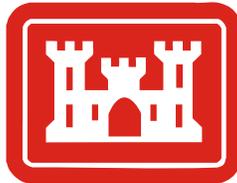


**Final
Accident Prevention Plan /
Site Safety and Health Plan
for
Vapor Intrusion Investigation
Former Schilling Air Force Base
CERCLA Process Support
Salina, Kansas**

August 22, 2006

Prepared for



U.S. Army Corps of Engineers
Kansas City District

Prepared by

**MALCOLM
PIRNIE**



Contract Number: W912DQ-06-D-0006
Project Number: 42244

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APPENDICES

APPENDIX A – Accident Prevention Plan Forms

APPENDIX B – Site Safety and Health Plan

LIST OF FIGURES

Figure No.	Title
4-1	Lines of Authority for Project Safety

LIST OF ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AHA	Activity Hazard Analysis
APP	Accident Prevention Plan
BMcD	Burns & McDonnell Engineering Company, Inc.
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CIH	Certified Industrial Hygienist
DART	Days Absent, Restricted, or Transferred Rate
DOT	Department of Transportation
EMR	Experience Modification Rate
EMS	Emergency Medical Service
FP&P	Fall Protection & Prevention
FSM	Field Site Manager
HAZWOPER	Hazardous Waste Operations and Emergency Response
HR	Human Resources
hr/year	Hours per Year
MSDS	Material Safety Data Sheet
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
PSHM	Project Safety and Health Manager
QC	Quality Control
SAFB	Schilling Air Force Base
SSHP	Site Safety and Health Plan
SSHS	Site Safety and Health Supervisor
TRIR	Total Recordable Incident Rate
U.S.	United States
USACE	United States Army Corps of Engineers

LIST OF IMPORTANT TELEPHONE NUMBERS

EMERGENCY NUMBERS

Fire Department:	911
Salina EMS:	911
Salina Police:	911
Poison Control Center:	785-239-7777
BMcD Safety (Eric Wenger):	816-822-3894
BMcD Project Manager (Tracy Cooley):	816-822-3369

OTHER PRIMARY CONTACTS

U.S. Army Corps of Engineers Project Manager (Robyn Kiefer):	816-389-3615
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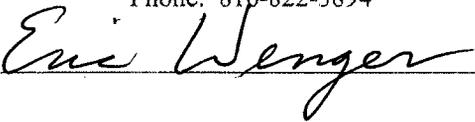
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1.0 SIGNATURE SHEET

**Accident Prevention Plan for
Vapor Intrusion Investigation
Former Schilling AFB
Salina, Kansas
Contract No. DACW41-02-D-0003**

I hereby certify that this Accident Prevention Plan is in compliance with the contract documents and specifications, and is submitted for U.S. Army Corps of Engineers (USACE) approval.

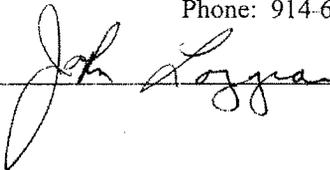
Eric Wenger, Certified Industrial Hygienist (CIH)
Phone: 816-822-3894



Tracy Cooley, Project Manager
Phone: 816-822-3369



John Logigian, Program Manager
Phone: 914-641-2690



2.0 BACKGROUND INFORMATION

2.1 CONTRACTOR

Burns & McDonnell Engineering Company, Inc. (BMcD)

2.2 CONTRACT NUMBER

W912DQ-06-D-0006

2.3 PROJECT NAME

Former Schilling Air Force Base (AFB) Vapor Intrusion Investigation, Salina, Kansas

2.4 PROJECT DESCRIPTION

2.4.1 Overview

This project will involve sub-slab vapor and indoor air sampling of 13 buildings located at the former Schilling AFB.

2.4.2 Scope of Work

Field activities to be conducted at the Site include sub-slab air sampling at 13 buildings and indoor air sampling based upon the sub-slab air sampling results. All sampling will be done in accordance with EPA methods TO-15 and TO-15 SIM respectively.

2.5 CONTRACTOR'S ACCIDENT RECORD

The following information is provided to outline the accident and safety record of the contractor executing the field phase of this project (Burns & McDonnell Engineering).

Year	TRIR (hr/year)	DART (days)	Lost Time Incident	Recordables	EMR (days/year)
2000	1.61	0.12	0.12	12	0.66
2001	0.65	0.16	0.16	11	0.66
2002	0.58	0.11	0.11	10	0.67
2003	0.99	0.18	0.18	16	0.63
2004	0.38	0.00	0.00	7	0.66
2005	0.25	0.05	0.05	7	0.66
2006	0.00	0.00	0.00	0	0.65

2.6 PHASES OF WORK REQUIRING ACTIVITY HAZARD ANALYSES

The following work activities have been identified for this project:

- Sub-slab vapor sampling
- Indoor air sampling

At a minimum, each work activity requires the completion of an Activity Hazard Analysis (AHA) and submit it to the project manager for approval prior to starting the activity. The approved AHA is included as Table 1-1 in the Site Safety and Health Plan (Appendix B of this plan) and will remain accessible on the project site for viewing by all site personnel and will be included as part of training during the phases of work.

* * * * *

3.0 STATEMENT OF SAFETY AND HEALTH POLICY

3.1 BURNS & MCDONNELL POLICY

The safety and health of each and every employee of BMcD is of primary importance. Therefore BMcD issues the following policy statement:

- It is the policy of BMcD that every employee is entitled to work under the safest possible conditions for the construction industry. To this end, every reasonable effort will be made in the interest of accident prevention, fire protection, and health preservation.
- A comprehensive safety and health program shall be maintained with the objective of reducing the number of accidents and injuries to an absolute minimum; zero recordables and zero lost time. To be successful such a program must embody the proper attitudes towards accident prevention on the part of both the supervisors and employees. It also requires cooperation in all safety and health matters, not only between supervisor and employee, but also between employee and his or her fellow worker. It is only through cooperation that such programs can work effectively.
- On each job the site safety and health supervisor (SSHS) will be responsible for implementing the safety program. All employees shall adhere to the rules, regulations, and other provisions of our safety program.

* * * * *

4.0 RESPONSIBILITY AND LINES OF AUTHORITY

4.1 RESPONSIBILITY

Project personnel who play a vital role in the project safety and health program are described in Section 2.0 of the Site Safety and Health Plan (SSHP – Appendix B of this Accident Prevention Plan (APP)).

4.2 LINES OF AUTHORITY FOR PROJECT SAFETY

Figure 4-1 provides a graphic presentation of the lines of authority for project safety.

* * * * *

5.0 SUBCONTRACTORS AND SUPPLIERS

Not applicable. No subcontractors will be working on this site.

* * * * *

6.0 TRAINING

6.1 TRAINING SUBJECTS

6.1.1 Training of Burns & McDonnell Field Personnel

Training of BMcD field personnel is addressed in Section 5.0 of the SSHP (Appendix B of this APP).

6.2 EMERGENCY RESPONSE TRAINING

BMcD intentions are to provide a safe working environment to all of its personnel. However if an injury should occur, proper accident reporting and investigative procedures must be activated. The following is the general policy of accident reporting and investigative procedures of BMcD:

- Employees shall immediately report all injuries, sustained while on duty, immediately to the field site manager.
- The field site manager shall be responsible for seeing that injured employees receive immediate medical attention and the details of the incident are reported.

Immediately following an injury, the field site manager shall:

- Arrange for immediate medical attention and proper transportation to the place of treatment.
- Completely fill out the incident report form (Form 1). The incident report form must be submitted within 24 hours.
- Start the investigative process to prevent recurrence of the same accident.
- When a field site manager is aware of lost time (disabling injury) accident, he/she shall immediately report the injury to the BMcD project manager.

In the event of death or very serious injury, the President shall inform OSHA. The project manager shall be responsible for keeping management informed on the status of all accidents, the maintenance of accident report records and for administration of industrial injury reports to comply with the law.

6.2.1 Supervisory and Employee Safety Meetings

BMcD field personnel will hold a brief ‘tailgate’ safety meeting to discuss possible site hazards each morning prior to commencing work. Daily safety meetings will be documented on the Safety Meeting Form located in Appendix A of the SSHP.

* * * * *

7.0 SAFETY AND HEALTH INSPECTIONS

7.1 SAFETY INSPECTIONS

A daily safety inspection will be conducted by the Site Safety and Health Supervisor (SSHS) or a designee. The “Daily Safety and Health Report” (Form 3 of Appendix A) will be completed as part of this review. Any noted deficiencies will have corrective action initiated by the project manager.

7.2 AUDITS

Periodically (such as monthly) a QC Safety and Health audit will be completed by the Project Safety and Health Manager (PSHM). Any observed safety/health deficiency will be noted in writing. Corrective action is to be immediately initiated by the BMcD project manager. Notes as to who was contacted to correct the item and the approximate time estimated for abatement will be recorded by the project manager. Once the item has been corrected, a follow-up note will be made to document what corrective action was taken and when it occurred.

7.3 IMMINENT DANGER

For any dangers that are serious and/or immediately dangerous to life or health, work shall be stopped until appropriate corrective actions are taken.

* * * * *

8.0 SAFETY AND HEALTH EXPECTATIONS AND COMPLIANCE

8.1 PROJECT SAFETY GOALS

BMcD's goal for this project is that it be completed without a loss-day injury. OSHA, state, and local safety regulations will be incorporated in this program as required.

8.2 VIOLATION OF SAFETY REQUIREMENTS

All site workers are expected to attend the New Employee Indoctrination prior to start of work, where they can become familiar with the contents of this APP and the site safety & health requirements. Every site worker is expected to follow the site safety & health requirements.

Whenever a violation of safety policy occurs and requires correction, the BMcD SSSS will document the situation on the Daily Safety and Health Report (Form 3) with a request for correction given to the subcontractor competent person. Corrective action will be documented on the Daily Safety and Health Report with further explanation given in the daily project diary. If immediate corrective action is not taken by the Subcontractor, they will be notified in writing using Form 2 "Safety/Health Violation Notice" which is located in Appendix A. The BMcD project manager will be informed of the action taken within 24 hours of the violation. The involvement of the project manager is essential to ensuring that there are no additional violations of safety policies at the work site.

Contractors First Violation of a Rule or Regulation

A contractor employee who is cited for a first-time notice by Form 2 "Safety/Health Violation Notice" shall be immediately removed from the construction site, and shall not be permitted to return to work for a period of at least 24 hours, missing the next full workday. (For example, if an employee were cited on a Friday afternoon, they would leave the site that day and would not be permitted to return to work until Tuesday morning.)

Contractors Second Violation of a Rule or Regulation

A contractor employee responsible for a repeat offense or receiving a second Form 2 shall be immediately and permanently removed from the construction site for the remainder of the contract period. This requirement may only be waived if the contractor demonstrates, on behalf of the employee, extenuating or mitigating circumstances, and obtains a waiver from the BMcD project manager.

8.3 BURNS & MCDONNELL VIOLATION OF A RULE OR REGULATION

The following is quoted from the BMcD Corporate Policies and Procedures Manuals, Chapter 8.2.7:

“First line supervisors and management, site managers, department managers, and safety representatives are responsible for enforcing all safety and health policies. Burns & McDonnell will take disciplinary action against employee-owners for failing to enforce such policies.”

Also, the policy states: “BMcD reserves the right to dismiss employee-owners who commit serious or repeat safety or health violations.”

* * * * *

9.0 ACCIDENT REPORTING

9.1 EXPOSURE DATA REPORTING (MAN-HOURS WORKED)

The site SSHS, with help from the BMcD project manager, will complete each month a “Monthly Exposure Report” (Form 4 in Appendix A), if any subcontractors have been working on site.

9.2 ACCIDENT INVESTIGATIONS, REPORTS, AND LOGS

For all incidences including accidents, work-related illnesses, or near misses (near hits), the responsible party will notify the SSHS. Within 24 hours, the responsible party will provide a written accident report to BMcD, who will complete and send both an “Incident Report” (Form 1) and a completed ENG Form 3394 (both forms are located in Appendix A) to the project manager.

9.3 NOTIFICATION OF MAJOR ACCIDENTS

In the event of a major accident, work-related illness, or near miss (near hit), the subcontractor will immediately notify the SSHS. This includes lost-work time cases and lost work-day cases. In the event of a fatality, or if three or more are injured from a particular incident, OSHA must be notified within 8-hours. For major accidents, the SSHS will notify the project manager within 4 hours of the event. An “Incident Report” (Form 1) and an ENG Form 3394 will be completed and sent to the project manager and the Malcolm Pirnie program manager.

* * * * *

10.0 MEDICAL SUPPORT

10.1 ADDRESS AND DIRECTIONS TO HOSPITAL

See the SSHP (Appendix B of this APP, Section 12.1) for the address and detailed directions to the hospital.

10.2 ON-SITE MEDICAL SUPPORT

It shall be the policy of BMcD to have first aid kits on hand at areas most accessible to employees and in the proximity of those areas where accidents are most likely to occur. Each site or location will be responsible for keeping the first aid kits adequately supplied. First aid kits will be provided at a ratio of one for every 25 employees. The presence of fewer than 25 employees on site still warrants a first aid kit to be on site.

The SSHA will ensure that first aid kits are available on the worksite and that these locations are known to all employees on the premises. Eyewash kits will be included with the first aid kits located in the cab of the BMcD vehicle. The SSHA will make checks of the first aid equipment at each location as part of the “Daily Safety and Health Report” (Form 3 in Appendix A).

As a measure to provide immediate first aid attention to personnel who suffer minor injuries, selected site personnel are trained in first aid.

* * * * *

11.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment is covered in Section 6.0 of the SSHP (Appendix B).

* * * * *

12.0 REQUIRED PLANS

12.1 LAYOUT PLANS

Not applicable.

12.2 EMERGENCY RESPONSE PLANS

Directions to the hospital are included in the SSHP (Appendix B of this APP, Section 12.1) along with a map (Figure 12-1 of Appendix B). Emergency phone numbers are found on page TC-6 of this APP.

12.2.1 Spill Plan

If hazardous or unknown potentially hazardous materials are unexpectedly spilled during project work activities; evacuate and secure the area (to keep out all personnel). Call for assistance and be careful not get exposed to the material. The SSHP and, depending on the size of the spill, the Project Manager shall be contacted. For large spills of hazardous materials a Hazardous Materials Response Team may need to be contacted to limit exposures to site personnel and/or the community. Emergency numbers are listed on page TC-6 of this APP and in Section 12.1 of the SSHP.

12.2.2 Hazardous Materials

Hazardous materials (even as small as one ounce) must not be commercially shipped or transported without being properly packaged, labeled, marked, placarded, and accompanied by appropriate shipping papers. Personnel who engage in packaging, labeling, marking, placarding, or transporting hazardous materials must be trained and aware of the Department of Transportation (DOT) requirements for hazardous material transportation. Hazardous materials include those materials, substances, and wastes listed in the Code of Federal Regulations Title 49.

12.2.3 Substance-Specific Regulations

The scope of this project anticipates potential exposure to low concentrations of vinyl chloride. The exposure action limits are described in Chapter 6 of the SSHP.

12.2.4 Escape Procedures and Routes

All employees have been trained to recognize and report emergency situations to their immediate supervisor. In case of immediate danger employees will be instructed to evacuate the immediate area and using the prescribed route proceed directly to a pre-determined meeting place in order to be accounted for by the responsible person in charge. The SSHP will check that all employees have safely evacuated and

will conduct a roll call to provide employee accountability. The SSHS will assess the emergency condition and contact the proper rescue emergency and/or medical authorities.

12.2.5 Critical Operations

See the SSHP for a discussion of critical operations.

12.2.6 Rescue and Medical Duties

Rescue and medical duty responsibilities are to be determined only by trained and competent personnel. If the extent of injuries can be treated by first aid medical attention, then a first aid certified person would administer medical help. In the event of rescue, immediate notification of the SSHS, Field Site Manager (FSM), and the Project Manager will be initiated. The competent person will evaluate the circumstances and appropriate rescue action will take place if action can be accomplished without endangering employees. If rescue can be conducted safely by trained competent on-site personnel then such action will take place. If rescue is determined to require additional assistance then Fire Department rescue personnel will be notified and dispatched to the jobsite.

12.2.7 Emergency Reporting

Employees have been trained to immediately contact or notify their immediate supervisor and/or foremen. Supervisors/foremen have been trained as the “competent person” to react to an emergency situation. The SSHS must be notified of the situation as soon as possible to help lead appropriate immediate action.

12.3 HAZARD COMMUNICATION PROGRAM

12.3.1 General Information

In compliance with the OSHA Hazard Communication standard, the following written Construction Hazard Communication Program has been established for BMcD and this project. Any questions regarding this program, or help needed in implementing this program, should be directed to the BMcD PSHM. The written program will be available in the on-site field office for review by any interested employee.

12.3.2 Container Labeling

The BMcD SSHS will verify that all containers received for use will:

- Be clearly labeled as to the contents,
- Have the appropriate hazard warning written on the label,
- List the name and address of the manufacturer on the label.

12.3.3 Material Safety Data Sheets (MSDS)

The SSSH will be responsible for receiving and maintaining a file of MSDS required for this project. MSDS's will be available to all employees for review during each work shift by asking the SSSH.

12.3.4 Employee Training On Hazard Communication

Each employee who may be potentially exposed to hazardous substances during the course of their work, is provided with hazard communication training by means of a brief overview during the New Employee Indoctrination. A course outline and records of BMcD employee training for hazard communication are maintained in the BMcD Human Resources (HR) Department.

The Project Manager is responsible for ensuring that BMcD project employees coming on the site have been trained in hazard communication.

The SSSH is responsible for confirming that all employees coming on the site have been trained in hazard communication. For further information on training, see Chapter 6 in this plan titled "Training".

12.3.5 Hazardous Non-Routine Tasks

Prior to performing non-routine tasks, such as a confined space entry, the SSSH must be informed by the supervisor directing employees to perform this non-routine task.

Upon being informed that a non-routine task will take place, the SSSH will inform the potentially affected employees of hazardous chemicals to which they may be exposed as well as protective measures that may be taken to reduce chance of exposure (i.e. personal protective equipment (ppe), air testing, ventilation, respirators, etc.).

12.3.6 List of Hazardous Chemicals

The MSDS constitute the list of hazardous chemicals used on this project. The MSDS are kept in a file on site which is held by the SSSH.

12.4 RESPIRATORY PROTECTION PLAN

These procedures are discussed in the SSHP in Appendix B.

12.5 HEALTH HAZARD CONTROL PROGRAM

Possible health hazards at this work site are more thoroughly defined in the SSHP in Appendix B.

12.6 LEAD ABATEMENT PLAN

Not applicable.

12.7 ASBESTOS ABATEMENT PLAN

Not applicable.

12.8 ABRASIVE BLASTING PLAN

Not applicable.

12.9 CONFINED SPACE PROGRAM

Not applicable.

12.10 HAZARDOUS ENERGY CONTROL PLAN (LOCKOUT/TAGOUT)

Not applicable.

12.11 CRITICAL LIFT PLAN

Not applicable.

12.12 CONTINGENCY PLAN FOR SEVERE WEATHER

All facility personnel must understand the Emergency Response and General Evacuation Procedures for their location. This information will be provided during the New Employee Indoctrination. Employees must also know the correct exits to use for all areas they enter and the assembly point locations.

In the event of severe weather, the following procedures will be followed:

- All personnel shall shut down field operations and take shelter.
- Upon notification that an evacuation is in progress, all company personnel and visitors will immediately use the nearest available exit and/or s and proceed to their designated assembly location.
- If lightning is occurring, stop outdoor work and move indoors, or stay inside a moving vehicle (do not continue to linger outdoors). Shut down and move away from heavy equipment.
- In case of tornadic conditions, seek out low ground (i.e. ditch or basement) , shield yourself from falling objects, and stay away from windows.
- The SSHS will take a head count.
- Any visitors should remain with the group, if feasible.

- All personnel will stay assembled until further instructions are received. However it is important to note that in some emergencies, employees must deviate from these instructions. Use common sense. For example, if smoke is present, employees need to begin evacuating even if the alarm has not been sounded. If smoke is present, stay below smoke while evacuating.

Note that not all emergencies are the same. In some cases employees will have to follow a procedure that is different from the facility evacuation plan. Be certain to train and drill employees in this need to exercise common sense above all in emergency situations.

12.13 ACCESS AND HAUL ROAD PLAN

Not applicable.

12.14 DEMOLITION PLAN

Not applicable

12.15 EMERGENCY RESCUE – TUNNELING

Not applicable.

12.16 UNDERGROUND CONSTRUCTION FIRE PREVENTION AND PROTECTION PLAN

Not applicable.

12.17 COMPRESSED AIR PLAN

Not applicable.

12.18 FORMWORK AND SHORING ERECTION AND REMOVAL PLANS

Not applicable.

12.19 JACKING PLAN LIFT SLAB PLANS

Not applicable.

12.20 SAFETY AND HEALTH PLAN AND SSHP FOR HAZARDOUS, TOXIC, OR RADIOACTIVE WASTE

The SSHP for this site is attached to this APP as Appendix B.

12.21 BLASTING PLAN

Not applicable.

12.22 DIVING PLAN

Not applicable.

12.23 PLAN FOR PREVENTION OF ALCOHOL AND DRUG ABUSE

BMcD prohibits the use, possession or distribution on the project site of any of the following by BMcD employees and by Subcontractor employees: alcoholic beverages, intoxicants, narcotics, illegal or unauthorized drugs (including marijuana), simulated drugs and related drug paraphernalia.

Employees must not report for duty under the influence of any drug/alcohol that may in any way adversely affect their working ability, alertness, coordination, response or adversely affect the safety of others on the job.

For purposes of this program, influence shall be presumed for any individual whose drug or alcohol level exceeds applicable testing levels.

All employees who work on the project will provide evidence of a negative drug/alcohol screen no later than the time of safety orientation prior to commencing work and will be required to submit to a post injury drug test. Such test will be administrated at the time of when the injured worker receives medical treatment.

BMcD will not perform random drug testing however, lower-tier subcontractors to BMcD may utilize a random testing program.

BMcD shall not allow employees who are found to be using alcohol or drugs illegally to remain on the project. BMcD and its Subcontractors will determine when the employee in violation can return to the project or be permanently removed.

Subcontractors must submit their drug and alcohol programs to BMcD for evaluation or they will be required to adopt the drug and alcohol program of BMcD. If the subcontractor chooses to adopt the program, notice must be made in writing to BMcD. BMcD will periodically check with subcontractors to evaluate the compliance of the submitted drug and alcohol program.

Legally prescribed drugs may be permitted on premises or work locations, provided the drugs are contained in the original prescription container and are prescribed by an authorized medical practitioner

for the current use of the person in possession. Legally prescribed drugs must not affect working ability, alertness, coordination or response of the person taking the medication.

12.24 FALL PROTECTION AND PREVENTION PLAN (FP&P)

Not applicable.

12.25 STEEL ERECTION PLAN

Not applicable.

12.26 NIGHT OPERATIONS LIGHTING PLAN

Not applicable.

12.27 SITE SANITATION PLAN

Not applicable.

12.28 FIRE PREVENTION PLAN

A fire extinguisher will be made available on the premises during sub-slab vapor and indoor air monitoring.

12.29 SILICA EXPOSURE REDUCTION PLAN

Not applicable.

* * * * *

13.0 CONTRACTOR INFORMATION

Not applicable.

* * * * *

14.0 SITE-SPECIFIC HAZARDS AND CONTROL

A site specific AHA is provided as Table 1-1 of the SSHP.

* * * * *

Appendix A
Accident Prevention Plan Forms



**FORM 1
INCIDENT REPORT**

Incident Date:	Incident Time:
Contract No.	
Project Number:	Project Abbreviation:
Person Completing Form:	
Date and Time of Report Completion:	
Affected Person(s):	
Summary and Cause of Incident:	
Recommended Corrective Action:	
Corrective Action Authorization Burns & McDonnell Superintendent Signature and Date: Manager of Construction Safety & Health Signature and Date:	



**FORM 2
Safety/Health Violation Notice**

Subcontractor In Violation:	Project:
Contract No.	Prime Contractor: Burns & McDonnell

Date: _____ Time: _____ Issued By: _____

Vehicle Type: _____ License No. _____ State: _____

Has Access to Site Been Denied? Yes _____ Reason: _____
No _____ Reason: _____

Violation Number _____

Type of Violation:

- b. Non-serious _____ c. Stop Work – Imminent Danger _____
c. Serious _____ d. Repeat Violation _____

Location of Violation: _____

Supervisor Responsible: _____

Violation Description:

Violation Corrected: _____ a.m./p.m.

Action Performed to Abate Violation _____

Signature _____ Date: _____ Time: _____

Standard Source

____ OSHA ____ NIOSH ____ NFPA ____ Site Health and Safety Plan
____ NEC ____ ANSI ____ EPA ____ Other _____



FORM 3
Daily Safety and Health Report

Project Name: Vapor Intrusion Investigation, Schilling Air Force Base
Field/Site Contractor: Burns & McDonnell

Week of _____

Yes = Practices observed to be safe; No = Practice observed as unsafe (must follow up)

(Mark NA if not applicable)

Completed by (initials)	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
AHA completed							
New Employee Indoctrin.							
Access & Haul Roads							
Barricading							
Chemical storage/labels							
Compressed gasses							
Confined Space Entry							
Crane Operations							
Electrical - GFCI							
Electrical - Other							
Excavations/Trenches							
Fall Protection							
Fire Extinguishers avail.							
First Aid kit available							
Housekeeping							
Ladders							
Lighting							
Material Handling							
MSDS Available							
Noise Protection							
PPE Use							
Postings displayed							
Rigging							
Sanitation							
Scaffolds							
Silica dust reduction							
Steel Erection							
Tools use/guarding							
Corrective Action: "No" requires documentation as to correction made.							

Note: AHA = Activity Hazard Analysis (Form 1); MSDS = Material Data Safety Sheets
GFCI = Ground-fault circuit interrupter; PPE = Personal Protective Equipment (hard hats, safety glasses, etc.)

<i>(For Safety Staff only)</i>	REPORT NO.	EROC CODE	UNITED STATES ARMY CORPS OF ENGINEERS ACCIDENT INVESTIGATION REPORT <i>(For Use of this Form See Help Menu and USACE Suppl to AR 385-40)</i>			REQUIREMENT CONTROL SYMBOL: CEEC-S-8(R2)
1. ACCIDENT CLASSIFICATION						
PERSONNEL CLASSIFICATION		INJURY/ILLNESS/FATAL		PROPERTY DAMAGE		MOTOR VEHICLE INVOLVED
GOVERNMENT <input type="checkbox"/> CIVILIAN <input type="checkbox"/> MILITARY		<input type="checkbox"/>		<input type="checkbox"/> FIRE INVOLVED <input type="checkbox"/> OTHER		<input type="checkbox"/>
<input type="checkbox"/> CONTRACTOR		<input type="checkbox"/>		<input type="checkbox"/> FIRE INVOLVED <input type="checkbox"/> OTHER		<input type="checkbox"/>
<input type="checkbox"/> PUBLIC		<input type="checkbox"/> FATAL <input type="checkbox"/> OTHER		XXXXXXXXXX		XXXXXXXXXX
2. PERSONAL DATA						
a. Name (Last, First, MI)		b. AGE	c. SEX <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE		d. SOCIAL SECURITY NUMBER	
f. JOB SERIES/TITLE		g. DUTY STATUS AT TIME OF ACCIDENT <input type="checkbox"/> ON DUTY <input type="checkbox"/> TDY <input type="checkbox"/> OFF DUTY		h. EMPLOYMENT STATUS AT TIME OF ACCIDENT <input type="checkbox"/> ARMY ACTIVE <input type="checkbox"/> ARMY RESERVE <input type="checkbox"/> VOLUNTEER <input type="checkbox"/> PERMANENT <input type="checkbox"/> FOREIGN NATIONAL <input type="checkbox"/> SEASONAL <input type="checkbox"/> TEMPORARY <input type="checkbox"/> STUDENT <input type="checkbox"/> OTHER (Specify) _____		
3. GENERAL INFORMATION						
a. DATE OF ACCIDENT (month/day/year)	b. TIME OF ACCIDENT (Military time) hrs	c. EXACT LOCATION OF ACCIDENT			d. CONTRACTOR'S NAME	
e. CONTRACT NUMBER <input type="checkbox"/> CIVIL WORKS <input type="checkbox"/> MILITARY <input type="checkbox"/> OTHER (Specify) _____		f. TYPE OF CONTRACT <input type="checkbox"/> CONSTRUCTION <input type="checkbox"/> SERVICE <input type="checkbox"/> A/E <input type="checkbox"/> DREDGE <input type="checkbox"/> OTHER (Specify) _____		g. HAZARDOUS/TOXIC WASTE ACTIVITY <input type="checkbox"/> SUPERFUND <input type="checkbox"/> DERP <input type="checkbox"/> IRP <input type="checkbox"/> OTHER (Specify) _____		(1) PRIME: (2) SUBCONTRACTOR:
4. CONSTRUCTION ACTIVITIES ONLY (Fill in line and corresponding code number in box from list - see help menu)						
a. CONSTRUCTION ACTIVITY (CODE) #				b. TYPE OF CONSTRUCTION EQUIPMENT (CODE) #		
5. INJURY/ILLNESS INFORMATION (Include name on line and correspondence code number in box for items e, f & g - see help menu)						
a. SEVERITY OF ILLNESS/INJURY (CODE) #				b. ESTIMATED DAYS LOST	c. ESTIMATED DAYS HOSPITALIZED	d. ESTIMATED DAYS RESTRICTED DUTY
e. BODY PART AFFECTED (CODE) PRIMARY # SECONDARY #				g. TYPE AND SOURCE OF INJURY/ILLNESS TYPE (CODE) # SOURCE (CODE) #		
f. NATURE OF ILLNESS / INJURY (CODE) #						
6. PUBLIC FATALITY (Fill in line and correspondence code number in box - see help menu)						
a. ACTIVITY AT TIME OF ACCIDENT (CODE) #				b. PERSONAL FLOATATION DEVICE USED? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A		
7. MOTOR VEHICLE ACCIDENT						
a. TYPE OF VEHICLE <input type="checkbox"/> PICKUP/VAN <input type="checkbox"/> AUTOMOBILE <input type="checkbox"/> TRUCK <input type="checkbox"/> OTHER (Specify) _____		b. TYPE OF COLLISION <input type="checkbox"/> SIDE SWIPE <input type="checkbox"/> HEAD ON <input type="checkbox"/> REAR END <input type="checkbox"/> BROADSIDE <input type="checkbox"/> ROLL OVER <input type="checkbox"/> BACKING <input type="checkbox"/> OTHER (Specify) _____		c. SEAT BELTS		USED
				(1) FRONT SEAT		
				(2) REAR SEAT		
8. PROPERTY/MATERIAL INVOLVED						
a. NAME OF ITEM		b. OWNERSHIP			c. \$ AMOUNT OF DAMAGE	
(1)						
(2)						
(3)						
9. VESSEL/FLOATING PLANT ACCIDENT (Fill in line and correspondence code number in box from list - see help menu)						
a. TYPE OF VESSEL/FLOATING PLANT (CODE) #				b. TYPE OF COLLISION/MISHAP (CODE) #		
10. ACCIDENT DESCRIPTION (Use additional paper, if necessary)						

See attached page.

11. CAUSAL FACTOR(S) (Read Instruction Before Completing)					
<p>a. (Explain YES answers in item 13)</p> <p>DESIGN: Was design of facility, workplace or equipment a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>INSPECTION/MAINTENANCE: Were inspection & maintenance procedures a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>PERSON'S PHYSICAL CONDITION: In your opinion, was the physical condition of the person a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>OPERATING PROCEDURES: Were operating procedures a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>JOB PRACTICES: Were any job safety/health practices not followed when the accident occurred? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>HUMAN FACTORS: Did any human factors such as, size or strength of person, etc., contribute to accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>ENVIRONMENTAL FACTORS: Did heat, cold, dust, sun, glare, etc., contribute to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p>					
<p>a. (CONTINUED)</p> <p>CHEMICAL AND PHYSICAL AGENT FACTORS: Did exposure to chemical agents, such as dust, fumes, mists, vapors or physical agents, such as, noise, radiation, etc., contribute to accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>OFFICE FACTORS: Did office setting such as, lifting office furniture, carrying, stooping, etc., contribute to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>SUPPORT FACTORS: Were inappropriate tools/resources provided to properly perform the activity/task? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>PERSONAL PROTECTIVE EQUIPMENT: Did the improper selection, use or maintenance of personal protective equipment contribute to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>DRUGS/ALCOHOL: In your opinion, was drugs or alcohol a factor to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p>					
12. TRAINING					
<p>a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>b. TYPE OF TRAINING.</p> <p><input type="checkbox"/> CLASSROOM <input type="checkbox"/> ON JOB</p>	<p>c. DATE OF MOST RECENT FORMAL TRAINING.</p> <p>(Month) (Day) (Year)</p>			
13. FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT; INCLUDE DIRECT AND INDIRECT CAUSES (See instruction for definition of direct and indirect causes.) (Use additional paper, if necessary)					
a. DIRECT CAUSE					
See attached page.					
b. INDIRECT CAUSE(S)					
See attached page.					
14. ACTION(S) TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(S).					
DESCRIBE FULLY:					
See attached page.					
15. DATES FOR ACTIONS IDENTIFIED IN BLOCK 14.					
a. BEGINNING (Month/Day/Year)			b. ANTICIPATED COMPLETION (Month/Day/Year)		
c. SIGNATURE AND TITLE OF SUPERVISOR COMPLETING REPORT		d. DATE (Mo/Da/Yr)	e. ORGANIZATION IDENTIFIER (Div, Br, Sect)	f. OFFICE SYMBOL	
CORPS _____					
CONTRACTOR _____					
16. MANAGEMENT REVIEW (1st)					
a. <input type="checkbox"/> CONCUR b. <input type="checkbox"/> NON CONCUR c. COMMENTS					
SIGNATURE		TITLE		DATE	
17. MANAGEMENT REVIEW (2nd - Chief Operations, Construction, Engineering, etc.)					
a. <input type="checkbox"/> CONCUR b. <input type="checkbox"/> NON CONCUR c. COMMENTS					
SIGNATURE		TITLE		DATE	
18. SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW					
a. <input type="checkbox"/> CONCUR b. <input type="checkbox"/> NON CONCUR c. ADDITIONAL ACTIONS/COMMENTS					
SIGNATURE		TITLE		DATE	
19. COMMAND APPROVAL					
COMMENTS					
COMMANDER SIGNATURE				DATE	

10.

ACCIDENT DESCRIPTION *(Continuation)*

13a.

DIRECT CAUSE *(Continuation)*

13b.

INDIRECT CAUSES *(Continuation)*

14.

ACTION(S) TAKEN, ANTICIPATED, OR RECOMMENDED TO ELIMINATE CAUSE(S) *(Continuation)*

GENERAL. Complete a separate report for each person who was *injured, caused, or contributed* to the accident (excluding uninjured personnel and witnesses). Use of this form for reporting USACE employee first-aid type injuries not submitted to the Office of Workers' Compensation Programs (OWCP) shall be at the discretion of the FOA commander. Please type or print legibly. Appropriate items shall be marked with an "X" in box(es). If additional space is needed, provide the information on a separate sheet and attach to the completed form. Ensure that these instructions are forwarded with the completed report to the designated management reviewers indicated in sections 16 and 17.

INSTRUCTIONS FOR SECTION 1— ACCIDENT CLASSIFICATION. (Mark All Boxes That Are Applicable.)

- a. GOVERNMENT. Mark "CIVILIAN" box if accident involved government civilian employee; mark "MILITARY" box if accident involved U.S. military personnel.
 - (1) INJURY/ILLNESS/FATALITY— Mark if accident resulted in any government civilian employee injury, illness, or fatality that requires the submission of OWCP Forms CA-1 (injury), CA-2 (illness), or CA-6 (fatality) to OWCP; mark if accident resulted in military personnel lost-time or fatal injury or illness.
 - (2) PROPERTY DAMAGE— Mark the appropriate box if accident resulted in any damage of \$1000 or more to government property (including motor vehicles).
 - (3) VEHICLE INVOLVED— Mark if accident involved a motor vehicle, *regardless* of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.
 - (4) DIVING ACTIVITY— Mark if the accident involved an in-house USACE diving activity.
- b. CONTRACTOR.
 - (1) INJURY/ILLNESS/FATALITY— Mark if accident resulted in any contractor lost-time injury/illness or fatality.
 - (2) PROPERTY DAMAGE— Mark the appropriate box if accident resulted in any damage of \$1000 or more to contractor property (including motor vehicles).
 - (3) VEHICLE INVOLVED— Mark if accident involved a motor vehicle, *regardless* of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.
 - (4) DIVING ACTIVITY— Mark if the accident involved a USACE Contractor diving activity.
- c. PUBLIC.
 - (1) INJURY/ILLNESS/FATALITY— Mark if accident resulted in public fatality or permanent total disability. (The "OTHER" box will be marked when requested by the FOA to report an unusual non-fatal public accident that could result in claims against the government or as otherwise directed by the FOA Commander).
 - (2) VOID SPACE— Make no entry.
 - (3) VEHICLE INVOLVED— Mark if accident resulted in a fatality to a member of the public and involved a motor vehicle, *regardless* of whether "INJURY/ILLNESS/FATALITY" is marked.
 - (4) VOID SPACE— Make no entry.

INSTRUCTIONS FOR SECTION 2— PERSONAL DATA

- a. NAME— (MANDATORY FOR GOVERNMENT ACCIDENTS. OPTIONAL AT THE DISCRETION OF THE FOA COMMANDER FOR CONTRACTOR AND PUBLIC ACCIDENTS). Enter last name, first name, middle initial of person involved.
- b. AGE— Enter age.
- c. SEX— Mark appropriate box.
- d. SOCIAL SECURITY NUMBER— (FOR GOVERNMENT PERSONNEL ONLY) Enter the social security number (or other personal identification number if no social security number issued).
- e. GRADE— (FOR GOVERNMENT PERSONNEL ONLY) Enter pay grade. Example: O-6; E-7; WG-8; WS-12; GS-11; etc.

- f. JOB SERIES/TITLE— For *government civilian employees* enter the pay plan, full series number, and job title, e.g. GS-0810/Civil Engineer. For *military personnel* enter the primary military occupational specialty (PMOS), e.g., 15A30 or 11G50. For *contractor employees* enter the job title assigned to the injured person, e.g. carpenter, laborer, surveyor, etc..
- g. DUTY STATUS— Mark the appropriate box.
 - (1) ON DUTY— Person was at duty station during duty hours or person was away from duty station during duty hours but on official business at time of the accident.
 - (2) TDY - Person was on official business, away from the duty station and with travel orders at time of accident. Line-of-duty investigation required.
 - (3) OFF DUTY - Person was not on official business at time of accident.
- h. EMPLOYMENT STATUS— (FOR GOVERNMENT PERSONNEL ONLY) Mark the most appropriate box. If "OTHER" is marked, specify the employment status of the person.

INSTRUCTION FOR SECTION 3— GENERAL INFORMATION

- a. DATE OF ACCIDENT— Enter the month, day, and year of accident.
- b. TIME OF ACCIDENT— Enter the local time of accident in military time. Example: 1430 hrs (not 2:30 p.m.).
- c. EXACT LOCATION OF ACCIDENT— Enter facts needed to locate the accident scene. (installation/project name, building number, street, direction and distance from closest landmark, etc..).
- d. CONTRACTOR NAME
 - (1) PRIME— Enter the exact name (title of firm) of the prime contractor.
 - (2) SUBCONTRACTOR— Enter the name of any subcontractor involved in the accident.
- e. CONTRACT NUMBER— Mark the appropriate box to identify if contract is civil works, military, or other: if "OTHER" is marked, specify contract appropriation on line provided. Enter complete contract number of prime contract, e.g., DACW 09-85-C-0100.
- f. TYPE OF CONTRACT— Mark appropriate box. A/E means architect/engineer. If "OTHER" is marked, specify type of contract on line provided.
- g. HAZARDOUS/TOXIC WASTE ACTIVITY (HTW)— Mark the box to identify the HTW activity being performed at the time of the accident. For Superfund, DERP, and Installation Restoration Program (IRP) HTW activities include accidents that occurred during inventory, predesign, design, and construction. For the purpose of accident reporting, DERP Formerly Used DoD Site (FUDS) activities and IRP activities will be treated separately. For Civil Works O&M HTW activities mark the "OTHER" box.

INSTRUCTIONS FOR SECTION 4— CONSTRUCTION ACTIVITIES

- a. CONSTRUCTION ACTIVITY— Select the *most appropriate* construction activity being performed at time of accident from the list below. Enter the activity name and place the corresponding code number identified in the box.

CONSTRUCTION ACTIVITY LIST

- | | |
|-------------------------|----------------------------|
| 1. MOBILIZATION | 14. ELECTRICAL |
| 2. SITE PREPARATION | 15. SCAFFOLDING/ACCESS |
| 3. EXCAVATION/TRENCHING | 16. MECHANICAL |
| 4. GRADING (EARTHWORK) | 17. PAINTING |
| 5. PIPING/UTILITIES | 18. EQUIPMENT/MAINTENANCE |
| 6. FOUNDATION | 19. TUNNELING |
| 7. FORMING | 20. WAREHOUSING/STORAGE |
| 8. CONCRETE PLACEMENT | 21. PAVING |
| 9. STEEL ERECTION | 22. FENCING |
| 10. ROOFING | 23. SIGNING |
| 11. FRAMING | 24. LANDSCAPING/IRRIGATION |
| 12. MASONRY | 25. INSULATION |
| 13. CARPENTRY | 26. DEMOLITION |

b. TYPE OF CONSTRUCTION EQUIPMENT—Select the equipment involved in the accident from the list below. Enter the name and place the corresponding code number identified in the box. If equipment is not included below, use code 24, "OTHER", and write in specific type of equipment.

CONSTRUCTION EQUIPMENT

- | | |
|------------------------------------|--------------------------------|
| 1. GRADER | 13. DUMP TRUCK (OFF HIGHWAY) |
| 2. DRAGLINE | 14. TRUCK (OTHER) |
| 3. CRANE (ON VESSEL/BARGE) | 15. FORKLIFT |
| 4. CRANE (TRACKED) | 16. BACKHOE |
| 5. CRANE (RUBBER TIRE) | 17. FRONT-END LOADER |
| 6. CRANE (VEHICLE MOUNTED) | 18. PILE DRIVER |
| 7. CRANE (TOWER) | 19. TRACTOR (UTILITY) |
| 8. SHOVEL | 20. MANLIFT |
| 9. SCRAPER | 21. DOZER |
| 10. PUMP TRUCK (CONCRETE) | 22. DRILL RIG |
| 11. TRUCK (CONCRETE/TRANSIT MIXER) | 23. COMPACTOR/VIBRATORY ROLLER |
| 12. DUMP TRUCK (HIGHWAY) | 24. OTHER |

INSTRUCTIONS FOR SECTION 5—INJURY/ILLNESS INFORMATION

a. SEVERITY OF INJURY / ILLNESS - Reference para 2-10 of USACE Suppl 1 to AR 385-40 and enter code and description from list below.

- | | |
|-----|---|
| NOI | NO INJURY |
| FAT | FATALITY |
| PTL | PERMANENT TOTAL DISABILITY |
| PPR | PERMANENT PARTIAL DISABILITY |
| LWD | LOST WORKDAY CASE INVOLVING DAYS AWAY FROM WORK |
| NLW | RECORDABLE CASE WITHOUT LOST WORKDAYS |
| RFA | RECORDABLE FIRST AID CASE |
| NRI | NON-RECORDABLE INJURY |

- b. ESTIMATED DAYS LOST—Enter the estimated number of workdays the person will lose from work.
- c. ESTIMATED DAYS HOSPITALIZED—Enter the estimated number of workdays the person will be hospitalized.
- d. ESTIMATED DAYS RESTRICTED DUTY—Enter the estimated number of workdays the person, as a result of the accident, will not be able to perform all of their regular duties.
- e. BODY PART AFFECTED—Select the most appropriate primary and when applicable, secondary body part affected from the list below. Enter body part name on line and place the corresponding code letters identifying that body part in the box.

GENERAL BODY AREA	CODE	BODY PART NAME
ARM/WRIST	AB	ARM AND WRIST
	AS	ARM OR WRIST
TRUNK, EXTERNAL MUSCULATURE	B1	SINGLE BREAST
	B2	BOTH BREASTS
	B3	SINGLE TESTICLE
	B4	BOTH TESTICLES
	BA	ABDOMEN
	BC	CHEST
	BL	LOWER BACK
	BP	PENIS
	BS	SIDE
	BU	UPPER BACK
BW	WAIST	
BZ	TRUNK OTHER	
HEAD, INTERNAL	C1	SINGLE EAR INTERNAL
	C2	BOTH EARS INTERNAL
	C3	SINGLE EYE INTERNAL
	C4	BOTH EYES INTERNAL
	CB	BRAIN
	CC	CRANIAL BONES
	CD	TEETH
	CJ	JAW
	CL	THROAT, LARYNX
	CM	MOUTH

	CN	NOSE	
	CR	THROAT, OTHER	
	CT	TONGUE	
	CZ	HEAD OTHER INTERNAL	
ELBOW	EB	BOTH ELBOWS	
	ES	SINGLE ELBOW	
FINGER	F1	FIRST FINGER	
	F2	BOTH FIRST FINGERS	
	F3	SECOND FINGER	
	F4	BOTH SECOND FINGERS	
	F5	THIRD FINGER	
	F6	BOTH THIRD FINGERS	
	F7	FOURTH FINGER	
	F8	BOTH FOURTH FINGERS	
TOE	G1	GREAT TOE	
	G2	BOTH GREAT TOES	
	G3	TOE OTHER	
	G4	TOES OTHER	
HEAD, EXTERNAL	H1	EYE EXTERNAL	
	H2	BOTH EYES EXTERNAL	
	H3	EAR EXTERNAL	
	H4	BOTH EARS EXTERNAL	
	HC	CHIN	
	HF	FACE	
	HK	NECK/THROAT	
	HM	MOUTH/LIPS	
	HN	NOSE	
	HS	SCALP	
KNEE	KB	BOTH KNEES	
	KS	KNEE	
LEG, HIP, ANKLE, BUTTOCK	LB	BOTH LEGS/HIPS/ANKLES/BUTTOCKS	
	LS	SINGLE LEG/HIP ANKLE/BUTTOCK	
HAND	MB	BOTH HANDS	
	MS	SINGLE HAND	
FOOT	PB	BOTH FEET	
	PS	SINGLE FOOT	
TRUNK, BONES	R1	SINGLE COLLAR BONE	
	R2	BOTH COLLAR BONES	
	R3	SHOULDER BLADE	
	R4	BOTH SHOULDER BLADES	
	RB	RIB	
	RS	STERNUM (BREAST BONE)	
	RV	VERTEBRAE (SPINE; DISC)	
	RZ	TRUNK BONES OTHER	
	SHOULDER	SB	BOTH SHOULDERS
		SS	SINGLE SHOULDER
THUMB	TB	BOTH THUMBS	
	TS	SINGLE THUMB	
TRUNK, INTERNAL ORGANS	V1	LUNG, SINGLE	
	V2	LUNGS, BOTH	
	V3	KIDNEY, SINGLE	
	V4	KIDNEYS, BOTH	
	VH	HEART	
	VL	LIVER	
	VR	REPRODUCTIVE ORGANS	
	VS	STOMACH	
	VV	INTESTINES	
	VZ	TRUNK, INTERNAL; OTHER	

f. NATURE OF INJURY/ILLNESS - Select the most appropriate nature of injury / illness from the list below. This nature of injury / illness shall correspond to the primary body part selected in 5e, above. Enter the nature of injury / illness name on the line and place the corresponding CODE letters in the box provided.

* The injury or condition selected below must be caused by a specific incident or event which occurred during a single work day or shift.

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME
*TRAUMATIC INJURY OR DISABILITY	TA	AMPUTATION
	TB	BACK STRAIN.
	TC	CONTUSION; BRUISE; ABRASION
	TD	DISLOCATION
	TF	FRACTURE
	TH	HERNIA
	TK	CONCUSSION
	TL	LACERATION, CUT
	TP	PUNCTURE
	TS	STRAIN, MULTIPLE
	TU	BURN, SCALD, SUNBURN
	TI	TRAUMATIC SKIN DISEASES/ CONDITIONS INCLUDING DERMATITIS
	TR	TRAUMATIC RESPIRATORY DISEASE
	TQ	TRAUMATIC FOOD POISONING
	TW	TRAUMATIC TUBERCULOSIS
	TX	TRAUMATIC VIROLOGICAL/ INFECTIVE/PARASITIC DISEASE
	T1	TRAUMATIC CEREBRAL VASCULAR CONDITION/STROKE
	T2	TRAUMATIC HEARING LOSS
	T3	TRAUMATIC HEART CONDITION
	T4	TRAUMATIC MENTAL DISORDER; STRESS; NERVOUS CONDITION
T8	TRAUMATIC INJURY - OTHER (EXCEPT DISEASE, ILLNESS)	

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME
SKIN DISEASE OR CONDITION	SB	BIOLOGICAL
	SC	CHEMICAL
	S9	DERMATITIS, UNCLASSIFIED

g. TYPE AND SOURCE OF INJURY/ILLNESS (CAUSE) - Type and Source Codes are used to describe what caused the incident. The Type Code stands for an ACTION and the Source Code for an OBJECT or SUBSTANCE. Together, they form a brief description of how the incident occurred. Where there are two different sources, code the initiating source of the incident (see example 1, below). Examples:

(1) An employee tripped on carpet and struck his head on a desk.
TYPE: 210 (fell on same level) SOURCE: 0110 (walking/working surface)

NOTE: This example would NOT be coded 120 (struck against) and 0140 (furniture).

(2) A Park Ranger contracted dermatitis from contact with poison ivy/ oak.
TYPE: 510 (contact) SOURCE: 0920 (plant)

(3) A lock and dam mechanic punctured his finger with a metal sliver while grinding a turbine blade.
TYPE: 410 (punctured by) SOURCE: 0830 (metal)

(4) An employee was driving a government vehicle when it was struck by another vehicle.
TYPE: 800 (traveling in) SOURCE: 0421 (government-owned vehicle, as driver)

NOTE: The Type Code 800, "Traveling In" is different from the other type codes in that its function is not to identify factors contributing to the injury or fatality, but rather to collect data on the type of vehicle the employee was operating or traveling in at the time of the incident.

Select the most appropriate TYPE and SOURCE identifier from the list below and enter the name on the line and the corresponding code in the appropriate box.

CODE	TYPE OF INJURY NAME
	STRUCK
0110	STRUCK BY
0111	STRUCK BY FALLING OBJECT
0120	STRUCK AGAINST
	FELL, SLIPPED, TRIPPED
0210	FELL ON SAME LEVEL
0220	FELL ON DIFFERENT LEVEL
0230	SLIPPED, TRIPPED (NO FALL)
	CAUGHT
0310	CAUGHT ON
0320	CAUGHT IN
0330	CAUGHT BETWEEN
	PUNCTURED, LACERATED
0410	PUNCTURED BY
0420	CUT BY
0430	STUNG BY
0440	BITTEN BY
	CONTACTED
0510	CONTACTED WITH (INJURED PERSON MOVING)
0520	CONTACTED BY (OBJECT WAS MOVING)
	EXERTED
0610	LIFTED, STRAINED BY (SINGLE ACTION)
0620	STRESSED BY (REPEATED ACTION)
	EXPOSED
0710	INHALED
0720	INGESTED
0730	ABSORBED
0740	EXPOSED TO
0800	TRAVELING IN
CODE	SOURCE OF INJURY NAME
0100	BUILDING OR WORKING AREA
0110	WALKING/WORKING SURFACE (FLOOR, STREET, SIDEWALKS, ETC)
0120	STAIRS, STEPS
0130	LADDER
0140	FURNITURE, FURNISHINGS, OFFICE EQUIPMENT
0150	BOILER, PRESSURE VESSEL
0160	EQUIPMENT LAYOUT (ERGONOMIC)
0170	WINDOWS, DOORS
0180	ELECTRICITY

**A nontraumatic physiological harm or loss of capacity produced by systemic infection; continued or repeated stress or strain; exposure to toxins, poisons, fumes, etc.; or other continued and repeated exposures to conditions of the work environment over a long period of time. For practical purposes, an occupational illness/disease or disability is any reported condition which does not meet the definition of traumatic injury or disability as described above.

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME
**NON-TRAUMATIC ILLNESS/DISEASE OR DISABILITY		
RESPIRATORY DISEASE	RA	ASBESTOSIS
	RB	BRONCHITIS
	RE	EMPHYSEMA
	RP	PNEUMOCONIOSIS
	RS	SILICOSIS
	R9	RESPIRATORY DISEASE, OTHER
VIROLOGICAL, INFECTIVE & PARASITIC DISEASES	VB	BRUCELLOSIS
	VC	COCCIDIOMYCOSIS
	VF	FOOD POISONING
	VH	HEPATITIS
	VM	MALARIA
	VS	STAPHYLOCOCCUS
	VT	TUBERCULOSIS
	V9	VIROLOGICAL/INFECTIVE/ PARASITIC-OTHER
	DISABILITY, OCCUPATIONAL	DA
DB		BACK STRAIN, BACK SPRAIN
DC		CEREBRAL VASCULAR CONDITION; STROKE
DD		ENDEMIC DISEASE (OTHER THAN CODE TYPES R&S)
DE		EFFECT OF ENVIRONMENTAL CONDITION
DH		HEARING LOSS
DK		HEART CONDITION
DM		MENTAL DISORDER, EMOTIONAL STRESS NERVOUS CONDITION
DR		RADIATION
DS		STRAIN, MULTIPLE
DU		ULCER
DV		OTHER VASCULAR CONDITIONS
D9		DISABILITY, OTHER

CODE	SOURCE OF INJURY NAME
0200	ENVIRONMENTAL CONDITION
0210	TEMPERATURE EXTREME (INDOOR)
0220	WEATHER (ICE, RAIN, HEAT, ETC.)
0230	FIRE, FLAME, SMOKE (NOT TOBACCO)
0240	NOISE
0250	RADIATION
0260	LIGHT
0270	VENTILATION
0271	TOBACCO SMOKE
0280	STRESS (EMOTIONAL)
0290	CONFINED SPACE
0300	MACHINE OR TOOL
0310	HAND TOOL (POWERED: SAW, GRINDER, ETC.)
0320	HAND TOOL (NONPOWERED)
0330	MECHANICAL POWER TRANSMISSION APPARATUS
0340	GUARD, SHIELD (FIXED, MOVEABLE, INTERLOCK)
0350	VIDEO DISPLAY TERMINAL
0360	PUMP, COMPRESSOR, AIR PRESSURE TOOL
0370	HEATING EQUIPMENT
0380	WELDING EQUIPMENT
0400	VEHICLE
0411	AS DRIVER OF PRIVATELY OWNED/RENTAL VEHICLE
0412	AS PASSENGER OF PRIVATELY OWNED/RENTAL VEHICLE
0421	DRIVER OF GOVERNMENT VEHICLE
0422	PASSENGER OF GOVERNMENT VEHICLE
0430	COMMON CARRIER (AIRLINE, BUS, ETC.)
0440	AIRCRAFT (NOT COMMERCIAL)
0450	BOAT, SHIP, BARGE
0500	MATERIAL HANDLING EQUIPMENT
0510	EARTHMOVER (TRACTOR, BACKHOE, ETC.)
0520	CONVEYOR (FOR MATERIAL AND EQUIPMENT)
0530	ELEVATOR, ESCALATOR, PERSONNEL HOIST
0540	HOIST, SLING CHAIN, JACK
0550	CRANE
0551	FORKLIFT
0560	HANDTRUCK, DOLLY
0600	DUST, VAPOR, ETC.
0610	DUST (SILICA, COAL, ETC.)
0620	FIBERS
0621	ASBESTOS
0630	GASES
0631	CARBON MONOXIDE
0640	MIST, STEAM, VAPOR, FUME
0641	WELDING FUMES
0650	PARTICLES (UNIDENTIFIED)
0700	CHEMICAL, PLASTIC, ETC.
0711	DRY CHEMICAL—CORROSIVE
0712	DRY CHEMICAL—TOXIC
0713	DRY CHEMICAL—EXPLOSIVE
0714	DRY CHEMICAL—FLAMMABLE
0721	LIQUID CHEMICAL—CORROSIVE
0722	LIQUID CHEMICAL—TOXIC
0723	LIQUID CHEMICAL—EXPLOSIVE
0724	LIQUID CHEMICAL—FLAMMABLE
0730	PLASTIC
0740	WATER
0750	MEDICINE
0800	INANIMATE OBJECT
0810	BOX, BARREL, ETC.
0820	PAPER
0830	METAL ITEM, MINERAL
0831	NEEDLE
0840	GLASS
0850	SCRAP, TRASH
0860	WOOD
0870	FOOD
0880	CLOTHING, APPAREL, SHOES
0900	ANIMATE OBJECT
0911	DOG
0912	OTHER ANIMAL
0920	PLANT
0930	INSECT
0940	HUMAN (VIOLENCE)
0950	HUMAN (COMMUNICABLE DISEASE)
0960	BACTERIA, VIRUS (NOT HUMAN CONTACT)

CODE	SOURCE OF INJURY NAME
1000	PERSONAL PROTECTIVE EQUIPMENT
1010	PROTECTIVE CLOTHING, SHOES, GLASSES, GOGGLES
1020	RESPIRATOR, MASK
1021	DIVING EQUIPMENT
1030	SAFETY BELT, HARNESS
1040	PARACHUTE

INSTRUCTIONS FOR SECTION 6 — PUBLIC FATALITY

- a. **ACTIVITY AT TIME OF ACCIDENT**—Select the activity being performed at the time of the accident from the list below. Enter the activity name on the line and the corresponding number in the box. If the activity performed is not identified on the list, select from the most appropriate primary activity area (water related, non-water related or other activity), the code number for "Other", and write in the activity being performed at the time of the accident.

WATER RELATED RECREATION

- | | |
|-----------------------------------|--|
| 1. Sailing | 9. Swimming/designated area |
| 2. Boating—powered | 10. Swimming/other area |
| 3. Boating—unpowered | 11. Underwater activities (skin diving, scuba, etc.) |
| 4. Water skiing | 12. Wading |
| 5. Fishing from boat | 13. Attempted rescue |
| 6. Fishing from bank dock or pier | 14. Hunting from boat |
| 7. Fishing while wading | 15. Other |
| 8. Swimming/supervised area | |

NON-WATER RELATED RECREATION

- | | |
|--|---|
| 16. Hiking and walking | 23. Sports/summer (baseball, football, etc.) |
| 17. Climbing (general) | 24. Sports/winter (skiing, sledding, snowmobiling etc.) |
| 18. Camping/picnicking authorized area | 25. Cycling (bicycle, motorcycle, scooter) |
| 19. Camping/picnicking unauthorized area | 26. Gliding |
| 20. Guided tours | 27. Parachuting |
| 21. Hunting | 28. Other non-water related |
| 22. Playground equipment | |

OTHER ACTIVITIES

- | | |
|--|----------------------------------|
| 29. Unlawful acts (fights, riots, vandalism, etc.) | 33. Sleeping |
| 30. Food preparation/serving | 34. Pedestrian struck by vehicle |
| 31. Food consumption | 35. Pedestrian other acts |
| 32. Housekeeping | 36. Suicide |
| | 37. "Other" activities |

- b. **PERSONAL FLOTATION DEVICE USED**—If fatality was water-related was the victim wearing a person flotation device? Mark the appropriate box.

INSTRUCTIONS FOR SECTION 7—MOTOR VEHICLE ACCIDENT

- a. **TYPE OF VEHICLE**—Mark appropriate box for each vehicle involved. If more than one vehicle of the same type is involved, mark both halves of the appropriate box. USACE vehicle(s) involved shall be marked in left half of appropriate box.

- b. **TYPE OF COLLISION**—Mark appropriate box.

- c. **SEAT BELT**—Mark appropriate box.

INSTRUCTIONS FOR SECTION 8—PROPERTY/MATERIAL INVOLVED

- a. **NAME OF ITEM**—Describe all property involved in accident. Property/material involved means material which is damaged or whose use or misuse contributed to the accident. Include the name, type, model; also include the National Stock Number (NSN) whenever applicable.

- b. **OWNERSHIP**—Enter ownership for each item listed. (Enter one of the following: *USACE; OTHER GOVERNMENT; CONTRACTOR; PRIVATE*)

- c. **\$ AMOUNT OF DAMAGE**—Enter the total estimated dollar amount of damage (parts and labor), if any.

INSTRUCTIONS FOR SECTION 9—VESSEL/ FLOATING PLANT ACCIDENT

- a. TYPE OF VESSEL/FLOATING PLANT—Select the most appropriate vessel/floating plant from list below. Enter name and place corresponding number in box. If item is not listed below, enter item number for "OTHER" and write in specific type of vessel/floating plant.

VESSEL/FLOATING PLANTS

- | | |
|------------------------|-----------------------------|
| 1. ROW BOAT | 7. DREDGE/DIPPER |
| 2. SAIL BOAT | 8. DREDGE/CLAMSHELL, BUCKET |
| 3. MOTOR BOAT | 9. DREDGE/PIPE LINE |
| 4. BARGE | 10. DREDGE/DUST PAN |
| 5. DREDGE/HOPPER | 11. TUG BOAT |
| 6. DREDGE/SIDE CASTING | 12. OTHER |

- b. COLLISION/MISHAP—Select from the list below the object(s) that contributed to the accident or were damaged in the accident.

COLLISION/MISHAP

- | | |
|-----------------------------|-----------------------|
| 1. COLLISION W/OTHER VESSEL | 7. HAULAGE UNIT |
| 2. UPPER GUIDE WALL | 8. BREAKING TOW |
| 3. UPPER LOCK GATES | 9. TOW BREAKING UP |
| 4. LOCK WALL | 10. SWEEP DOWN ON DAM |
| 5. LOWER LOCK GATES | 11. BUOY/DOLPHIN/CELL |
| 6. LOWER GUIDE WALL | 12. WHARF OR DOCK |
| | 13. OTHER |

INSTRUCTIONS FOR SECTION 10—ACCIDENT DESCRIPTION

DESCRIBE ACCIDENT—Fully describe the accident. Give the sequence of events that describe what happened leading up to and including the accident. Fully identify personnel and equipment involved and their role(s) in the accident. Ensure that relationships between personnel and equipment are clearly specified. Continue on blank sheets if necessary and attach to this report.

INSTRUCTIONS FOR SECTION 11—CAUSAL FACTORS

- a. Review thoroughly. Answer each question by marking the appropriate block. If any answer is yes, explain in item 13 below. Consider, as a minimum, the following:

- (1) DESIGN—Did inadequacies associated with the building or work site play a role? Would an improved design or layout of the equipment or facilities reduce the likelihood of similar accidents? Were the tools or other equipment designed and intended for the task at hand?
- (2) INSPECTION/MAINTENANCE—Did inadequately or improperly maintained equipment, tools, workplace, etc. create or worsen any hazards that contributed to the accident? Would better equipment, facility, work site or work activity inspections have helped avoid the accident?
- (3) PERSON'S PHYSICAL CONDITION—Do you feel that the accident would probably not have occurred if the employee was in "good" physical condition? If the person involved in the accident had been in better physical condition, would the accident have been less severe or avoided altogether? Was over exertion a factor?
- (4) OPERATING PROCEDURES—Did a lack of or inadequacy within established operating procedures contribute to the accident? Did any aspect of the procedures introduce any hazard to, or increase the risk associated with the work process? Would establishment or improvement of operating procedures reduce the likelihood of similar accidents?
- (5) JOB PRACTICES—Were any of the provisions of the Safety and Health Requirements Manual (EM 385-1-1) violated? Was the task being accomplished in a manner which was not in compliance with an established job hazard analysis or activity hazard analysis? Did any established job practice (including EM 385-1-1) fail to adequately address the task or work process? Would better job practices improve the safety of the task?

- (6) HUMAN FACTORS—Was the person under undue stress (either internal or external to the job)? Did the task tend toward overloading the capabilities of the person; i.e., did the job require tracking and reacting to many external inputs such as displays, alarms, or signals? Did the arrangement of the workplace tend to interfere with efficient task performance? Did the task require reach, strength, endurance, agility, etc., at or beyond the capabilities of the employee? Was the work environment ill-adapted to the person? Did the person need more training, experience, or practice in doing the task? Was the person inadequately rested to perform safely?
- (7) ENVIRONMENTAL FACTORS—Did any factors such as moisture, humidity, rain, snow, sleet, hail, ice, fog, cold, heat, sun, temperature changes, wind, tides, floods, currents, dust, mud, glare, pressure changes, lightning, etc., play a part in the accident?
- (8) CHEMICAL AND PHYSICAL AGENT FACTORS—Did exposure to chemical agents (either single shift exposure or long-term exposure) such as dusts, fibers (asbestos, etc.), silica, gases (carbon monoxide, chlorine, etc.), mists, steam, vapors, fumes, smoke, other particulates, liquid or dry chemicals that are corrosive, toxic, explosive or flammable, by-products of combustion or physical agents such as noise, ionizing radiation, non-ionizing radiation (UV radiation created during welding, etc.) contribute to the accident/incident?
- (9) OFFICE FACTORS—Did the fact that the accident occurred in an office setting or to an office worker have a bearing on its cause? For example, office workers tend to have less experience and training in performing tasks such as lifting office furniture. Did physical hazards within the office environment contribute to the hazard?
- (10) SUPPORT FACTORS—Was the person using an improper tool for the job? Was inadequate time available or utilized to safely accomplish the task? Were less than adequate personnel resources (in terms of employee skills, number of workers, and adequate supervision) available to get the job done properly? Was funding available, utilized, and adequate to provide proper tools, equipment, personnel, site preparation, etc.?
- (11) PERSONAL PROTECTIVE EQUIPMENT—Did the person fail to use appropriate personal protective equipment (gloves, eye protection, hard-toed shoes, respirator, etc.) for the task or environment? Did protective equipment provided or worn fail to provide adequate protection from the hazard(s)? Did lack of or inadequate maintenance of protective gear contribute to the accident?
- (12) DRUGS/ALCOHOL—Is there any reason to believe the person's mental or physical capabilities, judgement, etc., were impaired or altered by the use of drugs or alcohol? Consider the effects of prescription medicine and over the counter medications as well as illicit drug use. Consider the effect of drug or alcohol induced "hangovers".

- b. WRITTEN JOB/ACTIVITY HAZARD ANALYSIS—Was a written Job/Activity Hazard Analysis completed for the task being performed at the time of the accident? Mark the appropriate box. If one was performed, attach a copy of the analysis to the report.

INSTRUCTIONS FOR SECTION 12—TRAINING

- a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?—For the purpose of this section "trained" means the person has been provided the necessary information (either formal and/or on-the-job (OJT) training) to competently perform the activity/task in a safe and healthful manner.
- b. TYPE OF TRAINING—Mark the appropriate box that best indicates the type of training; (classroom or on-the-job) that the injured person received before the accident happened.
- c. DATE OF MOST RECENT TRAINING—Enter the month, day, and year of the last formal training completed that covered the activity-task being performed at the time of the accident.

INSTRUCTIONS FOR SECTION 13—CAUSES

- a. **DIRECT CAUSES**—The direct cause is that single factor which most directly lead to the accident. See examples below.
- b. **INDIRECT CAUSES**—Indirect causes are those factors which contributed to but did not directly initiate the occurrence of the accident.

Examples for section 13:

- a. Employee was dismantling scaffold and fell 12 feet from unguarded opening.
Direct cause: failure to provide fall protection at elevation.
Indirect causes: failure to enforce USACE safety requirements; improper training/motivation of employee (possibility that employee was not knowledgeable of USACE fall protection requirements or was lax in his attitude towards safety); failure to ensure provision of positive fall protection whenever elevated; failure to address fall protection during scaffold dismantling in phase hazard analysis.
- b. Private citizen had stopped his vehicle at intersection for red light when vehicle was struck in rear by USACE vehicle. (note USACE vehicle was in proper/safe working condition).
Direct cause: failure of USACE driver to maintain control of and stop USACE vehicle within safe distance.
Indirect cause: Failure of employee to pay attention to driving (defensive driving).

INSTRUCTIONS FOR SECTION 14—ACTION TO ELIMINATE CAUSE(S)

DESCRIPTION—Fully describe all the actions taken, anticipated, and recommended to eliminate the cause(s) and prevent reoccurrence of similar accidents/illnesses. Continue on blank sheets of paper if necessary to fully explain and attach to the completed report form.

INSTRUCTIONS FOR SECTION 15—DATES FOR ACTION

- a. **BEGIN DATE**—Enter the date when the corrective action(s) identified in Section 14 will begin.
- b. **COMPLETE DATE**—Enter the date when the corrective action(s) identified in Section 14 will be completed.
- c. **TITLE AND SIGNATURE**—Enter the title and signature of supervisor completing the accident report. For a **GOVERNMENT** employee accident/illness the immediate supervisor will complete and sign the report. For **PUBLIC** accidents the USACE Project Manager/Area Engineer responsible for the USACE property where the accident happened shall complete and sign the report. For **CONTRACTOR** accidents the Contractor's project manager shall complete and sign the report and provide to the USACE supervisor responsible for oversight of that contractor activity. This USACE Supervisor shall also sign the report. Upon entering the information required in 15.d, 15.e and 15.f below, the responsible USACE supervisor shall forward the report for management review as indicated in Section 16.
- d. **DATE SIGNED**—Enter the month, day, and year that the report was signed by the responsible supervisor.
- e. **ORGANIZATION NAME**—For **GOVERNMENT** employee accidents enter the USACE organization name (Division, Branch, Section, etc.) of the injured employee. For **PUBLIC** accidents enter the USACE organization name for the person identified in block 15.c. For **CONTRACTOR** accidents enter the USACE organization name for the USACE office responsible for providing contract administration oversight.

- f. **OFFICE SYMBOL**—Enter the latest complete USACE Office Symbol for the USACE organization identified in block 15.e.

INSTRUCTIONS FOR SECTION 16—MANAGEMENT REVIEW (1st)

1ST REVIEW—Each USACE FOA shall determine who will provide 1st management review. The responsible USACE supervisor in section 15.c shall forward the completed report to the USACE office designated as the 1st Reviewer by the FOA. Upon receipt, the Chief of the Office shall review the completed report, mark the appropriate box, provide substantive comments, sign, date, and forward to the FOA Staff Chief (2nd review) for review and comment.

INSTRUCTIONS FOR SECTION 17—MANAGEMENT REVIEW (2nd)

2ND REVIEW—The FOA Staff Chief (i.e., FOA Chief of Construction, Operations, Engineering, Planning, etc.) shall mark the appropriate box, review the completed report, provide substantive comments, sign, date, and return to the FOA Safety and Occupational Health Office.

INSTRUCTIONS FOR SECTION 18—SAFETY AND OCCUPATIONAL HEALTH REVIEW

3RD REVIEW—The FOA Safety and Occupational Health Office shall review the completed report, mark the appropriate box, ensure that any inadequacies, discrepancies, etc. are rectified by the responsible supervisor and management reviewers, provide substantive comments, sign, date and forward to the FOA Commander for review, comment, and signature.

INSTRUCTION FOR SECTION 19—COMMAND APPROVAL

4TH REVIEW—The FOA Commander shall (to include the person designated Acting Commander in his absence) review the completed report, comment if required, sign, date, and forward the report to the FOA Safety and Occupational Health Office. Signature authority shall not be delegated.

Appendix B
Site Safety and Health Plan

**Final
Site Safety and Health Plan
for
Vapor Intrusion Investigation
Former Schilling Air Force Base
CERCLA Process Support
Salina, Kansas**

August 22, 2006

Prepared for



U.S. Army Corps of Engineers
Kansas City District

Prepared by

**MALCOLM
PIRNIE**



Contract Number: W912DQ-06-D-0006
Project Number: 42244

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LIST OF ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
ACGIH	American Conference of Government Industrial Hygienists
ANSI	American National Standard Institute
BMcD	Burns & McDonnell Engineering Company, Inc.
cis-1,2-DCE	cis-1,2-dichloroethylene
CFR	Code of Federal Regulations
CGI	Combustible Gas Indicator
CIH	Certified Industrial Hygienist
CPR	Cardiopulmonary Resuscitation
dB	Decibels
DEET	Diethyl Toluamide
°C	Degrees Centigrade
°F	Degrees Fahrenheit
EM	Engineering Manual
EMS	Emergency Medical Service
FSM	Field Site Manager
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSM	Health and Safety Manual
HSO	Health and Safety Officer
IDW	Investigative derived waste
LEL	Lower Explosive Limit
LOTO	Lock Out/Tag Out
MSDS	Material Safety Data Sheet
NWS	National Weather Service
NIOSH	National Institute for Occupational Safety and Health
NRR	Noise Reduction Rating
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PID	Photoionization Detector
PPE	Personal Protective Equipment
ppm	Parts Per Million
PSHM	Project Safety and Health Manager
SAA	Salina Airport Authority

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

SAFB	Salina Air Force Base
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
SSHP	Site Safety & Health Plan
SSHS	Site Safety and Health Supervisor
TCE	Trichloroethylene
TLV	Threshold Limit Value
UL	Underwriters Laboratory
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VC	Vinyl Chloride
VOCs	Volatile Organic Compounds

* * * * *

1.0 INTRODUCTION

The health and safety protocol established in this plan is based on Burns & McDonnell Engineering Company's (BMcD) *Health and Safety Policies and Procedures for Hazardous Waste Operations*, specific site conditions, and chemical hazards known or anticipated to be present from available site data. The following Site Safety and Health Plan (SSHP) is intended solely for use during the vapor intrusion field work at Schilling Air Force Base (SAFB) to satisfy objectives described in the project documents and Work Plan. Specifications herein are subject to review and revision based on actual conditions encountered in the field during the site characterization. Revisions may be instituted by using the Health and Safety Plan Field Amendment Form (see Appendix A).

This SSHP provides the basis for health and safety criteria and procedures that will be used for the vapor intrusion field work at the former SAFB in Salina, Kansas. Although all field activities associated with the indoor air sampling task are not currently known, this SSHP will provide the basis for all field work to be performed by BMcD. This SSHP describes project organization; personnel routine and special hazard training; field implementation; site operating procedures; and the medical monitoring program. The flexibility of this SSHP allows unanticipated site-specific problems to be addressed while assuring adequate and suitable worker protection.

Site-specific information can be found in Section 1.1 and supplemental site-specific information is located in Appendix B. A summary of pertinent health and safety information and a site summary will be developed for the Site. The summary will include the following major elements:

- A site description
- Proposed investigative activities
- Description of known physical hazards associated with each activity
- Description of known chemical hazards associated with each activity
- Required monitoring equipment and description of levels of protection to be worn by personnel at the site

Special conditions will also be noted. This SSHP will be updated as new tasks are added.

Before site operations begin, all employees who will be involved will have read and understood this SSHP and all revisions. Before work begins, all affected environmental workers will sign the Agreement and Acknowledgment form (Appendix A).

All personnel must comply with established safety procedures as discussed in this SSHP. Any staff member who does not comply with safety policy, as established by the Project Safety and Health Manager (PSHM) or the Project Manager, will be immediately dismissed from the site.

1.1. SITE DESCRIPTION AND HISTORY

The Smoky Hill Army Air Base was built in 1942 and became the first operational training base for B-29 bombers. The base name was changed to the Smoky Hill AFB in 1946 and to Schilling AFB in 1957. The closure of Schilling AFB was announced in 1964 and the site was transferred to the Salina Airport Authority (SAA) in 1966. The SAA continues to operate the airfield as the Salina Municipal Airport. The remainder of the former Schilling AFB is currently used for light-to-heavy industrial, aviation, and educational purposes. Many of these entities either lease property from the SAA or have purchased their properties outright. The Site is located to the southwest of the city of Salina.

The primary contaminants at the former Schilling AFB Site are trichloroethylene (TCE) and its associated degradation products (cis-1, 2 –dichloroethylene [cis-1,2-DCE] and vinyl chloride [VC]), and carbon tetrachloride.

1.2. SCOPE OF WORK

Field activities to be conducted at the Site include but are not limited to sub-slab air sampling, indoor air sampling, and investigative derived waste (IDW) disposal.

1.3. STANDARD OPERATING PROCEDURES (SOP)

The SOPs for the SAFB include the following:

- Verification of internal safety documentation
- Development of site-specific health and safety plans
- Verification of subcontractor documentation/submittals
- Field audit frequency
- Quality control review

1.4. SITE SPECIFIC HAZARDS AND CONTROLS

The activity hazard analysis, included as Table 1-1 of this SSHP, presents site specific hazards and controls for sub-slab and indoor air sampling at the site.

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2.0 KEY PERSONNEL AND ALTERNATES

2.1. CONTRACTOR

BMcD is the contractor responsible for conducting work and implementing the SSHP. BMcD will conduct daily 'tailgate' safety briefings for all personnel working on or entering the site.

2.2. SITE SAFETY AND HEALTH SUPERVISOR (SSHS)

The SSHS is responsible for implementing and overseeing the SSHP. The SSHS is responsible for personnel on the site, maintaining proper medical surveillance, providing hazard communication information, training employees in safe operating procedures, emergency response, reviewing accident reports, reviewing inspection results, and advising the health and safety manager (HSM) and project manager on matters concerning the health and safety of employees or the public. The SSHS will be identified in the Sampling and Analysis Plan (SAP). The SSHS may be required to perform various types of area or personnel monitoring to verify worker exposure and ensure the proper selection of personal protective equipment (PPE). The SSHS should be consulted before any changes in the recommended procedures or levels of protective clothing are made.

2.3. PROGRAM MANAGER

The program manager is John Logigian of Malcolm Pirnie. Mr. Logigian has primary responsibility for fulfillment of contract terms and oversight of operations to verify that all legal and safety requirements are met. Mr. Logigian also has the responsibility to keep the project on schedule and within.

2.4. PROJECT MANAGER

The BMcD project manager will be Tracy Cooley and he will have primary responsibility to satisfy the technical and administrative requirements of the project and will provide direction and oversight to the field site manager (FSM) and the SSHS. The project manager will be responsible for communicating progress and any problems to Mr. Logigian (Malcolm Pirnie) who will in turn notify the United States Army Corps of Engineers (USACE) project manager. The project manager is hazardous waste operations (HAZWOPER)-trained and receives the annual 8-hour refresher HAZWOPER training. The project manager is responsible for procuring and providing the proper safety equipment at the site.

2.5. FIELD SITE MANAGER (FSM)

The FSM is the on-site operations coordinator of the field activities. The FSM will be identified in the SAP. The FSM is HAZWOPER-trained, receives the annual 8-hour HAZWOPER refresher training, has been fit tested to wear a respirator, and receives an annual medical physical. It is the FSM's duty to maintain site security, control site access for unauthorized personnel, supervise personnel on the site, stop site activities based on unsafe conditions or weather extremes, enforcing the buddy system where required, and verify that all procedures (health and safety, decontamination, protective equipment, etc.) are followed. The FSM will report to the project manager. The FSM will revise the SSHP by written amendment if site conditions change based on consultations with the PSHM, the project manager, and the program manager.

2.6. PROJECT SAFETY AND HEALTH MANAGER (PSHM)

The PSHM is responsible for providing professional health and safety support and oversight management to the SSHS. The PSHM will be Eric Wenger. The PSHM will review and provide support in all concerns regarding the health and safety of field personnel assigned to the project. The PSHM will be responsible for evaluating air monitoring data and recommending changes in engineering controls as needed. The PSHM will ensure that all BMcD project personnel have relevant and current training, and that all documentation of their training is kept in the general project file. Periodic field audits of the project work site may be conducted by the PSHM to evaluate the adequacy of the program and implement any necessary changes. The PSHM will review accident reports and the results of inspections.

The PSHM is a certified industrial hygienist (CIH) who will provide professional support by reviewing all health and safety programs as they apply to this project. The PSHM will approve the SSHP and all modifications to the plan as they affect the health and safety of field personnel. The PSHM will be available for emergency response and will provide upgrading and/or downgrading of protection levels as needed.

The following individuals will have the authority and responsibility to change the levels of protection and, if necessary, shut down field operations:

- SSHS
- FSM
- PSHM

2.7. FIELD TEAM MEMBERS

The field team members will be responsible for reading and understanding the SSHP and following the directives of the SSHS, FSM, and the PSHM. The field team members will be responsible for performing all work according to the procedures outlined in the SSHP and to notify the SSHS, FSM, and PSHM of any conditions that may pose a threat to the safety and health of the employees and the community.

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3.0 HEALTH RISK ANALYSIS

3.1. AREAS OF INTEREST, ANTICIPATED HAZARDS, AND RECOMMENDED CONTROL MEASURES

As previously described, this SSHP applies to all areas to be investigated by BMcD at SAFB. At present, all known contaminants that may be encountered include the chlorinated solvents TCE and its degradation products (cis-1,2-DCE and VC), and carbon tetrachloride. Contaminants suspected to exist at this Site are listed in Appendix B of this SSHP. A Chemical Hazard Summary Table is included as Appendix C.

Because previous investigative work has been performed at this site, data will be reviewed prior to engaging in any new work to ascertain the potential chemical and other possible hazards expected at the Site. In general, field team members working at the Site will be potentially exposed to contaminants via contact with air during sub-slab and indoor air sampling activities. Some common contaminants may be easily volatilized and could expose field personnel via inhalation. These and other sources of possible hazards to personnel performing work in the field were considered in the design of the SSHP.

It will be necessary to give advance notice to the USACE Project Manager and the SAA of planned field activities. All field work will be coordinated with the USACE Project Manager to minimize interference with normal site activities.

3.2. JOB TASKS AND OPERATIONS

Activity Hazard Analysis

Major work operations, such as those with a hazardous nature or that require special planning, shall have an Activity Hazard Analysis Form completed prior to the work operation. At a minimum, the following details shall be included on the job hazard analysis:

- Principle steps of the activity
- Potential safety/health hazards
- Recommended controls
- Equipment to be used
- Inspection requirements
- Training requirements

At a minimum, all of the following work operations and activities require a job hazard analysis along with any other operations determined necessary by BMcD:

- Sub-slab sampling
- Indoor air sampling

An activity hazard analysis for sub-slab and indoor air sampling is included in this SSHP as Table 1-1.

3.3. HEALTH HAZARD AND CHEMICAL RISK ANALYSIS

In general, the primary health and safety concern during field activities is inhalation of vapors. Climatic conditions can also present a health hazard to site personnel, especially when wearing PPE.

Personnel will also be monitored for heat and cold stress when atmospheric conditions warrant.

The Chemical Hazard Summary Table (see Appendix C) is a summary of the various analytes that may be encountered and their associated health risks. Many of the analytes listed in the tables are not anticipated to be present in sufficient quantities or concentrations in air to present a hazard to personnel. Based on information from previous site investigations, the principal contaminants expected to be encountered during the investigation are chlorinated solvents. Exposures to personnel above the threshold limit value (TLV) or permissible exposure limit (PEL) for these constituents is not anticipated.

3.4. HEAT STRESS

The SSHP will have received training developed by the American Red Cross (or equivalent) in first aid and cardiopulmonary resuscitation (CPR), including training on heat-related illnesses.

Workers will be trained to recognize and treat the signs and symptoms of heat stress.

3.4.1. Body Fluid Replacement

Water will be made available at the support zone for employee fluid replacement. When heat stress is determined to be a problem by the PSHM or SSHP, employees will be provided with water and/or a balanced electrolyte solution to replace fluid and electrolyte loss. During times when heat stress can occur, as determined by the SSHP, each employee will be provided a minimum of 8 ounces of fluid replacement (water or electrolyte replacement, such as Gatorade) each half-hour or sooner, as necessary.

3.4.2. Rest Breaks

When heat stress conditions are applicable, all rest breaks should be taken out of the zone of exclusion in a cooler, shaded, rest area. If these conditions are not available, more frequent rest breaks will be taken.

3.5. COLD STRESS

This procedure applies to all employees who perform fieldwork in cold environments at risk of cold stress injury.

3.5.1. Training

The SSHP will be trained by the American Red Cross (or equivalent) in first aid, CPR, and cold stress conditions. Personnel shall be instructed in safety and health procedures. The training program shall include, as a minimum, instruction in the following areas:

- Appropriate first aid treatment
- Proper clothing practices
- Proper eating and drinking habits
- Recognition of impending frostbite
- Recognition of the signs and symptoms of impending hypothermia or excessive cooling of the body when shivering does not occur
- Safe working practices

3.5.2. Background Information

Frostbite and hypothermia are two types of cold injury that personnel must be protected against during the performance of field duties. Two factors influence the development of a cold injury:

- Ambient temperature
- Wind velocity

3.5.3. Protective Clothing

Exposed skin surfaces must be protected by the use of appropriate cold weather protective clothing when temperatures are at or below 40 degrees Fahrenheit (°F). These protective items can include face masks, hand wear, and footwear. Windbreaks can shield the work area from the cooling effects of wind. Personnel shall wear protective clothing appropriate for the level of cold and planned physical activity.

The objective is to protect all parts of the body, with emphasis on the hands and feet. Eye protection against glare and ultraviolet light will be worn in snowy and icy terrain.

3.6. NOISE HAZARDS AND CONTROL

Selection and use of hearing protective devices including earplugs and ear muffs will be made based on the measured noise levels in the work zones and will take into account the fit and comfort of the hearing protection devices. Hearing protectors have a Noise Reduction Rating (NRR) as assigned during laboratory testing conditions. The hearing protective devices used on site will have a minimum NRR of 28 or greater (as marked on the hearing protection package). However, this NRR does not take into account the susceptibility of the human ear to hearing loss as reflected by the A-weighted decibel scale, neither does it account for “real-world” conditions that reduce the effectiveness of the devices. The American National Standards Institute (ANSI) 12.6 – 1997 standard describes obtaining this “real world” data on the effectiveness of hearing protectors by using personnel and conditions that simulate field conditions. This data, sometimes called Method B data, is currently available from a limited number of hearing protection suppliers upon contacting the manufacturer. This data will give more information on the actual decibel reduction of the hearing protectors.

Therefore, the selection of the hearing protective devices will be made using either field attenuation data (Method B data) for the protectors, such as that supplied by E-A-R Company, or if the field attenuation data is not available, the NRR will be adjusted by a calculation. The calculation involves adjusting the NRR for the A-weighted scale then adjusting with a 50% derating according to the OSHA Technical Manual (<http://www.osha.gov>). This calculation will be made for the hearing protective devices to determine a more realistic decibel reduction while in use if Method B data is not available. The following formula will be used to adjust the NRR to arrive at a more accurate estimate of decibel reduction:

$(\text{NRR}-7) \text{ divided by } 2 = \text{actual noise reduction in decibels (dB)}$

Assuming a hearing protective device has an NRR of 28, the above formula would estimate the actual noise reduction of the device to be 10.5 dB. This reduction of 10.5 dB should then be subtracted from the measured noise levels to estimate noise levels impacting the ear.

3.7. BIOLOGICAL HAZARDS

Personnel will be aware that site activities will disturb the local wildlife. Therefore, there is potential for field personnel to be bitten by snakes, animals, and insects. All field team members will be properly

briefed regarding the potential for encountering these hazards as well as prompt first aid procedures in the event of a snake, insect, or animal bite. Hantavirus may possibly be encountered when rodent nests are disturbed. Plants, such as poison ivy are also a hazard. Locally common biological hazards will be included in the tailgate safety meetings.

Ticks and chiggers are a persistent problem during the warm seasons in tall grassy and wooded locations. Use of insect repellent may be useful. Long pants tucked inside and taped to boots may also help limit ticks and chigger bites. When in areas suspected to have ticks and chiggers, it is recommended to wear light-colored clothing and inspect regularly for ticks.

The best method to mitigate biological hazards is to practice personal awareness.

Personnel will be instructed to use the following precautions:

- Apply an insect repellent containing DEET every few hours when in insect (tick)-and spider-infested areas. Use a solid repellent to minimize potential contamination of field samples;
- Periodic self-examination for the presence of ticks, especially on the scalp;
- Use gloved hands or utensils to remove questionable vegetation;
- Personnel will be aware of their work area;
- Personnel will continually observe conditions where they are working; and
- Personnel will not place their hands and feet in areas that cannot be observed or inspected.

3.8. PHYSICAL HAZARDS

The following subsections identify potential physical hazards that may be found at the Site. Safety guidelines specific to the area for contractors will be followed, including all local traffic laws.

3.8.1. Equipment Operations

Physical hazards can arise from various site activities, including sub-slab sampling, indoor air sampling, and IDW disposal. Hazards will be mitigated by using caution around moving equipment and by avoiding close proximity to moving equipment whenever possible. Field personnel may be exposed to a variety of physical injury hazards associated with equipment operations, include noise, struck-by injuries, eye hazards, and hand and foot injuries. The primary equipment to be operated during this project includes hammer drills, light trucks, cars, and support trailers. The following measures will be implemented for equipment operations to mitigate these hazards:

- The required work uniform for all field personnel (i.e., Level D protection) will be general work clothes, steel-toed construction boots (ANSI approved), safety goggles or glasses, work gloves, high visibility vests, and a hard hat (ANSI approved);
- Good housekeeping and adequate work space will be established before operation of any equipment, and will be maintained for the duration of the operation;
- Equipment will be inspected daily for condition and operation prior to use; and
- Field personnel will only approach operating equipment after making eye contact with the equipment operator and staying within sight of the operator.

3.8.2. Vehicle Traffic

Employees will be exposed to vehicle accident hazards during the project. To control these hazards, the following safety requirements will be strictly enforced.

- Seat belts will be worn while on roadways. Seat belt requirements also apply to the operation of construction equipment.
- Local traffic laws will be followed at all times. Vehicles will not be operated at speeds unsafe for the conditions (i.e., road surface, traffic, visibility, weather, etc).

3.8.3. Electric Hazards

All electrical work, usage, installation, and wire capacities will be in accordance with the provisions of the National Electrical Code (National Fire Protection Program Association). Power cords will be UL-listed heavy duty and will include a ground prong. Ground-fault circuit interrupters will also be utilized. All power cords and receptacles will be inspected before use to ensure that casings are not cracked, grounding prongs are attached, and that there are no visible defects. If a defect is found, the cord, receptacle, or equipment will be tagged and placed out of use until it is fixed or disposed of.

3.8.4. Fire and Explosion Hazards

The risk of fire or explosion may exist during field activities. No smoking signs will be posted and enforced, where applicable. In addition, grounding and bonding wires will be utilized when transferring flammable liquids to prevent sparks. Flammable liquids or materials will not be stored on site. Good house keeping practices will be employed to reduce the likelihood of fire and/or explosion. Fire extinguishers will be stored in BMcD vehicles located onsite, when applicable, and available to all site

personnel. Personnel will be trained in the proper use of fire extinguishers, techniques for smothering fires, and emergency evacuation procedures.

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4.0 TASK SPECIFIC HAZARD ASSESSMENT

4.1. RISKS ASSOCIATED WITH SUB-SLAB AND INDOOR AIR SAMPLING ACTIVITIES

During drilling and sampling operations, a conduit to the subsurface is open. Contaminated soil gas vapor may be brought to the surface, creating a potential for exposure through the inhalation of solvent vapors. The open drill hole also creates a conduit for vapor to be released to the atmosphere. However, the volume of vapor released to the atmosphere is relatively small and usually quickly diluted and dispersed in the air.

Working with a hammer drill also presents risks to personnel health. As discussed previously in this SSHP, all personnel will be in proper PPE and conduct themselves in accordance with the safety guidelines used by BMcD. Excessive noise and obscured vision of workers present hazards to nearby personnel. Hearing protection and periodic health and safety meetings held on site will provide personnel with an increased level of awareness when working. Only authorized personnel will be permitted in work zones.

* * * * *

5.0 PERSONNEL TRAINING

All BMcD personnel will participate in routine health and safety education and training programs. These programs are designed to provide personnel with a thorough knowledge of hazardous materials, health and safety hazard potentials, and federal OSHA regulations contained in Title 29 of the CFR 1910.120(e). The training includes the 40-hour HAZWOPER initial instruction and the 8-hour annual HAZWOPER refresher training. Site supervisors receive additional 8-hour specialized hazardous material training. As a minimum, this training will include the following topics:

- General Safety Rules
- Basics of Chemistry
- Basics of Toxicology/Physiology
- Hazardous Materials (types/characteristics)
- Hazard Communication Information
- Respiratory Protection
- Respirator Training
- Chemical Protective Clothing
- Decontamination Procedures/Personal Hygiene
- Fire Prevention/Protection
- Confined Space Work/Safety
- Atmospheric Testing/Sampling Procedures
- Emergency Response Procedures
- Federal and State Regulations

Site-specific training for field personnel will be conducted by the SSHS prior to performing field activities. The SSHS will be responsible for providing workers and visitors site- and activity-specific training during the course of a project. All personnel, whether worker or visitor, will be required to read the SSHP and sign an acknowledgement form (see Appendix A) that they have understood the document.

The contents of the site-specific training include the following:

- Site safety and health rules to perform their work with minimal risk to health and safety;

- Risks or hazards associated with sub-slab and indoor air sampling;
- Potential health effects associated with various chemicals suspected to be present on the site;
- Purpose and limitations of safety equipment; and
- Emergency response actions pertaining to operations on the site.

Workers who may be exposed to special hazards during field operations will receive additional training.

Daily safety meetings shall be conducted to review past activities, plan ahead for new or changed operations, review pertinent aspects of appropriate activity hazard analysis, establish safe working procedures for anticipated hazards, and provide necessary safety and health training. A summary of the daily safety meetings will be documented in the field logbook.

5.1 PRE-INVESTIGATION HEALTH AND SAFETY BRIEFING

A meeting shall be scheduled prior to the start of all field work and will include the FSM, PSHM, and the SSHS. Emergency services represented at this meeting should include fire, ambulance/emergency room, and others as appropriate. Health and safety issues and coordination of emergency procedures will be discussed during this meeting. Prior to the start of field activities, the FSM and the SSHS will meet with all field workers (including subcontractors if applicable). The purpose of this meeting is to discuss the hazards specific to the site, the tasks to be performed, and to specify the proper level of protection for each work activity. A Safety Meeting Form (Appendix A) will be completed during this briefing and will be signed by all personnel in attendance. A copy of the Safety Meeting Form will be provided to the SSHS for inclusion in the project file.

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6.0 PERSONAL PROTECTIVE EQUIPMENT

No single combination of PPE can protect field personnel from all hazards. The use of PPE can create significant worker hazards, such as heat stress, physical and psychological stress, and impaired vision, mobility, and communication. Nonetheless, field personnel must be prepared to upgrade their PPE if an unexpected hazardous situation is encountered. Careful pre-entry planning, anticipation of worst case conditions, and caution during field operations are imperative to an effective PPE program.

6.1. CRITERIA FOR LEVELS OF PROTECTION

Based on results of the preliminary evaluation, BMcD anticipates that Level D PPE will be worn at all times by on-site personnel for most of the activities. Level D protection would consist of steel-toed boots, hardhat, workgloves, and safety glasses.

If applicable, photoionization detector (PID), combustible gas indicator (CGI), direct-reading instruments, and detector -tube readings measured in the employee's breathing zone will be used to determine if a change in the level of protection is required. Upgrading to higher levels of protection will require additional personal sampling using standard methods established by the National Institute for Occupational Safety and Health (NIOSH) or OSHA for the collection and analysis of airborne contaminants.

If readings exceed the range for the level of protection indicated, personnel should withdraw and not return until an appropriate level of protection has been achieved. Upgrading protection shall be communicated to the program manager, who will convey this information to the PHSM.

During collection of sub-slab and indoor air samples, the breathing zone monitoring protocol presented in Section 6.1.1 will be followed.

6.1.1. Breathing Zone Monitoring Protocol

PID readings refer to readings above background, which are sustained for at least 2 minutes and are measured during the performance of field tasks.

If applicable, the following monitoring protocols are specific to each area of field activity. PID readings are used for general screening. Levels of protection are specified for ranges of measurements. Detector tubes to be collected are indicated for given ranges of PID readings. For areas where the presence of TCE is expected to be present, passive GASTEC Dosi-Tubes® (or their equivalent) will be utilized. PID lamp

selection is outlined in Appendix B and is based on the ionization potential of the site contaminants of concern. PID readings, in conjunction with detector tubes, will be utilized at field sites during tasks anticipated to have the highest level of contamination. If these measurements indicate exposure levels appropriate for Level D at the Site, the use of detector tubes would be limited to situations where field conditions have changed. Detector tubes will be available for use at the discretion of the FSM and SSHS.

The following procedure will be used for breathing zone monitoring:

- The FSM will select the first task for monitoring at the site. This location will be chosen based on the anticipation for the drill hole to have the highest level of contamination.
- If PID readings are less than 10 parts per million (ppm), the detector tubes listed under Level D protocol will be collected. If PID readings greater than 10 ppm are sustained for 2 minutes, all work will be performed in Level C, at a minimum, and the designated tubes will be collected.
- If air-monitoring results from the first task indicate Level D is appropriate, no additional tubes will be collected at the same field site, unless PID readings are greater than 10 ppm.

Upon review of PID, detector tube, and Dosi-Tube measurements, the PHSM may adjust the PPE requirements. If elevated PID and tube measurements are encountered, field personnel, in conjunction with the FSM and SSHS, may choose to allow ventilation of vapors before resuming work (rather than utilizing higher levels of PPE). If ventilation is allowed, detector tubes will be collected prior to the resumption of work to determine the level of PPE required. Detector tube results following the PID portion specify corresponding levels of protection. If the PID readings indicate a detector tube is to be collected, the tube will be collected during periods of exposure for the activity involved.

Dosi-Tubes are to be worn by the person who is expected to have the highest potential for exposure. Measurements on the dosimeter tubes will be observed during the field activities and recorded approximately every two hours in the field logbook.

The most stringent level of protection as indicated by the PID and detector tube readings is to be implemented.

If positive readings are documented during field activities, applicable information will be recorded on Daily Air Monitoring Forms (Appendix A). A separate form will be completed for each person. This information will be utilized to evaluate personal exposure.

6.1.2. PPE Requirements for the Investigation Areas at SAFB

The information provided in Appendix B offers PPE requirements based on measured exposures. Potential environmental investigation areas are addressed for their individual potential hazards.

6.2. LEVELS OF PROTECTION

LEVEL D

Level D protection is anticipated for the majority of the work previously described and includes the following equipment:

- Safety glasses, splash goggles, or face shield
- Hearing protection (when working near sources of high noise, such as airfield runways or drills)
- Hard hat and steel-toed boots (only required during drilling operations)
- Work uniform
- Disposable, chemical-resistant (nitrile) gloves
- Disposable, outer boot covers*
- Silver Shield Gloves® (when free product is handled)*

* Optional equipment

The following levels of PPE may also be necessary in the event that criteria for Level D protection are exceeded:

MODIFIED LEVEL D

Same as Level D, however, disposable, chemical-resistant clothing (Tyvek) with inner nitrile and outer silver shield gloves are required.

LEVEL C

- Full-face, (Half-face allowed unless specifically prohibited by Appendix B of this plan) (organic vapor and high efficiency particulate air) chemical-cartridge respirator approved by NIOSH
- Disposable, chemical-resistant (Tyvek® or Saranex®) clothing
- Disposable, chemical-resistant (nitrile) inner gloves
- Disposable outer glove (Silver Shield® when free product is handled; nitrile gloves when free product is not present).
- Chemical-resistant (polyblend) boots with steel toes and steel shank

- Hearing protection (only required when working near sources of high noise, such as airfield runways)
- Hard hat (only required during drilling operations)
- Disposable boot covers*
- Work uniform*
- Two-way radios*
- Face shield*

* Optional equipment

LEVEL B

- Full-faced supplied airline or positive pressure self contained breathing apparatus (NIOSH approved)
- Hooded, chemical-resistant suit, outer
- Disposable, protective suit, inner
- Chemical-resistant gloves, outer
- Tight fitting, chemical-resistant gloves, inner
- Escape mask respirator
- Disposable boot covers, outer
- Chemical-resistant boots with steel toe, inner
- Hard Hat*
- Face shield*
- Hearing Protection*

* Optional equipment

PPE will be stored in its original container from the manufacturer to prevent damage or possible contamination.

Basic rules for respirator usage are listed below:

Respiratory protection requirements are described in detail in the Burns & McDonnell Respiratory Program as found in the Burns & McDonnell *Corporate Health & Safety Policy and Procedure Manual*, Chapter 8. Basic rules of respiratory usage are listed below:

- Facial hair that interferes with a satisfactory fit of the mask-to-face seal is not allowed on personnel required to wear respirators.

- Respirator cartridges should be replaced after approximately 8-hours of continuous or intermittent usage, unless otherwise noted. Cartridges used for benzene must be replaced at the start of each shift. Cartridges should also be replaced if they become damaged, after the expiration date is exceeded, if vapor smell breakthrough occurs, or if filters become clogged causing resistance to breathing.
- Contact lenses may be worn when respiratory protection is required, in conjunction with additional eye protection to protect against particles or splashes, provided there is no interference with the respirator seal.
- Respirators shall be cleaned and disinfected after each day's use or more often, if necessary.
- The appropriate organic vapor cartridge will be used for protection against chlorinated solvent vapors.
- Prior to donning, respirators will be inspected for worn or deteriorated parts. Emergency respirators or self-contained devices will be inspected at least once a month and after each use.
- After donning, personnel should perform a daily positive and negative pressure fit-checks to determine if a good seal has been achieved.
- The employees will be familiar with all sections of the established Respiratory Program found in the Burns & McDonnell *Corporate Health & Safety Policy and Procedure Manual*, Chapter 8.

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7.0 HEALTH SURVEILLANCE PROGRAM

7.1 EMPLOYEE MEDICAL EXAMINATIONS

All BMcD employees involved in work at the Site will participate in a medical surveillance program administered under the direction of an occupational physician. The physical examinations shall meet the minimum requirements established by OSHA under the HAZWOPER standard. This program will include an annual medical evaluation. Each employee will have been evaluated to determine physical ability to perform work while using respiratory protective equipment in compliance with 29 CFR Part 1910.134 and ANSI Z88.2 - 1992.

A post-project, follow-up exam may be required if an exposure above the PEL is noted or an employee shows specific symptoms associated with the known or suspected hazardous chemicals exposure. The necessity of the exam will be determined by the SSHS and the PSHM based upon information supplied by the program manager/ FSM.

7.2 NOISE MONITORING

A sound level meter (at least Type 2) or noise dosimeter will be utilized to measure sound levels near groundwater purging and sampling and other noisy operations. If prior noise monitoring for each activity has already been conducted and the data is available, subsequent noise exposure monitoring for those activities is not required. Noise levels will be measured with the instrument's microphone placed within the monitored employee's hearing zone (a sphere with a two-foot diameter surrounding the head). The instrument will be set to the A-weighted scale and on slow response. When using the dosimeter, it will be set at a 3 dB exchange rate with the threshold level set at 80 dB. The criterion level (allowable dose) will be set at 85 dB. The permitted exposure time will be according to the TLV as established by the American Conference of Governmental Industrial Hygienist (ACGIH) as noted in table shown on page 7-2.

Noise exposure levels should not exceed the duration shown in the table below. For practical situations on this project, when field personnel are working in active traffic areas, when using equipment capable of high noise generation, and when the sound level reading for the operation exceeds 85 dB (steady for at least 3 seconds) then hearing protective devices will be required. If levels equal or exceed those listed in table below (or if a dosimeter equals or exceeds a 50% dose of the ACGIH level, equivalent to 82 dB) for

30 days or more per year, irrespective of hearing protection, then the employee must be enrolled in the employer’s Hearing Conservation Program.

When a worker’s time-weighted noise exposure exceeds 100 dB, both earplugs and earmuffs should be worn. NIOSH cautions that even double protection is inadequate when the time-weighted average exposures exceed 105 dB.

Dosimetry and sound level surveys (which can be completed with a dosimeter) will be performed by the contractor or subcontractor on site, and documented at start-up and whenever site equipment or other conditions affecting noise levels change.

In addition, hearing protective devices will be worn anytime the HSM believes a potential noise hazard exists.

Allowable Noise Exposure Times:

Measured Sound Levels (dB) in Worker’s Hearing Zone	Allowable exposure time (hours) without hearing protection	Allowable exposure time (hours) with ear plugs (NRR of 28)*	Allowable exposure time (hours) with ear plugs and muffs (NRR of 28 for one)**
80	16	16	16
82	16	16	16
85	8	16	16
88	4	16	16
91	2	16	16
94	1	8	16
97	½	4	16
100	¼	2	8
103	1/8	1	4

*Number computed by subtracting 7 from an NRR of 28, then dividing by 2, according to the OSHA Technical Manual.

**Number computed by subtracting 7 from an NRR of 28, then dividing by 2, then adding 5 dB for muff protection to the result.

Notes:

Assume 16 hours as the maximum allowable work time per day.

No noise exposure in excess of a peak C-Weighted sound level of 140 dB is permitted.

7.3 HEAT STRESS MONITORING

Always monitor signs and symptoms of heat-stressed workers. When water vapor impermeable clothing is worn, exposure to environmentally induced or activity induced heat stress will be discontinued for a person when:

- Sustained heart rate is greater than 160 beats per minute for those under 35 years of age; 140 for 35 years or older
- Deep body temperature is greater than 38 degrees Centigrade (°C) or 100 degrees °F
- There are complaints of sudden and severe fatigue, nausea, dizziness, lightheadedness, or fainting
- There are periods of inexplicable irritability, malaise, or flu-like symptoms
- Sweating stops and the skin becomes hot and dry

7.3.1 Identification and Treatment

When heat stress, heat exhaustion, or other heat stress symptoms are suspected, provide first aid and transport the patient to the medical facility identified in Section 12.1.

7.4 COLD STRESS MONITORING

The SSHP shall monitor environmental conditions by recording temperature and estimated windspeed. Information contained in Tables 7-1 and 7-2 will be used to evaluate the possibility of hypothermia among workers on site. Always monitor signs and symptoms of cold-stressed workers. Exposure to environmentally induced or activity cold stress will be discontinued for a person when:

- Onset of uncontrollable shivers and the sensation of cold: heartbeat slows and sometimes becomes irregular; pulse weakens, and blood pressure changes.
- Cool skin
- Irregular breathing with low blood pressure
- Vague or slow slurred speech, memory lapses, incoherence, and drowsiness
- Apparent exhaustion and fatigue after rest

7.4.1 Identification and Treatment

When frostbite, hypothermia, or other cold-stress symptoms are suspected, treat the patient to relieve symptoms and transport them to the medical facility identified in Section 12.1. Do not initiate special rewarming procedures.

* * * * *

**Table 7-1
Threshold Limit Values Work/Warm-up Schedule
for Four-Hour Shift***

Air-Temperature--Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
Degrees C (approx.)	Degrees F (approx.)	Max. Work Period	No. of Breaks								
-26 to -28	-15 to -19	(Norm. Breaks) 1		(Norm. Breaks) 1		75 min	2	55 min	3	40 min	4
-29 to -31	-20 to -24	(Norm. Breaks) 1		75 min	2	55 min	3	40 min	4	30 min	5
-32 to -34	-25 to -29	75 min	2	55 min	3	40 min	4	30 min	5	Non-emergency work should cease	
-35 to -37	-30 to -34	55 min	3	40 min	4	30 min	5	Non-emergency work should cease		Non-emergency work should cease	
-38 to -39	-35 to 3	40 min	4	30 min	5	Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease	
-40 to -4	-40 to -44	30 min	5	Non-emergency work should cease							
-43 & below	-45 & below	Non-emergency work should cease									

Notes:

- * 1. Schedule applies to any 4-hour work period with moderate to heavy work activity, with warm-up periods of ten (10) minutes in a warm location and with an extended break (e.g., lunch) at the end of the 4-hour work period in a warm location. For Light-to-Moderate Work (limited physical movement): apply the schedule one step lower. For example, at -35°C (-30°F) with no noticeable wind (Step 4), a worker at a job with little physical movement should have a maximum work period of 40 minutes with 4 breaks in a 4-hour period (Step 5).
 2. The following is suggested as a guide for estimating wind velocity if accurate information is not available:
5 mph: light flag moves; 10 mph: light flag fully extended; 15 mph: raises newspaper sheet; 20 mph: blowing and drifting snow.
 3. If only the wind chill cooling rate is available, a rough rule of thumb for applying it rather than the temperature and wind velocity factors given above would be: 1) special warm-up breaks should be initiated at a wind chill cooling rate of about 1750 watts per square meter (W/m²); 2) all non-emergency work should have ceased at or before a wind chill of 2250 W/m². In general, the warmup schedule provided above slightly under-compensates for the wind at the warmer temperatures, assuming acclimatization and clothing appropriate for winter work. On the other hand, the chart slightly over-compensates for the actual temperatures in the cooler ranges because windy conditions rarely prevail at extremely low temperatures.
 4. TLVs apply only for workers in dry clothing.
- * Adapted from Occupational Health & Safety Division, Saskatchewan Department of Labor.

8.0 MONITORING PROTOCOL

The following information describes the criteria to be used for air monitoring (if applicable) at the SAFB:

CGI	Area	Action
<p>≥ 10 percent LEL</p> <p>< 19.5 percent or > 23.5 percent</p> <p>Oxygen concentration</p>	Open Area or Confined Space	Withdraw, allow vapors to dissipate around work location; use copus blower if vapors will not dissipate

Air monitoring for the site will be accomplished with the following equipment:

Type of Instrument	Frequency	Caution
PID	Monitor workers breathing zone during sample collection	Ensure appropriate lamp is installed for chemicals of concern at site.
CGI	Continuously at point of drilling, or when drilling/boring equipment trips out of hole	Drilling/boring equipment should be positioned across the wind.
Sound Level Meter	Use near operation of heavy equipment and other noisy operations (see Section 7.2)	Follow allowable exposure times as stated in Section 7.2.
Real Time Aerosol Monitor	Follow manufacturer's instructions	Follow instructions in Section 6.0.
Detector tubes	As indicated in Appendix B. PID readings sustained for at least 2 minutes in the personnel breathing zones will result in use of detector tubes	Strong solvent odors may require further testing. Common solvents may be present at areas of influence.
Dosi-Tubes	As indicated in Appendix B. Tube measurements are to be recorded every two hours	Dosi-Tubes should be checked frequently to assess short term exposures.

Note: PID reading action levels will be above background concentrations. Action levels and duration of exposure are specified in Appendix B.

Caution is in order when using a CGI in atmospheres containing organic lead (e.g., tetraethyl lead found in leaded gasoline). Continuous and repeated use of a CGI in this type of atmosphere can result in the development of a coating on the detector. This coating causes a loss of sensitivity, resulting in apparently low meter readings. Frequent calibration checks must be performed in these atmospheres to ensure the accuracy of CGI readings. In addition, the CGI has limited sensitivity for methane if the meter is calibrated using pentane. Therefore, if drilling/excavating in areas suspected to have methane (such as landfills) calibration with methane is appropriate.

Air monitoring equipment used on the site should be calibrated in accordance with the following protocol:

Types	Calibration/Response Check	
	Frequency	Gas Standard
PID	Twice daily	100 ppm** isobutylene in air
CGI	Twice daily*	Pentane or methane

* The potential presence of organic lead compounds will require calibration four times daily.

** Parts per million

* * * * *

9.0 SITE SECURITY AND CONTROL

9.1 GENERAL SITE SECURITY

General site security is provided by BMcD personnel during field activities. All activities at the SAFB will be in compliance with USACE requirements. No one will be allowed to enter the zone of exclusion (as discussed below) without permission from BMcD and with the appropriate level of training. All persons entering the zone of exclusion must adhere to the guidelines set forth in this SSHP.

9.2 SITE WORK ZONES

Work location restrictions shall include, but not necessarily be limited to, the following zones:

- Zone of exclusion
- Contamination reduction zone
- Support zone

The zone of exclusion and contamination reduction zone will be within a 10-ft radius of the drill hole/sample location. The exclusion and contamination reduction zone will be subject to change based on the extent of contamination levels. Air monitoring (if applicable) will be conducted to determine contamination levels. The SSHP will restrict access to this area to site investigation personnel. The personnel decontamination station will be located at the entrance to this area.

The support zone includes the areas surrounding the zone of exclusion and contamination reduction zone. The support zone can be any area located outside of the contamination reduction zone where activity support may occur. A Site Operations Center may be established if required.

* * * * *

10.0 DECONTAMINATION PROCEDURES

10.1 PERSONNEL DECONTAMINATION

The decontamination of personnel and equipment will be performed within the exclusion and contamination reduction zone. The contamination reduction zone will be established to act as a transition zone for any necessary equipment or personnel decontamination, and for inspection activities. The decontamination reduction zone will be required for projects where site conditions change and personnel are required to wear Level C, Level B, or Modified Level D. The following procedures should be used when decontaminating personnel or equipment:

LEVEL D

- Establish a segregated equipment drop
- Remove disposable, outer boot covers
- Remove chemical-resistant, outer gloves
- Remove hard hat, and goggles, safety glasses, or face shield
- Remove disposable, inner gloves

LEVEL C, LEVEL B, (and Modified Level D)

- Establish a segregated equipment drop
- Remove disposable, outer boot cover
- Remove chemical-resistant, outer gloves
- Remove chemical-resistant suit
- Remove respirator, hard hat, or face shield
- Remove disposable gloves

At a minimum, the hands and face of each employee must be thoroughly washed upon leaving the work area. All reusable PPE (boots, hard hats, and possibly outer gloves) will be decontaminated in a designated area within the contamination reduction zone. The SSHS will visually inspect all reusable PPE and other equipment once decontamination procedures are completed. All decontamination activity will be monitored to ensure compliance with procedures described in this SSHP.

All disposable clothing that may have been contaminated will be collected and properly discarded.

10.2 EQUIPMENT DECONTAMINATION

To decontaminate hand tools and small pieces of equipment, a galvanized wash tub or clean, 5-gallon, plastic container will be partially filled with potable water. A non-phosphate detergent solution will be mixed in the container. The sampling equipment will be scrubbed visually clean using the detergent solution and a stiff, long-bristled brush. After the solution scrub, the device will be rinsed with distilled water to clean off the solution. Once the solution is rinsed, wet the equipment with isopropanol and allow to dry.

* * * * *

11.0 STANDARD OPERATING PROCEDURES

The following SOPs will be applied to each location and activity where work is performed on the SAFB. As hazards increase or decrease, the applicability of each SOP must be determined by the SSSH with the approval of any changes by the program manager and the PSHM.

The SSSH will make Material Safety Data Sheets (MSDSs) available for chemicals brought on site by BMcD personnel. Prior to repair work on machines, the operator will institute lockout/tagout (LOTO) procedures to prevent accidental starting of machinery. LOTO procedures are also required during work around electrical systems (e.g., sampling oil from a transformer).

11.1 PERSONNEL PRECAUTIONS

1. Eating, drinking, chewing gum or tobacco, smoking, and any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in the exclusion and contamination reduction zone and in any other area known to be contaminated.
2. The hands and face of each employee must be thoroughly washed upon leaving the work area.
3. When decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.
4. Contact with contaminated or suspected contaminated surfaces should be avoided. When possible, do not walk through puddles, leachate, or discolored surfaces; kneel on the ground; or lean, sit, or place equipment on drums, containers, or the ground.
5. Medicine and alcoholic beverages can potentiate the effects from exposure to toxic chemicals. Prescribed drugs should not be taken by personnel at hazardous waste operations where the potential for absorption, inhalation, or ingestion of toxic substances exists unless specifically approved by a qualified physician. Alcoholic beverage consumption will not be allowed during working hours. Illegal drug intake will not be allowed. Personnel under the influence of alcoholic beverages, illegal drugs, or drugs that impair field skills will be removed from the site.

6. All personnel must be familiar with standard operating safety procedures and any additional instructions and information contained in this SSHP. All visitors and subcontractors shall read this SSHP prior to entering the site.
7. Personnel will be familiar with the chemicals used on site and the associated hazards as described in each respective MSDS. The MSDSs for appropriate chemicals used by personnel on site will be available and located in the company vehicle. Personnel on site will be familiar with the hazard communication program prior to performing any activity on site.

See Section 6.0 for PPE requirements, including respirators.

11.2 OPERATIONS

1. All personnel going to the site must be adequately trained and thoroughly briefed on anticipated hazards, equipment, safety practices, emergency procedures, and communications.
2. Any required respiratory protective devices and clothing must be worn by all personnel going into areas designated for wearing protective equipment.
3. Personnel on site must use the buddy system as specified in OSHA 29 CFR 1910.120. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.
4. During continuous operations, on-site workers act as safety backup to each other; off-site personnel provide emergency assistance.
5. Personnel should practice unfamiliar operations prior to the actual procedure. This practice will occur in an area outside of the zone of exclusion.
6. Personnel and equipment in the contaminated area should be minimized, consistent with effective site operations.

7. Work areas for various operational activities must be established.
8. Procedures for leaving a contaminated area must be planned and implemented prior to going to the site. Work areas and decontamination procedures must be established based on expected site conditions.
9. Frequent and regular inspections of site operations will be conducted to verify compliance with this SSHP. If changes in operations occur, the SSHP must be modified to reflect these changes.
10. All electrical equipment (power tools, extension cords, instruments, radios, etc.) shall conform to OSHA 29 CFR 1926.400, Subpart K.
11. Fire prevention and protection (appropriate signs for flammable liquids, smoking areas, storage areas of combustible or flammable materials, etc.) shall be in accordance with OSHA 29 CFR 1926.150, Subpart F.
12. Site safety meetings will be held daily to discuss anticipated site conditions and daily activities. This meeting will be summarized in the field logbook.

11.3 VEHICLE ISSUES

In heavy traffic areas, use extra caution in moving around the site. Observe contractor personnel on the site to ensure their safety as well. Precautions that can be taken include traffic barricades, cones, signs, a flag person who keeps a constant watch on traffic, and blocking the work area with vehicles. The following traffic areas may be present at the investigation area and need to be considered:

- Highway and road shoulders
- City streets
- Parking lots
- Construction sites

11.4 LIGHTNING AND WEATHER HAZARDS

Caution is necessary in the field with regard to the hazards of lightning. The following precautions should be taken.

- Be aware of the weather to foresee and watch for the buildup of possible thunderstorms
- Be prepared to demobilize and take cover before thunderstorms are too close
- Cease operations when threatening conditions exist

Use extra care when working outside in inclement weather. Poor footing and difficulties in driving vehicles can result from wet or icy surfaces.

11.5 POWER TOOL SAFETY

It is necessary to practice proper safety measures when drilling with a rotary hammer drill.

- Be aware of all other on site personnel and their movement
- Wear proper PPE as described in Section 6.0 when operating the drill
- Do not place any body parts within range of the rotary bit
- Only use extension cords with ground-fault circuit interrupters and plug-ins that appear to be in proper working order and conform to OSHA 29 CFR 1926.400, Subpart K
- Do not disturb the operator of the drill while it is in operation
- Make yourself visible to the drill operator before approaching him/her

* * * * *

12.0 CONTINGENCY PLAN

Copies of the following emergency procedures will be kept in all BMcD site vehicles and provided to personnel in charge at the site. Emergency information will also be included in any site specific addendums.

12.1 EMERGENCY ACTION/STANDARD OPERATING PROCEDURES

1. The name and telephone number of the nearest medical treatment facility is found below. Figure 12-1 provides an overall view of the route to the hospital located in Salina, Kansas.

Salina Regional Health Center
400 South Santa Fe
Salina, Kansas 67402
Telephone: (785) 452-7000

Directions to Nearest Hospital

Prior to initiating field work, field personnel will attend a site briefing in which the route to and from the hospital will be driven to familiarize employees with the hospital location. A map is also provided in the site-specific SSHP, which outlines the routes to each hospital. From the site, travel north on Centennial Road to West Crawford Street. Turn east of Crawford and travel to Santa Fe. Turn north on Santa Fe Avenue and travel to South Street. The hospital is located on the right.

2. Telephone numbers and procedures for obtaining emergency services are as follows:
 - Ambulance 911
 - Fire Department (911) or 785-826-7340
 - Police (911) or 785-826-7210
3. A 16-unit emergency first aid kit that meets ANSI Standard Z308.1-1978 will be readily available on site, and designated personnel will have first aid training.
4. Sufficient water and/or dry chemical fire extinguishers (A, B, C fire extinguishers) and neutralizing agents will be maintained on site to cope with any situation until emergency services arrive.

5. A personal eyewash kit that meets ANSI Z358.1-1990 will be available in each BMcD field vehicle at the site. The main purpose of the eyewash unit is to provide immediate flushing. With this accomplished, the individual may then be transported to the hospital for professional care.

12.2 WORK AREA EMERGENCY PROCEDURES

The SSHS or the FSM shall immediately notify the BMcD project manager and the USACE project manager of any accident/incident. Accident reporting and recordkeeping will fulfill the requirements set forth in the USACE's "Safety and Health Requirements Manual," EM 385-1-1.

It will be the responsibility of the PSHM to thoroughly investigate the details of any accident or injury. Based on findings, corrective action relative to field procedures will be recommended to prevent recurrence.

12.3 MEDICAL EMERGENCIES

1. Any person who becomes ill or injured in the exclusion zone must be decontaminated as much as possible, with consideration as to which risk will be greater, the spread of contamination or the health of the individual. If the injury or illness is minor, full decontamination (remove contaminated clothing and wash hands and face with soap and water, see Section 10.1) should be completed and first aid administered prior to transport. If the individual's condition is more serious, at least partial decontamination should be attempted (e.g., complete disrobing of the victim and redressing in clean coveralls or wrapping in a blanket before transportation to the hospital). First aid should be administered while awaiting an ambulance or paramedics. The sampling team is trained and certified in First Aid and CPR.
2. If an injured victim is unconscious, notify emergency medical service (EMS). Inform the EMS dispatcher of the nature of the emergency. Do not move the victim unless it is absolutely necessary. Remain with the victim and wait for orders from the EMS dispatcher. The EMS dispatcher should determine what help is needed. Anyone transported to a clinic or hospital for treatment should be accompanied by information on the chemicals to which they may have been exposed.

3. Any vehicle used to transport contaminated personnel will be cleaned and tested to verify that it is clean before further use.
4. Provisions must be made to identify the substance to which the worker may have been exposed. This information must be given to medical personnel.

In the event that a major accident or injury occurs emergency first aid will be performed on injured persons by CPR and First Aid trained persons until emergency medical personnel arrive. Injured personnel will not be moved from the site by non-emergency medical personnel, unless there is a high risk that severe injury or loss of life will occur if the injured person(s) is not immediately moved. Non-injured personnel at the site will be checked for symptoms of shock following a major accident or injury. Work will not resume at the site until the HSO, FSM, and appropriate personnel approve.

12.4 FIRST AID MEASURES

In the event that personnel exposure symptoms occur, the following procedures will be used:

Chlorinated Solvents

Eye Contact: Flush eye immediately with copious amount of water; repeat until irritation is eliminated. If irritation occurs for more than 15 minutes, seek medical attention.

Skin Contact: Thoroughly wash exposed area with soap and water. If dermatitis or severe reddening occurs, seek medical attention. Report skin contact with tetraethyl lead contaminated materials to SSHS for medical monitoring.

Inhalation: Remove person into fresh air. If symptoms occur for more than 15 minutes, seek medical attention.

Ingestion: Do not induce vomiting; seek immediate medical attention.

12.5 FLAMMABLE CONDITIONS

In the event that combustible vapors exceed 10 percent of the LEL or strong odors are detected, the following actions should be taken:

- Eliminate all ignition sources and electric cutoff switches. Do not turn electric switches on or off if strong odors are present unless the switch is intrinsically safe. Do not allow vehicles to operate
- Move personnel away from the borehole
- Allow vapors to dissipate
- If conditions warrant, call in the listed sequence:
 - Ambulance 911
 - HSM
 - BMcD Project Manager
 - USACE Project Manager
- Provide answering personnel with the call back numbers, locations, directions, and situation assessment

12.6 CHEMICAL EMERGENCIES

The following conditions will necessitate the cessation of field work in the area of concern and revisions to this SSHP:

- CGI readings above 10 percent LEL
- CGI readings at or below 19.5 percent O₂ or above 23.5 percent O₂
- PID readings over 50 ppm above background for more than 15 seconds in the breathing zone
- Detector-tube measurements exceeding the specifications in Appendix B.

12.7 NATURAL HAZARDS

The following precautions will be observed during severe weather (e.g., tornadoes, high winds, thunderstorms, and hail):

Tornadoes

- Check the weather forecast before arriving at the site [phone number for the National Weather Service (NWS) at Topeka, Kansas (785) 234-2592, 828-271-4800, or on the Internet at www.ncdc.noaa.gov.
- The daily safety tailgate meeting will include specific directions about procedures to be taken in the event of hazardous weather conditions.
- If work is allowed during a tornado watch, the SSHS will periodically check the NWS updated weather forecast and notify site personnel as to any changes in weather conditions.
- If a tornado warning is issued by the NWS, or a funnel cloud is seen by site personnel, the SSHS will be notified and all work will be stopped. All personnel will then take cover in a basement or another low-lying area.
- If no warning is received and a funnel cloud is fast approaching, the SSHS will notify all site personnel to seek shelter at the nearest building available. If an adequate shelter is not found, remain away from the windows and possibly under a table until the tornado has passed. If it is not possible to safely find shelter, employees should seek safety under a heavy piece of equipment that offers protection from falling debris.

Severe Weather

- Check weather forecast before arriving at the site.
- The daily safety tailgate meeting will include specific directions about procedures to be taken in the event of hazardous weather conditions.

* * * * *

13.0 RECORD KEEPING

Documentation of the implementation of the SSHP will be kept in the project file. Documentation to be included is provided below:

- Visitor Log Sheet
- Air Monitoring Form
- Daily Calibration Log
- Safety Meeting Form
- Field Safety Checklist
- Agreement and Acknowledgement Statement
- Health and Safety Plan Field Amendment Form
- Supervisors Accident Investigation Report

All of these forms are provided in Appendix A.

* * * * *

14.0 REFERENCES

ACGIH, 2003, American Conference Governmental Industrial Hygienist. *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices*.

BMcD, 2003, Burns & McDonnell. *Burns & McDonnell Health and Safety Manual*. Intranet.

BMcD, 2003, Burns & McDonnell. *Respirator Selection Guide*. St. Paul, MN.

Forsberg & Mansdorf, 1993. *Quick Selection Guide to Chemical Protective Clothing*.

NIOSH, 1997, National Institute for Occupational Safety and Health. *Pocket Guide to Chemical Hazards*. June.

USACE, 2003, U.S. Army Corps of Engineers. *Safety and Health Requirements Manual*. EM 385-1-1, November.

* * * * *

TABLES

Table 1-1 Activity Hazard Analysis

SECTION 1

<u>Location:</u> Salina, Kansas	<u>Contract Number:</u> DACW41-02-D-0003	<u>Project Title:</u> Vapor Intrusion Investigation, Former SAFB
<u>Activity:</u> Sub-slab and Indoor Air Sampling	<u>Prime Contractor:</u> Burns & McDonnell	<u>Subcontractor(s):</u> N/A
<u>General description of scope of work for this activity:</u> Sub-slab sampling at 13 locations on Site to be followed by Indoor Air sampling based on sub-slab results		
<u>Date of Preparatory Inspection:</u>		
Principal Steps	Potential Safety/Health Hazards	Recommended Controls
<ul style="list-style-type: none"> A) Ambient Air Monitoring B) Drilling probe holes C) Installation of sampling equipment D) Disposal of IDW 	<ul style="list-style-type: none"> A) Loss of limbs from rotary drill B) Exposure to contaminants by inhalation C) Heat/cold stress D) Severe weather, including lightning and tornados E) Hearing Loss 	<ul style="list-style-type: none"> A) Use proper safety measures when drill is in operation such as do not disturb person operating drill and do not approach driller from behind B) Use PID to screen work area. Stop work and upgrade PPE if concentrations warrant a potential hazard according to the SSHP. C) Follow heat/cold stress recommendations given in the SSHP. D) Shut down field operations if lightning occurs or stormy weather approaches. E) Wear proper ear protection with correct NRR rating for the decibel level.

**Table 1-1 (continued)
Activity Hazard Analysis**

SECTION 2

ACTIVITY: Sub-slab and Indoor Air Sampling		
Equipment To Be Used	Inspection Requirements	Training Requirements
A) Level D - Work uniform, safety glasses, steel-toe boots, and as needed the following: hearing protection, nitrile gloves. B) PID - Photoionization detector with a 10.6 eV lamp. C) LEL/O2 meter. D) Rotary Hammer Drill	A) PPE Inspection.	A) HAZWOPER 40-hour initial training with 3 day supervised field training. B) HAZWOPER 8-hour refresher training within the past year (unless 40-hour was taken in the past year). C) First Aid/CPR/Bloodborne Pathogens training for two persons on site. D) Field Site Manager and Site Safety and Health Supervisor must have HAZWOPER 8-hour Supervisor Training as well as training on Heat/Cold stress.
REVIEWED BY:		APPROVED BY:
Safety Officer (signature)		
Subcontractor (signature)		

**Table 7-1
Threshold Limit Values Work/Warm-up Schedule
for Four-Hour Shift***

Air-Temperature--Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
Degrees C (approx.)	Degrees F (approx.)	Max. Work Period	No. of Breaks								
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-29 to -31	-20 to -24	(Norm. Breaks) 1		75 min	2	55 min	3	40 min	4	30 min	5
-32 to -34	-25 to -29	75 min	2	55 min	3	40 min	4	30 min	5	Non-emergency work should cease	
-35 to -37	-30 to -34	55 min	3	40 min	4	30 min	5	Non-emergency work should cease		Non-emergency work should cease	
-38 to -39	-35 to -3	40 min	4	30 min	5	Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease	
-40 to -4	-40 to -44	30 min	5	Non-emergency work should cease							
-43 & below	-45 & below	Non-emergency work should cease									

Notes:

- * 1. Schedule applies to any 4-hour work period with moderate to heavy work activity, with warm-up periods of ten (10) minutes in a warm location and with an extended break (e.g., lunch) at the end of the 4-hour work period in a warm location. For Light-to-Moderate Work (limited physical movement): apply the schedule one step lower. For example, at -35°C (-30°F) with no noticeable wind (Step 4), a worker at a job with little physical movement should have a maximum work period of 40 minutes with 4 breaks in a 4-hour period (Step 5).
 2. The following is suggested as a guide for estimating wind velocity if accurate information is not available:
5 mph: light flag moves; 10 mph: light flag fully extended; 15 mph: raises newspaper sheet; 20 mph: blowing and drifting snow.
 3. If only the wind chill cooling rate is available, a rough rule of thumb for applying it rather than the temperature and wind velocity factors given above would be: 1) special warm-up breaks should be initiated at a wind chill cooling rate of about 1750 watts per square meter (W/m²); 2) all non-emergency work should have ceased at or before a wind chill of 2250 W/m². In general, the warmup schedule provided above slightly under-compensates for the wind at the warmer temperatures, assuming acclimatization and clothing appropriate for winter work. On the other hand, the chart slightly over-compensates for the actual temperatures in the cooler ranges because windy conditions rarely prevail at extremely low temperatures.
 4. TLVs apply only for workers in dry clothing.
- * Adapted from Occupational Health & Safety Division, Saskatchewan Department of Labor.

TABLE 7-2
Cooling Power of Wind on Exposed Flesh Expressed as
Equivalent Temperature (under calm conditions)*

Estimated Wind Speed (mph)	Actual Temperature Reading (degrees F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	Equivalent chill Temperature (degrees F)											
calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds > 40 mph have little additional effect)	LITTLE DANGER If < hr with dry skin. Maximum danger of false sense of security				INCREASING DANGER Danger from freezing of exposed flesh within one minute.				GREAT DANGER Flesh may freeze within 30 seconds.			
Trench foot and immersion foot may occur at any point on this chart.												

* Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA

FIGURE

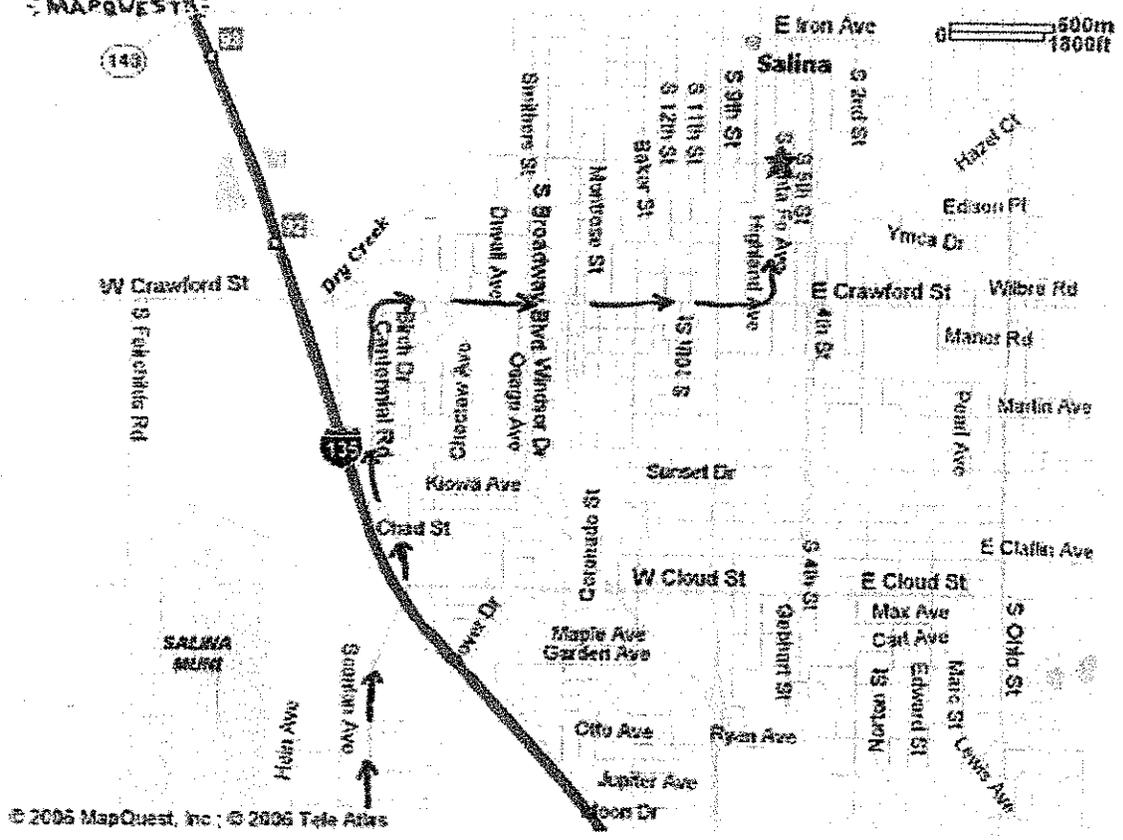
★ **Salina Regional Health Ctr:**

785-452-7000

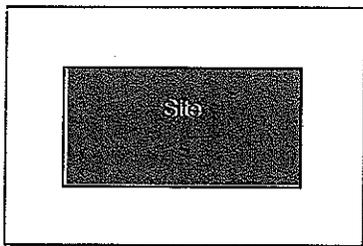
400 S Santa Fe Ave

Salina, KS 67401, US

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	<p>Figure 12-1 ROUTE TO HOSPITAL SAFB Salina, Kansas</p>
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APPENDIX A

Forms

**SAFETY MEETING FORM
SAFB**

Date:

Start Time:

Issues Discussed

Protective Clothing:

Chemical Hazards:

Physical Hazards:

Emergency Procedures:

Hospitals:

Special Equipment:

Miscellaneous

ATTENDEES

Print Name

Signature

Print Name	Signature

Meeting Conducted by:

FIELD SAFETY CHECKLIST

Work Location _____ Date _____

1. Reviewed work plans with client representative:
2. Requested maps of aboveground and underground utilities:
3. Reviewed utility maps: _____ (water supply, firewater, sewer, process sewer, electric, gas, telephone, other underground piping)
4. Met with utility representative to review utility locations and asked each utility the following questions:
 - a. Any underground utilities at work site?
 - b. Any ongoing construction that would affect field activities?
 - c. Any vapor releases associated with unit operations?
 - d. Any other hazards associated with operating units?
 - e. Any special requirements?

Name and name of utility:

5. Permits required: _____ Type: _____
6. Obtained necessary permits:
Permit expiration date: _____
7. Request MSDS for any on-site chemicals:
8. Client's established monitoring protocol, if any:
9. Obtained final approval for commencement of work:

Comments:

AGREEMENT AND ACKNOWLEDGMENT FORM
(continued)

Name Signature

Company Date

HEALTH AND SAFETY PLAN FIELD AMENDMENT FORM

Project Name: _____

Project Number: _____

Location:

Amendment Number:

Amendment Effective Date:

Changes in field activities or hazards:

Proposed Amendment:

Proposed By: _____
Site Health and Safety Supervisor or others

Date:

Approved By: _____
Project Manager

Date:

Health and Safety Department Manager

Date:

Declined By: _____

Date:

SUPERVISOR'S ACCIDENT INVESTIGATION REPORT

Instructions for Parts III and IV are given on the following page. If more space is needed in completing the report, use additional pages. Complete and return this report to the responsible BMcD safety organization no later than the next working day after the accident.

Location:

Part I - General Information

Name of Injured:

Division:

Date of Accident: _____ Hour: _____ am/pm

Exact Location:

Part II - Description of Accident (Summarize the accident, providing specific detail)

Part III - Cause of Accident (Determine the cause by analyzing all involved factors, including those listed in the instructions.)

A. Describe any **Unsafe** acts:

B. Describe any **Unsafe** conditions:

Part IV - Corrective Action Taken (Summarize actions taken and recommendations made to prevent a similar accident or recurrence of the same. Before completing this section, study the steps identified in the instructions.)

If no actions have been taken, give the reason(s):

Signatures:

Supervisor

Local EC&HS Official

Date Report Prepared:

SUPERVISOR'S ACCIDENT INVESTIGATION REPORT INSTRUCTIONS

Part III - Accident Causes. Use the following lists in determining the cause(s) of the accident

Selected Unsafe Acts - Personal Factors

Making safety devices inoperable
Failure to use guards provided
Using defective equipment in motion
Failure to use proper tools or equipment
Operating machinery or equipment at unsafe speed
Failure to use personal protective equipment
Operating without authority
Lack of skill or knowledge
Unsafe loading or placing
Improper lifting, lowering, or carrying
Taking unsafe position
Unnecessary haste
Influence of alcohol or drugs
Physical limitation or mental attitude
Unaware of hazards
Unsafe act of other

Selected Unsafe Conditions

Inadequate guards or protection
Defective tools or equipment
Unsafe condition of machine
Congested work area
Poor housekeeping
Unsafe floors, ramps, stairways, platforms
Improper material storage
Inadequate warning system
Fire or explosion hazards
Hazardous atmosphere: gases, dust, fumes, vapors
Hazardous substances
Inadequate ventilation
Radiation exposures
Excessive noise
Inadequate illumination

Part IV - Corrective Action Taken. Take the following steps to prevent a similar accident or recurrence of the same.

1. Discuss the accident with the employee involved and with any witnesses. Be sure to question the what-where-when-who-how-why aspects of the accident.
2. Inspect the equipment or materials involved for conditions that can be made safer.
3. Study the job setup and manner of doing the work and decide if improvements can be made.
4. Determine if the employee involved is suited for the job he or she is doing, if the employee received adequate training, and if there are any other problems.
5. Develop practical recommendations to correct the problem. Be sure your recommendations will not create other situations that could result in injury to employees.

APPENDIX B

Supplemental Site-Specific Information

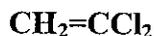
APPENDIX C
Chemical Hazard Summary

Appendix C
CHEMICAL HAZARD SUMMARY

NIOSH Pocket Guide to Chemical Hazards

Vinylidene chloride

CAS 75-35-4



RTECS KV9275000

Synonyms & Trade Names

1,1-DCE; 1,1-Dichloroethene; 1,1-Dichloroethylene; VDC; Vinylidene chloride monomer; Vinylidene dichloride

DOT ID & Guide

1303 130P (inhibited)

Exposure

ACGIH TLV: 5 ppm

Limits

NIOSH REL: Ca

OSHA PEL†: none

IDLH Ca [N.D.]

Conversion

Physical Description

Colorless liquid or gas (above 89°F) with a mild, sweet, chloroform-like odor.

MW: 96.9

BP: 89°F

FRZ: -189°F

Sol: 0.04%

VP: 500 mmHg

IP: 10 00 eV

Sp Gr: 1.21

FLP: -2°F

UEL: 15.5%

LEL: 6.5%

Class IA Flammable Liquid: FLP below 73°F and BP below 100°F

Incompatibilities & Reactivities

Aluminum, sunlight, air, copper, heat [Note: Polymerization may occur if exposed to oxidizers, chlorosulfonic acid, nitric acid, or oleum. Inhibitors such as the monomethyl ether of hydroquinone are added to prevent polymerization.]

Measurement Methods

NIOSH 1015; OSHA 19

See: NMAM or OSHA Methods

Personal Protection & Sanitation

Skin: Prevent skin contact

Eyes: Prevent eye contact

Wash skin: When contaminated

Remove: When wet (flammable)

Change: No recommendation

Provide: Eyewash, Quick drench

First Aid

Eye: Irrigate immediately

Skin: Soap flush immediately

Breathing: Respiratory support

Swallow: Medical attention immediately

Important additional information about respirator selection

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Appendix C CHEMICAL HAZARD SUMMARY

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, throat; dizziness, headache, nausea, dyspnea (breathing difficulty); liver, kidney disturbance; pneumonitis; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

Cancer Site [in animals: liver & kidney tumors]

NIOSH Pocket Guide to Chemical Hazards

1,2-Dichloroethylene

CAS 540-59-0

ClCH=CHCl

RTECS KV9360000

Synonyms & Trade Names

Acetylene dichloride, cis-Acetylene dichloride, trans-Acetylene dichloride, sym-Dichloroethylene

DOT ID & Guide

1150 130P

Exposure Limits

ACGIH TLV: 200 ppm

NIOSH REL: TWA 200 ppm (790 mg/m³)

OSHA PEL: TWA 200 ppm (790 mg/m³)

IDLH 1000 ppm See: 540590

Conversion 1 ppm = 3.97 mg/m³

Physical Description

Colorless liquid (usually a mixture of the cis & trans isomers) with a slightly acrid, chloroform-like odor

MW: 97.0

BP: 118-140°F

FRZ: -57 to -115°F

Sol: 0.4%

VP: 180-265 mmHg

IP: 9.65 eV

Sp Gr(77°F): 1.27

Fl P: 36-39°F

UEL: 12.8%

LEL: 5.6%

Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F

Incompatibilities & Reactivities

Strong oxidizers, strong alkalis, potassium hydroxide, copper [Note: Usually contains inhibitors to prevent polymerization]

Measurement Methods

NIOSH 1003; OSHA 7 See: NMAM or OSHA Methods

Personal Protection & Sanitation

Skin: Prevent skin contact

Eyes: Prevent eye contact

Wash skin: When contaminated

Remove: When wet (flammable)

Change: No recommendation

First Aid

Eye: Irrigate immediately

Skin: Soap wash promptly

Breathing: Respiratory support

Swallow: Medical attention immediately

Important additional information about respirator selection

Respirator Recommendations NIOSH/OSHA

Up to 2000 ppm:

(APF = 25) Any supplied-air respirator operated in a continuous-flow mode[‡]

(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)[‡]

(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)

Appendix C

CHEMICAL HAZARD SUMMARY

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister

(APF = 50) Any self-contained breathing apparatus with a full facepiece

(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, respiratory system; central nervous system depression

Target Organs Eyes, respiratory system, central nervous system

NIOSH Pocket Guide to Chemical Hazards

Trichloroethylene

CAS 79-01-6

$\text{ClCH}=\text{CCl}_2$

RTECS KX4550000

Synonyms & Trade Names

Ethylene trichloride, ICE, Trichloroethene, Trilene

DOT ID & Guide

1710 160

Exposure

ACGIH TLV: 50 ppm

NIOSH REL: Ca

Limits

OSHA PEL †: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 2 hours)

IDLH Ca [1000 ppm] See: 79016

Conversion 1 ppm = 5.37 mg/m³

Physical Description

Colorless liquid (unless dyed blue) with a chloroform-like odor.

MW: 131.4

BP: 189°F

FRZ: -99°F

Sol(77°F): 0.1%

VP: 58 mmHg

IP: 9.45 eV

Sp Gr: 1.46

FlP: ?

UEL(77°F): 10.5%

LEL(77°F): 8%

Combustible Liquid, but burns with difficulty.

Incompatibilities & Reactivities

Strong caustics & alkalis; chemically-active metals (such as barium, lithium, sodium, magnesium, titanium & beryllium)

Measurement Methods

NIOSH 1022, 3800; OSHA 1001

See: NMAM or OSHA Methods

Personal Protection & Sanitation

Skin: Prevent skin contact

First Aid

Eye: Irrigate immediately

Appendix C

CHEMICAL HAZARD SUMMARY

Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation
Provide: Eyewash, Quick drench

Skin: Soap wash promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Important additional information about respirator selection

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, heart, liver, kidneys, central nervous system

Cancer Site [in animals: liver & kidney cancer]

NIOSH Pocket Guide to Chemical Hazards

Vinyl chloride

CAS 75-01-4

CH₂=CHCl

RTECS [KU9625000](#)

Synonyms & Trade Names

Chloroethene, Chloroethylene, Ethylene monochloride, Monochloroethene, Monochloroethylene, VC, Vinyl chloride monomer (VCM)

DOI ID & Guide

1086 [116P](#) (inhibited)

Exposure

ACGIH TLV: 1 ppm

Limits

NIOSH REL: Ca

OSHA PEL: [1910 1017] TWA 1 ppm C 5 ppm [15-minute]

IDLH Ca [N D]

Conversion 1 ppm = 2.56 mg/m³

Physical Description

Colorless gas or liquid (below 7°F) with a pleasant odor at high concentrations [Note: Shipped as a liquefied compressed gas]

MW: 62.5

BP: 7°F

FRZ: -256°F

Sol(77°F): 0.1%

VP: 3.3 atm

IP: 9.99 eV

RGasD: 2.21

Fl P: NA (Gas)

UEL: 33.0%

LEL: 3.6%

Appendix C CHEMICAL HAZARD SUMMARY

Flammable Gas

Incompatibilities & Reactivities

Copper, oxidizers, aluminum, peroxides, iron, steel [Note: Polymerizes in air, sunlight, or heat unless stabilized by inhibitors such as phenol Attacks iron & steel in presence of moisture]

Measurement Methods

NIOSH 1007; OSHA 4, 75 See: NMAM or OSHA Methods

Personal Protection & Sanitation

Skin: Frostbite

Eyes: Frostbite

Wash skin: No recommendation

Remove: When wet (flammable)

Change: No recommendation

Provide: Frostbite wash

First Aid

Eye: Frostbite

Skin: Frostbite

Breathing: Respiratory support

Important additional information about respirator selection

Respirator Recommendations : NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin, and/or eye contact (liquid)

Symptoms Lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; [potential occupational carcinogen]

Target Organs Liver, central nervous system, blood, respiratory system, lymphatic system

Cancer Site [liver cancer]

NIOSH Pocket Guide to Chemical Hazards

Carbon tetrachloride

CAS 56-23-5

CCl₄

RIECS EG4900000

Synonyms & Trade Names

Carbon chloride; Carbon tet; Freon® 10; Halon® 104; Tetrachloromethane

DOT ID & Guide

1846 151

Exposure Limits

ACGIH TLV: 5 ppm

NIOSH REL: Ca ST 2 ppm (12.6 mg/m³) [60-minute]

OSHA PEL†: TWA 10 ppm C 25 ppm 200 ppm (5-minute maximum peak in any 4 hours)

IDLH Ca [200 ppm] See: 56235

Conversion 1 ppm = 6.29 mg/m³

Physical Description

Appendix C CHEMICAL HAZARD SUMMARY

Colorless liquid with a characteristic ether-like odor.

MW: 153.8	BP: 170°F	FRZ: -9°F	Sol: 0.05%
VP: 91 mmHg	IP: 11.47 eV		Sp Gr: 1.59
FIP: NA	UEL: NA	LEL: NA	

Noncombustible Liquid

Incompatibilities & Reactivities

Chemically-active metals such as sodium, potassium & magnesium; fluorine; aluminum [Note: Forms highly toxic phosgene gas when exposed to flames or welding arcs.]

Measurement Methods

NIOSH 1003; OSHA 7

See: NMAM or OSHA Methods

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation
Provide: Eyewash, Quick drench

First Aid

Eye: Irrigate immediately
Skin: Soap wash immediately
Breathing: Respiratory support
Swallow: Medical attention immediately

Important additional information about respirator selection

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; central nervous system depression; nausea, vomiting; liver, kidney injury; drowsiness, dizziness, incoordination; [potential occupational carcinogen]

Target Organs central nervous system, eyes, lungs, liver, kidneys, skin

Cancer Site [in animals: liver cancer]