

# Work Plan Addendum No. 01

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Revision No. 01

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## Modification to the Extraction System and Abandonment of Production Wells

Naval Industrial Reserve Ordnance Plant Fridley  
Fridley, Minnesota

Contract No. N62467-98-D-0995  
Contract Task Order No. 0024

August 2000

PREPARED FOR



Department of the Navy, Southern Division  
Naval Facilities Engineering Command  
2155 Eagle Drive  
North Charleston, South Carolina 29406

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Submitted to:

**U.S. Naval Facilities**  
**Engineering Command**  
**Southern Division**

Prepared by:



August 2000

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8-21-00  
Date

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**CH2MHILL**  
*Constructors, Inc.*

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**August 2000**

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# Acronym List

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ACI	American Concrete Institute
AALA	American Association for laboratory Accreditation
AASHTO	American Association of State Highway Transportation Officials
ACO	Administrative Contracting Officer
ACP	Anoka County Riverfront Park
ASTM	American Society for Testing Materials
bls	below land surface
CCI	CH2M HILL Constructors, Inc.
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-term Environmental Action Navy
CMP	Contract Management Plan
COD	chemical oxygen demand
COTR	Contracting Officer's Technical Representative
CTO	Contract Task Order
DFOW	Definable Feature of Work
DNR	Department of Natural Resources
g/cm <sup>3</sup>	grams per cubic centimeter
GWTF	groundwater treatment facility
HSP	Health and Safety Plan
IMR	Interim Measures Report
IR CDQM	Installation Restoration Chemical Data Quality Manual
lbs/gal	pounds per gallon
LDR	Land Disposal Restriction
MCES	Metropolitan Council Environmental Services
MDH	Minnesota Department of Health
mg/L	milligrams per liter
ml	milliliter
ml/L	milliliters per liter
MPCA	Minnesota Pollution Control Agency
NAVFAC	Naval Facilities Engineering Command
NIROP	Naval Industrial Reserve Ordnance Plant
NIST	National Institute of Standards Technology
NPDES	National Pollutant Discharge and Elimination System
NTU	nephelometric turbidity unit
NVLAP	National Voluntary Laboratory Accreditation Program
O&M	Operations and Maintenance
OVA	organic vapor analyzer
PID	photo-ionization detector
PPE	Personal Protective Equipment
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act

ROD	Record of Decision
ROICC	Resident Officer in Charge of Construction
RPM	Remedial Project Manager
SDS	State Disposal System
T&D	transportation and disposal
TCE	trichloroethene
TSCA	Toxic Substances Control Act
TSS	total suspended solids
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

# 1.0 Introduction

---

CH2M HILL Constructors, Inc. (CCI) has been contracted by the Department of the Navy, Southern Division, Naval Facilities Engineering Command (Southern Division, NAVFAC), to prepare this Work Plan Addendum to the Basewide Work Plan dated May 2000 for work to be performed by CCI at Naval Industrial Reserve Ordnance Plant (NIROP) Fridley in Fridley, Minnesota. The work is being performed under Contract No. N62467-98-D-0995, Contract Task Order (CTO) No. 0024, and in accordance with the management approach outlined in the CCI Contract Management Plan (CMP) dated July 1998.

The purpose of this Work Plan Addendum is to outline the procedures to be used for the planned work to enhance the existing extraction system at NIROP Fridley. The planned work under this Work Plan Addendum includes: 1) installation of additional extraction wells (one well inside the building and two wells outside for effective containment of the plume); 2) removal of Extraction Wells AT-1A and AT-4 from the groundwater treatment system; and 3) abandonment of unused water-supply Production Wells 2 and 3 (Unique Numbers 206695 and 234001).

The location and size of extraction wells; location, size and length of screen; and pumping rates for each of the extraction wells will be determined by the Groundwater Model developed by TetraTech NUS, Inc., the Comprehensive Long-term Environmental Action Navy (CLEAN) contractor and will be finalized based on technical discussions with the Partnering Team. The exact location of the extraction wells and pumping rates will be determined based on field conditions. Additionally, screen size and screen interval may be changed in the field based onsite conditions. This Work Plan Addendum serves as a supplement to the Basewide Work Plan prepared by CCI for use as the master document for the work at NIROP Fridley. CCI will use the procedures outlined in this Work Plan Addendum, in conjunction with the information in the Basewide Work Plan, to complete the work. As additional remedial work actions at NIROP Fridley is identified, CCI will prepare documents that will supplement the Basewide Work Plan master document and be identified sequentially as Work Plan Addendum 02, Work Plan Addendum 03, etc.

This Work Plan Addendum is organized into six sections and three appendices. A brief description of each section is presented below.

**1.0 Introduction** includes the site history, regulatory framework, scope of work, and project schedule for the planned work described in this Work Plan Addendum.

**2.0 Execution of Work** identifies the applicable definable features of work (DFOWs) and briefly describes each of these.

**3.0 Waste Management Plan** discusses the characterization, handling, transportation, and disposal of wastes encountered or generated during the performance of the field work described in this Work Plan Addendum.

**4.0 Environmental Protection Plan** addresses the various methods that will be employed in order to eliminate or minimize any potential impacts to the environment while performing the work described in this Work Plan Addendum.

**5.0 Health and Safety Plan** addresses project-specific health and safety issues for the work described in this Work Plan Addendum.

**6.0 Quality Control Plan** includes the site-specific project organization and testing requirements. All other quality control information is contained in the Basewide Work Plan.

**Appendix A** contains the project schedule.

**Appendix B** contains the complete site-specific Health and Safety Plan.

**Appendix C** contains Quality Control (QC) attachments (Testing Plan and Log, Submittal Register, Transportation and Disposal Log, resume of QC Manager, and QC Manager appointment letter).

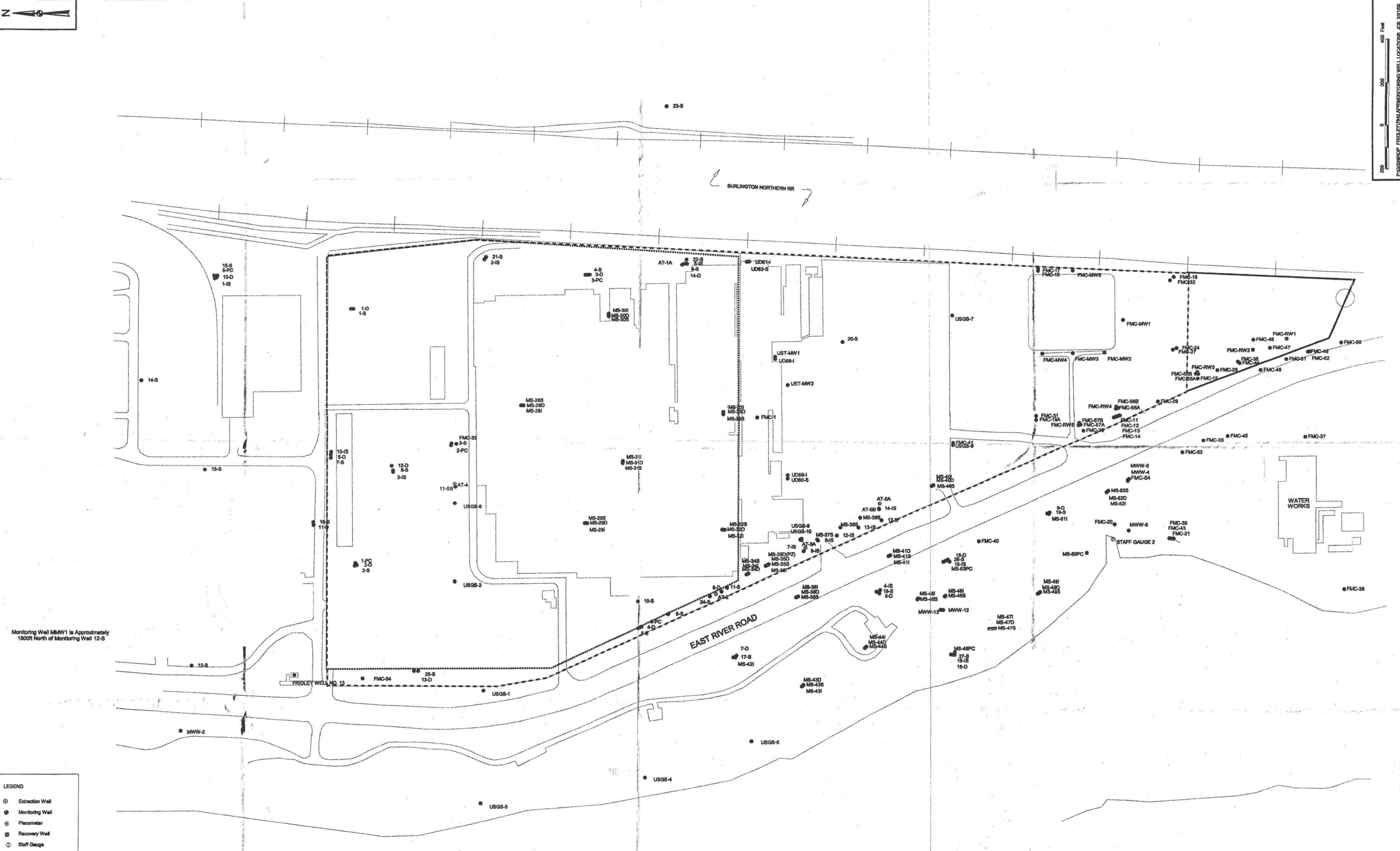
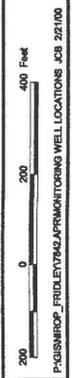
## **1.1 Site Setting**

NIROP Fridley is located near the twin cities of Minneapolis and St. Paul, Minnesota. As shown on Figure 1-1, the site is approximately 1,000 feet east of the Mississippi River and less than 1 mile south of Interstate 694. It lies on a broad, flat outwash terrace, and is largely covered by pavement, structures, and other facilities. Out of the total plant size of 138 acres, the federal government owns 83 acres which are operated by United Defense. The remaining 55 acres are owned and operated by United Defense. Figure 1-1 also shows the layout of the facility and the existing monitoring wells and extraction wells.

## **1.2 Site Background**

The Record of Decision (ROD) for groundwater remediation at the NIROP Fridley site was signed in September 1990 by representatives of the U.S. Navy (Navy), the United States Environmental Protection Agency (USEPA) - Region V, and the Minnesota Pollution Control Agency (MPCA). The remedial action in the ROD specified hydraulic containment and recovery of all future migration of contaminated groundwater from the NIROP Fridley and the recovery, to the extent feasible, of contamination downgradient of the NIROP Fridley site. The selected remedy included the installation and operation of groundwater extraction wells, with a two-phased plan for disposal of groundwater from the well extraction system. It was planned at that time, that contaminated groundwater located offsite and downgradient of the NIROP Fridley site in Anoka County Riverfront Park (ACP) would be allowed to naturally dissipate. However, this plan is currently under review.

Under the Phase I Plan, groundwater from the extraction system would be discharged to an existing sanitary sewer with treatment provided at a local wastewater treatment facility. Under the Phase II Plan, a groundwater treatment facility (GWTF) would be constructed and operated at NIROP Fridley to provide long-term groundwater treatment. Treated groundwater from the onsite groundwater treatment facility would then be discharged to the Mississippi River via a National Pollutant Discharge Elimination System (NPDES) / Metropolitan Council Environmental Services (MCES) State Disposal System (SDS) storm sewer discharge permit.



Monitoring Well MMW1 is Approximately 1800ft North of Monitoring Well 12-S

LEGEND

- ⊕ Extraction Well
- ⊙ Monitoring Well
- ⊙ Piezometer
- ⊙ Recovery Well
- ⊙ Staff Gauge

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	NO.	RELEASED FOR	BY	DATE

DRAWN BY J. BELLONE DATE 1/19/00  
 CHECKED BY Robert P. ... DATE 3/6/00  
 COST/SCHEDULE-AREA  
 SCALE AS NOTED

**Tetra Tech NUS, Inc.**

**SITE LOCATION AND MONITORING WELL LOCATION MAP**  
**1999 ANNUAL MONITORING REPORT**  
**NIROP FRIDLEY, MINNESOTA**

CONTRACT NO.	7842	OWNER NO.	
APPROVED BY	K. HENN	DATE	2/8/00
APPROVED BY		DATE	
DRAWING NO.	FIGURE 2-1	REV.	0

A groundwater extraction and treatment system was constructed based on design documents approved by the USEPA and the MPCA. Construction of the original groundwater extraction system included the installation of four extraction wells (AT-1A, AT-2, AT-3A, and AT-4) and a specific capacity test on each of these extraction wells to determine sustainable pumping rates in each well. Additional analysis, which included groundwater sampling and analysis indicated that groundwater pretreatment was required prior to discharge to the sanitary sewer owned by the MCES to meet discharge limits set by the MCES. As a result, a pretreatment system was also constructed at the NIROP Fridley site for use during the interim Phase I discharge to the sanitary sewer.

The groundwater extraction system and pretreatment facilities began operating in September 1992. Monitoring of the extraction system performance and groundwater via an extensive monitoring well network has been performed since startup according to the procedures described in the Remedial Action Work Plan for Groundwater Remediation, which was approved by the MPCA and the USEPA. The latest version of this plan was issued in January 2000.

As required by the ROD, an evaluation of the effectiveness of the groundwater extraction system in achieving hydraulic containment of contaminated groundwater from the site during the initial 90-day operating period was submitted to the USEPA and the MPCA in December 1992. The document concluded that additional groundwater extraction well(s) would be needed to achieve effective capture and hydraulic containment of contaminated groundwater. A work plan for upgrading the original groundwater extraction system was prepared by the Navy and approved by the USEPA and the MPCA. As provided in that work plan, two additional extraction wells (AT-5A and AT-5B) were constructed and placed into operation in June 1995. The combined groundwater extraction system, consisting of six extraction wells, is currently in operation.

The concentrations of trichloroethene (TCE) and other volatile organic compounds (VOCs) in the combined discharge from the extraction wells have decreased as much as two orders of magnitude since startup of the system in 1992. The concentrations decreased to levels where pretreatment of the groundwater was no longer necessary to comply with the MCES discharge permit limits. With the approval of the MCES, the pretreatment system was shut down in March 1995, and the combined discharge from the extraction wells was discharged directly to the sanitary sewer from March 1995 to December 10, 1998. Since 1992, approximately 1.85 billion gallons of groundwater have been treated and a total of approximately 27,000 pounds of TCE have been removed as of July 2000.

Construction of the Phase II onsite groundwater treatment facility began in September 1997 and was completed and operating in December 1998. When the onsite treatment facility was placed into operation, discharge to the MCES sanitary sewer system was terminated. The combined discharge from the extraction system is now fed through a feed system and air stripping units for treatment before the effluent groundwater is discharged to the Mississippi River through Outfall 020 (NPDES/SDS Permit MN0000710). The effluent discharge is monitored to ensure that the NPDES/SDS requirements are met.

## 1.3 Regulatory Framework

The scheduled installation and construction actions will be conducted pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). A ROD for implementation of a groundwater remediation system was signed in 1990 by representatives of the Navy, USEPA - Region V, and MPCA.

Installation of extraction wells and abandonment of production wells will be performed by a state-licensed well contractor. All drilling and well installations will conform to Minnesota Department of Health (MDH) Rules, Chapter 4725, Wells and Borings. A well sealing notification will be submitted to the MDH prior to abandoning the production wells. Upon completion of well abandonment, copies of well sealing record will be submitted to the MDH.

Modification to existing NPDES permit will be performed by the Navy and completed prior to the installation of extraction wells. Additionally, the Department of Natural Resources (DNR) Permit - No. 926127 - Annual Water Use Report, will be amended by the Navy to install additional extraction wells and to abandon wells.

Based on generator knowledge of the materials and the waste characterization sample results, the wastes will be classified in accordance with 40 Code of Federal Regulations (CFR) 261 regulations. Prior to waste shipment, the analytical data will be supplied to the disposal facility. Characterization and disposal of generated wastes will be in accordance with regulatory requirements identified in Section 3.0 of the Basewide Work Plan.

## 1.4 Project Schedule

The major project activities and estimated duration for each of the tasks to be performed under this CTO are provided in Appendix A. It is anticipated that mobilization to the site to begin the site operations will occur in August 2000.

## 1.5 Communications Plan

A communications matrix outlining the lines of communication for key CCI and Southern Division, NAVFAC personnel is presented in Table 1-1.

**TABLE 1-1**  
Communications Matrix for NIROP Fridley

CCI Position	Navy Personnel Reported To
R. Scott Newman, Program Manager	Eva Clement, Contracting Officer
Philip Altman, Senior Project Manager	Jimmy Jones, Contracting Officers' Technical Representative (COTR) Richard Stanley, Administrative Contracting Officer (ACO)
B. Venky Venkatesh, CTO Project Manager	Joel Sanders, Remedial Project Manager (RPM) Kerry Morrow, Naval Sea Systems, Onsite Navy Representative

<sup>1</sup>Person listed in CCI column reports directly to person or persons in the Navy column of that row.

## 2.0 Execution of Work

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### 2.1 Definable Features of Work

The following is a list of applicable DFOWs associated with the work activities described in this Work Plan Addendum.

- Mobilization and site preparatory work
- Demolition of production well house buildings
- Abandonment of production wells
- Installation of extraction wells
- Groundwater treatment facility modifications
- Operational startup
- Site restoration and demobilization
- Completion Report

Each of the DFOWs are briefly described in the following sections.

### 2.2 Mobilization and Site Preparatory Work

Upon approval of work plan, CCI and subcontractor(s) will mobilize all necessary resources to efficiently and completely perform the scope of work. The resources include, but are not limited to, personnel, equipment, materials, supplies, lower-tier subcontractors, and support facilities (e.g., project support trailer, decontamination facilities, waste containment facilities, material and equipment storage, cellular phones, water, portable sanitary facilities, etc.) to support the work activities at the site.

Coordination and scheduling of work activities with the various plant operations will be performed through a pre-construction meeting held at the site immediately following mobilization.

Site preparatory work is the first physical activity at the site and involves staging of material and equipment, demarcation of work zones, lockout/tagout of required equipment and utilities, and providing runoff/runoff control devices as required. Staging/lay down areas and waste storage areas will be designated by the onsite Navy Representative. Temporary barricades and caution signs will be provided around the work areas.

Since the facility will remain active throughout the duration of the work, the work areas will be arranged to minimize disruption of the on-going production. Work activities will be temporarily stopped during facility emergencies that affect the work areas.

### 2.3 Demolition of Production Well House Buildings

Prior to demolition, utilities feeding the Buildings 12b and 12c will be disconnected as directed by the onsite Navy Representative. The brick buildings enclosing Production Wells

2 and 3 will be demolished and all generated material will be managed and disposed of as discussed in Section 3.0. During the demolition operations, the generation of dust, mist, and particulate matter will be minimized. Dust will be controlled by wetting with a mist of water.

Based on visual observations, the production well house Buildings 12b and 12c do not appear to contain asbestos containing materials (ACMs). However, if ACMs are encountered during field work, the work will stopped and all ACM will be properly abated per USEPA, MPCA, and Local regulations.

## 2.4 Abandonment of Production Wells

The abandonment of Production Wells 2 and 3 will be performed in accordance with applicable federal, state and local laws and regulations. Prior to abandoning the wells, pumps and accessories in the wells will be removed. The wells will be abandoned by filling the casing from the bottom to the surface with cement-bentonite grout or concrete. The cement-bentonite grout or concrete will conform to manufacturer's specifications. Upon completion, the wells will be checked for 48 hours to determine whether curing is occurring properly. Specific curing specifications or quality assurance checks recommended by the manufacturer will be followed. Additionally, if significant settling has occurred, a sufficient amount of bentonite will be added to attain its initial level. These bentonite curing checks and any addition of bentonite will be recorded in the field logs.

## 2.5 Installation of Extraction Wells

The location and size of extraction wells; size and length of screen; and pumping rates for each of the extraction wells will be as determined by the groundwater model developed by TetraTech NUS, Inc and will be finalized based on technical discussions with the Partnering Team. The exact location of the extraction wells and pumping rates will be determined based on field conditions. Additionally, screen size and screen interval may be changed in the field based onsite conditions.

The drill rig will be cleaned and decontaminated prior to delivery to the site. The rig will not leak any fluids that may enter the borehole or contaminate equipment that is placed in the hole. The use of rags or absorbent materials to absorb leaking fluids is unacceptable.

Cable-tool drilling method will be used for the installation of the wells. Alternatively, with Navy's approval other drilling methods may be used including, air rotary, water rotary, mud rotary, or dual-tube reverse rotary.

If water is used, only potable water will be used. If mud is used, it will be 100 percent sodium bentonite. Chemical analyses of any drilling mud additive or substitute (e.g., foam, biodegradable material) proposed for use will be submitted to the Navy. When air is used, the air will be filtered to remove organic vapors and the effectiveness of the air filter will be checked at least every four hours. The air passing through the downstream end of the air line will be monitored with an organic vapor monitor (e.g., photoionization detection [PID], organic vapor analyzer [OVA]), and if organic vapors are detected, their source (filter, contaminated line, etc.) will be decontaminated or replaced.

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The drill rig will be cleaned and decontaminated prior to delivery to the site. The rig will not leak any fluids that may enter the borehole or contaminate equipment that is placed in the hole. The use of rags or absorbent materials to absorb leaking fluids is unacceptable.

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If water is used, only potable water will be used. If mud is used, it will be 100 percent sodium bentonite. Chemical analyses of any drilling mud additive or substitute (e.g., foam, biodegradable material) proposed for use will be submitted to the Navy. When air is used, the air will be filtered to remove organic vapors and the effectiveness of the air filter will be checked at least every four hours. The air passing through the downstream end of the air line will be monitored with an organic vapor monitor (e.g., photoionization detection [PID], organic vapor analyzer [OVA]), and if organic vapors are detected, their source (filter, contaminated line, etc.) will be decontaminated or replaced.

When installing wells through more than one water-bearing zone, appropriate measures will be taken to prevent cross-connection or cross-contamination of the zones or aquifers.

## **2.5.1 Borehole Requirements**

Borehole diameters will be at least 4 inches larger than the outside diameter of the casing and well screen. In the case of a hollow stem auger, the inside diameter of the auger will be at least 4 inches larger than the outside diameter of the casing and well screen. Variance from these requirements will be submitted to the Navy.

The installed extraction wells will be sufficiently straight to allow passage of pumps or sampling devices. The wells will be plumb within 1 degree of vertical where the water level is greater than 30 feet below land surface (bls) unless otherwise approved by Navy. A single-shot declination tool will be used to demonstrate plumbness. Wells not meeting straightness or plumbness specifications will be redrilled and/or reconstructed.

The documentation record and forms will document the following information for each boring:

- Extraction well identification
- Location in relation to an easily identifiable landmark
- Names of drilling subcontractor and logger
- Start and finish dates and times
- Drilling method
- Types of drilling fluids and depths at which they were used
- Diameters of surface casing, casing type, and methods of installation
- Depth at which saturated conditions were first encountered
- Lithologic descriptions and depths of lithologic boundaries
- Zones of caving or heaving
- Depth at which drilling fluid was lost and the amount lost
- Changes in drilling fluid properties
- Drilling rate
- Drilling rig reactions (e.g., chatter, rod drops, and bouncing)

## **2.5.2 Casing Requirements**

The casing requirements that will be followed include:

- All casing will be new, unused, and decontaminated.
- All casings will be joined only with compatible welds or couplings that will not interfere with the planned use of the well.
- All metal casing will be seamless stainless steel casing, and the casing "mill" papers will be included in the construction completion report.
- The casing will be straight and plumb within the tolerance stated for the borehole.

## **2.5.3 Well Screen Requirements**

Well screen requirements are as follows:

- All requirements that apply to casing will also apply to well screen, except for strength requirements.

- The wells will not be screened across more than one water-bearing unit.
- Screens will be factory slotted or wrapped.
- Screen slots will be sized to prevent 90 percent of the filter pack from entering the well, and for wells where no filter pack is used, the screen slot size will be selected to retain 60 to 70 percent of the formation materials in the screened zone.
- The bottom of the screen is to be capped and the cap will be joined to the screen by threads.

#### **2.5.4 Annular Space Requirements**

The annular space requirements are as follows:

- The annular space will be filled with a filter pack, a bentonite seal, and casing grout between the well string and the borehole wall.
- Any drilling fluids will be thinned with potable water of known acceptable quality to a density less than 1.2 grams per cubic centimeter ( $\text{g/cm}^3$ ) (10 pounds per gallon [lbs/gal]) before the annular space is filled, and a mud balance or Marsh Funnel will be kept onsite to allow measurement of drilling fluid density.
- As the annular space is being filled, the well string will be centered and suspended such that it does not rest on the bottom of the hole.

For wells greater than 50 feet deep, at least two centralizers will be used, one at the bottom and one at the top of the screen. Additional centralizers will be used as needed.

#### **2.5.5 Filter Pack Requirements**

The filter pack will consist of silica sand or gravel and will extend from the bottom of the hole to at least 2 feet above the top of the well screen. After the filter pack is emplaced, the well will be surged with a surge block for 10 minutes. The top of the sand pack will be sounded to verify its depth during placement. Additional filter pack will be placed as required to return the level of the pack to 2 feet above the screen. Surge the well for 5 minutes. Again, place additional filter packs as required to bring the level to 2 feet above the screen. If gravel is used, 6 inches of coarse sand will be placed on top of the gravel.

The filter pack material will be clean, inert, and well-rounded and will contain less than 2 percent flat particles. The sand or gravel will be certified free of contaminants by vendor or contractor.

The filter pack will have a grain size distribution and uniformity coefficient compatible with the formation materials and the screen, as described in Chapter 12, Groundwater and Wells, 2nd Edition, 1986. The filter pack will not extend across more than one water-bearing unit. In all wells (deep or shallow), the filter pack will be emplaced with a bottom-discharge tremie pipe of at least 1.5 inches in diameter. The tremie pipe will be lifted from the bottom of the hole at the same rate the filter pack is set. The volume of the filter pack emplaced in the well will be recorded. Potable water may be used, with the approval of MDH, to emplace the filter pack so long as no contaminants are introduced. The formation materials

may be used as a filter pack when they are compatible with the slot size of the screen, such as in glacial outwash gravel deposits.

### **2.5.6 Bentonite Seal Requirements**

The bentonite seal requirements are as follows:

- The bentonite seal will consist of at least 2 feet of bentonite between the filter pack and the casing grout.
- The bentonite will be hydrated before placement and will be installed by pump tremie methods.
- Only 100 percent sodium bentonite will be used.

### **2.5.7 Casing Grout Requirements**

The casing grout requirements are as follows:

- The casing grout will extend from the top of the bentonite seal to ground surface.
- The grout will be mixed in the following proportions: 94 pounds of neat Type I Portland or American Petroleum Institute Class A cement, not more than 4 pounds of 100 percent sodium bentonite powder, and not more than 8 gallons of potable water.
- All grout will be pump tremied using a side-discharge tremie pipe, and pumping will continue until 20 percent of the grout has been returned to the surface to ensure the grout job is done properly and surface contaminants will not enter the annulus.
- In wells where the bentonite seal is visible and within 30 feet of the land surface, the 20 percent return is not necessary so long as the tremie pipe is pulled back as the grout is emplaced.
- The excess grout (20 percent) will be removed and cleaned from the site prior to installing the pad.

### **2.5.8 Surface Completion Requirements**

For flush-mounted completions, cut the casing approximately 3 inches bls and provide a water-tight casing cap to prevent surface water from entering the well. To allow for escape of gas, a small diameter (e.g., 1/4-inch) vent hole will be placed in the upper portion of the casing, or a ventilated well cap will be used. A freely draining valve box with a locking cover will be placed over the casing. The top of the casing will be at least 1 foot above the bottom of the box. The valve box lid will be centered in a 3-foot diameter, 4-inch thick concrete pad that slopes away from the box at 1/4-inch per foot. The identity of the well will be permanently marked on the valve box lid and the casing cap. Where heavy traffic may pass over the well or for other reasons, the concrete pad and valve box/lid assembly will be constructed to meet the strength requirements of surrounding surfaces.

When aboveground surface completion is used, extend the well casing 2 or 3 feet above land surface. Provide a casing cap for each well, and shield the extended casing with a steel sleeve that is placed over the casing and cap and seated in a 3-foot by 3-foot by 4-inch concrete surface pad. To allow for escape of gas, a small diameter (e.g., 1/4-inch) vent hole

will be placed in the well casing, or a ventilated well cap will be used. The concrete surface pad will be reinforced with steel reinforcing bars at least ¼-inch in diameter. The ground surface will be freed of grass and scoured to a depth of 2 inches before setting the concrete pad. The diameter of the sleeve will be at least 6 inches greater than the diameter of the casing. Slope the pad away from the well sleeve. Install a lockable cap or lid on the guard pipe. The identity of the well will be permanently marked on the casing cap and the protective sleeve. Install three 3-inch diameter concrete-filled steel guard posts. The guard posts will be 5 feet in total length and installed radially from each well head. Recess the guard posts approximately 2 feet into the ground and set in concrete. Do not install the guard posts in the concrete pad placed at the well base. The protective sleeve and guard posts will be painted with yellow color specified by onsite Navy Representative.

All wells will be secured as soon as possible after drilling. Corrosion-resistant locks will be provided for both flush and aboveground surface completions. The locks will either have identical keys or be keyed for opening with one master key.

## **2.5.9 Extraction Well Development**

The extraction well development requirements are as follows:

- All newly installed extraction wells will be developed no sooner than 24 hours after installation to allow for grout curing.
- All drilling fluids used during well construction will be removed during development.
- Wells will be developed by pumping, including alternating use of surging with a surge block or jetting with water. If difficulty in development occurs, the intake zone will be surged or jetted.
- Wells will be developed until:
  - The suspended sediment content of the water is less than 0.75 milliliters per liter (ml/L), as measured in an Imhoff cone according to method E160.5;
  - The turbidity remains within a 10 nephelometric turbidity unit (NTU) range for at least 4 hours; and
  - The design pumping rates are maintained.
- Discharge water color and volume will be documented.
- No sediment will remain in the bottom of the well.
- No detergents, soaps, acids, bleaches, or other additives will be used to develop a well.

All development equipment will be decontaminated as described in the Site Specific Health and Safety Plan. Characterization, management, and disposal of generated development water is described in Section 3.0.

## **2.5.10 Step-Drawdown and Constant-Rate Testing**

### **2.5.10.1 Step-Drawdown Testing**

A step-drawdown testing will be conducted in each extraction well. Pumping will be maintained at a constant rate (plus 10 percent) for at least 3 hours at specified pumping rates for each 1 hour interval.

Water levels in the extraction wells will be measured and recorded during each step every minute for the first 10 minutes and every 5 minutes for the following 50 minutes. A separate access tube set to a point 2 feet above the pump intake will be used for measuring water levels.

The specified pumping rates will be maintained if the well has sufficient capacity to produce at those rates for the required time periods. If the specified pumping rate cannot be maintained prior to completion of each 1 hour time step, subsequent steps at higher rates need not be attempted. The flow rates will be reduced until the water level while pumping stabilizes at least 2 feet above the pump intake, and the test will be continued for 1 hour.

#### **2.5.10.2 Constant-Rate Testing**

Based on the results of the step-drawdown testing, the approximately sustainable capacity of each extraction well will be determined and each extraction well will be pumped at the chosen rate for 4 hours following full recovery after the step-drawdown test. This is to verify the capability of the well to sustain the chosen rate. A water level measurement will be taken and recorded at time intervals specified in the step-drawdown testing.

Sand content will be measured at hourly intervals from a sample of water representative of the entire flow in the pump discharge line from each well. Sand content is defined as the dry weight of materials retained by the #200 sieve per volume of water. Average sand content over the 4 hours will not exceed 2 milligrams per liter (mg/L). A well producing more than 2 mg/L by weight of sand will be redeveloped in accordance with Section 2.5.10 and will be subject to another round of constant-rate testing.

## **2.6 Groundwater Treatment Facility Modifications**

Pumps will be installed in the newly installed extraction wells to meet the specified pumping rates. Underground and/or overhead pipelines will be installed, as necessary, to convey extracted groundwater to the GWTF. Underground piping will be installed to a depth below the frost line. All piping material will match existing type.

The underground piping and utilities will be installed using a combination of trenching and jacking. Jacking will be the preferred method of construction below certain existing pavements and railroad tracks.

New monitoring equipment, meters, and telemetry equipment will be installed to match existing type. These items will be integrated into the existing control panels. Modification to the existing treatment system software will be performed by others.

## **2.7 Operational Startup**

After completion of work, a system checkout will be performed and a punchlist will be prepared. Performance testing will be performed to ensure that all components are functioning within the specified ranges. All flow-meter transmitters will be checked and calibrated during startup.

## 2.8 Site Restoration and Demobilization

Any pavement that is cut and removed during construction will be replaced. The replaced pavement and base course material will conform to existing construction.

All personnel and equipment will be decontaminated prior to leaving the area to avoid the possibility of inadvertently spreading contamination. Equipment will be properly decontaminated to remove all contamination that may be adhering to the equipment components as a result of the remedial action. Decontamination of personnel and equipment will be performed in accordance with the Site Specific Health and Safety Plan and the applicable provisions of 29 CFR 1910.120.

Following Navy approval, all personnel, equipment, temporary facilities and utilities will be demobilized from the site.

## 2.9 Completion Report

Upon completion of field work, a construction completion report will be prepared and submitted to the Navy, MCPA, and USEPA. The report will include the following:

- A summary of construction activities completed
- Copies of permit modifications, regulatory notifications, well sealing records, well completion records
- A description of the major equipment components installed
- A summary of wastes generated, their management and disposal
- A discussion of any deviations from this plan
- Photographic documentation of site conditions before, during, and after work activities
- A summary of conclusions and recommendations

Additionally, the report will also include a set of "as-built" drawings. The existing "as-built" drawings will be updated to reflect all changes made to the system.

## 3.0 Waste Management Plan

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This plan covers waste generated during the installation of extraction wells and abandonment of production wells.

All generated wastes will be containerized (in approved containers in accordance with 49 CFR 178) and transported to Navy-designated temporary staging areas. All containers, holding tanks, and roll-off containers must be in good condition with no leaks or damages. The temporary staging area will be bermed and lined with a polyethylene liner. Containers of solid and liquid wastes will be neatly arranged and stored in a secured onsite temporary staging area. Adequate aisle space will be provided between containers to allow the unobstructed movement of personnel and equipment. Containers will remain closed unless adding or removing material. Covers will be properly secured at the end of each workday. Hazardous waste storage areas will contain emergency equipment equivalent to hazard posed by waste. Typical items in a hazardous waste storage area include: fire extinguisher, spill control kits, decontamination equipment, and an alarm system (if radio equipment is not available to all staff working in storage area).

CCI's Subcontractor will be responsible for maintenance of the containment/storage area, including replacement of any worn or damaged containment materials. Daily inspections of the containment/storage area will be performed and documented to verify there are no ruptures to containers or other conditions that could result in a release, to make sure all containers are properly labeled, with labels visible, and to maintain good housekeeping.

Portable storage tanks for liquids will be provided with covers and secondary containment. Old labels will be removed. Any tank arriving onsite with contents will be rejected. Free liquids that have accumulated in the secondary containment will be pumped (or otherwise removed) and combined with tank contents.

The labeling of waste containers, tanks, and roll-off containers will be in accordance with 49 CFR 172, 173 and 178 (and 40 CFR 262 for hazardous wastes). Labels will include the following information:

- "Analysis Pending" - Temporary or handwritten label until analytical results are received and reviewed. This label will include the accumulation start date.  
NOTE: Listed hazardous wastes will be immediately labeled as hazardous wastes.
- "Hazardous Waste" – Required for wastes prior to receipt of analytical results and for all hazardous wastes. Listed hazardous wastes will be immediately labeled as hazardous wastes. Use pre-printed hazardous waste labels. Information on label will include:
  - Accumulation start date
  - Generator name
  - USEPA ID number for site
  - USEPA and/or state waste codes
  - Manifest number (for containers of less than 110-gallon capacity)

- “Non-Hazardous Waste” – Label for any waste that does not designate as hazardous. Use pre-printed labels. Information on the label will include:
  - Accumulation start date
  - Generator name
  - USEPA ID Number
  - State non-hazardous waste code or other waste-specific information (e.g., petroleum waste).

When known, major hazards will be indicated on the label (e.g., flammable, oxidizer, carcinogen).

Drums will be transported to the temporary staging areas on wood pallets and will be secured together with non-metallic bonding.

All generated wastes (including drill cuttings, generated water, decontamination fluids, demolition debris, and drummed personal protective equipment [PPE]) will be handled, stored, transported, and disposed of in accordance with all applicable federal, state and local regulations. All generated wastes will be disposed of within 90 days of the accumulation start date. All personnel handling hazardous waste will be trained in accordance with 49 CFR 172.704, 29 CFR 1910.120, and 40 CFR 262. All personnel responsible for hazardous waste labeling, inspecting, profiling and manifesting will be trained in accordance with 29 CFR 1910.120 and 49 CFR 172 as amended by HM-181 and HM-126. All vehicles carrying hazardous waste will be placarded in accordance with 49 CFR 172. All vehicles will be adequately protected to prevent leakage or spillage during shipment.

Prior to disposal, sampling and analysis of all generated wastes will be performed as discussed in Section 3.5. Based on generator knowledge of the materials and analytical results, the wastes will be classified in accordance with 40 CFR 261. For hazardous waste classification, some hazardous constituents may be associated with F-, K-, U-, or P-listed wastes and may trigger assignment of these listed waste codes, in addition to characteristic waste codes. Both analytical data and knowledge of the source and use of these constituents will be used to determine if a waste is a listed hazardous waste.

Prior to scheduling any waste shipment, a waste disposal approval package for each waste stream will be submitted to the onsite Navy Representative for review and approval. This package will include a waste profile naming the U.S. Navy, NIROP Fridley as the generator of the waste, analytical data applicable to the waste, letter of approval from the proposed waste disposal facility to accept the waste, Land Disposal Restriction (LDR) notification or certification for hazardous wastes, and a completed waste manifest. Shipping papers for all waste streams will be prepared in accordance with regulations established in 49 CFR 172. The onsite Navy Representative will provide the generator signature on the waste profiles and manifests. The Subcontractor will allow a minimum of two working days to obtain this signature.

### **3.1 Management of Soil**

Soil generated during installation of extraction wells will be used as backfill material or may be spread and graded in the North 40 area, if possible. If neither of these two options is

possible, then the generated soil will be stored in rolloffs for characterization and disposal. Based on analytical results the soil will be disposed of offsite as hazardous waste (non-Toxic Substances Control Act [non-TSCA]) or non-hazardous special waste.

Offsite treatment or disposal facilities will use the waste profile and supporting documentation (e.g., analytical data) to determine if they will accept a waste. Hazardous wastes will be sent to the appropriate RCRA Subtitle C treatment, storage, or disposal facility. Non-hazardous wastes will be sent to Subtitle D facilities or municipal landfills, as appropriate. The treatment or disposal facility will be responsible for providing a copy of the final waste manifest and for providing a certificate of destruction or disposal for each load of waste received.

## **3.2 Management of Generated Water**

### **3.2.1 Extraction Well Development Water**

Initially, the generated well development water will be contained in a portable holding tank. Each well will be pumped for approximately 15 minutes and one grab sample will be taken and analyzed for VOCs, total suspended solids (TSS), and chemical oxygen demand (COD). If the laboratory data shows that the development water meets the discharge limits set forth by the Metropolitan Council Environmental Services (MCES) for sanitary discharge, then development of wells will continue with development water discharged directly, without treatment, to the sanitary sewer. If laboratory results show development water to be in exceedance of the discharge limits set forth by the MCES for sanitary discharge, then the development water will be: 1) discharged to the onsite Groundwater Treatment Facility for treatment and disposal; or 2) contained in portable holding tanks for offsite disposal.

If more than one holding tank (max. 15,000 gallons) is pumped from each well, additional samples will be collected and analyzed for VOCs, TSS, and COD.

### **3.2.2 Step-Drawdown and Constant Rate Test Water**

Water generated from the step-drawdown and constant rate tests will be discharged to the onsite Groundwater Treatment Facility for treatment and disposal.

### **3.2.3 Decontamination Water**

Generated decontamination water will be managed similar to that of the extraction well development water per Section 3.2.1.

## **3.3 Management of Office Wastes, Construction and Demolition Debris**

All miscellaneous office waste, general construction debris (such as caution tapes, barricades, signs, packing materials), and uncontaminated demolition debris (generated from the demolition of production well houses) will be containerized in accordance with all applicable rules and regulations until it is disposed of offsite. No waste material and/or debris will be buried or otherwise allowed to remain on the site.

Office wastes and general construction debris without any contamination is classified as non-hazardous construction debris and will be disposed at a landfill permitted to accept such wastes.

Demolition debris items that can be reused at the site will be segregated from items to be disposed of at an offsite facility. Scrap metals will be shipped to a smelter and the remaining debris will be classified as non-hazardous construction debris and will be disposed at a landfill permitted to accept such wastes.

### 3.4 Management of Personal Protective Equipment

Used PPE includes disposable Tyvek® suits, gloves, booties, and plastic sheeting. Contaminated PPE will be placed in a plastic-lined 55-gallon drum immediately after use, the drum will be labeled to identify its contents and source of generation, and characterized using process knowledge. Contaminated PPE will be disposed as non-hazardous or hazardous waste, depending on characterization results of generated soil and water. Used uncontaminated PPE will be disposed of as non-hazardous wastes at a Subtitle D facility or municipal landfill, as appropriate.

### 3.5 Waste Characterization

This section, which supplements Section 2.0 of the Basewide Work, provides the required analyses for disposal characterization for wastes generated during extraction system enhancement.

The data quality objectives for the disposal characterization sampling task are listed in Table 3-1. The sampling and analytical requirements, along with the required level of quality and data packages are listed in Table 3-2.

**TABLE 3-1**  
Data Quality Objectives

Sampling Activity	Data Quality Objective Category
Waste characterization of the contaminated soils and aqueous waste (offsite laboratory analyses)	Definitive

Sampling, sample handling and storage, chain-of-custody, shipment, and sample analyses will be in accordance with the procedures provided in the Quality Assurance Project Plan (QAPP) included in the Remedial Action Work Plan, June 2000, Revision 6, developed by TetraTech NUS for NIROP Fridley.

Waste characterization samples will be collected to evaluate the handling, transportation, and disposal requirements of wastes (soil and water) generated during extraction well installation activities. Samples will be collected as described below and delivered to the USEPA-approved laboratory specified in the QAPP included in the Remedial Action Work Plan, June 2000, Rev. 6, developed by TetraTech NUS for NIROP Fridley for analyses. The soil samples will be analyzed for the parameters listed on Table 3-2.

**TABLE 3-2**  
Sampling and Analytical Summary

Sample Task	Sample Point	Matrix	Sampling Frequency	Approx Sample No	Sampling Method	Sampling Equipment	TAT <sup>1</sup>	DOO Level/ Data Package Reqmnt	Required Analysis	Analytical Method	Holding Time	Sample Preservtn	Containers/ Laboratory <sup>2</sup>
<b>Solids Disposal</b>													
Solids Disposal (Drill Cuttings and other debris)	Roll-off	Soil	One per roll-off (max. 20 cubic yards)	1 Composite sample	Dig to approx 6-12" for sample	SS Auger, SS Spoons, SS Bowl	14 days	DOO Level III, CCI Level A	TCLP Volatiles	1311/8260B	14 day TCLP extr; 14 day analysis	Cool to 4°C	(1) 4 oz amber glass
									TCLP Semi-Volatiles	1311/8270C	14 day TCLP extr; 7 day extr; 40 day analysis		
									TCLP Pesticides	1311/8081A	14 day TCLP extr; 7 day extr; 40 day analysis		
									TCLP Herbicides	1311/8151A	14 day TCLP extr; 7 day extr; 40 day analysis	Cool to 4°C	(1) 16 oz amber glass
									TCLP Metals	1311/6010B, 7470A	6 month TCLP extr; 6 month analysis Hg: 28 day TCLP extr; 28 day analysis		
									Ignitability	1030	ASAP		
Corrosivity	9045A	ASAP											
Reactivity	Chapter 7.3	ASAP											
<b>Liquids Disposal</b>													
Liquids Disposal (development water, etc)	Frac Tank	Water	One per container (max. 15,000 gallons)	3	Grab	Drum thief or Teflon bailer	14 days	DOO Level III, CCI Level A	TCL Volatiles	8260B	14 days	HCl pH< 2; Cool to 4°C	(2) 40 ml vial
									TCL Semi-volatiles	8270C	14 days ext; 40 days analysis		
									TCL Pesticides	8081A	14 days ext; 40 days analysis		
									TCL PCBs	8082	14 days ext; 40 days analysis	HNO3 pH< 2; Cool to 4°C	(1) 500ml HDPE
									TAL Metals	26010B	180 days		
									Mercury	7470A	28 days		
									Cyanide	335.3	14 days	Cool to 4°C NaOH pH>12	(1) 200ml glass
									Ignitability	1030	ASAP		
									Corrosivity	9045A	ASAP		
Reactivity	Chapter 7.3	ASAP											
Reactivity	Chapter 7.3	ASAP	Cool to 4°C	(3) 1L amber glass									

To the extent possible, samples will be collected using disposable sampling equipment. If required, decontamination of field sampling equipment will be performed in accordance with the QAPP.

### **3.5.1 Soil Characterization Sampling**

Soil characterization samples will be collected from the material contained in roll-off containers. One composite sample will be collected per roll-off container or as required by the disposal facility. The samples will be collected as follows:

1. Choose four points based on visual observation (choose locations showing discoloration, stains, or other signs of distress) in the roll-off container and place a marker (flag or stake) at each point.
2. At each of the four points, collect grab samples by performing the following steps:
  - 2.1. Remove the top 12 inches of the soil using a stainless steel auger.
  - 2.2. Auger down another 6 inches, remove the sampler, and place the sample in a stainless steel bowl.
3. Homogenize the four grab samples by quartering techniques using a stainless steel spoon.
4. Fill the appropriate sample jars with the homogenized sample
5. Close the jars, label, and package the sample for shipment to the laboratory.

Samples for VOCs analysis will not be composited and homogenized. They will be collected as discrete grab samples from the roll-off containers at locations indicating highest field screening test results.

### **3.5.2 Water Characterization Sampling**

A sample will be collected from the portable containers using either a dip jar or bailer. The sample containers for volatiles analyses will be filled first. The 40-milliliter (ml) vials will be filled so that there is no headspace in each vial. The sample containers for the remaining analyses will then be filled.

## **3.6 Transportation and Disposal**

### **3.6.1 Transportation**

Each transportation vehicle and load of waste will be inspected before leaving the site. The quantities of waste leaving the site will be recorded. Transportation of non-hazardous wastes will be completed by a transporter licensed for commercial transportation. In the event that wastes are hazardous, the transporter will be licensed in accordance with 49 CFR 171-179. A copy of the documentation indicating that the selected transporter has appropriate licenses will be received prior to transport of any waste material.

The transporter will be responsible for weighing loads at a Department of Transportation certified scale. For each load of material, weight measurements will be obtained for each full and empty container or dump truck. Disposal quantities will be based on the difference of weight measurements between the full and empty container or dump truck. Tanker trucks,

drums of liquids, and temporary storage tank volumes will be measured onsite. Weights and volumes will be recorded on the waste manifest. Copies of weight tickets will be provided with the final manifest.

All personnel involved in offsite disposal activities will follow safety and spill response procedures outlined in the HSP. No materials from other projects will be combined with materials from NIROP Fridley. The following procedures also will be observed when transporting wastes offsite:

- Minimize impacts to general public traffic.
- Repair road damage caused by construction and/or hauling traffic.
- Cleanup material spilled in transit.
- Line and cover trucks/trailers used for hauling contaminated materials to prevent releases and contamination.
- Decontaminate vehicles prior to re-use, other than hauling contaminated material.
- Seal trucks transporting liquids.

### **3.6.2 Manifests/Shipping Documentation**

Each load of waste material will be manifested prior to leaving the site. At a minimum, the manifest will include the following information:

- Transporter information including name, address, contact and phone number
- Generator information including name, address, contact, and phone number
- Destination site name including street/ mailing address
- Description of waste (e.g. petroleum contaminated waste)
- Appropriate waste codes (if applicable)
- Type of container
- Quantity of waste (volumetric estimate)
- LDR Notification/Certification (if applicable)

A carbon copy of the initial manifest form for each load will be retained onsite and attached to the Daily Production Report.

If the signed hazardous waste manifest from the designated offsite facility is not received within 35 days, the transporter or the designated facility will be contacted to determine the status of the waste. If the signed hazardous waste manifest has not been received within 45 days, an "Exception Report" will be prepared for the Navy and the Navy will submit it to the State of Minnesota, as required under 40 CFR 262.42.

### **3.6.3 Transportation and Disposal Log**

A log of all generated wastes will be maintained at the site. At a minimum, the log will include the type of waste, source of waste, quantity of waste, waste accumulation start date, sampling data, and disposal information. A copy of the Transportation and Disposal Log is included in Appendix C.

### **3.6.4 Disposal of Waste Streams**

Offsite treatment or disposal facilities will use the waste profile and supporting documentation (e.g., analytical data) to determine if they will accept a waste. Hazardous wastes will be sent to the appropriate RCRA Subtitle C treatment, storage, or disposal facility. Non-hazardous wastes will be sent to Subtitle D facilities or municipal landfills, as appropriate. The treatment or disposal facility will be responsible for providing a copy of the final waste manifest and for providing a certificate of treatment or disposal for each load of waste received.

Consistent with the CERCLA Offsite Policy (58 FR 49200, September 22, 1993), wastes will be transported to and treated or disposed at an offsite facility determined acceptable by the USEPA Regional Offsite Contact. According to 40 CFR 300.400(b), the Regional Contact determines that the facility has no significant violations, and has no releases of hazardous substances (for RCRA Subtitle C facilities).

## **3.7 Records/Reporting**

The following records and documents will be maintained:

- Transportation and offsite disposal records, including:
  - Profiles and associated characterization data
  - Manifests, LDR notifications/certifications, bills of lading, and other shipping records
  - Offsite facility waste receipts
- Training records
- Inspection records

Additionally, Material Data Safety Sheets (MSDSs) for all chemicals brought onsite will be maintained at the site.

## 4.0 Environmental Protection Plan

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The Environmental Protection Plan of the Basewide Work Plan addresses general procedures that will be implemented to prevent pollution and protect the environment during field operations.

## 5.0 Health and Safety Plan

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The HSP, provided in Appendix B, contains site-specific procedures and protocols pertaining to personnel and public health and safety issues encountered during the field operations at NIROP Fridley. It is through the implementation of this Work Plan Addendum, along with the Basewide Health and Safety Plan and CCI's overall Health and Safety Program, that site hazards and risks with regard to remediation activities will be controlled and minimized.

## **6.0 Quality Control Plan**

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The Quality Control Plan provided in this Work Plan Addendum supplements the Basewide Work Plan.

The Submittal Register, included in Appendix C of the this Work Plan Addendum, documents submittals in accordance with Appendix B of CCI's Contract Management Plan (dated July 1998). CCI will approve submittals as identified in the Submittal Register. All approved submittals will be distributed by CCI to the appropriate Navy personnel, the project site, and to the job file.

The site-specific project organization chart, included in this section of the work plan Work Plan Addendum as Figure 6-1, depicts the chain-of-command for this CTO and the individuals responsible for executing the work as indicated. Roles and responsibilities are summarized in Table 6-1.

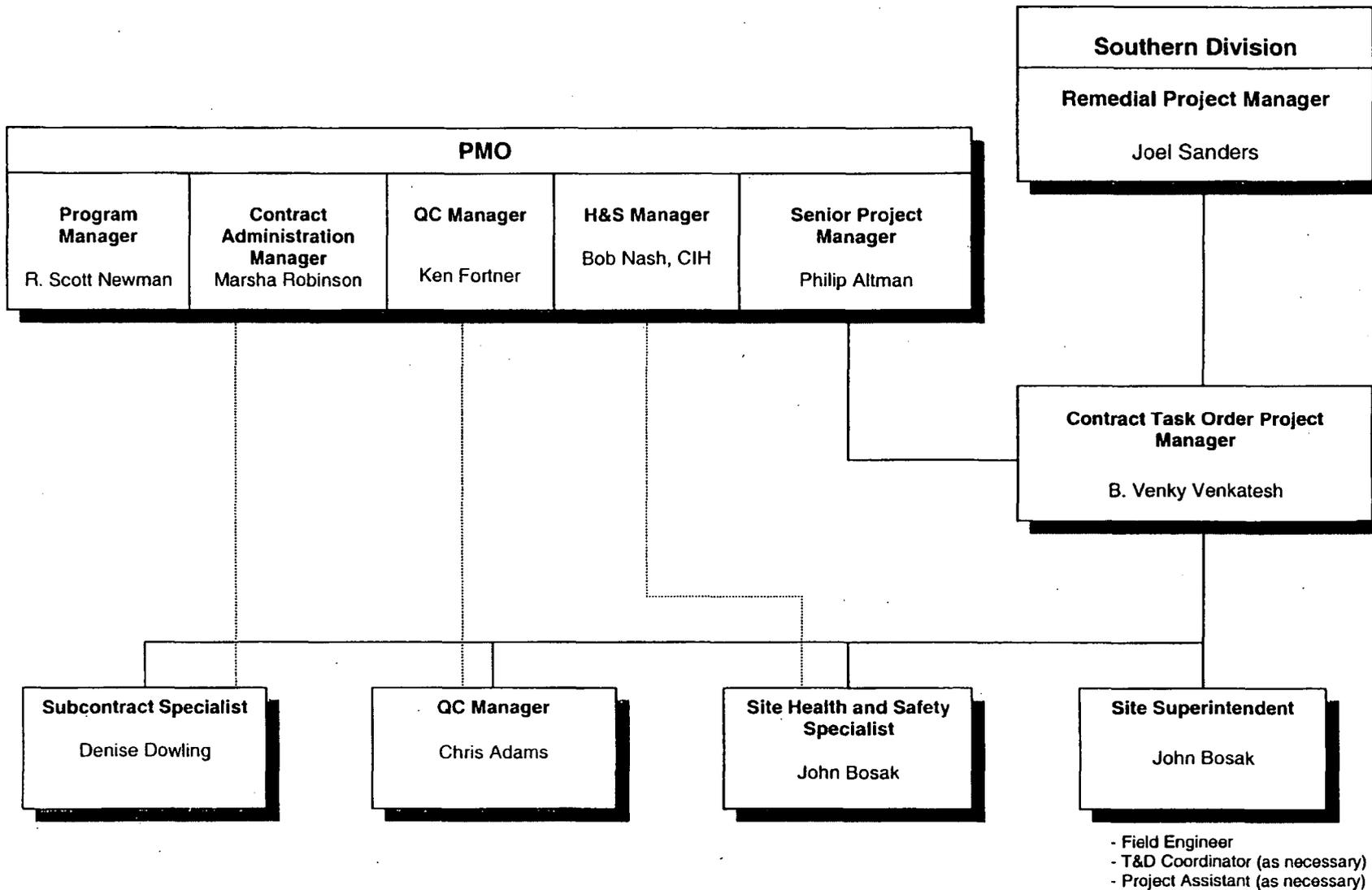
### **6.1 Resume and Appointing Letter of Project QC Manager**

The Project QC Manager is Mr. Chris Adams. Mr. Adams's resume is included in Appendix C. The appointing letter, appointing Mr. Adams as the Project QC Manager is also included in Appendix C.

### **6.2 Testing Requirements**

Construction testing is not anticipated for the work covered by this Work Plan Addendum. However, if construction testing is required, the construction testing utilized will function as lower tier subcontractors.

If construction testing becomes necessary, construction testing laboratories will be National Institute of Standards and Technology (NIST), National Voluntary Laboratory Accreditation Program (NVLAP), American Association of State Highway and Transportation Officials (AASHTO), or American Association for Laboratory Accreditation (AALA) certified.



# 6.0 Air Monitoring Specifications

Reference CH2M HILL SOP HS-06, Air Monitoring

Air monitoring specifications are listed in Table 6-1.

**TABLE 6-1**  
Air Monitoring Specifications

Instrument	Action Levels <sup>a</sup>	Frequency <sup>b</sup>	Calibration
PID MiniRAE with 10.6eV lamp or equivalent	0 – ppm – Level D 25 > ppm – Stop Work	Initially and periodically during task	Daily

- <sup>a</sup> Action levels apply to sustained breathing-zone measurements above background.
- <sup>b</sup> The exact frequency of monitoring depends on field conditions and is to be determined by the SHSS; generally, every 5 to 15 minutes is acceptable; more frequently may be appropriate. Monitoring results should be recorded. Documentation should include instrument and calibration information, time and measurement result, personnel monitored, and place/location where measurement is taken (e.g., "Breathing Zone/MW-3," "at surface/SB-2," etc.).
- <sup>c</sup> If the measured percent of O<sub>2</sub> is less than 10 percent, an accurate LEL reading will not be obtained. Percent LEL and percent O<sub>2</sub> action levels apply only to ambient working atmospheres, and not to confined-space entry. More-stringent percent LEL and O<sub>2</sub> action levels are required for confined space.

## 6.1 Calibration Specifications

Calibration specifications are listed in Table 6-2. Refer to the respective manufacturer's instructions for proper instrument-maintenance procedures.

**TABLE 6-2**  
Calibration Specifications

Instrument	Gas	Span	Reading	Method
PID: MiniRAE, 10.6 eV bulb	100 ppm isobutylene	CF=53	53 ppm +5 ppm	1.5 lpm REG T-Tubing

## 6.2 Air Sampling

Sampling may be required by other OSHA regulations where there may be exposure to certain contaminants. Air sampling typically is required when site contaminants include lead, cadmium, arsenic, asbestos, and certain volatile organic compounds. Contact the HSM immediately if these contaminants are encountered.

### 6.2.1 Method Description

Real time air monitoring will be performed. Contact HSM if assistance is required.

### 6.2.2 Personnel and Areas

Results must be sent immediately to the HSM. Regulations may require reporting to monitored personnel. Results reported to: HSM: Robert Nash/ATL.

**TABLE 6-1**  
**Roles, Responsibilities, and Authorities of Individuals Assigned to this Contract Task Order**

Role	Responsibility	Authority
Project Manager	<ul style="list-style-type: none"> <li>• Management and Technical Direction of work</li> <li>• Communication with Southern Division RPM and onsite Navy Representative</li> <li>• Overview subcontractor performance</li> <li>• Select CTO staff</li> <li>• Develop CTO Work Plan and supporting plans</li> <li>• Meet CTO Performance Objectives</li> <li>• Prepare status reports</li> </ul>	<ul style="list-style-type: none"> <li>• Approve subcontractor selection</li> <li>• Approve invoices to Southern Division</li> <li>• Approve CTO baseline schedule</li> <li>• Stop work at the site for any reason</li> <li>• Approve payment to vendors and suppliers</li> <li>• Approve payment to subcontractors</li> </ul>
Site Superintendent	<ul style="list-style-type: none"> <li>• Responsible for all site activities</li> <li>• Provide direction to subcontractors</li> <li>• Act for Project Manager</li> <li>• Provide daily status reports</li> <li>• Prepare CTO Work Plan</li> <li>• Conduct daily safety meetings</li> <li>• Review subcontractor qualifications</li> <li>• Stop work for unsafe conditions or practices</li> </ul>	<ul style="list-style-type: none"> <li>• Stop work for subcontractors</li> <li>• Approve corrective action for site work-arounds</li> <li>• Approve materials and labor costs for site operations</li> <li>• Resolve subcontractor interface issues</li> <li>• Approve daily and weekly status reports</li> </ul>
Project QC Manager	<ul style="list-style-type: none"> <li>• Monitor and report on subcontractor quality and quantities</li> <li>• Audit subcontractors offsite fabrication</li> <li>• Maintain Submittal Register</li> <li>• Participate in Continuous Improvement Team</li> <li>• Stop work for non-compliant operations</li> <li>• Maintain Lessons Learned Log</li> </ul>	<ul style="list-style-type: none"> <li>• Stop work for non-compliant operations</li> <li>• File daily quantities report</li> <li>• File Lessons Learned Log Sheet</li> <li>• Approve resumption of work for resolved quality issues</li> </ul>
Site Health and Safety Specialist	<ul style="list-style-type: none"> <li>• Monitor and report on subcontractor safety and health performance</li> <li>• Record and report safety statistics</li> <li>• Conduct needed site safety and health orientation</li> <li>• Maintain Environmental Log</li> <li>• Stop work for unsafe practices or conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Stop work for unsafe practices or conditions</li> <li>• Approve subcontractor site specific health and safety plan</li> <li>• Set weekly safety objectives</li> <li>• Approve resumption of work for resolved safety issues</li> </ul>

**Appendix A**

**Project Schedule**

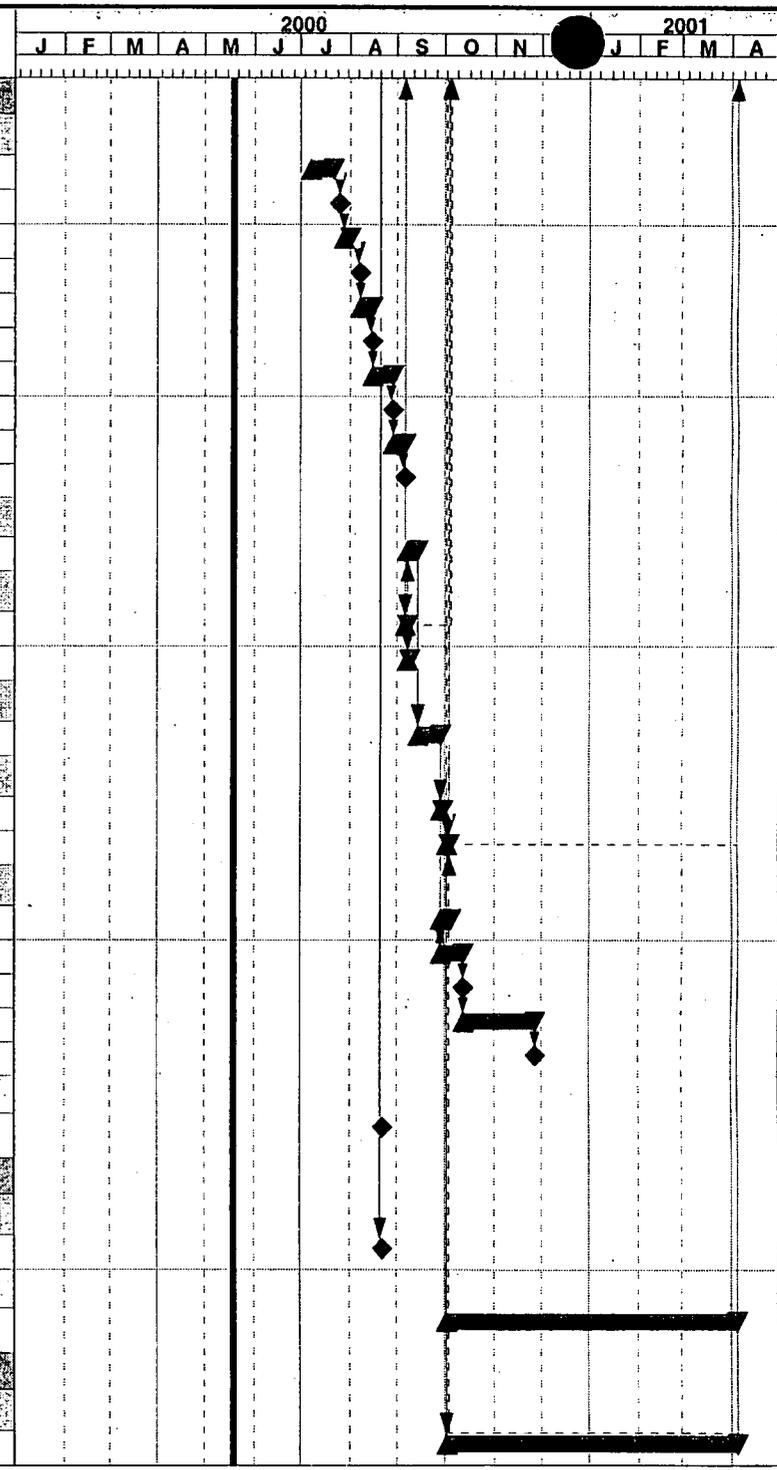


Activity ID	WBS CHARGE #	% Comp	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish	2000												2001				
								J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	
<b>PROJECT MANAGEMENT</b>																								
AX99220101	99.22.01.01	0	CCI Project Management (Field)	143*	143*	06SEP00	04APR01																	
AX99220102	99.22.01.02	0	CCI Project Management (Office)	304*	252*	08MAR00A	22MAY01																	
<b>MOBILIZATION &amp; PREPARATORY WORK</b>																								
AX99010291	99.01.02.91	0	CCI Mobilization	2	2	01SEP00	05SEP00																	
AX99010290	99.01.02.90	0	CTO Pre-Construction Meeting	1	1	05SEP00	05SEP00																	
AX99010401	99.01.04.01	0	Initiate Job Site Presence	5	5	27SEP00	03OCT00																	
AX99210590	99.21.05.90	0	CCI Demobilization	2	2	05APR01	06APR01																	
<b>GOUNDWATER EXTRACTION SYSTEMS</b>																								
Subtotal		16		451	252	09AUG99A	22MAY01																	
<b>PHASE 2</b>																								
<b>BID PACKAGE PREP/AWARD</b>																								
AX20010391	20.01.03.91	0	Prepare Bid Packages	10	10	07JUL00*	20JUL00																	
AX 20150		0	Issue RFB to Subcontractors	0	0		25JUL00																	
AX20010392	20.01.03.92	0	Subcontractor Pre-Bid Meeting/Site Visit	2	2	28JUL00	31JUL00																	
AX 20165		0	Subcontractor Bids Due	0	0		07AUG00																	
AX20010393	20.01.03.93	0	Evaluate Bid Packages	5	5	08AUG00	14AUG00																	
<b>COST PROPOSAL PREPARATION</b>																								
AX20010328	20.01.03.26	100	Deveip/submit Budgetary Estimate to SoDiv	3	0	09AUG99A	13AUG99A																	
AX20010327		100	Submit Cost Proposal to SoDiv	0	0		13AUG99A																	
AX20010326	20.01.03.26	100	Develop Cost Estimate/Schedule	25	0	09AUG99A	21DEC99A																	
AX 20187		100	Negotiate CTO with Client	1	0	08MAR00A	08MAR00A																	
AX 20199		100	Submit Final/Negotiated Estimate/Schedule	1	0	08MAR00A	08MAR00A																	
AX 2000001		100	Phase 3 Award	0	0		08MAR00A																	
<b>WORK PLANS PREPARATION</b>																								
AX20010301	20.01.03.01	0	Sampling and Analysis Plan	10*	6*	15MAY00A	26MAY00																	
AX20010304	20.01.03.04	0	Environmental Protection Plan	10*	6*	15MAY00A	26MAY00																	
AX20010306	20.01.03.06	0	Pollution Control Plan	10*	6*	15MAY00A	26MAY00																	
AX20010308	20.01.03.08	0	Site - Specific H&S Plan H&S PLAN	10*	6*	15MAY00A	26MAY00																	
AX20010313	20.01.03.13	0	General Site Work Plan	10*	6*	15MAY00A	26MAY00																	
AX20010314	20.01.03.14	0	Quality Control Plan	10*	6*	15MAY00A	26MAY00																	
AX20010315	20.01.03.15	0	Transportation & Disposal Plan	10*	6*	15MAY00A	26MAY00																	
AX20010390	20.01.03.90	0	Hazardous Waste Mgmt Plan	10*	6*	15MAY00A	26MAY00																	
AX 20290		0	Submit Draft Work Plans to SoDiv	0	0		26MAY00																	
AX 20185		0	Southern Division WP Comment Period	10	10	30MAY00	12JUN00																	
AX 20190		0	Incorporate WP Comments	3	3	13JUN00	15JUN00																	
AX 20191		0	Submit Final WP to Southern Division	0	0		15JUN00																	
AX 2095		0	Work Plan Approval Received	0	0		20JUN00																	
AX31010330	31.01.03.30	0	Construction/Drawings & Specifications	10	10	12JUN00*	23JUN00																	

Activity ID	WBS CHARGE #	% Comp	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish	2000												2001			
								J	F	M	A	M	J	J	A	S	O	N	J	F	M	A	
<b>PHASE 3</b>																							
<b>BID PACKAGE PREP/AWARD</b>																							
AX 31188		0	Issue Letter of Intent to Award	0	0		14AUG00																
AX31010394	31.01.03.94	0	Submit Subcontractor Plans & Submittals	10	10	15AUG00	28AUG00																
AX 31180		0	Subcontractor Plans Due	0	0		28AUG00																
AX31010395	31.01.03.95	0	Review Subcontractor Plans & Submittals	5	5	29AUG00	05SEP00																
AX 31210		0	Award Subcontracts for GW Extraction	0	0		05SEP00																
<b>MOBILIZATION &amp; PREPARATORY WORK</b>																							
AX31010292	31.01.02.92	0	Subcontractor Mobilization	1	1	03OCT00	03OCT00																
AX31221209	31.22.12.09	0	Bond (Subcontractor)	1	1	03OCT00	03OCT00																
<b>1 INSIDE EXTRACTION WELL</b>																							
AX31060202	31.06.02.02	0	Well Drilling & Development (1 inside)	15	15	11DEC00	03JAN01																
AX31061402	31.06.14.02	0	Well Pumps & Controls (1 inside)	10	10	16FEB01	02MAR01																
AX31061502	31.06.15.02	0	Well Piping & Valves (1inside)	10	10	05MAR01	16MAR01																
<b>3 OUTSIDE EXTRACTION WELLS</b>																							
AX31060201	31.06.02.01	0	Well Drilling & Develop (3 outside)	45	45	04OCT00	08DEC00																
AX31061401	31.06.14.01	0	Well Pumps & Controls (3 outside)	15	15	11DEC00	03JAN01																
AX31061501	31.06.15.01	0	Well Piping & Valves (3 outside)	30	30	04JAN01	15FEB01																
<b>WELL ABANDONMENT</b>																							
AX31060120	31.06.01.20	0	Well Abandonment, AT-2 (1)	1	1	04JAN01	04JAN01																
<b>SAMPLING &amp; ANALYSIS</b>																							
AX31020905	31.02.09.05	0	T&D Analysis, Cuttings	10	10	04JAN01	18JAN01																
AX31020907	31.02.09.07	0	T&D Analysis, Water, Non-Haz	10	10	04JAN01	18JAN01																
<b>TRANSPORTATION AND DISPOSAL</b>																							
AX31192292	31.19.22.92	0	T&D Contact Water, Non-Haz	10	10	19JAN01	01FEB01																
AX31192297	31.19.22.97	0	T&D, Well Cuttings/Water	10	10	19JAN01	01FEB01																
<b>SITE RESTORATION</b>																							
AX31200301	31.20.03.01	0	Restore Disturbed Area	2	2	19MAR01	20MAR01																
AX31210000		0	System System-Up & Optimization	10	10	21MAR01	03APR01																
AX31210		0	System Start-Up & Optimization Complete	0	0		03APR01																
AX31210591	31.21.05.91	0	Subcontractor Demobilization	1	1	04APR01	04APR01																
<b>POST CONSTRUCTION</b>																							
AX31210606	31.21.06.06	0	Subcontractor Supplied AS-BUILT Drawings	3	3	19MAR01	21MAR01																
AX31220410	31.22.04.10	0	Surveying (AS-BUILTS)	5	5	04APR01	10APR01																
AX31210607	31.21.06.07	0	Prepare Construction Documentation Report	30	30	11APR01	22MAY01																
AX312106		0	Submit Construction Documentation Report	0	0		22MAY01																
<b>CTO COMPLETE</b>																							
AX 3100001		0	Project Complete	0	0		22MAY01																

Activity ID	WBS CHARGE #	% Comp	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish	2000												2001			
								J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A
<b>ANOKA COUNTY PARK</b>																							
Subtotal		0		80	80	19MAY00	12SEP00																
<b>PHASE 2</b>																							
<b>BID PACKAGE PREP/AWARD</b>																							
AX21010391	21.01.03.91	0	Prepare Bid Packages	10	10	22JUN00	06JUL00																
AX 21150		0	Issue RFB to Subcontractors	0	0		11JUL00																
AX21010392	21.01.03.92	0	Subcontractor Pre-Bid Meeting/Site Visit	2	2	14JUL00	17JUL00																
AX 21165		0	Subcontractor Bids Due	0	0		24JUL00																
AX21010393	21.01.03.93	0	Evaluate Bid Packages	5	5	25JUL00	31JUL00																
AX 21188		0	Issue Letter of Intent to Award	0	0		31JUL00																
AX 21181		0	Submit Subcontractor Plans & Submittals	10	10	01AUG00	14AUG00																
AX 21180		0	Subcontractor Plans Due	0	0		14AUG00																
AX 21189		0	Review Subcontractor Plans & Submittals	5	5	15AUG00	21AUG00																
AX 21210		0	Award Subcontracts	0	0		21AUG00																
AX 21211		0	Project Mobilization	0	0	13SEP00																	
<b>COST PROPOSAL PREPARATION</b>																							
AX21010326	21.01.03.26	0	Develop Cost Estimate/Schedule	10	10	19MAY00*	02JUN00																
AX21010327		0	Submit Cost Proposal to SoDiv	0	0		02JUN00																
AX 21187		0	Negotiate CTO with Client	1	1	06JUN00	06JUN00																
AX 21199		0	Submit Final/Negotiated Estimate/Schedule	1	1	07JUN00	07JUN00																
AX 2100001		0	Phase 3 Award	0	0		21JUN00																
<b>WORK PLANS PREPARATION</b>																							
AX21010301	21.01.03.01	0	Sampling and Analysis Plan	10	10	22JUN00	06JUL00																
AX21010304	21.01.03.04	0	Environmental Protection Plan	10	10	22JUN00	06JUL00																
AX21010306	21.01.03.06	0	Pollution Control Plan	10	10	22JUN00	06JUL00																
AX21010308	21.01.03.08	0	Site - Specific H&S Plan H&S PLAN	10	10	22JUN00	06JUL00																
AX21010313	21.01.03.13	0	General Site Work Plan	10	10	22JUN00	06JUL00																
AX21010314	21.01.03.14	0	Quality Control Plan	10	10	22JUN00	06JUL00																
AX21010315	21.01.03.15	0	Transportation & Disposal Plan	10	10	22JUN00	06JUL00																
AX21010390	21.01.03.90	0	Hazardous Waste Mgmt Plan	10	10	22JUN00	06JUL00																
AX 21290		0	Submit Draft Work Plans to SoDiv	0	0		06JUL00																
AX 21185		0	Southern Division WP Comment Period	10	10	07JUL00	20JUL00																
AX 21190		0	Incorporate WP Comments	3	3	21JUL00	25JUL00																
AX 21191		0	Submit Final Draft WP to BCT	0	0		25JUL00																
AX 21192		0	BCT WP Comment Period	10	10	31JUL00	11AUG00																
AX 21193		0	Incorporate BCT Comments	5	5	14AUG00	18AUG00																
AX 2195		0	Work Plan Approval Received	0	0		21AUG00																
AX 21194		0	Submit Final WP To SD	1	1	21AUG00	21AUG00																
<b>ABANDON SUPPLY WELL!</b>																							
Subtotal		0		98	98	07JUL00	27NOV00																

Activity ID	WBS CHARGE #	% Comp	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish
<b>PHASE 3</b>							
<b>BID PACKAGE PREP/AWARD</b>							
AX32010391	32.01.03.91	0	Prepare Bid Packages	10	10	07JUL00*	20JUL00
AX 321500		0	Issue RFB to Subcontractors	0	0		25JUL00
AX32010392	32.01.03.92	0	Subcontractor Pre-Bid Meeting/Site Visit	2	2	28JUL00	31JUL00
AX 321650		0	Subcontractor Bids Due	0	0		07AUG00
AX32010393	32.01.03.93	0	Evaluate Bid Packages	5	5	08AUG00	14AUG00
AX 321880		0	Issue Letter of Intent to Award	0	0		14AUG00
AX32010394	32.01.03.94	0	Submit Subcontractor Plans & Submittals	10	10	15AUG00	28AUG00
AX 32180		0	Subcontractor Plans Due	0	0		28AUG00
AX32010395	32.01.03.95	0	Review Subcontractor Plans & Submittals	5	5	29AUG00	05SEP00
AX 322100		0	Award Subcontracts for Abandon Supply	0	0		05SEP00
<b>DEMOLITION</b>							
AX32030190	32.03.01.90	0	Demo of Well Buildings	5	5	07SEP00	13SEP00
<b>MOBILIZATION &amp; PREPARATORY WORK</b>							
AX32010292	32.01.02.92	0	Subcontractor Mobilization	1	1	06SEP00	06SEP00
AX32221209	32.22.12.09	0	Subcontractor Bonds	1	1	07SEP00	07SEP00
<b>WELL ABANDONMENT</b>							
AX32060120	32.06.01.20	0	Well Abandonment	10	10	14SEP00	27SEP00
<b>SITE RESTORATION</b>							
AX32200301	32.20.03.01	0	Restoration of Disturbed Areas	2	2	28SEP00	29SEP00
AX32210591	32.21.05.91	0	Subcontractor Demobilization	1	1	02OCT00	02OCT00
<b>POST CONSTRUCTION</b>							
AX32220410	32.20.04.10	0	Surveying (As-builts)	5	5	28SEP00	04OCT00
AX32210606	32.21.06.06	0	Preparation of Well Abandonment Report	10	10	28SEP00	12OCT00
AX322107		0	Submit Well Abandonment Report	0	0		12OCT00
AX32210607	32.21.06.07	0	Preparation of Construction Documentation	30	30	13OCT00	27NOV00
AX322106		0	Submit Construction Documentation Report	0	0		27NOV00
<b>PHASE COMPLETE</b>							
Subtotal		0		0	0		21AUG00
<b>PHASE 2</b>							
<b>CTO COMPLETION</b>							
AXAX20250		0	Phase II Complete	0	0		21AUG00
Subtotal		0		125*	125*	02OCT00	04APR01
<b>PHASE 3</b>							
AX88010101		0	Phase 3 Summary - CTO #0024	125*	125*	02OCT00	04APR01



## **Appendix B**

### **Site-Specific Health and Safety Plan**

**Health and Safety Plan  
Naval Industrial Reserve Ordnance Plant  
Fridley, Minnesota**

**Revision No. 00**

**Contract No. N62467-98-D-0995  
Contract Task Order No. 0024**

Submitted to:  
**U.S. Naval Facilities  
Engineering Command  
Southern Division**

Prepared by:



**CH2MHILL**  
*Constructors, Inc.*

115 Perimeter Center Place, N.E.  
Suite 700  
Atlanta, GA 30346

June 2000

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3	Chemical-Specific Training Form
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# Acronyms

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°F	degrees Fahrenheit
ATL	Atlanta
CCI	CH2M HILL Constructors, Inc.
CNS	central nervous system
CPR	cardiopulmonary resuscitation
CTO	Contract Task Order
dBA	decibel A-rated
DOT	Department of Transportation
FA	first aid
GFCI	ground fault circuit interrupter
HAZCOM	hazard communication
HR	heart rate
HSM	Health and Safety Manager
HSP	Health and Safety Plan
IDLH	immediately dangerous to life and health
IDW	investigation derived waste
lb	pound
LEL	lower explosive limit
mg/m <sup>3</sup>	milligrams per cubic meter
MSDS	Material Safety Data Sheet
NDG	nuclear density gauge
NSC	National Safety Council
NIROP	Naval Industrial Reserve Ordnance Plant
NAVFAC	Naval Facilities Engineering Command
OSHA	Occupational Safety and Health Administration
PDF	personal flotation device
PPE	personal protective equipment
ppm	parts per million
RMSF	Rocky Mountain Spotted Fever
SCBA	self-contained breathing apparatus
SHSS	Site Health and Safety Specialist
SOP	Standard of Practice
SZ	support zone
TBD	to be determined
TMCC	Truck-mounted crash cushion
TSDF	treatment, storage, and disposal facility

This health and safety plan (HSP) will be kept on the site during field activities and will be reviewed and updated as necessary. The plan adopts, by reference, the standards of practice (SOPs) in the CH2M HILL *Corporate Health and Safety Program, Program and Training Manual*, and CH2M HILL Constructors, Inc. (CCI) Health and Safety Guidelines as appropriate. The Site Health and Safety Specialist (SHSS) is to be familiar with these SOPs and the content of this plan. Site personnel must sign Attachment 1. In addition, this plan adopts procedures in the work plan for the project.

# 1.0 Project Information and Description

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**Client or Owner:** Southern Division, Navy RAC

**Project No:** 153691

**CCI Project Manager:** B. Venky Venkatesh

**Office:** Cleveland, Ohio

**Site Name:** Naval Industrial Reserve Ordnance Plant (NIROP) Fridley

**Site Address:** 4800 East River Road, Fridley, Minnesota

**Date Health and Safety Plan Prepared:** June 2000

**Date(s) of Initial Visit:** May 2000

**Date(s) of Site Work:** June – December 2000

**Site Access:** Site access is through the Main Entrance on East River Road.

**Site Size:** The site occupies 83 acres located 700 feet from the Mississippi River in northern Minneapolis. The NIROP site alone occupies 57 acres. In addition there is an 18-acre site just south of the facility.

**Site Topography:** relatively flat

**Prevailing Weather:** warm summers with cold, potentially harsh winters

**Site Description and History:** NIROP Fridley began producing weapons systems in 1940 and continues today producing systems for the Navy and the Army. A majority of the site contamination was traced to a leaking sewer system under the main building. From the 1940s until 1969, the operating contractor disposed of chemicals and other hazardous materials on 18 acres it owned south of the Fridley facility. The facility is currently active and is operated by the Carlyle Group of Washington, D.C.

This project involves reworking the extraction well operations.

# 2.0 Project Organization and Tasks to be Performed under this Plan

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## 2.1 Project Organization

**Client:** Southern Division, Naval Facilities Engineering Command (NAVFAC)

**CCI:** Project Manager: B. Venky Venkatesh/CLE

Field Team Leader: TBD/ATL

Refer to Section 4.0 for field staff.

**Contractors and Subcontractors:** Refer to Section 4.2.

## 2.2 Description of Tasks

Refer to project documents (i.e., work plan) for detailed task information. A health and safety risk analysis has been performed for each task and is incorporated in this HSP through task-specific hazard controls and requirements for monitoring and protection. Tasks in addition to those listed below require an approved amendment to this plan before additional work begins. Refer to Section 10.2 for procedures related to tasks that do not involve hazardous waste operations and emergency response (HAZWOPER).

### 2.2.1 HAZWOPER-Regulated Tasks

HAZWOPER-regulated tasks include:

- Demolition of Production Well Housing Building
- Abandonment of wells
- Installation of extraction wells
- Modification of groundwater treatment system

### 2.2.2 Non-HAZWOPER-Regulated Tasks

Under specific circumstances, the training and medical monitoring requirements of federal or state HAZWOPER regulations are not applicable. It must be demonstrated that the tasks can be performed without the possibility of exposure in order to use non-HAZWOPER-trained personnel. **Prior approval from the Health and Safety Manager (HSM) is required before these tasks are conducted on regulated hazardous waste sites.**

#### TASKS

- Electrical installation
- Masonry work
- Mechanical installations (equipment, pumps, etc.)
- Engineering testing/evaluation
- Building construction
- Waste removal/hauling

#### CONTROLS

- Brief on hazards, limits of access, and emergency procedures
- Post contamination areas as appropriate (refer to Section 8.2 for details)
- Sample and monitor as appropriate (refer to Section 5.0)

A task hazard analysis is provided in Table 2-1.

**TABLE 2-1**  
Task Hazard Analysis

Potential Hazards	Tasks			
	Drilling, Well installation	Demolition HS-45	Remediation, construction oversight	Remedial Construction
Compressed Gas HS-63	X	X		X
Concrete and Masonry Work				X
Cranes, Hoist, Rigging	X			X
Drilling HS-35	X			
Electrical HS-23	X	X		X
Energized Electrical	X	X		X
Excavation HS-32		X		
Fall Protection HS-31	X	X		X
Fire Protection	X	X		
Flying debris/objects	X	X		
Lockout/Tagout HS-33		X		X
Manual Lifting HS-29	X	X	X	X
Noise >85dBa	X	X		X
Slip, Trip, Fall	X	X		
Traffic Control	X	X	X	X
Visible lighting	X	X	X	X
Vehicle traffic	X	X	X	X
Welding and Cutting HS-63	X	X		X

### 2.2.3 Hazard Controls

This section provides safe work practices and control measures used to reduce or eliminate potential hazards. These practices and controls are to be implemented by the party in control of either the site or the particular hazard. CCI employees and subcontractors must remain aware of the hazards affecting them regardless of who is responsible for controlling the hazards. CCI employees and subcontractors who do not understand any of these provisions should contact the SHSS for clarification.

In addition to controls specified in this section, activity Self-Assessment Checklist is provided in Attachment 5. This checklist is to be used to assess the adequacy of CCI and subcontractors site-specific safety requirements. Objective of the self-assessment process is to identify gaps in project safety performance, and prompt for corrective actions in

addressing gaps. A Self-Assessment Checklist will be completed weekly and returned to the Senior Project Manager, with a copy to the Health and Safety Manager (HSM).

### **2.2.3.1 General Hazards and Housekeeping**

*Reference CH2M HILL SOP HS-20, General Practices*

The following guidelines relate to general hazards and housekeeping:

- Site work will be performed during daylight hours whenever possible. Work conducted during hours of darkness will require enough illumination intensity to read a newspaper without difficulty.
- Hearing protection worn in areas where you need to shout to hear someone within 3'.
- Good housekeeping must be maintained at all times in all project work areas.
- Common paths of travel established and kept free from 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.
- Stairs or ladders are required when there is a break in elevation of 19 inches or more.
- Specific areas should be designated for the proper storage of materials.
- Tools, equipment, materials, and supplies will be stored in an orderly manner.
- As work progresses, scrap and unessential materials must be neatly stored or removed from the work area.
- Containers should be provided for collecting trash and other debris and will be removed at regular intervals.
- All spills will be quickly cleaned up. Oil and grease will be cleaned from walking and working surfaces.

### **2.2.3.2 Hazard Communication**

*Reference CH2M HILL SOP HS-05, Hazard Communication*

The SSHA is to perform the following:

- Complete an inventory of chemicals brought onsite by CCI using the Project-Specific Chemical Hazard Communication Form provided in Attachment 2.
- Confirm inventory of chemicals brought onsite by CCI subcontractors is available.
- Confirm locations of Material Safety Data Sheets (MSDSs) from client, contractors, and subcontractors for chemicals to which CCI employees potentially are exposed.
- Before or as the 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.

- Give employees required chemical-specific HAZCOM training using the Chemical-Specific Tracking Form provided in Attachment 3.

### **2.2.3.3 Compressed Gas Cylinders**

*Reference CH2M HILL SOP HS-63, Welding and Cutting*

The following guidelines relate to compressed gas cylinders:

- Valve caps must be in place when cylinders are transported, moved, or stored.
- Cylinder valves must be closed when cylinders are not being used and when cylinders are being moved.
- Cylinder valves must be closed when cylinders are not being used and when cylinders are being moved.
- Cylinders must be shielded from welding and cutting operations and positioned to avoid being struck or knocked over; contacting electrical circuits; or exposed to extreme heat sources.
- Cylinders must be secured on a cradle, basket, or pallet when hoisted; they may not be hoisted by choker slings.

### **2.2.3.4 Concrete and Masonry Construction**

The following guidelines relate to concrete and masonry construction:

- Wear appropriate personal protective equipment (eye/face protection, gloves, rubber boots) when in areas where concrete is being poured.
- Protruding reinforcing steel (rebar), onto which personnel could fall, must be guarded to eliminate the hazard of impalement.
- Stay as clear as possible of all hoisting operations. Loads, including concrete buckets, will not be hoisted overhead of personnel.
- Maintain a safe distance from formwork and shoring being removed from concrete structures.
- Maintain a safe distance from precast and lift-slab concrete being lifted into position until physically secured.
- Do not stand behind the tensioning jacks during post-tensioning.
- Do not ride concrete buckets.
- Do not enter limited access zones during concrete or masonry wall construction.

### **2.2.3.5 Cranes, Hoists, and Rigging**

The following guidelines relate to cranes, hoists, and rigging:

- Only certified crane operators are permitted to operate cranes.

- Maintain safe distance from operating cranes and stay alert of crane movement. Avoid positioning between fixed objects and operating cranes and crane pinch points, remain outside of crane swing and turning radius. Never turn your back on operating cranes.
- Approach cranes only after receiving the operator's attention. The operator will acknowledge your presence and stop movement of the crane. Never approach operating cranes from the side or rear where the operator's vision is compromised.
- When required to work in proximity to operating cranes, wear high-visibility vests to increase visibility to operators. For work performed after daylight hours, vests will be made of reflective material or include a reflective stripe or panel.
- Stay clear of all hoisting operations. Loads will not be hoisted overhead of personnel.
- Cranes will not be used to lift or lower personnel.
- If crane becomes electrically energized, personnel will be instructed not to touch any part of the crane or attempt to touch any person who may be in contact with the electrical current. The utility company or appropriate party will be contacted to have line de-energized prior to approaching the crane.
- Do not exceed hoist load limits.
- Ensure load is level and stable before hoisting
- Inspect all rigging equipment prior to use. Do not use defective rigging for any reason.
- Only use rigging equipment for the purpose it was designed and intended.

#### **2.2.3.6 Demolition**

*Reference CH2M HILL SOP HS-45, Demolition*

The following guidelines relate to demolition:

- Remain a safe distance from the demolition zone to reduce exposure to fragmentation of glass, steel, masonry, and other debris during demolition operations.
- Do not enter the demolition zone unless completely necessary, and only after the competent person has assessed the condition of the structure and has authorized entry.
- Follow requirements established by competent person. Competent person will inform personnel of areas that are safe to enter and areas where entry is prohibited. Competent person should escort CH2M HILL personnel while in the demolition zone.
- All demolition activities that may affect the integrity of the structure or safety of personnel must cease until personnel have exited the demolition zone.

#### **2.2.3.7 Drilling**

*Reference CH2M HILL SOP HS-35, Drilling*

The following guidelines relate to drilling:

- Only authorized personnel are permitted to operate drill rigs.

- Stay clear of areas surrounding drill rigs during every startup.
- Stay clear of the rotating augers and other rotating components of drill rigs.
- Stay clear of all hoisting operations. Loads will not be hoisted overhead of personnel.
- Do not wear loose-fitting clothing or other items such as rings or watches that could get caught in moving parts. Long hair should have it restrained.
- If equipment becomes electrically energized, personnel will be instructed not to touch any part of the equipment or attempt to touch any person who may be in contact with the electrical current. The utility company or appropriate party will be contacted to have line de-energized prior to approaching the equipment.
- Smoking around drilling operations is prohibited.

### **2.2.3.8 Electrical**

*Reference CH2M HILL SOP HS-23, Electrical*

The following guidelines relate to electrical systems:

- Only qualified personnel are permitted to work on energized electrical systems.
- Only authorized personnel are permitted to enter high-voltage areas.
- Do not tamper with electrical wiring and equipment unless qualified to do so. All electrical wiring and equipment must be considered energized until lockout/tagout procedures are implemented.
- Inspect electrical equipment, power tools, and extension cords for damage prior to use. Do not use defective electrical equipment, remove from service.
- All temporary wiring, including extension cords and electrical power tools, must have ground fault circuit interrupters (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/equipment must be effectively grounded/double-insulated UL approved.
- Operate and maintain electric power tools and equipment according to manufacturers' instructions.
- Maintain safe clearance distances between overhead power lines and any electrical conducting material unless the power lines have been de-energized and grounded, or where insulating barriers have been installed to prevent physical contact. Maintain at least 10 feet from overhead power lines for voltages of 50 kV or less, and 10 feet plus ½ inch for every 1 kV over 50 kV.

- Temporary lights will not be suspended by their electric cord unless designed for suspension. Lights will be protected from accidental contact or breakage.
- Protect electrical equipment, tools, switches, and outlets from environmental elements.

### **2.2.3.9 Energized Electrical**

The following guidelines relate to energized electrical systems:

- Only qualified personnel permitted to work on unprotected energized electrical systems.
- Electrical wiring and equipment will be de-energized prior to conducting work unless it can be demonstrated that de-energizing introduces additional or increased hazards or is unfeasible due to equipment design or operational limitations.
- Electrical systems will be considered energized until lockout/tagout procedures are implemented.
- The Energized Electrical Work permit provided in Attachment 4 of this plan must be completed prior to working on unprotected energized electrical systems.
- Follow control measures & procedures identified on Energized Electrical Work permit.

### **2.2.3.10 Fall Protection**

*Reference CH2M HILL SOP HS-31, Fall Protection*

The following guidelines relate to fall protection:

- Fall protection systems must be used to eliminate fall hazards when performing construction activities at a height of 6 feet or greater and when performing general industry activities at a height of 4 feet or greater.
- Staff exposed to fall hazards must complete the CH2M HILL Fall Protection training course and receive project-specific fall protection training. Do not use fall protection systems on which you have not been trained.
- The SHSS must complete the Project Fall Protection Evaluation Form and provide project-specific fall protection training to all staff exposed to fall hazards. The Project Fall Protection Evaluation Form is provided in Attachment 4 of this plan.
- The SHSS will act as competent person and will inspect and oversee the use of fall protection systems. Follow all requirements established by the competent person for the use and limitation of fall protection systems.
- A registered professional engineer will oversee the use of horizontal lifelines.
- Only one person will be simultaneously attached to a vertical lifeline.
- 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.

- Inspect personal fall arrest systems prior to each use. Do not use damaged fall protection systems at any time, or for any reason.
- Set-up personal fall arrest systems so that you can neither free-fall more than 6 feet nor contact any lower level.
- Only attach personal fall arrest systems to anchorage points capable of supporting at least 5,000 pounds.
- Use fall protection equipment for fall protection only and not to hoist materials. Do not use personal fall arrest systems that have been subjected to impact loading.

### **2.2.3.11 Fire Prevention**

*Reference CH2M HILL SOP HS-22, Fire Prevention*

The following guidelines relate to fire prevention:

- Fire extinguishers will be provided so 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, and
  - undergo a maintenance check each year.
- The area in front of extinguishers must be kept clear.
- Post “Exit” signs over exiting doors, and post “Fire Extinguisher” signs over extinguisher locations.
- 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, covered container until removed from the site.
- Flammable/combustible liquids must be kept in approved containers, and must be stored in an approved storage cabinet.

### **2.2.3.12 Ladders**

*Reference CH2M HILL SOP HS-25, Stairways and Ladders*

The following guidelines relate to ladders:

- Ladders must be inspected by a competent person for visible defects prior to each day’s use. Defective ladders must be tagged and removed from service.
- Portable ladders must extend at least 3 feet above landing surface.
- User must face the ladder when climbing; keep belt buckle between side rails.
- User must use both hands to climb, use rope to raise and lower equipment and materials.
- Straight and extension ladders must be tied off to prevent displacement.

- Ladders that may be displaced by work activities or traffic must be secured or barricaded.
- Fixed ladders  $\geq$  20 feet in height must be provided with fall protection devices.
- Stepladders are to be used in the fully opened and locked position.
- Users are not to stand on the top two steps of a stepladder, nor are users to sit on top or straddle a stepladder.
- Straight and extension ladders must be positioned at such an angle that the ladder base to the wall is one-fourth of the working length of the ladder.

### **2.2.3.13 Lockout/Tagout**

*Reference CH2M HILL SOP HS-33, LOCKOUT/TAGOUT*

The following guidelines relate to lockout/tagout:

- Do not work on equipment when the unexpected operation could result in injury, unless lockout/tagout procedures are implemented.
- Staff working under a lockout/tagout procedure must complete the CH2M HILL Lockout/Tagout training course. Project-specific training may also be required onsite-specific lockout/tagout procedures.
- Standard lockout/tagout procedures include the following six steps:
  - notify all personnel in the affected area of the lockout/tagout,
  - shut down the equipment using normal operating controls,
  - isolate all energy sources,
  - apply individual lock and tag to each energy isolating device,
  - relieve or restrain all potentially hazardous stored or residual energy, and
  - verify that isolation and de-energization of the equipment has been accomplished. Once verified that the equipment is at the zero energy state, work may begin.
- All safe guards must be put back in place, all affected personnel notified that lockout/tagout has been removed, and controls positioned in the safe mode prior to lockout/tagout removal.
- Do not remove another person's lock or tag.

### **2.2.3.14 Manual Lifting**

*Reference CH2M HILL SOP HS-29, Manual Lifting*

The following proper lifting techniques must be used when lifting any object:

- Plan storage and staging to minimize lifting or carrying distances.
- Split heavy loads into smaller loads.
- Use mechanical lifting aids whenever possible.
- Have someone assist with the lift especially for heavy or awkward loads.
- Ensure the path of travel is clear prior to the lift.

### **2.2.3.15 Rigging**

The following guidelines relate to rigging:

- Stay clear of all hoisting operations. Loads will not be hoisted overhead of personnel.
- Hoists will not be used to lift or lower personnel.
- Do not exceed hoist load limits.
- Ensure load is level and stable before hoisting
- Inspect all rigging equipment prior to use. Do not use defective rigging for any reason.
- Only use rigging equipment for the purpose it was designed and intended.

### **2.2.3.16 Steel Erection**

The following guidelines relate to steel erection:

- Protruding reinforcing steel (rebar), onto which personnel could fall, must be guarded to eliminate the hazard of impalement.
- Structural steel loads will not be released from hoisting line until members are secured with at least two bolts, or the equivalent at each connection and drawn up wrench tight.
- Tag lines will be used for controlling loads.
- Containers will be provided for storing or carrying rivets, bolts, and drift pins, and secured against accidental displacement when aloft.
- Air line hose sections will be secured together, except when quick disconnect couplers are used to join sections.
- Impact wrenches used for bolting provided with a locking device for retaining socket.
- Turnbuckles will be secured to prevent unwinding while under stress.
- Plumbing-up guys will be removed only under the supervision of a competent person.
- Metal decking of sufficient strength laid tight and secured to prevent movement.
- Provisions will be made to secure temporary flooring against displacement. Planks will overlap the bearing on each end by a minimum of 12 inches. Wire mesh, exterior plywood, or equivalent, will be used around columns where planks do not fit tightly.
- Unused openings in floor, temporary or permanent, completely planked over or guarded.

### **2.2.3.17 Exposure to Public Vehicular Traffic**

The following precautions must be taken when working around traffic, and in or near an area where traffic controls have been established by a contractor:

- 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.
- 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, flash flooding, limited sight-distance, hills, curves, guardrails, width of shoulder (i.e., breakdown lane), etc.
- Always remain aware of an escape route - behind an established barrier, parked vehicle, guardrail, etc.
- 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 traffic, a “buddy system” should be used, where one worker is looking towards traffic.
- When working on highway projects, obtain copy of the contractor’s traffic control plan.
- Work area should be protected by a physical barrier – such as a K-rail or Jersey barrier.
- Review traffic control devices to ensure that they are adequate to protect your work area. Traffic control devices should: 1) convey a clear meaning, 2) command respect of road users, and 3) give adequate time for proper traffic response. The adequacy of these devices are dependent on limited sight distance, proximity to ramps or intersections, restrictive width, duration of job, and traffic volume, speed, and proximity.
- Either a barrier or shadow vehicle should be positioned a considerable distance ahead of the work area. The vehicle should be equipped with a flashing arrow sign and truck-mounted crash cushion (TMCC). All vehicles within 40 feet of traffic should have an orange flashing hazard light atop the vehicle.
- Except on highways, flaggers should be used when: 1) two-way traffic is reduced to using one common lane, 2) driver visibility is impaired or limited, 3) project vehicles enter or exit traffic in an unexpected manner, or 4) the use of a flagger enhances established traffic warning systems.
- Lookouts should be used when physical barriers are not available or practical. The lookout continually watches approaching traffic for signs of erratic driver behavior and warns workers. Vehicles should be parked at least 40 feet away from the work zone and traffic. Minimize the amount of time that you will have your back to oncoming traffic.

### **2.2.3.18 Welding and Cutting**

*Reference CH2M HILL SOP HS-63, Welding and Cutting*

The following guidelines relate to welding and cutting:

- Only authorized/trained personnel are permitted to operate welding/cutting equipment.

- Do not enter areas where welding/cutting operations are taking place unless completely necessary and only after receiving permission from the welding/cutting operator.
- If you must be present in an area during welding/cutting operations, position yourself behind flash screens or wear glasses/goggles with lenses of appropriate darkness.
- Do not look directly at the welding/cutting flash or at reflective surfaces surrounding welding/cutting operations.
- Avoid contacting compressed gas cylinders. Cylinders should be firmly secured in an upright position at all times.
- Be aware of tripping hazards created by welding hoses, power cables, leads, and cords positioned on walking surfaces.

## 3.0 Hazard Evaluation and Control

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### 3.1 Heat and Cold Stress

*Reference CH2M HILL SOP HS-09, Heat and Cold Stress*

#### 3.1.1 Preventing Heat Stress

The following guidelines relate to heat stress prevention:

- Drink 16 ounces of water before beginning work, such as in the morning or after lunch. Disposable (e.g., 4-ounce) cups and water maintained at 50 to 60 degrees Fahrenheit (°F) should be available. Under severe conditions, drink 1 to 2 cups every 20 minutes, for a total of 1 to 2 gallons per day. Take regular breaks in a cool, preferably air-conditioned, area. Do not use alcohol in place of water or other nonalcoholic fluids. Decrease your intake of coffee and caffeinated soft drinks during working hours. Monitor for signs of heat stress.
- Acclimate to site work conditions by slowly increasing workloads; e.g., do not begin site work with extremely demanding activities.
- Use cooling devices, such as cooling vests, to aid natural body ventilation. The devices add weight, so their use should be balanced against efficiency.
- Use mobile showers or hose-down facilities to reduce body temperature and cool protective clothing.
- During hot weather, conduct field activities in the early morning or evening if possible.
- Provide adequate shelter to protect personnel against radiant heat (sun, flames, hot metal), which can decrease physical efficiency and increase the probability of heat stress.
- In hot weather, rotate shifts of workers.
- Maintain good hygiene standards by frequently changing clothing and by showering. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should consult medical personnel.

### 3.1.2 Symptoms and Treatment of Heat Stress

The symptoms of heat stress are listed in Table 3-1.

**TABLE 3-1**  
Symptoms and Treatment of Heat Stress

	<b>Heat Syncope</b>	<b>Heat Rash (<i>miliaria rubra</i>, "prickly heat")</b>	<b>Heat Cramps</b>	<b>Heat Exhaustion</b>	<b>Heat Stroke</b>
<b>Signs and Symptoms</b>	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 thready pulse and low blood pressure; oral temperature normal or low	Red, hot, dry skin; dizziness; confusion; rapid breathing and pulse; high oral temperature.
<b>Treatment</b>	Remove to cooler area. Rest lying down. Increase fluid intake. Recovery usually is prompt and complete.	Use mild drying lotions and powders, and keep skin clean for drying skin and preventing infection.	Remove to cooler area. Rest lying down. Increase fluid intake.	Remove to cooler area. Rest lying down, with head in low position. Administer fluids by mouth. Seek medical attention.	Cool rapidly by soaking in cool—but not cold—water. Call ambulance, and get medical attention immediately!

### 3.1.3 Heat-Stress Monitoring

For field activities part of ongoing site work activities in hot weather, the following procedures should be used to monitor the body's physiological response to heat and to estimate the work-cycle/rest-cycle when workers are performing moderate levels of work. These procedures should be considered when the ambient air temperature exceeds 70°F, the relative humidity is high (greater than 50 percent), or when the workers exhibit symptoms of heat stress.

The heart rate (HR) should be measured by the radial pulse for 30 seconds, as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats per minute, or 20 beats per minute above resting pulse. If the HR is higher, the next work period should be shortened by 33 percent, while the length of the rest period stays the same. If the pulse rate still exceeds 110 beats per minute at the beginning of the next rest period, the following work cycle should be further shortened by 33 percent. The procedure is continued until the rate is maintained below 110 beats per minute, or 20 beats per minute above resting pulse.

### 3.1.4 Preventing Cold Stress

The following guidelines relate to cold stress prevention:

- Be aware of the symptoms of cold-related disorders, and *wear proper clothing for the anticipated fieldwork*.
- 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.** This measure relates the dry bulb temperature and the wind velocity. It is used only to estimate the combined effect of wind and low air temperatures on exposed skin. The wind-chill index sometimes is limited in its usefulness because the 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 is used only as a guideline to warn workers when they are in a situation that can cause cold-related illnesses. Used in conjunction with the NSC guidelines, the wind-chill index provides a starting point for adjusting work and warm-up schedules.
- **NSC Guidelines for Work and Warm-Up Schedules.** The cold-exposure limits recommended by the NSC can be used in conjunction 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 illness*. If symptoms are not observed, the work duration can be increased.
- The wind-chill index and the NSC guidelines are in the CH2M HILL *Corporate Health and Safety Program, Program and Training Manual, SOP HS-09*.

### 3.1.5 Symptoms and Treatment of Cold Stress

The symptoms and treatment of cold stress are listed in Table 3-2.

**TABLE 3-2**  
Symptoms and Treatment of Cold Stress

	<b>Immersion (Trench) Foot</b>	<b>Frostbite</b>	<b>Hypothermia</b>
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. Rewarm area quickly in warm—but <b>not</b> hot—water. Have victim drink warm fluids, but <b>not</b> 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 <b>not</b> coffee or alcohol. Get medical attention.

## **3.2 Locating Buried Utilities**

### **3.2.1 Local Utility Mark-Out Service**

The Facility Utility Department will be responsible for marking buried utilities.

### **3.2.2 Procedures for Locating Buried Utilities**

Procedures for locating buried utilities are listed as follows:

- Where available, obtain utility diagrams for the facility.
- Review locations of sanitary and storm sewers, electrical conduits, water supply lines, natural-gas lines, and fuel tanks and lines.
- Review proposed locations of intrusive work with facility personnel knowledgeable of locations of utilities. Check locations against information from utility mark-out service.
- Where necessary, clear locations with a utility-locating instrument (e.g., metal detector).
- Where necessary (e.g., uncertainty about utility locations), excavation or drilling of the upper depth interval should be performed manually. Monitor for signs of utilities during advancement of intrusive work (e.g., sudden change in advancement).
- When the client or other onsite party is responsible for determining the presence and locations of buried utilities, the SHSS should confirm that arrangement.

### 3.3 Biological Hazards and Controls

Biological hazards and controls are listed in Table 3-3.

TABLE 3-3  
Biological Hazards and Controls

Hazard and Location	Control Measures
<b>Snakes</b> typically are found in underbrush and tall grassy areas.	If you encounter a snake, stay calm and look around; 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. <b>DO NOT</b> apply ice, cut the wound, or apply a tourniquet. Carry the victim or have him/her walk slowly if the victim must be moved. Try to identify the type of snake: note color, size, patterns, and markings.
<b>Poison ivy, poison oak, and poison sumac</b> typically are found in brush or wooded areas. They are more commonly found in moist areas or along the edges of wooded areas.	Become familiar with the identity of these plants. 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.
Exposure to <b>bloodborne pathogens</b> may occur when rendering first aid or CPR, or when coming into contact with medical or other potentially infectious material, or when coming into contact with landfill waste or waste streams containing such infectious material.	Training is required before a task involving potential exposure is performed. Exposure controls and personal protective equipment (PPE) are required as specified in CH2M HILL SOP HS-36, <i>Bloodborne Pathogens</i> . Hepatitis B vaccination must be offered before the person participates in a task where exposure is a possibility.
<b>Bees and other stinging insects</b> may be encountered almost anywhere and may present a serious hazard, particularly to people who are allergic.	Watch for and avoid nests. Keep exposed skin to a minimum. Carry a kit if you have had allergic reactions in the past, and inform the SHSS and/or the buddy. If a stinger is present, remove it carefully with tweezers. Wash and disinfect the wound, cover it, and apply ice. Watch for allergic reaction; seek medical attention if a reaction develops.
<b>Other potential biological hazards</b>	None Anticipated.

### 3.4 Tick Bites

Reference CH2M HILL HS-03, Tick Bites

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.

**Prevention** against tick bites includes avoiding tick areas; wearing tightly woven light-colored clothing with long sleeves and wearing pant legs tucked into boots or socks; spraying **only outside** of clothing with insect repellent containing permethrin or permanone, and spraying skin with DEET; and checking yourself frequently for ticks and showering as soon as possible. To prevent chemical repellents from interfering with sample analyses, exercise care while using repellents during the collection and handling of environmental samples.

If **bitten** by a tick, carefully remove the tick with tweezers, grasping the tick as close as possible to the point of attachment while being careful not to crush the tick. After removing

the tick, wash your hands and disinfect and press the bite area. The removed tick should be saved. Report the bite to human resources personnel.

Look for symptoms of Lyme disease or Rocky Mountain spotted fever (RMSF): Lyme - a rash that looks like a bullseye with a small welt in the center; RMSF - a rash of red spots under the skin 3 to 10 days after the tick bite. In both cases, chills, fever, headache, fatigue, stiff neck, bone pain may develop. If symptoms appear, seek medical attention.

### 3.5 Radiological Hazards and Controls

Refer to CH2M HILL's Corporate Health and Safety Program, Program and Training Manual, and Corporate Health and Safety Program, Radiation Protection Program Manual, for standards of practice for operating in contaminated areas. There are no known radiological hazards associated with this project.

### 3.6 Hazards Posed by Chemicals Brought on the Site

#### 3.6.1 Hazard Communication

*Reference CH2M HILL Hazard Communication Manual*

CH2M HILL's *Hazard Communication Program Manual*, which is available from area or regional offices and from the Corporate Human Resources Department in Denver, Colorado. The project manager is to request Material Safety Data Sheets (MSDSs) from the client or from the contractors and the subcontractors for chemicals to which CCI employees potentially are exposed. The SHSS is to do the following:

- Give employees required site-specific hazard communication (HAZCOM) training.
- Confirm that inventory of chemicals brought on the site by subcontractors is available.
- Before or as chemicals arrive on the site, obtain an MSDS for each hazardous chemical.
- Label chemical containers with identity of chemical and with hazard warnings, if any.

The chemical products listed in Table 3-4 will be used on the site. Refer to Attachment 2 for MSDSs.

**TABLE 3-4**  
Chemical Hazards

Chemical	Quantity	Location
Isobutylene (calibration gas)	1 liter, compressed gas	Support Zone
Methanol (decontamination)	4 liters, flammable	Support/Decontamination Zone
Hexane (decontamination)	4 liters, flammable	Support/Decontamination Zone
Alconox/Liquinox (detergent)	< 1 liter, powder/liquid	Support/Decontamination Zone

#### 3.6.2 Shipping and Transportation of Chemical Products

*Reference CH2M HILL's Procedures for Shipping and Transporting Dangerous Goods*

Nearly all chemicals brought to the site are considered hazardous materials by the U.S. Department of Transportation (DOT). All staff who ship the materials or transport them by

road must receive the CH2M HILL 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 HSM or the Equipment Coordinator for additional information.

### 3.7 Contaminants of Concern

*Reference Project Files for More-Detailed Contaminant Information*

Contaminants of concern are listed in Table 3-5.

**TABLE 3-5**  
Contaminants of Concern

Contaminant	Location and Maximum <sup>a</sup> Concentration (ppm)	Exposure Limit <sup>b</sup>	IDLH <sup>c</sup>	Symptoms and Effects of Exposure	PIP <sup>d</sup> (eV)
Trichloroethylene (TCE)	GW: Low Level > 1 ppm	50 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

Footnotes:

<sup>a</sup> Specify sample-designation and media: SB (Soil Boring), A (Air), D (Drums), GW (Groundwater), L (Lagoon), TK (Tank), S (Surface Soil), SL (Sludge), SW (Surface Water).

<sup>b</sup> Appropriate value of PEL, REL, or TLV listed.

<sup>c</sup> 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.

<sup>d</sup> PIP = photoionization potential; NA = Not applicable; UK = Unknown.

## 3.8 Potential Routes of Exposure

Potential routes of exposure include:

- **Dermal:** Contact with contaminated media. This route of exposure is minimized through proper use of PPE, as specified in Section 5.
- **Inhalation:** Vapors and contaminated particulates. This route of exposure is minimized through proper respiratory protection and monitoring, as specified in Sections 5 and 6, respectively.
- **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 eating, drinking, or smoking).

## 4.0 Personnel

### 4.1 CCI Employee Medical Surveillance and Training

*Reference CH2M HILL SOP HS-01, Medical Surveillance, and HS-02, Health and Safety Training*

The employees listed in Table 4-1 are enrolled in the CH2M HILL Comprehensive Health and Safety Program and meet state and federal hazardous waste operations requirements for 40-hour initial training, 3-day on-the-job experience, and 8-hour annual refresher training. Employees designated "SHSS" have received 8 hours of supervisor and instrument training and can serve as SHSS for the level of protection indicated. An SHSS with a level designation (D, C, B) equal to or greater than the level of protection being used must be present during all tasks performed in exclusion or decontamination zones that involve the potential for exposure to health and safety hazards. Employees designated "FA-CPR" are currently certified by the American Red Cross, or equivalent, in first aid and cardiopulmonary resuscitation (CPR). At least one FA-CPR designated employee must be present during all tasks performed in exclusion or decontamination zones that involve the potential for exposure to health and safety hazards. The employees listed below are currently active in a medical surveillance program that meets state and federal regulatory requirements for hazardous waste operations. Certain tasks (e.g., confined-space entry) and contaminants (e.g., lead) may require additional training and medical monitoring.

Pregnant employees are to be informed of and are to follow the procedures in CH2M HILL's SOP HS-04, *Reproduction Protection*, including obtaining a physician's statement of the employee's ability to perform hazardous activities, before being assigned fieldwork.

**TABLE 4-1**  
Project Personnel Safety Certifications

Employee Name	Office	Responsibility	SHSS/FA-CPR
Venky Venkatesh	CLE	Project Manager	FA-CPR
TBD		Site Superintendent	
TBD		SHSS	
Denny Brestle	ATL	QC Inspector	Level B SHSS; FA-CPR
Robert Nash	ATL	H&S Manager	Level B SHSS; FA-CPR

### 4.2 Field Team Chain of Command and Communication Procedures

#### 4.2.1 Client

Contact Name: Eva Clement, Naval Facilities Engineering Command, North Charleston, South Carolina

## 4.2.2 CCI

**Project Manager:** B. Venky Venkatesh/CLE

**Health and Safety Manager:** Robert Nash/ATL

**Site Superintendent:** TBD

**Site Health and Safety Specialist:** TBD

The SHSS is responsible for contacting the site superintendent and the project manager. In general, the project manager either will contact or will identify the client contact. The Health HSM should be contacted as appropriate. The SHSS or the project manager must notify the client and the HSM when a serious injury or a death occurs or when health and safety inspections by OSHA or other agencies are conducted. Refer to Sections 10 through 12 for emergency procedures and phone numbers.

## 4.2.3 Subcontractors

*Reference Section 3, Corporate Health and Safety Program Manual*

When specified in the project documents (e.g., contract), this plan may cover CCI subcontractors. However, this plan does not address hazards associated with tasks and equipment that the subcontractor has expertise in (e.g., operation of drill rig). Specialty subcontractors are responsible for health and safety procedures and plans specific to their work. Specialty subcontractors are to submit plans to CCI for review and approval before the start of fieldwork. Subcontractors must comply with the established health and safety plan(s). CCI must monitor and enforce compliance with the established plan(s).

General health and safety communication with subcontractors contracted with CCI and covered by this plan is to be conducted as follows:

- Request that the subcontractor, if a specialty subcontractor, submit a safety or health plan applicable to their expertise (e.g., drill-rig safety plan or nuclear density gauge [NDG] health plan); attach the reviewed plan.
- Supply subcontractors with a copy of this plan, and brief them on its provisions.
- Direct health and safety communication to the subcontractor-designated safety representative.
- Notify the subcontractor-designated representative if a violation of the plan(s) is observed. Specialty subcontractors are responsible for mitigating hazards in which they have expertise.
- If a hazard condition persists, inform the subcontractor. If the hazard is not mitigated, stop affected work as a last resort and notify the project manager.
- When an apparent imminent danger exists, promptly remove all affected personnel. Notify the project manager.
- Make clear that consistent violations of the health and safety plan by a subcontractor may result in termination of the subcontract.

# 5.0 Personal Protective Equipment

Reference CH2M HILL SOP HS-07, Personal Protective Equipment; HS-08, Respiratory Protection

## 5.1 PPE Specifications

PPE specifications are listed in Table 5-1.

**TABLE 5-1**  
PPE Specifications<sup>a</sup>

Task	Level	Body	Head	Respirator <sup>b</sup>
General work uniform when no chemical exposure is anticipated	D	Work clothes; steel-toe, steel-shank leather work boots; work gloves	Hardhat <sup>c</sup> Safety glasses Ear protection <sup>d</sup>	None required
Drilling Operations or potential for splash with contaminated water	Modified D	<b>COVERALLS:</b> Uncoated Tyvek® <b>BOOTS:</b> Steel-toe, steel-shank chemical-resistant boots OR steel-toe, steel-shank leather work boots with outer rubber boot covers <b>GLOVES:</b> Inner surgical-style nitrile glove AND outer chemical-resistant leather or arimid-fiber glove.	Hardhat <sup>c</sup> Splash shield <sup>c</sup> Safety glasses Ear protection <sup>d</sup>	None required
<b>NOT APPROVED FOR THIS ACTIVITY</b>	C	<b>COVERALLS:</b> Polycoated Tyvek® <b>BOOTS:</b> Steel-toe, steel-shank chemical-resistant boots OR steel-toe, steel-shank leather work boots with outer rubber boot covers <b>GLOVES:</b> Inner surgical-style nitrile glove AND outer chemical-resistant nitrile glove.	Hardhat <sup>c</sup> Splash shield <sup>c</sup> Ear protection <sup>d</sup> Spectacle inserts	APR, full face, MSA Ultratwin or equivalent; with GME-P100 <sup>e</sup> cartridges or equivalent
<b>NOT APPROVED FOR THIS ACTIVITY</b>	B	<b>COVERALLS:</b> Polycoated Tyvek® <b>BOOTS:</b> Steel toe, steel-shank chemical-resistant boots OR steel-toe, steel-shank leather work boots with outer rubber boot covers <b>GLOVES:</b> Inner surgical-style nitrile glove AND outer chemical-resistant nitrile glove.	Hardhat <sup>c</sup> Splash shield <sup>c</sup> Ear protection <sup>d</sup> Spectacle inserts	Positive-pressure demand self-contained breathing apparatus (SCBA): MSA Ultralite, or equivalent

<sup>a</sup> Modifications are as indicated. CCI will provide PPE to only CCI employees.

<sup>b</sup> No facial hair that would interfere with respirator fit is permitted.

<sup>c</sup> Hardhat and splash-shield areas are to be determined by the SHSS.

<sup>d</sup> Ear protection should be worn while working around drill rigs or other noise-producing equipment or when conversations cannot be held at distances of 3 feet or less without shouting. Refer to Section 6 for other requirements.

<sup>e</sup> The GME-H cartridge is the new standard-issue cartridge. Available stock of the previously standard GMC-H cartridges may be used for tasks covered by this plan.

## 5.2 Upgrading or Downgrading Level of Protection

The reasons for upgrading or downgrading the PPE level are as follows:

- Upgrade
  - Request from individual performing task
  - Change in work task 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 (Section 6) exceeded
  
- Downgrade
  - New information indicating that situation is less hazardous than originally thought
  - Change in site conditions that decreases the hazard
  - Change in work task that will reduce contact with hazardous materials

Performing a task that requires an upgrade to a higher level of protection (e.g., Level D to Level C) is permitted only when the PPE requirements have been specified in Section 5.0 and an SHSS who meets the requirements specified in Section 4.1 is present.

# 6.0 Air Monitoring Specifications

Reference CH2M HILL SOP HS-06, Air Monitoring

Air monitoring specifications are listed in Table 6-1.

**TABLE 6-1**  
Air Monitoring Specifications

Instrument	Action Levels <sup>a</sup>	Frequency <sup>b</sup>	Calibration
PID MiniRAE with 10.6eV lamp or equivalent	0 – ppm – Level D > ppm – Level C > ppm – Stop Work	Initially and periodically during task	Daily

<sup>a</sup> Action levels apply to sustained breathing-zone measurements above background.

<sup>b</sup> The exact frequency of monitoring depends on field conditions and is to be determined by the SHSS; generally, every 5 to 15 minutes is acceptable; more frequently may be appropriate. Monitoring results should be recorded. Documentation should include instrument and calibration information, time and measurement result, personnel monitored, and place/location where measurement is taken (e.g., "Breathing Zone/MW-3," "at surface/SB-2," etc.).

<sup>c</sup> If the measured percent of O<sub>2</sub> is less than 10 percent, an accurate LEL reading will not be obtained. Percent LEL and percent O<sub>2</sub> action levels apply only to ambient working atmospheres, and not to confined-space entry. More-stringent percent LEL and O<sub>2</sub> action levels are required for confined space.

## 6.1 Calibration Specifications

Calibration specifications are listed in Table 6-2. Refer to the respective manufacturer's instructions for proper instrument-maintenance procedures.

**TABLE 6-2**  
Calibration Specifications

Instrument	Gas	Span	Reading	Method
PID: MiniRAE, 10.6 eV bulb	100 ppm isobutylene	CF=53	53 ppm +5 ppm	1.5 lpm REG T-Tubing

## 6.2 Air Sampling

Sampling may be required by other OSHA regulations where there may be exposure to certain contaminants. Air sampling typically is required when site contaminants include lead, cadmium, arsenic, asbestos, and certain volatile organic compounds. Contact the HSM immediately if these contaminants are encountered.

### 6.2.1 Method Description

Real time air monitoring will be performed. Contact HSM if assistance is required.

### 6.2.2 Personnel and Areas

Results must be sent immediately to the HSM. Regulations may require reporting to monitored personnel. Results reported to: HSM: Robert Nash/ATL.

# 7.0 Decontamination

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Reference CH2M HILL SOP HS-13, Decontamination

The SHSS must monitor the effectiveness of the decontamination procedures. Decontamination procedures found to be ineffective will be modified by the SHSS.

## 7.1 Decontamination Specifications

Decontamination specifications are listed in Table 7-1.

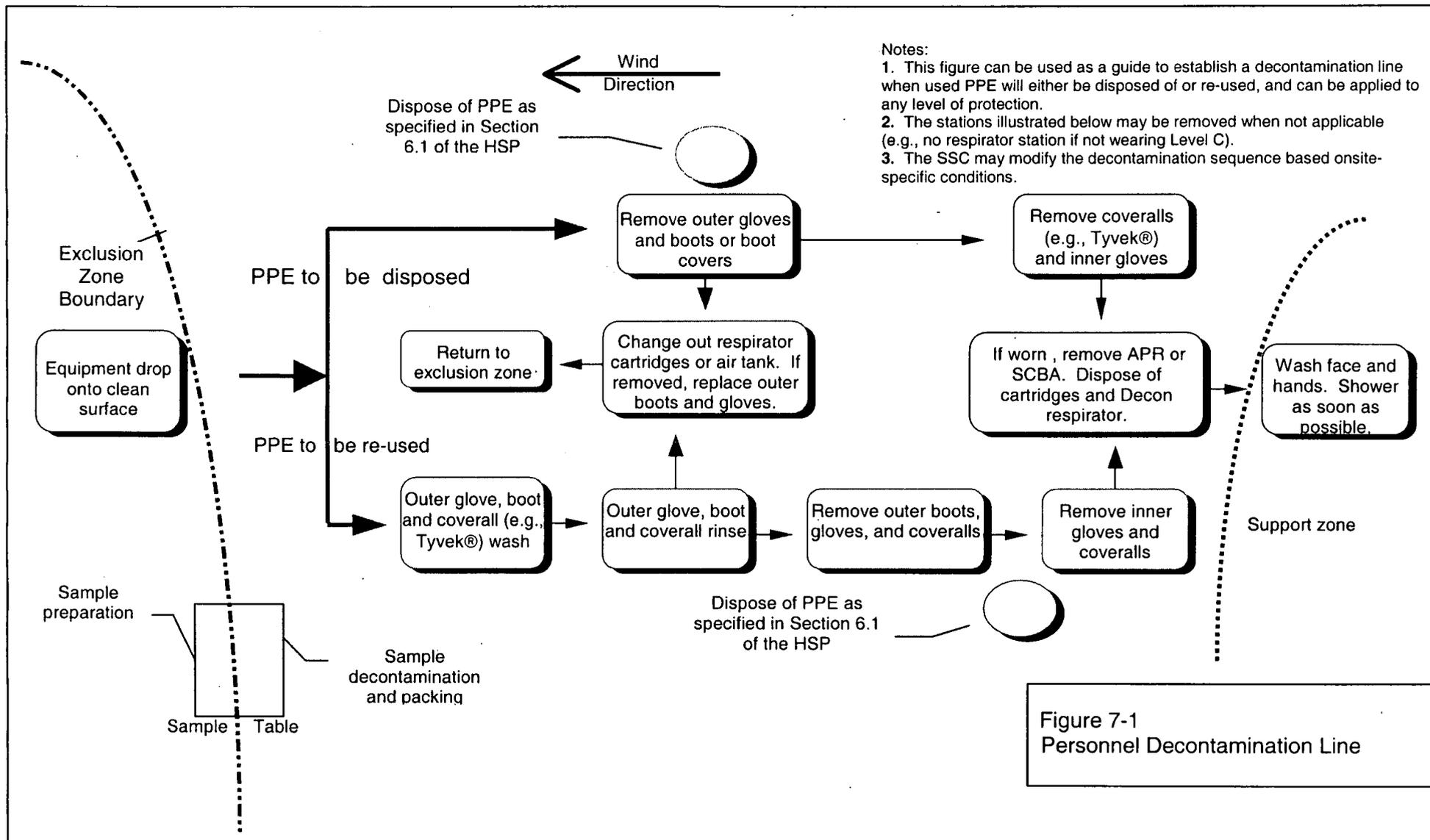
TABLE 7-1  
Decontamination Specifications

Personnel	Sample Equipment	Heavy Equipment
<ul style="list-style-type: none"><li>• Boot wash/rinse</li><li>• Glove wash/rinse</li><li>• Body-suit removal</li><li>• Hand wash/rinse</li><li>• Face wash/rinse</li><li>• Shower ASAP</li><li>• <b>PPE-disposal method</b> Dispose in drums</li><li>• <b>Water-disposal method</b> Dispose in drums</li></ul>	<ul style="list-style-type: none"><li>• Wash/rinse equipment</li><li>• Solvent-rinse equipment</li><li>• <b>Solvent-disposal method:</b> Dispose in drums</li></ul>	<ul style="list-style-type: none"><li>• Power wash</li><li>• Steam clean</li><li>• <b>Water-disposal method</b> Dispose in drums</li></ul>

## 7.2 Diagram of Personnel-Decontamination Line

No eating, drinking, or smoking is permitted in contaminated areas and in exclusion or decontamination zones. The SHSS should establish areas for eating, drinking, and smoking. Contact lenses are not permitted in exclusion or decontamination zones.

Figure 7-1 illustrates a typical establishment of work zones, including the decontamination line. Work zones are to be modified by the SHSS to accommodate task-specific requirements.



## 8.0 Spill Prevention and Control Plan

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This Spill Prevention and Control Plan establishes minimum site requirements. Subcontractors are responsible for spill prevention and control related to their operations. Subcontractors written spill prevention and control procedures must be consistent with this plan. All spills must be reported to your supervisor, the site manager, and the Contract Manager.

### 8.1 Spill Prevention

All fuel and chemical storage areas will be properly protected from onsite and offsite vehicle traffic. Fuel storage tanks must be equipped with secondary containment. Fuel tanks must be inspected daily for signs of leaks. Accumulated water must be inspected for signs of product before discharge.

Incidental chemical products must be properly stored, transferred, and used in a safe manner. Should chemical product use occur outside areas equipped with spill control materials, adequate spill control materials must be maintained.

### 8.2 Spill Containment and Control

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

- Immediately warn any nearby personnel and notify the work supervisor.
- Assess the spill area to ensure that it is safe to approach.
- Activate site evacuation signal if spill presents an emergency.
- Ensure any nearby ignition sources are immediately eliminated.
- If it can be done safely, stop the source of the spill.
- Establish site control for the spill area.
- Use proper PPE in responding to the spill.
- Contain and control spilled material through the use of sorbent booms, pads, or other materials.

### 8.3 Spill Cleanup and Removal

All spilled material, contaminated sorbent, and contaminated media will be cleaned up and removed as soon as possible. Contaminated spill material will be drummed, labeled, and properly stored until material is disposed of. Contaminated material will be disposed of according to applicable federal, state, and local requirements. Contact the regulatory compliance person for the project or the program for assistance.

## 9.0 Confined-Space Entry

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*Reference CH2M HILL SOP HS-17, Confined Space Entry*

Confined-space entry requires health and safety procedures, training, and a permit. Activities to remove oil/water separators may require confined space entry.

When planned activities include confined-space entry, permit-required confined spaces accessible to CCI personnel are to be identified before the task begins. The SHSS will confirm that permit spaces are properly posted or that employees are informed of their locations and informed of their hazards.

# 10.0 Site control Plan

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## 10.1 Site control Procedures

The following site control procedures will be implemented for this CTO:

- The SHSS will conduct a site safety briefing (see below) before starting field activities or as tasks and site conditions change.
- Topics for briefing onsite safety: general discussion of health and safety plan, site-specific hazards, locations of work zones, PPE requirements, equipment, special procedures, emergencies.
- SHSS records attendance at safety briefings in logbook and documents topics discussed.
- Post the OSHA job-site poster in a central and conspicuous location at sites where project field offices, trailers, or equipment storage boxes are established. Posters can be obtained by calling either 800/548-4776 or 800/999-9111.
- Field Trailers: Post "Exit" signs above exit doors, and post "Fire Extinguisher" signs above locations of extinguishers. Keep areas near exits and extinguishers clear.
- Determine wind direction.
- Establish work zones: support, decontamination, and exclusion zones. Delineate work zones with flags or cones as appropriate. The support zone (SZ) should be upwind of the site.
- Establish decontamination procedures, including respirator-decontamination procedures, and test the procedures.
- Use access control at the entry and exit from each work zone.
- Store chemicals in appropriate containers.
- Make MSDSs available for onsite chemicals to which employees are exposed.
- 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.
- Establish and maintain the "buddy system."
- Establish procedures for disposing of material generated on the site.
- Initial air monitoring is conducted by the SHSS in appropriate level of protection.

- The SHSS is to conduct periodic inspections of work practices to determine the effectiveness of this plan -- refer to CH2M HILL SOP 18, *Health and Safety Checklist*. Deficiencies are to be noted, reported to the HSM, and corrected.

## 10.2 HAZWOPER Compliance Plan

*Reference CH2M HILL SOP HS-17, Health and Safety Plans*

The following procedures are to be followed when certain activities do not require 24- or 40-hour training. Note that prior approval from the HSM is required before these tasks are conducted on regulated hazardous waste sites.

- Certain parts of the site work may be covered by state or federal HAZWOPER standards and therefore require training and medical monitoring. Anticipated tasks must be included in Section 2.2.1.
- Air sampling must confirm that there is no exposure to gases or vapors before non-HAZWOPER-trained personnel are allowed on the site. Other data (e.g., soil) also must document that there is no potential for exposure. The HSM must approve the interpretation of these data. Refer to Sections 3.8 and 6.2 for contaminant data and air sampling requirements, respectively.
- Non-HAZWOPER-trained personnel must be informed of the nature of the existing contamination and its locations, the limits of their access, and the emergency action plan for the site. Non-HAZWOPER-trained personnel also must be trained in accordance with all other state and federal OSHA requirements, including 29 CFR 1910.1200 (HAZCOM). Refer to Section 3.7.1 for hazard communication requirements.
- 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 volatile contaminants. Non-HAZWOPER-trained personnel should be monitored whenever the belief is that there may be a possibility of exposure (e.g., change in site conditions), or at some reasonable frequency to confirm that there is no exposure. Refer to Section 6.1 for air monitoring requirements.
- Treatment system start-ups: Once a treatment system begins to pump and treat contaminated media, the site is, for the purposes of applying the HAZWOPER standard, considered a treatment, storage, and disposal facility (TSDF). Therefore, once the system begins operation, only HAZWOPER-trained personnel (minimum of 24 hours of training) will be permitted to enter the site. All non-HAZWOPER-trained personnel must leave the site.

If HAZWOPER-regulated tasks are conducted concurrently with nonregulated tasks, non-HAZWOPER-trained subcontractors must be removed from areas of exposure. If non-HAZWOPER-trained personnel remain on the site while a HAZWOPER-regulated task is conducted, the contaminant/exposure area (exclusion zone) must be posted, non-HAZWOPER-trained personnel must be reminded of the locations of restricted areas and the limits of their access, and real-time monitoring must be conducted. Non-HAZWOPER-trained personnel at risk of exposure 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.

# 11.0 Emergency Response Plan

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*Reference CH2M HILL SOP HS-12, Emergency Response*

## 11.1 Pre-Emergency Planning

The SHSS performs the applicable pre-emergency planning tasks before starting field activities and coordinates emergency response with the facility and local emergency-service providers as appropriate.

- Review the facility emergency and contingency plans where applicable.
- Locate the nearest telephone; determine what onsite communication equipment is available (e.g., two-way radio, air horn).
- Identify and communicate chemical, safety, radiological, and biological hazards.
- Confirm and post emergency telephone numbers, evacuation routes, assembly areas, and route to hospital; communicate the information to onsite personnel.
- Post site map marked with locations of emergency equipment and supplies, and post Occupational Safety and Health Administration (OSHA) job-site poster. The OSHA job-site poster is required at sites where project field offices, trailers, or equipment-storage boxes are established. Posters can be obtained by calling either 800/548-4776 or 800/999-9111.
- Field Trailers: Post "Exit" signs above exit doors, and post "Fire Extinguisher" signs above locations of extinguishers. Keep areas near exits and extinguishers clear.
- Review changed site conditions, onsite operations, and personnel availability in relation to emergency response procedures.
- Evaluate capabilities of local response teams where applicable.
- 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; 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, chemical and vapor releases.
- Review notification procedures for contacting CCI's medical consultant and team member's occupational physician.
- Rehearse the emergency response plan once before site activities begin, including driving the route to the hospital.

- Brief new workers on the emergency response plan.
- The SHSS will evaluate emergency response actions and initiate appropriate follow-up actions.

## 11.2 Emergency Equipment and Supplies

The SHSS should mark the locations of emergency equipment on the site map and should post the map. Emergency equipment and its location are listed in Table 11-1.

**TABLE 11-1**  
Emergency Equipment

Emergency Equipment and Supplies	Location
20 lb (or two 10-lb) fire extinguisher (A, B, and C classes)	In Field Vehicle
First aid kit	In Field Vehicle
Eye wash	In Field Vehicle
Potable water	In Field Vehicle
Bloodborne-pathogen kit	In Field Vehicle
Additional equipment (specify)	

## 11.3 Emergency Medical Treatment

Emergency medical treatment procedures are as follows:

- Notify appropriate emergency response authorities listed in Sections 12 and 13 (e.g., 911).
- During a time of no emergency, contact CCI's medical consultant for advice and guidance on medical treatment.
- The SHSS 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.
- Get medical attention immediately.
- Perform decontamination where feasible; lifesaving and first aid or medical treatment take priority.
- Notify the field team leader and the project manager of the injury.
- Make certain that the injured person is accompanied to the emergency room.
- Notify the health and safety manager.
- Notify the injured person's human resources department within 24 hours.

- Prepare an incident report - refer to CH2M HILL SOP 12, *Emergency Response and First Aid*. Submit the report to the corporate director of health and safety and the corporate human resources department within 48 hours.
- When contacting the medical consultant, state that you are calling about a CCI matter, and give your name, your 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.

## 11.4 Non-emergency Procedures

The procedures listed above may be applied to non-emergency incidents. Injuries and illnesses (including overexposure to contaminants) must be reported to Human Resources. If there is doubt about whether medical treatment is necessary, or if the injured person is reluctant to accept medical treatment, contact the CCI medical consultant.

When contacting the medical consultant, state that the situation is a CCI matter, and give your name, your 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. Follow these procedures as appropriate.

## 11.5 Incident Response

In fires, explosions, or chemical releases, actions to be taken include the following:

- Shut down CCI operations and evacuate the immediate work area.
- Account for personnel at the designated assembly area(s).
- Notify appropriate response personnel.
- Assess the need for site evacuation, and evacuate the site as warranted.

Instead of implementing a work-area evacuation, note that small fires or spills posing minimal safety or health hazards may be controlled.

## 11.6 Evacuation

Evacuation procedures are as follows:

- Evacuation routes will be designated by the SHSS before work begins.
- Onsite and offsite assembly points will be designated before work begins.
- Personnel will leave the exclusion zone and assemble at the onsite assembly point upon hearing the emergency signal for evacuation.
- Personnel will assemble at the offsite point upon hearing the emergency signal for a site evacuation.
- The SHSS and a "buddy" will remain on the site after the site has been evacuated (if possible) to assist local responders and advise them of the nature and location of the incident.
- The SHSS accounts for all personnel in the onsite assembly zone.

- A person designated by the SHSS before work begins will account for personnel at the offsite assembly area.
- The SHSS will write up the incident as soon as possible after it occurs and will submit a report to the corporate director of health and safety.

## 11.7 Evacuation Routes and Assembly Points

Evacuation routes and assembly areas (and alternative routes and assembly areas) are specified on the site map posted at the site.

## 11.8 Evacuation Signals

Evacuation signals are listed in Table 11-2.

**TABLE 11-2**  
Evacuation Signals

Signal	Meaning
Grasping throat with hand	Emergency—help me
Thumbs up	OK; understood
Grasping buddy's wrist	Leave area now
Continuous sounding of horn	Emergency; leave site now

## 11.9 Emergency Response Telephone Numbers

Emergency response telephone numbers are listed in Table 11-3.

**TABLE 11-3**  
Emergency Response Telephone Numbers

Site Address:	Phone: Cellular Phone:
<b>Police:</b> Fridley Police Department	<b>Phone:</b> 911 or 612/572-3629
<b>Fire:</b> Fridley Fire Department	<b>Phone:</b> 911 or 612/572-3613
<b>Ambulance:</b> Fridley Fire Department	<b>Phone:</b> 911 or 612/572-3613
<b>Hospital:</b> Unity Hospital	<b>Phone:</b> 612/780-7627
<b>Address:</b> 550 Osborne Road NE., Fridley, MN 55432	

\*When using a cellular phone outside the telephone's normal calling area, exercise caution in relying on the cellular phone to activate 911. When the caller is outside the normal calling area, the cellular service carrier should connect the caller with emergency services in the area where the call originated, but this may not occur. Telephone numbers of backup emergency services should be provided if a cellular phone is relied on to activate 911.

<b>Route to Hospital:</b>	From Main Gate, turn RIGHT on East River Road	1.5 miles
	Take the I-694 EAST Ramp	0.4 miles
	Merge onto I-694 East	0.2 miles
	Take the MN-47/University Ave. Exit	0.2 miles
	Keep LEFT at the Fork in the ramp	0.1 miles
	Turn LEFT onto University Ave NE/MN-47 North	2.7 miles
	Turn RIGHT onto Osborne Road NE	0.3 miles

Distance: 5.4 miles

Approximate travel time: 11 minutes

The hospital location map is provided in Figure 11-1.

## 11.10 Government Agencies Involved in Project

**Federal Agency and Contact Name:** Naval Facilities Engineering Command

Contact the project manager. Generally, the project manager will contact relevant government agencies.

## 11.11 Emergency Contacts

If an injury occurs, notify the injured person's personnel office as soon as possible after obtaining medical attention for the injured person. Notification **MUST** be made within 24 hours of the injury. Emergency contacts are listed in Table 11-4.

**TABLE 11-4**  
Emergency Contacts

<b>CCI Medical Consultant</b> Dr. Peter P Greany WorkCare Inc. 333 S. Anita Drive Orange, CA 92868 800/455-6155 (After-hours calls will be returned within 20 minutes.)	<b>Occupational Physician ( Local)</b>
<b>CCI Drug-Free Workplace Program Administrator</b> Alicia Sweeney/ATL 770/604-9095	<b>Site Safety and Health Specialist (SHSS)</b> TBD
<b>Navy RAC Health and Safety Manager (HSM)</b> Robert Nash/ATL 770/604-9095	<b>Project Manager</b> Venky Venkatesh/CLE 216/623-0326
<b>Radiation Health Manager (RHM)</b> Dave McCormack/SEA 206/453-5000	<b>Human Resources Manager</b> Nancy Orr /DEN 303/771-0925
<b>Client</b> Richard Stanley Naval Facilities Engineering Command	<b>Corporate Human Resources Department</b> Julie Zimmerman/COR 303/771-0900
<b>Federal Express Dangerous Goods Shipping</b> 800/238-5355 CH2M HILL Emergency Number for Shipping Dangerous Goods 800/255-3924	<b>Worker's Compensation and Auto Claims</b> Sterling Administrative Services 800/420-8926 After hours 800/497-4566 Report fatalities AND report vehicular accidents involving pedestrians, motorcycles, or more than two cars.

## 12.0 Approval

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This site-specific health and safety plan has been written for use by CCI only. CCI claims no responsibility for its use by others unless that use has been specified and defined in project or contract documents. The plan is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if those conditions change.

### 12.1 Original Plan

Written by:

Date:

Approved by: Robert Nash

Date: June, 2000

### 12.2 Revisions

Revisions Made by:

Date:

Revisions to Plan:

Revisions Approved by:

Date:

## 13.0 Distribution

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Distribution for this plan is listed in Table 13-1.

**TABLE 13-1**  
Distribution List

<b>Name</b>	<b>Office</b>	<b>Responsibility</b>	<b>Number of Copies</b>
Robert Nash	ATL	Health and Safety Manager/Approver	1
B. Venky Venkatesh	CLE	Project Manager	1
TBD		Site Superintendent/Field Team	
TBD		Site Safety and Health Specialist	1
Client	NA	Client Project Manager	

**Attachment 1**

**Employee Signoff**



**Attachment 2**

**Project Specific Chemical Product Hazard Communication Form**

## Project-Specific Chemical Product Hazard Communication Form

This form must be completed prior to performing activities that expose personnel to hazardous chemicals products. Upon completion of this form, the SSC shall verify that training is provided on the hazards associated with these chemicals and the control measures to be used to prevent exposure to CH2M HILL and subcontractor personnel. Labeling and MSDS systems will also be explained.

**Project Name:** NIROP

**Project Number:**

**MSDSs will be maintained  
at the following  
location(s):**

*Hazardous Chemical Products Inventory*

Chemical	Quantity	Location	MSDS Available	Container labels	
				Identity	Hazard
Isobutylene	1 liter, compressed	Support Zone			
Methanol	< 1 Gallon	Support/Decon Zones			
Hexane	< 1 Gallon	Support/Decon Zones			
Alconox/Liquinox	< 1liter	Support/Decon Zones			

Refer to SOP HS-05 *Hazard Communication* for more detailed information.

**Attachment 3**

**Chemical-Specific Training Form**

## CCI CHEMICAL-SPECIFIC TRAINING FORM

Location: NIROP	Project # :
SSHS:	Trainer:

### TRAINING PARTICIPANTS:

NAME	SIGNATURE	NAME	SIGNATURE

### REGULATED PRODUCTS/TASKS COVERED BY THIS TRAINING:


The HCC shall 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 shall 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 CH2M HILL's written hazard communication program shall be made available for employee review in the facility/project hazard communication file.

**Attachment 4**

**Material Safety Data Sheets**

# Alconox®

## MATERIAL SAFETY DATA SHEET

Alconox, Inc.  
9 East 40th Street, Suite 200  
New York, NY 10016

### I. IDENTIFICATION

Product Name (as appears on label)	ALCONOX
CAS Registry Number:	Not Applicable
Effective Date:	January 1, 1998
Chemical Family:	Anionic Powdered Detergent

### II. HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

There are no hazardous ingredients in ALCONOX as defined by the OSHA Standard and Hazardous Substance List 29 CFR 1910 Subpart Z.

### III. PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point (F):	Not Applicable
Vapor Pressure (mm Hg):	Not Applicable
Vapor Density (AIR=1):	Not Applicable
Specific Gravity (Water=1):	Not Applicable
Melting Point:	Not Applicable
Evaporation Rate (Butyl Acetate=1):	Not Applicable
Solubility in Water:	Appreciable-Soluble to 10% at ambient conditions
Appearance:	White powder interspersed with cream colored flakes.

### IV. FIRE AND EXPLOSION DATA

Flash Point (Method Used):	None
Flammable Limits:	LEL: No Data UEL: No Data
Extinguishing Media:	Water, dry chemical, CO <sub>2</sub> , foam
Special Firefighting Procedures:	Self-contained positive pressure breathing apparatus and protective clothing should be worn when fighting fires involving chemicals.
Unusual Fire and Explosion Hazards:	None

### V. REACTIVITY DATA

Stability:	Stable
Hazardous Polymerization:	Will not occur
Incompatibility (Materials to Avoid):	None
Hazardous Decomposition or Byproducts:	May release CO <sub>2</sub> on burning

#### VI. HEALTH HAZARD DATA

Route(s) of Entry:	Inhalation? Yes Skin? No Ingestion? Yes
Health Hazards (Acute and Chronic):	Inhalation of powder may prove locally irritating to mucous membranes. Ingestion may cause discomfort and/or diarrhea. Eye contact may prove irritating.
Carcinogenicity:	NTP? No IARC Monographs? No OSHA Regulated? No
Signs and Symptoms of Exposure:	Exposure may irritate mucous membranes. May cause sneezing.
Medical Conditions Generally Aggravated by Exposure:	Not established. Unnecessary exposure to this product or any industrial chemical should be avoided. Respiratory conditions may be aggravated by powder.
Emergency and First Aid Procedures:	Eyes: Immediately flush eyes with water for at least 15 minutes. Call a physician. Skin: Flush with plenty of water. Ingestion: Drink large quantities of water or milk. Do not induce vomiting. If vomiting occurs readminister fluids. See a physician for discomfort.

#### VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken if Material is Released or Spilled:	Material foams profusely. Recover as much as possible and flush remainder to sewer. Material is biodegradable.
Waste Disposal Method:	Small quantities may be disposed of in sewer. Large quantities should be disposed of in accordance with local ordinances for detergent products.
Precautions to be Taken in Storing and Handling:	Material should be stored in a dry area to prevent caking.
Other Precautions:	No special requirements other than the good industrial hygiene and safety practices employed with any industrial chemical.

### VIII. CONTROL MEASURES

Respiratory Protection (Specify Type):	Dust mask - Recommended
Ventilation:	Local Exhaust-Normal Special-Not Required Mechanical-Not Required Other-Not Required
Protective Gloves:	Impervious gloves are useful but not required.
Eye Protection:	Goggles are recommended when handling solutions.
Other Protective Clothing or Equipment:	None
Work/Hygienic Practices:	No special practices required

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THE INFORMATION HEREIN IS GIVEN IN GOOD FAITH BUT NO WARRANTY IS EXPRESSED OR IMPLIED.

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SCOTT SPECIALTY GASES -- ISOBUTYLENE IN AIR - CALIBRATION GAS CYL  
MATERIAL SAFETY DATA SHEET  
NSN: 6665012148247  
Manufacturer's CAGE: 51847  
Part No. Indicator: A  
Part Number/Trade Name: ISOBUTYLENE IN AIR

=====  
General Information  
=====

Item Name: CALIBRATION GAS CYL  
Company's Name: SCOTT SPECIALTY GASES  
Company's Street: ROUTE 611 NORTH  
Company's City: PLUMSTEADVILLE  
Company's State: PA  
Company's Country: US  
Company's Zip Code: 18949  
Company's Emerg Ph #: 215-766-8861; 908-754-7700  
Company's Info Ph #: 215-766-8861  
Record No. For Safety Entry: 003  
Tot Safety Entries This Stk#: 005  
Status: SMJ  
Date MSDS Prepared: 23APR92  
Safety Data Review Date: 27SEP94  
MSDS Serial Number: BVRGC  
Hazard Characteristic Code: G3

=====  
Ingredients/Identity Information  
=====

Proprietary: NO  
Ingredient: PROPENE, 2-METHYL-; (ISOBUTYLENE)  
Ingredient Sequence Number: 01  
NIOSH (RTECS) Number: UD0890000  
CAS Number: 115-11-7  
OSHA PEL: N/K (FP N)  
ACGIH TLV: N/K (FP N)

-----  
Proprietary: NO  
Ingredient: AIR, REFRIGERATED LIQUID; AIR COMPRESSED (UN1002, DOT); AIR  
REFRIGERATED LIQUID (CRYOGENIC LIQUID) (UN1003) (DOT)  
Ingredient Sequence Number: 02  
NIOSH (RTECS) Number: AX5271000  
OSHA PEL: N/K (FP N)  
ACGIH TLV: N/K (FP N)

=====  
Physical/Chemical Characteristics  
=====

Appearance And Odor: COLORLESS GAS W/POSSIBLE SLIGHT OLEFINIC ODOR.  
Boiling Point: -318F, -194C  
Vapor Pressure (MM Hg/70 F): N/A  
Vapor Density (Air=1): 1.2  
Specific Gravity: 0.88 (H\*20=1)  
Evaporation Rate And Ref: NOT APPLICABLE  
Solubility In Water: INSOLUBLE  
Percent Volatiles By Volume: 100

=====  
Fire and Explosion Hazard Data  
=====

Flash Point: NONFLAMMABLE  
Lower Explosive Limit: N/A  
Upper Explosive Limit: N/A  
Extinguishing Media: USE WHAT IS APPROPRIATE FOR SURROUNDING FIRE.  
Special Fire Fighting Proc: USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT (FP N). USE WATER SPRAY TO KEEP FIRE EXPOSED CYLINDERS COOL.  
Unusual Fire And Expl Hazrds: COMPRESSED AIR AT HIGH PRESSURES WILL ACCELERATE THE BURNING OF FLAMMABLE MATERIALS.

=====  
Reactivity Data  
=====

Stability: YES  
Cond To Avoid (Stability): NONE SPECIFIED BY MANUFACTURER.  
Materials To Avoid: NONE.  
Hazardous Decomp Products: NONE.  
Hazardous Poly Occur: NO  
Conditions To Avoid (Poly): NOT RELEVANT

=====  
Health Hazard Data  
=====

LD50-LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.  
Route Of Entry - Inhalation: YES  
Route Of Entry - Skin: NO  
Route Of Entry - Ingestion: NO  
Health Haz Acute And Chronic: ACUTE:CONCENTRATION OF ISOBUTYLENE IS THIS MIXTURE SHOULD NOT PRESENT ANY SYMPTOMS OF TOXICITY. CHRONIC:NONE.  
Carcinogenicity - NTP: NO  
Carcinogenicity - IARC: NO  
Carcinogenicity - OSHA: NO  
Explanation Carcinogenicity: NOT RELEVANT  
Signs/Symptoms Of Overexp: NONE SPECIFIED BY MANUFACTURER.  
Med Cond Aggravated By Exp: NONE.  
IMMEDIATELY FLUSH W/POTABLE WATER FOR A MINIMUM OF 15 MINUTES, SEEK ASSISTANCE FROM MD (FP N). SKIN:FLUSH W/COPIOUS AMOUNTS OF WATER. CALL MD (FP N). INHAL:IMMEDIATELY REMOVE VICTIM TO FRESH AIR. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

=====  
Precautions for Safe Handling and Use  
=====

Steps If Matl Released/Spill: EVACUATE & VENTILATE AREA. REMOVE LEAKING CYLINDER TO EXHAUST HOOD OR SAFE OUTDOORS AREA IF THIS CAN BE DONE SAFELY.  
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.  
Waste Disposal Method: DISPOSAL MUST BE I/A/W FEDERAL, STATE & LOCAL REGULATIONS (FP N). RETURN CYLS TO SUPPLIER FOR PROPER DISP W/ANY VALVE OUTLET PLUGS/CAPS SECURED & VALVE PROT CAP IN PLACE. ALLOW GAS TO DISCHARGE AT SLOW RATE TO ATM IN UNCONFINED AREA/EXHST HOOD.  
Precautions-Handling/Storing: STORE IN WELL VENTILATED AREAS ONLY. KEEP VALVE PROT CAP ON CYLS WHEN NOT IN USE & SECURE CYL WHEN USING TO PROT FROM FALLING.  
Other Precautions: USE SUITABLE HAND TRUCK TO MOVE CYLS. PROT CYLS FROM PHYSICAL DMG. DO NOT DEFACE CYLS/LBLS. MOVE CYL W/ADEQ HAND TRUCK. CYL SHOULD BE REFILLED BY QUALIFIED PRODUCERS OF COMPRESSED GAS. SHIPMENT OF COMPRESSED GAS CYL WHICH HAS NOT (SUPDAT)

=====  
Control Measures  
=====

Respiratory Protection: USE NIOSH/MSHA APPROVED SCBA IN CASE OF EMERGENCY OR NON-ROUTINE USE.

Ventilation: PROVIDE ADEQUATE GENERAL & LOCAL EXHAUST VENTILATION.

Protective Gloves: RUBBER GLOVES.

Eye Protection: ANSI APPROVED CHEM WORKERS GOGGS (FP N).

Other Protective Equipment: WEAR SAFETY SHOES. A SAFETY SHOWER & EYEWASH STATION SHOULD BE READILY AVAILABLE.

Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.

Suppl. Safety & Health Data: OTHER PREC:BEEN FILLED BY OWNER OR WITH HIS WRITTEN CONSENT IS A VIOLATION OF FEDERAL LAW (49 CFR).

=====  
Transportation Data  
=====

Trans Data Review Date: 94269  
=====

=====  
Disposal Data  
=====

=====  
Label Data  
=====

Label Required: YES

Technical Review Date: 27SEP94

Label Date: 26SEP94

Label Status: G

Common Name: ISOBUTYLENE IN AIR

Chronic Hazard: NO

Signal Word: NONE

Acute Health Hazard-None: X

Contact Hazard-None: X

Fire Hazard-None: X

Reactivity Hazard-None: X

Special Hazard Precautions: ACUTE:CONCENTRATION OF ISOBUTYLENE IS THIS MIXTURE SHOULD NOT PRESENT ANY SYMPTOMS OF TOXICITY. CHRONIC:NONE LISTED BY MANUFACTURER.

Protect Eye: Y

Protect Skin: Y

Protect Respiratory: Y

Label Name: SCOTT SPECIALTY GASES

Label Street: ROUTE 611 NORTH

Label City: PLUMSTEADVILLE

Label State: PA

Label Zip Code: 18949

Label Country: US

Label Emergency Number: 215-766-8861; 908-754-7700

ALDRICH CHEMICAL SUB OF SIGMA-ALDRICH -- 65550 METHANOL  
MATERIAL SAFETY DATA SHEET  
NSN: 681000F030311  
Manufacturer's CAGE: 60928  
Part No. Indicator: A  
Part Number/Trade Name: 65550 METHANOL

=====  
General Information  
=====

Company's Name: ALDRICH CHEMICAL CO SUB OF SIGMA-ALDRICH  
Company's Street: 1001 W ST PAUL AVE  
Company's P. O. Box: 355  
Company's City: MILWAUKEE  
Company's State: WI  
Company's Country: US  
Company's Zip Code: 53233  
Company's Emerg Ph #: 800-325-5832-S/800-231-8327-A  
Company's Info Ph #: 800-325-5832-S/800-231-8327-A  
Record No. For Safety Entry: 001  
Tot Safety Entries This Stk#: 001  
Status: SE  
Date MSDS Prepared: 01APR92  
Safety Data Review Date: 30SEP93  
Preparer's Company: ALDRICH CHEMICAL CO SUB OF SIGMA-ALDRICH  
Preparer's St Or P. O. Box: 1001 W ST PAUL AVE  
Preparer's City: MILWAUKEE  
Preparer's State: WI  
Preparer's Zip Code: 53233  
MSDS Serial Number: BRXZV

=====  
Ingredients/Identity Information  
=====

Proprietary: NO  
Ingredient: METHANOL (METHYL ALCOHOL), COLUMBIAN SPIRITS  
Ingredient Sequence Number: 01  
NIOSH (RTECS) Number: PC1400000  
CAS Number: 67-56-1  
OSHA PEL: S,200PPM/250STEL  
ACGIH TLV: S,200PPM/250STEL; 93  
Other Recommended Limit: 200 PPM

=====  
Physical/Chemical Characteristics  
=====

Appearance And Odor: COLORLESS LIQUID  
Boiling Point: 64.6C  
Melting Point: -98C  
Vapor Pressure (MM Hg/70 F): 97.68  
Vapor Density (Air=1): 1.1  
Specific Gravity: 0.791

=====  
Fire and Explosion Hazard Data  
=====

Flash Point: 52F  
Lower Explosive Limit: 6%  
Upper Explosive Limit: 36%  
Extinguishing Media: CO2, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.  
Special Fire Fighting Proc: WEAR SELF-CONTAINED BREATHING APPARATUS & FULL

PROTECTIVE CLOTHING.

Unusual Fire And Expl Hazrds: VAPOR MAY TRAVEL CONSIDERABLE DISTANCE TO 725F.

=====  
Reactivity Data  
=====

Stability: YES

Cond To Avoid (Stability): HEAT, SPARKS, OPEN FLAME OR OTHER SOURCES OF IGNITION.

Materials To Avoid: ACIDS, ACID CHLORIDES, ACID ANHYDRIDES, OXIDIZING/REDUCING AGENTS, ALKALI METALS.

Hazardous Decomp Products: CO, CO2

Hazardous Poly Occur: NO  
=====

Health Hazard Data  
=====

LD50-LC50 Mixture: ORAL LD50 (RAT): 5628 MG/KG

Route Of Entry - Inhalation: YES

Route Of Entry - Skin: YES

Route Of Entry - Ingestion: YES

Health Haz Acute And Chronic: MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. VAPOR OR MIST IS IRRITATING TO THEY EYES, MUCOUS MEMBRANES, SKIN, & UPPER RESPIRATORY TRACT. CAN CAUSE DAMAGE TO THE EYES, LIVER, HEART, KIDNEYS. GASTROINTESTINAL DISTURBANCES & CONVULSIONS. MAY CAUSE BLINDNESS IF INGESTED.

Carcinogenicity - NTP: NO

Carcinogenicity - IARC: NO

Carcinogenicity - OSHA: NO

Explanation Carcinogenicity: NONE

Signs/Symptoms Of Overexp: OPTIC NERVE NEUROPATHY, VISUAL FIELD CHANGES, HEADACHE, DYSPNEA, NAUSEA, VOMITING.

Med Cond Aggravated By Exp: CUTS, SCRATCHES

Emergency/First Aid Proc: EYES/SKIN: FLUSH W/PLENTY OF WATER FOR AT LEAST 15 MINS WHILE REMOVING CONTAMINATED CLOTHING & SHOES. INHALATION: REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHIG IS DIFFICULT, GIVE OXYGEN. INGESTION: WASH OUT MOUTH W/WATER PROVIDED PERSON IS CONSCIOUS. DISCARD CONTAMINATED CLOTHING & SHOES. OBTAIN MEDICAL ATTENTION IN ALL CASES.  
=====

Precautions for Safe Handling and Use  
=====

Steps If Matl Released/Spill: EVACUATE AREA. SHUT OFF ALL IGNITION SOURCES. USE PROTECTIVE EQUIP. COVER W/DRY-LIME, SAND OR SODA ASH. PLACE IN COVERED CONTAIERS USING NON-SPARKING TOOLS & TRANSPORT OUTDOORS. VENTILATE AREA & WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

Neutralizing Agent: DRY LIME, SAND OR SODA ASH

Waste Disposal Method: BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCRUBBER BUT EXERT EXTRA CARE IN IGNITING AS THIS MATERIAL IS HIGHLY FLAMMABLE. OBSERVE ALL FEDERAL, STATE & LOCAL LAWS. UN1230.

Precautions-Handling/Storing: KEEP TIGHTLY CLOSED & AWAY FROM HEAT, SPARKS & OPEN FLAME. PRODUCT IS HYGROSCOPIC. STORE IN A COOL DRY PLACE. NO SMOKING. CANNOT BE MADE NON-POISONOUS

Other Precautions: AVOID CONTACT W/EYES, SKIN, CLOTHING & BREATHING OF VAPORS. DON'T USE IF SKIN IS CUT OR SCRATCHED.  
=====

Control Measures  
=====

Respiratory Protection: WEAR AN APPROPRIATE NIOSH/MSHA APPROVED  
RESPIRATOR.  
Ventilation: MECHANICAL EXHAUST  
Protective Gloves: CHEMICAL RESISTANT  
Eye Protection: SAFETY GOGGLES  
Other Protective Equipment: RUBBER BOOTS, SAFETY SHOWER, EYE BATH  
Work Hygienic Practices: WASH THOROUGHLY AFTER HANDLING.

=====  
Transportation Data  
=====

=====  
Disposal Data  
=====

=====  
Label Data  
=====

Label Required: YES  
Technical Review Date: 30SEP93  
Label Date: 17SEP93  
Label Status: F  
Common Name: 65550 METHANOL  
Chronic Hazard: YES  
Signal Word: DANGER!  
Acute Health Hazard-Severe: X  
Contact Hazard-Severe: X  
Fire Hazard-Severe: X  
Reactivity Hazard-Slight: X  
Special Hazard Precautions: MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED  
OR ABSORBED THROUGH SKIN. VAPOR OR MIST IS IRRITATING TO THE EYES,  
MUCOUS MEMBRANES, SKIN, & UPPER RESPIRATORY TRACT. CAN CAUSE DAMAGE TO THE EYES,  
LIVER, HEART, KIDNEYS. GASTROINTESTINAL DISTURBANCES & CONVULSIONS. MAY  
CAUSE BLINDNESS IF INGESTED. TARGET ORGANS: EYES, SKIN, LIVER, HEART,  
KIDNEYS, RESPIRATORY & DIGESTIVE TRACTS. DIGESTIVE TRACTS, LIVER.  
Protect Eye: Y  
Protect Skin: Y  
Protect Respiratory: Y  
Label Name: ALDRICH CHEMICAL CO SUB OF SIGMA-ALDRICH  
Label Street: 1001 W ST PAUL AVE  
Label P.O. Box: 355  
Label City: MILWAUKEE  
Label State: WI  
Label Zip Code: 53233  
Label Country: US  
Label Emergency Number: 800-325-5832-S/800-231-8327-A  
Year Procured: UNK

ALDRICH CHEMICAL -- HEXANE ACS GRADE - N-HEXANE  
MATERIAL SAFETY DATA SHEET  
NSN: 681000N040300  
Manufacturer's CAGE: 60928  
Part No. Indicator: A  
Part Number/Trade Name: HEXANE ACS GRADE

=====  
General Information  
=====

Item Name: N-HEXANE  
Company's Name: ALDRICH CHEMICAL CO  
Company's P. O. Box: 355  
Company's City: MILWAUKEE  
Company's State: WI  
Company's Country: US  
Company's Zip Code: 53201  
Company's Emerg Ph #: 414-273-3850  
Company's Info Ph #: 414-273-3850  
Record No. For Safety Entry: 001  
Tot Safety Entries This Stk#: 001  
Status: SMJ  
Date MSDS Prepared: 04AUG92  
Safety Data Review Date: 03MAR93  
MSDS Serial Number: BRZJT  
Hazard Characteristic Code: NK

=====  
Ingredients/Identity Information  
=====

Proprietary: NO  
Ingredient: HEXANE  
Ingredient Sequence Number: 01  
NIOSH (RTECS) Number: MN9275000  
CAS Number: 110-54-3  
OSHA PEL: 500 PPM  
ACGIH TLV: 50 PPM; 9293

=====  
Physical/Chemical Characteristics  
=====

Appearance And Odor: COLORLESS LIQUID  
Boiling Point: 154F,68C  
Vapor Pressure (MM Hg/70 F): 132@20C  
Vapor Density (Air=1): 3  
Specific Gravity: 0.661

=====  
Fire and Explosion Hazard Data  
=====

Flash Point: -10F,-23C  
Lower Explosive Limit: 1.2%  
Upper Explosive Limit: 7.7%  
Extinguishing Media: CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.  
Special Fire Fighting Proc: WEAR NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT (FP N). USE WATER SPRAY TO COOL FIRE-EXPOSED CONTAINERS.  
Unusual Fire And Expl Hazrds: VAPOR MAY TRAVEL CONSIDERABLE DISTANCE TO SOURCE OF IGNITION AND FLASH BACK. CONTAINER EXPLOSION MAY OCCUR UNDER FIRE CONDITIONS. EXTREMELY FLAMMABLE.

=====  
Reactivity Data  
=====

Stability: YES  
Cond To Avoid (Stability): HEAT, SPARKS AND OPEN FLAME.  
Materials To Avoid: OXIDIZING AGENTS. CHLORINE, FLUORINE, MAGNESIUM  
PERCHLORATGE.  
Hazardous Decomp Products: TOXIC FUMES OF: CARBON MONOXIDE, CARBON  
DIOXIDE.  
Hazardous Poly Occur: NO  
Conditions To Avoid (Poly): NOT RELEVANT  
=====

=====  
Health Hazard Data  
=====

LD50-LC50 Mixture: LD50: (ORAL, RAT) 28710 MG/KG  
Route Of Entry - Inhalation: YES  
Route Of Entry - Skin: YES  
Route Of Entry - Ingestion: YES  
Health Haz Acute And Chronic: ACUTE: HARMFUL IF SWALLOWED, INHALED, OR  
ABSORBED THRU SKIN. VAPOR OR MIST IS IRRITATING TO EYES, MUCOUS MEMBRANES  
AND UPPER RESPIRATORY TRACT. CAUSES SKIN IRRITATION. MAY CAUSE NERVOUS  
SYSTEM DISTURBANCES. EXPOSURE CAN CAUSE: COUGHING, CHEST PAINS, DIFFICULTY  
IN BREATHING. LUNG IRRIT, CHEST PAIN (EFTS OF OVEREXP)  
Carcinogenicity - NTP: NO  
Carcinogenicity - IARC: NO  
Carcinogenicity - OSHA: NO  
Explanation Carcinogenicity: NOT RELEVANT  
Signs/Symptoms Of Overexp: HLTH HAZ: & EDEMA WHICH MAY BE FATAL. GI  
DISTURBANCES, NAUSEA, HEADACHE AND VOMITING.  
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.  
Emergency/First Aid Proc: EYES: IMMEDIATELY FLUSH W/COPIOUS AMTS OF WATER FOR @  
LST 15 MIN & SEEK MED ADVICE. SKIN: IMMEDIATELY FLUSH W/COPIOUS AMTS OF WATER FOR  
@ LST 15 MIN WHILE REMOVING CONTAMD CLTHG & SHOES. WASH CONTAMD CLTHG  
BEFORE REUSE. INHAL: REMOVE TO FRESH AIR. IF NOT BRTHG GIVE ARTF RESP. IF  
BREATHING IS DIFFICULT, GIVE OXYGEN. INGEST: WASH OUT MOUTH W/ WATER  
PROVIDED PERSON IS CONSCIOUS. CALL A PHYSICIAN.  
=====

=====  
Precautions for Safe Handling and Use  
=====

Steps If Matl Released/Spill: EVAC AREA. SHUT OFF ALL SOURCES OF IGNIT.  
WEAR NIOSH/MSHA APPRVD SCBA, RUBB BOOTS & HEAVY RUBB GLOVES. COVER W/AN  
ACTIVATED CARBON ABSORB, TAKE UP & PLACE IN CLSD CONTRS. TRANSPORT  
OUTDOORS. VENT AREA & WASH SPILL SITE AFTER MATL PICKUP IS COMPLETE.  
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.  
Waste Disposal Method: BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN  
AFTERBURNER AND SCRUBBER BUT EXERT EXTRA CARE IN IGNITING AS THIS MATERIAL  
IS HIGHLY FLAMMABLE. OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL  
REGULATIONS.  
Precautions-Handling/Storing: KEEP TIGHTLY CLSD. STORE IN A COOL DRY  
PLACE. DO NOT BREATHE VAP. AVOID CONT W/EYES/SKIN/CLTHG. IRRITANT. HARMFUL  
VAP. NEUROLOGICAL HAZARD.  
Other Precautions: KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAME.  
=====

=====  
Control Measures  
=====

Respiratory Protection: WEAR APPROPRIATE NIOSH/MSHA APPROVED RESPIRATOR.  
Ventilation: USE ONLY IN A CHEMICAL FUME HOOD.

Protective Gloves: CHEMICAL-RESISTANT GLOVES.  
Eye Protection: CHEMICAL SAFETY GOGGLES.  
Other Protective Equipment: OTHER PROTECTIVE CLOTHING, SAFETY SHOWER AND EYE BATH.  
Work Hygienic Practices: WASH THOROUGHLY AFTER HANDLING.  
Suppl. Safety & Health Data: NONE SPECIFIED BY MANUFACTURER.

=====  
Transportation Data  
=====

=====  
Disposal Data  
=====

=====  
Label Data  
=====

Label Required: YES  
Technical Review Date: 03MAR93  
Label Date: 03MAR93  
Label Status: G  
Common Name: HEXANE ACS GRADE  
Chronic Hazard: NO  
Signal Word: DANGER!  
Acute Health Hazard-Severe: X  
Contact Hazard-Slight: X  
Fire Hazard-Severe: X  
Reactivity Hazard-None: X  
Special Hazard Precautions: STORE IN A COOL DRY PLACE. DO NOT BREATHE VAPOR. AVOID CONTACT W/EYES/SKIN/CLTHG. IRRITANT. HARMFUL VAPOR. HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THRU SKIN. VAPOR/MIST IS IRRITATING TO EYES, MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT. CAUSES COUGHING, CHEST PAINS, DIFFICULTY IN BREATHING, LUNG IRRITATION, CHEST PAIN & EDEMA WHICH MAY BE FATAL. GI DISTURBANCES, NAUSEA, HEADACHE AND VOMITING. CHRONIC: NONE LISTED BY MANUFACTURER.  
Protect Eye: Y  
Protect Skin: Y  
Protect Respiratory: Y  
Label Name: ALDRICH CHEMICAL CO  
Label P.O. Box: 355  
Label City: MILWAUKEE  
Label State: WI  
Label Zip Code: 53201  
Label Country: US  
Label Emergency Number: 414-273-3850

**Attachment 5**

**Self Assessment Checklist**

# CH2MHILL JOBSITE SAFETY INSPECTION CHECKLIST

Revision.: 03

STANDARD OF PRACTICE HS-18 - HEALTH AND SAFETY CHECKLIST

Date: 05/01/98

Note: The following jobsite safety inspection checklist is to be used only at locations where CCI controls the work. It is not to be used at locations where others control the work.

Project Name: Naval Industrial Reserve Ordnance Plant Project No.: 153691  
 Location: Fridley, Minnesota Project Manager: Venky Venkatesh  
 Inspector: \_\_\_\_\_ Date: \_\_\_\_\_

This checklist has been divided into two sections. The first section (I through XXVI) are applicable to all projects. The second section (XXVII through XXIX) addresses specific situations such as hazardous waste, construction activities, and office trailers. There may be some duplication between the first and second sections.

If an item is not applicable, the column titled "N/A" should be checked. If an item is applicable but the auditor does not observe it during the inspection, the "N/O" column should be checked. For each deficiency noted, a Health and Safety Audit Finding Form must be completed. The Corporate Health and Safety Director must be copied on the results of all audits.

Check "Yes" for Items Completed	Yes	No	N/A	N/O
<b>I. JOBSITE OFFICE</b>				
1. Posters and safety signs in place:				
a. OSHA safety poster	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Emergency Telephone Number Form	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Workers Compensation Form	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. First aid kit:				
a. Fully stocked/sufficient supply	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. First-aid administered by a person with a valid certificate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Bloodborne-pathogen kit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Accident/injury reporting:				
a. Employees briefed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Forms available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. All injuries and illnesses reported and logged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Accidents investigated and properly followed up to prevent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Accident reports and logs submitted promptly as required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Job safety rules and regulations available/posted

**II. HAZARD COMMUNICATION**

1. Employee training:

a. Employees' signed training certificates on file

2. Material safety data sheets (MSDSs):

a. MSDSs on file

b. Log assigned to competent person

c. Log complete and up to date

3. Written program on file

**III. EMPLOYEE TRAINING**

1. Safety indoctrination held for new employees

2. Sufficient instruction given in recognition and avoidance of job hazards; unsafe conditions; and job rules, regulations, and procedures

3. Sufficient instruction in proper use and maintenance of tools, equipment, and personal protective equipment

4. Employees instructed to report unsafe or hazardous conditions to proper job supervisor

5. Employees instructed to promptly report injury, illness, and accidents involving damage to equipment and materials

6. All site personnel have read the job safety rules and regulations and have signed the "Employee Signoff Sheet"

**IV. JOBSITE LOGISTICS AND LAYOUT**

1. Traffic routes around construction areas:

a. Warning signs, flagging in place

b. Crane swing flagged

2. Utility ditches:

a. Flagged or barricaded

3. Trucks and heavy equipment:

a. Good mechanical conditions

b. Backup signals working

c. Seat belts installed and used

**V. PUBLIC PROTECTION**

1. Warning signs in place around site

2. After-hours hazards:

a. Drop-offs protected

b. Ladders lowered

3. Hazard lights

**VI. HOUSEKEEPING**

1. Material storage yard:
- a. Stacked neatly and properly
  - b. Aisles, walkways, roads clear
2. Check work areas for:
- a. Loose and waste materials
  - b. Vicinity of ladders, stairs, ramps, and machinery
  - c. Empty bottles, containers, papers, trash, bands, brick-bats, etc.
  - d. Trash cans, dumpsters available and emptied regularly
  - e. Trash chutes and surrounding areas clear
  - f. Nails, boards, debris removed
  - g. Trash receptacles provided for drinking cups

**VII. PERSONAL PROTECTIVE EQUIPMENT (PPE)**

1. Hard hats
2. Safety shoes/boots
3. Eye/face protection
4. Safety belts/lanyards
5. Ear protection:
- a. Noise level areas of 90 dBA and above identified
  - b. Signs notifying personnel of "Hearing Protection Required" posted
6. Specialized equipment:
- a. Gloves
  - b. Chemical-resistant clothing
7. Tools:
- a. Handles in good shape
  - b. Tool guards in place
  - c. Proper tools used for the job
  - d. Tools maintained in functional condition (hammer heads not mushroomed)

**VIII. SANITATION**

- 1. Temporary toilets:
  - a. Serviced regularly
  - b. Sufficient Quantity (20 or fewer employees - 1 required;  
20 or more employees - 1 toilet and 1 urinal per 40 workers)
- 2. Potable Water:
  - a. Tightly closed containers
  - b. Equipped with tap
  - c. Paper cups available
  - d. Containers labeled "Drinking Water"

**IX. FLOOR AND WALL OPENINGS GUARDS**

**X. PORTABLE LADDERS (straight, extension, step)**

- 1. Inspected and in good conditions (not painted)
- 2. Ladders must not be tied or fastened together unless specifically designed for such a use
- 3. Properly secured top and bottom
- 4. All straight and extension ladders equipped with safety shoes and/or blocked off in use
- 5. Rails extend at least 36 inches above landing or work platform
- 6. Step ladders fully open when in use
- 7. Metal ladders not used around electrical hazards
- 8. Defective ladders tagged and removed from work area
- 9. Properly maintained and stored
- 10. Ladder areas barricaded where required
- 11. Personnel instructed on care, use and inspection of ladders.

**XI. FIXED LADDERS**

**XII. SCAFFOLDING**

- 1. Erected under proper supervision
- 2. All structural members adequate for use
- 3. All connections adequate, pins, crossbracing provided and support
- 4. Proper footings provided (sound, rigid, and secured)

- |   |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 5. Safely tied into structure   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Access ladder or safe equivalent provided and used   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Defective and damaged parts, planks, etc., removed from service  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Ladders and working areas kept free of debris, ice, snow, chemicals, and grease  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Complete platform, planks, close together and overlapped by at least 12 inches or secured by wire or proper cleating                                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. Guard rails, mid-rails, and toe boards installed on all open sides of platforms 10 feet and over in height (applies to both maintenance and construction) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. Frequent inspections made   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**XIII. ELECTRICAL**

- |  |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. Cords/devices have current inspection color code tape installed                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Frayed cords, broken plugs fixed  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Temporary wiring:   |                          |                          |                          |                          |
| a. Panels secured and GFCIs working  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Away from vehicle pathways  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Out of water/moisture   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d. No broken receptacles found   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| e. Sufficient outlets for all crafts   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Temporary lighting with cages   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Assured equipment grounding conductor program in place, if not using GFCIs                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Lock-out or tag-out system used when necessary  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Electrical dangers posted and guarded   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Fire hazards checked, proper extinguishers available                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Only qualified electricians work on electrical circuits and equipment                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. Cords passing through work areas must be covered or elevated to protect them from damage | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**XIV. TEMPORARY HEATERS**

**XV. FIRE PROTECTION**

- |  |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. Office fire extinguisher in working order and inspected regularly | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|--------------------------|--------------------------|--------------------------|--------------------------|

- |  |                          |                          |                          |                                     |
|--|--------------------------|--------------------------|--------------------------|-------------------------------------|
| 2. One extinguisher, 2A rating, for each 3,000 square feet of protected area         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3. One extinguisher, 2A rating, on each floor adjacent to each stairway              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 4. Trash, paper, other combustibles picked up  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 5. Welders/roofers have extinguishers nearby and a fire watch is available if needed | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 6. Fire alarm available/fire evacuation plan   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 7. "No Smoking" signs posted and enforced where necessary                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 8. Supervisors and employees trained in proper use of extinguishers                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |

**XVI. MATERIAL STORAGE AND HANDLING**

- |   |                          |                          |                          |                                     |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|
| 1. Neat storage area, clear passageways   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 2. Materials spotted to minimize rehandling and reduce transport distances                        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 3. Power equipment used to handle heavy/awkward loads   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 4. Stacks on firm footing and all tier stacked materials secured against sudden movement          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 5. Storage platforms, skids, bins, shelves, etc. in good repair                                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 6. Protruding nails and wires removed and rugged metal edges protected before material is handled | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 7. Lifting weights known before handling  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 8. Employees using proper lifting methods, picking up loads correctly                             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 9. Proper number of employees for each operation, physically suited for task                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 10. Tag lines used to control loads   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 11. Protection provided against falling hazards   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 12. Dust protection observed  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 13. Extinguishers or other fire protection available  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 14. Combustibles, flammable, and other unrelated materials separated and clearly identified       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 15. "No Smoking" signs posted where necessary   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

16. Safe loading limits observed for indoor storage

**XVII. DEMOLITION WORK**

1. Operations planned ahead and checked for lead and asbestos if applicable

2. Safety work permit required and necessary blinding of lines, etc., accomplished

3. Adjacent structures shored or braced

4. Electrical, water, sewer, steam lines cut off, locked out, or tagged

5. Area roped off or barricaded

6. Proper safety, danger, and warning signs provided and used

7. Adequate lighting and ventilation provided where necessary

8. Material chutes used

9. Adequate safe access provided

10. Clear operating space provided for equipment and vehicles

11. Overhead protection provided where required

12. Proper fire extinguishing equipment in place

13. Full clothing, serviceable shoes, and adequate PPE (hard hats, goggles, gloves, safety belts, respirators, ear plugs or muffs, etc.) provided

14. Regular supervision maintained

15. Safe housekeeping, welding, rigging, and scaffolding practices observed

**XVIII. CONCRETE CONSTRUCTION**

1. Forms properly installed and braced

2. Adequate shoring used, plumbed and cross-braced

3. Shoring remains in place until strength is attained

4. Proper curing period and procedures observed

5. Heating devices checked, necessary permits obtained

6. Mixing and transport equipment supported and traffic planned and

- |  |                          |                          |                          |                                     |
|--|--------------------------|--------------------------|--------------------------|-------------------------------------|
| 7. Adequate runways, walkways guarded, etc.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 8. Employees wear full clothing, serviceable shoes, long-sleeve shirts                             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 9. Hard hats, gloves, boots, plus goggles and respirators provided for protection from cement dust | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 10. Protruding nails and stripped form material removed from area                                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 11. Good housekeeping and safe hoisting and scaffolding practices observed                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |

**XIX. STEEL ERECTION**

**XX. MASONRY WORK**

- |  |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. Proper scaffolding erected  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Masonry saws properly equipped                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Hard hats, eye and face protection, and dust respirators provided | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Good housekeeping and rigging practices observed                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**XXI. EXCAVATION, SHORING, AND TRENCHING**

**XXII. FLAMMABLE AND COMBUSTIBLE LIQUIDS**

- |   |                          |                          |                          |                                     |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|
| 1. All containers clearly marked to show contents (gas cylinders, cans, drums, fuel tanks, etc.)                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 2. Proper storage practices observed:   |                          |                          |                          |                                     |
| a. Storage areas enclosed or protected from heat and mobile equipment exposure                                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| b. Fire hazards checked   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| c. Sufficient fire extinguishers  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| d. UL approved safety cans for 1 to 5 gallons of flammable liquids  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| e. Approved cabinet for indoor storage of liquids in excess of 25-gallons, but not more than 120-gallon storage | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| f. Sign labeled "Flammable - Keep Fire Away" posted on cabinet  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |

**XXIII. FLAMMABLE GAS (Oxygen/Acetylene)**

- |  |                          |                          |                          |                                     |
|--|--------------------------|--------------------------|--------------------------|-------------------------------------|
| 1. Cylinders:  |                          |                          |                          |                                     |
| a. Away from heat  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| b. Stored upright (secured)                              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| c. Valves closed on empty cylinders                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| d. Valve protection caps in place if cylinder not in use | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| e. Valve key wrench available                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

- |    |   |                          |                          |                          |                          |
|----|---|--------------------------|--------------------------|--------------------------|--------------------------|
| f. | Portable rack with bottles secured  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| g. | Instruct project staff to never drag or slide bottles   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| h. | Designated storage area   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| i. | "No Smoking" signs posted   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| j. | Oxygen bottles stored 20' from acetylene bottles or 1/2-hour fire barrier installed between them                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. | Gauges/valves/hoses:  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| a. | Good condition  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. | Fire arresters installed (both hoses)   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. | Eye protection available  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. | Ventilation adequate  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. | When in use, gas lines properly located to prevent tripping and falling   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. | All burning torches bled and free of oxygen and acetylene and/or other gases during lunch breaks and other extended periods of time | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**XXIV. WELDING OPERATIONS**

- |     |   |                          |                          |                          |                          |
|-----|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 1.  | Performed by qualified personnel  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2.  | Screens, shields, or eye protection provided and used to protect employees from welding operation | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3.  | Employees wear sufficient clothing and PPE  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4.  | Equipment checked before use and in operative conditions  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5.  | Electrical equipment grounded   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6.  | Power cables protected and in good repair   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7.  | Power cables properly located to prevent tripping and falling hazards                             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8.  | Dry chemical fire extinguisher within 30 feet   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9.  | Exposed combustible materials removed to safe location or properly protected from sparks and slag | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. | Valid hot work permit required or provided  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. | Overhead protection provided where required   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- |   |                          |                          |                          |                                     |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|
| 12. "Danger - No Smoking, Matches or Open Lights" signs posted when required    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 13. Adequate lighting and ventilation provided                                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 14. Machines turned off at end of shift or when not in use for extended periods | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |

**XXV. HOISTS**

- |   |                          |                          |                          |                                     |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|
| 1. Material hoists:   |                          |                          |                          |                                     |
| a. Designed by licensed professional engineer   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| b. With tower enclosed for full height on all sides with 1/2-inch by 18--inch Gauge screen mesh, except for landing for landing access  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| c. With tower not enclosed, hoist platform or car shall be totally enclosed on all sides for the full height between floor and overhead covering with 1/2-inch x 14-inch gauge mesh | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| d. Operation rules poster "No Riders Allowed" posted  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| e. Hoisting entrances guarded by substantial gate or bars   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| f. Vertical gates of sufficient height to prevent anyone from looking over them into shaft  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| g. Competent person assigned to inspect daily   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| h. Weekly inspections logged  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| I. Annual inspection available  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| j. Fire extinguisher in place and inspected   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| k. Load chart posted  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |

**XXVI. BLASTING**

**XXVII. HAZARDOUS WASTE**

**Certification and Training of CH2M HILL Personnel**

- |  |                          |                          |                          |                                     |
|--|--------------------------|--------------------------|--------------------------|-------------------------------------|
| 1. Medical exam within last 12 months  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 2. 40-hour initial training, 3 days supervised field activities, 8-hour annual Refresher           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 3. First aid and CPR certification   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 4. Quantitatively fit tested (preferred method per NIOSH Publication 87-116, 87-116, Appendix B.3) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 5. Attend pre-entry safety meeting   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 6. Site Safety Coordinator with appropriate training   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

**Certification and Training of Subcontractor Personnel**

- |   |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. Medical exam within last 12 months   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. 40-hour initial training, 3 days supervised field activities, 8-hour Annual refresher    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. First aid and CPR certification  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Quantitatively fit tested (preferred method per NIOSH Publication 87-116, (Appendix B.3) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Attend pre-entry safety meeting  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b><u>Site Safety Documentation</u></b>   |                          |                          |                          |                          |
| 1. Site health and safety plan (HSP) prepared and approved                                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. HSP onsite   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. All personnel onsite identified in HSP   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Documentation of safety briefing   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Hospital map posted  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Phone numbers posted   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Emergency vehicle identified   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Material Safety Data Sheets (MSDSs) onsite   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Work zones delineated<br>(How? _____)  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. Wind direction flags in use   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. Documentation of calibration of monitoring equipment in Clean environment               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 12. Monitoring conducted and recorded as specified in HSP<br>(Frequency? _____)             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 13. Monitoring for heat/cold stress   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 14. Buddy system in use   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15. Decontamination procedures established as specified in HSP                              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 16. No eating, drinking, or smoking in exclusion and contamination Reduction zones          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 17. Toilet facilities provided  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18. No contact lenses   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

19. Work conducted during daylight hours only

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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**Safety Briefing**

1. All personnel attended (including new personnel)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

2. Documentation of meetings

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

3. Chemical hazards and toxicology reviewed

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

4. Physical hazards reviewed

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

5. Biological hazards reviewed

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

6. Heat/cold stress information reviewed

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

7. Air monitoring requirements

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

8. Levels of protection reviewed

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

9. Work zones reviewed

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

10. Decontamination procedures reviewed

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

11. Emergency response procedures reviewed

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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12. Site communications

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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**Personal Protective Equipment (PPE)**

1. Levels of protection being worn as specified in HSP

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

2. All appropriate PPE available onsite

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

3. Hard hats being worn

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

4. Appropriate hand protection being used  
(What? \_\_\_\_\_ )

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

5. Appropriate body protection being used  
(What? \_\_\_\_\_ )

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

6. Appropriate eye protection being used  
(What? \_\_\_\_\_ )

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

7. Appropriate ear protection being used

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

8. Appropriate respirator protection being used

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

9. Respirators donned correctly

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	--------------------------	--------------------------	-------------------------------------

- |  |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 10. If PPE is not onsite, prepared to halt work                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. Disposal methods in place for disposable PPE                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>Decontamination Procedures</b>                                |                          |                          |                          |                          |
| 1. Decontamination procedure established as specified in the HSP | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Decontamination zone clearly defined                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. PPE properly decontaminated<br>(How? _____ )                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Sampling equipment properly decontaminated<br>(How? _____ )   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Monitoring equipment properly decontaminated<br>(How? _____ ) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Heavy equipment properly decontaminated<br>(How? _____ )      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Samples properly decontaminated<br>(How? _____ )              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Decontamination fluids appropriately disposed of              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**XXVIII. CONSTRUCTION INSPECTIONS**

- |  |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. Are the following inspected frequently:   |                          |                          |                          |                          |
| a. Jobsite   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Materials   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Equipment   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Are first aid kits inspected before being sent to a jobsite and weekly thereafter?                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. When noise levels are suspected to exceed 85 db(A) is noise monitoring conducted?                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. When exposure limits for gases, vapors, fumes, and/or mists might be exceeded, is monitoring conducted? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. When onsite, are respirators inspected regularly?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. When working near or over water, are buoyant work vests and preservers inspected regularly?             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Is all fire fighting equipment, including portable fire extinguishers periodically inspected?           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Is rigging equipment inspected prior to each use and as necessary?                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- |  |                          |                          |                          |                                     |
|--|--------------------------|--------------------------|--------------------------|-------------------------------------|
| 11. Are abrasive wheels inspected and ring tested before mounting?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 12. Are joints in structures and pipelines used as ground return circuits Bonded/inspected periodically?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 13. Is each cord set; attachment cap, plug, and receptacle of cord sets; and Equipment connected by plug inspected for electrical grounding before each day's use? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 14. Are lockout/tagout procedures in place whenever equipment is being Repaired or maintained?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 15. Are single point suspended scaffolds type hoists, cables, and related equipment regularly serviced and inspected?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 16. Are cranes and derricks inspected by a competent person prior to each use and during use?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 17. Is hoisting machinery for cranes and derricks inspected annually?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 18. Are trial lift of personnel baskets visually inspected by a competent Person immediately after a trial lift?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 19. Are hoists inspected and tested at not more than 3-month intervals?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 20. Are hoist towers inspected and maintained on a weekly basis?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 21. Before moving, are booms on aerial lifts inspected, properly cradled, and Outriggers stowed?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 22. Are excavation inspected by a competent person after every rainstorm or Hazard-increasing occurrence?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 23. Are excavations inspected daily by a competent person?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 24. Are roof face and walls of tunnels inspected at the start of each shift and Frequently thereafter?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 25. Does a competent person inspect all drilling and associated equipment Prior to blasting?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 26. Prior to blasting, are drilling areas inspected?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 27. During demolition, are stairs, passage ways, and ladders periodically inspected?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 28. Are electrical systems of vehicles transporting explosive Underground checked weekly?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 29. Are electrical transmission and distribution equipment inspected prior to starting work?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 30. Are lockout/tagout designated switched and disconnectors visually Inspected and tested prior to operation?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 31. When working on energized lines, is rubber protective equipment Visually inspected prior to use?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 32. Are body belts and straps inspected before use?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 33. Are live line tools visually inspected before each work day?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

- |  |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 34. Is power transmission equipment visually inspected daily?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 35. Are inspections of overhead lines made prior to climbing to determine that structures are capable of sustaining additional stresses? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 36. Are ladders inspected periodically and after any occurrence which could affect their safety?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**XXIX. OFFICE TRAILERS/BUILDINGS**

**Employer Posting**

- |   |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. Is the OSHA (or state) job safety poster displayed in a prominent location where all employees are likely to see it?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Are emergency telephone numbers posted where they can be readily found in case of emergency?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Where employees may be exposed to any toxic substances or harmful physical agents, has appropriate information concerning employee access to medical and exposure records and Material Safety Data Sheets been posted or otherwise made readily available to affected employees? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Are signs concerning exiting from buildings, room capacities, floor loading, exposures to x-ray, microwave, or other harmful radiation or substances posted where appropriate?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Are other required posters properly displayed, such as:  |                          |                          |                          |                          |
| a. Industrial Welfare Commission orders regulating wages, hours, and working conditions?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Discrimination in employment prohibited by law?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Notice to employees of unemployment and disability insurance.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Payday notice?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**Emergency Action Plan**

- |  |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. Are alarm systems properly maintained and tested regularly?     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Is the emergency action plan reviewed and revised periodically? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Do employees know their responsibilities:                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| a. For reporting emergencies?                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. During an emergency?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. For conducting rescue and medical duties?                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**Fire Protection**

- |   |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. Is there a current fire prevention plan?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Does the plan describe the type of fire protection equipment and/or                              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Are practices and procedures established to control potential fire hazards and ignition sources? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- |     |   |                          |                          |                          |                                     |
|-----|---|--------------------------|--------------------------|--------------------------|-------------------------------------|
| 4.  | Is local fire department well acquainted with facilities, location, and specific hazards?                             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 5.  | Is there a fire alarm system and is it certified as required?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 6.  | If you have a fire alarm system, is it tested at least annually?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 7.  | Are fire doors and shutters in good operating condition?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 8.  | Are automatic sprinkler system water control valves, air and water pressures checked weekly/periodically as required? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 9.  | Is maintenance of automatic sprinkler systems assigned to responsible persons or to a sprinkler contractor?           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 10. | Is an earthquake preparedness kit on site?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |

**Exiting or Egress**

- |    |  |                          |                          |                          |                                     |
|----|--|--------------------------|--------------------------|--------------------------|-------------------------------------|
| 1. | Are all exits marked with an exit sign and illuminated by a reliable light source?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 2. | Are the directions to exits, when not immediately apparent, marked with visible signs?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 3. | Are doors, passageways, or stairways that are neither exits nor access to exits and which could be mistaken for exits, appropriately marked "NOT AN EXIT," "TO BASEMENT," "STOREROOM," etc.? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 4. | Are exit doors side-hinged?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 5. | Are all exits kept free of obstructions?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 6. | Are there sufficient exits to permit prompt escape in case of emergency?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 7. | Are special precautions taken to protect employees during construction and repair operations?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 8. | Where exiting will be through frameless glass door, glass exit doors, etc., and the doors fully tempered, and do they meet the safety requirements for human impact?                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |

**General Work Environment**

- |    |  |                          |                          |                          |                          |
|----|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. | Are all work sites clean and orderly?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. | Are work surfaces kept dry or appropriate means taken to assure the surfaces are slip-resistant? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. | Are all spilled materials or liquids cleaned up immediately?                                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. | Are the minimum number of toilets and washing facilities provided?                               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. | Are all toilets and washing facilities clean and sanitary?                                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. | Are all work areas adequately illuminated?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**Walkways**

- |    |  |                          |                          |                          |                                     |
|----|--|--------------------------|--------------------------|--------------------------|-------------------------------------|
| 1. | Are aisles and passageways kept clear? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|----|--|--------------------------|--------------------------|--------------------------|-------------------------------------|

- 2. Are aisles and walkways marked as appropriate?
- 3. Are wet surfaces covered with nonslip materials?
- 4. Are holes in the floor, sidewalk, or other walking surface repaired Properly, covered, or otherwise made safe?

**Medical Services And First Aid**

- 1. If medical and first aid facilities are not in proximity to your workplace, is At least one employee on each shift currently qualified to render first aid?
- 2. Are medical personnel readily available for advice and consultation on Matters of employee health?
- 3. Are emergency phone numbers posted?
- 4. Are first aid kits easily accessible to each work area, with necessary Supplies available, periodically inspected, and replenished as needed?
- 5. Have first aid kit supplies been approved by a physician, indicating they are adequate for a particular area or operation?

**XXX. CONFINED SPACE ENTRY**  
**XXXI. STAIRWAYS AND LADDERS**  
**XXXII. FALL PROTECTION**  
**XXXIII. EXCAVATIONS**

**Personnel Safe Work Practices (3.1)**

- 1. .Competent person has completed daily inspection and has authorized any entry.
- 2. Personnel aware of entry requirements established by competent person.
- 3. Protective systems are free from damage and in stable condition.
- 4. Surface objects/structures secured from falling into excavation.
- 5. Potential hazardous atmospheres have been tested and found to be at safe levels.
- 6. Precautions taken to prevent cave-in from water accumulation in the excavation.
- 7. Personnel wearing appropriated PPE, HSP.

**General**

- 8. Daily safety briefing/meeting conducted with personnel.
- 9. Excavation and protective systems adequately inspected by competent person.
- 10. Defective protective systems or other unsafe conditions corrected before entry.
- 11. Guardrails provided on walkways over excavations 6' or deeper .
- 12. Barriers provided at excavations 6' or deeper when not readily visible.

- |  |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 13. Barriers or covers provided for wells, pits, shafts, or similar excavation 6' or deeper.                             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 14. Excavating equipment operated safely.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b><u>Prior to Excavating (3.2.2)</u></b>  |                          |                          |                          |                          |
| 15. Location of underground utilities and installations identified.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b><u>Excavating Activities (3.2.3)</u></b>  |                          |                          |                          |                          |
| 16. Rocks, trees, and other unstable surface objects removed or supported.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 17. Exposed underground utility lines supported.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18. Undermined surface structures supported or determined to be in safe condition.                                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 19. Warning system used to remind equipment operators of excavation edge.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b><u>Excavation Entry (3.2.4)</u></b>   |                          |                          |                          |                          |
| 20. Trenches >4' deep provided with safe means of egress within 25'.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 21. Structure ramps designed and approved by competent person.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 22. Potential hazardous atmospheres tested prior to entry.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 23. Rescue equipment provided where potential for hazardous atmosphere exist.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 24. Ventilation used to control hazardous atmospheres and air tested frequently.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 25. Appropriate respiratory protection used when ventilation does not control hazards.                                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 26. Precautions taken to prevent cave-in from water accumulation in the excavation.                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 27. Precautions taken to prevent surface water from entering excavation.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 28. Protection provided from falling/rolling material from excavation face.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 29. Spoil piles, equipment, materials restrained or kept at least 2' from excavation edge.                               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b><u>Excavation Protective Systems (3.2.5)</u></b>  |                          |                          |                          |                          |
| 30. Protective systems used for excavations 5' or deeper.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 31. Protective systems for excavations deeper than 20' designed by Professional Engineer and signed off.                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 32. If soil unclassified, maximum allowable slope is 34°.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 33. Protective systems free from damage.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 34. Protective systems used according to manufacturers recommendations and not subject to loads exceeding design limits. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 35. Protective system components securely connected to prevent movement or failure.                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 36. Cave-in protection provided while entering/exiting shielding system.                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 37. Personnel removed from shielding systems when installed, removed, or vertical movement. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b><u>Protective System Removal (3.2.6)</u></b>   |                          |                          |                          |                          |
| 38. Protective system removal starts and progresses from excavation bottom.                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 39. Protective systems removed slowly and cautiously.                                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40. Temporary structure supports used if failure of remaining components observed.          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 41. Back-filling taking place immediately after protective system removal.                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b><u>Excavating at Hazardous Waste Sites (3.2.7)</u></b>                                   |                          |                          |                          |                          |
| 42. Waste disposal according to HSP and Environmental Protection Plan.                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 43. Appropriate decontamination procedures being followed, per HSP.                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**XXXIV. DRILLING**

**Personnel Safe Work Practices. (3.1)**

- |   |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. Only authorized personnel operating drill rig.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Personnel cleared during rig startup.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Personnel clear of rotating parts.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Personnel not positioned under hoisted loads.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Loose clothing and jewelry removed.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Personnel instructed not to approach equipment that has become electrically energized. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Smoking is prohibited around drilling operation.                                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Personnel wearing appropriate PPE, per HSP.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**General (3.2.1)**

- |   |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 9. Daily safety briefing/meeting conducted with crew.                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. Daily inspection of drill rig and equipment conducted before use. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**Drill Rig Placement (3.2.2)**

- |  |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 11. Location of underground utilities identified.                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 12. Safe clearance distance maintained from overhead powerlines. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 13. Drilling pad established, when necessary. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|--------------------------|--------------------------|--------------------------|--------------------------|

- |                                       |                          |                          |                          |                          |
|---------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 14. Drill rig leveled and stabilized. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|

**Drill Rig Travel (3.2.3)**

- |   |                          |                          |                          |                                     |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|
| 15. Rig shut down and mast lowered and secured prior to rig movement.             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 16. Tools and equipment secured prior to rig movement.                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 17. Only personnel seated in cab are riding on rig during movement.               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 18. Safe clearance distance maintained while traveling under overhead powerlines. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 19. Backup alarm or spotter used when backing rig.                                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| <b><u>Drill Rig Operation (3.2.4)</u></b>   |                          |                          |                          |                                     |
| 20. Kill switch clearly identified and operational.                               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 21. All machine guards are in place.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 22. Rig ropes not wrapped around body parts.                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 23. Pressurized lines and hoses secured from whipping hazards.                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 24. Drill operation stopped during inclement weather.                             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 25. Air monitoring conducted per HSP for hazardous atmospheres.                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 26. Rig placed in neutral when operator not at controls.                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| <b><u>Drill Rig Maintenance (3.2.5)</u></b>                                       |                          |                          |                          |                                     |
| 27. Defective components repaired immediately.                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 28. Lockout/tagout procedures used prior to maintenance.                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 29. Cathead in clean, sound condition.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 30. Drill rig ropes and wire lines in clean, sound condition                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 31. Fall protection used for exposures > 6'.                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 32. Rig in neutral and augers stopped rotating before cleaning.                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 33. Good housekeeping maintained on and around rig.                               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| <b><u>Drilling at Hazardous Waste Sites (3.2.6)</u></b>                           |                          |                          |                          |                                     |
| 34. Waste disposal according to HSP and Environmental Protection Plan.            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| 35. Appropriate decontamination procedures followed, per HSP>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |

**XXXV. EARTHMOVING EQUIPMENT**  
**XXXVI. DEMOLITION**

**PERSONNEL SAFE WORK PRACTICES (3.1)**

- |  |                          |                          |                          |                                     |
|--|--------------------------|--------------------------|--------------------------|-------------------------------------|
| 1. Personnel remain safe distance from demolition zone (DZ) during work. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 2. Personnel entering DZ, only when necessary.                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |

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|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 3. Prior to DZ entry, competent person evaluates structure and authorizes Entry.                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Personnel aware of entry requirements established by competent person.                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Competent person escorts personnel during DZ entry, if possible.                                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Personnel removed from DZ prior to activities that could affect structural integrity or safety. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Personnel not positioned under hoisted loads.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Personnel wearing appropriated PPE per HSP.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b><u>PERSONNEL ACTIVITIES (3.2)</u></b>   |                          |                          |                          |                          |
| 9. Demolition permit completed and submitted, as required.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. Competent person completed engineering survey, available at site.                              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. Regulated hazardous substances removed prior to demolition.                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 12. Hazardous materials purged from tanks, pipes, and equipment.                                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 13. Utility service lines shut off, capped, or otherwise controlled, utilities notified.           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 14. Utilities needed for demolition temporary relocated.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b><u>GENERAL (3.2.1)</u></b>  |                          |                          |                          |                          |
| 15. Daily safety briefing/meeting conducted with crew.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 16. Daily inspection of demolition equipment conducted before use.                                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 17. Competent person inspecting DZ for hazards as work progresses.                                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18. Competent person controls entry into DZ, unauthorized entry prohibited.                        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 19. Multi-story structures provided with adequate canopy over entrances.                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 20. Demolition starts at top of structure and proceeds downward.                                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 21. Fire extinguisher available at demolition area.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b><u>PROTECTION OF THE PUBLIC (3.2.2)</u></b>   |                          |                          |                          |                          |
| 22. Demo work not performed in area occupied by public, unless permitted By contract.              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 23. Overhead protection provided for pedestrian traveled sidewalks.                                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 24. Walking surfaces kept free of obstructions.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 25. Standard guardrails provided on pedestrian bridges, ramps, runways, and platforms.             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 26. Signs posted informing pedestrians of hazards.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 27. Temporary fence provided around perimeter of DZ adjacent to public areas.                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 28. Watch placed at openings when DZ barricades temporarily removed.                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 29. Warning lights provided around DZ hazards at night, walkways lighted.                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b><u>WORK AREA PROTECTION (3.2.3)</u></b>   |                          |                          |                          |                          |
| 30. Wall openings protected by guardrail 42" high.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 31. Fall protection provided for fall hazards 6' or greater.                                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 32. Adequate barricades and signs provided when debris dropped through floor openings.       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 33. Floor opening, not used as material drops, adequately covered.                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 34. Signs, barricades, flagging used to warn personnel of hidden hazards.                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 35. Glass removed from structure, or personnel protected from fragments.                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 36. Damaged structure's walls and floors shored and braced.                                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 37. All DZ accessways not meant to be accessed closed at all times.                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 38. Multi-story structure stairways adequately covered and illuminated.                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 39. DZ areas adequately illuminated.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40. Protruding reinforcing steel protected when personnel work above it.                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b><u>MANUAL REMOVAL OF WALLS AND MASONRY (3.2.4)</u></b>                                    |                          |                          |                          |                          |
| 41. Walls not permitted to fall on floors exceeding their carrying capacity.                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 42. Wall greater than one story not free standing unless originally designed to stand alone. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 43. Personnel not working on walls during inclement weather.                                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 44. Load-supporting members not cut until above floors demolished and removed.               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 45. Floor openings within 10' of walls are planked unless personnel removed from below.      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 46. Masonry debris removed from steel left in place as masonry demo progresses.              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 47. Walkways/ladders provided to safely reach scaffolds and walls.                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 48. Retaining walls removed only after supported material removed/secured                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b><u>MANUAL REMOVAL OF FLOORS (3.2.5)</u></b>   |                          |                          |                          |                          |
| 49. Debris removed from floor arches prior to demolition.                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 50. Plank walkways 18" or greater provided for access across demolished floors.           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 51. Planks overlap 1' and laid over solid bearings.                                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 52. Areas under floor arch demolition barricaded and personnel removed.                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b><u>DEMOLITION USING HEAVY EQUIPMENT OR CRANES (3.2.6)</u></b>                          |                          |                          |                          |                          |
| 53. Personnel removed from DZ during use of mechanical equipment.                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 54. Mechanical equipment positioned of floors capable of supporting Imposed loads.        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 55. Working surface edges provided with curbs or stop-logs.                               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 56. Heavy equipment operated safely .   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 57. Roof stonework and steel members cut free prior to wall demolition.                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 58. Demo ball weight appropriate for crane's rated load and line strength.                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 59. Crane boom and loadline is as short as possible.                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 60. Demo ball securely attached to loadline with swivel-type connection.                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 61. Cranes operated safely.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b><u>MATERIAL CHUTES (3.2.7)</u></b>   |                          |                          |                          |                          |
| 62. Materials not dropped outside exterior walls unless area protected.                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 63. Chutes designed/constructed to withstand impact loads of debris.                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 64. Chutes entirely enclosed except of insertion points, openings closed when not in use. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 65. Gate provided at chute discharge, competent employee controls gate.                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 66. Signs and barricades installed around chute discharge.                                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 67. Chute openings protected by guardrail where personnel stand to dump.                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 68. Toeboard provided in front of chute openings when mechanical equipment used to dump.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 69. Personnel not entering chute to remove items.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b><u>DEBRIS STORAGE (3.2.8)</u></b>  |                          |                          |                          |                          |
| 70. Debris does not exceed allowable floor loads  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 71. Wood floor structures, only one floor above grade removed for debris storage space.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 72. Wood floor beams supporting walls left in place or equivalent support provided.       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- 73. Floor arches not removed 25' above grade for debris storage.
- 74. Storage spaces blocked off except when material is being removed.
- HOUSEKEEPING (3.2.9)**
- 75. Work areas, passageways, stairs, ladders, and exits kept free of debris.
- 76. Demolition materials, tools, and equipment placed in an orderly manner.
- 77. Receptacles provided for disposal of miscellaneous trash.
- 78. Air, water, electrical, and welding lines positioned to eliminate tripping hazards.
- 79. Burning debris done according to local requirements.
- 80. Fires completely extinguished at least 1 hour before end of day's work.
- OTHER ACTIVITIES ASSOCIATED WITH DEMOLITION (3.2.10)**
- 81. Scaffolds erected and used safely.
- 82. Aerial lifts used safely.
- 83. Stairways and ladders used safely.
- 84. Control measures taken before welding/burning on hazardous coatings.
- 85. Welding and cutting performed safely.

## Appendix C

### Quality Control Attachments

- Submittal Register
- Testing Plan and Log
- Transportation and Disposal Log
- Resume of QC Manager
- QC Manager Appointment Letter

## Submittal Register

Contract Number: N62467-98-D-0995		CTO No.: 0024			CTO Title: NIROP Fridley					Location: Fridley, MN				Contractor: CH2M HILL Constructors, Inc.		
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Spec Section	Item Description	Para. Number	Approving Authority	Other Reviewers	Submittal Number	Scheduled Submission Date	CCI Review Date	CCI Disposition	CCI Transmit Date	QC Admin Received Date	QC Disposition	QC Admin Transmit Date	Contracting Officer Received	Contracting Officer Disposition	Contracting Officer Return	Remarks
SD-07	<b>Schedules</b>															
	Project Schedule															
SD-18	<b>Records</b>															
	Environmental Conditions Reports															
	Status Reports															
	List of Contractor Personnel															





## **K. Chris Adams**

Project QC Manager

### **Related Training**

OSHA 40-hour Health and Safety Training  
Red Cross First Aid and CPR Training  
Construction Safety Training  
OSHA 8-hour Emergency Response Training  
OSHA 50-hour site Supervisor Training  
Level I Certification Bituminous Concrete, Ohio Department of Transportation  
Bridge Inspection Training, Ohio Department of Transportation  
ACI Certified Concrete Technician  
Certified Concrete Field Testing Technician Training

### **Summary of Relevant Experience**

- Twenty-two years experience in field inspection of transportation, environmental and structural projects including airports, highways, bridges, and sewers
- Experienced in hazardous waste environments and government facilities
- Expertise in batching, placing, finishing, and inspection of concrete

Level of responsibility has ranged from resident superintendent/engineer managing inspection teams and multiple contractors to periodic field inspection. Duties include scheduling of inspection teams and review of daily reports; chairing progress meetings for owner, contractors and subcontractors; monitoring work for performance to plans and specifications from project initiation through final completion including preparation of progress reports and contractor change order requests; review of shop drawings, record drawings and preparation of cost and quantity estimates for equipment and materials.

### **Work Experience**

Dayton International Airport, Ohio – As acting resident engineer, Mr. Adams supervised four inspectors. Projects included a \$12.2 million taxiway extension that involved earthwork, batching and placement of approximately 2,200 cubic yards of concrete pavement daily; a 7.7 million taxiway rehabilitation involving batching and placement of approximately 1,700 cubic yards of concrete daily, installation of aircraft guidance signs, taxiway lighting, storm drainage, and airport pavement markings; and a 7.4 million runway rehabilitation that involved placement of 13- to 17-inch thick concrete pavement over existing runway, reconstruction of five intersecting taxiways, installation of a new taxiway and runway edge lighting, and installation of new aircraft guidance signage.

Wright-Patterson Air Force Base, Ohio – As resident construction inspector, Mr. Adams had full responsibility for construction inspection and materials testing. This \$1.5 million project consisted of resurfacing 360,000 square yards of the main runway with a 3-inch asphaltic concrete/tar rubber overlay and repair of an 86,000 square yard concrete section of the runway.

## K. Chris Adams

Sanitary Sewer through a Volatile Organic Compound-Contaminated Aquifer, Greene County, Ohio – As project field supervisor for the 45.3 million project, Mr. Adams was responsible for supervision and scheduling of five inspectors, monitoring contractor compliance with Site Health and Safety Plan (OSHA standards), as well as compliance with plans and specifications. The project included installation of 6,100 feet of 33- to 60-inch diameter sewer and pumping and onsite treatment of over 550 million gallons of contaminated groundwater.

Carlisle Area Sanitary Sewer System, Montgomery and Warren Counties, Ohio – As resident inspector, Mr. Adams was responsible for daily inspection. This 410.2 million project utilized five contractors and consisted of placement of 152,000 lineal feet of 8-to 21-inch gravity sewers at depths up to 32 feet and six pumping stations.

New Entrance/ Access Road, Lima Branch of Ohio State University – As resident construction inspector, Mr. Adams had full field responsibility including monitoring contractor compliance with plans and specifications, verification of quantities, scheduling and monitoring of materials testing, and facilitating biweekly progress meetings.

Victory Express Truck Terminal, Dayton, Ohio - As construction inspector, Mr. Adams for this \$1.1 million project, Mr. Adams was responsible for field inspection of the placement of 340,000 square yards of new concrete pavement including inspection of base preparation for concrete pavement, forming, hand-pouring, finishing, and curing. He was responsible for coordination of curing and air entrainment testing.

Interstate 70 Resurfacing (7.5 miles), Montgomery and Preble Counties, Ohio – Mr. Adams served as resident construction inspector for this \$6.5 million project, which was completed to ODOT standards. Activities included removal of concrete slabs at bridge approaches, adjustment of bridge heights, bridge deck resurfacing and parapet wall repair, installation of new underdrains, resurfacing with asphalt overlay, asphalt and concrete materials testing, berm repair and reseeding, and sigh placement.

Bridge coating Inspection, Ohio – As resident inspector, Mr. Adams was responsible for bridge painting projects including removal and disposal of hazardous lead-based paint.



**CCI** NAVY RAC

**CH2MHILL Constructors, Inc.**  
115 Perimeter Center Place, NE  
Suite 700  
Atlanta, GA  
30346-1278  
TEL 770.604.8095  
FAX 770.604.9282

August 29, 2000

Mr. Chris Adams  
CH2M HILL Constructors, Inc.  
2125 South Tecumseh  
Springfield, OH 45502

RE: Contract No. N62467-98-D-0995  
Contract Task Order 0024 – NIROP Fridley – Fridley, Minnesota  
Project Quality Control Manager Letter of Appointment

Dear Mr. Adams:

Herein describes the responsibilities and authority delegated to you in your capacity as the Project QC Manager on the NIROP Fridley site, Contract Task Order (CTO) 0024 under the Navy RAC Contract # N62467-98-D-0995.

In this position, you assist and represent the QC Program 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 Navy RAC 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 Navy RAC 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. 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:

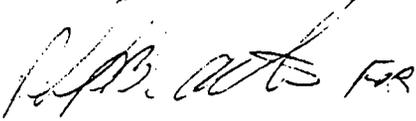
*"No work or testing may be performed unless the QC Program Manager or Project QC Manager is on the work site."*

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 QC Program Manager and Project Manager 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 QC Program Manager so that approval can be obtained in advance from the Contracting Officer or designated representative, in accordance with Section C Paragraph.6.2.1 of the contract.

Sincerely,

CH2M HILL Constructors, Inc.



R. Scott Newman  
Program Manager

cc: Venky Venkatesh/CLE  
Theresa Rojas/ATL  
CCI Project File No. 153691