments:**
Pace			
Uncomfortable position			
Inconvenient location			
Position/Line of fire			
Apparel (hair, loose clothing, jewelry)			
Repetitive motion			**Observed Worker's Corrective Actions/Comments:**
Other…			

Safety and Occupational Health Deficiency Tracking Log						
Item	Date Identified	Identified By	Deficiency Description	Resolution Date	Corrected By	Actual Correction Date
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						

Attachment 10
Loss/Near Loss Incident Report Form

Incident Report Form

Type of Incident (Select at least one)

- ☐ Injury/Illness
- ☐ Environmental/Permit Issue
- ☐ Property Damage
- ☐ Near Miss
- ☐ Spill/Release
- ☐ Other

General Information (Complete for all incident types)

Preparer's Name: _____ Preparer's Employee Number: _____

Date of Report: _____ Date of Incident: _____ Time of Incident: _____ am/pm

Type of Activity (Provide activity being performed that resulted in the incident)

- ☐ Asbestos Work
- ☐ Confined Space Entry
- ☐ Construction Mgmt- Haz Waste
- ☐ Construction Mgmt - Non-Haz Waste
- ☐ Demolition
- ☐ Drilling-Haz Waste
- ☐ Drilling-Non Haz Waste
- ☐ Drum Handling
- ☐ Electrical Work
- ☐ Excavation Trench-Haz Waste
- ☐ Excavation Trench-Non Haz
- ☐ Facility Walk Through
- ☐ General Office Work
- ☐ Keyboard Work
- ☐ Laboratory
- ☐ Lead Abatement
- ☐ Motor Vehicle Operation
- ☐ Moving Heavy Object
- ☐ Other (Specify) _____
- ☐ Process Safety Management
- ☐ Tunneling
- ☐ Welding
- ☐ Wetlands Survey
- ☐ Working from Heights
- ☐ Working in Roadways
- ☐ WWTP Operation

Location of Incident (Select one)

- ☐ Company Premises (JVI Office: _____)
- ☐ Field (Project #: _____ Project/Site Name: _____ Client: _____)
- ☐ In Transit (Traveling from: _____ Traveling to: _____)
- ☐ At Home

Geographic Location of Incident (Select region where the incident occurred)

- ☐ Northeast
- ☐ Northeast
- ☐ Northwest
- ☐ Southwest
- ☐ Corporate
- ☐ Canadian
- ☐ Asia Pacific
- ☐ Europe Middle East
- ☐ Latin America

If an AGVIQ subcontractor was involved in the incident, provide their company name and phone number:

_____

Describe the Incident (Provide a brief description of the incident): _____

_____

_____

_____

_____

Injured Employee Data (Complete for Injury/Illness incidents only)

If AGVIQ employee injured

Employee Name: _____ Employee Number: _____

If AGVIQ Subcontractor employee injured

Employee Name: _____ Company: _____

Injury Type

- ☐ Allergic Reaction
- ☐ Amputation
- ☐ Asphyxia
- ☐ Bruise/Contusion/Abrasion
- ☐ Burn (Chemical)
- ☐ Burn/Scald (Heat)
- ☐ Cancer
- ☐ Carpal Tunnel
- ☐ Concussion
- ☐ Cut/Laceration
- ☐ Dermatitis
- ☐ Dislocation
- ☐ Electric Shock
- ☐ Foreign Body in eye
- ☐ Fracture
- ☐ Freezing/Frost Bite
- ☐ Headache
- ☐ Hearing Loss
- ☐ Heat Exhaustion
- ☐ Hernia
- ☐ Infection
- ☐ Irritation to eye
- ☐ Ligament Damage
- ☐ Multiple (Specify)

_____

- ☐ Muscle Spasms
- ☐ Other (Specify)

_____

- ☐ Poisoning (Systemic)
- ☐ Puncture
- ☐ Radiation Effects
- ☐ Strain/Sprain
- ☐ Tendonitis
- ☐ Wrist Pain

Part of Body Injured

- ☐ Abdomen
- ☐ Ankle(s)
- ☐ Arms (Multiple)
- ☐ Back
- ☐ Blood
- ☐ Body System
- ☐ Buttocks
- ☐ Chest/Ribs
- ☐ Ear(s)
- ☐ Elbow(s)
- ☐ Eye(s)
- ☐ Face
- ☐ Finger(s)
- ☐ Foot/Feet
- ☐ Hand(s)
- ☐ Head
- ☐ Hip(s)
- ☐ Kidney
- ☐ Knee(s)
- ☐ Leg(s)
- ☐ Liver
- ☐ Lower (arms)
- ☐ Lower (legs)
- ☐ Lung
- ☐ Mind
- ☐ Multiple (Specify)
- ☐ Neck
- ☐ Nervous System
- ☐ Nose
- ☐ Other (Specify)

_____

- ☐ Reproductive System
- ☐ Shoulder(s)
- ☐ Throat
- ☐ Toe(s)
- ☐ Upper Arm(s)
- ☐ Upper Leg(s)
- ☐ Wrist(s)

10.5.1.1.1.1.1.1.1 *Nature of Injury*

- ☐ Absorption
- ☐ Bite/Sting/Scratch
- ☐ Cardio-Vascular/Respiratory System Failure
- ☐ Caught In or Between
- ☐ Fall (From Elevation)
- ☐ Fall (Same Level)
- ☐ Ingestion
- ☐ Inhalation
- ☐ Lifting
- ☐ Mental Stress
- ☐ Motor Vehicle Accident
- ☐ Multiple (Specify)

_____

- ☐ Other (Specify)

_____

- ☐ Overexertion
- ☐ Repeated Motion/Pressure
- ☐ Rubbed/Abraded
- ☐ Shock
- ☐ Struck Against
- ☐ Struck By
- ☐ Work Place Violence

Initial Diagnosis/Treatment Date: _____

Type of Treatment

- ☐ Admission to hospital/medical facility
- ☐ Application of bandages
- ☐ Cold/Heat Compression/Multiple Treatment
- ☐ Cold/Heat Compression/One Treatment
- ☐ First Degree Burn Treatment
- ☐ Heat Therapy/Multiple treatment
- ☐ Multiple (Specify)

_____

- ☐ Heat Therapy/One Treatment
- ☐ Non-Prescriptive medicine
- ☐ None
- ☐ Observation
- ☐ Other (Specify)

_____

- ☐ Prescription- Multiple dose
- ☐ Prescription- Single dose
- ☐ Removal of foreign bodies
- ☐ Skin Removal
- ☐ Soaking therapy- Multiple Treatment
- ☐ Soaking Therapy- One Treatment
- ☐ Stitches/Sutures
- ☐ Tetanus
- ☐ Treatment for infection
- ☐ Treatment of 2nd /3rd degree burns
- ☐ Use of Antiseptics – multiple treatment
- ☐ Use of Antiseptics – single treatment
- ☐ Whirlpool bath therapy/multiple treatment
- ☐ Whirlpool bath therapy/single treatment
- ☐ X-rays negative
- ☐ X-rays positive/treatment of fracture

Number of days doctor required employee to be off work: _____
Number of days doctor restricted employee's work activity: _____
Equipment Malfunction: Yes ☐ No ☐ Activity was a Routine Task: Yes ☐ No ☐
Describe how you may have prevented this injury:

_____
_____
_____

Physician Information		Hospital Information	
Name:	_____	Name:	_____
Address:	_____	Address:	_____
City:	_____	City:	_____
Zip Code:	_____	Zip Code:	_____
Phone:	_____	Phone:	_____

Property Damage (Complete for Property Damage incidents only)

Property Damaged: _____ Property Owner: _____
Damage Description: _____
Estimated Amount: $ _____

Spill or Release (Complete for Spill/Release incidents only)

Substance (attach MSDS): _____ Estimated Quantity: _____
Facility Name, Address, Phone No.:
_____
Did the spill/release move off the property where work was performed?:
_____
Spill/Release From: _____ Spill/Release To: _____

Environmental/Permit Issue (Complete for Environmental/Permit Issue incidents only)

Describe Environmental or Permit Issue:
_____
Permit Type:
_____
Permitted Level or Criteria (e.g., discharge limit):
_____
Permit Name and Number (e.g., NPDES No. ST1234):
_____
Substance and Estimated Quantity:
_____
Duration of Permit Exceedance:
_____

Verbal Notification (Complete for all incident types)(Provide names, dates and times)

AGVIQ Personnel Notified: _____
Client Notified: _____

Root Cause Investigation

This attachment is provided to assist in accessing, completing, and reviewing an incident investigation. It is important to remember the following when conducting an investigation:

Gather relevant facts, focusing on fact-finding, not fault-finding.
Draw conclusions, pitting facts together into a probable scenario.
Determine incident root cause(s), the basic causes why an unsafe act/condition existed.
Develop and implement solutions, matching all identified root causes with solutions.

Documentation
The following should be included in the Incident Report Form (IRF) to document the incident.

Description

Provide a description of the event and the sequence of events and actions that took place prior to the incident. Start with the incident event and work backwards in time through all of the preceding events that directly contributed to the incident. The information should identify why the event took place as well as who was involved, when and where the event took place, and what actions were taken.

Cause Analysis

Using the form and flowchart in this attachment the root cause of the incident will be determined. This form must be retained in the project and/or regional HS&E files.

Immediate Causes—List the substandard actions or conditions that directly affected the incident. The following are examples of immediate causes:

> ***Substandard Actions*:** Operating equipment without authority; failure to warn; failure to secure; operating at improper speed; making safety device inoperable; using defective equipment; failing to use PPE; improper loading; improper lifting; improper position for task; under influence of alcohol or drugs; horseplay.
>
> ***Substandard Conditions:*** Exposure to hazardous materials; exposure to extreme temperatures; improper lighting; improper ventilation; congestion; exposure to fire and explosive hazard; defective tools, equipment or materials; exposure to extreme noise; poor ventilation; poor visibility; poor housekeeping.

Basic Causes—List the personal and job factors that caused the incident. The following are examples of basic causes:

> ***Personal Factors:*** Capability; knowledge; skill; stress; motivation.
>
> ***Job Factors:*** Abuse or misuse; engineering; maintenance; purchasing; supervision; tools and equipment; wear and tear; work standards.

Corrective Action Plan

Include all corrective actions taken or those that should be taken to prevent recurrence of the incident. Include the specific actions to be taken, the employer and personnel responsible for implementing the actions, and a time frame for completion. Be sure the corrective actions address the causes. For example, training may prevent recurrence of an incident caused by a lack of knowledge, but it may not help an incident caused by improper motivation.

The following are examples of management programs that may be used to control future incidents. These programs should be considered when determining specific corrective actions.

Management Programs: Accident/incident analysis; emergency preparedness; engineering controls; general promotion; group meetings; health control; hiring and placement; leadership and administration; management training; organizational rules; personal protective equipment; planned inspections; program audits; program controls; purchasing controls; task analysis and procedures; task observation.

Loss/Near-Loss Investigation Report Form

Employer Information

Company Name: _____

Project Name: _____ Task Order: _____

Project Location: _____

Task Location: _____

Job Assignment: _____

Preparer's Name: _____ Preparer's Employee Number: _____

Incident Specific Information

Date of Incident: _____ Time of Incident: _____ a.m./p.m.

Location of incident:
☐Company premises
☐Field
☐In Transit
☐
Other:_____
_____

Address where the incident occurred: _____

Equipment Malfunction: Yes ☐ No ☐ Activity was a Routine Task: Yes ☐ No ☐

Describe any property damage: _____

Specific activity the employee was engaged in when the incident occurred:
_____
_____

All equipment, materials, or chemicals the employee was using when the incident occurred:
_____
_____

Describe the specific incident and how it occurred:
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Describe how this incident may have been prevented:

_____
_____
_____
_____
_____
_____
_____
_____

Contributing Factors (Describe in detail why incident occurred):

_____
_____
_____
_____
_____

Date employer notified of incident: _____ To whom reported: _____

Witness Information (First Witness)

Name: _____
Employee Number_____
Address:_____
City: _____
Zip Code : _____
Phone: _____

Witness Information (Second Witness)

Name: _____
Employee Number_____
Address:_____
City: _____
Zip Code : _____
Phone: _____

Additional information or
comments:_____
_____
_____

A ROOT CAUSE ANALYSIS FORM MUST BE COMPLETED FOR ALL INJURIES AND ILLNESSES OR ACTUAL LOSSES.

COMPLETION OF THE ROOT CAUSE ANALYSIS FORM FOR NEAR LOSSES IS OPTIONAL, AT THE DISCRETION OF THE HEALTH AND SAFETY MANAGER.

Determination of Root Cause(s)

For losses or near losses the information may be gathered by the supervisor or other personnel immediately following the loss or near loss. Based on the complexity of the situation, this information may be all that is necessary to enable the investigation team to analyze the loss, to determine the root cause, and to develop recommendations. More complex situations may require the investigation team to revisit the loss site or re-interview key witnesses to obtain answers to questions that may arise during the investigation process.

Photographs or videotapes of the scene and damaged equipment should be taken from all sides and from various distances. This point is especially important when the investigation team will not be able to review the loss scene.

The investigation team must use the Root Cause Analysis Flow Chart to assist in identifying the root cause(s) of a loss. Any loss may have one or more root causes and contributing factors. The root cause is the primary or immediate cause of the incident, while a contributing factor is a condition or event that contributes to the incident happening, but is not the primary cause of the incident. Root causes and contributing factors that relate to the *person* involved in the loss, his or her peers, or the supervisor should be referred to as personal factors. Causes that pertain to the *system* within which the loss or injury occurred should be referred to as job factors.

<u>Personal Factors</u>

1. Lack of skill or knowledge, lack of motivation
5. Correct way takes more time and/or requires more effort
6. Short-cutting standard procedures is positively reinforced or tolerated
7. Person thinks that there is no personal benefit to always doing the job according to standards

<u>Job Factors</u>

2. Lack of or inadequate operational procedures or work standards.
3. Inadequate communication of expectations regarding procedures or standards
4. Inadequate tools or equipment

<u>Other</u>

8. Uncontrollable Factors *

The root cause(s) could be any one or a combination of these seven possibilities or some other uncontrollable factor. In the vast majority of losses, the root cause is very much related to one or more of these seven factors. * **Uncontrollable factors should be used rarely and only after a thorough review eliminates all seven other factors.**

Root Cause Analysis Form

Root Cause Analysis (RCA)

Root Cause Categories (RCC): Select the RCC numbered below that applies for the root cause (RC) and/or contributing factor (CF) in the first column, then describe the specific root cause and corrective actions in each column.

1. **Lack of skill or knowledge**
2. **Lack of or inadequate operational procedures or work standards**
3. **Inadequate communication of expectations regarding procedures or work standards**
4. **Inadequate tools or equipment**
5. **Correct way takes more time and/or requires more effort**
6. **Short-cutting standard procedures is positively reinforced or tolerated**
7. **Person thinks there is no personal benefit to always doing the job according to standards**
8. **Uncontrollable Factor (Note: Uncontrollable factors should be used rarely and only after a thorough review eliminates "all" seven other factors.)**

RCC #	Root Cause(s)	Corrective Actions	RC[1]	CF[2]	Due Date	Completion Date	Date Verified

[1] RC = Root Cause; [2] CF = Contributing Factors (check which applies)

Investigation Team Members

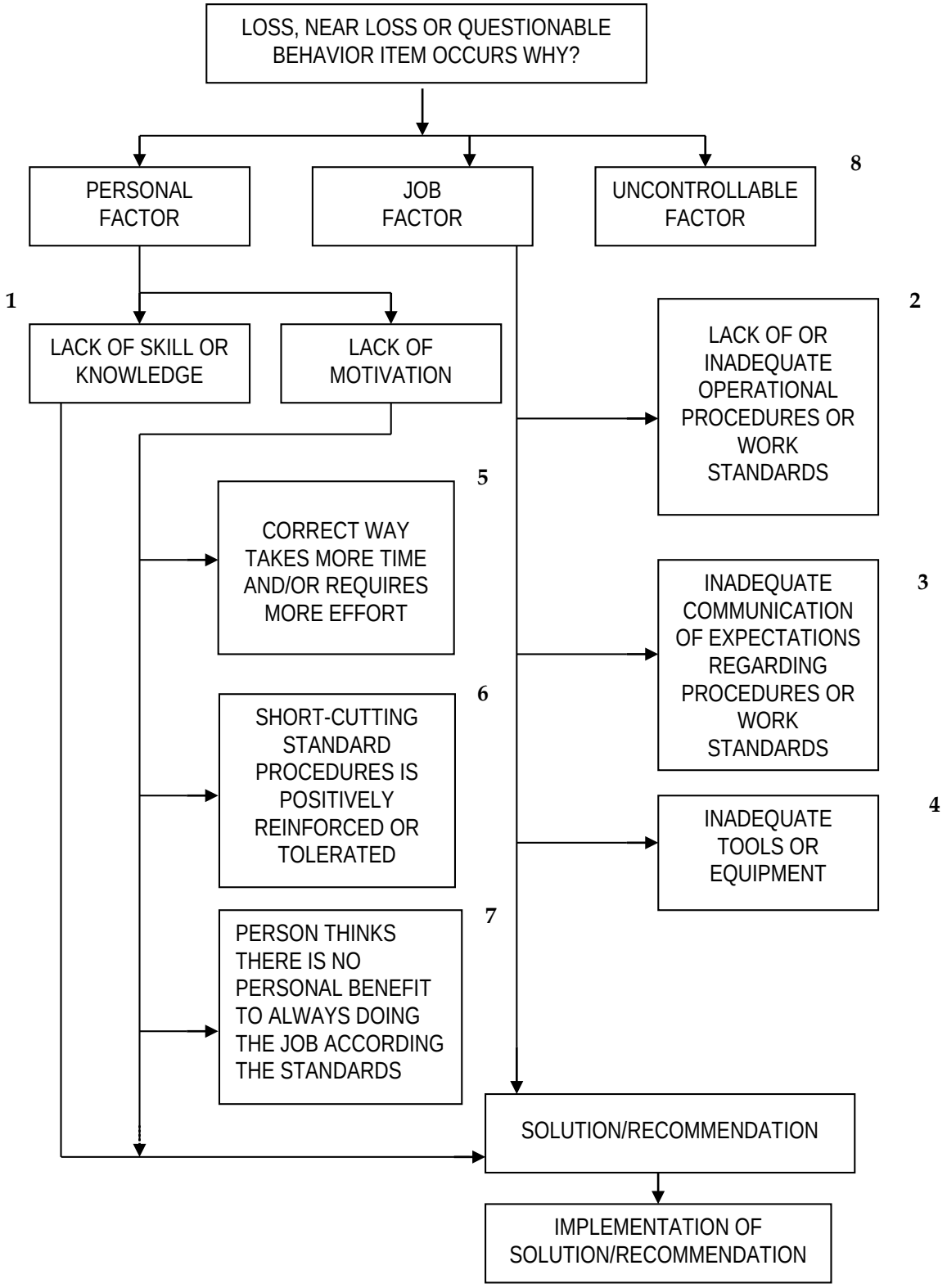
Name	Job Title	Date

Results of Solution Verification and Validation

Reviewed By

Name	Job Title	Date

Root Cause Analysis Flow Chart



Attachment 11
Hurricane Preparedness Plan

Hurricane Preparedness Plan

Enhanced Bioremediation – Areas F and G
Naval Air Station Jacksonville
Jacksonville, Florida

Revision No. 00

Contract No. N62470-12-D-7004
Contract Task Order No. JM19

Submitted to:

U.S. Naval Facilities
Engineering Command

Prepared by:

June 2014

Revision 00

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Attachments

A Hurricane Preparedness Responsibility Checklists
B Hurricane Tracking Map

Acronyms and Abbreviations

COR	Condition of Readiness
FEMA	Federal Emergency Management Administration
HSO	Health and Safety Officer
mph	mile(s) per hour
NAS	Naval Air Station
NOAA	National Oceanic and Atmospheric Administration
OSHA	Occupational Safety and Health Administration
PPE	personal protective equipment
ROICC	Resident Officer in Charge of Construction
SSHO	Site Safety and Health Officer

1.0 Introduction

1.1 Purpose

This procedure outlines the general responsibilities and actions to be taken in preparation for and response to a hurricane or hurricane warnings posted for the coastal regions of Florida where Naval Air Station (NAS) Jacksonville is located. All personnel should understand that predicting the occurrence and path of a hurricane is difficult, however the risk can be minimized and controlled by following the procedures in this plan.

1.2 Scope

This procedure is applicable to all contractor personnel, subcontractors and remediation equipment present at NAS Jacksonville.

1.3 Discussion

This procedure provides information on how to protect personnel and property in the event of a hurricane. For Florida, attention must be paid to all tropical storms and hurricanes due to the uncertainty of time and location of landfall.

The following table demonstrates accuracy of forecasting a hurricane landfall. Probability of a landfall occurrence is low-more than 24 hours in advance of a storm.

Hours Before Landfall	Maximum Probability Values
72 Hours	10 Percent
48 Hours	13-18 Percent
36 Hours	20-25 Percent
24 Hours	35-45 Percent
12 Hours	60-70 Percent

2.0 Definitions

The following definitions apply to various terms used in this document.

Conditions of Readiness (COR):

- **Condition V -** Destructive winds are possible at NAS Jacksonville **within 96 hours**. Normal daily job site cleanup and good housekeeping practices.
- **Condition IV** - Destructive winds are possible at NAS Jacksonville **within 72 hours**. Normal daily job site cleanup and good housekeeping practices. Collect and store in piles or containers, scrap lumber, waste material and rubbish, for removal and disposal at the end of each workday. Maintain the construction site, including storage areas, free of accumulation of debris. Stack form lumber in neat piles less than 4 feet high. Remove all trash debris and other objects which could become missile hazards. Contact Resident Officer In Charge of Construction (ROICC) for Condition requirements, updates, and completion of required actions.
- **Condition III** - Destructive winds are possible at NAS Jacksonville **within 48 hours**. Maintain **Condition IV** requirements. Begin securing the job site for and taking those actions necessary for **Condition I**, which cannot be completed within 18 hours. Cease all routine activities, which might interfere with securing operations. Begin collecting and stowing all gear and portable equipment. Make preparations for securing buildings. Review requirements pertaining to **Condition II** and continue action as necessary to attain **Condition III** readiness. Contact the weather station on Base for weather and COR updates and completion of required actions.
- **Condition II** - Destructive winds are possible at NAS Jacksonville **within 24 hours.** Curtail or cease routine activities until securing operations are complete. Reinforce or remove formwork and scaffolding. Secure machinery, tools, equipment, and materials, or remove from job site. Expend every effort to clear all missile hazards and loose equipment from the job site. Contact ROICC for weather and COR updates and completion of required actions.
- **Condition I** - Destructive winds are possible in at NAS Jacksonville **within 12 hours**. Perform and complete all remaining actions required for lower conditions of readiness. Secure the job site and leave the government premises.
- **Destructive Winds** - Generally winds reaching or exceeding the force of a tropical storm ($\geq$ 39 miles per hour [mph] or 34 knots). Winds from any storm system (tropical or otherwise) that are determined to have the potential to cause property damage or personal injury which would warrant NAS Jacksonville to initiate a Condition IV alert.
- **Gale** - Non-tropical windstorm with winds 38 to 63 mph (33 to 55 knots).
- **Hurricane** - A tropical cyclone in which the maximum sustained surface wind is 74 mph (64 knots) or greater.

- **Hurricane Warning** - A warning that sustained winds of 74 mph (64 knots) or higher, associated with a hurricane, are expected in a specified coastal area in 24 hours or less.
- **Hurricane Watch** - An announcement for specific areas where a hurricane or an incipient hurricane poses a possible threat to a coastal area, generally within 36 hours.
- **Missile Hazard** - Any object that may become airborne during high winds.
- **Severe Weather -** Any storm of tropical or non-tropical origin that has the capacity to produce destructive winds.
- **Storm** - Non-tropical windstorm with winds 38 to 62 mph (33 to 55 knots).
- **Storm Surge** - An abnormal rise in sea level accompanying a hurricane or other intense storm, and whose height is the difference between the observed level of the sea surface and the level that would have occurred in the absence of the storm.
- **Storm Tide** - The actual sea level resulting from the astronomical tide combined with the storm surge. This term is used interchangeably with Hurricane Tide.
- **Tornado** - Violent rotating columns of air with winds 115 to 288 mph (100 to 250 knots).
- **Tropical Depression** - A tropical low-pressure system in which the maximum sustained surface wind is 38 mph (33 knots) or less.
- **Tropical Storm** - A tropical low pressure system in which the maximum surface wind ranges from 39 to 73 mph (34 to 63 knots) inclusive. This is the strength at which the National Hurricane Center applies a name to the storm.
- **Tropical Storm Watch** - Tropical storm conditions pose a threat to a coastal area generally within 36 hours.
- **Tropical Storm Warning** - A warning for tropical storm conditions with sustained winds within the range of 39 to 73 mph (34 to 63 knots), which are expected in a specified coastal area within 24 hours or less.

3.0 Emergency Operating Procedures

3.1 Condition V – Destructive Winds are Possible within 96 Hours (Early Preparedness)

The Site Safety and Health Officer (SSHO) will notify the project manager and site superintendent (field team leader) when a tropical storm has been named and/or any severe weather has the potential to produce destructive winds at NAS Jacksonville within **96 hours**. This will initiate COR Condition V. This phase will continue until:

- The storm or condition is downgraded.
- The storm track poses no threat to the site.
- Condition IV begins.

During Condition V, the progress of the storm will be monitored and tracked by Hurricane Tracking Maps (**Attachment A**). The Base will be contacted at least twice daily for Condition Requirements updates and to inform him of completion of required actions for Condition V.

See Attachment A for the Hurricane Preparedness Responsibility Checklist - Condition V.

3.2 Condition IV – Destructive Winds are Possible within 72 Hours

This COR starts when severe weather is within 72 hours of posing a threat to the project location. The SSHO will ensure that the following steps are taken:

- Monitor the storm and inform the Project Manager and Site Superintendent (field team leader) of its progress.
- Check PPE supplies and equipment to determine if any shipments are required or if pending shipments should be advanced or postponed.

During Condition IV, the progress of the storm will be continuously monitored and tracked. The Site Superintendent (field team leader) or SSHO will instruct site personnel to begin general cleanup of all loose materials that may pose a hazard during high winds or rain. This will include removal of all debris, trash, and other debris that may become missile hazards. All form lumber will be stacked in neat piles less than 4 feet high. The ROICC will be contacted at least twice daily for Condition Requirements updates and to inform him of completion of required actions for Condition IV. Attachment 5 of the APP includes a list of emergency telephone numbers.

The Site Superintendent (field team leader) or SSHO will keep all site personnel advised of the status of the storm and site preparation activities. Due to the urgency and amount of work involved in preparing for a threatening storm, all construction operations that might interfere with securing operations, such as starting a major excavation, will cease.

The Site Superintendent (field team leader) will ensure that the following steps are taken:

- Fill fuel tanks in all equipment onsite.

- Secure stockpiled material onsite.
- Review requirements for Condition IV with all site personnel.
- Maintain Condition IV requirements.

See Attachment A for the Hurricane Preparedness Responsibility Checklist - Condition IV.

3.3 Condition III – Tropical Storm Warning (Destructive Winds are Possible within 48 Hours)

This COR starts when severe weather poses a threat to the project site within 48 hours. Condition III activities will also start if a threatening tropical storm is upgraded to a hurricane, or a severe storm approaching NAS Jacksonville has generated destructive winds in other locations. The Project Manager, Site Superintendent (field team leader), and SSHO will determine when to cease all operations based upon current weather conditions and/or as directed by the Base contact. If the storm or Condition is downgraded, the Project Manager, Site Superintendent (field team leader), and SSHO will contact the Base contact to decide if a downgrade of the COR is appropriate. Actions for Condition III will be maintained and the following shall also be completed:

- Machinery, tools, equipment, and materials will be secured or removed from the site.
- Take actions to secure job site necessary for Condition I that cannot be completed within 18 hours.

See **Attachment A** for the Hurricane Preparedness Responsibility Checklist - Condition III.

3.4 Condition II – Destructive Winds are Possible within 24 Hours (Tropical Storm Warning)

Condition II begins when destructive winds are anticipated within 24 hours and/or as directed by the Base contact. The Project Manager, Site Superintendent (field team leader), and SSHO will determine when to demobilize from the site based upon weather conditions.

3.4.3 Site Superintendent Responsibilities

Where a Site Superintendent (field team leader) is assigned to the project and onsite at the time of the Condition II warning, this individual shall be responsible for the following actions:

- Secure machinery, tools, equipment, and materials or remove them from the job site.
- Conduct a roll call of personnel onsite and inform the SSHO.
- Notify personnel, on leave, of schedule changes.
- Personnel needing to leave the project to attend to personal matters will notify their Site Superintendent (field team leader) immediately.
- Heavy equipment will be secured according to the manufacturer's recommendations.
- All small field equipment will be secured.
- Where a full time SSHO is not assigned to or is not on the site at the time of the Condition II warning, the Site Superintendent (field team leader) shall execute the above responsibilities and the SSHO responsibilities identified in Section 3.4.2.

3.4.2 SSHO Responsibilities

Where a SSHO is assigned to the project and onsite at the time of the Condition II warning, this individual shall be responsible for the following actions:

- All visitors from the site are evacuated.
- Make a final site walk-through to determine that the site is secure and clear all missile hazards from the job site.
- Inform the Project Manager that all personnel are being released from the site.
- Where a full time Site Superintendent (field team leader) is not assigned to or is not on the site at the time of the Condition II warning, the SSHO shall execute the above responsibilities and the Site Superintendent (field team leader) responsibilities identified in Section 3.4.1 above.

If the storm or Condition is downgraded, the Project Manager, Site Superintendent (field team leader), and SSHO will conference to decide if a downgrade of the phase is necessary.

See Attachment A for the Hurricane Preparedness Responsibility Checklist - Condition II.

3.5 Condition I – Destructive Winds are Possible within 12 Hours

Condition I begins when destructive winds are anticipated within 12 hours and/or as directed by the Base contact. The Site Superintendent (field team leader) will ensure that the following steps are taken:

- Complete all remaining actions required for lower conditions of readiness.
- Secure job site access and evacuate to safe refuge.

See Attachment A for the Hurricane Preparedness Responsibility Checklist - Condition I.

3.6 Resuming Site Operations

The Project Manager will contact the Base to determine when site operations will resume. Although the hurricane/severe weather has passed, hazards may still exist because of water damage, other hazardous conditions, dangers from electric shock, poisonous snakes, etc.

The SSHO will conduct a damage survey with the Project Manager and Site Superintendent (field team leader). Photographs of the storm damage at the site will be taken by the Site Superintendent (field team leader). They will develop a prioritized recovery plan from the survey findings. Subsequently, all site personnel will be notified when it is safe to return to work. Required personnel and subcontractor expertise will be mobilized to the site to repair any damaged equipment.

See Attachment A for the Hurricane Preparedness Responsibility Checklist - Resume Site Operations.

4.0 Debriefing

Following the return to work of site personnel, the Site Superintendent (field team leader) will conduct a debriefing with site personnel. The debriefing will accomplish the following objectives:

- Finalize a recovery plan.
- Review the Hurricane Preparedness Plan for effectiveness.
- Suggest and agree on improvements to the plan.
- Incorporate plan changes.

When completed, the project manager and/or Site Superintendent (field team leader) will meet with site personnel to discuss any corrective actions or changes in this plan.

5.0 References

The following references and sources of information may be consulted for additional guidance on hurricane preparedness and response:

- Disaster Planning Guide for Business and Industry, Federal Emergency Management Administration (FEMA)
- U.S. Department of Commerce; National Oceanic and Atmospheric Administration (NOAA)
- COMNAVREG MIDLANT INST

Attachment A

Hurricane Preparedness Responsibility Checklist

Hurricane Preparedness Checklist

Condition V (Landfall Within 96 Hours)

Date/Time Entered Condition V:_____

Severe Weather/Tropical Storm:

_____

Action Items

- ☐ Notify Project Manager
- ☐ Track of Storm Poses No Threat
- ☐ Storm or Condition is Downgraded
- ☐ Upgrade to Condition IV

Storm Location

Date/Time:_____

Location/Coordinates:_____

Date/Time:_____

Location/Coordinates:_____

Date/Time:_____

Location/Coordinates:_____

Date/Time:_____

Location/Coordinates:_____

Condition V Action Items Complete:_____

Date:_____

Hurricane Preparedness Checklist

Condition IV (Landfall Within 72 hours)

Date/Time Entered Condition IV:_____

Action Items

- ☐ Notify Project Manager
- ☐ Notify Site Superintendent (field team leader)
- ☐ Notify Site Personnel
- ☐ Assemble shift personnel to begin preparation
- ☐ Track storm on hurricane tracking map (if applicable) (Attachment B)

The Project Foremen will ensure the following steps are taken:

- ☐ Secure all heavy equipment located at the site in accordance with manufacturer's specifications. All equipment will be moved to a secured site location.
- ☐ All equipment fuel tanks will be filled.
- ☐ All subcontractors with equipment or supplies on site will be notified to begin removal procedures.

Condition IV Action Items Complete:_____

Date:_____

Hurricane Preparedness Checklist

Condition III (Landfall Within 48 hours)

Date/Time Entered Condition III:_____

Action Items

- ☐ Provide the status of the storm to site personnel on an hourly basis
- ☐ Take actions to secure job site necessary for Condition I that cannot be accomplished in 18 hours
- ☐ Recheck all items on checklist for Condition IV to ensure they are complete (i.e., gas tanks are still filled)

See itemized equipment checklist (itemized list of equipment to be secured/removed and COR for action)

Condition III Action Items Complete:_____

Date:_____

Hurricane Preparedness Checklist

Condition II (Landfall Within 24 Hours)

Date/Time Entered Condition II:_____

Action Items

- ☐ Evacuate all visitors from the site
- ☐ Conduct a roll call of site personnel and inform the SSHO
- ☐ Check the status of all incoming shipments of supplies and equipment
- ☐ Remove all unnecessary vehicles from the site
- ☐ Secure heavy equipment in accordance with manufacturer's specification
- ☐ Secure all valuable records and equipment
- ☐ Release personnel from the site
- ☐ Recheck all items on checklist for Conditions IV and III to ensure they are complete (i.e., gas tanks are still filled)

Condition II Action Items Complete:_____

Date:_____

Hurricane Preparedness Checklist

Condition I (Landfall Within 12 Hours)

Date/Time Entered Condition I:_____

Action Items

- ☐ Complete all action items for lower conditions of readiness
- ☐ Secure job site access and evacuate to safe refuge

Condition I Action Items Complete:_____

Date:_____

Hurricane Preparedness Checklist

Resume Site Operations

Date/Time Resume Site Operations:_____

Action Items

- ☐ Conduct a damage survey
- ☐ Notify all site personnel when to return to work
- ☐ Develop a prioritized recovery plan
- ☐ Inspect electrical equipment before re-energizing to detect and repair damage
- ☐ Provide bottled water for drinking until normal drinking water is deemed safe to drink
- ☐ Remove storm debris from site
- ☐ Notify Base of the resumption of site activities

Resume Site Operations Action Items Complete:_____

Date:_____

Hurricane Preparedness Checklist

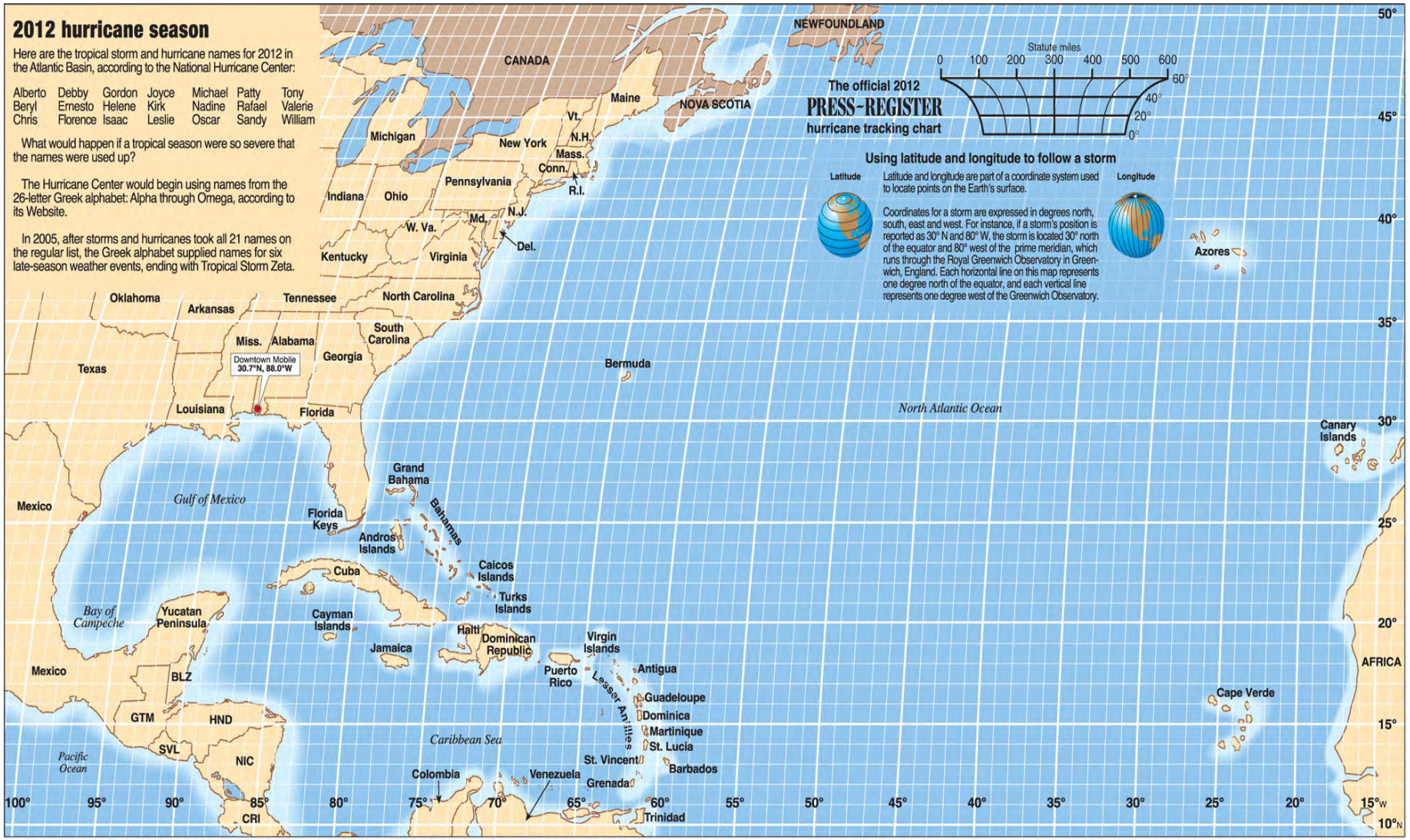
Itemized Equipment Checklist, Condition III.

Equipment	Secure in Place	Remove from Project Site

Attachment B

Hurricane Tracking Map

HURRICANE TRACKING MAP



Source: Tracking map based on National Geographic Atlas of the World, sixth edition, Robinson projection map, standard parallels 38°N and 38°S.

Press-Register graphic

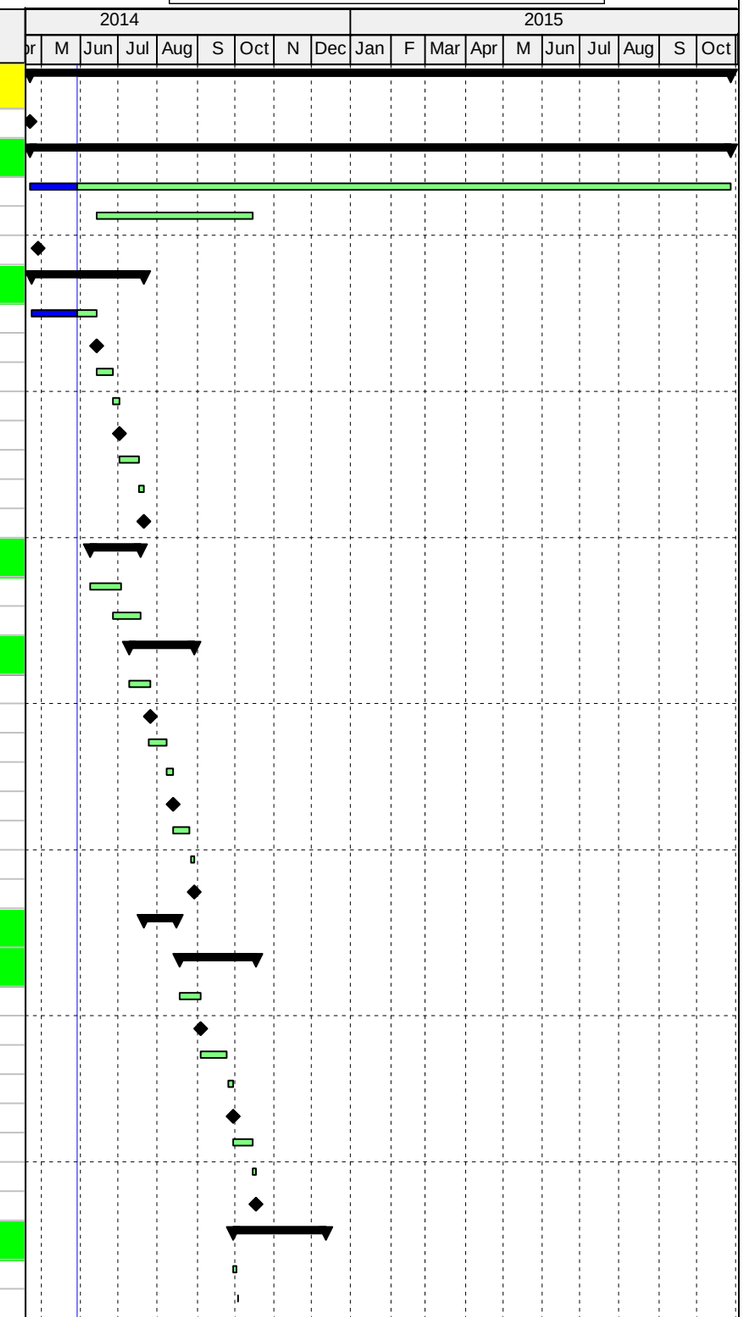
Appendix B

Project Schedule

JM19 - Enhanced Bioremediation Areas FG, NAS Jacksonville, FL

POP 4/22/2014 - 9/30/2015

Activity Name	Start	Finish
JM19 WBS JM19 - Enhanced Bioremediation Areas F&G, NAS Jacksonville, FL	22-Apr-14 A	27-Oct-15
Task Order Award	22-Apr-14 A	
JM19 WBS.04.02.01.00 Project Management and Project Support	22-Apr-14 A	27-Oct-15
Project Management	22-Apr-14 A	27-Oct-15
Procurement	13-Jun-14	15-Oct-14
Kickoff Meeting	28-Apr-14 A	
JM19 WBS.04.03.01.01 Phase I - Pre-Design Tracer Test - Work Plan	23-Apr-14 A	21-Jul-14
Prepare Draft Work Plan	23-Apr-14 A	13-Jun-14
Submit Draft WP to Navy		13-Jun-14
Navy Review	13-Jun-14	26-Jun-14
Adjudicate Navy Comments	27-Jun-14	01-Jul-14
Submit WP to Regulators		01-Jul-14
Regulatory Review	02-Jul-14	16-Jul-14
Adjudicate Regulator Comments	17-Jul-14	21-Jul-14
Submit Final Work Plan		21-Jul-14
JM19 WBS.04.10.06.00 Phase I - Pre-Design Tracer Test	09-Jun-14	18-Jul-14
Preparation	09-Jun-14	03-Jul-14
Field Event	27-Jun-14	18-Jul-14
JM19 WBS.04.10.06.91 Phase I - Pre-Design Tracer Test - Technical Memorandum	09-Jul-14	29-Aug-14
Prepare Draft Technical Memorandum	09-Jul-14	25-Jul-14
Submit Draft TM to Navy		25-Jul-14
Navy Review	25-Jul-14	07-Aug-14
Adjudicate Navy Comments	08-Aug-14	12-Aug-14
Submit TM to Regulators		12-Aug-14
Regulatory Review	13-Aug-14	26-Aug-14
Adjudicate Regulator Comments	27-Aug-14	29-Aug-14
Submit Final Technical Memorandum		29-Aug-14
JM19 WBS.04.11.03.00 Phase II - Remedial System Design - Particle Tracking Model	21-Jul-14	15-Aug-14
JM19 WBS.04.03.01.02 Phase II - Remedial System Design - Work Plan with UFP-SAP	18-Aug-14	17-Oct-14
Prepare Draft Work Plan	18-Aug-14	04-Sep-14
Submit Draft Work Plan to Navy		04-Sep-14
Navy Review	04-Sep-14	24-Sep-14
Adjudicate Navy Comments	25-Sep-14	29-Sep-14
Submit Work Plan to Regulators		29-Sep-14
Regulatory Review	30-Sep-14	14-Oct-14
Adjudicate Regulator Comments	15-Oct-14	17-Oct-14
Submit Final Work Plan		17-Oct-14
JM19 WBS.04.07.15.01 Phase III - Field Work - System Construction	30-Sep-14	11-Dec-14
Mobilization	30-Sep-14	02-Oct-14
Kickoff meeting	03-Oct-14	03-Oct-14



Date	Revision	Checked	Approved

Actual Work
Remaining Work
Milestone
Summary

ORACLE Primavera P6

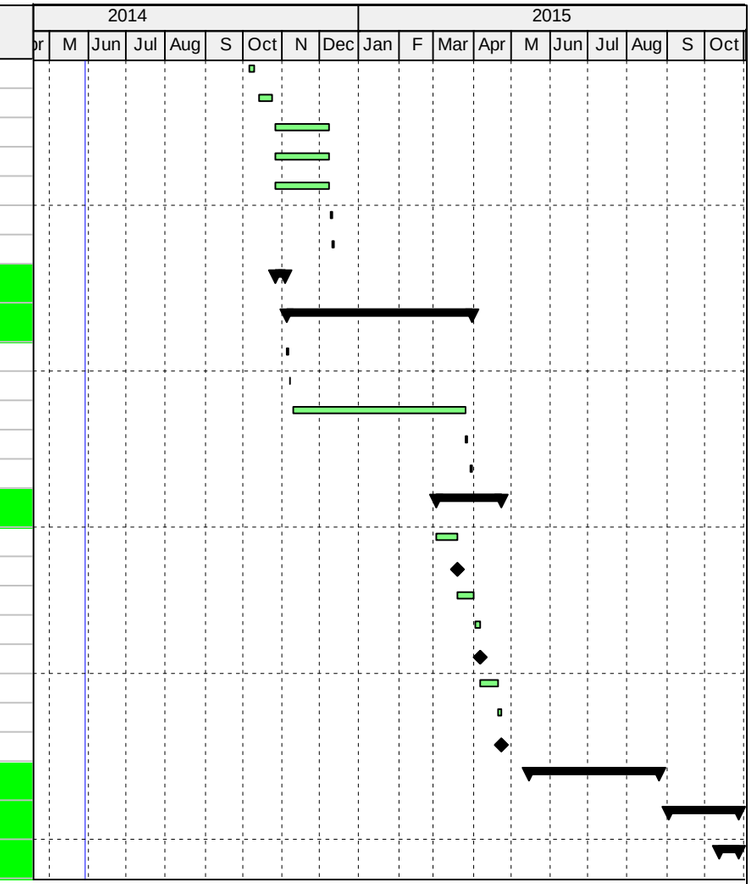
AGVIQ

SB RAC II

JM19 - Enhanced Bioremediation Areas FG, NAS Jacksonville, FL

30-May-14

Activity Name	Start	Finish
Utility Locate	06-Oct-14	10-Oct-14
Install Monitoring Wells	14-Oct-14	24-Oct-14
Injection Well Installation	27-Oct-14	08-Dec-14
Injection Trailer Construction	27-Oct-14	08-Dec-14
Survey	27-Oct-14	08-Dec-14
Site restoration	09-Dec-14	10-Dec-14
Demobilization	11-Dec-14	11-Dec-14
JM19 WBS.04.07.09.00 Phase III - Baseline GW Sampling Event	27-Oct-14	03-Nov-14
JM19 WBS.04.21.06.01 Phase III - Injection Event #1	04-Nov-14	31-Mar-15
Mobilize Equipment	04-Nov-14	06-Nov-14
Kickoff meeting	07-Nov-14	07-Nov-14
Injection activities	10-Nov-14	25-Mar-15
Site restoration	26-Mar-15	27-Mar-15
Demobilize	30-Mar-15	31-Mar-15
JM19 WBS.04.02.03.04 Phase III - Construction Completion Report	03-Mar-15	23-Apr-15
Prepare Draft Construction Completion Report	03-Mar-15	19-Mar-15
Submit Draft CCR to Navy		19-Mar-15
Navy Review	19-Mar-15	01-Apr-15
Adjudicate Navy Comments	02-Apr-15	06-Apr-15
Submit CCR to Regulators		06-Apr-15
Regulatory Review	07-Apr-15	20-Apr-15
Adjudicate Regulator Comments	21-Apr-15	23-Apr-15
Submit Final Construction Completion Report		23-Apr-15
JM19 WBS.04.06.91.00 Phase III - Performance Monitoring	15-May-15	26-Aug-15
JM19 WBS.04.11.05.00 Phase III - Performance Tech Memo	02-Sep-15	27-Oct-15
JM19 WBS.Closeout Project Closeout	13-Oct-15	27-Oct-15



Actual Work
Remaining Work
Milestone
Summary

ORACLE Primavera P6

AGVIQ

SB RAC II

JM19 - Enhanced Bioremediation Areas FG, NAS Jacksonville, FL

30-May-14

Date	Revision	Checked	Approved

Appendix C

UIC Notification Memorandum

- UIC Approval Order
- UIC Notification Memorandum Form
- Product Cut Sheet
- MSDS
- Toxicology Report

June 18, 2014

Ms. Jennifer Conklin
Florida Department of Environmental Protection
Bob Martinez Center
Division of Waste Management
Federal Programs Section
2600 Blairstone Road
Mail Station 4535
Tallahassee, FL 32399-2400

Subject: Contract No. N62470-12-D-7004
Task Order No. JM19, Enhanced Bioremediation Areas F&G - Naval Air Station Jacksonville, Florida

Draft UIC Notification Memorandum Submission – Phase I (Pre-Design) Dye Tracer Pilot Test

Dear Ms. Conklin:

AGVIQ, LLC (AGVIQ) is pleased to submit an advance copy of the Draft UIC Notification Memorandum describing the planned Rhodamine WT dye tracer pilot test, which is part of the pre-design phase of the enhanced bioremediation effort at Areas F&G, Naval Air Station Jacksonville, Florida (NAS JAX). This is an electronic submittal only, however a hard copy is available upon request.

The UIC Notification Memorandum is also provided as an appendix to the forthcoming tracer pilot test work plan, currently in Navy review, but in an effort to maintain the current project schedule and expedite review and approval to commence the tracer test, the Partners agreed that AGVIQ should issue the UIC Notification Memorandum to FDEP immediately.

Details of the proposed tracer test are provided in the enclosed form; however, the below description is presented as a courtesy:

Tracer Test Objective: Inject fluorescing dye into the shallow aquifer and measure dye concentrations at nearby observation wells over time to establish radius of influence, injection rates and pressures, mobile porosity, and other hydraulic parameters prior to designing the enhanced bioremediation substrate injection system.

Location of Test: in the grassy area south of Building 791 – see attached figure

Number and depth of injection wells: 6 new wells to a depth of 50 ft, screened from either 10 to 30 or 30 to 50 ft bgs.

Number and depth of observation wells: in addition to 3 existing monitoring wells, 2 new observation will be installed.

Volume and concentration of injectate: up to 100,000 gallons of dye/water mixture. Concentration of dye at the injection wellhead will be 42.5 mg/L.

Work Schedule: Well installation to occur from August 5 through August 13, 2014. Tracer test to occur from August 18 through 27, 2014.

Additional information is available upon request. Please provide your comments on this document as soon as possible.

Please call me at (678) 530-4085 or via email at eric.davis@ch2m.com if you have any questions or comments regarding the enclosed information.

Sincerely;
AGVIQ, LLC

Eric J. Davis
Project Manager

CC: Adrienne Wilson/NAVFAC SE
Mike Singletary/NAVFAC SE
Tim Curtin/NAS JAX

Florida Department of

Memorandum **Environmental Protection**

TO: Cathy McCarty, P.G.
Florida Department of Environmental Protection
Bureau of Water Facilities Regulation
Underground Injection Control Section - MS 3530
2600 Blair Stone Road, Tallahassee, FL 32399-2400

FROM: _____ (Note 1.)
_____
_____

DATE: _____

SUBJ: **Proposed Injection Well(s) for In Situ Aquifer Remediation at a Hazardous Waste Remedial Action Site**

Pursuant to paragraph 62-528.630(2)(c), F.A.C., inventory information is hereby provided regarding the proposed construction of temporary injection well(s) for the purpose of in situ aquifer remediation at a contaminated site.

Facility name: Naval Air Station (NAS) Jacksonville
Facility address: Operable Unit (OU) 3 - Areas E&G
City/County: Jacksonville, Duval County
Latitude/Longitude: _____
FDEP Facility Number: _____
Facility owner's name: _____
Facility owner's address: _____
_____
_____
_____

Well contractor's name: To Be Determined (Note 2.)
Well contractor's address: _____
_____
_____
_____

Facility name: NAS Jacksonville
FDEP facility no.: _____

AFFECTED AQUIFER

Name of aquifer: Surficial Aquifer
Depth to groundwater (feet): Approximately 5 feet
Aquifer thickness (feet): Approximately 50 feet
Areal extent of contamination (square feet): Site maps included with the Work Plan

INJECTION WELLS

A site map showing the location and spacing of injection wells, the areal extent of the groundwater contamination plume, and associated monitoring wells is attached. The injection well(s) features are summarized below, and/or a schematic of the injection well(s) is attached.

Direct-push or HSA/Mud rotary *(circle the appropriate well type)* Rotasonic
Diameter of well(s) (i.e., riser pipe & screen) (inches): 2
Total depth of well(s) (feet): 50
Screened interval: 8 to 50 feet below land surface
Grouted interval: 8 to 38 feet below land surface
Casing diameter, if applicable (inches): n/a
Cased depth, if applicable: n/a to n/a feet below land surface
Casing material, if applicable: n/a

PROJECT DESCRIPTION

The in situ, injection-type aquifer remediation product/process remediates contaminants by:
(check those that apply)

- ☐ bioremediation,
- ☐ chemical oxidation, or
- ■ other (describe) no remediation will occur during this phase of work

Brief description of the project:

Pre-Design dye tracer test to collect hydrogeologic and hydraulic data for a pilot scale ERD system design. Will use Rhodamine WT fluorescing dye.

Summary of major design considerations and features of the project:

Number of injection wells: 6
Injection volume per well (gallons): 4,700 to 9,400 gal water with 5.3% Rhodamine WT
Single or multiple injection events: single
Injection volume total (all wells, all events): up to 100,000 gallons

Process flow diagrams are included with the Work Plan to illustrate the injection arrays.

Facility name: NAS Jacksonville
FDEP facility no.: _____

FLUID TO BE INJECTED

Composition of injected fluid:
(ingredient, wt. %) (Note 3.): Liquid Rhodamine WT fluorescing dye will be mixed with potable water. The Rhodamine WT will be diluted from a 20% stock solution to 5.3% (42.5 mg/L) at each well head. A product cut sheet, MSDS, and toxicology report is included with this form

TEMPORARY INJECTION ZONE OF DISCHARGE (ZOD)

(check those that apply)

■ No ZOD needed. The fluid to be injected meets the primary and secondary groundwater standards of Chapter 62-550, F.A.C., and the minimum groundwater criteria of Chapters 62-520 and 62-777, F.A.C.

☐ ZOD permission by rule 62-520.310(8)(c), F.A.C., for reagent chemical species and/or parameter(s) in the fluid to be injected (or re-injected) that exceed secondary groundwater standards. ZOD permission by this rule also applies to chemical species in the fluid to be injected that exceed primary groundwater standards or minimum groundwater criteria, provided those species are prime constituents of the reagents used to remediate site contaminants. The list of chemical species and parameters for which the approved Remedial Action Plan identifies zone size, duration and groundwater monitoring are as follows:

_____
_____
_____

☐ ZOD permission by rule 62-520.310(8)(c), F.A.C., for the following contaminants of concern that exceed their groundwater standards in the fluid to be re-injected as part of a closed-loop re-injection system for which the approved Remedial Action Plan identifies zone size, duration and groundwater monitoring:

_____
_____
_____

☐ ZOD permission by variance because fluid to be injected contains the following impurities that are not prime constituents of the reagents used to remediate the site's contaminants, and the concentration of those impurities in the fluid to be injected are in excess of their primary groundwater standards:

_____
_____
_____

☐ A variance needs to be granted before the remediation can be conducted.

☐ A variance has already been granted for the impurities listed above:

Date variance granted: _____ Zone size (feet):_____ Duration (time):_____

♦♦♦

☐ If ZOD permission by rule 62-520.310(8)(c), F.A.C., or by variance is checked above, then a figure that delineates the ZOD is attached, or ☐ the ZOD is described as follows:

_____
_____

Facility name: NAS Jacksonville
FDEP facility no.: _____

CLEANUP CRITERIA AND ENFORCEABLE APPROVAL ORDER

In situ injection-type aquifer remediation of the contaminants of concern at this site is intended to meet the groundwater cleanup target levels established for them in accordance with applicable and appropriate chapters of the Florida Administrative Code and cited in the approved Remedial Action Plan. Additionally, all other groundwater standards will be met at the time of project completion for any residuals associated with the ingredients of the injected remediation products, and any by-products or intermediates produced as a result of the chemical or biochemical transformation of those ingredients or the contaminants of concern during their use. Applicable primary and secondary drinking water standards are set forth in Chapter 62-550, F.A.C., and additional groundwater quality criteria are set forth in Chapters 62-520 and 62-777, F.A.C.

The remediation plan estimates that site remediation will take _____ months. We will notify you if there are any modifications to the remediation strategy which will affect the injection well design or the chemical composition and volume of the injected remediation product(s).

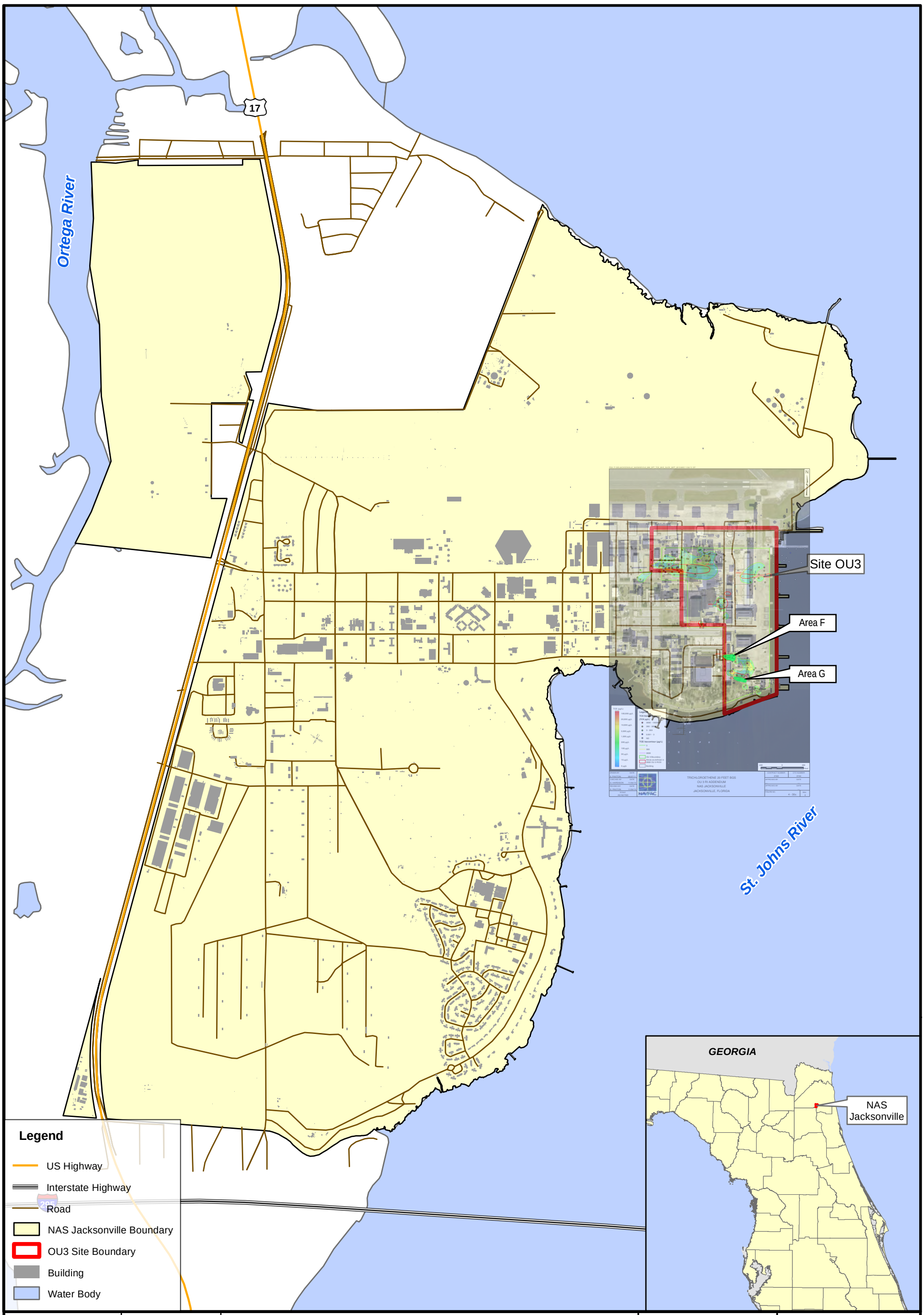
The proposed remediation plan was approved on _____ by an enforceable approval order. A copy is attached. The remediation system installation is expected to commence within 60 days. Please call me at _____ if you require additional information.

##

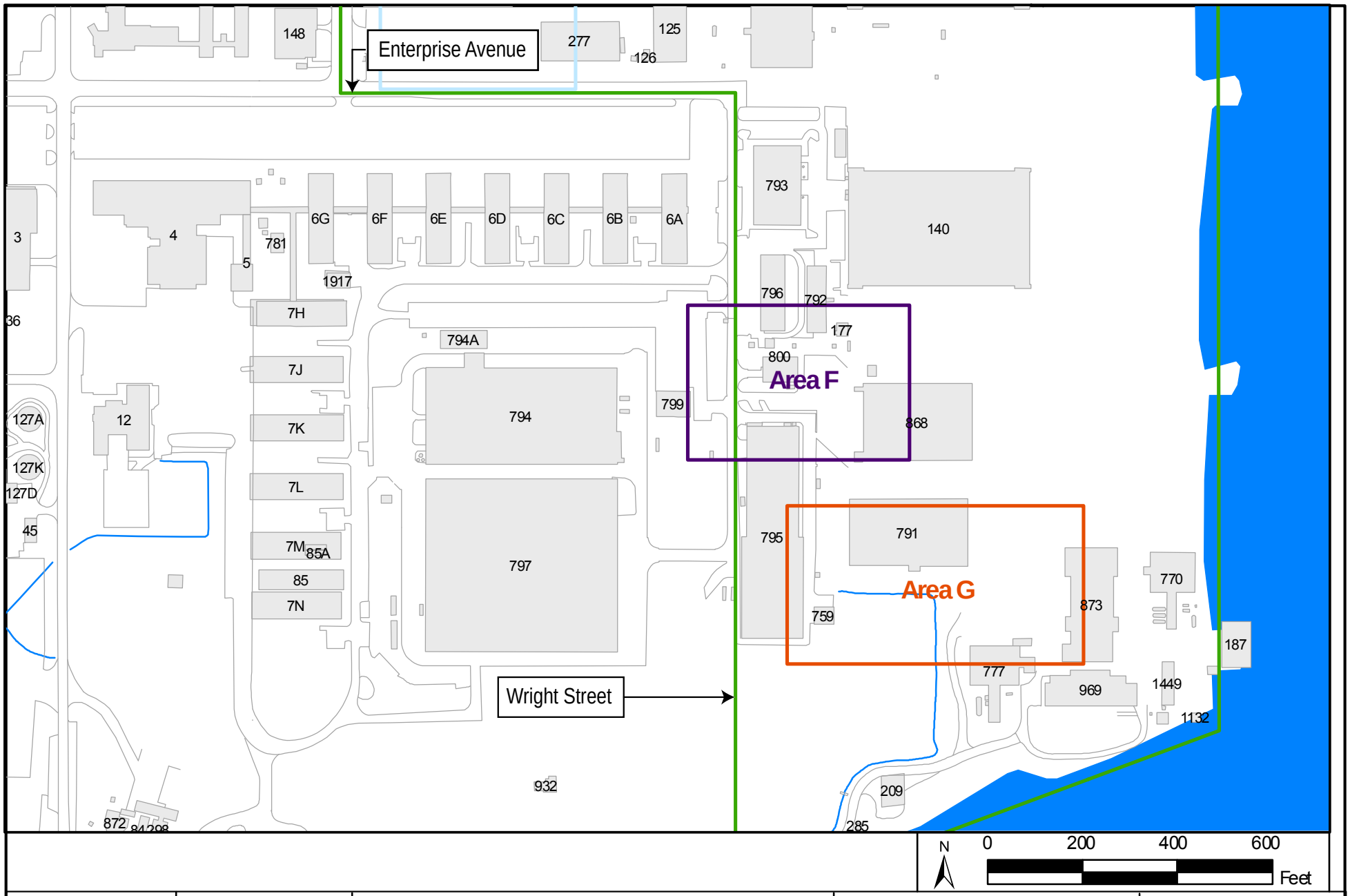
Note 1. This notification memorandum is primarily for use by state technical reviewers, but remediation contractors may fill in all blanks except those labeled “FROM” and “DATE” on page 1, and the “approval date”, and “telephone number” blanks in the last paragraph on page 4. Those blanks are filled only by the regulator. In the case that the memorandum form is partially completed by the remediation contractor, the FDEP technical reviewer must verify that the information provided by the contractor is accurate and complete.

Note 2. If an injection well installation contractor has not yet been selected, then indicate the name and address of the project’s general remediation contractor/consultant.

Note 3. Complete chemical analysis of the fluid to be injected is required by Chapter 62-528, F.A.C. Some remediation products and processes may have already submitted this information at the time of application for acceptance by the Innovative Technology Acceptance Program. For those situations, when completing the Fluid To Be Injected section of this memorandum, it will suffice to indicate: (1) an Innovative Technology Acceptance letter has been issued; (2) the date of the acceptance letter; (3) the acceptance letter contains the chemical analysis, or a voucher for the confidential disclosure of the injected fluid’s chemical composition if it is a proprietary formulation; and (4) the fluid will be injected at concentrations that are less than or equal to those cited in the acceptance letter. For products and processes that do not hold an Innovative Technology Acceptance letter, but for which the site-specific Remedial Action Plan provides a complete description of the chemical composition of the fluid to be injected, it will be necessary to enter this information into the Fluid To Be Injected section of this memorandum.



DRAWN BY	DATE	AGVIQ	Figure 1-1 Site Vicinity Map OU3 Areas F and G *NAS Jacksonville, Florida*	N 0 890 1,780 Feet
CHECKED BY	DATE			CONTRACT NUMBER
REVISED BY	DATE			APPROVED BY DATE
SCALE AS NOTED				APPROVED BY DATE
				FIGURE NO. REV 0



DRAWN BY	DATE		
CHECKED BY	DATE		
REVISED BY	DATE		
SCALE AS NOTED			

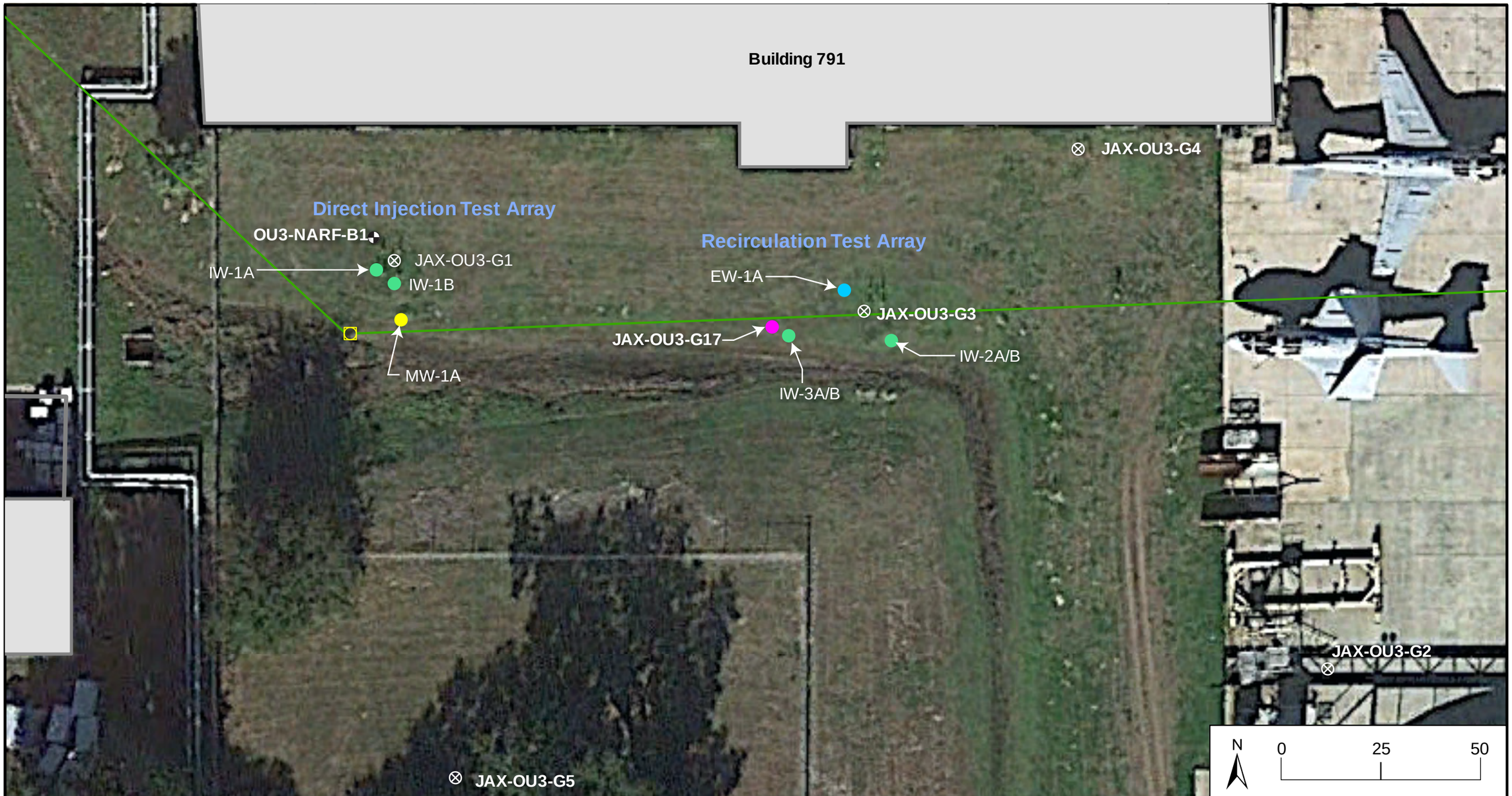
AGVIQ

Legend

- OU-03
- OU-03 - AREA F
- OU-03 - AREA G
- Stream
- Water Body
- Structure Existing Area

Figure 1-2
Site Location Map
OU3 Areas F and G
NAS Jacksonville, Florida

CONTRACT NUMBER	___
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. 1-2	REV 0



DRAWN BY	DATE		
CHECKED BY	DATE		
REVISED BY	DATE		
SCALE AS NOTED			

AGVIQ

Legend

Monitoring Well Locations
- Monitoring Well
- Multi-Chamber Well
- Manhole
- Newly Installed Extraction Well
- Newly Installed Injection Well
- Newly Installed Monitoring Well
- Newly Installed Multilevel Well

Site Boundary
- Road
- Storm Sewer
- Building

Figure 2-1
Proposed Tracer Test Arrays
OU3 Area G
NAS Jacksonville, Florida

CONTRACT NUMBER	
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. 2-1	REV 0

Cole-Parmer® Dye Tracers

Determine water flow in closed circuits or open channels

- Biodegradable and nontoxic
- Blue dye brightens ponds

Dyes diffuse rapidly in water, producing a vivid, easy-to-see color. Excellent for identifying diffusion and dispersion patterns, rates of flow, discharge locations, seepage areas, sea marking, and more.

Fluorescent red dye (rhodamine WT) is noncarcinogenic. Ideal in yellowed water or water with heavy algae growth. Fluorescent yellow/green dye (fluorescein) works best in silt-filled waters. Use an ultraviolet lamp to trace fluorescent red, yellow/green or orange dyes where normal visual detection is difficult. Orange (xanthene) dye appears as bright yellow under ultraviolet light. Use blue dye to brighten murky ponds and other landscaped waters. Minimum detectable concentration of all dyes in clear water is 1 ppm.

Tracers are available in tablets, liquid, or powder form. Quick-dissolving tablets are easy to handle with less mess than other forms. They are perfect for applications such as storm lines, cooling and plumbing systems, and sewer lines. Choose liquid for applications such as metered input, flow/dilution/disperation rate assessment, septic inspections, or fluorometric dye tests. Powdered form is well-suited for large applications where liquid is undesirable, such as in cooling towers, lakes, rivers and ponds, or power plant piping.

00298-06 00298-17 00295-18 00298-28

NSF

Description	Size	Max. gallons of water to obtain 1 ppm	Fluorescent red dye		Fluorescent yellow/green dye		Blue dye		Fluorescent orange dye	
			Catalog number	Price	Catalog number	Price	Catalog number	Price	Catalog number	Price
Tablets	200 tablets	60 (red, ylw/grn) 35 (orange) 20 (blue) all per tablet	T-00295-16	*	T-00295-17	*	T-00295-18	*	T-00295-19	*
Pint concentrate	Pint	3,125 (red) 12,500 (ylw/grn, blue) 4,000 (orange)	T-00298-16		T-00298-17		T-00298-18		T-00298-19	
Gallon concentrate	Gallon	25,000 (red) 100,000 (ylw/grn, blue) 32,000 (orange)	T-00298-06		T-00298-07		T-00298-08		T-00298-09	
Powder, 1 lb	Pound	60,400 (red, orange) 120,000 (ylw/grn, blue)	T-00298-26		T-00298-27		T-00298-28		T-00298-29	

***Discount:** Save 10% when you buy eight 200-tablet bottles.

Cole-Parmer® Solvent-Based Liquid Dye Tracers

Provide leak detection and color coding for oils, synthetic oils, fats, waxes, resins and most solvents

NEW

- Liquid, high-strength dyes with a wide range of compatibilities
- Free from any insolubles

Dyes diffuse rapidly, producing a vivid, easy-to-see color—ideal for hydraulics, automotive, color coding, and manufacturing. Dilution factors for coloring light oils is 1 to 64,000; for coloring dark oils is 1 to 12,800; and for leak detection is 1 to 640.

00295-04 00295-24

Size	Red dye For coloring and leak tracing		Fluorescent Red dye For leak tracing using UV		Blue dye For coloring darker oils		Yellow dye For coloring light oils	
	Catalog number	Price	Catalog number	Price	Catalog number	Price	Catalog number	Price
4 oz	T-00295-04		T-00295-06		T-00295-08		T-00295-10	
16 oz	T-00295-24		T-00295-26		T-00295-28		T-00295-30	

BRIGHT DYES™ MATERIAL SAFETY DATA SHEET
FWT RED™ 25 LIQUID

MSDS PREPARATION INFORMATION

PREPARED BY:	T. P. MULDOON (937) 886-9100	EMERGENCY RESPONSE: USA/CANADA/MEXICO:	INFOTRAC (800) 535-5053
DATE PREPARED:	11/9/11	INTERNATIONAL:	(352) 323-3500

PRODUCT INFORMATION

MAUNFACTURED BY: KINGSCOTE CHEMICALS
3334 S. TECH BLVD.
MIAMISBURG, OHIO 45342

CHEMICAL NAME ..... NOT APPLICABLE
CHEMICAL FORMULA ..... NOT APPLICABLE
CHEMICAL FAMILY ..... XANTHENE DYE FORM

HAZARDOUS INGREDIENTS

DESCRIPTION	%	T.L.V.	C.A.S. #
TRIMELLITIC ACID	.375	NONE	528-44-9

	LD/50, SPECIES	LC/50, SPECIES
ORAL (MOUSE)	2500 MG/KG	NONE AVAILABLE
DERMAL (RABBIT)	NOT AVAILABLE	NOT AVAILABLE

PHYSICAL DATA

PHYSICAL STATE ..... LIQUID
ODOR AND APPEARANCE ..... DARK RED LIQUID WITH MILD ODOR
SPECIFIC GRAVITY ..... ~1.03
VAPOR DENSITY (mm Hg @ 25 °C) ..... NOT APPLICABLE
VAPOR DENSITY (AIR =1) ..... NOT APPLICABLE
EVAPORATION RATE (Butyl Acetate = 1) ..... NOT APPLICABLE
BOILING POINT ..... ~ 100 degrees. C (212 degrees. F)
FREEZING POINT ..... ~ 0 degrees C (32 degrees F)
pH ..... 8.6 TO 8.8
SOLUBILITY IN WATER ..... VERY SOLUBLE

FIRE HAZARD

CONDITION OF FLAMMABILITY ..... NON-FLAMABLE
MEANS OF EXTINCTION ..... WATER FOG, CARBON DIOXIDE, DRY CHEMICAL, WEAR SCBA
FLASH POINT AND METHOD ..... NOT APPLICABLE
UPPER FLAMABLE LIMIT ..... NOT APPLICABLE
LOWER FLAMABLE LIMIT ..... NOT APPLICABLE
AUTO-IGNITION TEMPERATURE ..... NOT APPLICABLE
HAZARDOUS COMBUSTION PRODUCTS ..... BURNING MAY PRODUCE OXIDES OF CARBON & NITROGEN
UNUSUAL FIRE HAZARD ..... NOT APPLICABLE

EXPLOSION HAZARD

SENSITIVITY TO STATIC DISCHARGE	NOT APPLICABLE
SENSITIVITY TO MECHANICAL IMPACT	NOT APPLICABLE

REACTIVITY DATA

PRODUCT STABILITY	STABLE
PRODUCT INCOMPATIBILITY	DO NOT MIX WITH ACIDS
CONDITIONS OF REACTIVITY	NOT APPLICABLE
HAZARDOUS DECOMPOSITION PRODUCTS	SEE HAZARDOUS COMBUSTION PRODUCTS

TOXICOLOGICAL PROPERTIES

SYMPTOMS OF OVER EXPOSURE FOR EACH POTENTIAL ROUTE OF ENTRY:

INHALLATION, ACUTE	TRIMELLITIC ACID MAY CAUSE IRRITATION
INHALATION, CHRONIC	NOT KNOWN
SKIN CONTACT	MAY BE IRRITATING TO THE SKIN. WILL CAUSE TEMPORARY STAINING OF THE SKIN ON CONTACT.
EYE CONTACT	MAY CAUSE IRRITATION
INGESTION	URINE MAY BE A RED COLOR UNTIL THE DYE HAS BEEN WASHED THROUGH THE SYSTEM.
EFFECTS OF ACUTE EXPOSURE	DIRECT CONTACT MAY CAUSE IRRITATION TO THE EYES, SKIN, AND RESPIRATORY TRACT.
EFFECTS OF CHRONIC EXPOSURE	NOT KNOWN
THRESHOLD OF LIMIT VALUE	NOT APPLICABLE
CARCINOGENICITY	NOT LISTED AS A KINOWN OR SUSPECTED CARCINOGEN BY IARC, NTP OR OSHA.
TERATOGENICITY	NONE KNOWN
MUTAGENICITY	CONFLICTING EVIDENCE AS TO MUTAGENICITY OF THE DYE CONTAINED IN THIS PRODUCT.
TOXICOLOGY SYNERGISTIC PRODUCTS	NONE KNOWN

REGULATORY INFORMATION

SARA SECTION 303:	NONE FOUND
SARA (311, 312) HAZARD CLASS:	IMMEDIATE HEALTH HAZARD
SARA (313) REPORTABLE CHEMICAL (%):	NONE
METAL CONTENT:	THIS PRODUCT IS NOT A METALLIZED DYE
TSCS INVENTORY STATUS	ALL COMPONENTS ARE INCLUDED ON TSCA SECTION 8
CALIFORNIA PROPOSITION 65 CHEMICALS:	NONE
TSCA SECTION 12 (B) EXPORT REGULATIONS:	NOT SUBJECT TO TSCA 12 (b) EXPORT REGULATION

ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION:	LC50: >320 mg/L RAINBOW TROUT (96 Hour) LC50: 170 mg/L DAPHINA MAGNA

NO DEVELOPMENTAL ABNORMALITIES OR TOXICITY TO OYSTER LARVAE AT 100 mg/L

PREVENTATIVE MEASURES

PERSONAL PROTECTIVE EQUIPMENT

GLOVES	RUBBER
RESPIRATORY	NONE REQUIRED UNDER NORMAL CONDITIONS
EYE PROTECTION	GOGGLES
CLOTHING	PROTECTIVE CLOTHING SHOULD BE WORN WHERE CONTACT IS UNAVOIDABLE.
OTHER	HAVE ACCESS TO EMERGENCY EYEWASH.
ENGINEERING CONTROLS	NOT NECESSARY UNDER NORMAL CONDITIONS USE LOCAL VENTILATION IF DUSTY CONDITIONS EXIST.
SPILL OR LEAK RESPONSE	CONTAIN AND CLEAN UP SPILL IMMEDIATELY, PREVENT FROM ENTERING FLOOR DRAINS. SWEEP POWDERS AND PLACE IN WASTE DISPOSAL CONTAINER, FLUSH AFFECTED AREA WITH WATER.
WASTE DISPOSAL	INCINERATE OR REMOVE TO A SUITABLE SOLID WASTE DISPOSAL SITE, DISPOSE OF ALL WASTES IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS.
HANDELING PROCEDURES AND EQUIPMENT	NO SPECIAL REQUIREMENTS.
STORAGE REQUIREMENTS	STORE AT ROOM TEMPERATURE BUT ABOVE THE FREEZING POINT OF WATER
SHIPPING INFORMATION	KEEP FROM FREEZING

FIRST AID MEASURES

FIRST AID EMERGENGY PROCEDURES

EYE CONTACT	FLUSH EYES WITH WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION IF IRRITATION PERSISTS.
SKIN CONTACT	WASH SKIN THOROUGHLY WITH SOAP AND WATER. GET MEDICAL ATTENTION IF IRRITATION DEVELOPS.
INHALATION	IF DUST IS INHALED, MOVE TO FRESH AIR. IF BREATHING IS DIFFICULT GIVE OXYGEN AND GET IMMEDIATE MEDICAL ATTENTION.
INGESTION	DRINK PLENTY OF WATER AND INDUCE VOMITING. GET MEDICAL ATTENTION IF LARGE QUANTITIES WERE INGESTED OR IF NAUSEA OCCURS. NEVER GIVE FLUIDS OR INDUCE VOMITING IF THE PERSON IS UNCONSCIOUS OR HAS CONVULSIONS.

SPECIAL NOTICE

ALL INFORMATION, RECOMMENDATIONS AND SUGGESTIONS APPEARING HEREIN CONCERNING THIS PRODUCT ARE BASED UPON DATA OBTAINED FROM MANUFACTURER AND/OR RECOGNIZED TECHNICAL SOURCES; HOWEVER, KINGSCOTE CHEMICALS MAKES NO WARRANTY, REPRESENTATION OR GUARANTEE AS TO THE ACCURACY, SUFFICIENCY OR COMPLETENESS OF THE MATERIAL SET FORTH HEREIN. IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE SAFETY, TOXICITY AND SUITABILITY OF HIS OWN USE, HANDLING, AND DISPOSAL OF THE PRODUCT. ADDITIONAL PRODUCT LITERATURE MAY BE AVAILABLE UPON REQUEST. SINCE ACTUAL USE BY OTHERS IS BEYOND OUR CONTROL, NO WARRANTY, EXPRESS OR IMPLIED, IS MADE BY KINGSCOTE CHEMICALS AS TO THE EFFECTS OF SUCH USE, THE RESULTS TO BE OBTAINED OR THE SAFETY AND TOXICITY OF THE PRODUCT, NOR DOES KINGSCOTE CHEMICALS ASSUME ANY LIABILITY ARISING OUT OF USE BY OTHERS OF THE PRODUCT REFERRED TO HEREIN. THE DATA IN THE MSDS RELATES ONLY TO SPECIFIC MATERIAL DESIGNATED HEREIN AND DOES NOT RELATE TO USE IN COMBINATION WITH ANY OTHER MATERIAL OR IN ANY PROCESS.

END OF MATERIAL SAFETY DATA SHEET

Smart, P. L.—A Review of the Toxicity of Twelve Fluorescent Dyes Used for Water Tracing: *NSS Bulletin* 46: 21-33.

A REVIEW OF THE TOXICITY OF TWELVE FLUORESCENT DYES USED FOR WATER TRACING

P. L. SMART
Department of Geography
University of Bristol
Bristol BS8 1SS
England

Toxicological information is reviewed for twelve fluorescent dyes used in water tracing, Fluorescent Brightener 28, Tinopal CBS-X, Amino G Acid, Diphenyl Brilliant Flavine 7GFF, Pyranine, Lissamine Yellow FF, Fluorescein, Eosine, Rhodamine WT, Rhodamine B, Sulphorhodamine B and Sulphorhodamine G. Mammalian tests indicate a low level of both acute and chronic toxicity. However, only three tracers could be demonstrated not to provide a carcinogenic or mutagenic hazard. These were Tinopal CBS-X, Fluorescein and Rhodamine WT. Rhodamine B is a known carcinogen and should not be used. In aquatic ecosystems, larval stages of shellfish and algae were the most sensitive. Persistent dye concentrations in tracer studies should not cause problems provided they are below 100 μg/l.

INTRODUCTION

Fluorescent dyes have been widely employed in the tracing of water because of their high detectability. There is, however, increasing concern on the effects of chemicals introduced into natural waters. This prompted a previous review of the toxicity of fluorescent dye tracers (Smart, 1982). This paper updates the earlier work and also incorporates material not previously included due to limitations on space. Information is provided on the 12 fluorescent dyes listed in Table 1. The chemical structures of these dyes are given in Figure 1. Dyes for which the exact structural formula is not known, such as CI Fluorescent Brightener 15, are not included. In order to update this data base, I would appreciate receiving details of any toxicological information which has not been included, or which has become available since publication.

Before examining the data, it is important to remember that differences in test protocols and methods, in test species, route of administration and dose, all make comparison of toxicity data from different studies difficult. Furthermore, the standard of toxicity tests has improved with time, and some of the earlier studies may follow protocols no longer acceptable in modern toxicology. A more difficult problem is that the toxicity of dyes may well vary with manufacturer, or even the batch of dye tested, due to the presence of impurities. In the case of biological stains, for instance, Marshall and Lewis (1974) have shown that many substances other than the stated dye can be present. This has been confirmed for several of the dyes discussed in this paper by Lutty (1978) and Nestman et al. (1979), who quote purities as low as 75%. The presence of impurities explains why some workers reported Rhodamine B to be mutagenic in the *Salmonella typhum*—mammalian microsome test, while the pure dye was demonstrated to be non-mutagenic (Nestman et al., 1979). There are also differences in the concentration of commercial dyestuffs due to incorporation of additives, which makes comparison of different products difficult. No attempt had been made in this review to deal

Table 1. Colour Index (3rd ed.) designations, dye type and bibliographical code used for the fluorescent dye tracers.

Name	CI Number	Dye Type	Code
Calcophor White ST CI Fluorescent Brightener	28	Stilbene derivative	FB28
Tinopal CBS-X CI Fluorescent Brightener	351	Sulphostyryl derivative	FB351
Amino G Acid	—	Dye intermediate	AGA
Diphenyl Brilliant Flavine 7GFF	DY 96	Stilbene derivative	DY96
Pyranine	CI 59040	Pyrene	P
Lissamine Yellow FF	CI 56205	Aminoketone	LYFF
Fluorescein Sodium	CI 45350	Xanthene	FL
Eosine Sodium	CI 45380	Xanthene	E
Rhodamine WT*	—	Xanthene	RWT
Rhodamine B	CI 45170	Xanthene	RB
Sulphorhodamine B	CI 45100	Xanthene	SRB
Sulphorhodamine G	CI 45220	Xanthene	SRG

*Acid Red 388

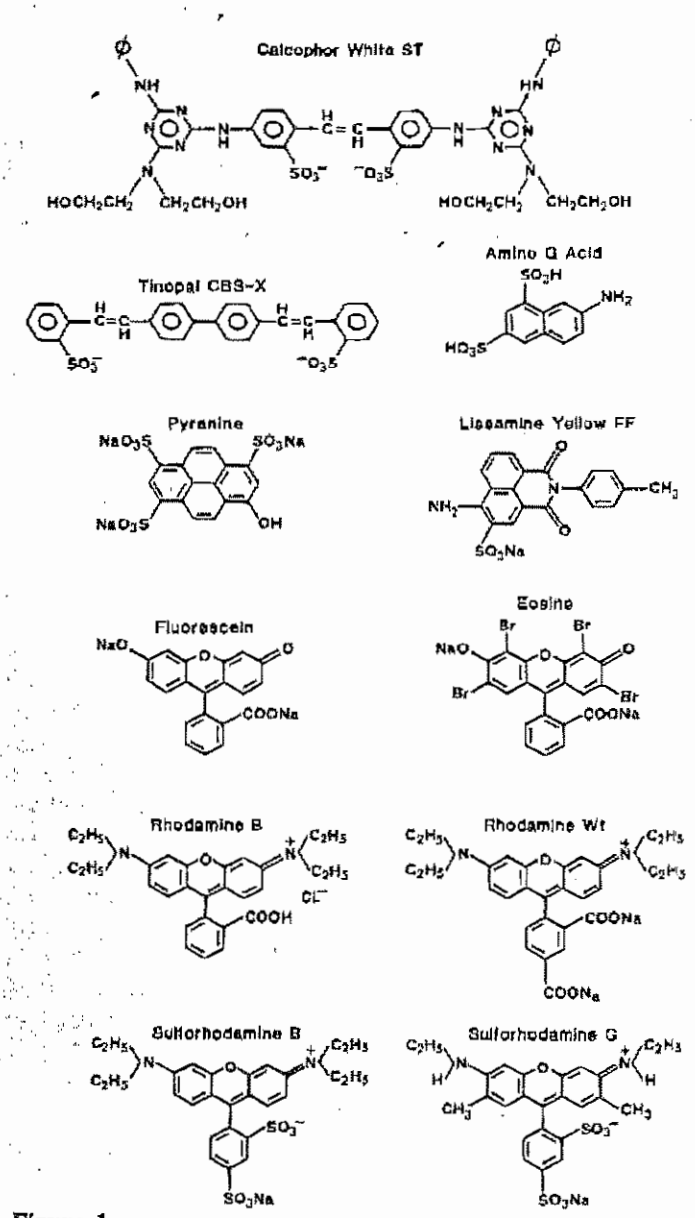


Figure 1.

with these problems, but referral back to the original source will often clarify these points. There are clearly advantages in utilising a product for which a hazard data sheet detailing toxicity information is available from the manufacturer.

The paper is divided into three sections, corresponding to the three main toxicological areas of concern in using tracer dyes. First, the toxicity of dyes in mammal systems is discussed in order to assess the acute and chronic effects of dye ingestion in man, and the possible hazards associated with handling the dyes. The second section reviews the data on carcinogenicity and mutagenicity, hazards which may be caused by long-term low-level exposure. Finally, the possible toxicity of tracers introduced into aquatic ecosystems is discussed. The toxicity criteria and measures included in the

Table 2. Toxicity of fluorescent tracer dyes in mammals.

Test	Animal	FB28	FB51	AGA	DY96	P	LVFF	FL	E	RWT	RB	SRB	SRG	Source
Acute Oral LD50 g/kg	Rat	14.5	5.58	—	>15.0	>15.0	8.56	5.72	>1.0	>23.0	>0.5	>10.0	>10.0	16, 19, 23, 27, 28 43, 53, 106, 118.
	Mouse	>10.0	>5.0	—	—	—	—	4.74	—	—	0.89	—	—	15, 53, 94.
Acute Intravenous LD50 mg/kg	Mouse	—	—	—	—	1050	110	300	550	430	a	b	b	48, 66, 71.
No Effect Acute Intraperitoneal mg/kg	Mouse	375	—	—	—	>50	>50	>91	>50	>167	5	>75	>75	24, 25, 57, 67.
	Rat	400	—	—	—	—	—	500	250	—	<95	—	—	57, 94.
No Effect Chronic Oral. Dose (%)	Rat	>1.0	>0.5	—	—	—	—	—	>2.0	—	0.1	—	—	68.
		106	12.9		—	—	—	—	18		18			
Time (Weeks)	Dog	—	>1.0	—	—	—	—	—	—	—	—	—	—	
	Hamster	—	—	—	—	—	—	<0.75	—	—	—	—	—	
								8.6						
No Effect on Reproduction or Teratogenicity Dose/Time	Chronic	1%	0.1%	—	—	—	—	—	—	—	c	—	—	68, 93.
	Rat	18m	3 gen											
	Acute Rat	—	—	—	—	—	—	0.5g/kg	—	—	—	—	—	74, 96.
Irritation c	Eyes	m	c	—	o	s	s	—	—	sc	—	s	s	16, 19, 27,
	Skin	o	s	—	o	o	o	—	—	m	—	o	o	39, 43, 106.
Photoactivity d		o	v	—	—	—	—	+	+	v	—	—		31, 32, 33, 43, 56 77, 78, 102, 107.

Notes: a. LD50 Less than RWT. b. LD50 Greater than RB. c. o = none, s = slight, m = moderate, sc = severe, c = extreme.
d. + = toxicity increased with light exposure. 0 = no effect. v = toxicity decreased with light exposure.
e. 'Highest no effect level in prior two-year study.' Exact dose not quoted.

summary tables have been selected to permit wide comparisons of all the dyes. Where several sources of information are available, these have been checked for conformity and the most toxic result recorded. The tables provide a summary only, and reference should also be made to the original sources from which the information has been abstracted. These sources are coded according to the numbers given in the bibliography.

Toxicity in Mammals

Of the acute lethal data reported (Table 2), the LD50 (Lethal Dose—50) value for oral administration is the best general indication of dye toxicity. Although the maximum experimental values for Eosine and Rhodamine B are lower than desirable, the LD50 for all twelve days is very high. None of the dyes would be regarded as toxic using this criterion, the corresponding value for common salt being 8 to 10 g/kg. The intravenous and intraperitoneal administration routes provide a test of the most severe situation, where there is no barrier to movement of dyes from the gut into the body. There is again no indication of substantial toxicity, and Lutty (1978) concluded that Pyranine, Lissamine Yellow FF, Eosine and Rhodamine WT, could be safely used for angiography in the human eye. Fluorescein is already widely used for this purpose.

Given the higher intraperitoneal toxicity of Rhodamine B compared to the other tracer dyes (Table 2), the more severe effects observed for this dye in both acute and chronic oral studies suggest that it is readily adsorbed in the gut. This is confirmed by metabolic studies (Table 3). The two optical brighteners, Fluorescein and Eosine are adsorbed to only a limited extent, but information is not available for the other tracer dyes. Eosine is discharged from the body via the bile duct, a pattern associated with its bromine substituents (Iga et al. 1971). All other dyes are cleared via the kidneys into the urine. Pathological examination of rats fed high dietary levels of Rhodamine B, showed enlargement of both the liver (where metabolism occurs) and the kidneys (Webb et al. 1961), but the metabolites were markedly less toxic. In man, Fluorescein is metabolised predominantly to the monoglucoride (Sheng-Chin Chen et al. 1980), with the basic fluoran structure remaining intact, as is also the case in the metabolism of Rhodamine B and Eosine.

No teratogenic or other effects on reproduction were observed in multi-generation tests on Calcophor White ST, Tinopal CBS-X, Fluorescein and Rhodamine B. Rhodamine WT and Tinopal CBS-X are severe irritants to the eye and moderately irritating to the skin. Both Fluorescein and Eosine are more toxic when contact is combined with exposure to light. In the case of Eosine, this may be due to release of halogen atoms during photo-decomposition (Tonogai et al., 1978), but Takashi and Kobayashi (1977) have demonstrated the importance of the singlet oxygen formed on light excitation of both these dyes. Rhodamine B does not show evidence of enhanced phototoxicity. This has also been demonstrated by an extensive series of tests for the two fluorescent brighteners.

All personnel handling dyes should wear protective gloves and clothing. Excessive inhalation of dust should be avoided, or a face mask employed during repacking of bulk supplies. All skin areas inadvertently contaminated by dye should be washed immediately with soap and water. Any splashes in the eyes should be flushed with copious quantities of water.

Based on the experimental results reviewed above, there is no evidence of either a short or long term toxic hazard to dye users or those drinking water containing tracer dyes. Even those employing tracers routinely in their work would not be likely to ingest sufficient dye to cause concern. For Rhodamine B (the most toxic of the tracers), the long term oral feeding studies yielded 'safe' continuous ingestion levels of 0.75 mg per day (U.S. Department of Health Education and Welfare, 1966), equivalent to 370 ug/l for normal consumption of drinking water. Comparable levels of the other fluorescent tracer dyes would therefore be acceptable.

Mutagenicity/Carcinogenicity

Early experiments by Umeda (1956) demonstrated development of Sarcoma (cancer) in long-term experiments with rats fed 0.2% of Rhodamine B, Eosine and Fluorescein. However, these studies were found lacking with respect to numbers of animals surviving, provision of adequate control, and experimental duration, when reviewed by IARC (1977 and 1978).

Table 3. Uptake and excretion of the tracer dyes in mammals.

	FB28	FB351	P	LYFF	FL	E	RWT	RB	SRB	SRG	Source
Gut adsorption[a]	O	O	—	—	O	O	—	+	—	—	16, 26, 79, 113
Excretion[b]	—	—	U	U	U	B	U	U	U	U	48, 49, 57, 66 67, 98, 104, 105, 110, 112, 113, 114.
Metabolism[c]	—	O	O	M	M	O	O	M	—	M	11, 43, 66, 67, 112, 113

Notes: a. O = Less than 10% uptake + = Greater than 10% uptake
b. U = In urine via kidneys B = In faeces via bile
c. O = Not metabolised M = Metabolised

Table 4. Carcinogenicity data for the tracer dyes

Test	FB28	FB351	AGA	DY96	P	LYFF	FL	E	RWT	RB	SRB	SRG	Source
Dominant Lethal Mutagenicity Test Rat and Mouse—No effect g/kg	1.0	1.5	—	—	—	—	—	—	—	—	—	—	4, 16, 53, 64, 80.
Carcinogenicity—rat	0/3	0/3	—	—	—	—	0/1	0/3	—	1/3	—	—	7, 13, 16, 33, 42, 46,
mouse	—	—	—	—	—	—	?/1	?/1	—	3/4	—	—	47, 68, 110, 115.

Key: O/n = noncarcinogenic: ?/n = possibly carcinogenic: x/n = carcinogenic in x tests out of n reported

Subsequent experiments (Anonn, 1981) have confirmed that Rhodamine B is carcinogenic. Results of more recent feeding studies, with mouse and rat (US National Toxicology Program) are not yet available for Fluorescein, while no further testing of Eosine has been undertaken.

Fluorescent whiteners have been extensively tested in mammals because of their widespread use and large production. Both Calcophor White ST and Tinopal CBS-X have been demonstrated to be non-carcinogenic in long-term feeding studies in rat, and in the Dominant Lethal Mutagenicity test in rat and mouse (Table 4). Information on carcinogenicity is not available for the remaining dyes, and an evaluation of their safety must be based on mutagenicity screening tests, which are rapid and less costly (Hoffman, 1982). These frequently employ micro-organisms or *in vitro* cultures of mammalian cells, although several *in vivo* tests are also available. There are strong correlations between the mutagenicity of chemicals in short-term tests and their carcinogenicity in mammals (Bartsch et al., 1980).

The three mutagenicity test results reported for Tinopal CBS-X are negative (Table 5), as would be expected from the carcinogenicity data discussed above. Amino G Acid and Lissamine Yellow FF have only been subject to a preliminary screening using the Ames Test (Kilbey, pers. comm., 1981). Amino G Acid was non-mutagenic, confirming the statement of Combes and Haveland-Smith (1982) that sulphonation of amino-napthalenes generally renders them non-mutagenic. Lissamine Yellow FF yielded uncertain results.

Fluorescein has been extensively tested in a variety of micro-organism tests for mutation and DNA alteration (Table 5). The results of the DNA-cell binding (DCB) test suggested that this dye was a possible mutagen on metabolic activation (Kubinski et al., 1981), but the authors were unable to confirm this result using gel-electrophoresis. Yoshikawa et al. (1978) reported no inactivation of transforming DNA *in vitro* using *Bacillus subtlis*. Other systems were also negative for mutagenic activity, with the exception of the results using photoactivation reported by Nishioka (1976) for unspecified mixtures of xanthene dyes. Photoactivation was not demonstrated in the Rec-Assay or inactivation of transforming DNA in *Bacillus subtlis* (Yoshikawa et al., 1978). Fluorescein has not been tested in mammalian systems for its effects on chromosomes, but the balance of the test results indicates it does not constitute a mutagenic hazard.

Eosine has also been widely tested and, unlike Fluorescein, demonstrates consistent photoactivation of mutagenicity in three different systems and four tests (Table 5). It is, however, uncertain to what extent these *in vivo* results can be applied to *in vitro* systems. No clastogenic effects were observed in tests using Chinese hampster ovary cells (Au and Hsu, 1979), nor were mutations induced *in vivo* in *Allium apa* or *Vicia faba* (Landa et al., 1965). Dye concentrations in the latter tests were, however, rather low, although a mutagenic effect was obtained for Rhodamine B.

Rhodamine WT has been the subject of extensive study by Douglas et al. (1983). Nestmann and Kowbel (1979) reported that the dye was mutagenic in the *Salmonella typhum*/mammalian microsome Ames test. However, in a battery of *in vitro* and *in vivo* tests in mammalian systems, Douglas et al. (1983) were only able to demonstrate a weak *in vitro* mutagenicity on using very high dye concentrations. No evidence of *in vivo* genetic activity was observed in terms of sperm abnormalities or bone marrow micro-nuclei in mice. They conclude that 'Rhodamine WT appears not to represent a major genotoxic hazard.'

Rhodamine B has been widely tested for mutagenicity as it is a known carcinogen. Out of twelve systems investigated, mutagenic activity was demonstrated in only five, including *in vivo* in *Drosophila melanogaster* (Clark, 1953)—although these experiments have been criticized by Lee et al. (1983). This demonstrates the limitations of mutagenicity tests and emphasizes the need for a wide suite of test results before deciding on the status of test materials. Furthermore, in the Ames test different results were reported for dye from a number of sources, with only two out of seven tests demonstrating mutagenic activity. Nestman et al. (1979) and Douglas et al. (1980) demonstrated that the mutagen was an impurity in the technical grade dye employed. This is an important finding because the concentration of impurities in commercial dyes may well vary with both manufacturer and dye batch. The advantages of utilising dyes from a manufacturer who has obtained relevant toxicity test information are thus clear.

Table 5. Mutagenicity data for the tracer dyes

Test	FB128	FB351	AGA	DY96	P	LYFF	FL	E	RWT	RB	SRB	SRG	Source
Rec-assay—*Bacillus subtilis*	—	—	—	—	—	—	0/3	1/2[b]	—	1/1	0/1	—	52, 103, 109, 119.
—*Escherichia coli*	—	—	—	—	—	—	0/1	0/1	—	0/1	—	—	51.
Disc test—*Escherichia coli*	—	—	—	—	—	—	0	?	—	?	—	—	65.
Petite mutations and gene conversions—Yeasts	—	0/1	—	—	—	—	0/1	1/2[b]	—	0/1	—	—	54, 56, 82, 84, 102.
Ames test—*Salmonella typhum*	—	0/1	0/1	—	—	?/1	1/4[b]	1/4[b]	A1/1	2/6[a]	?1/2	—	26, 38, 55, 56, 75, 83, 85 86, 87, 88, 92, 97, 101.
Chromosome aberrations													
—Chinese Hampster cells	—	0/1	—	—	—	—	—	0/1	0/1	3/3	1/1	—	8, 25, 26, 52, 62.
—Human bone cells	—	—	—	—	—	—	—	—	—	0/1	0/1	—	52, 97.
Sister Chromatid exchange —human or hampster cells	—	—	—	—	—	—	—	—	0/1	+/2	0/1	—	25, 52, 92, 97.
DCB Test for DNA alteration	—	—	—	—	—	—	A?/1	—	—	0/1	—		5, 92.
Inactivation of transforming DNA	—	—	—	—	—	—	0/1	1/1[b]	—	—	—	—	119.
DNA damage Chinese hampster cells	—	—	—	—	—	—	—	—	?/1	1/1	—	—	25, 85.
Chromosome alterations in vivo in bone marrow—rat	—	—	—	—	—	—	0/1	—	—	0/1	0/1	—	25, 52, 92.
—mouse	—	—	—	—	—	—	—	—	0/1	0/1	—	—	
Mutations in vivo—silkworm	—	—	—	—	—	—	0/1	—	—	0/1	0/1	—	52.

Key: 0/n = nonmutagenic; ?/n = possibly mutagenic; x/n = mutagenic in x tests out of n reported;
A = activation required

Notes: a. Mutagenic impurities present in some commercial products (14, 47)
b. Photoactivation required to produce mutagenicity (S,Y,AC,7)

Sulphorhodamine B has been tested in six systems. It shows no *in vivo* chromosome alteration in rat or *in vitro* in human bone-marrow cells, findings similar to those for Rhodamine B. However, unlike Rhodamine WT, it does cause chromosome aberrations *in vitro* in Chinese hampster cells. Sako et al. (1980) have also demonstrated a cytotoxic effect of Sulphorhodamine B in fetal rate hepatocytes, although this was significantly smaller than for halogen-bearing xanthene dyes. There is therefore some evidence from *in vitro* systems that Sulphorhodamine B is a mutagen, but this has not been demonstrated *in vivo*.

Table 6. Status of the tracer dyes with respect to carcinogenicity and mutagenicity.

Dye		Status
FB28	Non-carcinogenic	No data
FB351	Non-carcinogenic	Non-mutagenic
AGA	No data	Probably non-mutagenic
LYFF	No data	Possibly mutagenic
FL	Non-Carcinogenic	Non-mutagenic
E	Uncertain	Possibly mutagenic
RWT	No data	Possibly non-mutagenic
RB	Carcinogenic	Possibly mutagenic
SRB	No data	Possibly mutagenic

No information on the mutagenicity of Direct Yellow 96, Pyranine or Sulphorhodamine G has been obtained.

The discussion above illustrates the difficulty of assessing the status of chemicals when a complex and differential genotoxic response is shown, as appears to be the general case with rhodamine dyes. This difficulty is enhanced when the products tested are of technical grade and may contain impurities. Table 6 summarises the findings of this review. Three dyes can be identified as causing minimal carcinogenic and mutagenic hazard; Tinopal CBS-X, Fluorescein, and Rhodamine WT. Conversely, Rhodamine B is known to be carcinogenic and possibly mutagenic and should not be used.

Aquatic Organisms

There is a considerable body of data on the toxicity of the tracer dyes to fish. Most comparative data is available for the 48 and 96 hour LC50 (Lethal Concentration—50) in rainbow trout (*Salmo gairdneri*) (Table 7). In these tests, Rhodamine B and Tinopal CBS-X were the most toxic tracers, a finding supported by studies with bluegill (*Lepomis macrochirus*) and chanel catfish (*Ictalurus punctatus*. However, the LC50 values of these two tracers are still relatively high and they would not generally be considered toxic. Furthermore, dye concentrations of over 100 mg/l would only be achieved during the injection phase of a tracer test, and would be very unlikely to persist for several days. Data for Calcophor White ST and Pyranine is limited to a single species but, again, indicates low acute toxicity.

The only long-term fish exposure experiments are those of Benoit-Guyod et al. (1979) using guppy (*Lebistes reticulatus*) and are particularly useful as they relate to the most widely used tracers. After thirty days, there was some evidence of continuing mortality with additional exposure, but the TLM values at this time are the most useful guide to long-term toxicity in fish. Rhodamine B, Eosine and the two

Sulphorhodamine dyes are significantly more toxic than Rhodamine WT or Fluorescein. However, the TLM values, even for the more toxic tracers, are still three orders of magnitude greater than the visible dye concentration and five orders of magnitude in excess of those commonly expected in long-term tracer experiments. Indeed, as pointed out by Abram and Rhodes (1978), aesthetic considerations relating to the visible colouration of natural waters are more likely to limit tracer concentrations than dye toxicity. These considerations, however, would not apply to the blue fluorescent tracers which are colourless in solution.

Data are also presented in Table 7 for three aquatic invertebrates. *Asellus aquaticus* (the water hog louse) is generally considered a robust organism, while *Daphnia magna* (water flea) is more sensitive, and has been widely employed in bioassay work. The 72 hour LC50 values for *Daphnia* are generally lower than those for fish (as is also the case for *Artemia salina*). However, the egg and larval stages of organisms are even more sensitive as demonstrated by the limited data for a number of shellfish (Table 7). Concentrations of 1 to 10 mg/l of Rhodamine WT, Rhodamine B and Fluorescein (depending on the test organism) do not affect development or cause mortality in shellfish eggs and larvae after forty-eight hours' exposure. Whilst further data are needed for the other tracer dyes in these sensitive systems, it can be concluded that dye concentrations as high as 1 mg/l can be tolerated for two days without damage to aquatic organisms.

Several studies have been conducted to examine the degree of uptake and elimination of Rhodamine B by shellfish. Waugh and Key (1967) and Geckler and Wandstrat (1964) found that no staining occurred at concentrations of 0.02 mg/l in European flat oysters (*Ostrea edulis L*) and quahog clams (*Mercenaria mercenaria*) respectively. Even at much higher initial concentrations, the dye was eliminated within twenty-four hours on transfer to clean water, although Galassi and Canzonier (1976) demonstrated retention for up to three days in the blue mussel (*Mytilus edulis galloprovin cialis*). Comparable data is not available for the other tracers, although Feron and Hitz (1975) and Ganz et al. (1975) found that Tinopal CBS-X was not significantly accumulated and was rapidly expelled from bluegill (*Lepomus macrochirus*), even after prolonged exposure at 0.1 mg/l. Smart and Smith (in prep.) observed that the strong staining of trout (*Salmo gairdneri*) exposed to 500 mg/l of Rhodamine B declined on transfer to clean water.

The bioaccumulation tendency of dyestuff can be indicated from the partition coefficient in n-octonal/water (Anliker et al., 1981). This coefficient has been determined for several tracers by Benoit-Guyod (1979) (Table 8). As expected, the high water solubility and anionic character considered desirable in a tracer, give low partition coefficients. Also shown in Table 8 is a rating for protein binding, which is derived from *in vitro* experiments (Lutty, 1978; Lutty,

Table 7. Toxicity of tracer dyes in aquatic organisms.

		FB128	FB351	AGA	DY96	P	LYFF	FL	E	RWT	RB	SRB	SRG	Source
Fish														
TL50 mg/l—	30 days. *Lebistes reticulatus*	—	—	—	—	—	—	752	138	1360	24	116–58	88	12.
LC50 mg/l—	96 hr. *Salmo gairdneri*	—	130	> 1000	—	—	> 1000	1372	> 160	> 320	155	—	—	9, 53, 70,
	48 hr. *Salmo gairdneri*	—	—	> 1000	> 1000	—	> 1000	3420	> 100	> 320	506	450	—	100, 19, 70,
	96 hr. *Lepomis macrochirus*	> 1000	241	—	—	—	—	3433	—	—	379	—	—	100, 107, 16,
	96 hr. *Ictalurus punctatus*	—	126	—	—	—	—	2267	—	—	526	—	—	70, 53, 70.
	48 hr. *Oryzias latipes*	—	—	> 3000	—	—	—	3000	1800[a]	—	—	> 3000	—	107, 108.
Maximum Non-lethal Concentration mg/l	48 hr. *Leuciscus idus*	—	—	—	—	—	—	—	—	—	—	—	> 500	11, 43.
	96 hr. *Idus melanskes*	—	—	—	—	> 500	> 500	—	—	—	—	—	—	11, 43.
Aquatic Invertebrates														
LC50 mg/l	96 hr. *Asellus aquaticus*	—	—	> 3000	—	—	> 1000	—	—	> 2000	550	—	—	100, 117.
	24 hr. *Artemia salina*	—	—	—	—	—	—	100–300	—	—	180	—	—	89.
	72 hr. *Daphnia magna*	—	—	386[c]	—	—	> 1000[b]	165	90	170	29	139	88	12, 100.
Shell Fish														
No effect	48 hr. *Crassostrea virginica*	—	—	—	—	—	—	—	—	—	1.0	—	—	90.
Development of eggs mg/l	48 hr. *Crassostrea gigas*	—	—	—	—	—	—	—	—	10.0	—	—	—	91.
	48 hr. *Hemicentrotus pulcherrimus*	—	—	—	—	—	—	10.0	—	—	10.0	—	—	89.
	48 hr. *Mytilus edulis*	—	—	—	—	—	—	1.0	—	—	3.2	—	—	89.
LC50 mg/l	96 hr. *Corbicula manilensis*	—	—	—	—	—	—	—	—	—	> 500	—	—	18
	120 hr. *Australorbis glabratus*	—	—	—	—	—	—	10 < > 1.0	—	—	10 < > 1.0	—	—	76.

Notes: a. 1200 when bromine released during photodecomposition. b. 36 hr. c. 48 hr.

1979; Tonogai et al., 1979b; Tatsuji et al., 1971; Gangolli et al., 1972). These results relate well to the partition coefficients, although Eosine appears to be bound to a greater extent than Fluorescein, despite its somewhat smaller partition coefficient. They also indicate that Lissamine Yellow FF has some potential for bioaccumulation. However, even in the case of Rhodamine B, the most lipophilic of the dyes tested, the bioaccumulation factor would be below 100 and further testing *in vivo* would not be considered necessary.

Table 8. Partition coefficients (n-octonal/water) and protein binding of the tracer dyes.

	Partition Coefficient	Protein binding[a]
P	—	0
LYFF	—	+
FL	4.1×10^{-1}	±
E	4.7×10^{-2}	±
RWT	4.7×10^{-2}	±
RB	$1.9 \times 10^{+2}$	+
SRB	6.2×10^{-3}	0
SRG	9.5×10^{-3}	0

Notes: a + = Protein bound. ± = Weakly bound. 0 = Not protein bound.

Table 9. Effect of tracer dyes on algae (dye concentration 10 mg/l, exposure period 7 days).

	FB28	FL	E	RB	Source
Selanastrum capricornutum	++	—	—	+0	63
Chlorella sp.	—	++	++	++	72
Scenodesums sp.	—	0	0	+	72
Chlorococcum sp.	—	0	+0	+	72
Nostoc sp.	—	0	0	+0	72
Anabaena sp.	—	0	++	+0	72
Oscillatona sp.	—	0	0	+0	72

Key: ++ = No growth retardation
+ = Some growth retardation
+0 = Severe growth retardation
0 = No growth

In practice, the empirical studies of the elimination of Rhodamine B from shellfish and trout discussed above indicate that there is little possibility for bioaccumulation of this dye once environmental concentrations fall on completion of a tracer test.

Only two studies have reported the effects of tracer dyes on algal growth (Table 9). Little and Chillingworth (1974) showed that whilst Calcophor White ST caused no growth inhibition in *Selanastrum capricornutum* over a fourteen-day exposure period, Rhodamine B caused severe growth retardation at 10 mg/l. There was no effect for Rhodamine B at 1 mg/l. In an earlier study, Mason-Williams (1969) showed a differential response to dye exposure for a number of species found in Welsh streams. Surprisingly, Rhodamine B was less toxic overall to algae than Eosine, which was marginally less toxic than Fluorescein, the reverse of the order in higher organisms. Algal growth appears to be affected at similar concentrations by tracer dyes as the sensitive larval stages of shellfish. This reinforces the conclusion drawn above that enduring tracer concentrations as high as 1 mg/l would not be detrimental to aquatic ecosystems.

The toxicity of dyes to bacteria has been investigated primarily to determine the possible suppression of bacterial decomposition in sewage works. At present, only limited data is available, but following the adoption of a test protocol by ETAD (Brown et al., 1981), more comparable data should become available. No data is available for Lissamine Yellow FF or Rhodamine WT. However, as only the basic dye Rhodamine B appears to affect aerobic decomposition (Table 10), a finding supported by the wider survey of Hunter (1974) for other acid and basic dyestuffs, no detrimental effects would be expected for these dyes. The limited data for *Salmonella typhum* employed in the Ames test protocol suggest that there are no large differences in the toxicity of the various tracers to bacteria. It is not possible to convert the plate concentrations to environmental levels, but overall the data do suggest that bacteria are less sensitive to the tracer dyes than either algae or shellfish eggs and larvae.

In conclusion, there is no evidence of significant bioaccumulation for any of the tracer dyes in fish. The most sensitive aquatic organisms to the dyes are the developmental stages of shellfish, and algae. These, therefore, determine the maximum prolonged dye concentration which can be recommended. This limit is set at 1 mg/l, well above the persistent dye concentrations commonly used in tracer tests, and at least one order of magnitude above the visible threshold. There is no evidence that short-term exposure to concentrations in excess of 1 mg/l, such as could occur transiently at injection sites, are harmful, but prior dilution should be employed if rapid dispersion and dilution of the tracer dye is not expected.

Discussion

Before discussing the toxicity information described above, attention must be drawn to the possibility that chemical transformation of the tracer dyes may occur after release, producing compounds which are intrinsically more toxic.

Information on the toxicity of photo-decomposition products of tracer dyes has been reviewed above, with Eosine appearing to exhibit both photo-activation of mutagenic activity and phototoxicity due to release of bromine atoms. Smart and Smith (in prep.) showed in acute tests using *Asellus aquaticus* that for Lissamine Yellow FF the photodegradation products were similar in toxicity to the parent dye; but for Amino G Acid, they were significantly less toxic. In other tests, photo-decomposition products may well have been present and are therefore incorporated into toxicity figures in a non-systematic manner. The eventual photo-decomposition products of Fluorescein (and, by analogy with metabolism, of rhodamine dyes) are pthalic acid and rescorcinol (Ishibashi 1965). The latter was found to be non-mutagenic when test data were reviewed by Hed-

Table 10. Effect of tracer dyes on bacterial decomposition (dye concentration 100 mg/1, exposure period 3 hours), and in *Salmonella typhum* (Ames test).

	FB28	FB351	DY96	P	FL	E	RWT	RB	SRB	SRG	Source
Activated sludge[a]	+[b]	+	+	+	+	+	+	0	+	+[c]	11, 14, 16, 19,
(Aerobic)	+	0	—	—	—	—	—	—	—	—	29, 43, 45, 72
Salmonella typhum[d]	—	>2	—	—	10	>1	21	>1	—	—	56, 83, 86, 87

Notes: a. Upper line = effect on bacterial decomposition (+ no effect, 0 significant effect)
Lower line = Biodegradation of dye (+ biodegraded, 0 not biodegraded)
b. Aerobic and anaerobic decomposition.
c. Anaerobic decomposition only.
d. Concentration of dye retarding growth (mg / plate).

die et al. (1983). Therefore, photo-decomposition product toxicity appears only to be a problem for Eosine.

A particular hazard has been identified by Abidi (1982) due to the production of diethylnitrosamine (DENA) from the reaction of nitrites with the diethylamino moieties present in all rhodamine dyes. DENA is a potent animal carcinogen (Magee and Barnes, 1967). Abidi (1982) demonstrated the production of DENA in both natural and distilled water systems with nitrite levels in excess of 11 $\mu g/l$ and Rhodamine B with WT concentrations greater than 1 $\mu g/l$. It is, however, difficult to reconcile the high reaction yields (up to 96%) quoted in the laboratory experiments, with the known long-term persistence of rhodamine dyes in tracer tests. The DENA formed in the laboratory experiments was found to photo-decompose relatively slowly under ultraviolet irradiation. In the presence of ascorbic acid nitrosation was inhibited. Thus the observed persistence of anionic rhodamine dyes may be related to competing reactions which retard nitrosation of the dye, reducing the DENA hazard correspondingly. Determination of DENA levels during field trials with rhodamine dye tracers is urgently needed.

The third problem associated with the chemical transformation of tracer dyes is related to the production of chlorophenol compounds on chlorination of water for domestic supply. No experimental work has been conducted on this problem, although taste experiments with Rhodamine B performed by Wilson (1968) suggest that this reaction does occur. This confirms the statement of Murphy et al. (1975) that ring structures with electron-activating substituents (primarily OH and amino groups) are likely to be chlorinated. Further work is needed on this problem.

The acute and chronic toxicity of all the tracer dyes in mammal systems is sufficiently low that no danger should result in their use, providing normal precautions are observed during dye handling. However, only three tracers can be demonstrated to cause minimal carcinogenic and mutagenic hazard, Tinopal CBS-X, Flourescein and Rhodamine WT. Conversely, Rhodamine B is known to be carcinogenic and should not be used. The status of the remaining tracers is uncertain and they should be used only after careful consideration of the probable exposure risk, both to tracing personnel and to the wider population. In aquatic ecosystems, bioaccumulation is not a problem with any of the dyestuffs. There is no acute hazard associated with short exposures to very high dye concentrations, such as can occur on injection. For longer exposures, the development stages of shellfish and algae appear to be more sensitive than fish. Even in these systems, a concentration of 1 mg/l for 48 hours can be endured. It should not be a problem to keep persistent dye concentrations well below 100 $\mu g/l$, particularly as this is well above the visible threshold where aesthetic considerations may become dominant.

Further information is needed both on the mutagenicity of tracer dyes, and on the effects of long-term exposure in sensitive larval stages of aquatic organisms. There is also a need to assess the toxicological significance of compounds formed in the environment by reactions with dyestuffs.

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Conklin, Jennifer

From: Eric.Davis@CH2M.com
Sent: Monday, July 21, 2014 4:25 PM
To: Conklin, Jennifer
Cc: Eric.Davis@CH2M.com
Subject: RE: FDEP Comments - Enhanced Bioremediation - Areas F&G
Attachments: Plan View Well Map.pdf; x-section plan.pdf; x-section E to E'.pdf; Extraction Well.pdf; InjectionWell.pdf; Monitoring Well.pdf; multilevel well.pdf

Categories: Orange Category

Jennifer, here is the requested UIC information.

1. The driller is going to be TerraSonic International. My point of contact is David Boggs and his address is:

    2401 Clark St., Unit 2
    Apopka, FL 32703
    Phone: 407-730-9853

2a. plan view well map attached, indicating each type of well to be used for the test (injection, extraction, observation, and multilevel monitoring well)

2b. well construction schematics attached for each type of well (injection, extraction, observation, and multilevel monitoring well

2c. plan view x-section map and x-section of work area attached (from 2014 RI). Happens to run directly through our work area.

If you have any questions or need additional information, please let me know.

Thank you,
Eric

Eric J. Davis, MSc, PG, PMP
678.530.4085

From: Conklin, Jennifer [mailto:Jennifer.Conklin@dep.state.fl.us]
Sent: Monday, July 21, 2014 10:29 AM
To: Davis, Eric/ATL
Cc: Wilson, Adrienne T CIV NAVFAC SE; Tim Curtin (tim.l.curtin@navy.mil); Pete Dao (dao.peter@epa.gov)
Subject: FDEP Comments - Enhanced Bioremediation - Areas F&G

Eric,

I have discovered that I can approve the dye tracer pilot test without a P.E. review. However, after speaking with UIC, I do need some additional information before the memo can be approved:

1. Pg. 1 - Well Driller's information
2. Pg. 2 - Injection Wells – include well construction details of all wells to be used during the test. Include which wells will be used as injection and observation points. Also provide a cross section.

Thanks,

Jennifer R. Conklin
Remedial Project Manager
Department of Defense and Brownfields Partnerships
Florida Department of Environmental Protection
2600 Blair Stone Road, MS4535
Tallahassee, Florida 32399
Phone: (850) 245-8935
jennifer.conklin@dep.state.fl.us

Engineering Division, and the NAS Jacksonville Environmental Facilities Department to complete a site utility survey, acquire utility layout plans, and complete the excavation ("dig") permit. In addition, AGVIQ will subcontract a private utility locate firm to identify and confirm underground utilities in the area of the proposed injection and monitoring wells. Utilities in the work area will be marked with paint and stakes, as appropriate. Any damage to underground utilities or subsurface structures will be reported immediately to the NAS Jacksonville Environmental Facilities Department and Sunshine State One Call of Florida.

2.1.2 Tracer Test Layout

Figure 2-1 depicts the planned layout of two tracer test arrays. One test array is designed to assess ERD implementation using direct injection only. This array will consist of two adjacent injection wells (IW-1A and IW-1B) installed 5 feet apart and screened from 10 to 30 and 30 to 50 feet bgs, respectively. The second test array is designed to assess ERD implementation using recirculation. This array will consist of one centrally located extraction well (EW-1A) screened from 10 to 50 feet bgs. Two nested injection wells (IW-2A/B and IW-3A/B) will be installed to the southwest and southeast of the extraction well and screened from 10 to 20 and 40 to 50 feet bgs, respectively. The injection wells will be installed 20 feet from the extraction well and 35 feet from each other. The spacing of the injection wells and placement of the screen intervals was selected to uniformly distribute the tracer throughout the targeted zone.

In addition, two new monitoring wells (MW-1A and multilevel JAX-OU3-G17) will be installed to assess the distribution of the tracer. Table 2-1 provides a summary of the new and existing tracer test wells.

TABLE 2-1
Well Construction Details
OU3, Areas F and G, NAS Jacksonville

Well ID	Total Depth (feet bgs)	Screened Interval (feet bgs)	Notes
Direct Injection Array			
IW-1A	50	10-30	New injection well
IW-1B	50	30-50	New injection well
JAX-OU3-G1	58	8-9; 11-12; 17-19; 27-28; 37-38; 47-48; 57-58	Existing multilevel monitoring well 5 feet from IW-1A and IW-1B
OU3-NARF-B1	16.5	13-16	Existing monitoring well 7.5 feet from IW-1A
MW-1A	45	35-45	New monitoring well 10 feet from IW-1B
Recirculation Array			
IW-2A/B	50	10-20; 40-50	New nested injection well pair
IW-3A/B	50	10-20; 40-50	New nested injection well pair
EW-1A	50	10-50	New extraction well
JAX—OU3-G3	50	8-9; 11-12; 17-19; 27-28; 37-38; 47-48; 57-58	Existing multilevel monitoring well 10 feet from IW-2A/B

TABLE 2-1
Well Construction Details
OU3, Areas F and G, NAS Jacksonville

Well ID	Total Depth (feet bgs)	Screened Interval (feet bgs)	Notes
JAX-OU3-G17	20	8-9; 11-12; 17-19; 27-28; 37-38; 47-48; 57-58	New multilevel monitoring well 5 feet from IW-3A/B

bgs –below ground surface
Wells IW-2A/B and IW-3A/B are nested.

2.1.3 Well Construction

All wells will be installed using rotasonic drilling techniques by a driller licensed in the state of Florida.

Injection/Extraction/Monitoring Well Construction

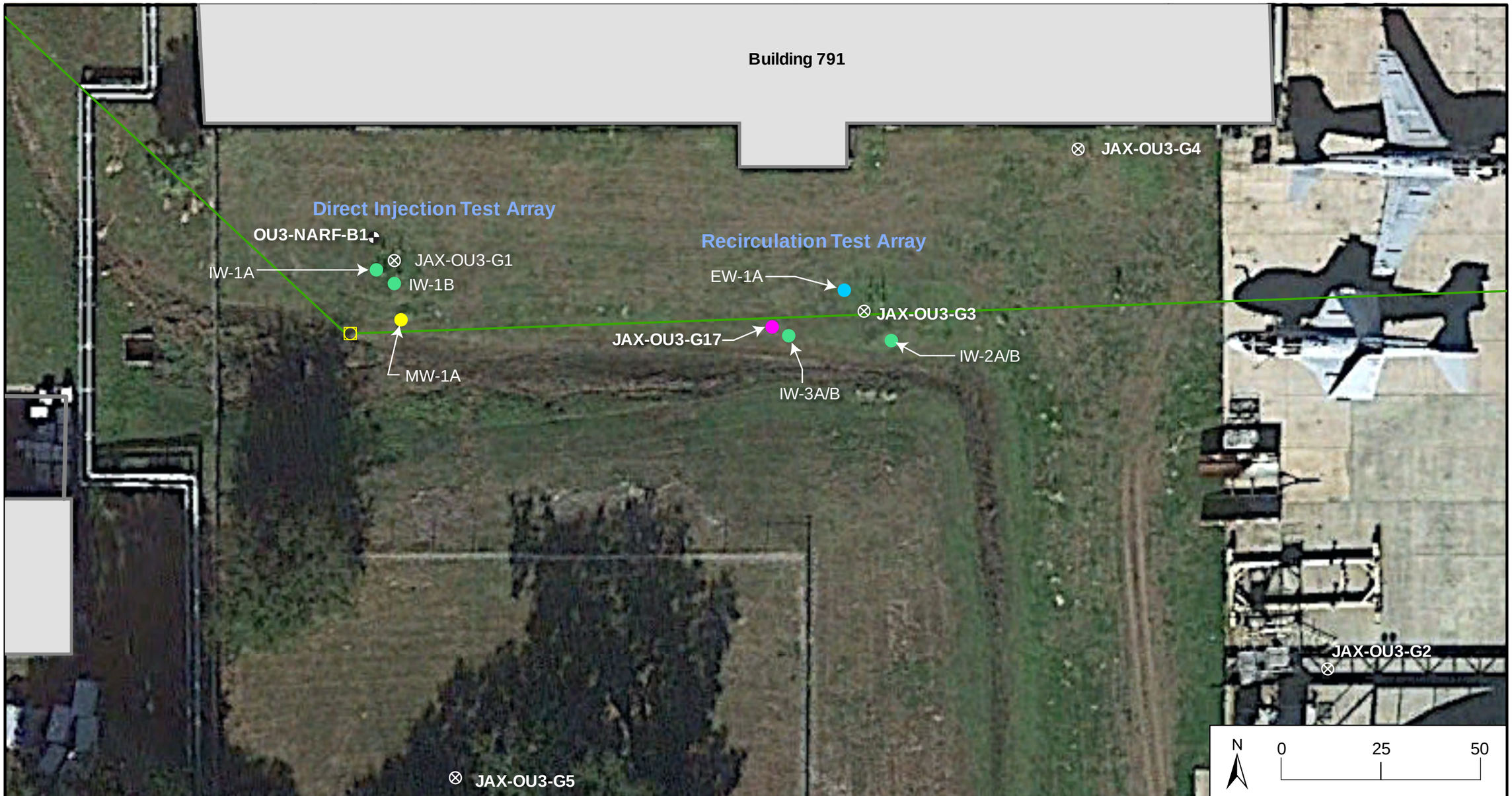
Injection and extraction wells will be constructed of 2-inch diameter Schedule 40 polyvinyl chloride (PVC) casing and 0.020-inch circumference slot well screen at the depths specified in Table 2-1. The monitoring well will have a 0.010-inch circumference slot well screen but will otherwise be constructed in the same manner as the injection and extraction wells. A filter pack will be installed from the base of the borehole to approximately 6 inches above the well screen and 6 inches below the well screen, and a 2-foot-thick bentonite seal will be placed over the filter pack. The annular space will be grouted to the ground surface. For the nested injection wells, a 19-foot-thick bentonite seal will be placed between the top of the bottom sand filter pack and the bottom of the top interval sand filter pack. Wells will be completed as flush mounts, with traffic-rated, steel protective covers set within surface pads made of concrete that are at least 4 inches thick and 1 foot diameter centered upon the well.

Wells will be developed using a surge block and pump until the water produced is relatively clear and free of sediment.

All drill cuttings will be contained in 55-gallon drums or roll-off or sludge boxes and development water will be contained in 55-gallon drums or a larger, approved container-type such as a poly tank or vacuum box pending sampling for characterization and proper disposal offsite in accordance with the Waste Management Plan (Section 3.0).

Multilevel Well Construction

The multilevel well will be installed using rotasonic (minimum 6-inch inside diameter and 10-inch outside diameter or rotasonic [6-inch diameter outer core barrel]) drilling technique. Construction of the intake ports and 1-foot screen at discrete depths of 8, 11, 17, 27, 37, 47, and 57 feet bgs for the new well will be performed by a drilling contractor before the Solinst continuous multichannel tubing (CMT) system (or equivalent) is inserted into the borehole. The well will be constructed within the rotasonic outer core barrel as it is withdrawn from the borings. The well casing will remain suspended in the borehole until the annual materials have been installed.



DRAWN BY	DATE		
CHECKED BY	DATE		
REVISED BY	DATE		
SCALE AS NOTED			

AGVIQ

Legend

Monitoring Well Locations
- Monitoring Well
- Multi-Chamber Well
- Manhole
- Newly Installed Extraction Well
- Newly Installed Injection Well
- Newly Installed Monitoring Well
- Newly Installed Multilevel Well

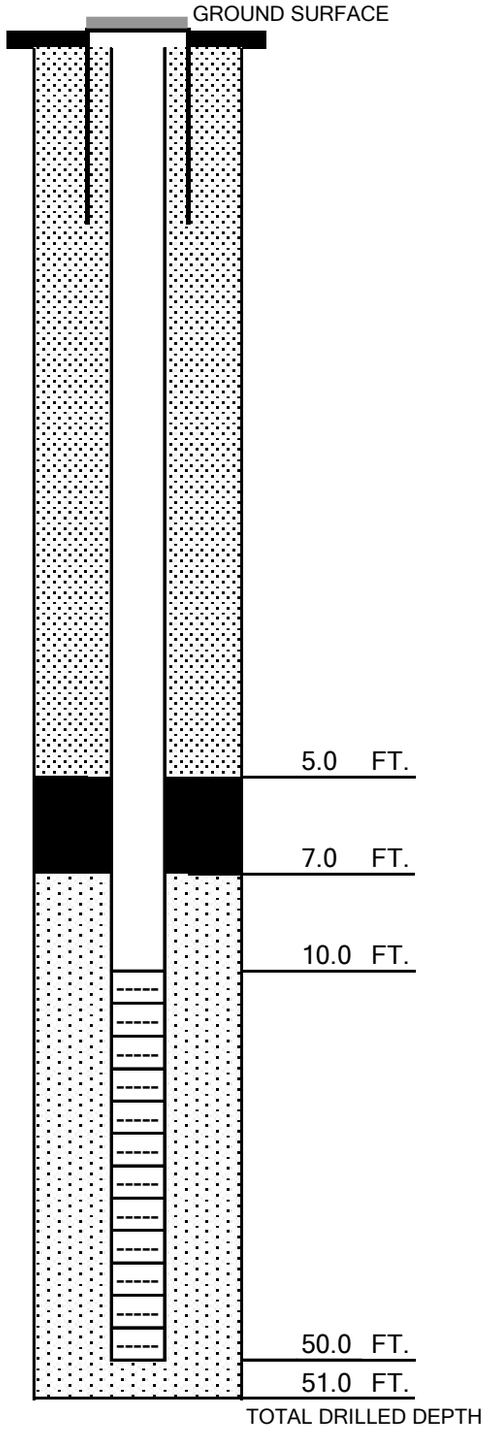
Site Boundary
- Road
- Storm Sewer
- Building

Figure 2-1
Proposed Tracer Test Arrays
OU3 Area G
NAS Jacksonville, Florida

CONTRACT NUMBER	
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. 2-1	REV 0

Well ID/LOCID _____

Extraction Well Construction Log



CLIENT NAME _____
PROJECT NAME _____
PROJECT # _____
PROJECT LOCATION _____
SITE ID _____

WELL LOCATION _____
HYDROLOGIC ZONE _____
HYDRAULIC GRADIENT _____

DRILLING DATE _____
COMPLETION DATE _____
DRILLING CO. TerraSonic
BOREHOLE DIA. 8"
DRILLING METHOD Rotasonic
DEPTH TO WATER _____
DEVELOPMENT (date/vol.) _____

RISER:
LENGTH NA
DIAMETER NA
MATERIAL NA

SEAL:
SEAL TYPE 1/4" Bentonite pellets

CASING:
INSTALL DATE _____
MATERIAL 2" sch 40 PVC
TOT. LENGTH 10
LENGTH (bgs) 10
INTVL CLASSSIF NA

SCREEN:
LENGTH 40
DIAMETER 2" sch 40 PVC
MATERIAL sch 40 PVC
SLOT SIZE 0.040
COMPLETION METHOD flush mount

PACK TYPE 8-16 Sieve Sand

REMARKS None

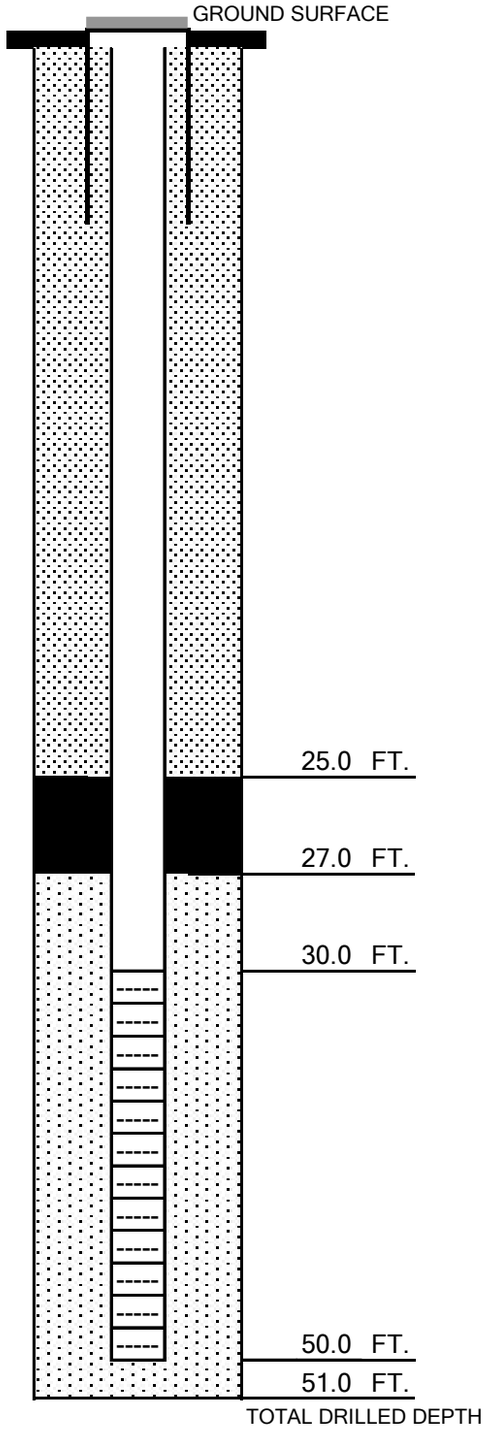
LITHOLOGY DESCRIP. Silty sand

HYDROGEOLOGIST _____

All measurements are from Ground Surface

Well ID/LOCID _____

Injection Well Construction Log



CLIENT NAME _____
PROJECT NAME _____
PROJECT # _____
PROJECT LOCATION _____
SITE ID _____

WELL LOCATION _____
HYDROLOGIC ZONE _____
HYDRAULIC GRADIENT _____

DRILLING DATE _____
COMPLETION DATE _____
DRILLING CO. TerraSonic
BOREHOLE DIA. 8"
DRILLING METHOD Rotasonic
DEPTH TO WATER _____
DEVELOPMENT (date/vol.) _____

RISER:
LENGTH NA
DIAMETER NA
MATERIAL NA

SEAL:
SEAL TYPE 1/4" Bentonite pellets

CASING:
INSTALL DATE _____
MATERIAL 2" sch 40 PVC
TOT. LENGTH 30
LENGTH (bgs) 30
INTVL CLASSSIF NA

SCREEN:
LENGTH 5'
DIAMETER 2" sch 40 PVC
MATERIAL sch 40 PVC
SLOT SIZE 0.040
COMPLETION METHOD flush mount

PACK TYPE 8-16 Sieve Sand

REMARKS None

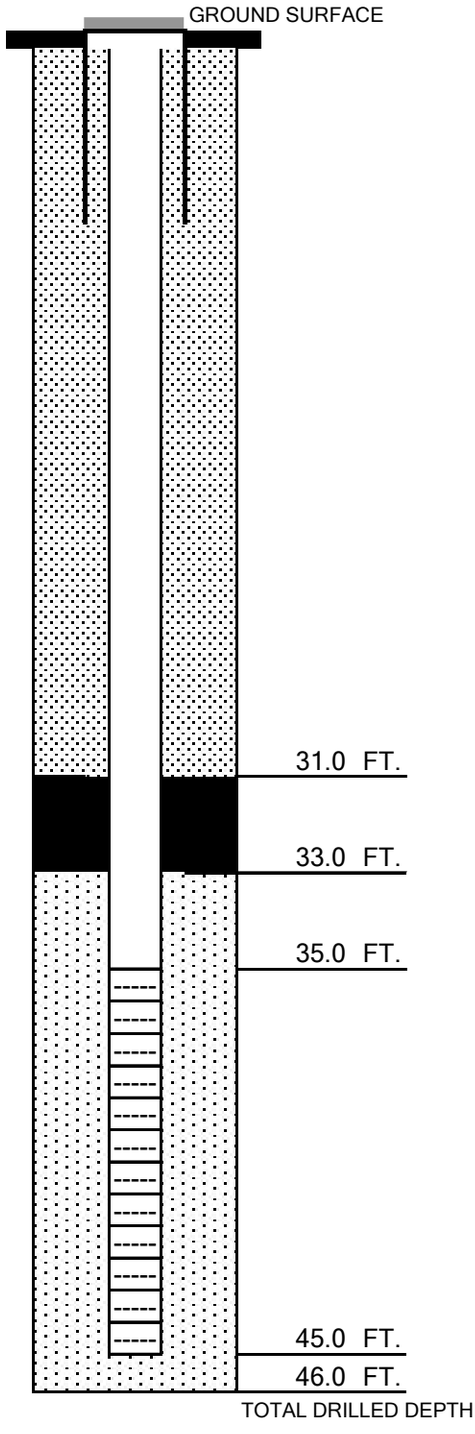
LITHOLOGY DESCRIP. Silty sand

HYDROGEOLOGIST _____

All measurements are from Ground Surface

Well ID/LOCID _____

Monitoring Well Construction Log



CLIENT NAME	
PROJECT NAME	
PROJECT #	
PROJECT LOCATION	
SITE ID	
WELL LOCATION	
HYDROLOGIC ZONE	NA
HYDRAULIC GRADIENT	NA
DRILLING DATE	
COMPLETION DATE	
DRILLING CO.	TerraSonic
BOREHOLE DIA.	6 1/4" ID
DRILLING METHOD	RotaSonic
DEPTH TO WATER	
DEVELOPMENT (date/vol.)	

RISER:

LENGTH	NA
DIAMETER	NA
MATERIAL	NA

SEAL:

SEAL TYPE	1/4' bentonite pellets

CASING:

INSTALL DATE	
MATERIAL	2" sch 40 PVC
TOT. LENGTH	35
LENGTH (bgs)	35
INTVL CLASSSIF	NA

SCREEN:

LENGTH	10
DIAMETER	2"
MATERIAL	sch 40 PVC
SLOT SIZE	0.010
COMPLETION METHOD	flush mount
PACK TYPE	Gravel pack #2
REMARKS	
LITHOLOGY DESCRIP.	silty sand
HYDROGEOLOGIST	

All measurements are from Ground Surface

PROJECT NUMBER	WELL NUMBER SHEET 1 OF 1

CH2MHILL

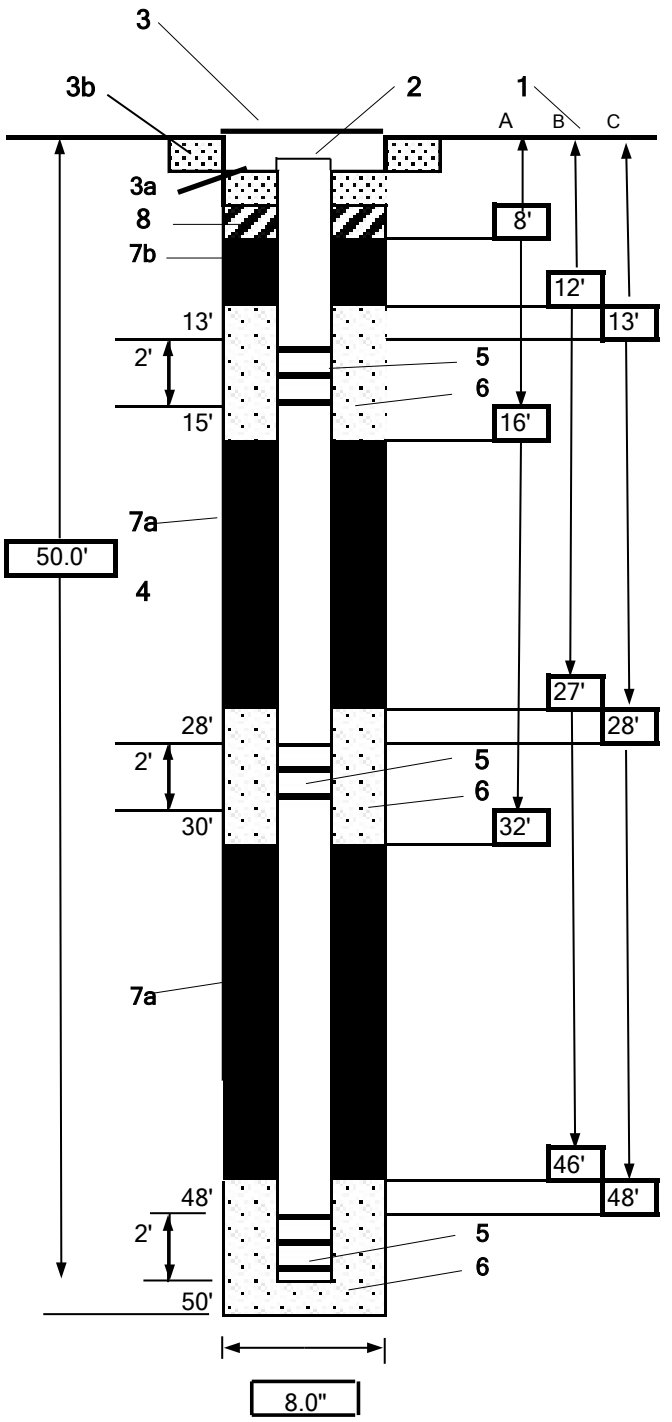
WELL COMPLETION DIAGRAM

PROJECT : NAS Jacksonville, Jacksonville FL. LOCATION : OU3 Area F and G NORTHING

DRILLING CONTRACTOR : TerraSonic EASTING

DRILLING METHOD AND EQUIPMENT USED : Rotosonic / Truck mounted Mini Sonic Rig 8" OD

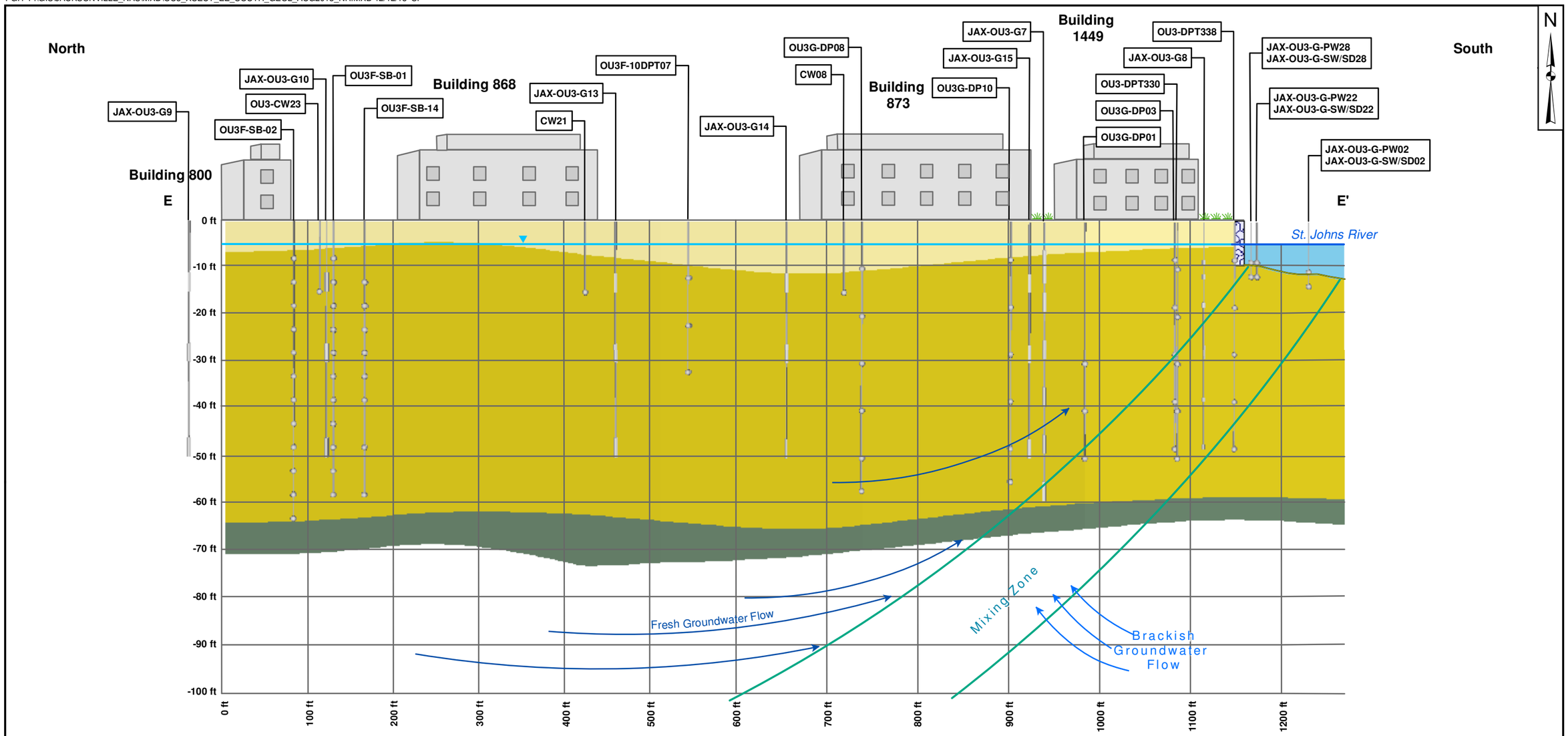
WATER LEVELS : START : END : LOGGER :



1- Ground elevation at well	Not obtained
2- Top of casing elevation	Not obtained
3- Wellhead protection cover type	Bolt-down manhole cover.
a) drain tube?	No
b) concrete pad dimensions	2' X 2' X 6"
4- Dia./type of well casing	1-inch / CMT HDPE multi chamber well
5- Type/slot size of screen	4 - 6*12" stainless steel mesh 100 w/ .040 wire per screen interval.
6- Type screen filter	20/30 silica sand
a) Quantity used	6 (50 lb) bags
7- Type of seal	Barroid bentonite chips 3/8"
a) Quantity used	3 (50 lb) bag
b) Quantity used	1 (50 lb) bag
8- Grout	1 bag
a) Grout mix used	Type I Portland cement w/ 5% bentonite
b) Method of placement	Tremie
A- Top of Seal	
B- Top of filter	
C- Top of Screen	
Development method	
Estimated purge volume	
Development time	

Comments Port 1: 50-48'
Port 2: 30-28'
Port 3: 15-13'

PGH P:\GIS\JACKSONVILLE_NAS\MXD\OU3_XSECT_EE_SOUTH_GEOL_AUG2013_NR.MXD 12/12/13 SP



Legend

- Water Table
- Sand
- Sand With Interbedded Silts and Clays
- Clay

Notes:
1) Elevations posted are depth below land surface.
2) Buildings are offset from cross-section. Sample locations area not contained within the buildings.
3) Boring logs were utilized in drawing the cross-section.

DRAWN BY	DATE
S. PAXTON	05/14/12
CHECKED BY	DATE
J. JOHNSON	12/12/13
REVISED BY	DATE
S. PAXTON	12/12/13
SCALE	
AS NOTED	

NAVFAC

CROSS-SECTION E - E', SOUTHERN OU 3
OU 3
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

CONTRACT NUMBER	CTO NUMBER
2106	0154
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO. 2 - 9	REV 0

PGH P:\GIS\JACKSONVILLE_NAS\MXD\OU3_TCE_XSECT_PLAN_SECT2_2013.MXD 12/12/2013 SP

14JAX0011

DRAWN BY	DATE
S. PAXTON	09/26/11
CHECKED BY	DATE
J. JOHNSON	12/12/13
REVISED BY	DATE
S. PAXTON	12/12/13
SCALE	
AS NOTED	

NAVFAC

CROSS-SECTION PLAN MAP
OU 3
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

CONTRACT NUMBER	CTO NUMBER
2106	0154
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
2 - 5	0

CTO 0154

Rev. 0
December 2013

Appendix D
Quality Control Documents

July 3, 2014

Mr. Osaguona Ogbebor
CH2M Hill
One South Main St, Suite 1100
Dayton, OH 45402

RE: Contract No. N62470-12-D-7004
Task Order No. JM 19 Enhanced Bioremediation – Operable Unit 3 Areas F and G Phase I (Pre-Design) Tracer Test, Naval Air Station Jacksonville, Jacksonville, Florida.
Project Quality Control Manager Letter of Appointment

Dear Mr. Ogbebor:

Herein describes the responsibilities and authority delegated to you in your capacity as the Project QC Manager for the remedial activities for the Enhanced Bioremediation – Operable Unit 3 Areas F and G Phase I (Pre-Design) Tracer Test, Naval Air Station Jacksonville, Jacksonville, Florida, Task Order No. JM 19 under the Navy Atlantic Small Business RAC II (SB RAC II) Contract No. N62470-12-D-7004.

In this position, you assist and represent the Program QC Manager in continued implementation and enforcement of the Project QC Plans. Your primary role is to ensure all requirements of the contract are met. Consistent with this responsibility, you will: (i) implement the QC program as described in the SB RAC II Contract; (ii) manage the site-specific QC requirements in accordance with the Project QC Plans; (iii) attend the coordination and mutual understanding meeting; (iv) conduct QC meetings; (v) oversee implementation of the three phases of control; (vi) perform submittal review and approval; (vii) ensure testing is performed; (viii) prepare QC certifications and documentation required in the SB RAC II Contract; and, (ix) furnish a Completion Certificate to the Contracting Officer or designated representative, upon completion of work under a contract task order , attesting that "the work has been completed, inspected, and tested, and is in compliance with the contract."

Your responsibilities further include identifying and reporting quality problems, rejecting nonconforming materials, initiating corrective actions, and recommending solutions for nonconforming activities.

You have the authority to control or stop further processing, delivery, or installation activities until satisfactory disposition and implementation of corrective actions are achieved. You have the authority to direct the correction of non-conforming work. All work requiring corrective action will be documented on daily reports, and, in the event non-*conforming work* is not

immediately corrected you are required to submit a non-conformance report to the PM and copy the Program QC Manager. A status log will be kept of all non-conforming work. You shall immediately notify the Program QC Manager in the event of any stop work order.

It is imperative that you comply with all terms of the basic contract. In particular, Section C, Paragraph 6.5.2, which states:

> "No work or testing may be performed unless the QC Program Manager or Project QC Manager is on the work site."

In the event that you are not able to be at the work site when work or testing is to be performed, it is your responsibility to inform the Program QC Manager and Project Manager, in advance, so that other arrangements can be made.

Further, if you are requested to perform the duties of the Site Supervisor, it is your responsibility to inform the Program QC Manager so that approval can be obtained in advance from the Contracting Officer or designated representative, in accordance with Section C Paragraph 6.6.2.1 of the contract.

You are a key member of the Project Manager's team. You ensure that work meets the specific requirements and intent of the work plan, the Navy's scope of work and the basic contract. Should you have any questions regarding this role, you should immediately contact the Program QC Manager, Taylor Sword. Your day-to-day activities on the site should be coordinated with all site personnel and the Project Manager. In event of any deficient items, the Superintendent and Project Manager should be advised immediately so they have opportunity to remedy the situation.

Sincerely,

AGVIQ LLC

P. Taylor Sword CPG
Senior Project Manager/QC Program Manager
AGVIQ Environmental Services, LLC

cc: P. Rakowski – AGVIQ
file

Submittal Register

Contract Number: N62470-12-D-7004		TO No.:			TO Title:					Location:				Contractor:		
Spec Section	Item Description	Para. Number	Approving Authority	Other Reviewers	Submittal Number	Scheduled Submission Date	Review Date	Disposition	Transmit Date	QC Admin Received Date	QC Disposition	QC Admin Transmit Date	Contracting Officer Received	Contracting Officer Disposition	Contracting Officer Return	Remarks
	SD-															
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Testing Plan and Log

TO No.:	TO Title:	Location:
SMALL BUSINESS RAC II		

Spec Section and Paragraph	Test Required	Proposed Lab	Sampled By	Tested By	Test Location	Frequency	Date Test Made	Test Results	Date Results Forwarded	Remarks

CONTRACTOR PRODUCTION REPORT

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

DATE OF REPORT:
REVISION NO:
REVISION DATE:

TO NO:	PROJECT NAME/LOCATION:		REPORT NO:
PROJECT NO:	SUPERINTENDENT:	SITE H&S SPECIALIST:	
AM WEATHER:	PM WEATHER:	MAX TEMP: F	MIN TEMP: F

SUMMARY OF WORK PERFORMED TODAY

JOB SAFETY

Was A Job Safety Meeting Held This Date?	☐ Yes ☐ No	
Were there any lost-time accidents this date? (If Yes, attach copy of completed OSHA report)	☐ Yes ☐ No	
Was a Confined Space Entry Permit Administered This Date? (If Yes, attach copy of each permit)	☐ Yes ☐ No	
Was Crane/Manlift/Trenching/Scaffold/HV Elec/High Work/Hazmat Work Done?? (If Yes, attach statement or checklist showing inspection performed)	☐ Yes ☐ No	
Was Hazardous Material/Waste Released into the Environment? (If Yes, attach description of incident and proposed action)	☐ Yes ☐ No	

TOTAL WORK HOURS ON JOB SITE THIS DATE (Including Continuation Sheets)	
CH2MHILL On-Site Hours	
AGVIQ On-Site Hours	
Subcontractor On-Site Hours	
Total On-Site Hours This Date	
Cumulative Total of Work Hours From Previous Report	
Total Work Hours From Start of Construction	

SAFETY ACTIONS TAKEN TODAY/SAFETY INSPECTIONS CONDUCTED (Include Safety Violations, Corrective Instructions Given, Corrective Actions Taken, and Results of Safety Inspections Conducted):

EQUIPMENT/MATERIAL RECEIVED TODAY TO BE INCORPORATED IN JOB

DESCRIPTION OF EQUIPMENT/MATERIAL RECEIVED	MAKE/ MODEL/ MANUFACTURER	EQUIPMENT/ LOT NUMBER	INSPECTION PERFORMED BY	NUMBER/ VOLUME/ WEIGHT

EQUIPMENT USED ON JOB SITE TODAY.

EQUIPMENT DESCRIPTION	EQUIPMENT MAKE/MODEL	SAFETY CHECK PERFORMED BY	NUMBER OF HOURS		
			USED	IDLE	REPAIR

CHANGED CONDITIONS/DELAY/CONFLICTS ENCOUNTERED (List any conflicts with the delivery order [i.e., scope of work and/or drawings], delays to the project attributable to site and weather conditions, etc.)**:**

VISITORS TO THE SITE:

LIST OF ATTACHMENTS (OSHA report, confined space entry permit, incident reports, etc.):

SAFETY REQUIREMENTS HAVE BEEN MET ☐

SUPERINTENDENT'S SIGNATURE DATE

AGVIQ ENVIRONMENTAL SERVICES	**CONTRACTOR PRODUCTION REPORT** (ATTACH ADDITIONAL SHEETS IF NECESSARY)	DATE OF REPORT: REVISION NO: REVISION DATE:
CTO NO:	PROJECT NAME/LOCATION:	REPORT NO:
PROJECT NO:	SUPERINTENDENT:	SITE H&S SPECIALIST:

WORK PERFORMED TODAY

EMPLOYEE	WORK PERFORMED	EMPLOYER	FEMALE?	MINORITY?	TITLE/TRADE	HRS

INCLUDE ALL PERSONNEL WORK HOURS IN THE TOTAL WORK HOURS ON JOB SITE

SAFETY REQUIREMENTS HAVE BEEN MET ☐

SUPERINTENDENT'S SIGNATURE

DATE

AGVIQ ENVIRONMENTAL SERVICES	**CONTRACTOR QUALITY CONTROL REPORT** (ATTACH ADDITIONAL SHEETS IF NECESSARY)	REPORT DATE: REVISION NO: REVISION DATE:
TO NO:	PROJECT NAME/LOCATION:	REPORT NO:
PROJECT NO:	PROJECT QC MANAGER:	SITE H&S SPECIALIST:

SAFETY MEETINGS AND INSPECTIONS

WAS A SAFETY MEETING HELD THIS DAY?	☐ YES	☐ NO	IF YES, ATTACH SAFETY MEETING MINUTES
WAS CRANE USED ON THE SITE THIS DAY?	☐ YES	☐ NO	IF YES, ATTACH DAILY CRANE REPORT OF INSPECTION AND CONTRACTOR CRANE OPERATION CHECKLIST

DEFINABLE FEATURES OF WORK STATUS

DFOW No.	Definable Feature Of Work	Preparatory	Initial	Follow-Up
1		☐	☐	☐
2		☐	☐	☐
3		☐	☐	☐
4		☐	☐	☐
5		☐	☐	☐
6		☐	☐	☐
7		☐	☐	☐
8		☐	☐	☐
9		☐	☐	☐
10		☐	☐	☐
11		☐	☐	☐
12		☐	☐	☐
13		☐	☐	☐
14		☐	☐	☐
15		☐	☐	☐

PREPARATORY

WAS PREPARATORY PHASE WORK PERFORMED TODAY? ☐ YES ☐ NO

IF YES, FILL OUT AND ATTACH SUPPLEMENTAL PREPARATORY PHASE CHECKLIST.

DFOW No.(from list above).	TASK/ACTIVITY	PREPARATORY PHASE REPORT NO.

INITIAL AND FOLLOW-UP FEATURE OF WORK COMMENTS

DFOW No.(from list above)	Phase	Comment/Finding/Action
	Initial ☐ Follow up ☐	
	Initial ☐ Follow up ☐	
	Initial ☐ Follow up ☐	
	Initial ☐ Follow up ☐	
	Initial ☐ Follow up ☐	
	Initial ☐ Follow up ☐	
	Initial ☐ Follow up ☐	
	Initial ☐ Follow up ☐	
	Initial ☐ Follow up ☐	
	Initial ☐ Follow up ☐	
	Initial ☐ Follow up ☐	

REWORK ITEMS IDENTIFIED TODAY (NOT CORRECTED BY CLOSE OF BUSINESS)			**REWORK ITEMS CORRECTED TODAY (FROM REWORK ITEMS LIST)**	
TASK/ACTIVITY	DATE ISSUED	DESCRIPTION	TASK/ACTIVITY	CORRECTIVE ACTION(S) TAKEN

AGVIQ ENVIRONMENTAL SERVICES	**CONTRACTOR QUALITY CONTROL REPORT** (ATTACH ADDITIONAL SHEETS IF NECESSARY)	REPORT DATE: REVISION NO: REVISION DATE:
CTO NO:	PROJECT NAME/LOCATION:	REPORT NO:
PROJECT NO:	PROJECT QC MANAGER:	SITE H&S SPECIALIST:

SAMPLING/TESTING PERFORMED

SAMPLING/TESTING PERFORMED	SAMPLING/TESTING COMPANY	SAMPLING/TESTING PERSONNEL

MATERIALS/EQUIPMENT INSPECTION (Materials received and inspected against specifications)

MATERIAL/EQUIPMENT DESCRIPTION	SPECIFICATION	MATERIAL ACCEPTED?	COMMENT/REASON/ACTION
		YES ☐ NO ☐	
		YES ☐ NO ☐	
		YES ☐ NO ☐	
		YES ☐ NO ☐	
		YES ☐ NO ☐	
		YES ☐ NO ☐	
		YES ☐ NO ☐	

SUBMITTALS INSPECTION / REVIEW

SUBMITTAL NO	SUBMITTAL DESCRIPTION	SPEC/PLAN REFERENCE	SUBMITTAL APPROVED?	COMMENT/REASON/ACTION
			YES ☐ NO ☐	
			YES ☐ NO ☐	
			YES ☐ NO ☐	
			YES ☐ NO ☐	

OFF-SITE SURVEILLANCE ACTIVITIES, INCLUDING ACTIONS TAKEN:

ACCUMULATION/STOCKPILE AREA INSPECTION

INSPECTION PERFORMED BY:				SIGNATURE OF INSPECTOR:			
ACCUMULATION/ STOCKPILE AREA LOCATION							
NO OF CONTAINERS:		NO OF TANKS:		NO OF ROLL-OFF BOXES:		NO OF DRUMS:	

INSPECTION RESULTS:

TRANSPORTATION AND DISPOSAL ACTIVITIES/SUMMARY/QUANTITIES:

GENERAL COMMENTS (rework, directives, etc.):

LIST OF ATTACHMENTS (examples, as applicable: preparatory phase checklist, QC meeting minutes, safety meeting minutes, crane inspections, crane operation checklist, COCs, weight tickets, manifests, profiles, rework item list, testing plan and log, etc.):

On behalf of the contractor, I certify that this report is complete and correct and equipment and material used and work performed during this reporting period is in compliance with the contract drawings and specifications to the best of my knowledge except as noted in this report.

PROJECT QC MANAGER'S SIGNATURE DATE

On behalf of the contractor, I attest that the work for which payment is requested, including stored material, is in compliance with contract requirements.

PROJECT QC MANAGER'S SIGNATURE DATE

Photo Log

TO Number	Project Number	Project Name	Site	Film Cassette Number	Photo Number	Date	Time	Task and Description	View Direction	Taken By

REQUEST FOR INFORMATION/CLARIFICATION

CONTRACT NO. **PROJECT NO.**

PROJECT TITLE & LOCATION:

BRIEF DESCRIPTION OF RFI:

TO:	NAME		TITLE	
FROM:	NAME		TITLE	
Date Submitted:	RFI No		DCN No	
Please Respond By:			Page:	of
REFERENCE				
DELIVERABLE NO.(S):				
DRAWING(S)/SPECS:				

1) DESCRIPTION OF EXISTING CONDITION AND/OR DEFICIENCY:

NAME TITLE

PROJECT TEAM MEMBER SIGNATURE DATE

2) RECOMMENDED SOLUTION:

NAME TITLE	NAME TITLE
PROJECT MANAGER APPROVAL SIGNATURE DATE	PROJECT TEAM MEMBER SIGNATURE DATE

3) RESPONSE/DISPOSITION:

NAME	NAME
LEAD ENGINEER SIGNATURE DATE	PROJECT MANAGER SIGNATURE DATE

RFC Required? **Yes** ☐ **No** ☐ **Schedule Impact?** **Yes** ☐ **No** ☐ **Cost Impact?** **Yes** ☐ **No** ☐

4) CLIENT RESPONSE/DISPOSITION CONCURRENCE:

NAME	NAME
QC MANAGER SIGNATURE DATE	AFCEE REP SIGNATURE DATE

REVIEW DISTRIBUTION			FINAL DISTRIBUTION		
☐ CLIENT REP	☐ FACILITY REP	☐ LEAD ENG	☐ CLIENT REP	☐ FACILITY REP	☐ LEAD ENG
☐ CLIENT CONTRACTS	☐	☐ Other	☐ CLIENT CONTRACTS	☐ PM	☐ Other
☐ KA	☐ PROJ ENG	☐	☐ KA	☐ PROJ ENG	☐

Request For Information Log

		Project Name:				Project Number:	
		Project QC Manager:					
RFI #	**Description of Issue**	**Submitted To**	**Date**	**Returned To**	**Date**	**Response/Disposition**	**Status**
1							
2							
3							
4							

Punch List / Rework Items List

PUNCH LIST /REWORK ITEMS

PROJECT NAME:			PROJECT NUMBER					
Item No	Date Identified	Description	Referenced Spec or Drawing	Date Subcontractor Notified	Proposed Date of Action Completion	Action Performed	Resolution	Date Completed
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
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14								
15								
16								
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25								
26								
27								

Monthly Summary Report of Field Tests

Start Date:	**End Date:**	**Submittal Date:**	**Submitted By:**
Contract Number: N62470-12-D-7004	**TO No.:**	**TO Title:**	**Location:**

Type of Test Required	Date of Test	Reporting Laboratory	Test Results

SMALL BUSINESS RAC	PREPARATORY PHASE REPORT	REPORT NO:	REPORT DATE: REVISION NO: REVISION DATE:
PROJECT NO:	DEFINABLE FEATURE OF WORK:	SITE/ACTIVITY:	

PERSONNEL PRESENT

NAME	POSITION	COMPANY/GOVERNMENT

SUBMITTALS

REVIEW SUBMITTALS AND/OR SUBMITTAL REGISTER.	HAVE ALL SUBMITTALS BEEN APPROVED? YES ☐ NO ☐
IF NO, WHAT ITEMS HAVE NOT BEEN SUBMITTED?	
ARE ALL MATERIALS ON HAND? YES ☐ NO ☐	
IF NO, WHAT ITEMS ARE MISSING?	
CHECK APPROVED SUBMITTALS AGAINST DELIVERED MATERIAL. (THIS SHOULD BE DONE AS MATERIAL ARRIVES).	
COMMENTS:	

MATERIAL STORAGE

ARE MATERIALS STORED PROPERLY? YES ☐ NO ☐	
IF NO, WHAT ACTION IS TAKEN?	

SPECIFICATIONS

REVIEW EACH PARAGRAPH OF SPECIFICATIONS.

DISCUSS PROCEDURE FOR ACCOMPLISHING THE WORK.

CLARIFY ANY DIFFERENCES.

PRELIM WORK & PERMITS

ENSURE PRELIMINARY WORK IS CORRECT AND PERMITS ARE ON FILE.	
IF NO, WHAT ACTION IS TAKEN?	

AGVIQ **Small Business RAC II**	**PREPARATORY PHASE REPORT**	REPORT NO:	REPORT DATE: REVISION NO: REVISION DATE:
PROJECT NO:	DEFINABLE FEATURE OF WORK:	SITE/ACTIVITY:	

TESTING

IDENTIFY TEST TO BE PERFORMED, FREQUENCY, AND BY WHOM.

TEST	FREQUENCY	PERFORMER

WHEN REQUIRED?

WHERE REQUIRED?

REVIEW TESTING PLAN.

HAVE TEST FACILITIES BEEN APPROVED?

TEST FACILITY	APPROVED?
	YES ☐ NO ☐
	YES ☐ NO ☐

SAFETY

ACTIVITY HAZARD ANALYSIS APPROVED? YES ☐ NO ☐

REVIEW APPLICABLE PORTION OF EM 385-1-1 AND AHA.

MEETING COMMENTS

NAVY/ROICC COMMENTS DURING MEETING.

OTHER ITEMS OR REMARKS

OTHER ITEMS OR REMARKS:

QC REPRESENTATIVE'S NAME	QC REPRESENTATIVE'S SIGNATURE		DATE	

Inspection Report

Date of Inspection:		**TO Number:**	**Project Name:**
Type of Inspection: *(Circle One)*	**Pre-Final**	**Final**	**Prepared By:**

Attendees

Name	**Title**	**Name**	**Title**

Findings / Punch List

Item No	Referenced Spec or Drawing	Description	QC Rep Action / Instruction	Resolution	Date Completed

Findings / Punch List					
Item No	Referenced Spec or Drawing	Description	QC Rep Action / Instruction	Resolution	Date Completed

WASTE TRACKING LOG

Task Order Number	Project Number	Task Order Name	Site/Task Description	Container Type	Container Desig./No.	Accumula-tion Start Date	Waste Profile No. and/or Sample ID	(Sub)Con-tractor	Trans-porter	Date Trans-ported	Trans-porter DOT # & EPA ID	Disposal Facility	Disp Fac State ID &/or EPA ID	Matrix	Waste Type (Haz, Nonhaz, TSCA)	Waste Code (RCRA then State)	Disposal Facility Date (found on final manifest)	Manifest Number	Disposal Method (Enter disposal quantity under appropriate method)							Cert. of Disp/ Destruc Date	Comments/ Notes
																			Incin-eration	Landfill	Recycle	Onsite	Offsite Water Treatment	Other	Unit		

Note: All waste should be included on the Waste Tracking Log from the moment of generation.