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May 19, 2015

Mr. Thomas Coogan
Wisconsin Department of Natural Resources
101 South Webster Street – RR/5
P.O. Box 7921
Madison, WI 53707-7921

Mr. Tauren Beggs
Wisconsin Department of Natural Resources
2984 Shawano Avenue
Green Bay, WI 54313

Subject: Sampling and Analysis Plan/Proposal for the Supplemental Site Investigation at the Former O'Keefe Property located at 1463 Red Maple Road, De Pere, Wisconsin – AECOM Project No. 60331598

Dear Mr. Coogan and Mr. Beggs:

AECOM Technical Services, Inc. (AECOM) is pleased to provide this Sampling and Analysis Plan/Proposal to conduct Supplemental Site Investigation (SI) under the Wisconsin Assessment Monies (WAM) Contractor Services Project. The Supplemental SI is to be conducted at the Former O'Keefe Property, located in De Pere, Wisconsin. The following paragraphs provide a project background, scope of services, proposed schedule, and our cost proposal to complete the described services. A site specific Health and Safety Plan has been provided under separate cover.

Introduction

Site Location and Background

The subject property is located in the City of De Pere, Brown County, Wisconsin. The site is bounded to the north by Red Maple Road, to the east by Richco Road, to the south by the planned extension of the Richco Road and American Boulevard corridors and agricultural land, and west by residential and agricultural land. The site is comprised of three platted parcels in the city of De Pere: WD-179-1, WD-179-3, and WD-179-4. There are currently no buildings on the site and much of the site is vegetated or leased as cropland.

In 1998 and 1999, Phase I and Phase II ESA services were performed by Robert E. Lee & Associates (REL) on behalf of the City of De Pere. The Phase I ESA documented use of portions of the site by Reliance Construction Company and suggested the potential for surface and subsurface impacts of oil and fuels related to equipment maintenance. Phase II services identified detections of volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), and metals above regulatory limits. In 2010, AECOM provided additional Phase II services through an EPA Brownfield Grant administered by Brown County. The 2010 Phase II services included installation of 11 direct push soil borings, nine of which included temporary monitoring wells. Soil and groundwater samples collected from the borings and wells were again analyzed for VOCs, PAHs, and metals. Findings were presented in a February 10, 2011, AECOM Phase II report and were

used by the Wisconsin Department of Natural Resources (WDNR) to aid with development of the proposed scope of work described below.

AECOM completed a Limited Site Investigation of the site, report dated February 6, 2015, under a Contractor Services Award of the Wisconsin Assessment Monies Program. The Limited SI identified four areas on this industrially zoned site with industrial direct contact RCL exceedances: one larger area in the northwest corner of parcel WD-L179-3 and southeast portion of Parcel WD-L179-4; and, three localized hotspots at boring locations B-8 (2010), B-100, and B-106.

Supplemental Site Investigation services are requested to determine the extent of the soil impacts in the vicinity of the three localized hotspot areas and near the southern extent of the larger contaminated area on parcel WD-L179-3. An additional boring was requested in the vicinity of the former residence where a potential fuel oil UST is suspected.

Investigation Participants

The following parties are participants in this site investigation.

- **WAM Applicant and Property Owner:**
  City of De Pere
  335 South Broadway, 2nd Floor
  De Pere, WI 54305-3600
  Contact: Mr. Ken Pabich, Planning & Economic Development Director
  (920) 339-4043

- **Regulatory Agency:**
  Wisconsin Department of Natural Resources
  101 South Webster Street – RR/5
  P.O. Box 7921
  Madison, WI 53707-7921
  Contact: Mr. Tom Coogan
  608-267-7560

  2984 Shawano Avenue
  Green Bay, WI 54313
  Contact: Mr. Tauren Beggs
  920-662-5178

- **Consultant:**
  AECOM
  1555 N RiverCenter Drive, Suite 214
  Milwaukee, WI 53212
  Contact: Donna Volk
  414-944-6171

- **Analytical Laboratory:**
  Pace Analytical Services
  1241 Bellevue Street, Suite 9
  Green Bay, WI 54302
  Contact: Chris Hyska
  920-321-9405

Scope of Work

The Supplemental SI proposed herein is intended to further investigate areas of environmental concern based on the results of the previous site investigation services. AECOM proposes to conduct soil and groundwater sampling and analysis as summarized below. The following paragraphs discuss the tasks required to complete the requested scope of work.

Utility Clearance

AECOM will contact Digger's Hotline for the location of public utilities in the area of the investigation prior to commencing work. We will also be relying on any available utility information from the City of De Pere. It is understood that all private utilities on the subject property have been decommissioned during demolition of the site structures.

Soil Boring Advancement, Soil Sampling, and Soil Analysis

Soil sampling will be conducted at 29 sampling locations. Soil probes (GP-120 through GP-148) will be advanced using a track-mounted hydraulic probe rig utilizing a 2-inch diameter drive rod to collect continuous soil samples. The locations of the proposed soil probes are shown on the attached Figure 1. The soil samples collected from the soil cores advanced by the hydraulic probe will be collected inside of a polyethylene sheath inserted into the end of the drive rod. The soil samples will be subdivided by depth into 1 to 2-foot increments, depending on the sample recovery and textural character. The soil probes GP-120 through GP-147 will extend to a maximum depth of 4 feet bgs. Probe GP-148 will extend to a maximum depth of 10 feet bgs. It is anticipated that the gravel layer in the vicinity of GP-106 will be removed prior to the investigation; otherwise, sample depths in this area will be adjusted in the field so as to sample below the gravel fill.

Soil samples will be evaluated and visually classified in the field. The soil samples will be described in the field with respect to the soil type, grain size distribution, and color (or discoloration), odor, and moisture content. Visual observations of the recovered material will also be documented in general accordance with ASTM Method D-2488-93. Field observations from the boring will be recorded on soil boring logs for submittal to WDNR.

Samples will be screened in the field with a photo-ionization detector (PID) equipped with a 10.6 electron volt (eV) lamp. The PID will be calibrated in the field according to manufacturer's instructions, using 100 parts per million (ppm) isobutylene span gas and air (zero gas), and checked between each screening event for proper response.

Two soil samples per soil boring location will be collected for potential laboratory analysis as described below. Samples will be collected from a depth of 0 to 2 feet bgs and 2 to 4 feet bgs for potential analysis.

- Near B-100: Samples from B-120, B-121, B-122, B-123 and B-124 at the 0-2 foot depth will be analyzed for PAHs. Soil samples collected from 2 to 4 feet from these locations and all samples from B-125 through B-129 will be held for potential analysis for PAHs, depending on the results of the initial laboratory results.

- Near B-106: Samples from B-130, B-131, B-132 and B-133 at the 0-2 foot depth will be analyzed for PAHs. Soil samples collected from 2 to 4 feet from these locations and all samples from B-134 through B-137 will be held for potential analysis for PAHs, depending on the results of the initial laboratory results.

- Near B-8: Confirmatory soil samples will be analyzed from 0 to 2 feet and 2 to 4 feet from B-138, which will be located (based on GPS coordinates) at the location of B-8, which was conducted in 2010. Both samples will be analyzed for PAHs. Samples from B-139 through B-145 will be held for potential analysis for PAHs, depending on the results of the initial laboratory results.

- South of B-112 and B-117: Samples from B-146 and B-147 will be analyzed for PAHs. Soil samples collected from 2-4 feet from these locations will be held for potential analysis for PAHs, depending on the results of the initial laboratory results.

- B-146 will be conducted in the vicinity of the former residence. One soil sample will be collected from the unsaturated zone within 4 feet of the ground surface for analysis of PVOCs and naphthalene.

The soil samples selected for analysis will be analyzed for PAHs according to EPA Method 8270 using a State Certified Laboratory (Pace Analytical Services). The sample collected from B-146 will also be analyzed for petroleum volatile organic compounds (PVOCs) and naphthalene using EPA Method 8260. One duplicate sample will be required to fulfill the QA/AC requirements, set forth in the Quality Assurance Project Plan (QAPP) for this project. The samples will be submitted to Pace Analytical Services for analytical testing in accordance with the QAPP.

Soil probe locations will be determined in the office before going into the field. Determined coordinates will be programmed into a hand-held GPS unit which will be brought into the field to locate the sample locations. These coordinates will be provided on the soil boring logs and as an appendix to the final report. In addition, AECOM will insert a metal spike/lath near ground surface into the backfilled probe hole, so the soil probe locations can be relocated using a standard metal detector.

Groundwater Sampling and Lab Analysis

A temporary monitoring well will be installed at B-148 at an approximate depth of 10 feet below ground surface. The temporary well will be developed/purged using a low flow technique with a peristaltic pump until the resultant water is low in silt/sediment or the well goes dry 3 times. The low flow sampling technique (flow < 1 liter/minute) will be used to collect a groundwater sample from B-146. The temporary well will be abandoned after groundwater sampling is complete.

The PVOC/naphthalene sample will be placed in PVOC vials with hydrochloric acid preservative. Pace will analyze the groundwater sample for PVOCs/naphthalene using Method 8260. One duplicate sample will be required to fulfill the QA/QC requirements, set forth in the Quality Assurance Project Plan (QAPP) for this project. The samples will be submitted to Pace in accordance with the QAPP.

Quality Assurance Project Plan

Sampling and analytical testing will be conducted in accordance with this plan as well as the Quality Assurance Project Plan developed for the WDNR WAM projects and annual updates dated May 22, 2012 and May 17, 2013.

Investigative Waste Management

Minimal excess soil will be generated during the advancement of the soil probes. Based on the limited depth of the soil probes and the presence of only low-level shallow impacts on the site we do not anticipate a need to drum soil cuttings. Excess soil generated during the site investigation will be left on-site adjacent to the borehole where the soil originated. We anticipate one drum of purge water will be generated for disposal and that water can be disposed through the municipal sanitary sewer.

Reporting

A letter report will be prepared to summarize the results of the sampling activities. The information obtained from the field exploration program and analytical testing will be compiled into tables, boring logs and figures, as appropriate to allow for evaluation of site conditions. Laboratory results of soil samples will be compared to WAC NR 720 residual contaminant levels (RCLs). The report will include a summary of field and laboratory procedures used, tabulated analytical data, a discussion of the findings of the investigation and recommendations for additional work, if appropriate. A draft report in electronic format will be submitted to the WDNR program manager and project manager for their review and comment prior to submitting a final report. We anticipate that three bound copies and two electronic copies of the final report will be submitted to WDNR.

Schedule

AECOM will coordinate field activities within one week of authorization to proceed. We anticipate soil and groundwater sampling can be scheduled within 2 to 3 weeks. We anticipate that analytical results will be available within two weeks of receipt of samples by the laboratory. Verbal results and the subcontract laboratory report will be provided to the WDNR within 1 to 2 days after receipt. Decisions regarding additional laboratory analysis will be discussed with the WDNR project manager prior to implementing. A draft report, documenting the results of the investigation, will be provided to the WDNR within 2 to 12 weeks following receipt of the analytical results. Delivery of the final report will be dependent on the timing and nature of comments by WDNR, but is anticipated to be within 1 to 6 weeks.

Health and Safety Plan

A site-specific Health and Safety Plan was prepared for this site and was provided previously. AECOM will continue to follow the established Health and Safety Plan. The Health and Safety Plan contains a summary of known site contaminants and other site hazards, emergency resources available, personnel protection, decontamination procedures and emergency procedures recommended for this project. Project field personnel will read and be familiar with the Plan prior to beginning the fieldwork.

Cost Proposal

AECOM proposes to complete this project on a time and materials basis in accordance with the labor and unit rates included in the updated fee schedule for contract extension dated July 26, 2012. AECOM estimates the breakdown of labor and material costs to complete this project to be $11,867.40, as shown on the attached Cost Proposal. This estimate includes analysis of all of the collected soil samples. It is likely that only one-third to one-half of the collected soil samples will be analyzed, based on the results of the initial samples, as described above. As such the cost may be as low as $8,500. The Cost Proposal indicates the unit prices for the various elements of service

that we expect will be utilized to provide the services outlined in this proposal. A back-up labor estimate is also provided, as you requested, to provide a breakdown of the labor effort by task. Invoice amounts will be based on actual units utilized at the agreed upon rates and will include travel costs and other expenses incurred by AECOM in rendering the proposed services. AECOM understands that the WDNR will incorporate this proposal into a contract including terms provided in the WDNR's Request for Statements of Qualification dated February 10, 2010.

Please contact us if you have any questions or comments regarding the scope of services or procedures presented in this plan.

Yours sincerely,

Donna M. Volk, P.G., CPG
Senior Hydrogeologist
donna.volk@aecom.com

Steven R. Schubring, P.G.
Operations Manager
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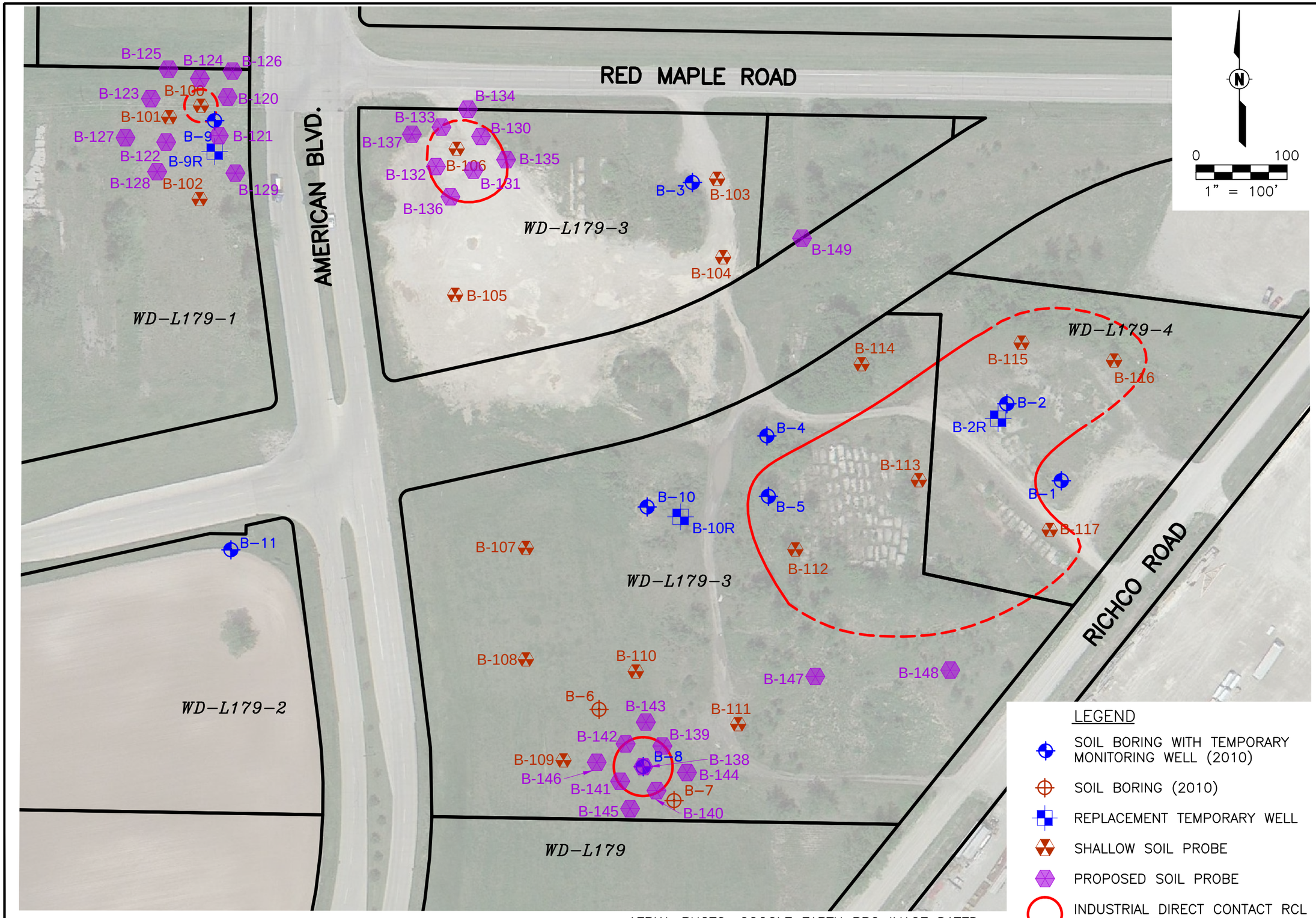
Jennifer L. Obertino, P.E.
Vice President
Central Midwest Environment Business Unit Lead
jennifer.obertino@aecom.com

Attachments:
- Cost Estimate
- Figure 1



AERIAL PHOTO: GOOGLE EARTH PRO IMAGE DATED 5/31/2011; DOWNLOADED ON 1/6/2015.

LEGEND

- SOIL BORING WITH TEMPORARY MONITORING WELL (2010)
- SOIL BORING (2010)
- REPLACEMENT TEMPORARY WELL
- SHALLOW SOIL PROBE
- PROPOSED SOIL PROBE
- INDUSTRIAL DIRECT CONTACT RCL EXCEEDANCE AREA

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PROPOSED SOIL PROBE LOCATION MAP
FORMER O'KEEFE PROPERTIES
1463 RED MAPLE ROAD
DE PERE, WISCONSIN

Drawn :	SAE	5/18/2015
Checked:	DV	5/18/2015
Approved:	DV	5/18/2015
PROJECT NUMBER	60331598	
FIGURE NUMBER	1	

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PROJECT COST ESTIMATE - LABOR

O'Keefe Property -Supplemental Site Investigation

	PERSONNEL BY DISCIPLINE	Project Director	Project Manager II	Eng IV/ Sci V	Project Manager I	Eng III/Sci IV	Eng II/Sci III	Eng I /Sci II	Scientist I	Technician II	Technician I	Proj Admin	**TOTAL LABOR REVENUE**
	WDNR SOQ	$150	$135	$120	$105	$105	$95	$85	$70	$60	$50	$50	
	SAP/HASP												
A.	SAP Preparation			4	1							2	$685
B.	HASP												$0
C.													$0
	SUBTOTAL HOURS / UNITS	0	0	4	1	0	0	0	0	0	0	2	7
	SUBTOTAL COSTS	$0	$0	$480	$105	$0	$0	$0	$0	$0	$0	$100	**$685**
	Site Investigation												
A.	Utility Clearance/Coordination				1								$105
B.	Soil Probe/well install-devel			1	1			14					$1,415
C.	Groundwater Sampling							2					$170
D.	Temp Well Abandonment							1					$85
E.	Investigative Waste Disposal												$0
F.	Data Eval/Report Prep	1		3	12				4			4	$2,250
G.	Project Management			1	1				1				$295
H.													$0
I.													$0
	SUBTOTAL HOURS / UNITS	1	0	5	15	0	0	17	5	0	0	4	47
	SUBTOTAL COSTS	$150	$0	$600	$1,575	$0	$0	$1,445	$350	$0	$0	$200	**$4,320**
	TOTAL HOURS / UNITS	1	0	9	16	0	0	17	5	0	0	6	54
	TOTAL COSTS	$150	$0	$1,080	$1,680	$0	$0	$1,445	$350	$0	$0	$300	**$5,005**

AECOM Environment

COST PROPOSAL - O'Keefe Property - Supplemental Site Investigation

LABOR

PERSONNEL BILLING TITLE	TOTAL HOURS	HOURLY RATE	TOTAL COST
PROJECT DIRECTOR II/III / ENGINEER V	1	$150	$150
PROJECT MANAGER II / PROJECT DIRECTOR I	0	$135	$0
ENGINEER IV/ SCIENTIST V	9	$120	$1,080
PROJECT MANAGER I/ENGINEER III/ SCIENTIST IV	16	$105	$1,680
ENGINEER II /SCIENTIST III	0	$95	$0
ENGINEER I /SCIENTIST II	17	$85	$1,445
SCIENTIST I	5	$70	$350
TECHNICIAN II	0	$60	$0
TECHNICIAN I	0	$50	$0
PROJECT ADMINISTRATOR	6	$50	$300
TOTAL LABOR COST			**$5,005**

The actual invoice amounts may vary due to many factors, including, but not limited to, the scope of services not yet fully developed, changes in project requirements, or alterations in the scope of services as actual site conditions are evaluated. Invoice amounts will be based on actual units utilized at the rates identified on this Cost Proposal and will also include travel costs and other expenses incurred by AECOM in rendering the services described in this proposal. AECOM will not exceed the attached cost estimate without prior approval.
Proposed changes, if any, to the scope of services and estimated costs following commencement of AECOM's services will be discussed with Client and amendments made as described in the attached Terms and Conditions. For additional services rendered, if any, but not included in the scope of services described in this proposal, invoice amounts will be based on the actual units used at the rates shown, and will include travel costs, and other expenses incurred by AECOM in rendering the services described in this proposal.
Subcontract unit rates for soil probe sampling are provided. Our preference is to obtain site-specific bids for services of this type due to varying mobilization distances, site access and soil conditions. Competitive bids can efficiently be obtained on a site by site basis.

A 10% markup will be applied to other expenses and costs.

FIELD INSTRUMENTS/EQUIPMENT

DESCRIPTION	QTY USED	# OF DAYS	UNIT COST*	TOTAL COST
pH/CONDUCTIVITY/TEMPERATURE METER			$ 12.00	$0.00
COMBUSTIBLE/MULTI-GAS METER			$ 50.00	$0.00
PHOTO IONIZATION DETECTOR	1	1	$ 75.00	$75.00
PERISTALTIC PUMP	1	1	$ 25.00	$25.00
BAILER (PVC/POLYETHYLENE)			$ 10.00	$0.00
BAILER (STAINLESS STEEL)			$ 15.00	$0.00
AIR SAMPLE PUMP CALIBRATOR			$ 25.00	$0.00
GROUNDWATER FILTER			$ 20.00	$0.00
55-GALLON STEEL DRUM			$ 55.00	$0.00
HAND AUGER (SOIL/SLUDGE)			$ 45.00	$0.00
WATER LEVEL METER			$ 10.00	$0.00
INTERFACE PROBE			$ 25.00	$0.00
CELL PHONE			$ 5.00	$0.00
DIGITAL CAMERA - DAILY			$ 5.00	$0.00
DIGITAL CAMERA - WEEKLY			$ 20.00	$0.00
CONDUCTIVITY/TEMPERATURE METER			$ 10.00	$0.00
VINYL TUBING (per ft.)	10	1	$ 0.25	$2.50
POLYETHYLENE TUBING (per ft.)			$ 0.50	$0.00
SILICONE TUBING (per ft.)			$ 4.50	$0.00
WELL LOCKS			$ 15.00	$0.00
WELL SAMPLING W/PUMP (PER WELL)*			$ 30.00	$0.00
WELL SAMPLING W/OUT PUMP (PER WELL)*			$ 20.00	$0.00
GPS EQUIPMENT	1	1	$ 200.00	$200.00

* - includes all expendables and equipment

H&S/OTHER EQUIPMENT

DESCRIPTION	QTY USED	# OF DAYS	UNIT COST*	TOTAL COST
LEVEL D PROTECTION			$ 5.00	$0.00
MODIFIED LEVEL D			$ 15.00	$0.00
SPILL KIT			$ 5.00	$0.00
PERSL. DECON EQUIP/SUPPLIES			$ 5.00	$0.00
PORTABLE EYE/FACE WASH STATION			$ 10.00	$0.00
LADDER			$ 5.00	$0.00
BARRICADES W/FLASHERS			$ 5.00	$0.00
BONDING CABLES			$ 5.00	$0.00
FIRST AID KIT			$ 5.00	$0.00
FIRE EXTINGUISHER			$ 5.00	$0.00
CONCRETE CORE MACHINE			$ 50.00	$0.00
METAL DETECTOR			$ 25.00	$0.00
MARKING PAINT (each)			$ 5.00	$0.00
STAKES/LATH (each)			$ 1.00	$0.00
WIRELESS PC NETWORK ACCESS CARD			$ 10.00	$0.00
GENERATOR			$ 25.00	$0.00
PROJECTOR			$ 50.00	$0.00
MILEAGE			$ 0.55	$0.00
YSI Multimeter			*$ 75.00*	*$0.00*
REPORTS/OFFICE SUPPLIES				
REPORTS	4	1	$15	$60.00
LANDFILL EQUIPMENT				
NUCLEAR METER - DAILY			$ 25.00	$0.00
NUCLEAR METER - WEEKLY			$ 125.00	$0.00
NUCLEAR METER - MONTHLY			$ 400.00	$0.00

TOTAL EQUIPMENT COSTS **$362.50**

AECOM SOIL PROBE SERVICES

	QTY USED	# OF DAYS	UNIT COST*	TOTAL COST
SOIL PROBE MOBILIZATION (mile)			$ 1.40	$0.00
SAMPLING (ft.)			$ 7.75	$0.00
TEMPORARY WELL CASING (ft.)			$ 6.60	$0.00
PROTECTOR PIPE (ea.)			$ 90	$0.00
ABANDONMENT (ft.)			$ 0.60	$0.00
DECON (day)			$ 55.00	$0.00
PAVEMENT CORING (in.)			$ 5.50	$0.00
PER DIEM			$ 140	$0.00
SUBCONTRACTORS				
Soil and Water Disposal			**1.10**	**$0.00**
On-Site Environmental - Soil Probes		**$1,619.00**	**1.10**	**$1,780.90**
			1.10	**$0.00**
			1.10	**$0.00**
TOTAL PROBE/SUBCONTRACTORS				**$1,780.90**

ANALYTICAL LABORATORY TESTING (other parameters by competitive quote)

	QTY USED	UNIT COST*	TOTAL COST		QTY USED	UNIT COST*	TOTAL COST
VOCs (soil & groundwater)		$65	$0.00	pH		$5	$0.00
VOCs (air)		$247	$0.00	Total Organic Carbon		$60	$0.00
SVOCs (soil & groundwater)		$175	$0.00	CYANIDE, TOTAL (groundwater)		$35	$0.00
PAHs (soil & groundwater)	60	$70	$4,200.00	MERCURY , TOTAL (water)		$25	$0.00
DRO (soil)		$30	$0.00	PCBs (soil)		$75	$0.00
GRO (soil)		$25	$0.00	FLASH POINT (soil)		$15	$0.00
PESTICIDES (soil & groundwater)		$160	$0.00	METALS - INDIVIDUAL (soil & groundwater)		$13	$0.00
HERBICIDES (soil & groundwater)		$200	$0.00	PVOCs (soil & groundwater)		$26	$0.00
RCRA METALS (soil & groundwater)		$75	$0.00	PVOCs + natphalene (soil & groundwater)	3	$30	$90.00

TOTAL LABORATORY COSTS $4,290.00
TOTAL LABORATORY COSTS (w/ 10% markup) **$4,719.00**

TOTAL ESTIMATED PROJECT COSTS **$11,867.40**

HEALTH AND SAFETY PLAN
Additional Site Investigation Activities
Former O'Keefe Properties
1463 Red Maple Road
City of DePere, Wisconsin

Prepared for:

Brown County Planning Commission and the City of De Pere, Wisconsin

Prepared by:

AECOM
1555 N. River Center Drive
Milwaukee, Wisconsin

Health and Safety Plan Expiration Date: September 2015

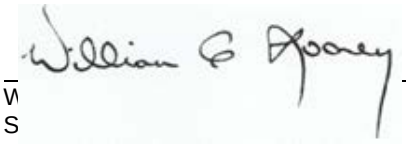
Project No:

Project Health and Safety Plan Approvals

This project Health and Safety Plan (HASP) was prepared for employees performing a specific, limited scope of work. It was prepared based on the best available information regarding the physical and chemical hazards known or suspected to be present on the project sites. While it is not possible to discover, evaluate, and protect in advance against all possible hazards which may be encountered during the completion of this project, adherence to the requirements of the HASP will significantly reduce the potential for occupational injury.

By signing below, I acknowledge that I have reviewed and hereby approve the HASP for the Additional Site Investigation Activities at the Former O'Keefe Properties located at 1463 Red Maple Road in the City of DePere, Wisconsin. This HASP has been written for the exclusive use of AECOM, its employees and subcontractors. The plan is written for specified site conditions, dates, and personnel, and must be amended if these conditions change.

Prepared by:



September 5, 2014
Date

W
S
AECOM Safety Professional

Approved by:

September 8, 2014
Date

Donna Volk, P.G., CPG
Senior Hydrogeologist
AECOM Project Manager

Executive Summary

The purpose of this Health and Safety Plan (HASP) is to address health and safety concerns related to the AECOM managed Additional Site Investigation Activities at the Former O'Keefe Properties located at 1463 Red Maple Road in the City of DePere, Wisconsin. The specific roles, responsibilities, authority, and requirements as they pertain to the safety of employees and the scope of services are discussed herein. The document is intended to identify known potential hazards and facilitate communication and control measures to prevent injury or harm. Additionally, provisions to control the potential for environmental impact from these activities are included where applicable.

The objective of the work is to determine if there is impacted soil and groundwater at the Site. AECOM will provide project management, oversight, sampling and sample screening, and analytical services to support the project.

The primary physical hazards which may be encountered include:

Vehicle Operation	Electrical	High Pressure Liquids
Overhead Utilities	Lifting	Falling objects
Underground Utilities	Noise	Flying debris
Traffic	Dust	Biologic Hazards (plants; insects, animals)
Slips, Trips and Falls	Sharp Objects	Weather (Heat and Cold Stress; sunburn)
Heavy Equipment Operation (e.g., drill rigs, direct push rigs)	Splashing Liquids	Inclement Weather
Rotating Equipment (drive pulleys and belts)	Corrosive Liquids	Poor Lighting
Pinch Points	Flammable Liquids	Personal Safety

Note: This list should not be considered to be all-inclusive. ADDITIONAL PHYSICAL HAZARDS MAY BE PRESENT

The chemical hazards that may be encountered include:

Volatile Organic Compounds (VOCs)/Chlorinated VOCs	Heavy Metals
Polynuclear Aromatic Hydrocarbons (PAH)	Carbon Monoxide

Note: This list should not be considered to be all-inclusive. ADDITIONAL CONTAMINANTS MAY BE PRESENT.

All staff are bound by the provisions of this HASP and are required to participate in a preliminary project safety meeting to familiarize themselves with the anticipated hazards and respective onsite controls. The discussion will cover the entire HASP subject matter, putting emphasis on critical elements of the plan such as the emergency response procedures, personal protective equipment, site control strategies, and monitoring requirements. In addition, daily tailgate safety meetings will be held to summarize the anticipated scope of work, identify new hazards and controls, define incident reporting requirements, review the results of inspections and discuss any lessons learned or concerns from the previous day.

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1.0 Introduction

This Health and Safety Plan (HASP; including Attachments and Supplements provides a general description of the levels of personal protection and safe operating guidelines expected of each employee or subcontractor associated with the Additional Site Investigation Activities at the Former O'Keefe Properties located at 1463 Red Maple Road in the City of DePere, Wisconsin. This HASP also identifies chemical and physical hazards known to be associated with the AECOM-managed activities addressed in this document.

HASP Supplements will be generated as necessary to address any additional activities or changes in site conditions, which may occur during field operations.

1.1 General

The provisions of this HASP are mandatory for all AECOM personnel engaged in fieldwork associated with the environmental services being performed at the subject site. A copy of this HASP, any applicable HASP Supplements and applicable AECOM Americas Safety, Health, and Environmental (SH&E) Procedures and Manual shall be accessible on site and available for review at all times. Record keeping will be maintained in accordance with this HASP and the applicable Standard Operating Procedures (SOPs). In the event of a conflict between this HASP, the SOPs and federal, state, and local regulations, workers shall follow the most stringent/protective requirements. Concurrence with the provisions of this HASP is mandatory for all personnel at the site covered by this HASP and must be signed on the acknowledgement page.

1.2 Project Policy Statement

AECOM is committed to protecting the safety and health of our employees and meeting our obligations with respect to the protection of others affected by our activities. We are also committed to protecting and preserving the natural environment in which we operate. The safety of persons and property is of vital importance to the success of this project and accident prevention measures shall be implemented to avoid injury, waste and loss. It shall be the policy that all operations be conducted safely. On site supervisors are responsible for maintaining a safe and healthy working environment in their areas of responsibility, and for fairly and uniformly enforcing safety and health rules and requirements for all project personnel.

Client, AECOM subcontractor and third party employees performing work that potentially exposes them to the hazards at the site are responsible for the safety and health for their personnel, must work under their own HASP and are also expected to review and acknowledge this HASP as a recognition of the SH&E standards that AECOM expects outside personnel to uphold.

Subcontractors shall comply with the requirements of the health and safety provisions contained within the contract document and all applicable rules, requirements and health, safety and environmental regulations. All practical measures shall be implemented to promote safety and maintain a safe place to work. Contractors are wholly responsible for the prevention of accidents on work under their direction and shall be responsible for maintenance of thorough safety and loss control programs and the execution of their own safety plans for the protection of workers.

1.3 References

This HASP conforms to the regulatory requirements and guidelines established in the following documents:

- Title 29, Part 1910 of the Code of Federal Regulations (29 CFR 1910), Occupational Safety and Health Standards (with special attention to Section 120, Hazardous Waste Operations and Emergency Response).
- Title 29, Part 1926 of the Code of Federal Regulations (29 CFR 1926), Safety and Health Regulations for Construction.
- National Institute for Occupational Safety and Health (NIOSH)/OSHA/U.S. Coast Guard (USCG)/EPA, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, Publication No. 85-115, 1985.

2.0 Site Information and Scope of Work

AECOM will complete Additional Site Investigation Activities at the Former O'Keefe Properties located at 1463 Red Maple Road in the City of DePere, Wisconsin. Work will be performed in accordance with the applicable Statement of Work (SOW) and associated Project Work Plan developed for project site. Deviations from the SOW will require that a Safety Professional review and changes be made to this HASP to ensure adequate protection of personnel and property.

The following is a summary of relevant data concerning the project sites, and the work procedures to be performed. The Project Work Plan prepared by AECOM as a companion document to this HASP provides more detail concerning both site history and planned work operations.

2.1 Site Information

This section provides a general description and historical information associated with the site.

2.1.1 General Description/Background/History

The former O'Keefe Properties is owned by the City of De Pere and is located at 1463 Red Maple Road in the southwest portion of the City of De Pere, Wisconsin. The site consists of five adjoining parcels. The site is bounded to the north by Red Maple Road, to the east by Richco Road, to the south by the potential extension of the Richco Road, American Boulevard corridors, and agricultural land, and west by residential and agricultural land. A section of South Bridge Road passes through the rea between two of the parcels. The site is currently vacant except for the street rights-of-way. Gravel parking lots from former business operations are present in some areas. However, much of the site is overgrown with vegetation.

A Phase I Environmental Site Assessment (ESA) completed at the site identified a number of recognized environmental conditions (RECs) related to past uses of the property. Subsequent Phase II Environmental Investigation activities at the property confirmed impacts to soil and groundwater. Additional sampling is necessary to delineate the soil polynuclear aromatic hydrocarbons (PAHs), lead, and arsenic exceedances and address the groundwater exceedances of dissolved arsenic and naphthalene.

2.2 Scope of Work

The scope of work includes obtaining the subsurface soil and groundwater samples required to further evaluate impacts at the site. AECOM will provide project management, oversight, sampling, and sample screening to support the project. The specific major field tasks being implemented at the site may include:

Soil boring and groundwater sampling activities will include:

- Mobilization to the site and rig-up for work;
- Utility clearance;
- Drilling and sampling of soil borings using direct push probe, hollow stem auger or other drilling procedures;
- Screening of soil samples by visual and olfactory observations and with field instruments;
- Installation and sampling of temporary or permanent monitoring wells;
- Selecting, packaging and shipment of samples for laboratory analysis;
- Closure/abandonment of boreholes;
- Personal and equipment decontamination;
- Rig-down and demobilization from the site; and,
- Performing other services required to support project activities

2.2.1 Additional Work Operations

Operations at the site may require additional tasks not identified in this section or addressed in Attachment A, THAs. Before performing any task not covered in this HASP, a THA must be prepared and approved by the Safety Professional.

3.0 Project Health and Safety Organization

3.1 Project Manager

The Project Manager (PM; Donna Volk, P.G., C.P.G.) has overall management authority and responsibility for all site operations, including safety. The PM will provide the site supervisor with work plans, staff, and budgetary resources, which are appropriate to meet the safety needs of the project operations.

3.2 Site Supervisor

The site supervisor has the overall responsibility and authority to direct work operations at the job site according to the provided work plans. The PM may act as the site supervisor while on site.

3.2.1 Responsibilities

The site supervisor is responsible for:

- Discussing deviations from the work plan with the SSO and PM.
- Discussing safety issues with the PM, SSO, and field personnel.
- Assisting the SSO with the development and implementation of corrective actions for site safety deficiencies.
- Assisting the SSO with the implementation of this HASP and ensuring compliance.
- Assisting the SSO with inspections of the site for compliance with this HASP and applicable SOPs.

3.2.2 Authority

The site supervisor has authority to:

- Verify that all operations are in compliance with the requirements of this HASP, and halt any activity that poses a potential hazard to personnel, property, or the environment.
- Temporarily suspend individuals from field activities for infractions against the HASP pending consideration by the SSO, the Safety Professional, and the PM.

3.2.3 Qualifications

In addition to being Hazardous Waste Operations and Emergency Response (HAZWOPER)-qualified (see Section 4.1), the Site Supervisor is required to have completed the 8-hour HAZWOPER Supervisor Training Course in accordance with 29 CFR 1910.120 (e)(4).

3.3 Site Safety Officer

3.3.1 Responsibilities

The SSO is responsible for:

- Updating the site-specific HASP to reflect changes in site conditions or the scope of work. HASP updates must be reviewed and approved by the Safety Professional.
- Being aware of changes in AECOM Safety Policy.
- Monitoring the lost time incidence rate for this project and work toward improving it.
- Inspecting the site for compliance with this HASP and the SOPs using the appropriate audit inspection checklist provided by an AECOM Safety Professional.
- Working with the site supervisor and PM to develop and implement corrective action plans to correct deficiencies discovered during site inspections. Deficiencies will be discussed with project management to determine appropriate corrective action(s).
- Contacting the Safety Professional for technical advice regarding safety issues.
- Providing a means for employees to communicate safety issues to management in a discreet manner (i.e., suggestion box, etc.).

- Determining emergency evacuation routes, establishing and posting local emergency telephone numbers, and arranging emergency transportation.
- Checking that all site personnel and visitors have received the proper training and medical clearance prior to entering the site.
- Establishing any necessary controlled work areas (as designated in this HASP or other safety documentation).
- Presenting tailgate safety meetings and maintain attendance logs and records.
- Discussing potential health and safety hazards with the Site Supervisor, the Safety Professional, and the PM.
- Selecting an alternate SSO by name and inform him/her of their duties, in the event that the SSO must leave or is absent from the site.

3.3.2 Authority

The SSO has authority to:

- Verify that all operations are in compliance with the requirements of this HASP.
- Issue a “Stop Work Order” under the conditions set forth in this HASP.
- Temporarily suspend individuals from field activities for infractions against the HASP pending consideration by the Safety Professional and the PM.

3.3.3 Qualifications

In addition to being HAZWOPER-qualified, the SSO is required to have completed the 8-hour HAZWOPER Supervisor Training Course in accordance with 29 CFR 1910.120 (e)(4). The SSO may also serve as the Site Supervisor.

3.4 **Employees**

3.4.1 Employee Responsibilities

Responsibilities of employees associated with this project include, but are not limited to:

- Understanding and abiding by the policies and procedures specified in the HASP and other applicable safety policies, and clarifying those areas where understanding is incomplete.
- Providing feedback to health and safety management relating to omissions and modifications in the HASP or other safety policies.
- Notifying the SSO, in writing, of unsafe conditions and acts.

3.4.2 Employee Authority

The health and safety authority of each employee assigned to the site includes the following:

- The right to refuse to work and/or stop work authority when the employee feels that the work is unsafe (including subcontractors or team contractors), or where specified safety precautions are not adequate or fully understood.
- The right to refuse to work on any site or operation where the safety procedures specified in this HASP or other safety policies are not being followed.
- The right to contact the SSO or the Safety Professional at any time to discuss potential concerns.
- The right and duty to stop work when conditions are unsafe, and to assist in correcting these conditions.

3.5 **Safety Professional**

The Safety Professional (Bill Looney) is the member of the AECOM Safety, Health and Environmental Department assigned to provide guidance and technical support for the project. Duties include the following:

- Approving this HASP and any required changes.
- Approving the designated Site Safety Officer (SSO).
- Reviewing all personal exposure monitoring results.

- Investigating any reported unsafe acts or conditions.

3.6 AECOM Regional Safety, Health and Environmental Manager (RSHEM)

The AECOM RSHEM (Nash Doyle) or his designated representatives (Bill Looney and Dan Schillings, District SHEM) are the individuals responsible for the preparation, interpretation and where appropriate, modification of this HASP. Modifications to this HASP which might result in less stringent precautions cannot be undertaken by the PM or the SSO without the approval of the RSHEM. Specific duties of the RSHEM include:

- Writing, approving and amending the HASP for this project;
- Advising the PM and SSO on matters relating to health and safety on this site;
- Recommending appropriate personal protective equipment (PPE) and respiratory equipment to protect personnel from potential site hazards;
- Facilitating accident investigations;
- Maintaining regular contact with the PM and SSO to evaluate site conditions and new information that might require modifications to the HASP, and;
- Conducting random project audits.

3.7 Subcontractors

The requirements for subcontractor selection and subcontractor safety responsibilities are outlined in *S3NA-213-PR Subcontractors*. Each AECOM subcontractor is responsible for assigning specific work tasks to their employees. Each subcontractor's management will provide qualified employees and allocate sufficient time, materials, and equipment to safely complete assigned tasks. In particular, each subcontractor is responsible for equipping its personnel with any required personnel protective equipment (PPE) and all required training.

AECOM considers each subcontractor to be an expert in all aspects of the work operations for which they are tasked to provide, and each subcontractor is responsible for compliance with the regulatory requirements that pertain to those services. Each subcontractor is expected to perform its operations in accordance with its own unique safety policies and procedures to ensure that hazards associated with the performance of the work activities are properly controlled. Copies of any required safety documentation for a subcontractor's work activities will be provided to AECOM for review prior to the start of onsite activities, if required.

Hazards not listed in this HASP but known to any subcontractor, or known to be associated with a subcontractor's services, must be identified and addressed to the AECOM PM or the Site Supervisor prior to beginning work operations. The Site Supervisor or authorized representative has the authority to halt any subcontractor operations and to remove any subcontractor or subcontractor employee from the site for failure to comply with established health and safety procedures or for operating in an unsafe manner.

3.8 Visitors

Authorized visitors (e.g., client representatives, regulators, AECOM management staff, etc.) requiring entry to any work location on the site will be briefed by the PM or Site Supervisor on the hazards present at that location. Visitors will be escorted at all times at the work location and will be responsible for compliance with their employer's health and safety policies. In addition, this HASP specifies the minimum acceptable qualifications, training and personal protective equipment which are required for entry to any controlled work area; visitors must comply with these requirements at all times.

3.8.1 Visitor Access

Visitors to any HAZWOPER controlled-work area must comply with the health and safety requirements of this HASP, and demonstrate an acceptable need for entry into the work area. All visitors desiring to enter any controlled work area must observe the following procedures:

- A written confirmation must be received by AECOM documenting that each of the visitors has received the proper training and medical monitoring required by this HASP. Verbal confirmation can be considered acceptable provided such confirmation is made by an officer or other authorized representative of the visitor's organization.
- Each visitor will be briefed on the hazards associated with the site activities being performed and acknowledge receipt of this briefing by signing the appropriate tailgate safety briefing form.
- All visitors must be escorted by an AECOM employee.

Unauthorized visitors, and visitors not meeting the specified qualifications, will not be permitted within established controlled work areas.

4.0 Hazard Assessment (Safety)

4.1 Physical Hazards

The following potential physical hazards have been identified:

Vehicle Operation	Electrical	High Pressure Liquids
Overhead Utilities	Lifting	Falling objects
Underground Utilities	Noise	Flying debris
Traffic	Dust	Biologic Hazards (plants; insects, animals)
Slips, Trips and Falls	Sharp Objects	Weather (Heat and Cold Stress; sunburn)
Heavy Equipment Operation (e.g., drill rigs, direct push rigs)	Splashing Liquids	Inclement Weather
Rotating Equipment (drive pulleys and belts)	Corrosive Liquids	Poor Lighting
Pinch Points	Flammable Liquids	Personal Safety

Note: This list should not be considered to be all-inclusive. ADDITIONAL PHYSICAL HAZARDS MAY BE PRESENT.

4.1.1 Vehicle Safety

Refer to SH&E SOP *S3NA-005-PR Vehicle and Driver Safety Program*. Make sure that the following basic safe driving practices are followed at all times while working on this project:

- Always wear a seat belt while operating a motor vehicle or while traveling as a passenger.
- Obey speed limits and local traffic laws at all times.
- Obtain proper directions to the site in advance and take the route that is most likely to be free of known traffic hazards (e.g., congestion, construction, etc.) and that avoids travel through potentially dangerous neighborhoods.
- Leave early to allow for contingencies.
- Prior to entering the vehicle, inspect the vehicle.
- Do not move your vehicle unless all equipment and supplies are secured. Items and material which may roll, slide, or move about in your vehicle while traveling are a major hazard. Secure the load
- Abstain from distractions while driving (e.g., the use of cell phones, eating/drinking, reading maps, etc.) If necessary, stop the vehicle and pull over to perform such activities safely. AECOM policy is engine on, cell phone off.
- Do not operate a motor vehicle if you are tired and/or have not had sufficient rest.

DOT Requirements

If you are to operate a vehicle exceeding 10,000 pounds (or vehicle and trailer with a combined weight over 10,000 pounds), or you are to transport greater than 1,000 pounds of hazardous materials, you MUST comply with DOT regulations. These are NOT addressed in this HASP; contact the H&S Department if this applies.

Emergency Procedures:

Always move out of traffic if possible; even if those in front of you have stopped. Stopping on an active highway can precipitate being hit from the rear. If you must stop on an active roadway, leave at least one car length in front of you, and watch the rear mirror, so you can ease up if someone behind can't stop. Keep your flashers on in this situation. If you are the only driver coming to a stop on an active roadway, leave the flashers on and when safe to do so, exit the car and get to a safe location.

If you must stop due to vehicle failure, etc. try to coast out of traffic. Put on your flashers, and tie a white handkerchief, etc. on the driver's side door or mirror. If you remain in the vehicle, lock the doors. Use your cell phone to summon help.

4.1.2 Unused Buildings Hazards

Some structures at the site may be unused or abandoned. When our work requires us to be in or near these type buildings, we must address the risks associated with the building and neighborhood. These risks include transient occupants of the building, poor lighting and ventilation, and disrepair of the building structure. To help ensure the security of employees performing activities at these sites, the following precautions should be observed.

If possible, avoid working alone at these sites. On most sites, client, subcontractor, or public service personnel are generally nearby in case of an emergency or accident. AECOM personnel, through prearranged coordination, can rely upon these personnel for assistance in an emergency.

Be aware that the physical condition of the building could be a hazard. If the power is off there will be no lighting or ventilation. Bring portable lighting sufficient to perform your task and to navigate the building safely.

Without natural or induced ventilation several conditions can reduce the oxygen level in closed rooms or basements. These conditions include rusting iron, rotting organic matter, natural gas and refrigerant leaks. If there is a potential that any of these conditions will exist, an oxygen meter should be used to verify that the oxygen level is above 19.5%

4.1.3 Slips, Trips, Falls and Protruding Objects

A variety of conditions may exist that may result in injury from slips, trips, falls, and protruding objects. Slips and trips may occur as a result of wet, slippery, or uneven walking surfaces. To prevent injuries from slips and trips, always keep work areas clean; keep walkways free of objects and debris; and report/clean up liquid spills. Serious injuries may occur as a result of falls from elevated heights. Always wear fall protection while working at heights of 6 feet or greater above the next lower level. Protruding objects are any object that extends into the path of travel or working area that may cause injury when contacted by personnel. Always be aware of protruding objects and when feasible remove, protect or label the protruding object with an appropriate warning.

4.1.4 Housekeeping

During site activities, work areas will be continuously policed for identification of excess trash and unnecessary debris. Excess debris and trash will be collected and stored in an appropriate container (e.g., plastic trash bags, garbage can, roll-off bin) prior to disposal. At no time will debris or trash be intermingled with waste PPE or contaminated materials. Procedures outlined in NA SH&E SOP *S3NA-307-PR Housekeeping, Worksite* will be followed.

4.1.5 Manual Lifting

Most materials associated with investigation and remedial activities are moved by hand. The human body is subject to severe damage in the forms of back injury, muscle strains, and hernia if caution is not observed in the handling process. Whenever possible, use mechanical assistance to lift or move materials and at a minimum, use at least two people to lift, or roll/lift with your arms as close to the body as possible. Procedures outlined in NA SH&E SOP *S3NA-308-PR Manual Lifting, Field* will be followed.

4.1.6 Utilities

Various forms of underground/overhead utility lines or pipes may be encountered during site activities. Prior to the start of intrusive investigative operations, utility clearance is mandated, as well as obtaining authorization from all concerned public utility department offices. If insufficient data is available to accurately determine the location of the utility lines, AECOM will hand clear to a depth of at least five feet below ground surface in the proposed areas of subsurface investigation. Should intrusive operations cause equipment to come into contact with utility lines, the SSO and an AECOM SH&E Professional will be notified immediately. Work will be suspended until the applicable utility agency is contacted and the appropriate actions for the particular situations can be taken. The phone number for the applicable state agency is provided in the Emergency Contacts list found in Section 11.

For additional requirements, refer to NA SH&E SOP S3NA-417-PR, *Utilities, Underground* and S3NA-406-PR *Electrical Lines, Overhead*. Overhead power and utility lines may be present on, or adjacent to, the site and represent a potential hazard during the mob/demob of equipment and supplies. Ensure equipment operators, truck drivers, etc. and signal person are aware of overhead power lines and maintain a safe distance.

4.1.7 Hydrovac Utility Locate/Excavation

The following precautions pertain to hydrovac operations used to clear utilities:

<u>High Pressure Water</u>:

- All pipes, hoses, and fittings must have a rating of the maximum pressure of the equipment

- Shutoff valves should be located (as near as possible) at the point-of-operation.
- High pressure water must not be used under any circumstances to clean dirt and dust from clothing or off a person's skin.
- Goggles, face shields, or other eye protection must be worn by personnel within ten feet of the hydrovac operation.
- Pumps should never be operated at capacities/speeds greater than the manufacturers' recommendation.
- Equipment should not become overheated.
- Moving parts, such as compressor flywheels, pulleys, and belts that could be hazardous should be effectively guarded.

Vacuum Systems:

Use of high volume vacuum equipment to remove material during hydrovac operations can create hazard for the operator and the work crew.

- It's possible for the operator to get stuck on the suction end of the hose. If the suction isn't broken quickly, the skin can rupture under the high vacuum and fluids can be sucked from the body. Vacuum trucks should have either a suction breaking device or an additional operator near the intake valve. Workers at the site must know where the intake valve and suction breaking device are located and how to operate them in event of an emergency.
- If the vacuum is used to remove flammable materials, an explosive atmosphere can be created in the vacuum tank. Vacuum systems used for flammable materials must be rated for flammable materials. Truck engines are an ignition source. They must be operated upwind of any source of vapor including the vacuum pump vent and the work area containing the flammable material. With nonconductive hose, any exposed metal, such as a hose flange, can accumulate static electricity and act as an ignition source if the metal touches or comes close to ground. If nonconductive hoses are used vacuum or discharge a flammable liquid, the metal parts shall be bonded, the hose and the tank or receiving vessel shall be bonded, and the bonding system shall be grounded.
- When volatile flammable or toxic liquids are loaded, the vacuum pump exhaust should be extended downwind by attaching a length of hose sufficient to allow venting to a hazard-free area away from people and ignition sources.

4.1.8 Heavy Equipment (Drill Rigs, Direct Push Rigs etc.)

Refer to SH&E SOP *S3NA-309-PR Mobile or Heavy Equipment*. Working around heavy equipment (drill rigs, dump trucks, backhoes, dozers etc.) poses potential hazards to employees. Such equipment can cause trauma injuries to the operator or nearby workers. It may also roll over, or fall on sloped ground or unstable soil. AECOM personnel are to remain clear of operating heavy equipment to the extent feasible.

When working around heavy equipment, employees should:

- Ensure that the operator is aware of your presence/activities;
- Stay in the operator's line of sight; don't work in his/her blind spot;
- Approach areas where equipment is operating from a direction visible to the operator;
- Develop a series of hand signals to facilitate communication with the operator

4.1.9 Concrete and Asphalt Coring, Cutting, Breaking

Cutting and coring and breaking concrete and asphalt can involve numerous hazards. The noise generated as a result of the tools used, and adequate hearing protection is necessary when conditions outlined in the Noise section below are encountered. Tools used which can include drills and saws, must be appropriately guarded to prevent hands, PPE, and other objects from being caught-up in the moving parts and drawing employees in. Dust may also be generated while cutting concrete and either respiratory protection or dust suppression will need to be utilized to prevent exposure. Additional consideration must be given chemical hazard concerns that may exist in the materials underlying the concrete.

4.1.10 Drilling Operations

Drilling operations, including hollow-stem, rotary and/or direct push drilling, present their own set of hazards. Several basic precautions that should be taken include, but are not limited to, confirming locations of underground and overhead utilities, wearing of appropriate PPE and the avoidance of loose clothing or jewelry, staying clear of moving parts, and knowing the locations of emergency shut-off switches. Detailed information regarding safety concerns and mitigation procedures are contained in SHE SOP *S3NA-405-PR, Drilling, Boring, and Direct Push Probing*. Additionally, prior to initiating operations,

always contact the local utility locator service. Utilities shall be marked and cleared as detailed *in S3NA-417-PR, Utilities, Underground*. Overhead utilities must also be identified in accordance with *S3NA-406-PR, Electrical Lines, Overhead*.

4.1.11 Flying Objects Hazards

Activities involving the use of power tools, heavy equipment, and hand tools, among other activities, can create flying object hazards where objects can become projectiles. When the potential of flying objects exists, employees must use the appropriate PPE including hard hats, safety goggles, and face shields to prevent projectiles from causing injuries.

4.1.12 General Electrical Hazards

Electrical and powered equipment may be used during a variety of site activities. Injuries associated with electrical and powered equipment include electric shock, cuts/lacerations, eye damage (from flying debris), and burns. Refer to AECOM SH&E SOP *S3NA-302-PR Electrical, General* and *S3NA-410-PR Hazardous Energy Control* for discussion and procedures to reduce risk of injury. To reduce the potential of injury from the hazards associated with electrical and powered equipment, always comply with the following:

- Use ground fault circuit interrupters (GFCIs) when using electrical powered tools/equipment. GFCIs prevent electrical shock by detecting the loss of electricity from a power cord and/or electrical device.
- Ensure generators are properly grounded, including the use of a grounding rod, driven to a depth of 3-feet.
- Wear ANSI-approved (Z87.1) safety glasses. Face shields may be required to provide additional face protection from flying debris.
- Wear appropriate work gloves. Work gloves may reduce the severity of burns and cuts/lacerations.

All temporary electric installations (site trailer, subpanels) will comply with OSHA (29 CFR 1926, Subpart K, and 29 CFR 1910, Subpart S) guidelines. Only qualified and competent individuals (licensed electrician) will provide electrical service/servicing. Refer to *S3NA-410-PR Hazardous Energy Control*, for additional requirements and information.

4.1.13 Compressed Gasses

Refer to S3NA-506-PR *Compressed Gases.*

Nitrogen or compressed air may be used to inflate bladder pumps, operate sampling equipment, pneumatic tools, and in other tasks. Specific chemical gas standards may be used to calibrate and operate monitoring and analysis equipment. Follow the compressed gas handling procedures as outlined below and in applicable SH&E SOPs.

- Inspect all cylinders upon delivery and verify that they are properly labeled.
- Do not store cylinders in direct sunlight (increase in temperature will increase pressure)
- Use a cylinder dolly to move large cylinders. Ensure the cylinders are secured to the dolly.
- Keep cylinder valves closed at all times (except when in use).
- Open valves slowly and away from people
- Close the valve and relieve the pressure before removing the regulator
- When cylinders are not in use, regulators should be removed, the valve cover installed and the cylinder returned to the storage area
- Always keep the valve cap over the valve assembly when not in use (break in valve will cause cylinder to become a projectile).
- Cylinders must be stored in the upright position and must be secured by a chain or rope.
- Full and empty oxidizing gas cylinders (such as oxygen and compressed air) and fuel gas cylinders (such as hydrogen and acetylene) must be separated by at least ten feet
- Segregate empty cylinders from full cylinders.

4.1.14 Dust and Odor Control

Specific controls will be in place to prevent dust generation. If dust is observed reaching or approaching the site boundary, activities causing the dust will be immediately stopped. Dust control measures (water spray, soil covers, slower work pace, or change in work activities) will be deployed prior to resuming work. Corrective measures will be documented in the daily report.

Due to the nature of the contaminants at the site, odors may be of concern. In the event that an odor complaint is received, the Site Supervisor and/or SSO will immediately assess site conditions and determine the probable cause or causes. Appropriate odor mitigation measures will be deployed. These measures may include covering sediment piles, deploying odor suppressing foam, implementation of air monitoring or discontinuing activities that are generating the odor. Corrective measures will be documented in the daily report.

4.1.15 Spill Prevention

Work activities may involve the use of hazardous materials (i.e. fuels, solvents) or work involving drums or other containers. The following procedures will be used to prevent or contain spills:

- All hazardous material will be stored in appropriate containers
- Tops/lids will be placed back on containers after use.
- Containers of hazardous materials will be stored appropriately away from moving equipment.
- At least one spill response kit, to include an appropriate empty container, materials to allow for booming or diking the area to minimize the size of the spill, and appropriate clean-up material e.g., Oil Dri) shall be available at each work site (more as needed).
- All hazardous commodities in use (i.e. fuels) shall be properly labeled.
- Containers shall only be lifted using equipment specifically manufactured for that purpose.
- For drums/containers, follow the procedures in *S3NA-308-PR, Manual Lifting*, *Field*, to minimize potential for injury or spill.

4.1.16 Traffic Control

4.1.16.1 AECOM Employees

This site may have open access to the public, work in traffic right of ways and/or operational vehicular traffic (e.g., forklifts). As such, traffic will be a concern to the field teams. When working in high traffic areas or inside structures, the following precautions should be implemented.

- Notify the property owner and tenants of your work location, dates of work and the anticipated work times. Suggest the possibility of a detour around the work area.
- Wear an ANSI-approved Class II or III reflective safety vest when working in or near an active roadway.
- Set up traffic cones, safety barriers or barrels 50 feet in front of the work area. "Men at Work" signs should also be placed in a conspicuous area to warn others of your presence.
- Consider working off-hours when traffic is at a minimum.

4.1.16.2 Work On/Adjacent to Public Roadways

If field activities may occur along or in a public roadway or right-of-way, the AECOM field team leader or PM must contact the local police department to determine if a police detail or traffic plan is required. Consult SH&E SOP S3NA-306-PR, *Highway and Road Work.*

Specific requirements exist when traffic must be redirected around a work area that is on or adjacent to a public roadway. In certain locations only police officers may redirect traffic. As a minimum, OSHA requires that flaggers be formally trained in accordance with the requirements specified in ANSI D6.1-1971. As a result, AECOM personnel should not redirect traffic on public roadways. When traffic must be redirected, and the local police do not perform that role, a traffic control firm should be hired (these are frequently listed in the yellow pages under "safety").

4.1.16.3 Patrons, Residents, General Public

The facilities may be open to the public while operations are taking place. A restricted zone will be established around those areas where work activities are occurring. The purpose of this restricted zone is to warn of the potential physical hazards associated with the activities being performed or supervised by AECOM. If space permits, a 20-foot radius restricted zone will be established around the work area. The restricted zone should be outlined with traffic cones, barricades, fencing or "Caution Tape" to prohibit entry by the general public.

4.1.17 Steam Cleaning/Pressure Washing

A high pressure steam cleaner or pressure washer may be used to decontaminate equipment. Workers using steam cleaning/pressure washing equipment or working within six feet of a steam cleaner/pressure washer use must wear a face shield over their safety glasses or goggles. Heat protective gloves should be work by workers handling the steam hose and nozzle. Long sleeve cotton shirts are recommended when using a steam cleaner.

- Never point the nozzle of the steam cleaner at any person.
- Avoid using the steam cleaner on containers of flammable liquids or gasses.
- Release the pressure before disconnection the nozzle or hoses.

4.1.18 Wildlife, Plant and Insect Hazards

Refer to *S3NA-313-PR Wildlife, Plants and Insects*, for additional information on hazard recognition and mitigation.

Commercial insect sprays (both repellents and insecticides) may contain chemicals that would adversely affect sample results. Avoid direct spraying around sample containers, bailers, open wellheads, etc. Consult with the project manager for guidance to avoid compromising sample analysis while still providing protection to workers

4.1.18.1 Reporting

When hazardous insects are observed or suspected, alert other site workers of the location of the hazardous area.

Report stings or bites to your immediate supervisor or SSO to begin the case management process. Complete the SHE Occupational Injury / Illness First Report and proceed as directed by the SHE Department.

4.1.18.2 Bees, Hornets, Wasps

<u>Hazards:</u>

- Encounters with flying, stinging insects often occur when nests are disturbed or threatened.
- Nesting areas commonly include well casings, excavation areas, electrical panels, trailer hitches, storage areas, trash cans, building eaves or overhangs, sign posts, hollow core metal doors, subsurface vaults, trees, unused vehicles or equipment, stored piping, and any similar locations that may have been undisturbed for a time.
- Before approaching or opening a well casing or similar semi-enclosed item or area, take a few moments to observe whether or not insects are flying around the item.
- If insects are observed, try to avoid the item if possible. If no insects are seen, approach with caution, tap or prod the item from a distance, and listen for buzzing. When you are reasonably certain that the item is not harboring insects or a nest, proceed with work.

<u>If a person is stung or attacked:</u>

- Stinging insects fly around the top of their target, so protect your head and move quickly away.
- If you are in a vehicle, stop safely and open all the windows.
- If you are stung, look for a stinger and remove it immediately (within 15 seconds if possible).
- Remove the stinger by wiping the area with a gauze pad, or by scraping a fingernail over the area.
- Never squeeze the stinger or use tweezers, as this may cause more venom to go into the skin and injure the muscle.
- Apply ice, over-the-counter sting relief products, or a simple cold compress to alleviate the pain of the sting. Ice will also reduce the swelling.

<u>Symptoms of Allergic Reactions:</u>

- Reactions vary widely from person to person, and the same person's sensitivity may change over time, becoming more severe.
- Reactions to a sting range from mild irritation to death. The sting site will likely hurt, have a hard swollen lump, get red, and itch.
- If the sting occurs in the neck or the mouth, or if severe symptoms are present, seek medical attention immediately.
- Swelling can quickly result in airway restriction. According to the CDC, these signs indicate a potentially life-threatening condition:
- Swelling that moves from the sting site to other parts of the body, especially the face or neck
- Breathing difficulty, wheezing
- Drop in blood pressure
- If you know you are allergic to stings and bites, be sure to take treatment supplies with you when you are away from an office or vehicle.
- Tell someone working with you exactly what to do if you are stung, including the specific conditions that may require emergency assistance.

4.1.18.3 Ticks

Hazards:

- Ticks in North America can be carriers of several diseases, including Lyme disease, Rocky Mountain Fever, and ehrlichiosis.
- Limiting exposure to ticks reduces the likelihood of infection if exposed to tick-infested habitats.

Prevention:

- Remove leaf litter and brush in work areas before tick season starts.
- Wear light-colored clothing so that ticks are visible.
- Tuck your pant legs into your socks.
- Apply repellents to discourage tick attachment.
- Promptly inspect your body and remove crawling or attached ticks when you leave a tick-infested area.
- Inspect field gear and vehicles for crawling ticks that could attach later.

Recommended Removal & Treatment Procedures:

- Use a specially-designed tick removal tool, fine-tipped tweezers, or shield your fingers with tissue, paper towel, or nitrile or rubber gloves.
- Grasp the tick as close to the skin surface as possible and pull upward with steady, even pressure.
- Do not twist or jerk the tick as this may cause mouthparts to break off and remain in the skin.
- Do not squeeze, crush, or puncture the body of the tick because its fluids may contain infectious organisms.
- Do not handle the tick with bare hands because infectious agents may enter through mucous membranes or breaks in the skin.
- After removing the tick, thoroughly disinfect the bite site and wash your hands with soap and water.
- You may wish to save the tick for identification in case you become ill within 2 to 3 weeks. Place the tick in a resealable plastic bag in the freezer, and mark the bag with the date of the bite.

4.1.18.4 Mosquitoes

Hazards:

Mosquitoes in the US have been known to carry West Nile Virus, St. Louis encephalitis, and Dengue Fever. Consult local authorities to obtain the most current information on the specific disease concerns and status for your local area.

West Nile Virus (WNV)

Information source: CDC website. WNV is transmitted to humans through bites from an infected mosquito.

- Mosquitoes become infected when they feed on infected birds
- not contagious from person to person
- no evidence that a person can be infected with WNV by handling live or dead infected birds
- CDS recommends using a protective barrier (gloves, inverted plastic bag) if you must handle a dead bird or other animal
- most WNV-infected humans have no symptoms
- a small proportion of infected persons will develop fever, headache, body aches, skin rash, swollen lymph glands
- fewer than 1% of infected people develop more severe illness including meningitis or encephalitis (symptoms can include headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness or paralysis) which can be fatal
- medical care should be sought as soon as possible for persons who have symptoms suggesting severe illness

Precautions & Prevention:

- The best prevention is to avoid being bitten by any mosquitoes.
- Apply insect repellent containing DEET (N, N-diethyl-meta-toluamide) when you are outdoors.
- Read and follow the product directions for any insect repellent.
- Wear long-sleeved clothes and long pants treated with repellent to further reduce your risk.
- If possible, stay indoors during the peak mosquito feeding hours of dusk to dawn.
- Limit the number of places available for mosquitoes to lay their eggs by eliminating standing water sources from around the work area.

4.1.18.5 Chiggers

Hazards:

- Chigger bites are from the tiny six-legged larvae of the chigger mite, which are so small that they can't be seen without a magnifying glass.
- Chiggers hide out in the grass, weeds, and vegetation, and then bite their victim by inserting their mouthparts into a pore or hair follicle of the skin.
- Within 3 to 6 hours of exposure to a chigger, a small, inflamed welt will appear on the skin, and will itch intensely.
- Itching can continue for a week or more, and if nothing is done to relive itching, secondary infections may develop from scratching. Chiggers are not known to carry disease in the U.S.

Precautions & Prevention:

- Mow vegetation from the working area.
- Eliminate shade and moisture from the area.
- Wear high boots and pants made out of tightly woven fabric.
- Tuck your pants into your socks or boots.
- Wear an insect repellent that is applied to skin, clothing, and clothing openings.
- Don't sit on or kneel in the grass.
- Stick to roads and trails.

Treatment after Field Work or Exposure:

- Wash your clothes in hot, soapy water. If you can't wash your clothes, put them in a sealed, plastic bag. Don't wear clothes again until they are washed in hot water or exposed to hot sunshine.
- Take a hot bath or shower, and wash with soap numerous times to dislodge larvae.
- If you are bitten, there are numerous over-the-counter treatments that your pharmacist can recommend, such as benzocaine, hydrocortisone, and calamine lotion.
- Treat your itching as soon as possible to prevent secondary infection from scratching.

4.1.18.6 Spiders

The most dangerous spiders to humans in North America are black widows and brown spiders (also known as brown recluse or fiddleback spiders). A guide to identifying these spiders is presented in the figure below:

Black Widow Spider

- Abdomen usually shows hourglass marking
- The female is 3-4 centimeters in diameter.
- Have been found in well casings and flush-mount covers.
- Not aggressive, but more likely to bite if guarding eggs.
- Light local swelling and reddening of the bite are early signs of a bite, followed by intense muscular pain, rigidity of the abdomen and legs, difficulty breathing, and nausea.
- If bitten, see physician as soon as possible.

Brown Spiders (Recluse)

- Central & South US, although in some other areas, as well.
- ¼ to ½ inch long body, and size of silver dollar
- Hide in baseboards, ceiling cracks, and undisturbed piles of material
- Bite either may go unnoticed or may be followed by a severe localized reaction, including scabbing, necrosis of affected tissue, and very slow healing.
- If bitten, see physician as soon as possible.

4.1.18.7 Reptiles, Birds, Bats

Snakes

Precautions & Treatment:

- Venomous snakes found in Wisconsin include the eastern massasauga and timber rattlesnake. Other non-venomous snakes such as black snakes, garter snakes and milk snakes may also be found.
- Leave snakes alone. Many people are bitten because they try to kill a snake or get a closer look at it. If you encounter a snake, walk around it, giving it a berth of about 6 feet.
- Stay out of tall grass, wear thick leather boots, and remain on paths as much as possible.
- Keep hands and feet out of areas that you can't see.
- If someone is a snakebite victim, the following first aid should be administered:

- Wash the bite with soap and water.
- Immobilize the bitten area and keep it lower than the heart.
- Get medical help immediately.
- There is a lot of false advice about how to treat snakebites. Do not ice or cool the bite, apply a tourniquet, or cut into the wound!

Birds & Bats

Hazards:

- Large populations of roosting birds or bats may present a serious health risk from disease organisms growing in the accumulations of droppings, feathers, and debris under a roost, especially if roosts have been active for years.
- The two most common fungal diseases associated with bird droppings are Histoplasmosis and Cryptococcosis.
- Birds may also carry or transmit other diseases that can attack humans such as West Nile Virus. Avian Flu may become a threat in the near future.

Prevention and treatment:

- If you are working in an area where large quantities of droppings are present, follow these precautions to minimize health risks:
- Wear a respirator that can filter particles as small as 0.3 microns, such as a HEPA filter.
- Wear disposable protective gloves, hat, coveralls, and boots if you will be in close contact.
- Wash or shower at the work site after cleanup, if possible.
- Modify the structure or use methods to prevent birds from re-establishing the roost.
- Contact local health department if unexplained dead birds are found. Do not collect the bird unless advised to do so by the health department.

See additional precautions under the Rodent-Borne Disease section below.

4.1.18.8 Animal Hazards

Dogs, Cats, Raccoons, Foxes, Coyotes, Deer

Hazards:

- Dangers from direct bites or by transmitting insects or disease.
- Scavengers in trash or stored materials
- Packs of feral dogs, individual animals, and uncontrolled domestic animals may all present hazards.
- Dead animals (disease, odors; carcass may attract other birds and animals)
- Potential traffic hazard for site vehicles and equipment (driver may swerve to avoid animal)
- Prevention & Precautions:
- Avoid close contact with any live or dead animal on the site.
- If you observe unusual animal behaviors, such as a raccoon that is active in the daytime, it may indicate that the animal is diseased.
- If animals are interfering with site operations or present a hazard, call the local animal control authority. If a wild animal appears to be diseased or is injured, contact a State Wildlife Office.
- If a dog approaches you, reduce your chances of being attacked by remaining calm; don't scream. Avoid eye contact. If you say anything, speak calmly and firmly.
- Don't run away or run past the dog. Don't turn and run.
- Try to stay still until the dog leaves, or back away slowly until the dog is out of sight.

- If you fall to the ground or are knocked down, curl into a ball, placing your hands over your head and neck. Protect your face.

Treatment & Reporting:

- If a dog bites someone, restrain the dog immediately, if it is safe to do so. The dog will have to be quarantined or tested for rabies.
- Check on the victim's condition. Call 911 if paramedic response is required.
- Report the incident to the Corporate SHE Department to arrange for medical treatment and appropriate case management.

Rodent-Borne Diseases (Mice, Rats, Squirrels, Rabbits)

Hazards & Reporting:

- Rodent infestation has the potential to cause serious communicable diseases including Hantavirus Pulmonary Syndrome (HPS), other viral diseases, plague, rabies, and tularemia. Untreated illness may result in death.
- Exposed persons may develop mild to severe pulmonary distress, flu-like symptoms, fatigue, fever, or muscle aches.
- Any activity that puts you in contact with fresh rodent urine, droppings, saliva, or nesting materials can place you at risk for HPS infection.
- Contact with rodent feces or dried urine may mobilize particles of wastes or tiny droplets containing the virus into the air where they may be inhaled.
- Virus transmission can also occur when infected materials are introduced directly into broken skin. Rarely, it can also be transmitted from the bite of an infected rodent.
- Infectious Period for HPS: Hantavirus may remain viable in the environment for 2 to 3 days at normal room temperature, although this span is highly variable. Temperature, humidity, and the rodent's diet all are factors in the life of the virus. The ultraviolet rays in sunlight kill Hantavirus. However, freezing temperatures will actually increase the time that the virus remains viable. (source: CDC website, April 2006)
- If you experience Hantavirus symptoms (fatigue, fever, severe shortness of breath, and deep muscle aches) within 1 to 5 weeks of exposure to rodents or their droppings, inform medical personnel of possible rodent exposure and contact the Corporate SHE Department immediately.

Prevention: Rodent control is the primary strategy to prevent infection and exposure.

- "Seal Up, Trap Up, and Clean Up": seal entry holes or gaps with steel wool or caulking; trap rodents; clean up rodent food sources and nesting sites.
- Avoid working conditions that may expose workers to droppings and dust.
- Plan in advance to take appropriate precautions if work includes:
- Entry into vehicles, rooms, storage buildings, sheds, warehouses, or other structures that have been closed up and infested for extended periods.
- Vacant, abandoned, unventilated or low-ventilation areas.
- Activities in these areas that may stir up dust which may mobilize a virus.
- Working in areas of obvious rodent infestation.
- Droppings and nests are commonly found behind cabinets or equipment, inside vacant and abandoned structures or vehicles, in stored piping and insulation or inside cardboard or foam boxes.
- Check inside boots and other stored PPE before donning; store in rodent-proof containers.
- Do not enter rooms or warehouses that have been closed up unless absolutely necessary.
- Do not stir up dust by sweeping or vacuuming up droppings, urine or nesting materials unless wearing appropriate PPE. HEPA-filtered vacuums are not recommended since they move air around and may create aerosols.

Procedures for Working in Infested Area:

- If it is necessary to perform work in closed-up areas or in areas with evidence of rodent infestation, contact professional exterminators to eliminate the infestation and clean up the location.
- If a professional exterminator is not available, the following procedure will reduce employee exposure:
- When going into outbuildings or a room, shed, or enclosure that has been closed for an extended period, open it and air it out before cleaning. Do not use powered ventilation.
- Before entering the infested area, prepare disinfectant solutions to clean the area and to decontaminate PPE when finished.
- Before beginning cleaning, don an air purifying respirator equipped with HEPA P-100 cartridges. Check seals and adjust for fit.
- Consider donning Tyvek or other disposable coveralls, and disposable or rubber boots to avoid dust on personal clothing that could be transferred out of the work area.
- Don inner rubber, latex, vinyl, or nitrile gloves (minimum) and outer nitrile or leather gloves before beginning cleaning.
- Thoroughly wet contaminated areas with a bleach solution or household disinfectant.
- A hypochlorite solution prepared by mixing 1 & 1/2 cups of household bleach in 1 gallon of water may be used in place of commercial disinfectant.
- Once everything is wet, take up the contaminated materials with a damp towel, then mop or sponge the area with disinfectant.
- Spray dead rodents with disinfectant and flea repellent (to avoid plague), then double-bag and dispose in appropriate waste disposal system. Contact the local or state health department other disposal methods.
- Finally, disinfect nitrile outer gloves before taking them off by washing with disinfectant or soap and water. Discard leather or pervious gloves. Remove coveralls and contain any dust from clothing.
- After taking off the outer gloves, remove respirator and disinfect as recommended by respirator manufacturer.
- Remove inner gloves. Wash hands thoroughly with soap and warm water.
- Wash exposed clothing in a washing machine using hot water and regular detergent. (Do not run clothing through dryer without washing first.) Machine dry laundered clothing on a high setting or hang it to dry in the sun.

4.1.18.9 Poisonous Plants

All undeveloped property potentially has poison ivy, oak, or sumac growing in areas where vegetation is not controlled. These plants can also be found in cultivated and landscaped areas. Use common sense when if you must enter areas containing such plants, wear protective clothing, such as Tyvek® coveralls, Nitrile or latex gloves, and boot covers. The use of a barrier cream such as Ivy Block can prevent the active agent in poisonous plants from affecting skin and Tecnu cleansing wipes can remove the plant oil from exposed skin.

Avoid using mowers and weed trimmers in areas where poison ivy and oak are likely. Additional care should be taken during early winter after the leaves have fallen from the poisonous plants; the poison still exists in the vines and stubble remaining above the ground. Wash any contaminated skin immediately with cold water and mild soap.

<u>Poison Ivy</u> Grows in West, Midwest, Texas, East. Several forms – vine, trailing shrub, or shrub. Three leaflets (can vary 3-9). Leaves green in summer, red in fall. Yellow or green flowers. White berries.	

Poison Oak Grown in the East (NJ to Texas), Pacific Coast. 6-foot tall shrubs or long vines. Oak-like leaves, clusters of three. Yellow berries.	
Poison Sumac Grows in boggy areas, especially in the Southwest and Northern states. Shrub up to 15 feet tall. Seven to 13 smooth-edged leaflets. Glossy pale yellow or cream-colored berries.	

4.1.19 Hearing Conservation

The use of sampling equipment (e.g., generator, pumps) and normal site operations can expose the field team to noise levels that exceed the OSHA PEL of 90 dB for an 8-hour day. Exposure to noise can result in the following:

Exposure to noise can result in the following:

- Temporary hearing losses where normal hearing returns after a rest period;
- Interference with speech communication and the perception of auditory signals;
- Interference with the performance of complicated tasks; and,
- Permanent hearing loss due to repeated exposure resulting in nerve destruction in the hearing organ.

Since personal noise monitoring will not be conducted during the proposed activities, employees must follow this general rule of thumb: If the noise levels are such that you must shout at someone 5 feet away from you, you need to be wearing hearing protection. Employees can wear either disposable earplugs or earmuffs but all hearing protection must have a minimum noise reduction rating (NRR) of 27 dB. Additional information on AECOM's Hearing Conservation Program can be found in S3NA-510-PR, *Hearing Conservation*.

4.1.20 Ultraviolet Hazards (Sun Exposure)

Workers performing field work outdoors may be susceptible to sunburn if not properly protected with sunscreen or protective clothing and hats. Skin can burn in minutes when the UV Index is VERY HIGH. Protective measures are advisable.

4.1.21 Weather Hazards

The Site Safety Officer will be attentive to daily weather forecasts for the project area each morning. Predicted weather conditions of potential field impact are to be included in safety briefings and the Task Hazard Analysis (THA) for that day. Weather changes should initiate a review and updates (THA) as necessary.

Severe weather can occur with little warning. Employees will be vigilant for the potentials for storms, lightning, high winds, and flash flood events.

4.2 **Contaminant Exposure Hazards**

The following is a discussion of the hazards presented to workers during this project from chemical hazards known, suspected or anticipated to be present on site.

Volatile Organic Compounds (VOCs)/Chlorinated VOCs	Heavy Metals
Polynuclear Aromatic Hydrocarbons (PAH)	Carbon Monoxide

Note: This list should not be considered to be all-inclusive. ADDITIONAL CONTAMINANTS MAY BE PRESENT

If there is any site condition or work scope change that may expose workers to concentrations that may exceed the OSHA PEL, special precautions (additional monitoring equipment, personal protective equipment, training and planning) are required. Contact the PM and RSHEM or Safety Professional prior to initiating such operations.

If unusual odors are noted or if respiratory tract irritation is noticed, the work team will remove themselves from the area of odor and contact the project manager. The project manager in concert with the RSHEM/Safety Professional will evaluate the necessity of air monitoring before activities continue

4.2.1 Volatile Organic Compounds (VOCs)/Chlorinated Volatile Organic Compounds (CVOCs)

Volatile Organic Compounds refer to a group of volatile compounds or mixtures that are relatively stable chemically and that exists in the liquid state at temperatures of approximately 32° to 82°F. VOCs are typically organic solvents used for extracting, dissolving, or suspending materials such as fats, waxes, and resins that are not soluble in water. The removal of the solvent from a solution permits the recovery of the solute intact with its original properties. Solvents are used in paints, adhesives, glues coatings, and degreasing/ cleaning agents. VOCs may be hydrocarbons consisting of compounds with only carbon-hydrogen chemical bonds (e.g., benzene, toluene) or compounds where other atoms may “substitute” for the hydrogen atoms, for example, chlorine, in the case of chlorinated solvents.

Chlorinated solvents, a type of VOC contain chlorine, were widely used for the degreasing of metal parts and are commonly detected at industrial or commercial sites. Typical solvents include tetrachloroethylene, trichloroethylene and 1,1,1-trichloroethane.

The natural breakdown products of chlorinated solvents (e.g., 1,1-dichloroethylene, 1,2-dichloroethylene and vinyl chloride) may also be present. These compounds are generally more toxic than their hydrocarbon analogs but are less flammable (most chlorinated hydrocarbons are not flammable.).

Dermal contact with VOC vapor and liquid may produce skin irritation or a rash. Prolonged or repeated skin contact may cause dermatitis or, in the case of chlorinated VOCs "chloracne." Workers taking the precautions associated with the parent compounds should be protected from the hazards associated with the break down products.

Overexposure to the VOC vapors from impacted groundwater and soils may result in depression of the central nervous system, symptoms of which include dizziness, headache, giddiness and drunken-like behavior. Chronic overexposures can result in liver and kidney damage. Some VOCs e.g., benzene, vinyl chloride are classed as known carcinogens.

4.2.2 Polynuclear Aromatic Hydrocarbons (PAHs)

PAHs are various combinations of multiple closed (benzene) rings that may include other attached molecular structures. They occur naturally in coal, petroleum, tars, pitches, and woods, and may be formed in fires involving heavy hydrocarbon materials.

Examples of PAH's, or PNA's, are anthracene, benzo(a)pyrene, chrysenes, fluoranthcene, naphthalene, and pyrenes, among many others. Many of the PAHs are carcinogenic. As a class they should be treated as carcinogens and exposures kept to a minimum. There are no OSHA permissible exposure limits for most of the specific compounds; however the "Coal Tar Pitch Volatiles" PEL should be used (0.2 mg/m3). PAHs are generally solids and not very volatile, making ingestion or inhalation of dust or smoke the likely routes of exposure

4.2.3 Carbon Monoxide

Carbon Monoxide is a colorless odorless gas commonly produced as a by-product of incomplete combustion. Carbon Monoxide combines with blood hemoglobin to form carboxyhemoglobin which interferes with the oxygen-carrying capacity of the blood. Typical progressive symptoms of acute exposure may include headache, dizziness, drowsiness, nausea, vomiting, collapse, coma and death. Initially the victim is pale; later the skin and mucus membranes may become cherry-red in color.

The OSHA PEL for carbon monoxide is 50 ppm (equivalent to 55 milligrams mg/m^3) as an 8-hour TWA concentration [29 CFR Table Z-1].

4.2.4 Dust

Dust generated during site activities can be hazardous to the respiratory system and irritating to the eyes. Dust can also carry the contaminants of concern potentially exposing workers by skin contact and inhalation. The ACGIH has established an eight-hour exposure limit for dust at 3 mg/m^3. The concentrations of the chemicals of concern in the soil are low enough that inhalation of dust would not by itself be an exposure hazard. However contamination of skin and clothing can provide additional exposures. Therefore the generation and contact with dust should be minimized.

Water or other methods should be used to control dust during dusty operations; however care must be used to prevent electrical shock if electric tools are used in the same area. If dusts become irritating and engineering controls such as the application of water cannot be used, respirators should be donned as discussed in Section 8.

4.2.5 Potential Exposure Routes and Controls

Inhalation: Risk of inhalation of contaminants of concern at the site appears low based on the work being performed. Limited off-gassing from soil and groundwater is anticipated. If high concentrations of contaminants are anticipated or if during routine air monitoring concentrations of contaminants are detected above the action levels, respiratory protection will be required.

Skin Contact: Skin contact with impacted soil and groundwater will be minimized by wearing nitrile sampling gloves. If high concentrations of contaminants are present or are expected to be present above the action level, an upgrade in personal protective equipment will be required.

Ingestion: The possibility of ingestion of contaminants of concern is limited. Protection against exposure via ingestion can be accomplished by avoiding hand to mouth contact and performance of proper decontamination procedures when exiting contaminated work areas.

Monitoring procedures will be employed during site investigation activities and O&M activities to assess employee exposure to chemical and physical hazards. Monitoring will consist primarily of onsite determination of various parameters (e.g., airborne contaminant concentrations and heat/cold stress effects), but may be supplemented by more sophisticated monitoring techniques, if necessary.

The chemical hazards associated with the sampling activities can be controlled in several ways, including:

- To reduce the potential for contact with contaminated soil, groundwater and any chemicals used for sample preservation, personal protective equipment (PPE), as described in Section 8 of this HASP, will be worn.
- As a precautionary measure, the breathing zone of AECOM employees will be screened with monitoring instruments during activities involving potential exposure to contaminated media. If the monitored levels of contaminants exceed the established action levels, as defined in Section 6, specific actions will be implemented to mitigate exposure. The actions detailed in Section 6 may include the donning Respiratory Protection or evacuation of the area.
- If work is being performed indoors becomes necessary and internal combustion equipment are used for heating or internal combustion engines are used to power equipment or for other purposes, a carbon monoxide meter will be available to monitor the work area. Additionally, consideration should be given to utilization of piping to route exhaust from engines to an area outside the structure, utilization of local exhaust to vent structures and performing interior work during hours when normal occupants are away. Note: Any indoor work is a change to the scope and must be approved by the PM and RSHEM. A THA must be completed to address the conditions that will be or may be encountered for indoor work.
- The decontamination procedures described in Section 10 address personal hygiene issues that will limit the potential for contaminant ingestion.

4.3 Hazard Analysis

Task Hazard Analyses (THAs) have been completed for all tasks identified in the Scope of Work (Attachment A):

4.3.1 Unanticipated Work Activities/Conditions

As a result of unanticipated work activities or changing conditions, additional THAs may be required. All additional THAs will be reviewed and approved by the SH&E Professional.

4.4 Task Specific SH&E Procedures

As discussed in Section 5.0, personnel may be exposed to a variety of chemical, physical, and radiological hazards resulting from task or equipment-specific activities. The controls for many of these hazards are discussed in SOPs found in the **Series 300 to 500** Americas SH&E SOPs.

	SOP#	TITLE		SOP#	TITLE
S3NA 300 Series Field(Common)			**S3NA 500 Series Industrial Hygiene**		
☐	S3NA-301-PR	Confined Spaces	☐	S3NA-501-PR	Asbestos
☒	S3NA-302-PR	Electrical, General	☐	S3NA-502-PR	Benzene
☐	S3NA-303-PR	Excavation and Trenching	☒	S3NA-503-PR	Blood borne Pathogen Program
☐	S3NA-304-PR	Fall Protection	☐	S3NA-504-PR	Cadmium

☒	S3NA-305-PR	Hand and Power Tools	☒	S3NA-505-PR	Cold Stress Prevention
☒	S3NA-306-PR	Highway and Road Work	☒	S3NA-506-PR	Compressed Gases
☒	S3NA-307-PR	Housekeeping, Worksite	☒	S3NA-507-PR	Hazardous Materials Communication / WHMIS
☒	S3NA-308-PR	Manual Lifting, Field	☒	S3NA-508-PR	Hazardous Materials Handling and Shipping
☒	S3NA-309-PR	Mobile or Heavy Equipment	☐	S3NA-509-PR	Hazardous Waste Operations and Emergency Response Activities
☐	S3NA-310-PR	Rigging, Hoisting, Cranes and Lifting Devises	☒	S3NA-510-PR	Hearing Conservation Program
☐	S3NA-311-PR	Scaffolding	☒	S3NA-511-PR	Heat Stress Prevention
☐	S3NA-312-PR	Ladders and Stairways	☐	S3NA-512-PR	Laboratory Safety
☒	S3NA-313-PR	Wildlife, Plants and Insects	☐	S3NA-513-PR	Lead
☒	S3NA-314-PR	Working Alone & Remote Travel	☐	S3NA-514-PR	Munitions and Explosives of Concern / Unexploded Ordnance (MEC-UXO)
☐	S3NA-315-PR	Water, Working Around	☐	S3NA-515-PR	Nanotechnology
			☐	S3NA-516-PR	Radiation Safety Programs
S3NA 400 Series Field (Uncommon)			☒	S3NA-517-PR	Radiation, Non-Ionizing
☐	S3NA-401-PR	Aircraft Charters	☐	S3NA-518-PR	Radiation, Gauge Source program
☐	S3NA-402-PR	All Terrain Vehicles (ATVs)	☒	S3NA-519-PR	Respiratory Protection Program
☐	S3NA-403-PR	Avalanches	☒	S3NA-520-PR	Spill Response, Incidental
☐	S4NA(US)-404-PR	Commercial Motor Vehicles	☒	S3NA-521-PR	Decontamination
☒	S3NA-405-PR	Drilling and Boring	☐	S3NA-522-PR	Hydrogen Sulfide
☒	S3NA-406-PR	Electrical Lines, Overhead			
☐	S3NA-407-PR	Electro-fishing			
☐	S3NA-408-PR	Elevated Work Platforms and Aerial Lifts			
☐	S3NA-409-PR	Forklifts (operation of)			
☐	S3NA-410-PR	Hazardous Energy Control			
☐	S3NA-411-PR	Machine Guarding			
☐	S3NA-412-PR	Powder-Actuated Tools			
☐	S4NA(US)-413-PR1	Process Safety Management			
☐	S4NA(US)-414-PR	Railway Sites			
☐	S4NA(US)-415-PR	RCRA Regulated Facilities			
☐	S3NA-416-PR	Tunnel and Underground Work			
☒	S3NA-417-PR	Utilities, Underground			
☐	S3NA-418-PR	Welding, Cutting and Other Hot Work			
☐	S3NA-419-PR	Water, Marine Operations, Boating			
☐	S3-NA420-PR	Water, Underwater Diving			

5.0 SH&E Requirements

5.1 HAZWOPER Qualifications

Personnel performing work at the job site must be qualified as HAZWOPER workers (unless otherwise noted in specific THAs or by the SSO), and must meet the medical monitoring and training requirements specified in the AECOM's Americas SH&E Standard Operating Procedures.

If site monitoring procedures indicate that a possible exposure has occurred above the OSHA permissible exposure limit (PEL), employees may be required to receive supplemental medical testing to document exposure or symptoms that may be specific to the particular materials present.

5.2 Site-Specific Safety Training

All AECOM personnel performing activities at the site will be trained in accordance with *S3NA-003-PR, SH&E Training*. All personnel are required to remain current in all of their required training and evaluate their need for additional training when there is a change in work. In addition to the general health and safety training programs, personnel will be required to complete any supplemental task specific training developed for the tasks to be performed. Administration and compliance with the requirements for additional task-specific training will be the responsibility of the project or lead manager. Any additional required training that is completed will be documented and tracked in the project files.

5.2.1 Competent Person Training Requirements

To complete the planned scope of work, an (OSHA conformance) competent person must be designated to perform the required daily onsite inspections of operations and/or equipment. The competent person may be an AECOM (if responsible for supervising that activity) or the subcontractor's employee. Designated competent person(s) for this project are shown in Table 5.2.1:

Table 5.2.1: Task-Specific Competent Persons

Employee Name	Organization	Area of Competency
No AECOM required Competent Person requirement was identified for the current project scope of work Per S3NA-202-PR*, Competent Person Designation*. If scope changes there may be requirements for OSHA competent persons. Subcontractors may be required to furnish Competent Persons for their work.	AECOM	**Potentially**: Respiratory Protection; Hearing Protection
To be determined: _____	Drilling Subcontractor	Potentially: Respiratory Protection; Hearing Protection, Heavy Equipment Operation
To be determined: _____		

Note: The training requirements for competent persons are specified in the indicated SOPs and/or *S3NA-202-PR Competent Person Designation*. By identifying an employee as a "competent person", that person has now been authorized to take prompt corrective measures to eliminate hazards.

5.3 Tailgate Meetings

Prior to the commencement of daily project activities, a tailgate meeting will be conducted by the SSO to review the specific requirements of this HASP, applicable THA. Attendance at the daily tailgate meeting is mandatory for all employees at the site covered by this HASP and must be documented on the attendance form. All safety training documentation is to be maintained in the project file by the SSO.

5.4 Hazard Communication

Hazardous materials that may be encountered during the work activities are addressed in this HASP and their properties, hazards and associated required controls will be communicated to all affected staff and subcontractors.

In addition, any employee or organization (contractor or subcontractor) intending to bring any hazardous material onto this AECOM-controlled work site must first provide a copy of the item's Material Safety Data Sheet (MSDS) to the SSO for review and filing (the SSO will maintain copies of all MSDS on site). MSDS may not be available for locally-obtained products, in which case some alternate form of product hazard documentation will be acceptable in accordance with the requirements of *S3NA-507-PR Hazardous Materials Communication/WHMIS*.

All personnel shall be briefed on the hazards of any chemical product they use, and shall be aware of and have access to all MSDS.

All containers on site shall be properly labeled to indicate their contents. Labeling on any containers not intended for single-day, individual use shall contain additional information indicating potential health and safety hazards (flammability, reactivity, etc.).

Attachment B provides copies of MSDS for those items planned to be brought on site at the time this HASP is prepared. This information will be updated as required during site operations.

5.5 Confined Space Entry

The AECOM SSO/site supervisor shall identify all potential confined spaces in accordance with S3NA-*301-PR Confined Spaces*. In addition; the AECOM SSO/Site Supervisor will inform all employees of the location of onsite confined spaces, and their associated security controls and procedures. **No confined space entries involving AECOM personnel or AECOM subcontractors are allowed on this project without special permission of Client H&S and Operations Management, the AECOM PM and the AECOM RSHEM.**

5.6 Hazardous, Solid, or Municipal Waste

If hazardous, solid, and/or municipal wastes are generated during any phase of the project, the waste shall be accumulated, labeled, and disposed of in accordance with applicable Federal, State, Provincial, Territorial and/or local regulations. Consult the Regional SH&E Manager for further guidance.

5.7 General Safety Rules

All site personnel shall conduct themselves in a safe manner and maintain a working environment that is free of additional hazards, in adherence to *S3NA-001-PR Safe Work Standards and Rules* and *S3NA-103-PR General Housekeeping*.

5.7.1 Housekeeping

During site activities, work areas will be continuously policed for identification of excess trash and unnecessary debris. Excess debris and trash will be collected and stored in an appropriate container (e.g., plastic trash bags, garbage can, roll-off bin) prior to disposal. At no time will debris or trash be intermingled with waste PPE or contaminated materials.

5.7.2 Smoking, Eating, or Drinking

Smoking, eating and drinking will not be permitted inside any controlled work area at any time. Field workers will first wash hands and face immediately after leaving controlled work areas (and always prior to eating or drinking). Consumption of alcoholic beverages is prohibited at any AECOM site. Smoking, eating or drinking must be in an approved area.

5.7.3 Personal Hygiene

The following personal hygiene requirements will be observed:

Water Supply: A water supply meeting the following requirements will be utilized:

> *Potable Water* - An adequate supply of potable water will be available for field personnel consumption. Potable water can be provided in the form of water bottles, canteens, water coolers, or drinking fountains. Where drinking fountains are not available, individual-use cups will be provided as well as adequate disposal containers. Potable water containers will be properly identified in order to distinguish them from non-potable water sources.
>
> *Non-Potable Water* - Non-potable water may be used for hand washing and cleaning activities. Non-potable water will not be used for drinking purposes. All containers of non-potable water will be marked with a label stating:

Non-Potable Water
Not Intended for Drinking Water Consumption

Toilet Facilities: A minimum of one toilet will be provided for every 20 personnel on site, with separate toilets maintained for each sex except where there are less than 5 total personnel on site. For mobile crews where work activities and locations permit transportation to nearby toilet facilities on-site facilities are not required.

Washing Facilities: Employees will be provided washing facilities (e.g., buckets with water and Alconox) at each work location. The use of water and hand soap (or similar substance) will be required by all employees following exit from the Exclusion Zone, prior to breaks, and at the end of daily work activities.

5.7.4 Buddy System

All field personnel will use the buddy system when working within any controlled work area. Personnel belonging to another organization on site can serve as "buddies" for AECOM personnel. Under no circumstances will any employee be present alone in a controlled work area. For areas not in controlled work areas, the procedures outlined in *S3NA-314-PR Working Alone Remote Travel* will be followed at all times.

5.8 Stop Work Authority

All employees have the right and duty to stop work when conditions are unsafe and to assist in correcting these conditions as outlined in *S3NA-002-PR Stop Work Authority.* Whenever the SSO determines that workplace conditions present an uncontrolled risk of injury or illness to employees, immediate resolution with the appropriate supervisor shall be sought. Should the supervisor be unable or unwilling to correct the unsafe conditions, the SSO is authorized and required to stop work, which shall be immediately binding on all affected AECOM employees and subcontractors.

Upon issuing the stop work order, the SSO shall implement corrective actions so that operations may be safely resumed. Resumption of safe operations is the primary objective; however, operations shall not resume until the Safety Professional has concurred that workplace conditions meet acceptable safety standards.

5.9 Client Specific Safety Requirements

AECOM will coordinate activities with the WDNR PM and designated site contact prior to mobilization.

6.0 Exposure Monitoring Procedures

6.1 Health and Safety Action Levels

An action level is a point at which increased protection is required due to the concentration of contaminants or the presence of other environmental conditions (extreme heat or cold) in the work area. The concentration level (above background level) and the ability of the PPE to protect against that specific contaminant determine each action level. The action levels are based on concentrations in the breathing zone.

If ambient levels are measured which exceed the action levels in areas accessible to unprotected personnel, necessary control measures (barricades, warning signs, and other actions to limit access, etc.) must be implemented prior to commencing activities at the specific work area.

Personnel should also be able to upgrade or downgrade their level of protection with the concurrence of SSO or the Safety Professional.

Reasons to upgrade:

- Known or suspected presence of dermal hazards.
- Occurrence or likely occurrence of gas, vapor, or dust emission.
- Change in work task that will increase the exposure or potential exposure to hazardous materials.

Reasons to downgrade:

- New information indicating that the situation is less hazardous than was originally suspected.
- Change in site conditions that decrease the potential hazard.
- Change in work task that will reduce exposure to hazardous materials.

6.2 Air Monitoring

AECOM will conduct the following air monitoring to determine employee exposure to the vapors of the contaminants of concern during all subsurface investigations and sampling activities.

Note: If there is any site condition or work scope change that may expose workers to concentrations that may exceed the OSHA PEL, special precautions (additional monitoring equipment, personal protective equipment, training and planning) are required. Contact the PM and RSHEM or Safety Professional prior to initiating such operations.

If unusual odors are noted or if respiratory tract irritation is noticed, the work team will remove themselves from the area of odor and contact the project manager. The project manager in concert with the RSHEM/Safety Professional will evaluate the necessity of air monitoring before activities continue.

The monitoring instruments and action levels provided below will be utilized:

<u>Instrument I: Photoionization Detector (PID) or Flame Ionization Detector (FID)</u>

A PID, such as a RaeSystems MiniRae 2000 equipped with a 10.6 eV (or higher) lamp and calibrated to isobutylene and/or a FID such as a Photovac MicroFID calibrated to methane (or equivalent instruments) will be used to screen the breathing zone of employees during activities that may expose them to contaminated soil or groundwater. If breathing zone concentrations are sustained (2 minutes) at 2 units above background, Level C respiratory protection, as described in Section 7.2, will be donned.

<u>Instrument II: Combination Combustible Gas Monitor and Oxygen (CGI, or LEL Meter)</u>

If high levels of contamination are associated with the site, or if high PID and/or FID readings are encountered or if the possibility of encountering flammable vapors or materials exists a CGI must be used to quantify the reading for explosive gases or vapors. The action level for stopping work is 10% LEL.

An oxygen meter will be used to monitor all atmospheres requiring an explosive gas meter. The oxygen level will be determined prior to the explosive gas level to assure that there is sufficient oxygen to support both human life and to allow the explosive gas meter to operate properly.

Instrument III Carbon Monoxide Meter

If heating or internal combustion engine-powered equipment other sources of carbon monoxide may be used inside a building, a CO meter must be used to monitor the buildup of exhaust gas in the building. The unit will be set to alarm at 25 ppm. If the alarm sounds, work will cease and all employees will leave the building. If carbon monoxide concentrations cannot be reduced, mechanical ventilation may be required. Even if the building is well ventilated and the exhaust gas is ducted to the outside, a CO meter is still required.

Additionally, consideration should be given to utilization of piping to route exhaust from engines to an area outside the structure, utilization of local exhaust to vent structures and performing interior work during hours when normal occupants are away.

He table below specifies the real-time monitoring equipment, which will be used for this project.

Table 6-1: Air Monitoring Instruments/Action Levels and Actions

Task	Instrument	Action Limit	Action
All tasks involving potential exposure to soils and groundwater contaminated with volatile organic compounds.	Photoionization Detector and/or Flame Ionization Detector	³ 2 units above background (sustained for 2-minutes in the breathing zone) ³ 50 units above background (sustained for 2-minutes in the breathing zone)	Don Level C protective clothing w/ NIOSH approved half or full-face piece respirator with combination organic vapor/P-100 cartridges. Stop work. Evacuate. Contact PM and RSHEM to determine mitigation procedures
When possibility of exposure to Carbon Monoxide exists (e.g. utilization of internal combustion engine powered devices in interior of buildings)	Carbon Monoxide Meter	³ 10 ppm ³ 25 ppm.	Investigate source. Check, correct and control. **Stop work.** Evacuate. Contact PM and RSHEM to determine mitigation procedures
When possibility of exposure to flammable vapors exists.	LEL (lower explosive limit) Meter	³ 5% LEL ³ 10% LEL	Check, correct and control. **Stop work.** Evacuate. Contact PM and RSHEM to determine mitigation procedures
All tasks involving potential flammable vapor concentrations above 10% of LEL	Oxygen Meter	Oxygen <19.5% Oxygen >23.5%	Will not support human breathing, will not support LEL meter operation, stop work and evacuate work area. Oxygen enriched environment which increases the likelihood of an explosive atmosphere, stop work and evacuate the work area.

*Or similar unit, as approved by the SH&E Professional

If the PID indicates a sustained (1 minute) concentration at any location in excess of 500 ppm as isobutylene or the instrument reads an off scale high concentration, a combustible gas meter will be obtained and used to verify that no

concentrations exceed ten percent (10%) of the Lower Explosive Limit (LEL). If concentrations exceed 10% of LEL, all spark and heat producing equipment will be shut down until the concentration can be reduced below 10% of LEL.

6.2.1 Monitoring Equipment Calibration

All instruments used will be calibrated or "bump checked" with a calibration gas of known concentration at the beginning and end of each work shift, in accordance with the manufacturer's recommendations. If the owner's manual is not available, the personnel operating the equipment will contact the applicable office representative, rental agency or manufacturer for technical guidance for proper calibration or "bump check". If equipment cannot be calibrated to specifications or fails the bump test, site operations requiring monitoring for worker exposure or off-site migration of contaminants will be postponed or temporarily ceased until this requirement is completed.

6.2.2 Personal Sampling

Should site activities warrant performing personal sampling (breathing zone) to better assess chemical exposures experienced by AECOM employees, the SSO, under the direction of a Certified Industrial Hygienist (CIH), or Safety Professional will be responsible for specifying the required monitoring. Within five working days after the receipt of monitoring results, the CIH or Safety Professional will notify each employee, in writing, of the results that represent that employee's exposure. Copies of air sampling results will be maintained in the SSO project files.

If the site activities warrant, the subcontractor will ensure its employees' exposures are quantified via the use of appropriate sampling techniques. The subcontractor shall notify the employees sampled in accordance with health and safety regulations, and provide the results to the SSO for use in determining the potential for other employees' exposure.

6.3 Heat and Cold Stress

Heat and cold stress may vary based upon work activities, PPE/clothing selection, geographical locations, and weather conditions. To reduce the potential of developing heat/cold stress, be aware of the signs and symptoms of heat/cold stress and watch fellow employees for signs of heat/cold stress.

6.3.1 Responding to Heat-Related Illness

Heat stress can be a significant field site hazard, particularly for non-acclimated personnel operating in a hot, humid setting. Site personnel will be instructed in the identification of a heat stress victim, the first-aid treatment procedures for the victim and the prevention of heat stress casualties. Work-rest cycles will be determined and the appropriate measures taken to prevent heat stress as outlined in S3NA-511-PR, *Heat Stress Prevention Program*.

The guidance below will be used in identifying and treating heat-related illness.

Table 6.3.1: Identification and Treatment of Heat-Related Illness

Type of Heat-Related Illness	Description	First Aid
Mild Heat Strain	The mildest form of heat-related illness. Victims exhibit irritability, lethargy, and significant sweating. The victim may complain of headache or nausea. This is the initial stage of overheating, and prompt action at this point may prevent more severe heat-related illness from occurring.	• Provide the victim with a work break during which he/she may relax, remove any excess protective clothing, and drink cool fluids. • If an air-conditioned spot is available, this is an ideal break location. • Once the victim shows improvement, he/she may resume working; however, the work pace should be moderated to prevent recurrence of the symptoms.

Type of Heat-Related Illness	Description	First Aid
Heat Exhaustion	Usually begins with muscular weakness and cramping, dizziness, staggering gait, and nausea. The victim will have pale, clammy moist skin and may perspire profusely. The pulse is weak and fast and the victim may faint unless they lie down. The bowels may move involuntarily.	• Immediately remove the victim from the work area to a shady or cool area with good air circulation (avoid drafts or sudden chilling). • Remove all protective outerwear. • Call a physician. • Treat the victim for shock. (Make the victim lie down, raise his or her feet 6–12 inches, and keep him/her cool by loosening all clothing). • If the victim is conscious, it may be helpful to give him/her sips of water. • Transport victim to a medical facility ASAP.
Heat Stroke	The most serious of heat illness, heat stroke represents the collapse of the body's cooling mechanisms. As a result, body temperature may rise to 104 degrees Fahrenheit or higher. As the victim progresses toward heat stroke, symptoms such as headache, dizziness, nausea can be noted, and the skin is observed to be dry, red, and hot. Sudden collapse and loss of consciousness follows quickly and death is imminent if exposure continues. Heat stroke can occur suddenly.	• Immediately evacuate the victim to a cool/shady area. • Remove all protective outerwear and as much personal clothing as decency permits. • Lay the victim on his/her back w/the feet slightly elevated. • Apply cold wet towels or ice bags to the head, armpits, and thighs. • Sponge off the bare skin with cool water. • The main objective is to cool without chilling the victim. • Give no stimulants or hot drinks. • Since heat stroke is a severe medical condition requiring professional medical attention, emergency medical help should be summoned immediately to provide onsite treatment of the victim and proper transport to a medical facility.

6.3.2 Cold Stress

SH&E SOP S3NA-505-PR, *Cold Stress Prevention*, provides additional details on prevention and treatment of cold stress injuries.

Type of Cold Stress

Cold injury is classified as either localized, as in frostbite, frostnip or chilblain; or generalized, as in hypothermia. Contributing factors to cold injury are exposure to humidity and high winds, wet conditions and inadequate clothing.

The likelihood of developing frostbite occurs when the face or extremities are exposed to a cold wind in addition to cold temperatures. The freezing point of the skin is about 30° F. When fluids around the cells of the body tissue freeze, skin turns white. This freezing is due to exposure to extremely low temperatures. As wind velocity increases, heat loss is greater and frostbite will occur more rapidly.

Symptoms of Cold Stress

The first symptom of frostbite is usually an uncomfortable sensation of coldness, followed by numbness. There might be a tingling, stinging or aching feeling in the affected area. The most vulnerable parts of the body are the nose, cheeks, ears, fingers and toes.

Symptoms of hypothermia, a condition of abnormally low body temperature, include uncontrollable shivering and sensations of cold. The heartbeat slows and can become irregular, the pulse weakens and the blood pressure changes. Pain in the extremities and severe shivering can be the first warning of dangerous exposure to cold.

Maximum severe shivering develops when the body temperature has fallen to 95° F. Productive physical and mental work is limited when severe shivering occurs. Shivering is a serious sign of danger. Immediately remove any person who is shivering from the cold.

Methods to Prevent Cold Stress

When the ambient temperature, or a wind chill equivalent, falls to below 40° F, site personnel who must remain outdoors should wear insulated coveralls, insulated boot liners, hard hat helmet liners and insulated hand protection. Wool mittens are more efficient insulators than gloves (American Conference of Governmental Industrial Hygienists recommendation). Keeping the head covered is very important, since 40% of body heat can be lost when the head is exposed. If it is not necessary to wear a hard hat, a wool knit cap provides the best head protection. A facemask may also be worn.

Persons should dress in several layers rather than one single heavy outer garment. The outer piece of clothing should ideally be wind and waterproof. Clothing made of thin cotton fabric or synthetic fabrics such as polypropylene is ideal since it helps to evaporate sweat. Polypropylene is best at wicking away moisture while still retaining its insulating properties. Loosely fitting clothing also aids in sweat evaporation. Denim is not a good protective fabric. It is loosely woven which allows moisture to penetrate. Socks with high wool content are best. If two pairs of socks are worn, the inner sock should be smaller and made of cotton, polypropylene or similar types of synthetic material that wick away moisture. If clothing becomes wet, it should be taken off immediately and a dry set of clothing put on.

If wind conditions become severe, it might become necessary to shield the work area temporarily. The SSO and the PM will determine if this type of action is necessary. Heated break trailers or a designated area that is heated should be available if work is performed continuously in the cold at temperatures, or equivalent wind chill temperatures, of 20° F.

If wind chill temperatures fall below minus 25° F, breaks from the cold will occur at a rate of one every hour. If wind chill temperatures fall below minus 45° F, all work will cease and persons will be required to go indoors. However, these guidelines can be modified at any time based on actual site conditions and professional judgment rendered by either the Field Manger and/or SSO. For example, the Field Manger and/or SSO will evaluate field crew fitness; the condition of their cold-weather gear, including boots; and will observe employees alertness, including fatigue and rate of cold tolerance/acclimation.

Dehydration occurs in the cold environment and can increase the susceptibility of the worker to cold injury due to significant change in blood flow to the extremities. Drink plenty of fluids, but limit the intake of caffeine.

7.0 Environmental Program (Environment)

7.1 Environmental Compliance and Management

This project and the individual tasks will comply with all federal, state, and local environmental requirements.

7.1.1 Air Emissions

AECOM operations are not anticipated to generate air emissions that will negatively impact the surrounding environment.

7.1.2 Hazardous Waste Management

Contaminated drill cuttings and contaminated soil removed from project borings will be stored, transported and disposed in strict compliance with all Federal, State and Local regulatory requirements. These requirements will be outlined in soil and/or groundwater management plans that will be developed prior to mobilization to any project.

Other wastes generated during site activities will be handled in accordance with all applicable federal, state and local regulations and Property owner's procedures.

7.1.3 Storm Water Pollution Prevention

AECOM operations are not anticipated to generate/discharge storm water. If required by regulation or if required to protect the environment, subcontractors will implement storm water infiltration control measures.

7.1.4 Wetlands Protection

AECOM operations are not anticipated to impact any wetlands. Client is responsible for identification and protection of any wetlands that exists on, adjacent to, or may be otherwise impacted by project operations.

7.1.5 Critical Habitat Protection

AECOM operations are not anticipated to impact any critical habitats. Client is responsible for identification and protection of any plant or animal critical habitats that exists on, adjacent to, or may be otherwise impacted by project operations.

7.1.6 Environmental Protection

Client contractors are responsible for implementing actions such as sediment control, storm water infiltration control, measures to mitigate impacts on wetlands, critical habitat protection, endangered species protection, etc.

8.0 Personal Protective Equipment

8.1 Personal Protective Equipment

The purpose of personal protective equipment (PPE) is to provide a barrier, which will shield or isolate individuals from the chemical and/or physical hazards that may be encountered during work activities. *S3NA-208-PR Personal Protective Equipment Program* lists the general requirements for selection and usage of PPE. Table 8-1 lists the minimum PPE required during site operations and additional PPE that may be necessary. The specific PPE requirements for each work task are specified in the individual THAs.

By signing this HASP the employee agrees having been trained in the use, limitations, care and maintenance of the protective equipment to be used by the employee on this project. If training has not been provided, request same of the PM/SSO for the proper training before signing.

Table 8-1: Personal Protective Equipment

PPE Item	Mobilization/ Rig up / Rig down / Administrative Activities	Soil Boring and Sampling	Temporary or Permanent Monitor Well Installation/ Groundwater Sampling	Borehole Abandonment	
Hard hat	√1	√	√	√	
Safety glasses	√	√	√	√	
Face shield	2	2	2	2	
Steel-toed boots	√	√	√	√	
Chemical Resistant Gloves, Inner, Nitrile	√3	√3	√3	√3	
Chemical Resistant Gloves, Outer Nitrile	√3	√3	√3	√3	
Work Gloves, Kevlar / Leather	√3	√3	√3	√3	
Hearing Protection	√4	√4	√4	√4	
Traffic Vest	√	√	√	√	
Polycoated Tyvek	-	√5	√5	-	
Tyvek	6	6	6	6	
Ivy Block® or Ivy Screen® barrier cream	6	6	6	6	
Snake Protection	7	7	7	7	
Cold/Wet Weather Gear	8	8	8	8	
Sunscreen	9	9	9	9	

✓ Required PPE

1. Hard hats not required when there are no potential head bump hazards.
2. Goggles and a face shield are required where contaminant or chemical may be splashed or is under pressure.
3. Wear work gloves when handling pipe, drums or sharp-edged equipment; impervious gloves for chemical exposure. Thermal protective gloves and PPE may be required if working on hot equipment. Combinations of gloves may be required if multiple hazards are present.
4. Wear hearing protection in areas where noise levels exceed 85 dBA (or normal speech becomes difficult).
5. Polycoated Tyvek or chemical resistant suit required when there is potential for contact with free product or soil that is highly impacted with contaminants. Contact PM and Safety Professional if high levels of contaminants are suspected or encountered.
6. Ivy Block® or Ivy Screen® barrier cream should be worn on exposed skin where there is a potential for exposure to poison ivy or oak. Tyvek coveralls and Nitrile gloves will be worn to protect workers from poison ivy and poison oak where contact cannot be avoided

7. Snake protection (e.g., boots and snake chaps) should be worn when walking through vegetated areas where there is a high potential for encountering snakes.
8. As required for weather conditions.
9. As required for sun (UV) protection. Utilize SPF 30 minimum; reapply as necessary.

8.2 PPE Doffing and Donning Information

The following information is to provide field personnel with helpful hints that, when applied, make donning and doffing of PPE a more safe and manageable task:

- Never cut disposable booties from your feet with basic utility knives. This has resulted in workers cutting through the booty and the underlying sturdy leather work boot, resulting in significant cuts to the legs/ankles. Recommend using a pair of scissors or a package/letter opener (cut above and parallel with the work boot) to start a cut in the edge of the booty, then proceed by manually tearing the material down to the sole of the booty for easy removal.
- When applying duct tape to PPE interfaces (wrist, lower leg, around respirator, etc.) and zippers, leave approximately one inch at the end of the tape to fold over itself. This will make it much easier to remove the tape by providing a small handle to grab while still wearing gloves. Without this fold, trying to pull up the tape end with multiple gloves on may be difficult and result in premature tearing of the PPE.
- Have a “buddy” check your ensemble to ensure proper donning before entering controlled work areas. Without mirrors, the most obvious discrepancies can go unnoticed and may result in a potential exposure situation.
- Never perform personal decontamination with a pressure washer.

8.3 Respiratory Protection

Refer to requirements in S3NA-519-PR *Respiratory Protection Program*. Respiratory protection, as described below, will be required if worker breathing zone concentrations are sustained above the action levels in the following table:

Task	Action Limit	Respiratory Protection	Level
All tasks involving potential exposure to VOC contaminated soils and/or groundwater	≥ 2 units above background (sustained for 2-minutes in the breathing zone)	NIOSH approved half or full-face piece respirator with combination organic vapor/P-100 cartridges.	C
	≥ 50 units above background (sustained for 2-minutes in the breathing zone)	**STOP WORK**. Evacuate. Contact PM and RSHEM to determine mitigation procedures	B

Air purifying respirators offer no protection against the hazards associated with exposure to carbon monoxide. If internal combustion powered equipment and/or gas space heaters are used for work inside a building, a carbon monoxide meter must be used to monitor the buildup of exhaust gas in the building. The unit will be set to alarm at 25 ppm. If the alarm sounds, work will cease and all employees will leave the building. If carbon monoxide concentrations cannot be reduced, mechanical ventilation may be required.

If work must be performed that may expose workers to concentrations that may exceed the OSHA PEL, special precautions (personal protective equipment, training and planning) are required. Contact the PM and RSHEM/Safety Professional prior to initiating such operations.

All employees who may be required to don respiratory protection during the field work must have successfully passed a qualitative or quantitative fit-test within the past year for the brand, model and size respirator they may wear.

If worn, respirators will be cleaned after each use with respirator wipe pads and will be stored in plastic bags after cleaning. Respirators will be thoroughly cleaned using disinfectant material within one week following any respirator use. Refer to the cleaning instructions provided with the respirator or specified by Appendix A to the OSHA regulations at 29 CFR 1910.134.

9.0 Site Control

9.1 General

The purpose of site control is to minimize potential contamination of workers, protect the public from site hazards, and prevent vandalism. The degree of site control necessary depends on the site characteristics, site size, and the surrounding community.

Controlled work areas will be established at each work location, and if required, will be established directly prior to the work being conducted. Diagrams designating specific controlled work areas will be drawn on site maps, posted in the support vehicle or trailer and discussed during the daily safety meetings. If the site layout changes, the new areas and their potential hazards will be discussed immediately after the changes are made. General examples of zone layouts have been developed for drilling and earth moving activities (e.g., excavating, trenching, etc.) and are attached to this section.

9.2 Controlled Work Areas

Each HAZWOPER controlled work area will consist of the following three zones:

- Exclusion Zone (EZ): Contaminated work area.
- Contamination Reduction Zone (CRZ): Decontamination area.
- Support Zone (SZ): Uncontaminated or “clean area” where personnel should not be exposed to hazardous conditions.

Each zone will be periodically monitored in accordance with the air monitoring requirements established in this HASP. The Exclusion Zone and the Contamination Reduction Zone are considered work areas. The Support Zone is accessible to the public (e.g., vendors, inspectors).

9.2.1 Exclusion Zone

The Exclusion Zone is the area where primary activities occur, such as sampling, remediation operations, installation of wells, cleanup work, etc. This area must be clearly marked with hazard tape, barricades or cones, or enclosed by fences or ropes. Only personnel involved in work activities, and meeting the requirements specified in the applicable THA and this HASP will be allowed in an Exclusion Zone.

The extent of each area will be sufficient to ensure that personnel located at/beyond its boundaries will not be affected in any substantial way by hazards associated with sample collection activities.

All personnel should be alert to prevent unauthorized, accidental entrance into controlled-access areas (the EZ and CRZ). If such an entry should occur, the trespasser should be immediately escorted outside the area, or all HAZWOPER-related work must cease. All personnel, equipment, and supplies that enter controlled-access areas must be decontaminated or containerized as waste prior to leaving (through the CRZ only).

9.2.2 Contamination Reduction Zone

The Contamination Reduction Zone is the transition area between the contaminated area and the clean area. Decontamination is the main focus in this area. The decontamination of workers and equipment limits the physical transfer of hazardous substances into the clean area. This area must also be clearly marked with hazard tape and access limited to personnel involved in decontamination.

9.2.3 Support Zone

The Support Zone is an uncontaminated zone where administrative and other support functions, such as first aid, equipment supply, emergency information, etc., are located. The Support Zone shall have minimal potential for significant exposure to contaminants (i.e., background levels).

Employees will establish a Support Zone (if necessary) at the site before the commencement of site activities. The Support Zone would also serve as the entry point for controlling site access.

9.3 Site Access Documentation

If implemented by the PM, all personnel entering the site shall complete the “Site Entry/Exit Log” located at the site trailer or primary site support vehicle.

9.4 Site Security

9.4.1 General

Site security is necessary to:

- Prevent the exposure of unauthorized, unprotected people to site hazards.
- Avoid the increased hazards from vandals or persons seeking to abandon other wastes on the site.
- Prevent theft.
- Avoid interference with safe working procedures.

9.4.2 Working Hours

To maintain site security during working hours:

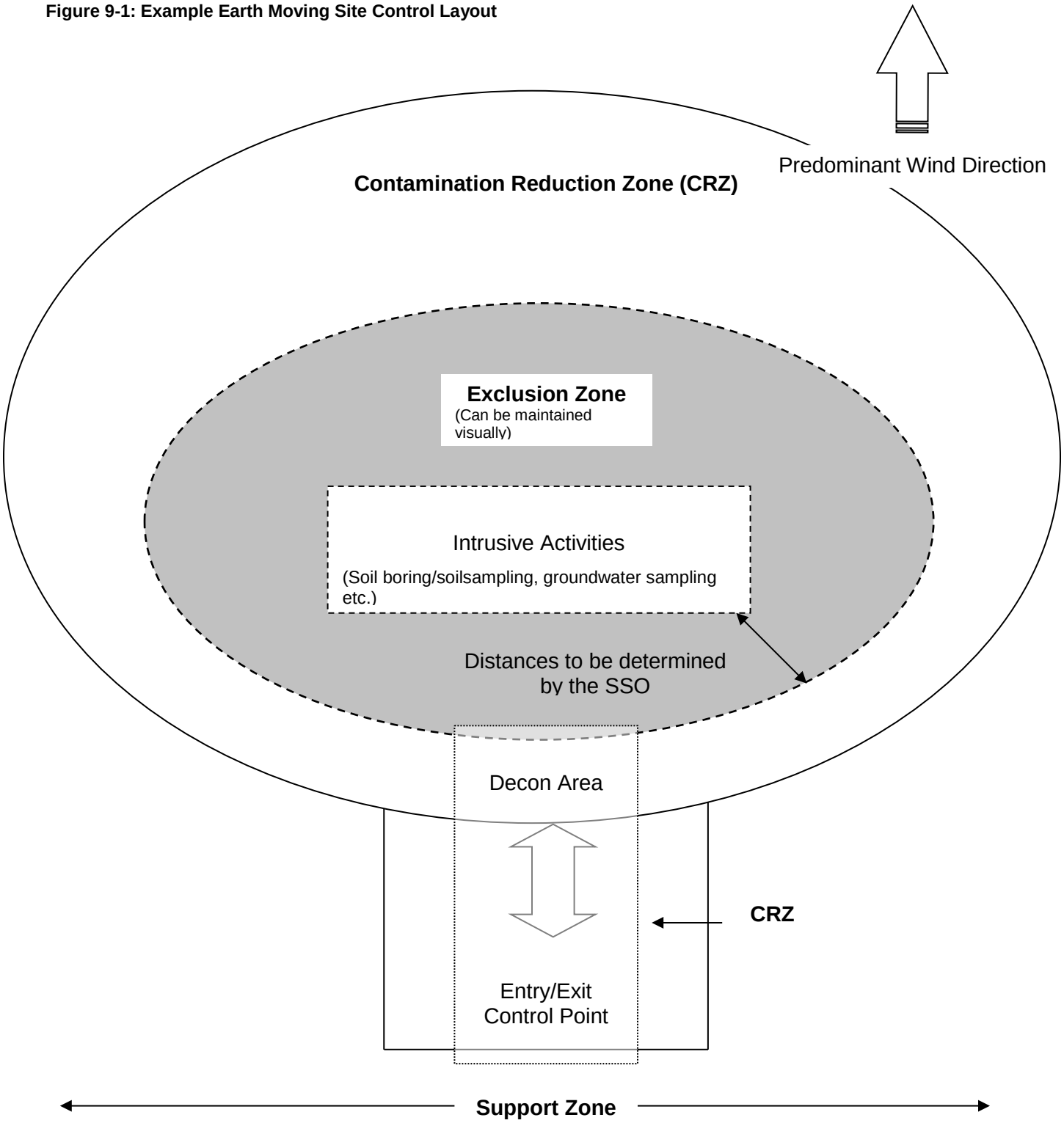
- Maintain security in the Support Zone and at access control points.
- Establish an identification system to identify authorized persons and limitations to their approved activities.
- Assign responsibility for enforcing authority for entry and exit requirements.
- When feasible, install fencing or other physical barrier around the site.
- If the site is not fenced, post signs around the perimeter and whenever possible, use guards to patrol the perimeter. Guards must be fully apprised of the hazards involved and trained in emergency procedures.
- Have the PM approve all visitors to the site. Make sure they have valid purpose for entering the site. Have trained site personnel accompany visitors at all times and provide them with the appropriate protective equipment.

9.4.3 Off Duty Hours

To maintain site security during off-duty hours:

- If possible, assign trained, in-house technicians for site surveillance. They will be familiar with the site, the nature of the work, the site's hazards, and respiratory protection techniques.
- If necessary, use security guards to patrol the site boundary. Such personnel may be less expensive than trained technicians, but will be more difficult to train in safety procedures and will be less confident in reacting to problems around hazardous substances.
- Enlist public enforcement agencies, such as the local police department, if the site presents a significant risk to local health and safety.
- Secure the equipment.

Figure 9-1: Example Earth Moving Site Control Layout



10.0 Decontamination

10.1 General Requirements

All possible and necessary steps shall be implemented to reduce or minimize contact with chemicals and contaminated/impacted materials while performing field activities (e.g., avoid sitting or leaning on, walking through, dragging equipment through or over, tracking, or splashing potential or known contaminated/impacted materials, etc.).

All personal decontamination activities shall be performed with an attendant (buddy) to provide assistance to personnel that are performing decontamination activities. Depending on specific site hazards, attendants may be required to wear a level of protection that is equal to the required level in the Exclusion Zone (EZ).

All persons and equipment entering the EZ shall be considered contaminated, and thus, must be properly decontaminated in the Contamination Reduction Zone (CRZ) prior to entering the Support Zone (SZ).

Decontamination procedures may vary based on site conditions and nature of the contaminant(s). If chemicals or decontamination solutions are used, care should be taken to minimize reactions between the solutions and contaminated materials. In addition, personnel must assess the potential exposures created by the decontamination chemical(s) or solutions. The applicable Material Safety Data Sheet (MSDS) must be reviewed and safe handling procedures in the MSDS adhered to by personnel contacting the chemicals/solutions.

All contaminated PPE and decontamination materials shall be contained, stored and disposed of in accordance with site-specific requirements determined by site management.

10.2 Decontamination Equipment

The equipment required to perform decontamination may vary based on site-specific conditions and the nature of the contaminant(s). The following equipment is commonly used for decontamination purposes:

- Soft-bristle scrub brushes or long-handled brushes to remove contaminants;
- Hoses, buckets of water or garden sprayers for rinsing;
- Plastic sheeting for an equipment laydown area;
- Large plastic/galvanized wash tubs or children's wading pools for washing and rinsing solutions;
- Large plastic garbage cans or similar containers lined with plastic bags for the storage of contaminated clothing and equipment;
- Metal or plastic cans or drums for the temporary storage of contaminated liquids; and
- Paper or cloth towels for drying protective clothing and equipment.

10.3 Personal/Equipment Decontamination

All personnel and equipment leaving the EZ shall be considered contaminated and must be properly decontaminated to minimize the potential for exposure and off-site migration of impacted materials. Equipment may include, but is not limited to: sampling tools, heavy equipment, vehicles, PPE, support devices (e.g., hoses, cylinders, etc.), and various handheld tools.

All employees performing equipment decontamination shall wear the appropriate PPE to protect against exposure to contaminated materials. The level of PPE may be equivalent to the level of PPE required in the EZ. Other PPE may include splash protection, such as face-shields and splash suits, and knee protectors. Following equipment decontamination, employees may be required to follow the proper personal decontamination procedures above.

For larger equipment, a high-pressure washer may need to be used. Some contaminants require the use of a detergent or chemical solution and scrub brushes to ensure proper decontamination.

For smaller equipment, use the following steps for decontamination:

- Remove majority of visible gross contamination in EZ.
- Wash equipment in decontamination solution with a scrub brush and/or power wash heavy equipment.
- Rinse equipment.
- Visually inspect for remaining contamination.
- Follow appropriate personal decontamination steps outlined above.

All decontaminated equipment shall be visually inspected for contamination prior to leaving the CRZ. Signs of visible contamination may include an oily sheen, residue or contaminated soils left on the equipment. All equipment with visible signs of contamination shall be discarded or re-decontaminated until clean. Depending on the nature of the contaminant, equipment may have to be sampled using a wipe method or other means.

11.0 Emergency Response Planning

OSHA defines emergency response as any "response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual-aid groups, local fire departments, etc.) to an occurrence which results, or is likely to result in an uncontrolled release of a hazardous substance." According to AECOM policy, AECOM personnel shall not participate in any emergency response where there are potential safety or health hazards (i.e., fire, explosion, or chemical exposure). AECOM response actions will be limited to evacuation and medical/first aid as described within this section below. As such this section is written to comply with the requirements of 29 CFR 1910.38 (a).

The basic elements of an emergency evacuation plan include:

- employee training,
- alarm systems,
- escape routes,
- escape procedures,
- critical operations or equipment,
- rescue and medical duty assignments,
- designation of responsible parties,
- emergency reporting procedures and
- methods to account for all employees after evacuation.

11.1 Employee Training

Employees must be instructed in the site-specific aspects of emergency evacuation. On-site refresher or update training is required anytime escape routes or procedures are modified or personnel assignments are changed.

11.2 Emergency Response Drills

For projects with durations of greater than four days on site, the SSO will initiate an evacuation drill during the first five days and shall repeat the drills at least quarterly. Deficiencies noted during the drills will be documented as a Near Loss, a Root Cause Analysis conducted and corrective actions initiated.

A table-top run through of the evacuations procedures from the manufacturing site will be conducted the first day on the site and reviewed with all workers arriving on site after that date.

Emergency Response drills and subsequent personnel briefings on evacuation procedures will be documented in the safety briefing agenda or briefing notes.

11.3 Alarm System/Emergency Signals

An emergency communication system must be in effect at all sites. The simplest and most and effective emergency communication system in many situations will be direct verbal communications. Each site must be assessed at the time of initial site activity and periodically as the work progresses. Verbal communications must be supplemented anytime voices cannot be clearly perceived above ambient noise levels (i.e., noise from heavy equipment; drilling rigs, backhoes, etc.) and anytime a clear line-of-sight cannot be easily maintained amongst all AECOM personnel because of distance, terrain or other obstructions.

Verbal communications will be adequate to warn employees of hazards associated with the immediate work area. The property is occupied but AECOM may not have access to facility phones. Therefore, AECOM will bring a portable phone to the site to ensure that communications with local emergency responders is maintained, when necessary.

11.4 Emergency Muster Point

The emergency muster point will be designated and all employees informed of its location and provided to all workers during the project mobilization.

11.5 Escape Routes and Procedures

The escape route from the site and an emergency muster point will be determined and provided to all workers during the project mobilization.

11.6 Employee Accounting Method

The SSO is responsible for accounting for all AECOM personnel on-site at all times. AECOM and its subcontract employees will notify the SSO when they enter and leave the site. The SSO will account for all AECOM and its subcontract employees following an evacuation.

11.7 Rescue and Medical Duty Assignments

The phone numbers of the police and fire departments, ambulance service, local hospital, and AECOM representatives are provided in the emergency reference sheet. This sheet will be posted in the site vehicle.

In the event an injury or illness requires more than first aid treatment, the SSO or a designated representative will accompany the injured person to the medical facility and will remain with the person until release or admittance is determined. The escort will relay all appropriate medical information to the project manager and the Safety Professional.

If the injured employee can be moved from the accident area, he or she will be brought to the CRZ where their PPE will be removed. If the person is suffering from a back or neck injury the person will not be moved and the requirements for decontamination do not apply. The SSO must familiarize the responding emergency personnel about the nature of the site and the injury. If the responder feels that the PPE can be cut away from the injured person's body, this will be done on-site. If this not feasible, decontamination will be performed after the injured person has been stabilized.

11.8 Designation of responsible parties

The SSO is responsible for initiating emergency response. In the event the SSO cannot fulfill this duty, the alternate SSO will take charge.

11.9 Near Miss Reporting

A *Near Miss Incident* is defined as any undesired event that, under slightly different circumstances (e.g., timing, distance, chance, etc.) could have resulted in personal harm, property damage, an environmental release or any undesired loss of resources. In other words, a Near Miss Incident is a situation in which an accident almost occurred.

AECOM requires that all Near Miss Incidents be reported as soon as possible after their occurrence to the Safety Professional and RSHEM using the Near Miss form attached in Attachment C.

Situations in which a hazard is identified and corrected before an incident occurs do not necessarily meet the definition of a Near Miss Incident and are referred to as HSE Observations. Reporting and following up on HSE Observations can also provide opportunities for learning and improvement in the same manner as reporting and following up on Near Miss Incidents. AECOM also strongly encourages the reporting of HSE Observations. HSE Observations may also be reported using the Near Miss form attached in Attachment C using the process described above.

11.10 Accident Reporting and Investigation

Any incident (other than minor first aid treatment) resulting in injury, illness or property damage requires an accident investigation and report. The investigation should be conducted as soon as emergency conditions are under control. The purpose of the investigation is not to attribute blame but to determine the pertinent facts so that repeat or similar occurrences can be avoided. An AECOM accident investigation form is presented in Attachment C of this HASP. The injured AECOM employee's supervisor and the RSHEM/Safety Professional should be notified immediately of the injury.

If a subcontractor employee is injured, they are required to notify the AECOM SSO. Once the incident is under control, the subcontractor will submit a copy of their company's accident investigation report to the AECOM SSO.

Table 11-1: Emergency Contacts

EMERGENCY COORDINATORS / KEY PERSONNEL			
Name	**Title/Workstation**	**Telephone Number**	**Mobile Phone**
Donna M. Volk, P.G., C.P.G.	AECOM Project Manager	414-944-6171	
	AECOM Site Supervisor		
	AECOM Site Safety Officer/ Emergency Coordinator (EC)		
Bill Looney	AECOM Safety Professional	414-944-6182	262-893-0658
Dan Schillings	District SH&E Manager	210-253-7567	210-601-4129
Nash Doyle	North Region SH&E Manager (RSHEM)	312-373-7813	312-593-8489
Incident Reporting	**Incident Reporting Line**	**800-348-5046**	
Kevin Brehm	Milwaukee Office Manager	414-944-6145	262-374-0337
Aaron Schuette	Brown County Planning Commission		
Ken Pabich	City of De Pere		

Organization / Agency	
Name	**Telephone Number**
Police Department	911
Fire Department	911
Ambulance Service ***(EMT will determine appropriate hospital for treatment)***	911
EMERGENCY HOSPITALS ***(Use by site personnel is only for non-emergency cases)***	
Bellin Medical Center 744 S. Webster Avenue Green Bay, WI	920-433-3500
Emergency Hospital Route: See Figures 1	
Poison Control Center	800-222-1222
Wisconsin Pollution Emergency	800-943-0003
National Response Center	800-424-8802
INFOTRAC (Spill Response Contractor; AECOM Account #74984)	800-535-5053
Title 3 Hotline	800-424-9346

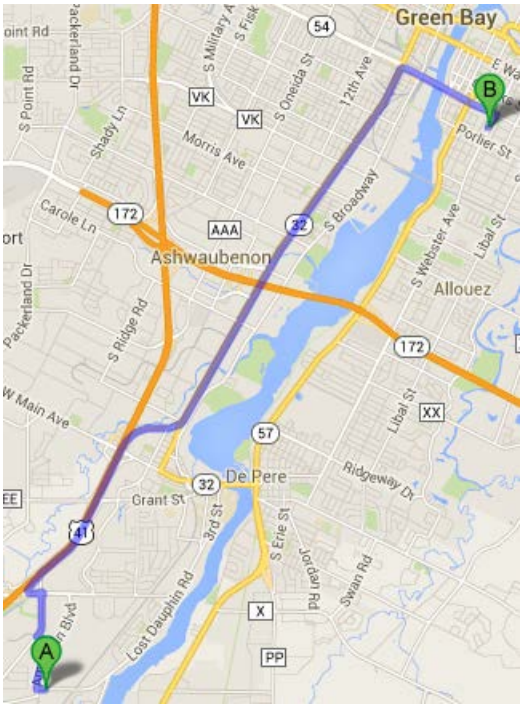
Public Utilities	
Name	**Telephone Number**
Digger's Hotline	811 or 800-242-8511

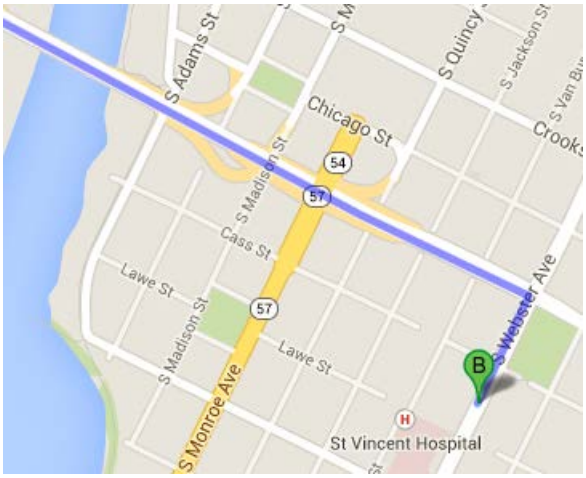
Figure 11.1: Emergency Occupational Hospital Route/Detail Map

HOSPITAL ROUTE/LOCATION MAP

From Former O'Keefe Properties, 1463 Red Maple Road, City of DePere, WI to:

Bellin Medical Center
744 S. Webster Avenue
Green Bay, WI
920-433-3500





Driving Directions **Distance: 9.7 Miles; Time: 15 Minutes**

1463 Red Maple Rd
De Pere, WI 54115

1. Head **west** on **Red Maple Rd** toward **Silver Maple Dr**
456 ft

2. Take the 1st right onto **American Blvd**
0.5 mi

3. Turn left onto **Fortune Ave**
0.2 mi

4. Take the 1st right onto **Lawrence Dr**
0.4 mi

5. At the traffic circle, take the **3rd** exit onto **Scheuring Rd**
0.2 mi

6. Slight right to merge onto **U.S. 41 N** toward **Green Bay**
1.9 mi

7. Take exit **163B** to merge onto **N Ashland Ave**
0.7 mi

8. At the traffic circle, continue straight onto **WI-32 N/N Ashland Ave**
4.4 mi

9. Exit onto **WI-54 E/W Mason St** toward **WI-57**
Continue to follow W Mason St
1.1 mi

10. Turn right onto **S Webster Ave**
0.2 mi

744 S Webster Ave
Green Bay, WI 54301

When using any driving directions or map, it's a good idea to do a reality check and make sure the road still exists, watch out for construction, and follow all traffic safety precautions. This is only to be used as an aid in planning

12.0 Personnel Acknowledgement

By signing below, the undersigned acknowledges that he/she has read and reviewed the AECOM Health and Safety Plan for the **Additional Site Investigation Activities at the Former O'Keefe Properties located at 1463 Red Maple Road in the City of DePere, Wisconsin.** The undersigned also acknowledges that he/she has been instructed in the contents of this document and understands the information pertaining to the specified work, and will comply with the provisions contained therein.

PRINT NAME	SIGNATURE	ORGANIZATION	DATE

ATTACHMENTS

Attachment A Task Hazard Analyses

[attach THAs]

Attachment B Material Safety Data Sheets

Alconox®

Material Safety Data Sheet

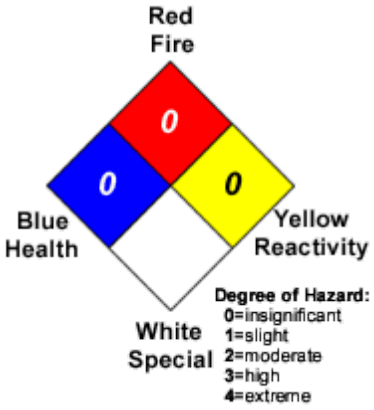
Alconox, Inc.
30 Glenn Street, Suite 309
White Plains, NY 10603

24 Hour Emergency Number - Chem-Tel (800) 255-3924

I. Identification

Product Name (shown on label):	ALCONOX
CAS Registry Number:	Not Applicable
Effective Date:	January 1, 1999
Chemical Family:	Anionic Powdered Detergent
Mfr. Catalog #s for Sizes:	1104, 1125, 1150, 1101, 1103, 1112

National Fire Protection Association 704 Labeling



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
Evaporation Rate (Butyl Acetate=1):	Not Applicable
Melting Point:	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, CO2, foam
Special Fire fighting 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 CO2 on burning

VI. Health Hazard Data

Route(s) of Entry:	Inhalation? Yes Skin? No Ingestion? Yes
Health Hazards (Acute and Chronic):	Inhalation of powder can prove locally irritating to mucous membranes. Ingestion can cause discomfort and/or diarrhea. Eye contact can 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 administer 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.

VII. 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

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

Isobutylene Calibration Gas

MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

PART I *What is the material and what do I need to know in an emergency?*

1. PRODUCT IDENTIFICATION

CHEMICAL NAME; CLASS: **NON-FLAMMABLE GAS MIXTURE**

Document Number: 002103

PRODUCT USE: For general analytical/synthetic chemical uses.

SUPPLIER/MANUFACTURER'S NAME: AIRGAS INC.

ADDRESS: 259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283

BUSINESS PHONE: 1-610-687-5253

EMERGENCY PHONE: 1-800-949-7937

International: 1-423-479-0293

DATE OF PREPARATION: April 22, 2001

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH		OSHA		NIOSH	OTHER
			TLV ppm	STEL ppm	PEL ppm	STEL ppm	IDLH ppm	ppm
Isobutylene	115-11-7	1 ppm - 1.7%	There are no specific exposure limits for Isobutylene. Isobutylene is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					
Air	25635-88-5	Balance	There are no specific exposure limits applicable to Air.					
Air is a mixture of gases. The primary components of air, and the approximate concentration of each component, are listed below								
Nitrogen	7727-37-9	79%	There are no specific exposure limits for Nitrogen. Nitrogen is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					
Oxygen	7782-44-7	21%	There are no specific exposure limits for Oxygen					

NE = Not Established. See Section 16 for Definitions of Terms Used.

NOTE (1): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This product is a colorless, odorless, non-flammable gas. The main health hazards associated with releases of this gas are related to the high pressure within the cylinder. Air, the

main component of this product, is generally considered non-flammable, however, Air will support combustion. The flammable component of this gas mixture is below the LEL. A cylinder rupture hazard exists when this product, which is under pressure, is subjected to heat or flames. Emergency responders must wear personal protective equipment appropriate for the situation to which they are responding.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: The most significant route of over-exposure for air is by inhalation at elevated or reduced pressure.

INHALATION: This product is non-toxic. Air, the main component of this product, is necessary for life.

OTHER POTENTIAL HEALTH EFFECTS: Contact with rapidly expanding gases (which are released under high pressure) may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact with liquid can quickly subside.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in **Lay Terms**. Over-exposure to this product may cause the following health effects:

ACUTE: The most significant hazards associated with compressed air is the pressure hazard. Contact with rapidly expanding gases (which are released under high pressure) may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact with liquid can quickly subside.

CHRONIC: There are currently no known adverse health effects associated with chronic exposure to this gas.

TARGET ORGANS: ACUTE: Respiratory system under ambient low pressure conditions. Central nervous system under ambient high pressure conditions. CHRONIC: None expected.

PART II *What should I do if a hazardous situation occurs?*

4. FIRST-AID MEASURES

RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS PRODUCT WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus equipment should be worn.

Victim(s) must be taken for medical attention. Rescuers should be taken for medical attention, if ecessary. Take copy of label and MSDS to physician or other health professional with victim(s). Remove victim(s) to fresh air, as quickly as possible. In case of eye contact which leads to irritation, immediately flush eyes with copious amounts of water for at least 15 minutes. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Only trained personnel should administer supplemental oxygen.

In case of frostbite, place the frostbitten part in warm water. DO NOT USE HOT WATER. If warm water is not available, or is impractical to use, wrap the affected parts gently in blankets. Alternatively, if the fingers or hands are frostbitten, place the affected area in the armpit. Encourage victim to gently exercise the affected part while being warmed. Seek immediate medical attention.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Acute or chronic respiratory conditions, as well as disorders involving the “Target Organs”, as listed in Section 3 (Hazard Information), may be aggravated by overexposure to the components of this product.

RECOMMENDATIONS TO PHYSICIANS: Administer oxygen as soon as possible, following exposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable.
AUTOIGNITION TEMPERATURE: Not applicable.
FLAMMABLE LIMITS (in air by volume, %):
Lower (LEL): Not applicable.
Upper (UEL): Not applicable.

5. FIRE-FIGHTING MEASURES (Continued)

FIRE EXTINGUISHING MATERIALS: Non-flammable gas. Use extinguishing media appropriate for surrounding fire.
UNUSUAL FIRE AND EXPLOSION HAZARDS: When involved in a fire, this material may decompose and produce toxic gases including carbon monoxide and carbon dioxide. Additionally, when involved in fire, the cylinders may rupture.
Explosion Sensitivity to Mechanical Impact: Not Sensitive.
Explosion Sensitivity to Static Discharge: Not Sensitive.
SPECIAL FIRE-FIGHTING PROCEDURES: Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Move fire-exposed cylinders from area, if it can be done without risk to fire-fighters. Withdraw immediately in case of rising sounds from venting pressure relief devices or any discoloration of tanks or cylinders due to a fire.

6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a release, clear the affected area, protect people, and respond with trained personnel. Minimum Personal Protective Equipment should be **Level D: safety glasses, and mechanically-resistant gloves. Level B, which includes the use of Self- Contained Breathing Apparatus, should be worn when oxygen levels are below 19.5% or are unknown.** Locate and seal the source of the leaking gas. If this does not stop the release (or if it is not possible to reach the valve), allow the gas to release in place or remove it to a safe area and allow the gas to be released there.

PART III *How can I prevent hazardous situations from occurring?*

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: Do not eat or drink while handling chemicals.
STORAGE AND HANDLING PRACTICES: Cylinders should be stored in dry, well-ventilated areas away from sources of heat. Compressed gases can present significant safety hazards. Store containers away from heavily trafficked areas and emergency exits.
SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS: Protect cylinders against physical damage. Store in cool, dry, well-ventilated, fireproof area, away from flammable or combustible materials and corrosive atmospheres. Store away from heat and ignition sources and out of direct sunlight. Do not store near elevators, corridors or loading docks. Do not allow area where cylinders are stored to exceed 52°C (125°F). Isolate from incompatible materials including flammable materials (see Section 10, Stability and Reactivity), which can burn violently. Use only storage containers and equipment (pipes, valves, fittings to relieve pressure, etc.) designed for the storage of Air. Do not store containers where they can come into contact with moisture. Cylinders should be stored upright and be firmly secured to prevent falling or being knocked over. Cylinders can be stored in the open, but in such cases, should be protected against extremes of weather and from the dampness of the ground to prevent rusting. Never tamper with pressure relief devices in valves and cylinders. The following rules are applicable to situations in which cylinders are being used:
Before Use: Move cylinders with a suitable hand-truck. Do not drag, slide or roll cylinders. Do not drop

cylinders or permit them to strike each other. Secure cylinders firmly. Leave the valve protection cap in-place until cylinder is ready for use.

During Use: Use designated CGA fittings and other support equipment. Do not use adapters. Do not heat cylinder by any means to increase the discharge rate of the product from the cylinder. Use check valve or trap in discharge line to prevent hazardous backflow into the cylinder. Do not use oils or grease on gas-handling fittings or equipment.

After Use: Close main cylinder valve. Replace valve protection cap. Mark empty cylinders "EMPTY".

NOTE: Use only DOT or ASME code containers. Earth-ground and bond all lines and equipment associated with this product. Close valve after each use and when empty. Cylinders must not be recharged except by or with the consent of owner. For additional information refer to the Compressed Gas Association Pamphlet P-1, *Safe Handling of Compressed Gases in Containers*. Additionally, refer to CGA Bulletin SB-2 "*Oxygen Deficient Atmospheres*".

7. HANDLING and STORAGE (Continued)

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain application equipment is locked and tagged out safely. Purge gas handling equipment with inert gas (i.e. nitrogen) before attempting repairs. Always use product in areas where adequate ventilation is provided.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation.

RESPIRATORY PROTECTION: Maintain Oxygen levels above 19.5% in the workplace. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

EYE PROTECTION: Splash goggles, face-shields or safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133, or Canadian Standards.

HAND PROTECTION: Wear mechanically-resistant gloves when handling cylinders of this product. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: Use body protection appropriate for task. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR.

9. PHYSICAL and CHEMICAL PROPERTIES

The following information is for **Air**, the main component of this product , unless otherwise stated:

RELATIVE VAPOR DENSITY: 1 EVAPORATION RATE (nBuAc = 1): Not applicable.

SPECIFIC GRAVITY: Not applicable. FREEZING POINT: -216.2°C (-357.2°F)

SOLUBILITY IN WATER: 1.49% (v/v) BOILING POINT @ 1 atmos: -194.3°C(-317.8°F)

VAPOR PRESSURE, mmHg @ 20°C:. pH: Not applicable.

EXPANSION RATIO: Not applicable. VAPOR PRESSURE: Not applicable.

SPECIFIC VOLUME: 13.3 ft^3/lb; (0.833 m^3/kg) ODOR THRESHOLD: Not applicable.

COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

The following information is pertinent to this gas mixture:
APPEARANCE, ODOR AND COLOR: This product is a colorless, odorless gas.
HOW TO DETECT THIS SUBSTANCE (warning properties): There are no distinctive properties to this product. In terms of leak detection, fittings and joints can be painted with a soap solution to detect leaks, which will be indicated by a bubble formation.

10. STABILITY and REACTIVITY

STABILITY: Normally stable.
DECOMPOSITION PRODUCTS: None known.
MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE. Air (the main component of this product) is not compatible with fuels, in that air will support combustion. The Isobutylene component of this mixture is incompatible with Strong oxidizers (e.g., chlorine, bromine pentafluoride, oxygen, oxygen difluoride, and nitrogen trifluoride).
HAZARDOUS POLYMERIZATION: Will not occur.
CONDITIONS TO AVOID: Contact with incompatible materials and exposure to heat, sparks and other sources of ignition. Cylinders exposed to high temperatures or direct flame can rupture or burst.

PART III *How can I prevent hazardous situations from occurring?*

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following toxicology data are for the components of this gas mixture present at a level greater than 1 mole %:
ISOBUTYLENE:
LC50 (Inhalation-Rat) 620 gm/m3/4 hours LC50 (Inhalation-Mouse) 415 gm/m3/2 hours

SUSPECTED CANCER AGENT: No component of this gas mixture is found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC, and therefore is not considered to be, nor suspected to be, cancer causing agents by these agencies.
IRRITANCY OF PRODUCT: Contact with rapidly expanding gases can cause frostbite and damage to exposed skin and eyes.
SENSITIZATION OF PRODUCT: No component of this product is a skin or respiratory sensitizer.
REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this product and its components on the human reproductive system.
Mutagenicity: This product is not reported to cause mutagenic effects in humans.
Embryotoxicity: This product is not reported to cause embryotoxic effects in humans.
Teratogenicity: This product is not reported to cause teratogenic effects in humans.

Reproductive Toxicity: This product is not reported to cause adverse reproductive effects in humans.
A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An embryotoxin is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.
BIOLOGICAL EXPOSURE INDICES: Biological Exposure Indices (BEIs) have been determined for the components of this product are as follows:

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: This gas will be dissipated rapidly in well-ventilated areas.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: No adverse effect is anticipated to occur to plant-life, except for frost produced in the presence of rapidly expanding gases.
EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence of an adverse effect of this product on aquatic life is currently available.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Product removed from cylinder must be disposed of in accordance with appropriate U.S. Federal, State and local regulations or with regulations of Canada and its Provinces. Return cylinders with residual product to Airgas, Inc. Do not dispose of locally.

14. TRANSPORTATION INFORMATION

THIS GAS MIXTURE IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Compressed gases, n.o.s. (Air, Isobutylene)
HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Compressed Gas)
UN IDENTIFICATION NUMBER: UN 1956
PACKING GROUP: Not Applicable
DOT LABEL(S) REQUIRED: Compressed Gas
NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 126

TRANSPORT CANADA, TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This gas mixture is considered as dangerous goods, per regulations of Transport Canada. Use the above information for the preparation of Canadian Shipments.

15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of this gas mixture are not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act.
U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for this material. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.
U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.
U.S. TSCA INVENTORY STATUS: The components of this product are listed on the TSCA Inventory.
OTHER U.S. FEDERAL REGULATIONS: Not applicable.
U.S. STATE REGULATORY INFORMATION: The components of this gas mixture are covered under specific State regulations, as denoted below:

Alaska - Designated Toxic and Hazardous Substances: None.
California - Permissible Exposure Limits for Chemical Contaminants: None.
Florida - Substance List: Isobutylene. **Illinois - Toxic Substance List:** None.
Kansas - Section 302/313 List: None.
Minnesota - List of Hazardous Substances: Isobutylene.
Massachusetts - Substance List: None.
Missouri - Employer Information/Toxic Substance List: None.
New Jersey - Right to Know Hazardous Substance List: Isobutylene.
North Dakota - List of Hazardous Chemicals, Reportable Quantities: None.
Pennsylvania - Hazardous Substance List: Isobutylene.
Rhode Island - Hazardous Substance List: None.
Texas - Hazardous Substance List: None.
West Virginia - Hazardous Substance List: None.
Wisconsin - Toxic and Hazardous Substances: None.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No component of this product is on the California Proposition 65 Lists.

LABELING: **CAUTION:** HIGH PRESSURE GAS.
MAY ACCELERATE COMBUSTION.
Keep oil and grease away.
Use equipment rated for cylinder pressure.
Close valve after each use and when empty.
Use in accordance with the Material Safety Data Sheet.

FIRST-AID: **IF INHALED**, remove to fresh air. If not breathing, give artificial respiration.

If breathing is difficult, give oxygen. Call a physician.
IN CASE OF FROSTBITE, obtain immediate medial attention.
DO NOT REMOVE THIS PRODUCT LABEL.

ADDITIONAL CANADIAN REGULATIONS:
CANADIAN DSL INVENTORY: The components of this product are listed on the DSL Inventory.
OTHER CANADIAN REGULATIONS: Not applicable.
CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: The components of this product are not on the CEPA Priorities Substances Lists.
CANADIAN WHMIS SYMBOLS: **Class A:** Compressed Gases

16. OTHER INFORMATION

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc.
9163 Chesapeake Drive, San Diego, CA 92123-1002
858/565-0302

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. AirGas, Inc. assumes no responsibility for injury to the vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, AirGas, Inc. assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.

DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:
CAS #: This is the Chemical Abstract Service Number which uniquely identifies each constituent.
EXPOSURE LIMITS IN AIR:
ACGIH - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits. **TLV -** Threshold Limit Value - an airborne concentration of a substance which represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour Time Weighted Average **(TWA)**, the

15-minute Short Term Exposure Limit, and the instantaneous Ceiling Level **(C)**. Skin absorption effects must also be considered.

OSHA - U.S. Occupational Safety and Health Administration. **PEL -** Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, “Vacated 1989 PEL,” is placed next to the PEL which was vacated by Court Order.

IDLH - Immediately Dangerous to Life and Health **-** This level represents a concentration from which one can escape within 30- minutes without suffering escape-preventing or permanent injury. **The DFG - MAK** is the Republic of Germany’s Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. **O**ccupational **S**afety and **H**ealth **A**dministration (**OSHA**). NIOSH issues exposure guidelines called **R**ecommended **E**xposure **L**evels (**REL**s). When no exposure guidelines are established, an entry of **NE** is made for reference.

HAZARD RATINGS:
HAZARDOUS MATERIALS IDENTIFICATION SYSTEM: Health Hazard: **0** (minimal acute or chronic exposure hazard); **1** (slight acute or chronic exposure hazard); **2** (moderate acute or significant chronic exposure hazard); **3** (severe acute exposure hazard; onetime overexposure can result in permanent injury and may be fatal); **4** (extreme acute exposure hazard; onetime overexposure can be fatal). Flammability Hazard: **0** (minimal hazard); **1** (materials that require substantial pre-heating before burning); **2** (combustible liquid or solids; liquids with a flash point of 38-93 □C [100-200□F]); **3** (Class IB and IC flammable liquids with flash points below 38 □C [100□F]); **4** (Class IA flammable liquids with flash points below 23 □C [73□F] and boiling
Reactivity Hazard: **0** (normally stable); 1 (material that can become unstable at elevated temperatures or which can react slightly with water); **2** (materials that are unstable but do not detonate or which can react violently with water); **3** (materials that can detonate when initiated or which can react explosively with water); **4** (materials that can detonate at normal temperatures or pressures). **PERSONAL PROTECTIVE EQUIPMENT CODES: B:** Gloves and goggles; **C:** Gloves, goggles, rubber apron (appropriate body protection); **D:** Gloves, goggles, faceshield; rubber apron (appropriate body protection);. **X:** Special attention should be given to PPE Selection.

NATIONAL FIRE PROTECTION ASSOCIATION: Health Hazard: **0** (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); **1** (materials that on exposure under fire conditions could cause irritation or minor residual injury); **2** (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); **3** (materials that can on short exposure could cause serious temporary or residual injury); **4** (materials that under very short exposure could cause death or major residual injury). Flammability Hazard and Reactivity Hazard: Refer to definitions for “Hazardous Materials Identification System”.

FLAMMABILITY LIMITS IN AIR:
Much of the information related to fire and explosion is derived from the National Fire Protection Association (**NFPA**). Flash Point – Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. Autoignition Temperature: The minimum temperature required to initiate combustion in air with no other source of ignition. LEL - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. UEL – the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

TOXICOLOGICAL INFORMATION:

Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD50** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC50** – Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m3** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Data from several sources are used to evaluate the cancer-causing potential of the material. The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **BEI** - Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV. Ecological Information: EC is the effect concentration in water.

REGULATORY INFORMATION:

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. Superfund Amendments and Reauthorization Act **(SARA)**; the Canadian Domestic/Non-Domestic Substances List **(DSL/NDSL)**; the U.S. Toxic Substance Control Act **(TSCA)**; Marine Pollutant status according to the **DOT**; the Comprehensive Environmental Response, Compensation, and Liability Act **(CERCLA or Superfund)**; and various state regulations.

Material Safety Data Sheet

Methyl Alcohol

ACC# 14280

Section 1 - Chemical Product and Company Identification

MSDS Name: Methyl Alcohol
Catalog Numbers: S75959, S75965, S75965A, S75965HPLC, S75965SPEC, A142RS200, A33F-1GAL, A408 1, A408 4, A408-1, A408-4, A4081, A4084, A408SK 4, A408SK-4, A408SK4, A411 20, A411 4, A411-20, A411-4, A41120, A4114, A412 1, A412 20, A412 20 001, A412 200, A412 4, A412 500, A412-1, A412-20, A412-200, A412-4, A412-500, A41200LC, A4121, A41220, A41220 001, A412200, A41220001, A41220003, A41220005, A412200LC, A41220LC, A4124, A4124LC, A412500, A412500002, A412500LC, A412CU1300, A412FB115, A412FB19, A412FB200, A412FB50, A412J500, A412LC, A412P 4, A412P-4, A412P4, A412P4LC, A412RB115, A412RB19, A412RB200, A412RB50, A412RS115, A412RS200, A412RS28, A412RS50, A412SK 4, A412SK-4, A412SK4, A412SS 115, A412SS-11, A412SS-115, A412SS-20, A412SS-200, A412SS-30, A412SS-50, A412SS115, A412SS50, A413-20, A413-4, A413-500, A413200, A4134, A413500, A433P 4, A433P-4, A433P4, A433S 20, A433S 200, A433S 4, A433S-20, A433S-200, A433S-4, A433S20, A433S200, A433S20001, A433S4, A434 20, A434-20, A43420, A450 4, A450-4, A4504, A4504LOT011, A4504LOT012, A452 1, A452 4, A452 SS115, A452-1, A452-4, A4521, A4524, A4524LC, A452J1, A452RS19, A452RS200, A452RS28, A452RS50, A452SK 1, A452SK 4, A452SK-1, A452SK-4, A452SK1, A452SK4, A452SS 200, A452SS 50, A452SS-11, A452SS-115, A452SS-20, A452SS-200, A452SS-30, A452SS-50, A452SS115, A452SS200, A452SS28, A452SS50, A453 1, A453 500, A453 500 001, A453 500 002, A453 500 003, A453-500, A4531, A4531LC, A4531LOT001, A453500, A453500 001, A453500 002, A453500 003, A453500 004, A453500001, A453500002, A453500003, A453500004, A453500005, A453J1, A454 1, A454 4, A454 SS115, A454 SS30, A454 SS50, A454-1, A454-4, A4541, A4541LC, A4544, A4544LC, A4544LOT012, A4544LOT014, A45450%SS-115, A454RS115, A454RS19, A454RS200, A454RS28, A454RS50, A454SS 200, A454SS115, A454SS200, A454SS28, A454SS30, A454SS50, A457 4, A4574, A497RS28, A52RS28, A52RS50, A54RS115, A54RS200, A54RS28, A54RS50, A935 4, A935-4, A9354, A935RB200, A936-1, A936-4, A947 4, A947-4, A9474, A9474LC, A9474LOT002, A947RS115, A947RS200, A947RS28, A947SS115, A947SS200, A947SS28, A947SS50, BP1105 1, BP1105 4, BP1105-1, BP1105-4, BP11051, BP11054, BP1105SS115, BP1105SS200, BP1105SS28, BP1105SS50, BP2618100, BPA947RS-115, BPA947RS-200, BPA947RS-28, FLA412RS-115, FLA412RS-200, FLA412RS-28, FLA412RS-50, FLA452RS-115, FLA452RS-28, FLA452RS-50, FLA454RS-115, FLA454RS-200, FLA454RS-28, FLA454RS-50, HC 400 1GAL, HC400 1GAL, HC4001GAL, IEAA453500A, NC9475554, NC9500047, NC9548094, NC9633361, NC9766429, NC9780216, SC95 1, SC951, SW2 1, SW21, TIA9474, TIA947P200, TIA947P200L, XXA45220LI
Synonyms: Carbinol; Methanol; Methyl hydroxide; Monohydroxymethane; Pyroxylic spirit; Wood alcohol; Wood naptha; Wood spirit; Monohydroxymethane; Methyl hydrate
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
67-56-1	Methyl alcohol	>99.0	200-659-6

Hazard Symbols: T F
Risk Phrases: 11 23/24/25 39/23/24/25

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear, colorless. Flash Point: 12 deg C. **Danger! Flammable liquid and vapor.** Causes respiratory tract irritation. Harmful if inhaled. This substance has caused adverse reproductive and fetal effects in animals. May cause central nervous system depression. May be absorbed through the skin. Poison! Cannot be made non-poisonous. Causes eye and skin irritation. May be fatal or cause blindness if swallowed. May cause digestive tract irritation with nausea, vomiting, and diarrhea. May cause liver, kidney and heart damage.
Target Organs: Kidneys, heart, central nervous system, liver, eyes.

Potential Health Effects

Eye: Produces irritation, characterized by a burning sensation, redness, tearing, inflammation, and possible corneal injury. May cause painful sensitization to light.
Skin: Causes moderate skin irritation. May be absorbed through the skin in harmful amounts. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis.
Ingestion: May be fatal or cause blindness if swallowed. May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause systemic toxicity with acidosis. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. May cause cardiopulmonary system effects.
Inhalation: Harmful if inhaled. May cause adverse central nervous system effects including headache, convulsions, and possible death. May cause visual impairment and possible permanent blindness. Causes irritation of the mucous membrane.
Chronic: Prolonged or repeated skin contact may cause dermatitis. Chronic inhalation and ingestion may cause effects similar to those of acute inhalation and ingestion. Chronic exposure may cause reproductive disorders and teratogenic effects. Laboratory experiments have resulted in mutagenic effects. Prolonged exposure may cause liver, kidney, and heart damage.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.
Skin: Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately. Induce vomiting by giving one teaspoon of Syrup of Ipecac.
Inhalation: Get medical aid immediately. Remove from exposure to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth respiration. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Notes to Physician: Effects may be delayed. Ethanol may inhibit methanol metabolism.

Section 5 - Firefighting Measures

General Information: Containers can build up pressure if exposed to heat and/or fire. As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. Vapors can travel to a source of ignition and flash back. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Flammable Liquid. Can release vapors that form explosive mixtures at temperatures above the flashpoint. Use water spray to keep fire-exposed containers cool. Water may be ineffective. Material is lighter than water and a fire may be spread by the use of water. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. May be ignited by heat, sparks, and flame.
Extinguishing Media: For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. Use water spray to cool fire-exposed containers. Water may be ineffective. For large fires, use water spray, fog or alcohol-resistant foam. Do NOT use straight streams of water.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Scoop up with a nonsparking tool, then place into a suitable container for disposal. Use water spray to disperse the gas/vapor. Remove all sources of ignition. Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite. Do not use combustible materials such as saw dust. Provide ventilation. A vapor suppressing foam may be used to reduce vapors. Water spray may reduce vapor but may not prevent ignition in closed spaces.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Do not breathe dust, vapor, mist, or gas. Do not get in eyes, on skin, or on clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Avoid contact with heat, sparks and flame. Do not ingest or inhale. Use only in a chemical fume hood. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.
Storage: Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area. Keep containers tightly closed. Do not store in aluminum or lead containers.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits. Use only under a chemical fume hood.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Methyl alcohol	200 ppm; 250 ppm STEL; skin - potential for cutaneous absorption	200 ppm TWA; 260 mg/m3 TWA 6000 ppm IDLH	200 ppm TWA; 260 mg/m3 TWA

OSHA Vacated PELs: Methyl alcohol: 200 ppm TWA; 260 mg/m3 TWA
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR §1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Appearance: clear, colorless
Odor: alcohol-like - weak odor
pH: Not available.
Vapor Pressure: 128 mm Hg @ 20 deg C
Vapor Density: 1.11 (Air=1)
Evaporation Rate:5.2 (Ether=1)
Viscosity: 0.55 cP 20 deg
Boiling Point: 64.7 deg C @ 760.00mm Hg
Freezing/Melting Point:-98 deg C
Decomposition Temperature: Not available.
Autoignition Temperature: 455 deg C (851.00 deg F)
Flash Point: 12 deg C (53.60 deg F)
NFPA Rating: (estimated) Health: 1; Flammability: 3; Reactivity: 0
Explosion Limits, Lower:7.30 vol %
Upper: 36.00 vol %
Solubility: miscible
Specific Gravity/Density:.7910g/cm3
Molecular Formula:CH4O
Molecular Weight:32.04

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: High temperatures, incompatible materials, ignition sources, oxidizers.
Incompatibilities with Other Materials: Acids (mineral, non-oxidizing, e.g. hydrochloric acid, hydrofluoric acid, muriatic acid, phosphoric acid), acids (mineral, oxidizing, e.g. chromic acid, hypochlorous acid, nitric acid, sulfuric acid), acids (organic, e.g. acetic acid, benzoic acid, formic acid, methanoic acid, oxalic acid), azo, diazo, and hydrazines (e.g. dimethyl hydrazine, hydrazine, methyl hydrazine), isocyanates (e.g. methyl isocyanate), nitrides (e.g. potassium nitride, sodium nitride), peroxides and hydroperoxides (organic, e.g. acetyl peroxide, benzoyl peroxide, butyl peroxide, methyl ethyl ketone peroxide), epoxides (e.g. butyl glycidyl ether), Oxidants (such as barium perchlorate, bromine, chlorine, hydrogen peroxide, lead perchlorate, perchloric acid, sodium hypochlorite)., Active metals (such as potassium and magnesium)., acetyl bromide, alkyl aluminum salts, beryllium dihydride, carbontetrachloride, carbon tetrachloride + metals, chloroform + heat, chloroform + sodium hydroxide, cyanuric chloride, diethyl zinc, nitric acid, potassium-tert-butoxide, chloroform + hydroxide, water reactive substances (e.g. acetic anyhdride, alkyl aluminum chloride, calcium carbide, ethyl dichlorosilane).
Hazardous Decomposition Products: Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide, formaldehyde.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 67-56-1 unlisted.
LD50/LC50:
CAS# 67-56-1:

Draize test, rabbit, eye: 40 mg Moderate;
Draize test, rabbit, eye: 100 mg/24H Moderate;
Draize test, rabbit, skin: 20 mg/24H Moderate;
Inhalation, rat: LC50 = 64000 ppm/4H;
Oral, mouse: LD50 = 7300 mg/kg;
Oral, rabbit: LD50 = 14200 mg/kg;
Oral, rat: LD50 = 5628 mg/kg;
Skin, rabbit: LD50 = 15800 mg/kg;<BR.

Carcinogenicity:
CAS# 67-56-1: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Epidemiology: Methanol has been shown to produce fetotoxicity in the embr yo or fetus of laboratory animals. Specific developmenta l abnormalities include cardiovascular, musculoskeletal, and urogenital systems.
Teratogenicity: Effects on Newborn: Behaviorial, Oral, rat: TDLo=7500 mg/kg (female 17-19 days after conception). Effects on Embryo or Fetus: Fetotoxicity, Inhalation, rat: TCLo=10000 ppm/7H (female 7-15 days after conception). Specific Developmental Abnormalities: Cardiovascular, Musculoskeletal, Urogenital, Inhalation, rat: TCLo=20000 ppm/7H (7-14 days after conception).
Reproductive Effects: Paternal Effects: Spermatogenesis: Intraperitoneal, mouse TDLo=5 g/kg (male 5 days pre-mating). Fertility: Oral, rat: TDLo = 35295 mg/kg (female 1-15 days after conception). Paternal Effects: Testes, Epididymis, Sperm duct: Oral, rat: TDLo = 200 ppm/20H (male 78 weeks pre-mating).
Neurotoxicity: No information available.
Mutagenicity: DNA inhibition: Human Lymphocyte = 300 mmol/L. DNA damage: Oral, rat = 10 umol/kg. Mutation in microorganisms: Mouse Lymphocyte = 7900 mg/L. Cytogenetic analysis: Oral, mouse = 1 gm/kg.
Other Studies: Standard Draize Test(Skin, rabbit) = 20 mg/24H (Moderate) S tandard Draize Test: Administration into the eye (rabbit) = 40 mg (Moderate). Standard Draize test: Administration int o the eye (rabbit) = 100 mg/24H (Moderate).

Section 12 - Ecological Information

Ecotoxicity: Not available.
Environmental Fate: Dangerous to aquatic life in high concentrations. Aquatic toxicity rating: TLm 96>1000 ppm. May be dangerous if it enters water intakes. Methyl alcohol is expected to biodegrade in soil and water very rapidly. This product will show high soil mobility and will be degraded from the ambient atmosphere by the reaction with photochemically produced hyroxyl radicals with an estimated half-life of 17.8 days. Bioconcentration factor for fish (golden ide) < 10. Based on a log Kow of -0.77, the BCF value for methanol can be estimated to be 0.2.
Physical/Chemical: No information available.
Other: None.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to

ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: CAS# 67-56-1: waste number U154; (Ignitable waste).

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	METHANOL				METHANOL
Hazard Class:	3				3(6.1)
UN Number:	UN1230				UN1230
Packing Group:	II				II
Additional Info:					FLASHPOINT 11 C

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 67-56-1 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA

Section 302 (RQ)
CAS# 67-56-1: final RQ = 5000 pounds (2270 kg)
Section 302 (TPQ)
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 67-56-1: acute, flammable.
Section 313

This material contains Methyl alcohol (CAS# 67-56-1, 99 0%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 67-56-1 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 67-56-1 can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T F

Risk Phrases:

R 11 Highly flammable. R 23/24/25 Toxic by inhalation, in contact with skin and if swallowed. R 39/23/24/25 Toxic : danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.

Safety Phrases:

S 16 Keep away from sources of ignition - No smoking. S 36/37 Wear suitable protective clothing and gloves. S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S 7 Keep container tightly closed.

WGK (Water Danger/Protection)

CAS# 67-56-1: 1

Canada

CAS# 67-56-1 is listed on Canada's DSL/NDSL List.

This product has a WHMIS classification of B2, D1A, D2A.

CAS# 67-56-1 is listed on Canada's Ingredient Disclosure List.

Exposure Limits

CAS# 67-56-1: OEL-ARAB Republic of Egypt:TWA 200 ppm (260 mg/m3);Ski
n OEL-AUSTRALIA:TWA 200 ppm (260 mg/m3);STEL 250 ppm;Skin OEL-BELGIU
M:TWA 200 ppm (262 mg/m3);STEL 250 ppm;Skin OEL-CZECHOSLOVAKIA:TWA 10
0 mg/m3;STEL 500 mg/m3 OEL-DENMARK:TWA 200 ppm (260 mg/m3);Skin OEL-
FINLAND:TWA 200 ppm (260 mg/m3);STEL 250 ppm;Skin OEL-FRANCE:TWA 200
ppm (260 mg/m3);STEL 1000 ppm (1300 mg/m3) OEL-GERMANY:TWA 200 ppm (2
60 mg/m3);Skin OEL-HUNGARY:TWA 50 mg/m3;STEL 100 mg/m3;Skin JAN9 OEL
-JAPAN:TWA 200 ppm (260 mg/m3);Skin OEL-THE NETHERLANDS:TWA 200 ppm (
260 mg/m3);Skin OEL-THE PHILIPPINES:TWA 200 ppm (260 mg/m3) OEL-POLA
ND:TWA 100 mg/m3 OEL-RUSSIA:TWA 200 ppm;STEL 5 mg/m3;Skin OEL-SWEDEN
:TWA 200 ppm (250 mg/m3);STEL 250 ppm (350 mg/m3);Skin OEL-SWITZERLAN
D:TWA 200 ppm (260 mg/m3);STEL 400 ppm;Skin OEL-THAILAND:TWA 200 ppm
(260 mg/m3) OEL-TURKEY:TWA 200 ppm (260 mg/m3) OEL-UNITED KINGDOM:TW
A 200 ppm (260 mg/m3);STEL 250 ppm;Skin OEL IN BULGARIA, COLOMBIA, JO
RDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM ch
eck ACGI TLV

Section 16 - Additional Information

MSDS Creation Date: 7/21/1999
Revision #6 Date: 1/24/2001

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages

Material Safety Data Sheet

Hydrochloric Acid, 0.1N Standard Solution

ACC# 95550

Section 1 - Chemical Product and Company Identification

MSDS Name: Hydrochloric Acid, 0.1N Standard Solution
Catalog Numbers: AC124200000, AC124200010
Synonyms: Muriatic acid; Anhydrous hydorchloric acid; Chlorohydric acid; Hydrochloride; Hydrogen chloride; Spirits of salt
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7647-01-0	Hydrochloric Acid	<1.0	231-595-7
7732-18-5	Water	Balance	231-791-2

Hazard Symbols: C
Risk Phrases: 34

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: colorless liquid. **Danger!** Corrosive. Mutagen. May cause fetal effects based upon animal studies. Causes eye and skin burns. May cause severe respiratory tract irritation with possible burns. May cause severe digestive tract irritation with possible burns. Possible sensitizer.
Target Organs: Respiratory system, teeth, eyes, skin, circulatory system.

Potential Health Effects

Eye: May cause irreversible eye injury. Vapor or mist may cause irritation and severe burns. Contact with liquid is corrosive to the eyes and causes severe burns. May cause painful sensitization to light.
Skin: May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure

to this material. Contact with liquid is corrosive and causes severe burns and ulceration.
Ingestion: May cause circulatory system failure. Causes severe digestive tract burns with abdominal pain, vomiting, and possible death. May cause corrosion and permanent tissue destruction of the esophagus and digestive tract.
Inhalation: May cause severe irritation of the respiratory tract with sore throat, coughing, shortness of breath and delayed lung edema. Causes chemical burns to the respiratory tract. Exposure to the mist and vapor may erode exposed teeth. Causes corrosive action on the mucous membranes.
Chronic: Prolonged or repeated skin contact may cause dermatitis. Repeated exposure may cause erosion of teeth. May cause fetal effects. Laboratory experiments have resulted in mutagenic effects. Prolonged exposure may cause conjunctivitis, photosensitization, and possible blindness.

Section 4 - First Aid Measures

Eyes: Get medical aid immediately. Do NOT allow victim to rub or keep eyes closed. Extensive irrigation is required (at least 30 minutes). SPEEDY ACTION IS CRITICAL!
Skin: Get medical aid immediately. Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.
Ingestion: Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately. Give milk of magnesia.
Inhalation: Get medical aid immediately. Remove from exposure to fresh air immediately. If breathing is difficult, give oxygen. DO NOT use mouth-to-mouth respiration. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Notes to Physician: Do Not use sodium bicarbonate in an attempt to neutralize the acid.
Antidote: Do Not use oils or ointments in eye.

Section 5 - Firefighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Not flammable, but reacts with most metals to form flammable hydrogen gas. Use water spray to keep fire-exposed containers cool. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. Reaction with water may generate much heat which will increase the concentration of fumes in the air. Containers may explode when heated.
Extinguishing Media: For large fires, use water spray, fog, or alcohol-resistant foam. Substance is nonflammable; use agent most appropriate to extinguish surrounding fire. Do NOT get water inside containers. Do NOT use straight streams of water. Most foams will react with the material and release corrosive/toxic gases. Cool containers with flooding quantities of water until well after fire is out. For small fires, use carbon dioxide (except for cyanides), dry chemical, dry sand, and alcohol-resistant foam.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Large spills may be neutralized with dilute alkaline solutions of soda ash, or lime. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Provide ventilation. Do not get water inside containers. A vapor suppressing foam may be used to reduce vapors. Cover with dry earth, dry sand, or other non-combustible material followed with plastic sheet to minimize spreading and contact with water.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Contents may develop pressure upon prolonged storage. Do not breathe dust, vapor, mist, or gas. Do not get in eyes, on skin, or on clothing. Keep container tightly closed. Do not ingest or inhale. Discard contaminated shoes. Use caution when opening. Keep from contact with moist air and steam.
Storage: Do not store in direct sunlight. Keep container closed when not in use. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Corrosives area. Do not store in metal containers. Do not store near flammable or oxidizing substances (especially nitric acid or chlorates).

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Hydrochloric Acid	C 5 ppm	50 ppm IDLH	C 5 ppm; C 7 mg/m3
Water	none listed	none listed	none listed

OSHA Vacated PELs: Hydrochloric Acid: No OSHA Vacated PELs are listed for this chemical.
Water: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear neoprene or polyvinyl chloride gloves to prevent exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR §1910.134 and ANSI

Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Section 9 - Physical and Chemical Properties

Physical State: Clear liquid
Appearance: colorless liquid
Odor: strong, pungent
pH: 1.10 (0.1 N)
Vapor Pressure: 190225 mm Hg
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: Not available.
Freezing/Melting Point: Not available.
Decomposition Temperature: Not available.
Autoignition Temperature: Not applicable.
Flash Point: Not applicable.
NFPA Rating: Not published.
Explosion Limits, Lower: Not available.
Upper: Not available.
Solubility: soluble in water.
Specific Gravity/Density:1.0000g/cm3
Molecular Formula:HCl
Molecular Weight:36.45

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Mechanical shock, incompatible materials, metals, excess heat, exposure to moist air or water, bases.
Incompatibilities with Other Materials: Acetates, acetic anhydride, alcohols + hydrogen cyanide, 2-aminoethanol, ammonium hydroxide, calcium carbide, calcium phosphide, cesium acetylene carbide, cesium carbide, chlorosulfonic acid, 1,1-difluoroethylene, ethylene diamine, ethyleneimine, fluorine, lithium silicides, magnesium boride, mercuric sulfate, oleum, perchloric acid, potassium permanganate, beta-propiolactone, propylene oxide, rubidium acetylene carbide, rubidium carbide, silver perchlorate + carbon tetrachloride, sodium, sodium hydroxide, sulfuric acid, uranium phosphide, vinyl acetate, zinc, metal oxides, aluminum, amines, carbonates, iron, steel, copper alloys, copper, alkali metals, bases.
Hazardous Decomposition Products: Hydrogen chloride, chlorine, carbon monoxide, carbon dioxide, hydrogen gas.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 7647-01-0: MW4025000
CAS# 7732-18-5: ZC0110000
LD50/LC50:
CAS# 7647-01-0:
Inhalation, mouse: LC50 =1108 ppm/1H;
Inhalation, rat: LC50 =3124 ppm/1H;
Oral, rabbit: LD50 = 900 mg/kg;<BR.

CAS# 7732-18-5:
Oral, rat: LD50 = >90 mL/kg;<BR.

Carcinogenicity:
CAS# 7647-01-0:
IARC: Group 3 carcinogen CAS# 7732-18-5: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Epidemiology: Experimental reproductive effects have been reported.
Teratogenicity: Embryo or Fetus: Stunted fetus, Inhalation, rat TCL0=450 mg/m3/1H Specific Developmental Abnormalities: homeostatis, ihl-rat TCL0=450 mg/m3/1H (female 1 days pre-mating).
Reproductive Effects: No information available.
Neurotoxicity: No information available.
Mutagenicity: Cytogenetic analysis: Hamster, lung = 30 mmol/L.; Cytogenetic analysis: Hamster, ovary = 8 mmol/L.
Other Studies: No data available.

Section 12 - Ecological Information

Ecotoxicity: Not available.
Environmental Fate: Rapidly hydrolyzes when exposed to water. Will exhibit extensive evaporation from soil surfaces. Upon transport through the soil, hydrochloric acid will dissolve some of the soil materials (especially those with carbonate bases) and the acid will neutralize to some degree.
Physical/Chemical: Not available.
Other: Not available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	HYDROCHLORIC ACID				HYDROCHLORIC ACID SOLUTION
Hazard Class:	8				8(9.2)
UN Number:	UN1789				UN1789
Packing Group:	II				II

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7647-01-0 is listed on the TSCA inventory.
CAS# 7732-18-5 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA

Section 302 (RQ)
CAS# 7647-01-0: final RQ = 5000 pounds (2270 kg)
Section 302 (TPQ)
CAS# 7647-01-0: TPQ = 500 pounds; RQ = 5000 pounds (does not meet toxi city criteria but because of high production volume and recognized tox icity is considered a chemical of concern)
SARA Codes
CAS # 7647-01-0: acute.
Section 313
This chemical is not at a high enough concentration to be reportable under Section 313. No chemicals are reportable under Section 313.
Clean Air Act:
CAS# 7647-01-0 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
CAS# 7647-01-0 is listed as a Hazardous Substance under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:

CAS# 7647-01-0 is considered highly hazardous by OSHA.

STATE

CAS# 7647-01-0 can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

CAS# 7732-18-5 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

C

Risk Phrases:

R 34 Causes burns.

Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S 36/37/39 Wear suitable protective clothing, gloves and eye/face protection. S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S 9 Keep container in a well-ventilated place.

WGK (Water Danger/Protection)

CAS# 7647-01-0: 1

CAS# 7732-18-5: No information available.

Canada

CAS# 7647-01-0 is listed on Canada's DSL/NDSL List.

CAS# 7732-18-5 is listed on Canada's DSL/NDSL List.

This product has a WHMIS classification of E, D2A.

CAS# 7647-01-0 is not listed on Canada's Ingredient Disclosure List.

CAS# 7732-18-5 is not listed on Canada's Ingredient Disclosure List.

Exposure Limits

CAS# 7647-01-0: OEL-AUSTRALIA:TWA 5 ppm (7 mg/m3) OEL-AUSTRIA:TWA 5 ppm (7 mg/m3) OEL-BELGIUM:STEL 5 ppm (7.7 mg/m3) OEL-DENMARK:STEL 5 ppm (7 mg/m3) OEL-FINLAND:STEL 5 ppm (7 mg/m3);Skin OEL-FRANCE:STEL 5 ppm (7.5 mg/m3) OEL-GERMANY:TWA 5 ppm (7 mg/m3) OEL-HUNGARY:STEL 5 mg/m3 OEL-JAPAN:STEL 5 ppm (7.5 mg/m3) OEL-THE NETHERLANDS:TWA 5 ppm (7 mg/m3) OEL-THE PHILIPPINES:TWA 5 ppm (7 mg/m3) OEL-POLAND:TWA 5 mg/m3 OEL-RUSSIA:STEL 5 ppm (5 mg/m3) OEL-SWEDEN:STEL 5 ppm (8 mg/m3) OEL-SWITZERLAND:TWA 5 ppm (7.5 mg/m3);STEL 10 ppm (15 mg/m3) OEL-THAILAND:TWA 5 ppm (7 mg/m3) OEL-TURKEY:TWA 5 ppm (7 mg/m3) OEL-UNITED KINGDOM:TWA 5 ppm (7 mg/m3);STEL 5 ppm (7 mg/m3) OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

Section 16 - Additional Information

MSDS Creation Date: 4/14/1999

Revision #2 Date: 8/02/2000

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

NITRIC ACID, 50-70%

1. Product Identification

Synonyms: Aqua Fortis; Azotic Acid; Nitric Acid 50%; Nitric Acid 65%; nitric acid 69-70%
CAS No.: 7697-37-2
Molecular Weight: 63.01
Chemical Formula: HNO3
Product Codes:
J.T. Baker: 411D, 412D, 5371, 5796, 5801, 5826, 5856, 5876, 5896, 9597, 9598, 9600, 9601, 9602, 9603, 9604, 9606, 9607, 9608, 9610, 9616, 9617, 9670
Mallinckrodt: 1409, 2704, 2705, 2716, 6623, H862, H988, H993, H998, V077, V650

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Nitric Acid	7697-37-2	50 - 70%	Yes
Water	7732-18-5	30 - 50%	No

3. Hazards Identification

Emergency Overview

POISON! DANGER! STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED. INHALATION MAY CAUSE LUNG AND TOOTH DAMAGE.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 4 - Extreme (Poison)
Flammability Rating: 0 - None
Reactivity Rating: 3 - Severe (Oxidizer)
Contact Rating: 4 - Extreme (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: White (Corrosive)

Potential Health Effects

Nitric acid is extremely hazardous; it is corrosive, reactive, an oxidizer, and a poison.

Inhalation:
Corrosive! Inhalation of vapors can cause breathing difficulties and lead to pneumonia and pulmonary edema, which may be fatal. Other symptoms may include coughing, choking, and irritation of the nose, throat, and respiratory tract.
Ingestion:
Corrosive! Swallowing nitric acid can cause immediate pain and burns of the mouth, throat, esophagus and gastrointestinal tract.
Skin Contact:
Corrosive! Can cause redness, pain, and severe skin burns. Concentrated solutions cause deep ulcers and stain skin a yellow or yellow-brown color.
Eye Contact:
Corrosive! Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.
Chronic Exposure:
Long-term exposure to concentrated vapors may cause erosion of teeth and lung damage. Long-term exposures seldom occur due to the corrosive properties of the acid.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders, eye disease, or cardiopulmonary diseases may be more susceptible to the effects of this substance.

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4. First Aid Measures

Immediate first aid treatment reduces the health effects of this substance.
Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
Ingestion:
DO NOT INDUCE VOMITING! Give large quantities of water or milk if available. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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5. Fire Fighting Measures

Fire:
Not combustible, but substance is a strong oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition. Can react with metals to release flammable hydrogen gas.
Explosion:
Reacts explosively with combustible organic or readily oxidizable materials such as: alcohols, turpentine, charcoal, organic refuse, metal powder, hydrogen sulfide, etc. Reacts with most metals to release hydrogen gas which can form explosive mixtures with air.
Fire Extinguishing Media:
Water spray may be used to keep fire exposed containers cool. Do not get water inside container.
Special Information:
Increases the flammability of combustible, organic and readily oxidizable materials. In the event of a fire,

wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

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6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker NEUTRASORB® acid neutralizers are recommended for spills of this product.

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7. Handling and Storage

Store in a cool, dry, ventilated storage area with acid resistant floors and good drainage. Protect from physical damage. Keep out of direct sunlight and away from heat, water, and incompatible materials. Do not wash out container and use it for other purposes. When diluting, the acid should always be added slowly to water and in small amounts. Never use hot water and never add water to the acid. Water added to acid can cause uncontrolled boiling and splashing. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

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8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
2 ppm (TWA), 4 ppm (STEL)
-ACGIH Threshold Limit Value (TLV):
2 ppm (TWA); 4 ppm (STEL)

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Nitric acid is an oxidizer and should not come in contact with cartridges and canisters that contain oxidizable materials, such as activated charcoal. Canister-type respirators using sorbents are ineffective.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

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9. Physical and Chemical Properties

Appearance:
Colorless to yellowish liquid.
Odor:
Suffocating, acrid.
Solubility:
Infinitely soluble.
Specific Gravity:
1.41
pH:
1.0 (0.1M solution)
% Volatiles by volume @ 21C (70F):
100 (as water and acid)
Boiling Point:
122C (252F)
Melting Point:
-42C (-44F)
Vapor Density (Air=1):
2-3
Vapor Pressure (mm Hg):
48 @ 20C (68F)
Evaporation Rate (BuAc=1):
No information found.

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Containers may burst when heated.
Hazardous Decomposition Products:
When heated to decomposition, emits toxic nitrogen oxides fumes and hydrogen nitrate. Will react with water or steam to produce heat and toxic and corrosive fumes.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
A dangerously powerful oxidizing agent, concentrated nitric acid is incompatible with most substances, especially strong bases, metallic powders, carbides, hydrogen sulfide, turpentine, and combustible organics.
Conditions to Avoid:
Light and heat.

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11. Toxicological Information

Nitric acid: Inhalation rat LC50: 244 ppm (NO_2)/30M; Investigated as a mutagen, reproductive effector. Oral (human) LDLo: 430 mg/kg.

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--------\Cancer Lists\-----------------------------------------------------

                                                ---NTP Carcinogen---
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Ingredient	Known	Anticipated	IARC Category
Nitric Acid (7697-37-2)	No	No	None
Water (7732-18-5)	No	No	None

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12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

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13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

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14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: NITRIC ACID
Hazard Class: 8
UN/NA: UN2031
Packing Group: II
Information reported for product/size: 6.5GL

International (Water, I.M.O.)

Proper Shipping Name: NITRIC ACID (WITH NOT MORE THAN 70% NITRIC ACID)
Hazard Class: 8
UN/NA: UN2031
Packing Group: II
Information reported for product/size: 6.5GL

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15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia

Nitric Acid (7697-37-2)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

		--Canada--		
Ingredient	Korea	DSL	NDSL	Phil.
Nitric Acid (7697-37-2)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

	-SARA 302-		------SARA 313------	
Ingredient	RQ	TPQ	List	Chemical Catg.
Nitric Acid (7697-37-2)	1000	1000	Yes	No
Water (7732-18-5)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------

		-RCRA-	-TSCA-
Ingredient	CERCLA	261.33	8(d)
Nitric Acid (7697-37-2)	1000	No	No
Water (7732-18-5)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No

SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No

Reactivity: No (Mixture / Liquid)

Australian Hazchem Code: 2PE
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **0** Other: **Oxidizer**
Label Hazard Warning:
POISON! DANGER! STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED. INHALATION MAY CAUSE LUNG AND TOOTH DAMAGE.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe vapor or mist.
Use only with adequate ventilation.
Wash thoroughly after handling.
Keep from contact with clothing and other combustible materials.
Do not store near combustible materials.
Store in a tightly closed container.
Remove and wash contaminated clothing promptly.
Label First Aid:
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In all cases get medical attention immediately.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****
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****
Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

ATTACHMENT C SUPERVISOR'S ACCIDENT INVESTIGATION REPORT AND NEAR MISS REPORTING FORM

S3NA-004-FM1
SUPERVISOR'S REPORT OF INCIDENT

AECOM

1. SEEK IMMEDIATE MEDICAL ATTENTION IF NECESSARY
2. EMPLOYEE MUST REPORT ALL INCIDENTS TO THEIR SUPERVISOR IMMEDIATELY.
3. REPORT THE INCIDENT TO THE APPROPRIATE INCIDENT REPORTING LINE. **(800) 348-5046**

ORGANIZATION INFORMATION

REGION: ☐ CAN-EAST ☐ CAN-CENTRAL ☐ CAN-WEST ☐ MID-ATLANTIC ☐ MIDWEST ☐ NORTHEAST ☐ South ☐ WEST	**DISTRICT:** **PROJECT NUMBER:**

BUSINESS LINE: ☐ AECOM CORP ☐ CONSTRUCTION SERVICES ☐ ENERGY&POWER ☐ ENVIRONMENT ☐ PDD ☐ TRANSPORTATION ☐ WATER

CLIENT NAME:	**PROJECT NAME:**

ADMINISTRATIVE

EMPLOYEE NAME:	**EMPLOYEE NUMBER:**
WORK PHONE:	**CELL PHONE:**
EMPLOYEE STATUS ☐ FULL TIME ☐ PART TIME ☐ SUB ☐ TEMP AGENCY ☐ THIRD PARTY	**HOME OFFICE ADDRESS:** **JOB TITLE:**

DESCRIPTION OF EVENT

TYPE OF OCCURRENCE: ☐ INJURY/ILLNESS ☐ PROPERTY DAMAGE ☐ ENV DAMAGE/SPILL ☐ REGULATORY INSPECTION ☐ MOTOR VEHICLE ACCIDENT ☐ BOATING INCIDENT ☐ NOV/CITATION ☐ REPUTATIONAL (AECOM, CLIENT, OTHER)

DATE OF INCIDENT:	**TIME OF INCIDENT:**
DATE REPORTED TO SUPERVISOR:	**TIME REPORTED TO SUPERVISOR:**
INCIDENT ADDRESS/LOCATION:	**CITY:**
STATE/PROVINCE/TERRITORY:	**ZIP/POSTAL CODE:**

WERE THERE ANY SUBCONTRACTORS, WITNESSES OR OTHER PERSONS INVOLVED: ☐ YES ☐ NO

IF YES, PLEASE PROVIDE DETAILS TO INCLUDE NAMES AND CONTACT INFORMATION

S3NA-004-FM1
SUPERVISOR'S REPORT OF INCIDENT

AECOM

PERSONAL INJURY

TYPE OF INJURY: ☐ FIRST AID (TREATED ON-SITE) ☐ MEDICAL AID (TREATED BY PROFESSIONAL) ☐ FATALITY

DESCRIBE THE INJURY AND BODY PART AFFECTED:

WAS A DOCTOR OR HOSPITAL VISITED? ☐ YES ☐ NO	**IF YES, WHEN:**
MEDICAL RECEIVED:	**DOCTOR/HOSPITAL NAME:**
PROVIDER ADDRESS:	**PHONE NUMBER:**

PROPERTY DAMAGE (COMPLETE FOR PROPERTY DAMAGE ONLY)

TYPE OF DAMAGE: ☐ AECOM PROPERTY ☐ MOTOR VEHICLE (COMPLETE MVA REPORT PAGE 3)

☐ SPILL OR RELEASE OF A HAZARDOUS SUBSTANCE ☐ MAJOR STRUCTURAL FAILURE ☐ CLIENT, SUBCONTRACTOR, OTHER:

DESCRIBE THE SPECIFIC DAMAGE, STRUCTURAL FAILURE OR HAZARDOUS RELEASE:

RANK THE SEVERITY OF THE DAMAGE: ☐ MINOR ☐ SERIOUS ☐ MAJOR

WHERE CAN THE PROPERTY BE SEEN?

PROPERTY OWNER NAME: **CONTACT INFORMATION:**

IS THERE ANY POTENTIAL FOR CIVIL, CRIMINAL OR REGULATORY LIABILITY AGAINST AECOM OR AN EMPLOYEE? ☐ YES ☐ NO

IF YES, DISCUSS WITH AECOM REGIONAL COUNSEL BEFORE PROCEEDING WITH ANY FURTHER REPORTING.

INDICATE WHO HAS BEEN NOTIFIED OF THE EVENT (E.G., OWNER/OPERATOR, STATE (US) OR GOVERNING BODY OF LABOUR, ETC?

EMPLOYEE DESCRIPTION OF INCIDENT:

What, when, where, why, how? Attached notes/diagrams as required and list any machinery or equipment involved.

ON-SITE/CORRECTIVE ACTIONS

INCIDENT IMMEDIATELY REPORTED ON-SITE TO:

WHAT CORRECTIVE ACTIONS WERE IMMEDIATELY IMPLEMENTED ON-SITE?

WHAT LONG-TERM OR PERMANENT CORRECTIVE ACTIONS ARE RECOMMENDED?

ACKNOWLEDGEMENTS

EMPLOYEE PRINTED NAME AND PHONE	**SIGNATURE AND DATE**

S3NA-004-FM1
SUPERVISOR'S REPORT OF INCIDENT

AECOM

SUPERVISOR REVIEW OF INCIDENT:	
SUPERVISORS PRINTED NAME AND PHONE	**SIGNATURE AND DATE**
MANAGER COMMENTS:	
MANAGER PRINTED NAME AND PHONE	**SIGNATURE AND DATE**
FOR REGIONAL SH&E MANAGER USE ONLY:	
CORRECTIVE ACTIONS REQUIRING IMPLEMENTATION BY SH&E MANAGER:	**RATIONALE:**
NAME AND SIGNATURE:	**DATE:**

RECORDABILITY DETERMINATION ☐ FIRST AID ☐ RECORDABLE ☐ RECORDABILITY UNDETERMINED ☐ NON WORK

☐ PROPERTY DAMAGE ☐ GENERAL LIABILITY ☐ VANDALISM

COMMENTS:

Near-Miss/Observation Report

Please use this form to report any observation (e.g., at-risk acts/ at-risk conditions, or positive observations), as well as near-misses, you encounter as a part of your work. This may include office or field locations.

AECOM

ADMINISTRATIVE

PROJECT NAME & NUMBER: ☐ **N/A**	**LOCATION:**
EMPLOYEE NAME:	**EMPLOYEE NUMBER:**
HOME OFFICE:	**DEPARTMENT NUMBER:**
MANAGER:	**JOB TASK/PROJECT DESCRIPTION:**
DATE AND TIME OF NEAR MISS/OBSERVATION :	**DATE AND TIME REPORTED:**

Work Activity	☐ Office	☐Driving	☐Field	☐Lab	☐Other: _____

REMEMBER: IDENTIFYING A NEAR MISS DOES NOT IMPLY GUILT BUT ASSISTS IN PREVENTING INCIDENTS OR INJURIES.

OBSERVATION, RISK OR NEAR MISS DETAILS

NEAR MISS POTENTIAL OUTCOME: ☐ INJURY/ILLNESS ☐ PROPERTY DAMAGE ☐ ENVIRONMENTAL DAMAGE

POTENTIAL SEVERITY: ☐ MINOR ☐ SERIOUS ☐ FATAL

DESCRIPTION OF NEAR MISS, OBSERVATION, RISK, OR POTENTIAL LIABILITY:

POTENTIAL IMMEDIATE CAUSES

- ☐ Procedures not followed
- ☐ Use of tools or equipment
- ☐ Use of protective measures
- ☐ Inattention/Lack of awareness
- ☐ Protective systems
- ☐ Tools, equipment, & vehicles
- ☐ Work exposures to…
- ☐ Work place environmental/layout

POTENTIAL SYSTEM CAUSES

- ☒ Physical capacity
- ☒ Physical condition
- ☐ Mental state
- ☐ Behavior
- ☐ Skill level
- ☐ Training/Knowledge transfer
- ☐ Mngmt/Supervision/Employee leadership
- ☐ Contractor selection & design
- ☐ Engineering/Design
- ☐ Work planning
- ☐ Purchasing, material handling/controls
- ☐ Tools & equipment
- ☐ Work rules/policies/stds/procedures
- ☐ Communication
- ☐ Other:_____

CORRECTIVE ACTIONS

Corrective Action Category Identified to Prevent Future Reoccurrence

(*Identify relevant issues in checkboxes and provide detail below, as applicable*)

- ☐ Different/New PPE needed
- ☐ New tool(s)/equipment needed
- ☐ Additional/proper personnel needed
- ☐ Change in working procedure
- ☐ New STOP WORK trigger identified
- ☐ Additional training/skills needed
- ☐ Improved housekeeping efforts
- ☐ Modified working behaviors
- ☐ Improved work planning
- ☐ Other:_____

WERE IMMEDIATE CORRECTIVE ACTIONS IMPLEMENTED? ☐ **YES** ☐ **NO** IF YES, PLEASE DESCRIBE:

WHAT LONG-TERM CORRECTIVE ACTIONS ARE RECOMMENDED?

FOR SH&E MANAGEMENT USE ONLY:

CORRECTIVE ACTIONS REQUIRING IMPLEMENTATION:	**RATIONALE:**
COMMUNICATED BACK TO EMPLOYEE: ☐	**COMMUNICATED BACK TO MANAGER:** ☐
COMPLETED BY:	**DATE:**

Attachment D Applicable SH&E SOPs

Americas SHE Standard Operating Procedures

Potentially applicable SOPs related to the project field activities are highlighted below

000 Series - SH&E Essentials	**Publication Date**
S3NA-000-MN SH&E Manual	October 1, 2010
S3NA-001-PR Safe Work Standards and Rules	October 1, 2010
S3NA-002-PR Stop Work Authority for Unsafe Work	December 1, 2010
S3NA-003-PR SH&E Training	October 1, 2010
S3NA-004-PR Incident Reporting	October 1, 2010
S3NA-005-PR Driver and Vehicle Safety Program	October 1, 2010
100 Series – Office	**Publication Date**
S3NA-101-PR Emergency Response Planning, Office	March 1, 2011
S3NA-102-PR Ergonomics, Office	December 1, 2010
S3NA-103-PR Housekeeping, Office	December 1, 2010
S3NA-104-PR Manual Lifting, Office	December 1, 2010
S3NA-105-PR Office Safety Programs	October 1, 2010
S3NA-106-PR Fire Protection, Office	December 1, 2010
S3NA-107-PR Violence in the Workplace	December 1, 2010
S3NA(Cal)-108-PR California Injury and Illness Prevention Program	June 1, 2011
200 Series - Project Management	**Publication Date**
S3NA-201-PR Client Site Requirements	October 1, 2010
S3NA-202-PR Competent Person Designation	October 1, 2010
S3NA-203-PR Emergency Response Planning, Field	March 1, 2011
S3NA-204-PR Environmental Compliance	June 1, 2011
S3NA-205-PR Equipment Inspections & Maintenance	December 1, 2010
S3NA-206-PR Fire Protection, Field	December 1, 2010
S3NA-207-PR Medical Services and First Aid	October 1, 2010
S3NA-208-PR Personal Protective Equipment Program	December 1, 2010
S3NA-209-PR Project Hazard Assessment and Planning	October 1, 2010
S3NA-210-PR Project Safety Meetings	October 1, 2010
S3NA-211-PR Regulatory Inspections	October 1, 2010
S3NA-212-PR Site Inspections	October 1, 2010
S3NA-213-PR Subcontractors	October 1, 2010
S3NA-214-PR Site Safety Officer	October 1, 2010

300 Series - Field (Common)	Publication Date
S3NA-301-PR Confined Spaces	December 1, 2010
S3NA-302-PR Electrical, General	December 1, 2010
S3NA-303-PR Excavation and Trenching	March 1, 2011
S3NA-304-PR Fall Protection/Working from Heights	March 1, 2011
S3NA-305-PR Hand and Power Tools	March 1, 2011
S3NA-306-PR Highway and Road Work	December 1, 2010
S3NA-307-PR Housekeeping, Worksite	December 1, 2010
S3NA-308-PR Manual Lifting, Field	December 1, 2010
S3NA-309-PR Mobile or Heavy Equipment	March 1, 2011
S3NA-310-PR Rigging, Hoisting, Cranes and Lifting Devises	December 1, 2010
S3NA-311-PR Scaffolding	March 1, 2011
S3NA-312-PR Stairways and Ladders	March 1, 2011
S3NA-313-PR Wildlife, Plants and Insects	March 1, 2011
S3NA-314-PR Working Alone & Remote Travel	March 1, 2011
S3NA-315-PR Water, Working Around	March 1, 2011
400 Series - Field (Uncommon)	**Publication Date**
S3NA-401-PR Aircraft Charters	October 1, 2010
S3NA-402-PR All Terrain Vehicles (ATVs)	March 1, 2011
S3NA-403-PR Avalanches	March 1, 2011
S3NA(US)-404-PR Commercial Motor Vehicles	June 1, 2011
S3NA-405-PR Drilling, Boring and Direct Push Probing	March 1, 2011
S3NA-406-PR Electrical Lines, Overhead	March 1, 2011
S3NA-407-PR Electrofishing	March 1, 2011
S3NA-408-PR Elevated Work Platforms and Aerial Lifts	March 1, 2011
S3NA-409-PR Forklifts (operation of)	March 1, 2011
S3NA-410-PR Hazardous Energy Control	March 1, 2011
S3NA-411-PR Machine Guarding	March 1, 2011
S3NA-412-PR Powder-Actuated Tools	March 1, 2011
S3NA(US)-413-PR Process Safety Management	June 1, 2011
S3NA-414-PR Railway Sites	December 1, 2010
S3NA(US)-415-PR RCRA Regulated Facilities	October 1, 2010
S3NA-416-PR Tunnel and Underground Work	March 1, 2011
S3NA-417-PR Utilities, Underground	March 1, 2011
S3NA-418-PR Welding, Cutting and Other Hot Work	March 1, 2011
S3NA-419-PR Water, Marine Operations/Boating	March 1, 2011
S3-NA420-PR Water/Underwater Diving	October 1, 2010

500 Series - Industrial Hygiene (Chemical, Biological, Radiological, Nuclear)	Publication Date
S3NA-501-PR Asbestos	March 1, 2011
S3NA-502-PR Benzene	March 1, 2011
S3NA-503-PR Blood borne Pathogen Program	March 1, 2011
S3NA-504-PR Cadmium	March 1, 2011
S3NA-505-PR Cold Stress Prevention	March 1, 2011
S3NA-506-PR Compressed Gases	March 1, 2011
S3NA-507 PR Hazardous Materials Communication / WHMIS	October 1, 2010
S3NA-508-PR Hazardous Materials Handling and Shipping	October 1, 2010
S3NA-509-PR Hazardous Waste Operations and Emergency Response	
S3NA-510-PR Hearing Conservation Program	December 1, 2010
S3NA-511-PR Heat Stress Prevention	December 1, 2010
S3NA-512-PR Laboratory Safety	March 1, 2011
S3NA-513-PR Lead	March 1, 2011
S3NA-514-PR Munitions and Explosives of Concern / Unexploded Ordnance	March 1, 2011
(MEC-UXO)	March 1, 2011
S3NA-515-PR Nanotechnology	March 1, 2011
S3NA-516-PR Radiation Safety Programs	March 1, 2011
S3NA-517-PR Radiation, Non-Ionizing	March 1, 2011
S3NA-518-PR Radiation, Gauge Source program	March 1, 2011
S3NA-519-PR Respiratory Protection Program	December 1, 2010
S3NA-520-PR Spill Response, Incidental	December 1, 2010
S3NA-521-PR Decontamination	October 1, 2011
S3NA-522-PR Hydrogen Sulfide	October 1, 2011
600 Series - Incident & Medical Management	**Publication Date**
S3NA-601-PR Recordkeeping	October 1, 2010
S3NA-602-PR Exposure Monitoring	October 1, 2010
S3NA-603-PR Incident Investigation and Review	October 1, 2010
S3NA-604-PR Medical Records	October 1, 2010
S3NA-605-PR Medical Surveillance Program	October 1, 2010
S3NA-606-PR Modified Duty Program	October 1, 2010
S3NA-607-PR Post Incident Medical Management	October 1, 2010
700 Series - SH&E Program Management	**Publication Date**
S3NA-701-PR Rules and Regulatory Review	October 1, 2010
S3NA-702-PR SH&E Organizational Reporting Structure & Supporting Roles	October 1, 2010
S3NA-703-PR SH&E Manual and Procedures Review	October 1, 2010
S3NA-704-PR SH&E Program Auditing	March 1, 2011
S3NA-705-PR SH&E Program Monitoring and Reporting	October 1, 2010