RAC V

RESPONSE ACTION CONTRACT FOR

Remedial, Enforcement Oversight, and
Non-Time Critical Removal Activities at Sites of Release
or Threatened Release of Hazardous Substances in Region V

HEALTH AND SAFETY PLAN
SOUTH MINNEAPOLIS NEIGHBORHOOD RESIDENTIAL SOIL CONTAMINATION SITE

Minneapolis, Minnesota
Remedial Investigation/Feasibility Study
WA No. 250-RICO-B58Y/Contract No. 68-W6-0025
April 2006

PREPARED FOR

U.S. Environmental Protection Agency

PREPARED BY

CH2M HILL
Ecology and Environment, Inc.
TN & Associates, Inc.
Tucker, Young, Jackson, Tull, Inc.

CH2M HILL HEALTH AND SAFETY PLAN

This Health and Safety Plan (HSP) will be kept on the site during field activities and will be reviewed as necessary. The plan will be amended or revised as project activities or conditions change or when supplemental information becomes available. The plan adopts, by reference, the Standards of Practice (SOPs) in the CH2M HILL *Corporate Health and Safety Program, Program and Training Manual*, as appropriate. In addition, this plan adopts procedures in the project work plan. The site safety coordinator (SSC) and designated safety coordinator (DSC) are to be familiar with these SOPs and the contents of this plan. CH2M HILL's personnel and subcontractors must sign **Attachment 1.**

Project Information and Description

PROJECT NO:	336752
CLIENT:	USEPA
PROJECT/SITE NAME:	South Minneapolis Neighborhood Residential Soil Contamination Site (SMSC)
SITE ADDRESS:	Minneapolis, Minnesota
CH2M HILL PROJECT MANAGER:	Jeff Keiser/MKE
CH2M HILL OFFICE:	135 South 84th Street, Suite 325 Milwaukee, WI 53214
DATE HASP PLAN PREPARED:	April 14, 2006
DATE OF SITE WORK:	May 2006
SITE ACCESS:	I-94 west to Cedar Ave south, west on E 24th Street to Bloomington Ave south
SITE SIZE:	The site encompasses an area with an approximate ¾-mile radius from the CMC Heartland Lite Yard Site (CMC Heartland Site) located at 28th Street E and Hiawatha Avenue.
SITE TOPOGRAPHY:	The area is relatively flat.
PREVAILING WEATHER:	Climate at the site is continental characterized with warm humid summers and cold winters. Periods of extreme heat are short. Average annual rainfall is 29.4 inches. Average monthly temperature is highest in July (73.2°F) and lowest in January (13.1°F).
SITE DESCRIPTION AND HISTORY:	The South Minneapolis Site is located in Hennepin County, Minneapolis, Minnesota. In 1989, the Minnesota Department of Health recommended soil sampling in the residential neighborhood located directly downwind of a former manufacturing facility due to elevated levels of arsenic. The former manufacturing site has been remediated and this investigation focuses on the surrounding residential properties. The site is located in an urban residential area and lies on flat terrain.
SPECIFIC TASKS TO BE PERFORMED:	Collection of soil samples using hand tools (0-3 inches). Direct push soil sampling (0-10 feet).

SITE MAP - SOUTH MINNEAPOLIS SITE

HAS BEEN REDACTED – ONE PAGE

CONTAINS POTENTIAL PERSONALLY-IDENTIFYING INFORMATION

1 Tasks to be performed Under This Health and Safety Plan

1.1 Description of Tasks

(Reference Final Work Plan, Project Instructions & Field Project Startup Form)

Refer to the project work plan for detailed task information. A health and safety risk analysis (Section 1.2) has been performed for each task and is incorporated in this HSP through task-specific hazard controls and requirements for monitoring and protection. Tasks other than those listed below require an approved amendment or revision to this HSP before tasks begin. Refer to **Section 8.2** for procedures related to "clean" tasks that do not involve hazardous waste operations and emergency response (Hazwoper).

1.1.1 Hazwoper-Regulated Tasks

- Surface soil sampling
- Subsurface soil sampling
- Surveying

1.1.2 Non-Hazwoper-Regulated Tasks

- None

1.1.3 Project HS&E Change Management Form

*This evaluation form should be reviewed on a **continual basis** to determine if the current site-specific HASP adequately addresses ongoing project work, and it should be modified whenever new tasks are contemplated or changed conditions are encountered.*

Project Task: **Sampling**

Activity Manager: Beth Rohde/MKE

Project Number: **336752**

Project Name: **South Minneapolis Neighborhood Residential Soil Contamination Site**

Evaluation Checklist		**Yes**	**No**
1.	Has CH2M HILL staff changed?		
2.	Has a new subcontractor been added to the project?		
3.	Is any chemical or product to be used that is not listed in Attachment 2 of the plan?		
4.	Are all tasks addressed in Section 1.1 of the site-specific HASP?		
5.	Have new contaminants or higher than anticipated levels of original contaminants been encountered?		
6.	Has other safety, equipment, activity, or environmental hazards been encountered that are not addressed in Section 2.1 of the plan?		

If the answer is "YES" to Questions 1-3, a HASP revision is NOT needed. Please take the following actions:

Confirm that the staff's medical and training status is current—check training records at: http://www.int.ch2m.com/hands (or contact your regional SPA) and confirm subcontractor qualifications. - Confirm with the project KA that subcontractor safety performance has been reviewed and is acceptable. - Confirm with H&S that subcontractor safety procedures have been reviewed and are acceptable.

If the answer is "YES" to Questions 4-6, a HASP revision MAY BE NEEDED. To determine if a revision is needed, please contact HS&E directly or complete the field project start-up form at:
http://www.int.ch2m.com/hsdocgen/fppricing.asp**.**

1.2 Task Hazard Analysis

(Refer to Section 2 for hazard controls)

Potential Hazards	TASKS		
	Surface Soil Sampling	Subsurface Soil Sampling	Surveying
Flying debris/objects	X	X	
Noise > 85dBA		X	
Electrical			
Suspended loads			
Buried utilities, drums, tanks		X	
Slip, trip, fall	X	X	X
Back injury	X		
Confined space entry			
Trenches / excavations			
Visible lightning	X	X	X
Vehicle traffic	X	X	
Elevated work areas/falls			
Fires			
Entanglement		X	
Drilling		X	
Heavy equipment		X	
Working near water			
Working from boat			
IDW Drum Sampling			

2 Hazard Controls

This section defines safe work practices and control measures used to reduce or eliminate potential hazards. Such practices and controls are to be implemented by the party in control of either the site or the particular hazard. CH2M HILL employees and subcontractors must remain aware of the hazards affecting them regardless of who is responsible for controlling the hazards. CH2M HILL employees and subcontractors who do not understand any of these provisions should contact the SSC for clarification.

In addition to the controls specified in this section, **Attachment 6** contains project-activity self-assessment checklists to be used to assess the adequacy of CH2M HILL and subcontractor site-specific safety requirements. The object of the self-assessment process is to identify gaps in project safety performance, and to prompt for corrective actions in addressing those gaps. Self-assessment checklists should be completed early in the project, when tasks or conditions change, or when otherwise specified by the HSM. The checklists, including documented corrective actions, should be made part of the permanent project records and be promptly submitted to the HSM.

2.1 Project-Specific Hazards

2.1.1 Field Vehicles

- Car rental must meet the following requirements:
  - Dual air bags
  - Antilock brakes
  - Be midsize or larger.
- Familiarize yourself with rental vehicle features.
  - Mirror adjustments
  - Seat adjustments
  - Cruise control features, if offered.
  - Pre-program radio stations.
- Always wear seatbelt while operating vehicle.
- Adjust headrest to proper position.
- Tie down loose items if utilizing a van.
- Pull off the road, put the car in park and turn on flashers before talking on a mobile phone.
- Maintain both a First Aid kit and Fire Extinguisher in the field vehicle at all times.
- Close car doors slowly and carefully. Fingers can get pinched in doors or the truck.
- Take shelter in the field vehicle in the event of light rain.
  - Listen to car radio for predictions of tornado or lightning.
- Park vehicle in a location where it can be accessed easily in the event of an emergency.

2.1.2 Inclement Weather

- Work may proceed in light rain- wear rain gear.
- Exposure to slips, trips and falls is increased during rainy and snowing conditions.
- Take cover in field vehicle during adverse weather conditions (High winds, heavy rain).
  - Work shall cease and cover sought in the event of lightning or tornado warnings.
  - Identify "Take Shelter" areas before starting project.
  - Work may proceed in light rain- wear rain gear.
- Notify the Project Manager and Client Representative after shelter has been sought.

2.1.3 Arsenic

- Team members shall take the computer based training found on the Virtual Office entitled Arsenic Exposure Training. The pathway is: VO/ Company Resources/ Corporate Groups/ Health, Safety, Environment & Quality/ Training & Medical / Training/ Training Courses/ Computer Based Training/ Arsenic Training.
- Team members shall review the Arsenic Fact Sheet found in **Attachment 5** of this Health and Safety Plan.
- Water should be added when activities create or could create airborne arsenic contaminated dust.
- Personnel working near arsenic-contaminated soil shall exercise enhanced personal hygiene (frequent hand washing prior to eating, drinking, and smoking; separation of work and street clothing/footwear, and so on).

2.2 Physical Hazards

2.2.1 Digging

(Reference CH2M HILL SOP HS-112, *Lifting*)

- Digging activities have a potential for back injuries.
- If someone is going to be digging remind them of the proper techniques which include:
  - **Warming up and stretching before exertion**
  - Using the legs to lift the weight of the full shovel
  - Using your feet to change direction to unload the shovel.
- Never twist your trunk when you are carrying a load.

2.2.2 Steep Slopes

- Always avoid steep slope areas whenever possible. “Climbing” in steep slope areas should be minimized and limited to that which does not require the use of climbing equipment.
- Exercise caution in relying on rocks and trees/tree stumps to support yourself—they may be loose.
- Whenever possible, switchback your way up/down steep areas.
- Maintain a slow pace with firm footing.
- Caution should be used when using machinery and/or working around potentially unstable slopes.
- If steep terrain must be negotiated, sturdy shoes or boots that provide ankle support should be used.

2.2.3 Exposure to Public Vehicular Traffic

- Exercise caution when exiting traveled way or parking along street – avoid sudden stops, use flashers, etc.
- Park in a manner that will allow for safe exit from vehicle, and where practicable, park vehicle so that it can serve as a barrier.
- All staff working adjacent to traveled way or within work area must wear reflective/high-visibility vests.
- Eye protection should be worn to protect from flying debris.
- Remain aware of factors that influence traffic related hazards and required controls – sun glare, rain, wind, flash flooding, limited sight-distance, hills, curves, guardrails, width of shoulder (i.e., breakdown lane), etc.
- Always remain aware of an escape route -- behind an established barrier, parked vehicle, guardrail, etc.
- Always pay attention to moving traffic – never assume drivers are looking out for you
- Work as far from traveled way as possible to avoid creating confusion for drivers.
- When workers must face away from traffic, a “buddy system” should be used, where one worker is looking towards traffic.

2.3 Physiological Hazards

2.3.1 Sprains

- If the sprain is minor, the victim may be able to walk with little or no assistance.
- To reduce the swelling of a minor sprain, you must put ice on the injury (of course, be careful of frostbite and hypothermia in cold weather).
- You will also need to tape the injured joint using sports tape or an ace bandage and allow the injured person to take ibuprofen (only if they are not allergic to aspirin), if they intend to walk out.
- On the other hand, major sprains may appear to be fractures and should be treated as such.
- Splint the injury and plan the best way to get the victim to medical care.

2.3.2 Cuts and Scrapes

- Take the time to wash the cut with soap and water, or an antiseptic towelette.
- Cleaning the wound immediately will help prevent infection later

2.3.3 Cramps

- If someone experiences muscle cramps, have him or her sit or lie down and relax.
- Massage and stretch the sore muscle slowly, gently, and carefully.
- Have him or her drink water, eat a little, and start again slowly.
- Drinking a sports drink like Gatorade will help replace salts that are lost because of sweating.
- Replacing these salts may help reduce the muscle cramps and prevent them from recurring.

2.3.4 Blisters

- Blisters most commonly occur on the feet, especially if someone uses inappropriate socks, wet socks or boots, or boots that do not fit or are not broken in.
- Preventing blisters is the most important first aid: if someone feels a "hot spot" starting (from friction between the skin and the boot) stop immediately and do something about it.
- Place a thin layer of moleskin or (believe it or not) duct tape on the affected area.
- If you don't take care of the hot spot, it will become a blister: in this case, use the moleskin, but with a hole in it, so that you don't place adhesive directly over the blister.
- You want to minimize pressure on the blister by building up protective padding around it, but not too much or you'll cause more problems.
- Generally you should not pop blisters, both because they can become infected, and because they may become more painful as you continue to walk.

2.3.5 Headaches

- Headaches result from many different things: dehydration, sunlight, tension, etc.
- You can best treat the headache by treating the cause, if you know it.
- Suggest that the person affected take aspirin, acetaminophen (e.g., Tylenol), or ibuprofen (e.g., Advil), drink water, eat a little, and, if possible, take a rest break.
- Wearing sunglasses may prevent headaches from too much sunlight.

2.3.6 Nosebleeds

- Nosebleeds more commonly occur in cold than in hot weather because of the very dry air.
- If someone gets a nosebleed, try to stop the bleeding by pinching the nostrils with your fingers.
- Be patient, because nosebleeds often take a while to stop.
- If pinching the nostrils doesn't work, you may insert a small, clean pad of gauze into the affected nostril, and pinch it again.
- If someone is prone to nosebleeds, especially in cold weather, it may help to wear a bandanna over the nose/mouth. As he or she breathes out, the bandanna traps some warmer, moist air, which may be enough to prevent a nosebleed.

2.4 Biological Hazards

2.4.1 Bees and other insect stings

- Bees and other stinging insects may be encountered almost anywhere and may present a serious hazard, particularly to people who are allergic.
- Watch for and avoid nests.
- Keep exposed skin to a minimum.
- Carry a kit if you have had allergic reactions in the past, and inform the SSC and/or buddy.
- If a stinger is present, remove it carefully with tweezers.
- Wash and disinfect the wound, cover it, and apply ice.
- Watch for allergic reaction; seek medical attention if a reaction develops.

2.4.2 Dog Bites

- Equip each field team with "Dog Repellant" spray.
  - Read manufactures instructions.
  - Position yourself up-wind if possible before using.
  - Only use if attacked-- not just threatened.
- Avoid all dogs – both leashed and stray.
- Don't disturb a dog while it is sleeping, eating or caring for puppies.
- If a dog approaches to sniff you - stay still.
- An aggressive dog has a tight mouth, flattened ears and a direct stare.
- If you're threatened by a dog, remain calm – don't scream and avoid eye contact.
- If you say anything, speak calmly and firmly.
- Don't turn and run – try to stay still until the dog leaves, or back away slowly until the dog is out of sight or you have reached safety (e.g., vehicle).
- If attacked, retreat to vehicle or attempt to place something between you and the dog.
- If you fall or are knocked to the ground, curl into a ball with your hands over your head and neck, and protect your face.
- If bitten, immediately scrub the bite site vigorously with soap and water.
- Report the incident to the local authorities.
- Seek medical attention as soon as possible.

2.4.4 Poison Ivy and Poison Sumac

- Poison ivy, poison oak, and poison sumac typically are found in brush or wooded areas.
- They are more commonly found in moist areas or along the edges of wooded areas.
- Become familiar with the identity of these plants.
- Wear protective clothing that covers exposed skin and clothes.
- Avoid contact with plants and the outside of protective clothing. If skin contacts a plant, wash the area with soap and water immediately.
- If the reaction is severe or worsens, seek medical attention. **SEE ATTACHMENT 7** for more details.

2.4.5 Snakes

- Snakes typically are found in underbrush and tall grassy areas.
- If you encounter a snake, stay calm and look around; there may be other snakes.
- Turn around and walk away on the same path you used to approach the area.
- If a person is bitten by a snake, wash and immobilize the injured area, keeping it lower than the heart if possible.
- Seek medical attention immediately.
- DO NOT apply ice, cut the wound, or apply a tourniquet.
- Try to identify the type of snake: note color, size, patterns, and markings.

2.4.6 Ticks

- Ticks typically are in wooded areas, bushes, tall grass, and brush.
- Ticks are black, black and red, or brown and can be up to one-quarter inch in size.
- Wear tightly woven light-colored clothing with long sleeves and pant legs tucked into boots; spray **only outside** of clothing with permethrin or permanone and spray skin with only DEET; and check yourself frequently for ticks.
- If bitten by a tick, grasp it at the point of attachment and carefully remove it.
- After removing the tick, wash your hands and disinfect and press the bite areas.
- Save the removed tick.
- Report the bite to human resources.
- Look for symptoms of Lyme disease or Rocky Mountain spotted fever (RMSF).
- Lyme: a rash might appear that looks like a bullseye with a small welt in the center.
- RMSF: a rash of red spots under the skin 3 to 10 days after the tick bite.
- In both cases, chills, fever, headache, fatigue, stiff neck, and bone pain may develop.
- If symptoms appear, seek medical attention.

- SEE **ATTACHMENT 7** for more details.

2.5 General Hazards

2.5.1 General Practices and Housekeeping

(Reference CH2M HILL SOP HS-507, *General Practices*)

- Perform site work during daylight hours whenever possible. Work conducted during hours of darkness requires enough illumination intensity to read a newspaper without difficulty.
- Maintain good housekeeping at all times in all project work areas.
- Establish common paths of travel, and keep them free from accumulation of materials.
- Keep access to aisles, exits, ladders, stairways, scaffolding, and emergency equipment free from obstructions.
- Provide slip-resistant surfaces, ropes, and/or other devices to be used.
- Designate specific areas for proper storage of materials.
- Store tools, equipment, materials, and supplies in an orderly manner.
- As work progresses, neatly store or remove scrap and unessential materials from the work area.
- Provide containers for collecting trash and other debris, and remove them at regular intervals.
- Clean up all spills quickly. Clean oil and grease from walking and working surfaces.

2.5.2 Hazard Communication

(Reference CH2M HILL SOP HS-107, *Hazard Communication)*

The SSC is to perform the following:

- Complete an inventory of chemicals brought on site by CH2M HILL using **Attachment 2.**
- Confirm that an inventory of chemicals brought on site by CH2M HILL subcontractors is available.
- Request or confirm locations of Material Safety Data Sheets (MSDSs) from the client, contractors, and subcontractors for chemicals to which CH2M HILL employees potentially are exposed.
- Before or as the chemicals arrive on site, obtain an MSDS for each hazardous chemical.
- Label chemical containers with the identity of the chemical and with hazard warnings, and store properly.
- Give employees required chemical-specific HAZCOM training using **Attachment 3.**
- Store all materials properly, giving consideration to compatibility, quantity limits, secondary containment, fire prevention, and environmental conditions.

2.5.3 Shipping and Transportation of Chemical Products

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

Chemicals brought to the site might be defined as hazardous materials by the U.S. Department of Transportation (DOT). All staff who ship the materials or transport them by road must receive CH2M HILL training in shipping dangerous goods. All hazardous materials that are shipped (as by Federal Express) or are transported by road must be properly identified, labeled, packed, and documented by trained staff. Contact the HSM or the Equipment Coordinator for additional information.

2.5.4 Lifting

(Reference CH2M HILL SOP HS-112, *Lifting*)

- Use proper lifting techniques must be used when lifting any object.
- Plan storage and staging to minimize lifting or carrying distances.
- Split heavy loads into smaller loads.
- Use mechanical lifting aids whenever possible.
- Have someone assist with the lift—especially for heavy or awkward loads.
- Make sure the path of travel is clear prior to the lift.

2.5.5 Fire Prevention

(Reference CH2M HILL SOP HS-208, *Fire Prevention*)

- Provide fire extinguishers so that the travel distance from any work area to the nearest extinguisher is less than 100 feet. When 5 gallons or more of a flammable or combustible liquid is being used, an extinguisher must be within 50 feet. Extinguishers must
  - be maintained in a fully charged and operable condition
  - be visually inspected each month
  - undergo a maintenance check each year
- Keep area in front of extinguishers clear.
- Post "Exit" signs over exiting doors and "Fire Extinguisher" signs over extinguisher locations.
- Store combustible materials stored outside should be at least 10 feet from any building.
- Keep solvent waste and oily rags in a fire resistant, covered container until removed from the site.
- Keep flammable/combustible liquids in approved containers and stored them in an approved storage cabinet.

2.5.6 Electrical

(Reference CH2M HILL SOP HS-206, *Electrical*)

- Only qualified personnel are permitted to work on unprotected energized electrical systems.
- Electrical power tools and equipment must be effectively grounded or double-insulated UL approved.
- Do not tamper with electrical wiring and equipment unless qualified to do so. Consider all electrical wiring and equipment energized until lockout/tagout procedures are implemented.
- Inspect electrical equipment, power tools, and extension cords for damage prior to use. Do not use defective electrical equipment—remove it from service.
- Make sure all temporary wiring, including extension cords and electrical power tools ground fault circuit interrupters (GFCIs) installed.
- Extension cords must be
  - equipped with third-wire grounding
  - covered, elevated, or protected from damage when passing through work areas
  - protected from pinching if routed through doorways
  - not fastened with staples, hung from nails, or suspended with wire
- Operate and maintain electric power tools and equipment according to manufacturers' instructions.
- Maintain safe clearance distances between overhead power lines and electrical conducting material unless power lines have been de-energized and grounded, or where insulating barriers have been installed to prevent physical contact. Maintain at least 10 feet from overhead power lines for voltages of 50 kV or less, and 10 feet plus ½ inch for every 1 kV over 50 kV.
- Protect electrical equipment, tools, switches, and outlets from environmental elements.

2.5.7 Cold Stress

(Reference CH2M HILL SOP HS-211, *Heat and Cold Stress*)

- Be aware of the symptoms of cold-related disorders, and wear proper, layered clothing for the expected fieldwork. Appropriate rain gear is a must in cool weather.
- Consider monitoring the work conditions and adjusting the work schedule using guidelines developed by the U.S. Army (wind-chill index) and the National Safety Council (NSC).
- Wind-chill index is used to estimate the combined effect of wind and low air temperatures on exposed skin. The wind-chill index does not take into account the body part that is exposed, the level of activity, or the amount or type of clothing worn. For those reasons, it should only be used as a guideline to warn workers when they are in a situation that can cause cold-related illnesses.
- NSC Guidelines for Work and Warm-Up Schedules can be used with the wind-chill index to estimate work and warm-up schedules for fieldwork. The guidelines are not absolute; workers should be monitored for symptoms of cold-related illnesses. If symptoms are not observed, the work duration can be increased.
- Persons who experience initial signs of immersion foot, frostbite, hypothermia should consult the SSC/DSC to avoid progression of cold-related illness.
- Observe one another for initial signs of cold-related disorders.
- Obtain and review weather forecast. Be aware of predicted weather systems along with sudden drops in temperature, increase in winds, and precipitation.

SYMPTOMS AND TREATMENT OF COLD STRESS

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

Wind Chill Chart

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

Frostbite Times: 30 minutes; 10 minutes; 5 minutes

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

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

Effective 11/01/01

2.5.8 Procedures for Locating Buried Utilities

Local Utility Mark-Out Service

Name: Gopher State One-Call
Phone: 1-800-252-1166

- Obtain utility diagrams for the facility if available.
- Review locations of sanitary and storm sewers, electrical conduits, water supply lines, natural gas lines, and fuel tanks and lines.
- Review proposed locations of intrusive work with facility personnel knowledgeable of locations of utilities. Check locations against information from utility mark-out service.
- Where necessary (as when uncertain about utility locations), perform excavation or drilling of the upper depth interval manually.
- Monitor for signs of utilities during advancement of intrusive work (for example, sudden change when advancing auger or split spoon).
- When the client or other onsite party is responsible for determining the presence and locations of buried utilities, the SSC should confirm that arrangement.

2.5.9 Confined Space Entry

(Reference CH2M HILLCH2M HILL SOP HS-203, *Confined Space Entry*)

Confined space entry is not permitted. Confined space entry requires additional health and safety procedures, training, and a permit. If conditions change such that confined-space entry is necessary, contact the HSM to develop the required entry permit.

When planned activities will not include confined-space entry, permit-required confined spaces accessible to CH2M HILL personnel are to be identified before the task begins. The SSC is to confirm that permit spaces are properly posted or that employees are informed of their locations and hazards.

2.6 Radiological Hazards and Controls

Refer to CH2M HILL's *Corporate Health and Safety Program,* Program *and Training Manual,* and *Corporate Health and Safety Program, Radiation Protection Program Manual,* for standards of practice in contaminated areas.

Hazards	Controls
None Known	None Required

2.7 Contaminants of Concern

(Refer to Project Files for more detailed contaminant information)

Contaminant	Location and Maximum[a] Concentration (ppm)	Exposure Limit[b]	IDLH[c]	Symptoms and Effects of Exposure	PIP[d] (eV)
Arsenic	**SB:** unknown **SS:** 1,200	0.01 mg/m^3	5 CA	Ulceration of nasal septum, respiratory irritation, dermatitis, gastrointestinal disturbances, peripheral neuropathy, hyperpigmentation	NA

[a] Specify sample-designation and media: SB (Soil Boring), GW (Groundwater), SS (Surface Soil), SW (Surface Water).

[b] Appropriate value of PEL, REL, or TLV listed.

[c] IDLH = immediately dangerous to life and health (units are the same as specified "Exposure Limit" units for that contaminant); CA = Potential occupational carcinogen.

[d] PIP = photoionization potential; NA = Not applicable.

2.8 Potential Routes of Exposure

Dermal: Contact with contaminated media. This route of exposure is minimized through proper use of PPE, as specified in Section 4.	**Inhalation:** Vapors and contaminated particulates. This route of exposure is minimized through proper respiratory protection and monitoring, as specified in Sections 4 and 5, respectively.	**Other:** Inadvertent ingestion of contaminated media. This route should not present a concern if good hygiene practices are followed (for example, wash hands and face before drinking or smoking).

3 Project Organization and Personnel

3.1 CH2M HILL Employee Medical Surveillance and Training

(Reference CH2M HILL SOPs HS-113, *Medical Monitoring*, and HS-110, *Health and Safety Training)*

The employees listed below are enrolled in the CH2M HILL Comprehensive Health and Safety Program and meet state and federal hazardous waste operations requirements for 40-hour initial training, 3-day on-the-job experience, and 8-hour annual refresher training. Employees designated "SSC" have completed a 12-hour site safety coordinator course, and have documented requisite field experience. An SSC with a level designation (D, C, B) equal to or greater than the level of protection being used must be present during all tasks performed in exclusion or decontamination zones. Employees designated "FA-CPR" are certified by the American Red Cross, or equivalent, in first aid and CPR. At least one FA-CPR designated employee must be present during all tasks performed in exclusion or decontamination zones. The employees listed below are currently active in a medical surveillance program that meets state and federal regulatory requirements for hazardous waste operations. Certain tasks (e.g., confined-space entry) and contaminants (e.g., arsenic) may require additional training and medical monitoring.

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

Employee Name	Office	Responsibility	SSC/FA-CPR
Jeff Keiser	MKE	Project Manager	
Beth Rohde	MKE	Assistant Project Manager	SSC/FA-CPR
Dave Shekoski	MKE	FTL/Field Staff	SSC/FA-CPR
Christie Walker	MKE	FTL/Field Staff	SSC/FA-CPR
Jon Tortomasi	MKE	FTL/Field Staff	SSC/FA-CPR
Carolyn Fehn	MKE	FTL/Field Staff	SSC/FA-CPR
Osaguona Ogbebor	DAY	FTL/Field Staff	SSC
Jennifer Myers	WDC	FTL/Field Staff	SSC
Shane Lowe	STL	FTL/Field Staff	
Emily Molander	MKE	FTL/Field Staff	SSC/FA-CPR
Tory Schultz	MKE	FTL/Field Staff	SSC/FA-CPR
Sarah Dunmyer	DAY	FTL/Field Staff	SSC
Rachel Grand	STL	FTL/Field Staff	SSC/FA-CPR
Mark Eshbaugh	DAY	FTL/Field Staff	SSC/FA-CPR
Rebecca Wrobel	DFW	FTL/Field Staff	
Shaun Roark	SEA	FTL/Field Staff	
Huck Raddemann	MKE	FTL/Field Staff	SSC/FA-CPR

3.2 Field Team Chain of Command and Communication Procedures

3.2.1 Client

Contact Name:	Tim Prendiville, EPA
Phone:	312-886-5122

3.2.2 CH2M HILL

Project Manager:	Jeff Keiser/MKE
Health and Safety Manager:	Steve Beck/MKE
Field Team Leader:	Dave Shekoski/MKE
Site Safety Coordinator:	Dave Shekoski/MKE

The SSC is responsible for contacting the Field Team Leader and Project Manager. In general, the Project Manager will contact the client. The Health and Safety Manager should be contacted as appropriate.

4 Personal Protective Equipment (PPE)

(Reference CH2M HILL SOP HS-117, *Personal Protective Equipment*, HS-121, *Respiratory Protection*)

PPE Specifications [a]

Task	Level	Body	Head	Respirator [b]
➢ General site entry ➢ Surveying	D	**Boots**: Steel-toe, leather work boots **Gloves:** None	Safety glasses	None required
➢ Surface soil sampling	Modified D	**Boots:** Steel-toe, leather work boots **Gloves:** Surgical-style.	Safety glasses	None required
➢ Subsurface soil sampling	Modified D	**Boots:** Steel-toe, leather work boots with outer rubber boot covers **Gloves:** Surgical-style.	Safety glasses Hardhat [c] Ear protection [d]	None required

Reasons for Upgrading or Downgrading Level of Protection

Upgrade[e]	Downgrade
• Request from individual performing tasks. • Change in work tasks that will increase contact or potential contact with hazardous materials. • Occurrence or likely occurrence of gas or vapor emission. • Known or suspected presence of dermal hazards. • Instrument action levels (Section 5) exceeded.	• New information indicating that situation is less hazardous than originally thought. • Change in site conditions that decreases the hazard. • Change in work task that will reduce contact with hazardous materials.

[a] Modifications are as indicated. CH2M HILL will provide PPE only to CH2M HILL employees.
[b] Facial hair that would interfere with respirator fit is not permitted.
[c] Hardhat and splash-shield areas are to be determined by the SSC.
[d] Ear protection should be worn when conversations cannot be held at distances of 3 feet or less without shouting.
[e] Performing a task that requires an upgrade to a higher level of protection (e.g., Level D to Level C) is permitted only when the PPE requirements have been approved by the HSM, and an SSC qualified at that level is present.

5 Air Monitoring/Sampling

(Reference CH2M HILL SOP HS-06, *Air Monitoring)*

5.1 Air Monitoring Specifications

Instrument	Tasks	Action Levels[a]	Range	Frequency [b]	Calibration
None Required	NA	NA	NA	NA	NA

5.2 Calibration Specifications

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

Instrument	Gas	Span	Reading	Method
NA	NA	NA	NA	NA

5.3 Air Sampling

Air sampling typically is required when site contaminants include lead, cadmium, arsenic, asbestos, and certain volatile organic compounds. Although arsenic is the contaminant of concern for the South Minneapolis site, soil concentrations are below levels where air sampling would be required. Air sampling is required if arsenic soil concentrations exceed 10,000 mg/kg. The highest soil concentrations observed in the residential area were 1,600 mg/kg. Contact the HSM immediately if these contaminants are encountered.

Method Description

None

Personnel and Areas

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

HSM: **Steve Beck/MKE**
Other: **John Culley/SEA**

6 Decontamination

(Reference CH2M HILL SOP HS-506, *Decontamination*)

The SSC must establish and monitor the decontamination procedures and their effectiveness. Decontamination procedures found to be ineffective will be modified by the SSC. The SSC must ensure that procedures are established for disposing of materials generated on the site.

6.1 Decontamination Specifications

Personnel	Sample Equipment	Heavy Equipment
• Outer-glove removal • Hand wash/rinse • Face wash/rinse • Shower ASAP • Dispose of PPE in municipal trash, or contain for disposal • Dispose of personnel rinse water to facility or sanitary sewer, or contain for offsite disposal	• Wash/rinse equipment	• Power wash • Dispose of equipment rinse water to facility or sanitary sewer, or contain for offsite disposal

6.2 Diagram of Personnel-Decontamination Line

Eating, drinking, and smoking are not permitted in contaminated areas and in exclusion or decontamination zones. The SSC should establish areas for eating, drinking, and smoking. Contact lenses are not permitted in exclusion or decontamination zones.

Figure 6-1 illustrates a conceptual establishment of work zones, including the decontamination line. Work zones are to be modified by the SSC to accommodate task-specific requirements.

7 Site-Control Plan

7.1 Site-Control Procedures

(Reference CH2M HILL SOP HS-510, *Site Control)*

- The SSC will conduct a site safety briefing (see below) before starting field activities or as tasks and site conditions change.
- Topics for briefing on site safety: general discussion of Health and Safety Plan, site-specific hazards, locations of work zones, PPE requirements, equipment, special procedures, emergencies.
- The SSC records attendance at safety briefings in a logbook and documents the topics discussed.
- Post the OSHA jobsite poster in a central and conspicuous location in accordance with CH2M HILL SOP HS-71, *OSHA Postings.*
- Establish support, decontamination, and exclusion zones. Delineate with flags or cones as appropriate. Support zone should be upwind of the site. Use access control at entry and exit from each work zone.
- Establish onsite communication consisting of the following:
  - Line-of-sight and hand signals
  - Air horn
  - Two-way radio or cellular telephone if available
- Establish offsite communication.
- Establish and maintain the “buddy system.”
- Initial air monitoring is conducted by the SSC in appropriate level of protection.
- The SCC is to conduct periodic inspections of work practices to determine the effectiveness of this plan—refer to Sections 2 and 3. Deficiencies are to be noted, reported to the HSM, and corrected.

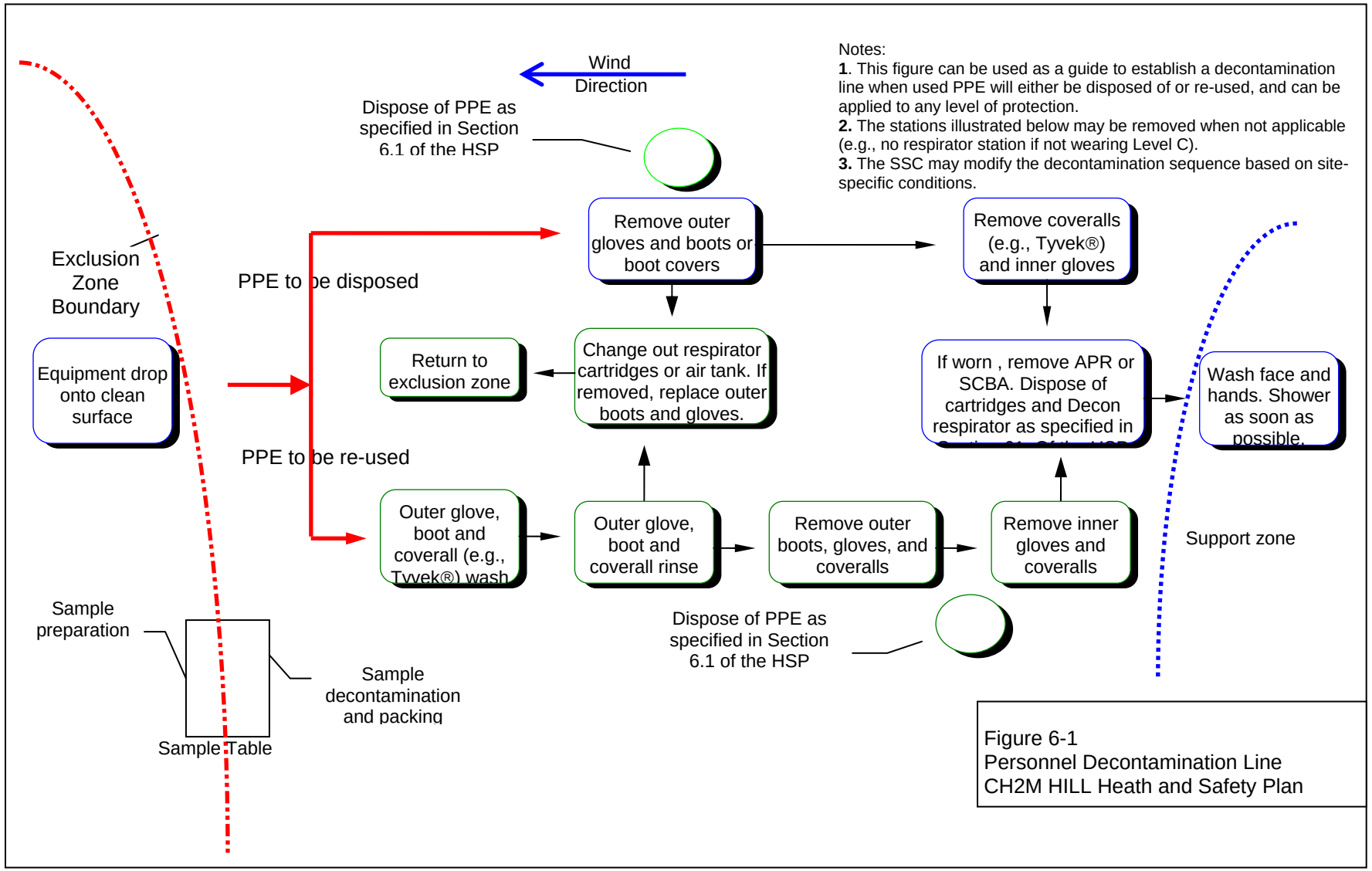


Figure 6-1
Personnel Decontamination Line
CH2M HILL Heath and Safety Plan

8 Emergency Response Plan

(Reference CH2M HILL, SOP HS-106, *Emergency Response*)

8.1 Pre-Emergency Planning

The SSC performs the applicable pre-emergency planning tasks before starting field activities and coordinates emergency response with CH2M HILL onsite parties, the facility, and local emergency-service providers as appropriate.

- Review the facility emergency and contingency plans where applicable.
- Determine what onsite communication equipment is available (e.g., two-way radio, air horn).
- Determine what offsite communication equipment is needed (e.g., nearest telephone, cell phone).
- Confirm and post emergency telephone numbers, evacuation routes, assembly areas, and route to hospital; communicate the information to onsite personnel.
- Field Office: Post "Exit" signs above exit doors, and post "Fire Extinguisher" signs above locations of extinguishers. Keep areas near exits and extinguishers clear.
- Review changed site conditions, onsite operations, and personnel availability in relation to emergency response procedures.
- Where appropriate and acceptable to the client, inform emergency room and ambulance and emergency response teams of anticipated types of site emergencies.
- Designate one vehicle as the emergency vehicle; place hospital directions and map inside; keep keys in ignition during field activities.
- Inventory and check site emergency equipment, supplies, and potable water.
- Communicate emergency procedures for personnel injury, exposures, fires, explosions, and releases.
- Rehearse the emergency response plan before site activities begin, including driving route to hospital.
- Brief new workers on the emergency response plan.

The SSC will evaluate emergency response actions and initiate appropriate follow-up actions.

8.2 Emergency Equipment and Supplies

The SSC should mark the locations of emergency equipment on the site map and post the map.

Emergency Equipment and Supplies	Location
20 lb (or two 10-lb) fire extinguisher (A, B, and C classes)	Support zone/heavy equipment
First aid kit	Support zone/field vehicle
Eye Wash	Support and decon zone/field vehicle
Potable water	Support and decon zone/field vehicle
Bloodborne-pathogen kit	Support zone/field vehicle
Additional equipment (specify): Cell Phone	On SSC

8.3 Incident Response

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

- Shut down CH2M HILL operations and evacuate the immediate work area.
- Notify appropriate response personnel.
- Account for personnel at the designated assembly areas.
- Assess the need for site evacuation, and evacuate the site as warranted.

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

8.4 Emergency Medical Treatment

The procedures listed below may also be applied to nonemergency incidents. Injuries and illnesses (including overexposure to contaminants) must be reported to Human Resources. If there is doubt about whether medical treatment is necessary or if the injured person is reluctant to accept medical treatment, contact the CH2M HILL medical consultant. During nonemergencies, follow these procedures as appropriate.

- Notify appropriate emergency response authorities listed in Section 9.8 (e.g., 911).
- The SCC will assume charge during a medical emergency until the ambulance arrives or until the injured person is admitted to the emergency room.
- Prevent further injury.
- Initiate first aid and CPR where feasible.
- Get medical attention immediately.
- Perform decontamination where feasible; lifesaving and first aid or medical treatment take priority.
- Make certain that the injured person is accompanied to the hospital emergency room.
- When contacting the medical consultant, state that the situation is a CH2M HILL matter, and give your name and telephone number, the name of the injured person, the extent of the injury or exposure, and the name and location of the medical facility where the injured person was taken.
- Report incident as outlined in Section 9.7.

8.5 Evacuation

- Evacuation routes and assembly areas (and alternative routes and areas) are specified on the site map.
- Evacuation routes and assembly areas will be designated by the SSC before work begins.
- Personnel will assemble at assembly areas upon hearing the emergency signal for evacuation.
- The SSC and a buddy will remain on the site after the site has been evacuated (if safe) to assist local responders and advise them of the nature and location of the incident.
- The SSC will account for all personnel in the onsite assembly area.
- A designated person will account for personnel at alternate assembly areas.
- The SSC will write up the incident as soon as possible after it occurs and submit a report to the Corporate Director of Health and Safety.

8.6 Evacuation Signals

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

8.7 Incident Notification and Reporting

- Upon any project incident (fire, spill, injury, near miss, death), immediately notify the PM and HSM. Call emergency beeper number if HSM is unavailable.
- For CH2M HILL work-related injuries or illnesses, contact and help human resources administrator complete an Incident Report Form. The Incident Report Form must be completed within 24 hours of incident.
- For CH2M HILL subcontractor incidents, complete the Subcontractor Accident/Illness Report Form and submit to the HSM.
- Notify and submit reports to client as required in contract.

9 Approval

This site-specific Health and Safety Plan has been written for use by CH2M HILL only. CH2M HILL claims no responsibility for its use by others unless that use has been specified and defined in project or contract documents. The plan is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if those conditions change.

9.1 Original Plan

Written By: Matt Boekenhauer **Date:02/06/2006**

Approved By: Steve Beck **Date: 04/17/2006**

9.2 Revisions

Revisions Made By: **Date:**

Revisions to Plan:

Revisions Approved By: **Date:**

---

10 Attachments

Attachment 1: Employee Signoff Form – Field Safety Instructions
Attachment 2: Project-Specific Chemical Product Hazard Communication Form
Attachment 3: Chemical-Specific Training Form
Attachment 4: Emergency Contacts
Attachment 5: Project H&S Forms/Permits
Attachment 6: Project Activity Self-Assessment Checklists
Attachment 7: Applicable Material Safety Data Sheets
Attachment 8: Biological Fact Sheets

EMPLOYEE SIGNOFF FORM

CH2MHILL

EMPLOYEE SIGNOFF FORM

Health and Safety Plan

- The CH2M HILL project employees and subcontractors listed below have been provided with a copy of this HSP, have read and understood it, and agree to abide by its provisions.

Project Name: South Minneapolis **Project Number:** 336752

EMPLOYEE NAME (Please print)	EMPLOYEE SIGNATURE	COMPANY	DATE

CH2MHILL

Health and Safety Plan

Attachment 2

Project-Specific Chemical Product Hazard Communication Form

CH2MHILL

Project-Specific Chemical Product Hazard Communication Form

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

Project Name: South Minneapolis **Project Number:** 336752

MSDSs will be maintained at the following locations: Field Vehicle and Office Base 2441 Bloomington Avenue, Minneapolis, MN

Hazardous Chemical Products Inventory

Chemical	Quantity	Location	MSDS Available	Container labels	
				Identity	Hazard
Alconox/Liquinox	< 1liter	Support/decon zones			

Refer to SOP HS-107 *Hazard Communication* for more detailed information.

CHEMICAL-SPECIFIC TRAINING FORM

CH2MHILL

CHEMICAL-SPECIFIC TRAINING FORM

Location:	Project # : 336752
HCC:	Trainer:

TRAINING PARTICIPANTS:

NAME	SIGNATURE	NAME	SIGNATURE

REGULATED PRODUCTS/TASKS COVERED BY THIS TRAINING:

The HCC shall use the product MSDS to provide the following information concerning each product listed above.

☐ Physical and health hazards

☐ Control measures that can be used to provide protection, including appropriate work practices, emergency procedures, and personal protective equipment to be used

☐ Methods and observations used to detect the presence or release of the regulated product in the workplace, including periodic monitoring, continuous monitoring devices, visual appearance or odor of regulated product when being released, and so on

Training participants shall have the opportunity to ask questions concerning these products and, upon completion of this training, will understand the product hazards and appropriate control measures available for their protection.

Copies of MSDSs, chemical inventories, and CH2M HILL's written hazard communication program shall be made available for employee review in the facility/project hazard communication file.

Emergency Contacts Page

24-Hour CH2M HILL Emergency Beeper – 888/444-1226

Medical Emergency – 911

CH2M HILL Medical Consultant
Dr. Jerry Burke
Health Resources
600 West Cumming Park
Suite 3400
Woburn, MA 01801-6350
800-350-4511
(After hours calls will be returned within 20 minutes)

Fire/Spill Emergency – 911
Local Fire Dept General Information #: 612-673-2890

CHEMTREC 1-800-424-9300

Security & Police – 911
Local Police Non-Emergency #: 612-348-2345

Corporate Director Health and Safety
Name: Jerry Lyle/BOI
Phone: 208-345-5314
24-hour emergency beeper: 888-444-1226

Utilities Emergency
Water: 612-673-5600

Gas: 612-372-5050 (Minnegasco/Center Point Energy)

800-895-2999 (Xcel Energy)

Electric: 800-895-1999 (Xcel Energy)

Health and Safety Manager (HSM)
Name: Steve Beck/MKE
Phone: (414) 272-2426 ext. 277
Cell: (414) 526-4517

Safety Coordinator (SC)
Name: Corey Wilcox
Phone: 414-272-1052

Regional Human Resources Department
Name: Cindy Bauder/WDC
Phone: 703/471-6405

Project Manager
Name: Jeff Keiser
Phone: 414-272-1052

Corporate Human Resources Department
Name: Pete Hannon/DEN
Phone: 303/771-0900

Federal Express Dangerous Goods Shipping
Phone: 800/238-5355

CH2M HILL Emergency Number for Shipping Dangerous Goods
Phone: 800/255-3924

Worker's Compensation:
Contact Regional Human Resources Dept. to have an Incident Report Form (IRF) completed. After hours contact Julie Zimmerman after hours: 303/664-3304

Automobile Accidents:
Rental: Carol Dietz/COR
1-303/713-2757
CH2M HILL owned: Zurich Insurance Co.
1-800/987-3373

Facility Alarms: None

Evacuation Assembly Area(s): Field Vehicle

Hospital

Hospital Name/Address:
Abbott Northwestern Hospital, 800 East 28th Street, Minneapolis

Hospital Phone #:
(612) 863-4000

Directions to Hospital

From the east on I-94
Exit I-94 at Cedar Avenue (Exit 234C), turn left. Follow Cedar Avenue (Cedar veers to the right at the traffic lights) to East 26th Street and turn right. If visiting the Heart Hospital or main hospital, take 26th Street to Chicago Avenue and turn left. Proceed to East 28th Street and turn left. Turn left again onto the hospital campus.

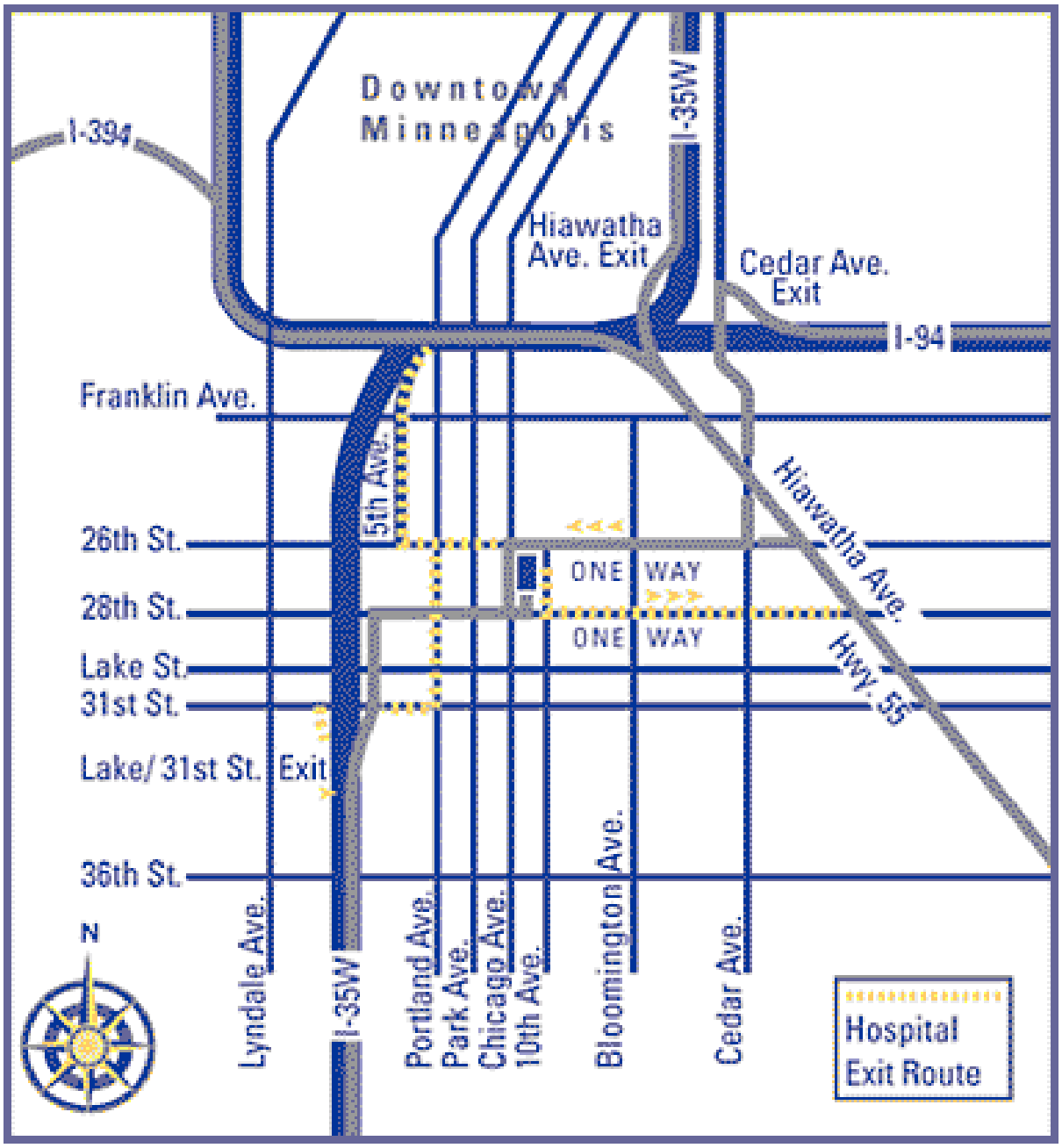
From the northwest on I-94
Exit I-94 at the Hiawatha/Highway 55 Exit (Exit 234A). Follow Hiawatha/Highway 55 to East 26th Street. Turn right onto 26th Street. If visiting the Heart Hospital or main hospital, take 26th Street to Chicago Avenue and turn left. Proceed to East 28th Street and turn left. Turn left again onto the hospital campus.

From the west on I-394
Follow I-394 to I-94 East (Exit 8B). Exit I-94 at the Hiawatha/Highway 55 Exit (Exit 234A). Follow Hiawatha/Highway 55 to East 26th Street. Turn right onto 26th Street. If visiting the Heart Hospital or main hospital, take 26th Street to Chicago Avenue and turn left. Proceed to East 28th Street and turn left. Turn left again onto the hospital campus.

From the north on I-35W
Exit I-35W at the Hiawatha/Highway 55 Exit (Exit 17A). Follow Hiawatha/Highway 55 to East 26th Street. Turn right onto 26th Street. If visiting the Heart Hospital or main hospital, take 26th Street to Chicago Avenue and turn left. Proceed to East 28th Street and turn left. Turn left again onto the hospital campus.

From the south on I-35W
Exit I-35W at the 31st Street/Lake Street Exit (Exit 15). Proceed north on the frontage road (which is South 2nd Avenue). Turn right onto East 28th Street and proceed to Chicago Avenue. If visiting the Heart Hospital or main hospital, cross Chicago Avenue and immediately turn left onto the hospital campus.

From the southeast on Hiawatha/Highway 55
Turn left off Hiawatha/Highway 55 onto East 26th Street. If visiting the Heart Hospital or main hospital, follow 26th Street to Chicago Avenue, turn left. Proceed to East 28th Street and turn left. Turn left again onto the hospital campus.


Downtown Minneapolis
I-394
I-35W
Hiawatha Ave. Exit
Cedar Ave. Exit
I-94
Franklin Ave.
5th Ave.
26th St.
28th St.
Lake St.
31st St.
Lake/ 31st St. Exit
36th St.
ONE WAY
ONE WAY
Hiawatha Ave.
Hwy. 55
N
Lyndale Ave.
I-35W
Portland Ave.
Park Ave.
Chicago Ave.
10th Ave.
Bloomington Ave.
Cedar Ave.
Hospital Exit Route

CH2MHILL

Health and Safety Plan

Attachment 5

Project H&S Forms and Permits

CH2MHILL

Attachment 5: Arsenic Fact Sheet

Arsenic
Standard of Practice HSE-501

Arsenic Fact Sheet

Uses and Occurrences

The manufacture and transportation of arsenic compounds; use in the manufacture of herbicide, pesticide, fungicides, and defoliants; use in the manufacture and handling of calcium arsenate; use in the manufacture of electrical semiconductors, diodes, and solar batteries; as an additive for food and drinking water for animals; use as a preharvest desiccant, sugarcane ripener, soil sterilant, or for timber thinning; use as a bronzing or decolorizing addition in glass manufacturing; use in the production of opal glass and enamels; use as an addition to alloys to increase hardening and heat resistance; during smelting of ores; during the cleanup of soil contaminated with arsenic; military applications; and general handling, storage, and use of arsenic.

Physical Characteristics

Appearance:	Gray metal or white powder
Odor:	Garlic-like when heated
Flammable:	None
Flash Point:	None
Flammable Range:	None
Specific gravity:	5.73 for arsenic metal, 2.16 for arsenic trioxide
Stability:	Stable
Incompatibilities:	Heat, hydrogen gas, and oxidizing agents
Melting Point:	Sublimes at 613^{o}C; -8.5^{o}C for arsenic trioxide
Boiling Point:	Sublimes at 613^{o}C; 130^{o}C for arsenic trioxide

Signs and Symptoms of Exposure

Short term (Acute):	Nausea, vomiting, diarrhea, weakness, loss of appetite, cough, chest pain, giddiness, headache, and breathing difficulty.
Long term (Chronic):	Numbness and weakness in the legs and feet, skin and eye irritation, hyperpigmentation, thickening of palms and soles (hyperkeratosis), contact dermatitis, skin sensitization, warts, ulceration and perforation of the nasal septum

Modes of Exposure

Inhalation:	Dusts and Vapors
Absorption:	Liquid
Ingestion:	Dusts and Liquid

Exposure Limits

Action level	5 $\mu g/m^3$
PEL	10 $\mu g/m^3$
STEL	None
TLV	10 $\mu g/m^3$

Exposure Level vs. Regulatory Requirements

EXPOSURE LEVEL (EL)	REGULATORY REQUIREMENTS
EL < AL	Maintain exposure as low as reasonably achievable
AL > EL, EL < PEL	Implement portions of the OSHA Arsenic standard and Training
EL > PEL	Implement all portions of the OSHA Arsenic Standard including training, medical surveillance, engineering controls, establishment of work areas, etc.

PPE

Eye:	Safety Glasses; contact lenses should **not** be worn
Skin:	Chemical protective gloves and body protection
Respiratory:	Air purifying respirators and supplied air respirators, depending on the exposure

First Aid

Inhalation:	Move to fresh air; seek medical attention promptly
Skin:	Quick drenching with water; wash skin with soap and water; seek medical attention promptly
Eyes	Flush with water for 15 minutes, lifting the lower and upper lids occasionally; seek medical attention promptly
Ingestion:	Seek medical attention promptly

Vaccination Declination

The Occupational Safety and Health Administration requires the following declination form to be signed in the event an employee declines a vaccination.

“I understand that due to my occupational exposure, I may be at risk of acquiring _____ infection. I have been given the opportunity to be vaccinated with the _____ vaccine, at no charge to myself. However, I decline _____ vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring _____, a serious disease. If, in the future, I continue to have occupational exposure to _____or other potentially infectious materials and I want to be vaccinated with _____ vaccine, I can receive the vaccination series at no charge to me.”

“I have been provided with and have read the Vaccine Factsheet that discusses the pros and cons of the LYMErix™ (Lyme disease vaccine), Hepatitis A and Hepatitis B vaccinations.”

Print Name: _____ Employee Number: _____

Signed: _____ Date: _____

Project Activity Self-Assessment Checklists

CH2MHILL

H&S Self-Assessment Checklist-Arsenic

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project's HSP/FSI.

This checklist is to be used at the following locations: 1) where CH2M HILL employees are exposed to arsenic, or 2) CH2M HILL provides oversight of subcontractor personnel who are exposed to arsenic.

The SSC or DSC may consult with subcontractors when completing this checklist, but shall not direct the means and methods of arsenic operations nor direct the details of corrective actions. Subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately, or all exposed personnel shall be removed from the hazard until corrected.

Completed checklists shall be sent to the HS&E Staff for review.

Project Name: _____ Project No.: _____

Location: _____ PM: _____

Auditor: _____ Title: _____ Date: _____

This specific checklist has been completed to:

☐ Evaluate CH2M HILL employee exposure to arsenic hazards
☐ Evaluate a CH2M HILL subcontractor's compliance with the arsenic standard and its requirements
Subcontractors Name: _____

- Check "Yes" if an assessment item is complete/correct.
- Check "No" if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the subcontractor. Section 3 must be completed for all items checked "No."
- Check "N/A" if an item is not applicable.
- Check "N/O" if an item is applicable but was not observed during the assessment.

Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HS-65.

SECTION 1

	Yes	No	N/A	N/O
PERSONNEL SAFE WORK PRACTICES (3.1)				
1. Areas that exceed the PEL have been designated as regulated areas	☐	☐	☐	☐
2. Personnel meet medical and training requirements	☐	☐	☐	☐
3. No eating, drink, and/or smoking are allowed in the regulated areas.	☐	☐	☐	☐
4. Warning signs have been posted at all entrances to the regulated areas	☐	☐	☐	☐
5. Selection of PPE is based on most relevant exposure monitoring data	☐	☐	☐	☐
6. Personnel working near arsenic-contaminated soil or material shall use wet methods and work practices to control dust; wear disposable coveralls and exercise personal hygiene practices	☐	☐	☐	☐
7. Contact lenses are not worn when working with arsenic	☐	☐	☐	☐

SECTION 2	Yes	No	N/A	N/O
EXPOSURE ASSESSMENTS (3.2.2)				
8. Initial air monitoring conducted over full shift for each job classification.	☐	☐	☐	☐
9. Air sampling conducted every six months when exposure limit (EL) ≥ AL but < PEL	☐	☐	☐	☐
10. Air sampling of employees conducted quarterly when EL ≥ PEL.	☐	☐	☐	☐
11. Additional air monitoring has been collected when there are any changes in operation	☐	☐	☐	☐
COMMUNICATION OF HAZARDS (3.2.3)				
12 Training on the Hazard Communication Standard has been met.				
13 CH2M HILL personnel have completed the Arsenic Training Module	☐	☐	☐	☐
13. Training on the Fact Sheet, HSP/FSI and OSHA standard has been met.				
14. Employees have been informed of air monitoring results within 5 days after receipt of results.	☐	☐	☐	☐
14. Where PEL is exceeded, affected employees have been notified of results and control measures to be utilized to reduce exposure below the PEL.	☐	☐	☐	☐
15. Storage or shipping containers have been properly labeled	☐	☐	☐	☐
16. Written compliance program is available to all affected employees	☐	☐	☐	☐
CONTROL METHODS (3.2.4)				
17. Engineering controls and work practices have been utilized to reduce exposures below the PEL.	☐	☐	☐	☐
18. When controls are unable to reduce exposures below the PEL, respiratory protection is utilized.	☐	☐	☐	☐
19. Regulated areas have been established and demarcated where exposures exceed the PEL	☐	☐	☐	☐
20. Only authorized personnel with respiratory protection may enter regulated areas.	☐	☐	☐	☐
21. Where EL ≥ PEL, a written compliance program is implemented prior to commencing work	☐	☐	☐	☐
22. The compliance program is based on the most recent air monitoring/sampling results.	☐	☐	☐	☐
23 The compliance program is updated for new exposure monitoring data or every six months	☐	☐	☐	☐
24. All surfaces are free of accumulation of arsenic	☐	☐	☐	☐
25. Cleaning methods minimize airborne arsenic activity	☐	☐	☐	☐
26. Where vacuuming is used, vacuums are used and emptied as to minimize airborne arsenic	☐	☐	☐	☐
27. A written housekeeping and maintenance plan is in place and maintained	☐	☐	☐	☐
28. Compressed air not used to remove arsenic from surfaces	☐	☐	☐	☐
29. Employees do not eat, drink, smoke, chew tobacco/gum, or apply cosmetics in regulated areas	☐	☐	☐	☐
30. Change areas provided where EL ≥ PEL or where employees are subject to eye or skin irritation	☐	☐	☐	☐
31. Employee not allowed to leave workplace wearing clothing worn during work shift	☐	☐	☐	☐
32. Shower facilities installed and used with cleaning agents and towels, where feasible	☐	☐	☐	☐
33. Hand washing facilities provided for use by employees prior to eating, drinking, smoking, etc.	☐	☐	☐	☐
34. Eating facilities free of arsenic provided for employees working in regulated areas	☐	☐	☐	☐
PERSONAL PROTECTIVE EQUIPMENT (3.2.5)				
23. Respirators are used in areas where EL ≥ PEL.	☐	☐	☐	☐
24. Respirator cartridges are replaced at the end of shift or service life indicator, where available	☐	☐	☐	☐
25. The selection of the appropriate respirator is based on the airborne arsenic concentration	☐	☐	☐	☐
26. PAPRs are provided to employees who request such a respirator	☐	☐	☐	☐
27. PPE is supplied at no cost to employees	☐	☐	☐	☐
28. Employee exposed to arsenic tri-chloride wear impervious clothing	☐	☐	☐	☐
29. Clean and dry protective clothing is provided weekly. Daily if EL ≥ 100 $\mu g/m^3$	☐	☐	☐	☐
30. Protective clothing is repair or replaced if found to be ineffective	☐	☐	☐	☐
31. Contaminated protective clothing is removed from change areas at the end of the shift	☐	☐	☐	☐
32. All clothing requiring laundering is packaged in sealed, labeled containers	☐	☐	☐	☐
33. Personnel or vendors who launder contaminated clothing are formally informed of the hazards	☐	☐	☐	☐

SECTION 3

Complete this section for all items checked "No" in Sections 1 or 2. Deficient items must be corrected in a timely manner.

Item #	Corrective Action Planned/Taken	Date Corrected

Auditor: _____ Project Manager: _____

CH2MHILL

HS&E Self-Assessment Checklist - DRILLING

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project's written safety plan.

This checklist is to be used at locations where: 1) CH2M HILL employees are potentially exposed to drilling hazards, 2) CH2M HILL staff are providing support function related to drilling activities, and/or 3) CH2M HILL oversight of a drilling subcontractor is required.

Safety Coordinator may consult with drilling subcontractors when completing this checklist, but shall not direct the means and methods of drilling operations nor direct the details of corrective actions. Drilling subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately, or all exposed personnel shall be removed from the hazard until corrected.

Project Name: _____ Project No.: _____

Location: _____ PM: _____

Auditor: _____ Title: _____ Date: _____

This specific checklist has been completed to:

☐ Evaluate CH2M HILL employee exposures to drilling hazards (complete Section 1).
☐ Evaluate CH2M HILL support functions related to drilling activities (complete Section 2)
☐ Evaluate a CH2M HILL subcontractor's compliance with drilling safety requirements (complete entire checklist).
Subcontractors Name: _____

- Check "Yes" if an assessment item is complete/correct.
- Check "No" if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the drilling subcontractor. Section 3 must be completed for all items checked "No."
- Check "N/A" if an item is not applicable.
- Check "N/O" if an item is applicable but was not observed during the assessment.

Numbers in parentheses indicate where a description of this assessment item can be found in SOP HSE-35.

SECTION 1 - SAFE WORK PRACTICES (4.1)

		Yes	No	N/A	N/O
1.	Personnel cleared during rig startup	☐	☐	☐	☐
2.	Personnel clear of rotating parts	☐	☐	☐	☐
3.	Personnel not positioned under hoisted loads	☐	☐	☐	☐
4.	Loose clothing and jewelry removed	☐	☐	☐	☐
5.	Smoking is prohibited around drilling operation	☐	☐	☐	☐
6.	Personnel wearing appropriate personal protective equipment (PPE), per written plan	☐	☐	☐	☐
7.	Personnel instructed not to approach equipment that has become electrically energized	☐	☐	☐	☐

SECTION 2 - SUPPORT FUNCTIONS (4.2)

FORMS/PERMITS (4.2.1)

8.	Driller license/certification obtained	☐	☐	☐	☐
9.	Well development/abandonment notifications and logs submitted and in project files	☐	☐	☐	☐
10.	Water withdrawal permit obtained, where required	☐	☐	☐	☐
11.	Dig permit obtained, where required	☐	☐	☐	☐

UTILITY LOCATING (4.2.2)				
12. Location of underground utilities and structures identified	☐	☐	☐	☐

SECTION 2 (Continued)

	Yes	No	N/A	N/O
WASTE MANAGEMENT (4.2.3)				
13. Drill cuttings and purge water managed and disposed properly	☐	☐	☐	☐
DRILLING AT HAZARDOUS WASTE SITES (4.2.4)				
14. Waste disposed of according to project's written safety plan	☐	☐	☐	☐
15. Appropriate decontamination procedures being followed, per project's written safety plan	☐	☐	☐	☐
DRILLING AT ORDNANCE EXPLOSIVES (OE)/UNEXPLODED ORDNANCE (UXO) SITES (4.2.5)				
16. OE plan prepared and approved	☐	☐	☐	☐
17. OE/UXO avoidance provided, routes and boundaries cleared and marked	☐	☐	☐	☐
18. Initial pilot hole established by UXO technician with hand auger	☐	☐	☐	☐
19. Personnel remain inside cleared areas	☐	☐	☐	☐
SECTION 3 - DRILLING SAFETY REQUIREMENTS (4.3)				
GENERAL (4.3.1)				
20. Only authorized personnel operating drill rigs	☐	☐	☐	☐
21. Daily safety briefing/meeting conducted with crew	☐	☐	☐	☐
22. Daily inspection of drill rig and equipment conducted before use	☐	☐	☐	☐
DRILL RIG PLACEMENT (4.3.2)				
23. Location of underground utilities and structures identified	☐	☐	☐	☐
24. Safe clearance distance maintained from overhead power lines	☐	☐	☐	☐
25. Drilling pad established, when necessary	☐	☐	☐	☐
26. Drill rig leveled and stabilized	☐	☐	☐	☐
27. Additional precautions taken when drilling in confined areas	☐	☐	☐	☐
DRILL RIG TRAVEL (4.3.3)				
28. Rig shut down and mast lowered and secured prior to rig movement	☐	☐	☐	☐
29. Tools and equipment secured prior to rig movement	☐	☐	☐	☐
30. Only personnel seated in cab are riding on rig during movement	☐	☐	☐	☐
31. Safe clearance distance maintained while traveling under overhead power lines	☐	☐	☐	☐
32. Backup alarm or spotter used when backing rig	☐	☐	☐	☐
DRILL RIG OPERATION (4.3.4)				
33. Kill switch clearly identified and operational	☐	☐	☐	☐
34. All machine guards are in place	☐	☐	☐	☐
35. Rig ropes not wrapped around body parts	☐	☐	☐	☐
36. Pressurized lines and hoses secured from whipping hazards	☐	☐	☐	☐
37. Drill operation stopped during inclement weather	☐	☐	☐	☐
38. Air monitoring conducted per written safety plan for hazardous atmospheres	☐	☐	☐	☐
39. Rig placed in neutral when operator not at controls	☐	☐	☐	☐
DRILL RIG SITE CLOSURE (4.3.5)				
40. Ground openings/holes filled or barricaded	☐	☐	☐	☐
41. Equipment and tools properly stored	☐	☐	☐	☐
42. All vehicles locked and keys removed	☐	☐	☐	☐
DRILL RIG MAINTENANCE (4.3.6)				
28. Defective components repaired immediately	☐	☐	☐	☐
29. Lockout/tagout procedures used prior to maintenance	☐	☐	☐	☐
30. Cathead in clean, sound condition	☐	☐	☐	☐
31. Drill rig ropes in clean, sound condition	☐	☐	☐	☐
32. Fall protection used for fall exposures of 6 feet (U.S.) 1.5 meters (Australia) or greater	☐	☐	☐	☐
33. Rig in neutral and augers stopped rotating before cleaning	☐	☐	☐	☐

34. Good housekeeping maintained on and around rig	☐	☐	☐	☐

SECTION 4

Complete this section for all items checked “No” in previous sections. Deficient items must be corrected in a timely manner.

Item #	**Corrective Action Planned/Taken**	**Date Corrected**

Auditor: _____ Project Manager: _____

Applicable Material Safety Data Sheets

ALCONOX®

1. Product Identification

Synonyms: Proprietary blend of sodium linear alkylaryl sulfonate, alcohol sulfate, phosphates, and carbonates.
CAS No.: Not applicable.
Molecular Weight: Not applicable to mixtures.
Chemical Formula: Not applicable to mixtures.
Product Codes: A461

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Alconox® proprietary detergent mixture	N/A	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

CAUTION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO EYES AND RESPIRATORY TRACT.

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

Health Rating: 1 - Slight
Flammability Rating: 0 - None
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES; LAB COAT
Storage Color Code: Orange (General Storage)

Potential Health Effects

Inhalation:
May cause irritation to the respiratory tract. Symptoms may include coughing and shortness of breath.
Ingestion:
May cause irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea.
Skin Contact:
No adverse effects expected.
Eye Contact:

May cause irritation, redness and pain.
Chronic Exposure:
No information found.
Aggravation of Pre-existing Conditions:
No information found.

4. First Aid Measures

Inhalation:
Remove to fresh air. Get medical attention for any breathing difficulty.
Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Wash exposed area with soap and water. Get medical advice if irritation develops.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:
Not expected to be a fire hazard.
Explosion:
No information found.
Fire Extinguishing Media:
Dry chemical, foam, water or carbon dioxide.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust. When mixed with water, material foams profusely. Small amounts of residue may be flushed to sewer with plenty of water.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Moisture may cause material to cake. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
- OSHA Permissible Exposure Limit (PEL):
15 mg/m3 total dust, 5 mg/m3 respirable fraction for nuisance dusts.
- ACGIH Threshold Limit Value (TLV):
10 mg/m3 total dust containing no asbestos and < 1% crystalline silica for Particulates Not Otherwise Classified (PNOC).

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, a half-face dust/mist respirator may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece dust/mist respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear protective gloves and clean body-covering clothing.

Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
White powder interspersed with cream colored flakes.

Odor:
No information found.

Solubility:
Moderate (1-10%)

Specific Gravity:
No information found.

pH:
No information found.

% Volatiles by volume @ 21C (70F):
0

Boiling Point:
No information found.

Melting Point:
No information found.

Vapor Density (Air=1):

No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
No information found.
Conditions to Avoid:
No information found.

11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure.

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

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Alconox®	No	No	None
proprietary detergent mixture			

12. Ecological Information

Environmental Fate:
This product is biodegradable.
Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

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

Ingredient	TSCA	EC	Japan	Australia
Alconox® proprietary detergent mixture	Yes	No	No	No

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

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Alconox® proprietary detergent mixture	No	No	Yes	No

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

Ingredient	-SARA 302- RQ	TPQ	------SARA 313----- List	Chemical Catg.
Alconox® proprietary detergent mixture	No	No	No	No

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

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Alconox® proprietary detergent mixture	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: No Fire: No Pressure: No
Reactivity: No (Pure / Solid)

16. Other Information

NFPA Ratings: Health: **0** Flammability: **0** Reactivity: **0**

Label Hazard Warning:

CAUTION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO EYES AND RESPIRATORY TRACT.

Label Precautions:

Avoid contact with eyes.
Keep container closed.
Use with adequate ventilation.
Avoid breathing dust.
Wash thoroughly after handling.

Label First Aid:

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes. In all cases, get medical attention.

Product Use:

Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 1, 2, 3, 4, 5, 6, 7, 8, 9,

10, 11, 12, 15, 16.

Disclaimer:

****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

SINCLAIR OIL -- GASOLINE - GASOLINE,UNLEADED
MATERIAL SAFETY DATA SHEET
NSN: 9130012720983
Manufacturer's CAGE: 2X948
Part No. Indicator: A
Part Number/Trade Name: GASOLINE

==========

General Information

==========

Item Name: GASOLINE,UNLEADED
Company's Name: SINCLAIR OIL CORP
Company's Street: 550 E SOUTH TEMPLE
Company's P. O. Box: 30825
Company's City: SALT LAKE CITY
Company's State: UT
Company's Country: US
Company's Zip Code: 84130-0825
Company's Emergency Ph #: 801-524-2700/800-424-9300(CHEMTREC)
Company's Info Ph #: 801-524-2853/307-324-3404 MEDICAL
Record No. For Safety Entry: 037
Tot Safety Entries This Stk#: 072
Status: SE
Date MSDS Prepared: 01JAN92
Safety Data Review Date: 04DEC92
Supply Item Manager: KY
MSDS Serial Number: BPKZJ
Hazard Characteristic Code: F2
Unit Of Issue: GL

==========

Ingredients/Identity Information

==========

Proprietary: NO
Ingredient: CYCLOHEXANE (SARA III)
Ingredient Sequence Number: 01
Percent: 0.9-1.8
NIOSH (RTECS) Number: GU6300000
CAS Number: 110-82-7
OSHA PEL: 300 PPM
ACGIH TLV: 300 PPM, 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: BENZENE (SARA III)
Ingredient Sequence Number: 02
Percent: 0.8-4.8
NIOSH (RTECS) Number: CY1400000
CAS Number: 71-43-2
OSHA PEL: 1PPM/5STEL;1910.1028
ACGIH TLV: 10 PPM; A2; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: TOLUENE (SARA III)
Ingredient Sequence Number: 03
Percent: 6.6-7.8
NIOSH (RTECS) Number: XS5250000
CAS Number: 108-88-3
OSHA PEL: 200 PPM/150 STEL
ACGIH TLV: 50 PPM; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: XYLENES (O-,M-,P- ISOMERS) (SARA III)
Ingredient Sequence Number: 04
Percent: 6- 10.4
NIOSH (RTECS) Number: ZE2100000
CAS Number: 1330-20-7
OSHA PEL: 100 PPM/150 STEL
ACGIH TLV: 100 PPM/150STEL;9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: NAPHTHALENE (SARA III)
Ingredient Sequence Number: 05
Percent: 0.1-1.2
NIOSH (RTECS) Number: QJ0525000
CAS Number: 91-20-3
OSHA PEL: 10 PPM/15 STEL
ACGIH TLV: 10 PPM/15 STEL; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: METHYL TERT-BUTYL ETHER (SARA III)
Ingredient Sequence Number: 06
Percent: 0 - 15
NIOSH (RTECS) Number: KN5250000
CAS Number: 1634-04-4
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: ETHYL ALCOHOL (ETHANOL)
Ingredient Sequence Number: 07
Percent: 0 - 10
NIOSH (RTECS) Number: KQ6300000
CAS Number: 64-17-5
OSHA PEL: 1000 PPM
ACGIH TLV: 1000 PPM; 9293
Other Recommended Limit: NONE RECOMMENDED

==========
Physical/Chemical Characteristics
==========
Appearance And Odor: CLEAR, BRONZE, RED OR PURPLE COLOR LIQUID - STRONG HYDROCARBON ODOR
Boiling Point: UNKNOWN
Melting Point: <-76F,<-60C
Vapor Pressure (MM Hg/70 F): 466 - 776
Specific Gravity: 0.7
Decomposition Temperature: UNKNOWN
Solubility In Water: NEGLIGIBLE
Corrosion Rate (IPY): UNKNOWN
Autoignition Temperature: >500F

==========

Fire and Explosion Hazard Data

==========

Flash Point: -45F,-43C
Lower Explosive Limit: 1.4%
Upper Explosive Limit: 7.6%
Extinguishing Media: USE WATER FOG, CARBON DIOXIDE, FOAM, DRY CHEMICAL OR HALON. WATER MAY BE INEFFECTIVE.
Special Fire Fighting Proc: WEAR FIRE FIGHTING PROTECTIVE EQUIPMENT & A FULL FACED SELF CONTAINED BREATHING APPARATUS/SUPPLIED-AIR RESPIRATOR.COOL FIRE EXPOSED CONTAINERS WITH WATER SPRAY.
Unusual Fire And Expl Hazards: EXTREMELY FLAMMABLE LIQUID. VAPOR ACCUMULATION COULD FLASH AND/OR EXPLODE IF IT COMES IN CONTACT WITH OPEN FLAME.

==========

Reactivity Data

==========

Stability: YES
Cond To Avoid (Stability): HEAT, SPARKS, OPEN FLAMES, STATIC ELECTRICITY AND OTHER SOURCES OF IGNITION
Materials To Avoid: STRONG OXIDIZING AGENTS, HALOGENS, STRONG ACIDS, ALKALIES
Hazardous Decomp Products: CARBON MONOXIDE, CARBON DIOXIDE
Hazardous Poly Occur: NO

==========

Health Hazard Data

==========

LD50-LC50 Mixture: ORAL LD50 (RAT) IS UNKNOWN
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: ACUTE/CHRONIC-HIGH VAPOR CONCENTRATIONS ARE IRRITATING TO THE EYES & THE RESPIRATORY TRACT.MAY CAUSE DIZZINESS, HEADACHE,ARE ANESTHETIC,MAY CAUSE UNCONSCIOUSNESS.PROLONGED/REPEATED LIQUID CONTACT WITH SKIN WILL DRY & DEFAT SKIN,LEADING TO IRRITATION & DERMATITIS. CONTAINS BENZENE WHICH CAUSES BLOOD DISEASE,LEUKEMIA.
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: YES
Explanation Carcinogenicity: CONTAINS BENZENE.MAY CAUSE BLOOD DISEASES INCLUDING LEUKEMIA.VAPORS MAY CAUSE KIDNEY CANCER IN MALE RATS.
Signs/Symptoms Of Overexp: HIGH VAPOR CONCENTRATIONS ARE IRRITATING TO THE EYES & THE RESPIRATORY TRACT. MAY CAUSE DIZZINESS, HEADACHE, ARE ANESTHETIC, MAY CAUSE UNCONSCIOUSNESS & EVEN DEATH. PROLONGED/REPEATED LIQUID CONTACT WITH SKIN WILL DRY & DEFAT SKIN, LEADING TO IRRITATION & DERMATITIS. CONTAINS BENZENE WHICH CAUSES BLOOD DISEASE,LEUKEMIA
Med Cond Aggravated By Exp: BENZENE-INDIVIDUALS WITH LIVER DISEASE MAY BE MORE SUSCEPTIBLE TO TOXIC EFFECTS.HEXANE-INDIVIDUALS WITH NEUROLOGICAL DISEASE SHOULD AVOID EXPOSURE.PETROLEUM SOLVENT-THOSE WITH EXISTING DERMATITIS.
Emergency/First Aid Proc: CALL A PHYSICIAN IN ALL CASES.EYES: IMMEDIATELY FLUSH WITH WATER FOR 15 MINUTES,HOLDING EYELIDS OPEN.SKIN:WASH WITH SOAP & WATER.INHALED:REMOVE TO FRESH AIR & PROVIDE CPR/OXYGEN IF NECESSARY.ORAL:DO NOT INDUCE VOMITING.CALL A PHYSICIAN IMMEDIATELY.

==========
Precautions for Safe Handling and Use
==========
Steps If Matl Released/Spill: WEAR PROTECTIVE EQUIPMENTS.ELIMINATE ALL SOURCES OF IGNITION.USE EXPLOSION-PROOF TOOLS.SHUT OFF FUEL SOURCE.DIKE SPILL.PREVENT LIQUID FROM ENTERING SEWERS/WATERWAYS.RECOVER FREE LIQUID.ADD SAND,EARTH OR OTHER ABSORBENT MATERIAL.TRANSFER TO CONTAINER.
Neutralizing Agent: NOT APPLICABLE
Waste Disposal Method: TREATMENT, STORAGE, TRANSPORTATION AND DISPOSAL MUST BE IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS.
Precautions-Handling/Storing: STORAGE-STORE IN ACCORDANCE WITH NATIONAL FIRE PROTECTION ASSOCIATION REGULATIONS.KEEP CONTAINERS CLOSED.
Other Precautions: "EMPTY" CONTAINERS RETAIN RESIDUE AND CAN BE DANGEROUS. DO NOT PRESSURIZE,CUT,WELD,BRAZE,SOLDER,DRILL,GRIND OR EXPOSE SUCH CONTAINERS TO HEAT,FLAME,SPARKS.THEY MAY EXPLODE AND CAUSE INJURY/DEATH. AVOID REPEATED OR PROLONGED CONTACT WITH SKIN.
==========
Control Measures
==========
Respiratory Protection: NIOSH-APPROVED SELF-CONTAINED BREATHING APPARATUS OR ORGANIC VAPOR RESPIRATOR OR SUPPLIED-AIR RESPIRATOR, IF NEEDED.
Ventilation: LOCAL/MECHANICAL (GENERAL) VENTILATION - EXPLOSION PROOF, WELL GROUNDED EQUIPMENTS
Protective Gloves: RUBBER
Eye Protection: CHEMICAL SPLASH GOGGLES & FACE SHIELD
Other Protective Equipment: IMPERVIOUS CLOTHING TO AVOID SKIN AND EYE CONTACT. EYE WASH STATION & SAFETY SHOWER.
Work Hygienic Practices: AVOID CONTACT WITH EYES, SKIN OR CLOTHING. WASH HANDS AFTER USING PRODUCT. AVOID BREATHING VAPORS OR MISTS.
==========
Transportation Data
==========
Trans Data Review Date: 92339
DOT PSN Code: GTN
DOT Proper Shipping Name: GASOLINE
DOT Class: 3
DOT ID Number: UN1203
DOT Pack Group: II
DOT Label: FLAMMABLE LIQUID
IMO PSN Code: HRV
IMO Proper Shipping Name: GASOLINE
IMO Regulations Page Number: 3141
IMO UN Number: 1203
IMO UN Class: 3.1
IMO Subsidiary Risk Label: -
IATA PSN Code: RMF
IATA UN ID Number: 1203
IATA Proper Shipping Name: MOTOR SPIRIT
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
AFI PSN Code: MUC
AFI Prop. Shipping Name: GASOLINE
AFI Class: 3
AFI ID Number: UN1203
AFI Pack Group: II
AFI Label: FLAMMABLE LIQUID
AFI Basic Pac Ref: 7-7

==========

Disposal Data

==========

==========

Label Data

Label Required: YES
Technical Review Date: 04DEC92
MFR Label Number: UNKNOWN
Label Status: F
Common Name: GASOLINE
Signal Word: DANGER!
Acute Health Hazard-Severe: X
Contact Hazard-Severe: X
Fire Hazard-Severe: X
Reactivity Hazard-None: X
Special Hazard Precautions: ACUTE/CHRONIC-HIGH VAPOR CONCENTRATIONS ARE IRRITATING TO THE EYES & THE RESPIRATORY TRACT.MAY CAUSE DIZZINESS, HEADACHE,ARE ANESTHETIC,MAY CAUSE UNCONSCIOUSNESS.PROLONGED/REPEATED LIQUID CONTACT WITH SKIN WILL DRY & DEFAT SKIN,LEADING TO IRRITATION & DERMATITIS. CONTAINS BENZENE WHICH CAUSES BLOOD DISEASE,LEUKEMIA.STORAGE-STORE IN ACCORDANCE WITH NATIONAL FIRE PROTECTION ASSOCIATION REGULATIONS.FIRST AID-CALL A PHYSICIAN IN ALL CASES.EYES:IMMEDIATELY FLUSH WITH WATER FOR 15 MINUTES,HOLDING EYELIDS OPEN.SKIN:WASH WITH SOAP & WATER.INHALED:REMOVE TO FRESH AIR & PROVIDE CPR/OXYGEN IF NEEDED.ORAL:DO NOT INDUCE VOMITING.CALL A PHYSICIAN IMMEDIATELY
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: SINCLAIR OIL CORP
Label Street: 550 E SOUTH TEMPLE
Label P.O. Box: 30825
Label City: SALT LAKE CITY
Label State: UT
Label Zip Code: 84130-0825
Label Country: US
Label Emergency Number: 801-524-2700/800-424-9300(CHEMTREC)

==========

Biological Fact Sheets

Poison Oak (Ivy and Sumac too)

Reaction to Poison Oak is an allergic response and ranges from no reaction to a severe “rhus” dermatitis. Rhus is the class of poisonous plants which also includes poison ivy and poison sumac, mango, and other urushiol containing plants. 3 of 4 people will develop dermatitis on contact with urushiol.

Shrubs are usually 12" to 30" high, or a tree-climbing vine, with triple leaflets and short, smooth hair underneath. A project site in Portland had 8’ tall poison oak bushes. Early berries are fuzzy and white; later, dun-colored. Plants are red and dark green in Spring and Summer, with yellowing leaves anytime especially in dry areas. Leaves may achieve bright reds in Fall, but the plant loses its (yellowed, then brown) leaves in Winter, leaving toxic stems. All parts of the plant remain toxic throughout the seasons.

Spring Growth

Summer Colors

Fall Colors

Primary contamination results from contact with bruised or broken plant parts that release "toxicodendrol", an oily resin containing the toxic chemical "urushiol".

Poison Ivy

Poison Sumac

Poison Oak

Exposure to Poison Oak is Preventable

Exposure to poison oak often becomes an OSHA recordable illness. The dermatitis is so severe that many people seek medical care and get prescription cortisone creams to reduce the suffering caused by the itch.

Exposure to Poison Oak is not an unavoidable part of working outdoors!

1. Identify Poison Oak – The best way to prevent exposure is to recognize the plant and avoid working in areas where poison oak is present.

2. If you must work in areas with poison oak, contact you project manager and health and safety manager to determine the best procedures to prevent contamination.

3. Contamination with poison oak can happen through several pathways. These include

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

4. If you must work on a site with poison oak the following precautions are necessary.

   Do not drive vehicles onto the site where it will come into contact with poison oak. Vehicles which need to work in the area, such as drill rigs or heavy equipment must be washed as soon as possible after leaving the site.

   All tools used in the poison oak area, including those used to cut back poison oak, surveying instruments used in the area, air monitoring equipment or other test apparatus must be decontaminated before they are placed back into the site vehicle. If on-site decontamination is not possible, use plastic to wrap any tools or equipment until they can be decontaminated.

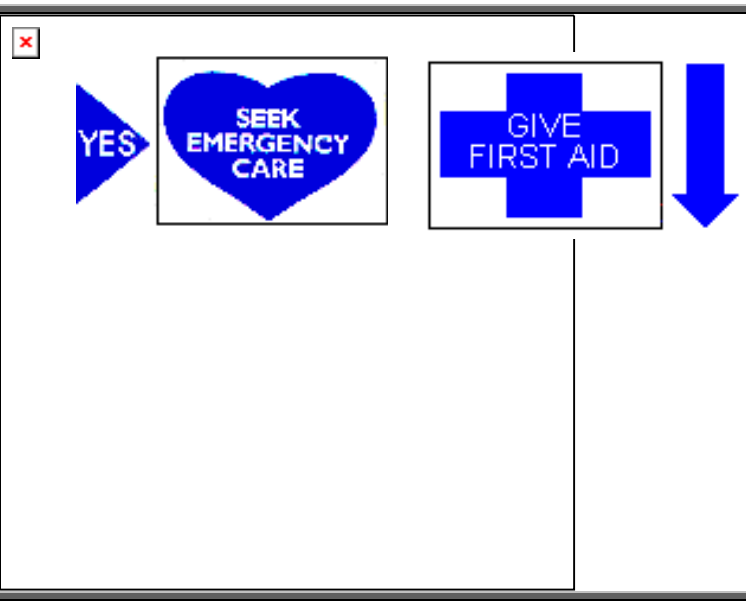
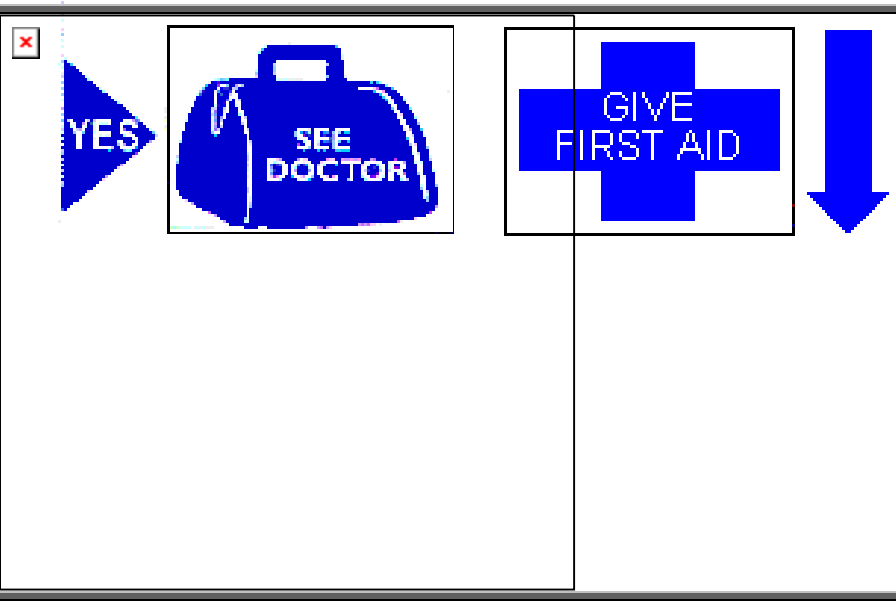
   Personal protective equipment, including tyvek coveralls, gloves, and boot covers must be worn. PPE must be placed into plastic bags and sealed if they are not disposed immediately into a trash receptacle.

   As soon as possible following the work, shower to remove any potential contamination. Any body part with suspected or actual exposure should be washed with “Tecnu” or other product designed for removing urushiol. If you do not have Tecnu wash with cold water. Do not take a bath, as the oils can form and invisible film on top of the water and contaminate your entire body upon exiting the bath.

   Tecnu may also be used to decontaminate equipment.

5. If there is exposure use the following first aid procedures, or others you may find to alleviate the pain and itch.

Poison Oak First Aid

Are there any of these problems? • Swelling in the throat, tongue and/or lips • A hard time breathing or swallowing • Weakness, dizziness • Bluish lips and mouth • Unconsciousness	
NO	Use emergency kit with adrenalin, if available, and Get Emergency Care.
Do you have any of these problems? • Skin that is very bright red. • Pus. • Rash that has spread to the mouth, eyes or genitals. • Rash on large areas of the body or the face.	
	See Doctor and Give first aid before seeing doctor: • Take a hot shower (only after rash develops), put the rash area in hot

	water or pour hot water over it. Make sure the water is not too hot to burn the skin. The hot water causes itching at first, but brings relief later. Do not use soap.
	• Take an over-the-counter antihistamine, such as Benadryl, as stated on the label.
	• For weeping blisters:
	  • Mix 2 teaspoons of baking soda in 1 quarter (4 cups) of water.
	  • Dip squares of gauze in this mixture.
	  • Cover the blisters with the wet gauze for 10 minutes, four times a day. (Do not apply this to the eyes.)

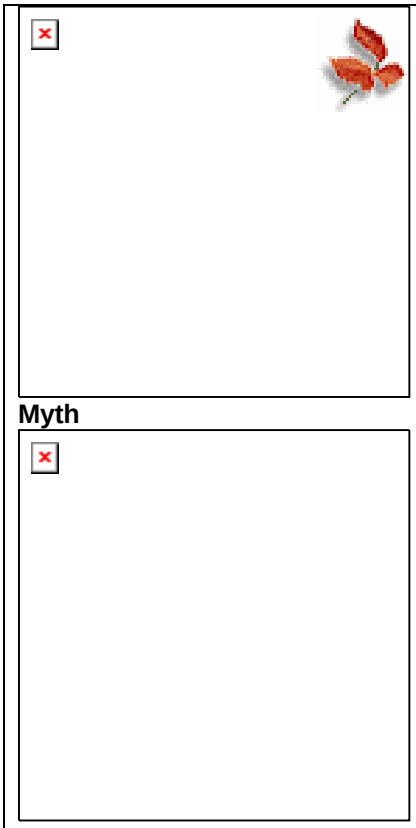
Self-Care/First Aid

- Make sure you wash all clothes and shoes with hot water and a strong soap. Also, bathe pets who have come in contact with poison ivy, oak or sumac. The sap can stay on pets for many days.
- Keep your hands away from your eyes, mouth and face.
- Do not scratch or rub the rash.
- Apply any of these to the skin rash:
- Calamine (not Caladryl) lotion
- Zinc oxide ointment
- Paste made with baking soda - mix 3 teaspoons of baking soda with 1 teaspoon of water
- Take an over-the-counter antihistamine such as Benadryl, as stated on the label
  If self-care/first aid measures don't bring relief, call your doctor.

Poison Oak Facts

Urushiol Oil is Potent

- Only 1 nanogram (billionth of a gram) needed to cause rash
- Average is 100 nanograms for most people
- 1/4 ounce of urushiol is all that is needed to cause a rash in every person on earth
- 500 people could itch from the amount covering the head of a pin
- Specimens of urushiol several centuries old have found to cause dermatitis in sensitive people.
- 1 to 5 years is normal for urushiol oil to stay active on any surface including dead plants
- Derived from **urushi**, Japanese name for lacquer

Myth .. 	**Fact**
Poison Oak is contagious	Rubbing the rashes won't spread poison ivy to other parts of your body (or to another person). You spread the rash only if **urushiol oil** -- the sticky, resinlike sugbstance that casues the rash -- has been left on your hands.
You can catch poison ivy simply by being near the plants	Direct contact is needed to release **urusiol oil**. Stay away from forest fires, direct burning, or anything else that can cause the oil to become airborne such as a lawnmower, trimmer, etc.
Leaves of three, let them be	Poison sumac has 7 to 13 leaves on a branch, although poison ivy and oak have 3 leaves per cluster
Do not worry about dead plants	**Urushiol** oil stays active on any surface, including dead plants, for up to 5 years.
Breaking the blisters releases **urushiol** oil that can spread	Not true. But your wounds can become infected and you may make the scarring worse. In very extreme cases, excessive fluid may need to be withdrawn by a doctor.

Tick-Borne Pathogens

There are 6 notable tick-borne pathogens that present a significant field hazard, and in some areas account for more than half of our serious field incidents. These procedures should be applied during any field activity – even those field efforts that are located predominantly in paved areas but with bordering vegetation.

Hazard Control

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

- Avoiding tick habitats and ceasing operations in heavily infested areas
- Reducing tick abundance through habitat disruption or the application of a pesticide
- Personal protection through the use of repellants and protective clothing
- Frequent tick inspections and proper hygiene

In most circumstances, treating persons who only have a tick bite (i.e., no signs of illness) is not recommended.

Avoidance and Reduction of Ticks

To the extent practical, tick habitats should be avoided. Stay within established paths or clearings and avoid traversing through brushy areas. In areas with significant tick infestation, consider stopping work and withdrawing until adequate tick population control can be achieved. Stopping and withdrawing should be considered as seriously as entering an area without proper energy control or with elevated airborne contaminants – tick-borne pathogens present risk of serious illness!

In areas where significant population density or infestation exists, tick reduction should be considered. Tick reduction can be achieved by (1) disrupting tick habitats and/or (2) direct population reduction through the use of non-restricted tick-toxic pesticides (e.g., Damminix, Sevin). This approach is more commonly practical in smaller, localized areas or perimeter areas that might require frequent access.

Habitat disruption may include only simple vegetative maintenance such as removing leaf litter and trimming grass and brush. Tick populations can be reduced between 72% and 100% when leaf litter alone is removed. In more heavily infested areas, habitat disruption may include grubbing, and tree trimming or removal; and direct population reduction can be achieved with non-restricted pesticide application (e.g., Damminix, Sevin). Consumer (non-restricted) pesticides can be used when use is consistent with product label requirements, application will not occur in environmentally sensitive areas, and property owner concurrence is obtained. When pesticides are used at an industrial facility provide written notification so that the facility can consider including such use in their Community Right-to-Know reports.

Habitat controls must be implemented with appropriate health and safety controls, in compliance with environmental requirements, and may be best left to the property owner, tenant, or licensed pesticide applicator. Contact your regional Environmental Compliance Coordinator (ECC) to determine if the desired area of application includes environmentally sensitive areas. Caution should be exercised when using chemical repellents or pesticides in or around areas where environmental or industrial media samples will be collected.

Personal Protection

After other prevention and controls are implemented, personal protection is still necessary in controlling exposure to ticks. Personal protection must include all of the following steps:

- So that ticks may be seen on your clothing, wear light-colored clothing. Full-body New Tyvek® (paper-like disposable coveralls) may also be used; worn entirely or up to one's waist.
- To prevent ticks from getting underneath clothing, tuck pant legs into socks or tape to boots.
- Consider using hip waders (even treated with Fluon) in heavily infested areas.
- Wear lightweight long-sleeved shirts, a hat, and high boots. Tie back long hair.
- A 0.5% formulation of permethrin (applied to clothes) *is the most effective product available in controlling ticks* (this is the same product used in strengths of 1% to 5% to control head lice). Apply permethrin repellent/insecticide to the outside of boots and clothing before wearing, per product label. Consider applying to work-only cotton coveralls or disposal coveralls (e.g., New or QC Tyvek®).

Personal Protection (Continued)

- Apply DEET repellent to exposed skin or clothing per product label.
- Frequently check for ticks and remove from clothing. Roller-type, double-tape lint remover can be used to effectively remove ticks from clothing.
- At the end of the day, search your entire body for ticks (particularly groin, armpits, neck, and head) and shower.
- To prevent pathogen transmission through mucous membranes or broken/cut skin, wash or disinfect hands and/or wear surgical-style nitrile gloves anytime ticks are handled.

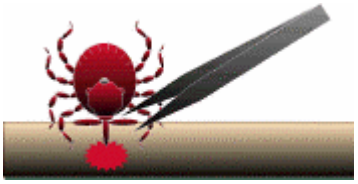
Pregnant women and individuals using prescription medications should consult with their physician and/or pharmacists before using chemical repellents. Because human health effects may not be fully known, use of chemical repellents should be kept to a minimum frequency and quantity. Always follow manufacturers' use instructions and precautions. Wash hands after handling, applying, or removing protective gear and clothing. Avoid hand-to-face contact, eating, drinking, smoking, etc. when applying or using repellents. Remove and wash clothes per repellent product label. Chemical repellents should not be used on infants and children.

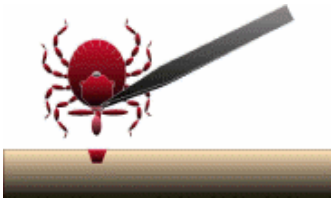
In most circumstances, treating persons who only have a tick bite (i.e., no signs of illness) is not recommended. Even if signs and symptoms of illness are not experienced, report all work-related tick bites to your supervisor, Health & Safety (H&S), and Human Resources (HR).

Tick Removal

1. Use fine-tipped tweezers or shield your fingers with a tissue, paper towel, or nitrile gloves.

2. Grasp the tick as close to the skin surface as possible and pull upward with steady, even pressure. Do not twist or jerk the tick; this may cause the mouthparts to break off and remain in the skin. (If this happens, remove mouthparts with tweezers. Consult your healthcare provider if infection occurs.)





3. Do not squeeze, crush, or puncture the body of the tick because its fluids (saliva, hemolymph, gut contents) may contain infectious organisms. Releasing these organisms to the outside of the tick's body or into the bite area may increase the chance of infectious organism transmission.

4. Do not handle the tick with bare hands because infectious agents may enter through mucous membranes or breaks in the skin. This precaution is particularly directed to individuals who remove ticks from domestic animals with unprotected fingers. Children, elderly persons, and immunocompromised persons may be at greater risk of infection and should avoid this procedure.

5. After removing the tick, thoroughly disinfect the bite area and wash your hands with soap and water.

6. You may wish to save the tick for identification in case you become ill. Your doctor can use the information to assist in making an accurate diagnosis. Place the tick in a plastic bag and put it in your freezer. Write the date of the bite on a piece of paper with a pencil and place it in the bag.

Note: Folklore remedies such as petroleum jelly or hot matches do little to encourage a tick to detach from skin. In fact, they may make matters worse by irritating the tick and stimulating it to release additional saliva, increasing the chances of transmitting the pathogen. These methods of tick removal should be avoided. In addition, a number of tick-removal devices have been marketed, but none are better than a plain set of fine tipped tweezers.

First-Aid and Medical Treatment

Tick bites should always be treated with first-aid. Clean and wash hands and disinfect the bite area after removing embedded tick. Consult a healthcare professional if infection or symptoms and effects of tick-borne illnesses develop. Even if signs and symptoms of illness are not experienced, report all work-related tick bites to your supervisor, H&S, and HR.

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

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

Hazard Recognition

An important step in controlling tick-related hazards is understanding how to identify ticks, their habitats, their geographical locations, and signs and symptoms of tick-borne illnesses.

Tick Identification

There are four varieties of hard-bodied ticks that have been associated with transmitting one or more tick-borne pathogens. These tick varieties include:

- Deer (Black Legged) Tick (eastern and pacific)
- Lone Star Tick
- Dog Tick
- Rocky Mountain Wood Tick

These varieties and their geographical locations are illustrated on the following page.

Tick Habitat

In the eastern states, ticks are associated with deciduous forest and habitat containing leaf litter. Leaf litter provides a moist cover from wind, snow, and other elements. In the North Central states, tick habitats are generally found in heavily wooded areas often surrounded by broad tracts of land cleared for agriculture. On the Pacific Coast, the tick habitats are more diverse. Here, ticks have been found in habitats with forest, north coastal scrub, high brush, and open grasslands. Coastal tick populations thrive in areas of high rainfall, but ticks are also found at inland locations.

Illnesses -- Signs and Symptoms

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

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

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

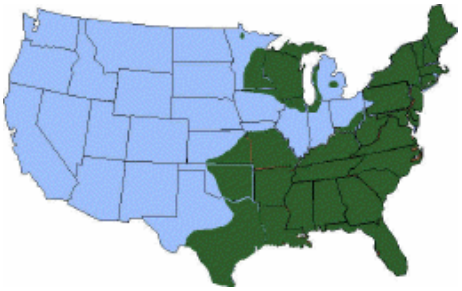
Deer Tick

From Left: adult female, adult male, nymph, and larvae Deer Tick (cm scale)

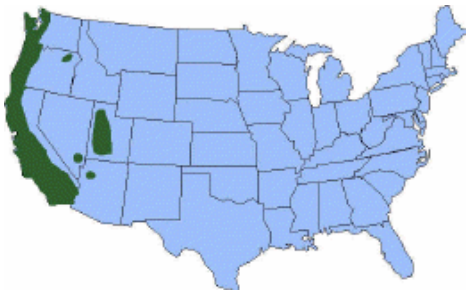
Lone Star Tick

Dog Tick

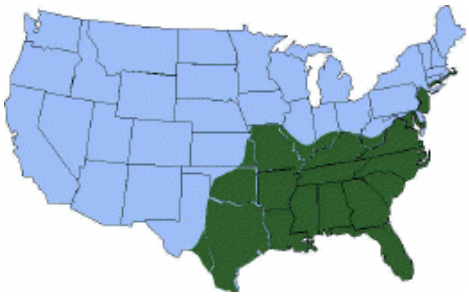
Rocky Mountain Wood Tick



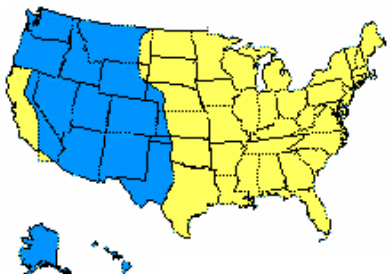
Distribution of Deer Tick (Green)



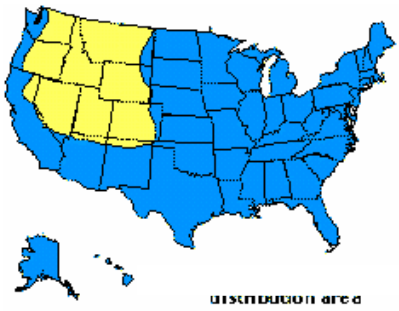
Distribution of Pacific Deer Tick (Green)



Distribution of Lone Star Tick (Green)



Distribution of Dog Tick (Yellow)



Distribution of Rocky Mountain Wood Tick (Yellow)