PLAINTIFF'S EXHIBIT

UC-1694

HEALTH AND SAFETY PLAN
ENVIRONMENTAL CLOSURE OF SIX TANKS
UNION CARBIDE CHEMIC ...ORATION
BROWNSVILLE, TEXAS

HSP-UC

BRC 0649

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IT HEALTH AND SAFETY POLICY

It is the policy of IT to provide a healthful work environment for all its employees. IT considers no phase of operations or administration to be of greater importance than injury and illness prevention. Safety takes predence over expediency or short cuts, and every attempt will be made to reduce the possibility of injury, illness, or accident occurrence. The potential for occupational exposures to organic and inorganic lead and asbestos as well as to the numerous physical and chemical hazards of the project required strict adherence to the health and safety plan.

The purpose of the health and safety program is to protect all personnel while successfully completing the project consistent with the client's requirements. To accomplish this, the plan requires that IT Site personnel be assigned specific health and safety responsibilities. IT also prescribes mandatory operating procedures, establishes personal protective equipment requirements for specific activities or work zones, and develops contingency plans for unanticipated conditions, emergency response, and for spill cleanup and abatement.

The provisions of the plan are mandatory for all IT personnel and subcontractors assigned to the project and are meant to supplement the client's safety requirements. All authorized visitors to a Site will be required to abide by these procedures. Work conditions can be expected to change as the operation progresses. As appropriate, addenda to a plan will be provided by the health and safety representative. No changes to a plan will be implemented without prior approval of the health and safety representative and UCC Site personnel. Our standard procedure is included below for your information.

1.0 PURPOSE

The purpose of this general policy is to set forth minimum requirements and procedures for a general hazardous materials Site mitigation occupational safety and health plan. The site-specific Health and Safety Plan prepared for the Environmental Closure of six tanks at the Union Carbide Corporation Brownsville Plant follows this description of IT's general policy.

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2.0 DISCUSSION

The protection of worker and environmental safety and health are major concerns during project design and cannot be compromised. This general plan is designed to protect worker safety and health by describing the responsibilities and requirements of all personnel.

Work conditions can be expected to vary from Site to Site. These conditions may require modification of this general plan. Conditions may also be expected to change as work progresses at a particular Site. As appropriate, addenda will be provided by the Occupational Safety and Health Department.

With the exception of any emergency situation, no changes to this plan may be implemented without the prior approval of the IT Corporation Occupational Safety and Health Department and UCC Site personnel.

3.0 ASSIGNMENT OF RESPONSIBILITIES

The regional Occupational Safety and Health (OSH) representative will be responsible for development and coordination of the Site health and safety program. This program will comply with established IT procedures in all respects and will include medical surveillance, training, requirements, hazard assessment, personal protective equipment, field implementation, and audits. Agency liaison on matters relating to health and safety will be handled by the OSH representative.

3.1 OPERATIONS FOREMAN

The Operations Foreman will be responsible for field implementation of the safety and health plan. This will include communicating Site requirements to all personnel, field supervision, and consultation with OSH representative regarding appropriate changes to the safety and health plan.

3.2 TEAM FOREMAN/LEADMAN

The Team Foreman/Leadman will be the first line supervisor responsible for ensuring that work crews comply with all Site requirements.

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3.3 TEAM MEMBER/LABORER

All team members/laborers will be responsible for understanding and complying with all Site health and safety requirements. This includes maintaining Site contamination reduction areas and cleaning and maintaining health and safety equipment and facilities.

4.0 MEDICAL PROGRAM

All IT personnel on Site shall have successfully completed a preplacement (ITC PRO 9410.1) or periodic/update physical examination. This examination has been designed to comply with appropriate regulatory requirements.

All subcontractor personnel shall have successfully completed a similar examination to the IT preplacement physical. This medical surveillance shall be provided by the subcontractor.

4.1 EMERGENCY MEDICAL TREATMENT

Should Site personnel suffer an injury or illness, the following resources will be utilized, as appropriate:

1. Site personnel shall be qualified to render first-aid and/or cardiopulmonary resuscitation, as appropriate.
2. Fire Department Rescue Squad (specify city/county/phone).
3. Ambulance Service (company/name/phone).
4. Sheriff's Office (phone).
5. Hospital Emergency Room (name/address/phone).

5.0 TRAINING

All IT Site personnel will receive the following training before being allowed on Site (into the contaminated zone).

- Basic safety - Hazards Protection and Hazardous Chemical Handling courses.
- Basic toxicology.
- Respiratory protection (types, limitations, qualitative fit testing).

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- Air-purifying respirators
- Supplied air respirators

- Site-specific health and safety plan (concentrates on specific safety precautions and decontamination procedures).

All subcontractor personnel shall have successfully completed minimum training requirements as specified by the IT Corporation OSH Department. All training shall be provided by the subcontractor.

6.0 HAZARD ASSESSMENT

At the beginning of each shift, and as often as necessary to ensure safety, a qualified supervisor shall conduct an area survey to locate work place hazards and determine appropriate control measures.

Baseline air monitoring tests shall be conducted before work begins. Air monitoring will consist of six evaluation levels.

1. Level 1 - Combustible gas meters shall be strategically located on the Site and operated as "continuous" monitors.
2. Level 2 - The air monitoring technician shall make regular rounds performing combustible gas and detector tube tests at designated stations.
3. Level 3 - Periodic surveys will be made to determine whether radioactive materials are present.
4. Level 4 - Industrial hygiene techniques will be used for area monitoring on a periodic basis.
5. Level 5 - Industrial hygiene techniques will be used for personnel monitoring on a periodic basis.
6. Level 6 - Industrial hygiene and detector tube techniques will be used for area sampling in affected locations in the event of an inadvertent release of hazardous vapors.

All monitoring data are to be entered into permanent logbooks. When complete, all logs are to be forwarded to the OSH Department.

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5.7 GENERAL SITE SAFETY REQUIREMENTS

IT shall clearly delineate work zones in and around the plant and shall specify equipment, operations, and personnel requirements within these areas. The work zones will include:

- Contamination (Exclusion) Zone - This area includes all areas where material is being removed, handled, staged, or covered, and all areas where contaminated equipment or personnel travel. The area will be marked with appropriate warning signs if required by the OSH standard. The area will be off limits to unauthorized personnel. A sign-in/sign-out sheet will be necessary at the point of entry into the contaminated zone.

- Contamination Reduction (Neutral) Zone 0 this area shall occur at the interface of contaminated and clean areas and provide for the transfer of construction materials from clean to site-dedicated equipment, the decontamination of equipment prior to entering the clean area, the decontamination of personnel and clothing prior to entering the clean area, and for the physical segregation of the clean and contaminated areas.

- Clean (Site Safety) Zone - This area is the remainder of the Site and is defined as being an area outside the zone of significant air, soil, or surface water contamination. The clean area will be clearly delineated and procedures implemented to prevent active or passive contamination from the work Site. The clean area provides for:

  - An entry area for personnel, material, and equipment to the Site exclusion areas;

  - An exit area for decontaminated personnel, materials, and equipment from the contamination reduction area;

  - The housing of Site services; and

  - A storage area for clean safety and work equipment.

All trenching and excavation work must comply with all safety regulatory agency rules.

1. Before any excavation work, the existence and location of underground pipe, electrical conductors, etc., must be determined.

2. The walls and spaces of all excavations and trenches more than five feet deep shall be guarded by shoring, sloping of the ground, or some other equivalent means.

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3. Daily inspections of excavation shall be made. If there is evidence of possible cave-ins or slides, all work in the excavation shall cease until the necessary safeguards have ben taken.

4. Trenches more than four feet deep shall have ladders or steps located so as to require no more than 25 feet of lateral travel between means of access.

5. All trenches shall be backfilled as soon as practical after work is completed and all associated equipment removed.

6. All equipment such as pipe, rebar, etc., shall be kept out of traffic lanes and accessways. Equipment shall be stored so as not to endanger personnel at any time.

7. All trenches shall be completely guarded on all sides. A minimum of two feet from edges will be maintained.

8. Trench guarding shall consist of wooden or metal barricades spaced no farther apart than 20 feet. Such barricades shall be no less than 36 inches high when erected.

9. Battery-lighted barricades shall be used as follows:

   a. A minimum of two battery-lighted barricades shall be used to corners, one on either side of the barricade.

   b. At least one battery-lighted barricade shall be used where vehicular traffic approaches the trench at right angles.

   c. Where trenches parallel roadways, distance between battery-lighted barricades shall not exceed 40 feet unless this requirement conflicts with a and b above and additional units are required.

   d. All battery-lighted units shall be serviced as necessary to ensure equipment is operating.

10. Protection between barricades shall consist of at least 3/4-inch wide nylon tape or yellow and black tape. The tape shall be stretched between barricades.

11. All barricaded sections immediately adjacent to where pedestrians cross trenches shall be guarded with a minimum of 2- x 2-inch wooden rails from the bridge to the first adjacent barricade. This barricade shall not be less than eight feet horizontally to the top of the first barricade.

12. All pedestrian bridges shall be of sufficient strength to prevent no greater vertical deflection than 1/2 inch when a 250-pound weight is applied to the center of the bridge.

13. Handrails shall consist of intermediate and top rail on both sides of the bridge. The top rail shall be a minimum of 42 inches high and be

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capable of withstanding a lateral force of 200 pounds against the center of the top rail.

14. All surfaces, which a person could reasonably contact, should be sufficiently free of splinters, nails, or protrusions which may cause injury.

15. All bridges intended for vehicular traffic shall be constructed to withstand twice the load of the heaviest vehicle anticipated.

A decontamination unit shall be positioned at the entrance to the contamination reduction zone with a step-off area just inside the contamination reduction zone. All personnel entering or leaving the contamination reduction zone shall pass through these areas to done or doff their protective equipment. Disposable booties shall be provided for personnel entering the Contamination Reduction Zone.

Legible and understandable precautionary labels shall be prominently affixed to containers of raw materials, intermediates, products, by-products, mixtures, scrap, waste, debris, and contaminated clothing.

Contaminated protective equipment shall not be removed form the regulated area until it has been cleaned or properly packaged and labeled. Employees shall not be permitted to exit the regulated area until contaminated clothing and equipment have been removed in accordance with the above and employees have washed their hands and face with soap and water.

Removal of materials from protective clothing or equipment by blowing, shaking, or any other means which may disperse materials into the air is prohibited. Eating, drinking, smoking, and application of cosmetics shall be restricted to the clean zone. All employees shall be required to wash their face and hands with soap and water before eating, drinking, smoking, or applying cosmetics.

Portable or fixed emergency shower/eyewash stations shall be strategically located throughout the regulated area. A deluge shower or hose and nozzle shall be available in the Contamination Reduction Zone to wash down heavily contaminated personnel before doffing protective clothing. Change rooms and

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shower facilities shall be provided for the use of employees working in the regulated area. All personnel shall be required to shower at the end of their shift before leaving the job Site.

As appropriate, equipment on Site shall be bonded and grounded, spark proof, and explosion resistant. A sufficient number of fire extinguishers, as determined on Site with a minimum rating of 10B:C, shall be strategically located throughout the areas where active work is progressing so as to limit the travel distance by personnel to less than 75 linear feet.

The air monitoring technician, safety watches, and Operations Foreman shall carry compressed air horns. In the event of fire, spill, inadvertent vapor release, or other hazardous incident, three short blasts shall signal all personnel to evacuate the Site, pending determination of appropriate action. An inhalator and resuscitator shall be available in the decontamination unit. This equipment is to be used only by CPR-trained personnel.

For work in confined spaces, all applicable provisions of ITC PRO 9531.1 shall be met. All personnel should avoid contact with potentially contaminated substances. Walking through puddles or mud, kneeling on the ground, or leaning against drums should be avoided whenever possible. Monitoring equipment shall not be placed on potentially contaminated surfaces.

A tailgate safety meeting shall be conducted at the beginning of each shift and when new personnel arrive at the job in accordance with ITC PRO 9540.1. A flagman with roadwork vest, signs, cones, and high level warning signs shall be provided when it is necessary to control normal vehicular traffic due to vehicles entering or leaving the Site.

Personnel on Site shall use the "buddy" system (pairs). Buddies should prearrange hand signals for communication in case of a lack of radios or radio breakdown. Communication or visual contact shall be maintained between crew members at all times.

Field personnel must observe each other for signs of toxic exposure. Indications of adverse effects include, but are not limited to:

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- Changes in complexion and skin discoloration
- Changes in coordination
- Changes in demeanor
- Excessive salivation and pupillary response
- Changes in speech pattern.

Field personnel shall be cautioned to inform each other of nonvisual effects of toxic exposure such as:

- Headaches
- Dizziness
- Nausea
- Blurred vision
- Cramps
- Irritation of eyes, skin, or respiratory tract.

All air cylinders placed on heavy equipment for use for the operator shall be well secured in a bracket which is bolted or welded to the unit.

All containers shall be opened by remote mechanical means with a protective shield installed between the operator and container. When conditions warrant, this provision may be waived by the OSH Department if another acceptable method is available.

Prompt remedial action shall be taken whenever an inadvertent release of a hazardous material occurs. Appropriate action to provide secure footing shall be taken at all locations where personnel will be working.

8.0 PERSONAL PROTECTIVE EQUIPMENT

If during the operation workers may be exposed to chemical contaminants, without regard to the use of respirators, or where possibility of skin or eye irritation exists, the OSH Department will specify the appropriate personal protective equipment by work zone.

- Contamination Zone
- Contamination Reduction Zone

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- Clean Zone
- The OSH Department will specify minimum requirements for each Site.

Personal protective equipment on emergency standby shall include:

- Eastwind Chem-Pro suits (two)
- Neoprene boots with hard sole liners (four pair: two size 10, two size 12)
- Self-contained breathing apparatus (SCBA) (two units)
- Backup bottles for SCBA (two).

Respiratory protection shall comply with ITC PRO 9561.

- Properly cleaned, maintained, NIOSH approved respirators shall be used.
- Selection of respirators shall be review with the OSH Department.
- As a minimum, air-purifying cartridges shall be replaced at the end of each shift.
- Employees wearing air-purifying respirators shall be required to change filter elements whenever an increase in breathing resistance or breakthrough is detected.
- Only employees who have had preissue qualitative fit tests shall be allowed to work in atmosphere where respirators are required.
- If an employee experiences difficulty in breathing during fitting test or during use, he or she shall be reexamined by a physician to determine whether the employee can wear a respirator while performing the required duty.
- Employees who wear respirators shall be allowed to leave work areas to wash the face and respirator facepiece as needed to prevent potential skin irritation associated with respirator use.
- Facial hair that might interfere with achieving a good facepiece seal is prohibited.

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9.0 HEAT STRESS

Adverse climatic conditions--heat and cold--are important considerations in planning and conducting Site operations. Ambient temperature effects can include physical discomfort, reduced efficiency, personal injury, and increased accident probability. Heat stress is of particular concern while wearing impermeable protective garments since these garments prevent evaporative body cooling.

All appropriate provisions of IT procedures regarding heat stress shall be met. Additionally, one or more of the following control measures can be used to help control heat stress:

- Provision of adequate liquids to replace lost body fluids. Employees must replace water and salt lost from sweating. Employees must be encouraged to drink more than the amount required to satisfy thirst. Thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement.

  Replacement fluids can be 0.1 percent salt water solution, commercial mixes such as Gatorade or Quik Kick, or a combination of these with fresh water. Employees should be encouraged to salt their foods more heavily.

- Establishment of a work regimen that will provide adequate rest periods for cooling down. This may require additional shifts of workers.

- Cooling devices such as vortex tubes or cooling vests can be worn beneath protective garments.

All breaks are to be taken in a cool rest area (77 degrees Fahrenheit is best). Employees shall remove impermeable protective garments during rest periods. Employees shall not be assigned other tasks during rest periods. All employees shall be informed of the importance of adequate rest and proper diet in the prevention of heat stress.

10.0 SUBCONTRACTORS

All subcontractor employees shall meet the minimum requirements to be on Site as set forth by IT. All training, medical surveillance, and personal protective equipment shall be provided by the subcontractor. All provisions of IT procedures regarding subcontractor responsibilities shall be met. Indemnifi-

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cation and release forms and documentation of compliance with IT requirements shall be signed/provided by the subcontractor and retained on file by IT.

11.0 SITE SECURITY

A controlled access to the regulated area(s) shall be established. Unauthorized personnel, media, etc., shall not enter the Site without appropriate authorization. All persons entering the regulated area(s) shall be equipped with appropriate personal protective devices. All persons entering the regulated area(s) shall be subject to the health and safety requirements set forth by IT.

DWJ/HSP-Policy

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HEALTH AND SAFETY PLAN

Site: Union Carbide Brownsville Plant
Location: Star Route Box 90
Brownsville, Texas 78521

Project No. 305-659
Regional Office: Houston

Client Contact: Ms. Belia Cortez

Phone No.: 512/831-4501

OBJECTIVE(S): Empty and decontaminate the interiors of six small storage tanks in preparation for removal. Four(4) tanks contain caustic liquid/crystal, 1 tank contains toluene, and 1 tank contains formic acid.

FACILITY DESCRIPTION: The Union Carbide Brownsville Plant is in the process of being dismantled, and there is a small group of UCC employees on-site to oversee the operations.

DISPOSAL METHODS: Caustic material will be treated on-site with HCL to adjust the pH to between 6 and 9 prior to discharge into an evaporation pond. Toluene and formic acid product and rinse will transported off-site for incineration.

UNUSUAL FEATURES: Access to most tanks is adequate, but UCC will remove any debris and underbrush blocking access. Most tanks or on foundations within earthen firewall dikes.

HAZARD ASSESSMENT: The following materials will handled during the operation; Appendix A contains an MSDS for each chemical.

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MATERIAL	FORM	HAZARD
Sodium Hydroxide	Liquid/Solid	Corrosive. Burns eyes and skin, upper respiratory irritant. Moderate toxicity. Non-flammable. See MSDS.
Hydrochloric Acid	Liquid	Corrosive. Burns eyes and skin, upper respiratory irritant. Moderate toxicity. Non-flammable. See MSDS.
Toluene	Liquid	Flammable, moderate explosive hazard. Skin, eye, and respiratory irritant. See MSDS.
Formic Acid	Liquid	Corrosive. Burns eyes and skin, upper respiratory irritant. See MSDS.
Parkem PK626	Liquid	Irritates eyes. Moderate skin irritant. See MSDS.

PERSONNEL PROTECTION:

LEVEL B will be used for all direct waste contact work and for all working in the exclusion zone as support for those working inside the tank. Level C will be used in the decontamination zone, and Level D is the minimum for all involved in non-waste contact work.

LEVEL B protection should be selected when the highest level of respiratory protection is needed, but a lesser level of skin and eye protection. Level B protection is the minimum level recommended on initial site entries until hazards have been further identified and defined by monitoring, sampling, and other reliable methods of analysis, and personnel equipment corresponding with those findings utilized.

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Personal Protection Equipment

- Positive-pressure (pressure-demand), self contained or airline breathing apparatus (OSHA/NIOSH approved);
- Chemical resistant clothing (overalls and long sleeved jacket, coveralls, hooded two piece chemical splash suit, or disposable chemical resistant coveralls);
- Coveralls (under splash suit);*
- Gloves, outer, chemical resistant;
- Gloves, inner, chemical resistant;
- Boots, inner, steel toe and shank;
- Boots, outer, chemical resistant;
- Two-way radio communications (intrinsically safe);* and
- Hard hat.

*Optional

LEVEL C protection should be selected when the type of airborne substance is known, concentration measured, criteria for using air-purifying respirators met, and skin and eye exposure is unlikely. Periodic monitoring of the air must be performed.

Personal Protective Equipment

- Air-purifying respirator (OSHA/NIOSH approved);
- Chemical resistant clothing (one piece coverall, hooded two piece chemical splash suit, chemical resistant hood and apron, or disposal chemical resistant coveralls);
- Gloves, outer, chemical resistant;
- Gloves, inner, chemical resistant;
- Boots, outer, steel toe and shank;
- Cloth coveralls (inside chemical protective clothing);*
- Two-way radio communications (intrinsically safe); and*
- Hard hat.

*Optional

LEVEL D is primarily a work uniform. It should not be worn on any site where respiratory or skin hazards exist.

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Personal Protective Equipment

- Cloth coveralls and protective gloves
- Boots or shoe, steel toe and shank;
- Hard hat; and
- Safety eye wear.

*Optional

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DECONTAMINATION AND DISPOSAL:

_____ LEVEL B - Segregated equipment drop, boot cover and glove wash, boot cover and glove rinse, tape removal, boot cover removal, outer glove removal, safety boot removal, SCBA backpack/airline removal, facepiece removal, inner glove removal, inner clothing removal, field wash, redress.

_____ LEVEL C - Segregated equipment drop, boot cover and glove wash, boot cover and glove rinse, tape removal, boot cover removal, outer glove removal, safety boot removal, splash suit removal, facepiece removal, inner glove removal, inner clothing removal, field wash, redress.

_____ LEVEL D - Segregated equipment drop, boot and glove wash, boot and glove rinse.

Decontamination Modification (personnel surfaces, materials, instruments, equipment, etc.):

NA

Disposal Procedures (contaminated equipment, supplies, disposable washwater): Decon water to be disposed along with tank contents and contaminated clothing to be bagged for disposal by UCC.

EMERGENCY PROCEDURES:

Overt Personnel Exposure:

Skin and Eye Contact:

See MSDS, Appendix A

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Inhalation:

See MSDS, Appendix A

Ingestion:

See MSDS, Appendix A

EMERGENCY RESOURCES*

Ambulance	911
Hospital Emergency Room	911
Poison Control Center	911
Police	911
Fire Department	911
Site Telephone	512/831-4501
U.S. EPA (24 Hour Hotline)	800/424-8802
Chemtac	800/424-9300
National Poison Control Center	404/588-4400

*See "Numbers To Know" sheet in Appendix C.

EMERGENCY CONTACTS:

IT Health & Safety Manager

Warren Houseman 800-444-9586

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EMERGENCY ROUTES

Hospital: Exit Plant and proceed west on 48 past the intersection with 511, to the interstection with 802 (approximately 4 miles). Turn right on 802 and proceed about 1 mile. Hospital is on the left.

Other: _____

PERSONNEL POTENTIALLY EXPOSED TO HAZARDOUS MATERIALS

Personnel authorized to enter HWS	Assignment
1.	
2.	
3.	
4.	
5.	

Other personnel assigned to handle hazardous materials (decontaminate, analyze samples, etc.):

1.	
2.	
3.	
4.	
5.	

SITE ENTRY PROCEDURES:

See Brownsville Plant Safety Rules, Appendix B

See Section Tank Entry Procedure, Appendix C

Work Limitations (time of day, etc.):

Day light hours

Tail-gate safety meetings to be held daily, see form to be completed in Appendix C.

BRC 0668

SITE SAFETY FOLLOW UP REPORT:

1. Was the Safety Plan followed as presented? _____Yes _____No

2. Describe, in detail, any changes to the Safety Plan while on-site:

_____
_____
_____
_____
_____
_____

3. Reason for changes:

_____
_____
_____
_____
_____

EVALUATION OF SITE SAFETY PLAN

1. Was the Safety Plan adequate? _____yes _____no

2. What changes would you recommend:

_____
_____
_____
_____

DWJ/HSP-UCC

BRC 0669

APPENDIX A

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MATERIAL SAFETY DATA SHEET

GENIUM PUBLISHING CORPORATION

1145 CATALYN ST., SCHENECTADY, NY 12303 USA (518) 377-8854

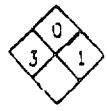
MSDS # N 3A
SODIUM HYDROXIDE
50% LIQUID
Revision A
Issued: October, 1977
Revised: August, 1985

From Genium's MSDS Collection, to be used as a reference.

SECTION 1. MATERIAL IDENTIFICATION

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MATERIAL NAME: SODIUM HYDROXIDE, 50% LIQUID
OTHER DESIGNATIONS: Liquid caustic soda, lye solution, CAS #1310-73-2 (NaOH).
MANUFACTURER: Available from many sources including:
Diamond Shamrock Co., Chlor-Alkali Div.
351 Phelps Court, Box 152300
Irving, TX 75015-2300
(800) 241-3134



SECTION 2. INGREDIENTS AND HAZARDS

	%	HAZARD DATA
SODIUM HYDROXIDE (NaOH)	>48.5	Ceiling Limit: 2 mg/m^3*
TYPICAL IMPURITIES:		
Carbonate (as Na_2CO_3)	<0.25	1% NaOH Soln
Chloride (as NaCl)	<1.15	
Chlorate (as $NaClO_3$)	<0.25	Eye, rabbit: Severe irritation
Sulfate (as Na_2SO_4)	<0.03	
Silica (as SiO_2)	<0.01	
Water	balance	

* Current (1985-86) ACGIH TLV. Current OSHA PEL is 2.0 mg/m^3 averaged over 8 hours.

SECTION 3. PHYSICAL DATA

Boiling point, 1 atm .... ca 140°C
Volatiles (water) 50%
Water Solubility ..... complete
Viscosity @ 20°C, cps ... 50
Specific gravity, 60/60°F ... 1.53
Density, lbs/gal 12.76

APPEARANCE & ODOR: Clear liquid - No odor.

DESCRIPTION: A 50% solution of sodium hydroxide (NaOH) in water.

SECTION 4. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits in Air	Lower	Upper
None - not combustible	N/A	N/A	N/A	N/A

EXTINGUISHING MEDIA:
Use extinguishing agents suitable for the surrounding fire. Use water spray to cool containers of this material which are involved in a fire situation to help prevent rupture.
Sodium hydroxide will react with metals such as aluminum, tin, and zinc to generate flammable and explosive hydrogen gas.

Firefighters should wear self contained breathing apparatus and full protective gear to prevent contact with this corrosive material.

SECTION 5. REACTIVITY DATA

This material is stable under normal storage conditions in sealed containers. Polymerization will not occur. There are no hazardous decomposition products. It reacts with CO_2 in the air to form sodium carbonate. It reacts violently with acids accompanied by heat generation and with many organic chemicals, especially nitrocarbons and halocarbons. It can react with trichloroethylene to form spontaneously flammable dichloroacetylene.
Avoid contact with leather and wool. Contact with aluminum, tin, magnesium, zinc, and alloys that contain these metals causes the formation of hydrogen gas (MSDS #65) (flammable)

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...TION 6. HEALTH HAZARD INFORMATION

TLV Ceiling Unit: 2 mg/m^3

...ydroxide is a strong alkali and is dangerous when improperly handled. It is destructive to all human ...t contacts, producing severe burns. Eye contact causes severe, permanent injury. Skin contact causes ...tion and, if not removed immediately, severe burns with scarring. The effects of inhalation of the mist ...from mild irritation to destructive burns. Pneumonitis may occur. Ingestion causes severe burns of the ... throat and stomach and may be fatal.

...AID: Wash eyes immediately with plenty of running water for at least 15 minutes, including under eye- ...and all surfaces. Speed in rinsing eyes with water is important if permanent injury is to be avoided. ...ical help immediately. SKIN CONTACT: Flush exposed area promptly with large quantities of water. Re- ...contaminated clothes while washing. Prolong washing in serious cases until medical help arrives. Get ... attention for serious exposure. INGESTION: Immediately give person large quantities of water or milk ..., (Never give anything by mouth to an unconscious person). Do not induce vomiting. Obtain medical ...e immediately. INHALATION: Remove from exposure to mist and get prompt medical help. (Paramedic, ... community).

...ON 7. SPILL, LEAK AND DISPOSAL PROCEDURES

...Ahead is essential for handling spills. Clean-up personnel should wear protective equipment to pre- ...and eye contact. Pick-up spill with vacuum equipment (alkali resistant) for disposal or flush to ...ea with water. Neutralize residue with dilute acid and rinse with water.

...Waste caustic must never be discharged directly to sewers, drains or surface waters. Dilute well ...with water and carefully neutralize with acid. Follow all applicable federal, state and local ...regulations.

...WASTE NUMBER: D002, corrosive (soln ≥ pH ≥12.5)-40CFR 261.22

...SPILL QUANTITY: 1000 lbs (40CFR117)

...PECIAL PROTECTION INFORMATION

...General ventilation and exhaust ventilation to meet TLV requirement, especially where the ...ge formation exists. Use a NIOSH-approved respirator with full face covering for mist, where ...cal safety goggles. A plastic faceshield, in addition to safety goggles, should be worn if ...ble. Use rubber gloves, apron or protective clothing and rubber boots where needed to ...sodium hydroxide solution.

...Safety showers must be immediately available.

...SPECIAL HAZARD TO CONTACT LENSES WEARERS; the slippery nature of this solution would ...result to remove the contact lenses. Critical rinsing of the contaminated eye would be

...ECAUTIONS AND COMMENTS

...ers. Protect containers from physical damage. Avoid handling conditions which can ...ation. Have abundant water (preferably running water) available where material ...plied for emergency use. Drains servicing areas where this material is stored or ...ities for pH adjustment and dilution of spills and flushings before discharge. ...el should be trained in proper handling precautions and emergency procedures, with ...ency.

...ssive Material

...4, 9, 11, 13, 27, 55, 58.V.

APPROVALS. [signature] 11/85

INDUST. HYGIENE/SAFETY [signature] 11/85

MEDICAL REVIEW: [signature] Nov 85

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MATERIAL SAFETY DATA SHEET

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NO. 30A

HYDROCHLORIC ACID
Revision A

DATE June 1984

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: HYDROCHLORIC ACID
DESCRIPTION: This material is a water solution of hydrogen chloride gas.
OTHER DESIGNATIONS: Muriatic Acid, Concentrated Hydrochloric Acid, GE Material D4A3, CAS# 007 647 010, Aqueous Hydrochloric Acid
MANUFACTURER: Available from many suppliers.

SECTION II. INGREDIENTS AND HAZARDS

	%	HAZARD DATA
Hydrogen Chloride (HCl)	<38	8-hr TWA 5 ppm or 7 mg/m^3 (C)*
Impurities (depends on acid grade)	Traces	
Water	Balance	
		Human, Inhalation LCLo 1300ppm/30 M
		Rabbit, Oral LD_{50} 900 mg/kg
		Rat, Oral (20°Be') LD_{50} 700 mg/kg
		Rabbit, Skin (20°Be') LD_{50} >5g/kg, 24 H-C

*Current OSHA PEL and ACGIH (1983) TLV Ceiling Level.

SECTION III. PHYSICAL DATA

	18°Be'	20°Be'	22°Be'	23°Be'
Weight % HCl	27.9	31.5	35.2	37.1
Boiling pt, 1 atm, deg F	208	182	144	123
Freezing point, deg F (approx)	-43	-63	-86	-101
Specific gravity, 60/60 F	1.142	1.162	1.179	1.189
Vap. Press., 25C, HCl/Total, mm Hg	~7/15	~25/33	~87/92	~186/190

All materials are completely water soluble with ~100% volatiles and pH <1.
Appearance & Odor: Clear, colorless to lt. yellow, fuming* liquid with a pungent, irritating odor. 1-5 ppm HCl detected by smell; 5-10 ppm is disagreeable.
*Higher conc. tend to be fuming liquids at room temperature.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits in Air	Lower	Upper
N/A	N/A	N/A	-	-

Extinguishing media: Select that suitable for surrounding fire. Use a water spray to cool fire exposed containers to prevent rupture.
Nonflammable, but acid can react with many metals, such as iron, to produce flammable hydrogen gas. (Flammable conc. may accumulate inside metal equipment.) Neutralize acid with limestone, slaked lime or soda ash to minimize formation of potentially explosive hydrogen gas.
Firefighters should use full protective clothing and self-contained breathing apparatus when this material is involved in a fire situation.

SECTION V. REACTIVITY DATA

This material is stable when properly contained and handled. It is a strong mineral acid and is, thus, highly reactive with materials such as metals, metal oxides, hydroxides, amines, carbonates and other alkaline materials. It is highly corrosive to many materials; it must have proper containment for handling and storage.
It liberates significant levels of HCl gas by vapor pressure at room temperature when concentrated and large amounts of HCl when heated.
Reaction with most metals will produce flammable hydrogen gas.
Incompatible with materials such as cyanides, sulfides, sulfites and formaldehyde (may release HCN, H_2S, SO_2, bischloromethyl ether, respectively).

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NO 30A

SECTION VI. HEALTH HAZARD INFORMATION

TLV 5 ppm Ceiling Level (as HCl)

Aqueous HCl and its vapors are strong irritants of the eyes, mucous membranes, and skin. Severity of eye injury from splashes [from irritation to severe burns] depends on quantity, conc. and duration of contact. Excessive acute exposure to HCl vapors/mists promptly irritates the upper respiratory tract and can result in coughing, burning of the throat, choking sensation and, if inhaled deeply, pulmonary edema. Prolonged or repeated low level exposure may cause teeth erosion. Skin exposure can cause burns; repeated or prolonged exposure to dilute soln. may cause dermatitis. Ingestion can cause severe burns and possible laryngeal spasm. FIRST AID:

Eye Contact: Contact physician! Immediately flush with running water for 15 min. including under eyelids.

Skin Contact: Flush affected area well with water. Remove grossly contaminated clothing under safety shower. Get medical help if large skin area contacted or if irritation persists.

Inhalation: Remove to fresh air. Restore and/or support breathing as needed. Use O_2 therapy for coughing, difficult breathing. Get medical help. Keep warm and at rest.

Ingestion: If victim is conscious, give 2-3 glasses of water, then milk of magnesia or limewater. Contact physician! Do not induce vomiting!

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Report large spills to safety personnel. Evacuation may be needed; keep upwind. Remove sources of ignition if H_2 is a hazard. Provide optimum ventilation. Those involved in clean-up of large spills must use full protective clothing, boots, and self-contained breathing apparatus.

Small spills and residues can be covered with excess of a mixture of soda ash and slaked lime to neutralize, and the slurry picked up for landfill burial or flushed with much water.

Contain large spills. Collect or flush with water to holding area for neutralization. Do not flush directly to sewer or surface waters.

DISPOSAL: Dispose of acid via licensed contractor or neutralize with limestone, soda ash or slaked lime. Flushing to sewer depends on allowable neutral salt concentrations in effluent water. Follow Federal, State and Local regulations. Consider use of waste acid to neutralize alkaline wastes. EPA (CWA) RQ is 5000 lb. (40 CFR 117)

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide adequate exhaust ventilation to meet TLV requirements. Face velocity of hoods should exceed 100 lfm. Use approved respirator or self-contained breathing apparatus for emergency or non-routine conditions with full facepiece above 50 ppm.

Those handling hydrochloric acid should use protective clothing and equipment to prevent body contact with the liquid. Use rubber gloves or gauntlets, apron, boots, long sleeved shirt, body suit, etc. Use chemical safety goggles and/or face shield for eye protection against splashing of acid.

An eyewash station, washing facilities, and safety shower must be readily available to areas of use and handling.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Store closed containers out of direct sunlight, in a clean, cool, open or well-ventilated area, away from oxidizing agents, away from alkaline material and sources of heat. Area should have acid resistant floor and approved drainage. Protect containers from physical damage. Use nonsparking tools in areas around tanks and pipes where hydrogen might be generated.

Use with good ventilation. Avoid inhalation of HCl vapors. Odor of HCl gives adequate warning for a prompt voluntary withdrawal from excessive exposure. Do not get in eyes or on skin or clothing. Wash thoroughly after handling.

Provide emergency neutralization materials and equipment near storage and use areas.

DOT Classification: CORROSIVE MATERIAL I.D. No. UN1789 Label: CORROSIVE
IMO Class 8

DATA SOURCE(S) CODE: 1-12,14-16,27,31,34,37,38,47-49

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APPROVALS: MIS/CRD J. M. Nielsen
INDUST. HYGIENE/SAFETY 6-7-84
MEDICAL REVIEW: 15 June 1984

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Material Safety Data Sheet

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Schenectady, NY 12303-1836 USA
(518) 377-8855

GENIUM PUBLISHING CORP.

No. 317
TOLUENE
(Revision D)

Issued: August 1979
Revised: April 1986

SECTION 1. MATERIAL IDENTIFICATION

20

MATERIAL NAME: TOLUENE

OTHER DESIGNATIONS: Methyl Benzene, Methyl Benzol, Phenylmethane, Toluol, C_7H_8, CAS #0108-88-3

MANUFACTURER/SUPPLIER: Available from many suppliers, including:
Allied Corp., PO Box 2064R, Morristown, NJ 07960; Telephone: (201) 455-4400
Ashland Chemical Co., Industrial Chemicals & Solvents Div., PO Box 2219, Columbus, OH; Telephone: (614) 889-3844

HMIS
H: 2
F: 3
R: 0
PPE*
*See sect. 8



R 1
I 3
S 2
K 4

SECTION 2. INGREDIENTS AND HAZARDS

	%	HAZARD DATA
Toluene 	ca 100	8-hr TLV: 100 ppm, or 375 mg/m³* (Skin)** Man, Inhalation, TCLo: 100 ppm: Psychotropic*** Rat, Oral, LD_{50}: 5000 mg/kg Rat, Inhalation, LCLo: 4000 ppm/4 hrs. Rabbit, Skin, LD_{50}: 14 gm/kg Human, Eye: 300 ppm

* Current (1985-86) ACGIH TLV. The OSHA PEL is 200 ppm with an acceptable ceiling concentration of 300 ppm and an acceptable maximum peak of 500 ppm/10 minutes.

** Skin designation indicates that toluene can be absorbed through intact skin and contribute to overall exposure.

*** Affects the mind.

SECTION 3. PHYSICAL DATA

Boiling Point ... 231°F (111°C)
Vapor Pressure @ 20°C, mm Hg ... 22
Water Solubility @ 20°C, wt. % ... 0.05
Vapor Density (Air = 1) ... 3.14
Evaporation Rate (BuAc = 1) ... 2.24
Specific Gravity (H_2O = 1) ... 0.866
Melting Point ... -139°F (-95°C)
Percent Volatile by Volume ... ca 100
Molecular Weight ... 92.15

Appearance and odor: Clear, colorless liquid with a characteristic aromatic odor. The odor is detectable to most individuals in the range of 10 to 15 ppm. Because olfactory fatigue occurs rapidly upon exposure to toluene, odor is not a good warning property.

SECTION 4. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits in Air	LOWER	UPPER
40°F (4°C) CC	896°F (480°C)	% by Volume	1.27	7.1

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical, alcohol foam. Do not use a solid stream of water because the stream will scatter and spread the fire. Use water spray to cool tanks/containers that are exposed to fire and to disperse vapors.

UNUSUAL FIRE/EXPLOSION HAZARDS: This OSHA class IB flammable liquid is a dangerous fire hazard. It is a moderate fire hazard when exposed to oxidizers, heat, sparks, or open flame. Vapors are heavier than air and may travel a considerable distance to an ignition source and flash back.

SPECIAL FIRE-FIGHTING PROCEDURES: Fire fighters should wear self-contained breathing apparatus with full facepiece operated in a positive-pressure mode when fighting fires involving toluene.

SECTION 5. REACTIVITY DATA

CHEMICAL INCOMPATIBILITIES: Toluene is stable in closed containers at room temperature under normal storage and handling conditions. It does not undergo hazardous polymerization. This material is incompatible with strong oxidizing agents, dinitrogen tetraoxide, silver perchlorate, tetranitromethane, and uranium hexafluoride. Contact with these materials may cause fire or explosion. Nitric acid and toluene, especially in the presence of sulfuric acid, will produce nitrated compounds that are dangerously explosive.

CONDITIONS TO AVOID: Avoid exposure to sparks, open flame, hot surfaces, and all sources of heat and ignition. Toluene will attack some forms of plastics, rubber, and coatings. Thermal decomposition or burning produces carbon dioxide and/or carbon monoxide.

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Union Carbide trial exhibit UC-1694: IT Corporation Health and Safety Plan for Environmental Closure of Six Tank...
ACL Doc 16777 · Page 27 of 58
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asbestosclaims.law/library/16777/27

SECTION 6. HEALTH HAZARD INFORMATION TLV

Toluene is not considered a carcinogen by the NTP, IARC, or OSHA. SUMMARY OF RISKS: Vapors of toluene may cause irritation of the eyes, nose, upper respiratory tract, and skin. Exposure to 200 ppm for 8 hours causes mild fatigue, weakness, confusion, lacrimation (tearing) and paresthesia (a sensation of prickling, tingling, or creeping on the skin that has no objective cause). Exposure to higher concentrations may cause headache, nausea, dizziness, dilated pupils, and euphoria, and, in severe cases, may cause unconsciousness and death. The liquid is irritating to the eyes and skin. Contact with the eyes may cause transient corneal damage, conjunctival irritation, and burns if not promptly removed. Repeated and/or prolonged contact with the skin may cause drying and cracking. It may be absorbed through the skin in toxic amounts. Ingestion causes irritation of the gastrointestinal tract and may cause effects resembling those from inhalation of the vapor. Chronic overexposure to toluene may cause reversible kidney and liver injury. FIRST AID: EYE CONTACT: Immediately flush eyes, including under eyelids, with running water for at least 15 minutes. Get medical attention if irritation persists.* SKIN CONTACT: Immediately flush skin (for at least 15 minutes) while removing contaminated shoes and clothing. Wash exposed area with soap and water. Get medical attention if irritation persists or if a large area has been exposed.* INHALATION: Remove victim to fresh air. Restore and/or support breathing as required. Keep victim warm and quiet. Get medical help.* INGESTION: Give victim 1 to 2 glasses of water or milk. Contact a poison control center. Do not induce vomiting unless directed to do so. Transport victim to a medical facility. Never give anything by mouth to a person who is unconscious or convulsing. * GET MEDICAL ASSISTANCE = In plant, paramedic, community. Get medical help for further treatment, observation, and support after first aid, if indicated.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

SPILL/LEAK: Notify safety personnel of large spills or leaks. Remove all sources of heat and ignition. Provide maximum explosion-proof ventilation. Limit access to spill area to necessary personnel only. Remove leaking containers to safe place if feasible. Cleanup personnel need protection against contact with liquid and inhalation of vapor (see sect. 8).
WASTE DISPOSAL: Absorb small spills with paper towel or vermiculite. Contain large spills and collect if feasible, or absorb with vermiculite or sand. Place waste solvent or absorbent into closed containers for disposal using nonsparking tools. Liquid can be flushed with water to an open holding area for handling. Do not flush to sewer, watershed, or waterway.
COMMENTS: Place in suitable container for disposal by a licensed contractor or burn in an approved incinerator. Consider reclaiming by distillation. Contaminated absorbent can be buried in a sanitary landfill. Follow all Federal, state, and local regulations. TLm 96: 100-10 ppm. Toluene is designated as a hazardous waste by the EPA. The EPA (RCRA) HW No. is U220 (40 CFR 261). The reportable quantity (RQ) is 1000 lbs/454 kg (40 CFR 117).

SECTION 8. SPECIAL PROTECTION INFORMATION

Provide general and local exhaust ventilation to meet TLV requirements. Ventilation fans and other electrical service must be nonsparking and have an explosion-proof design. Exhaust hoods should have a face velocity of at least 100 lfm (linear feet per minute) and be designed to capture heavy vapor. For emergency or nonroutine exposures where the TLV may be exceeded, use an organic chemical cartridge respirator if concentration is less than 200 ppm and an approved canister gas mask or self-contained breathing apparatus with full facepiece if concentration is greater than 200 ppm.
Safety glasses or splash goggles should be worn in all work areas. Neoprene gloves, apron, face shield, boots, and other appropriate protective clothing and equipment should be available and worn as necessary to prevent skin and eye contact. Remove contaminated clothing immediately and do not wear it until it has been properly laundered.

Eyewash stations and safety showers should be readily available in use and handling areas.

Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

STORAGE SEGREGATION: Store in a cool, dry, well-ventilated area away from oxidizing agents, heat, sparks, or open flame. Storage areas must meet OSHA requirements for class IB flammable liquids. Use metal safety cans for handling small amounts. Protect containers from physical damage. Use only with adequate ventilation. Avoid contact with eyes, skin, or clothing. Do not inhale or ingest. Use caution when handling this compound because it can be absorbed through intact skin in toxic amounts. SPECIAL HANDLING/STORAGE: Ground and bond metal containers and equipment to prevent static sparks when making transfers. Do not smoke in use or storage areas. Use nonsparking tools. ENGINEERING CONTROLS: Preplacement and periodic medical exams emphasizing the liver, kidneys, nervous system, lungs, heart, and blood should be provided. Workers exposed to concentrations greater than the action level (50 ppm) should be examined at least once a year. Use of alcohol can aggravate the toxic effects of toluene.
COMMENTS: Emptied containers contain product residues. Handle accordingly!
Toluene is designated as a hazardous substance by the EPA (40 CFR 116). DOT Classification: Flammable liquid. UN1294.
Data Source(s) Code: 1-9, 12, 16, 20, 21, 24, 26, 34, 81, 82. CR

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Approvals J.O. Reinoso, 11/86.
Indust. Hygiene/Safety D.W. 12-86
Medical Review

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NO. 416

MATERIAL SAFETY DATA SHEET

GENIUM PUBLISHING CORPORATION
P.O. BOX 1436, SCHENECTADY, NY 12301 USA
(518) 385-2577

GENIUM PUBLISHING CORP.

FORMIC ACID

Date June 1979

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: FORMIC ACID
OTHER DESIGNATIONS: Methanoic Acid, Hydrogen Carboxylic Acid, HCOOH, GE Material D5C31, CAS # 000 064 186
MANUFACTURER: Material available from several suppliers, including:

J.T. Baker Chemical Company
222 Red School Lane
Phillipsburg, NJ 08865

Union Carbide Corp.
Chemicals and Plastics Div.
270 Park Ave.
New York, NY 10017

SECTION II. INGREDIENTS AND HAZARDS

	%	HAZARD DATA
Formic Acid *	> 85	8-hr TWA 5ppm or 9 mg/m^3**
*About 90% in water solution is the usual commercial product.		Rat, oral LD_{50} 1210 mg/kg
**Current (1978) OSHA and ACGIH TLV. The saturated vapor concentration in air is 80 g/m^3 at 20 C.		

SECTION III. PHYSICAL DATA

	Approx 90%	Glacial (98+%)
Boiling point, 1 atm, deg C	105	101
Vapor pressure at 20 C, mm Hg	ca 23	ca 34
Vapor density (Air=1)	-	1.6
Specific gravity, 20/20 C	1.208	1.223
Water solubility	Miscible	Miscible
Freezing point, deg C	-9	8.4
Flash point (TCC), deg F	ca 141	ca 118

Appearance & Odor: A colorless, fuming, hygroscopic liquid with a highly pungent and penetrating odor.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method (See Sect. III)	Autoignition Temp.	Flammability Limits In Air % by volume (90%)	LOWER	UPPER
	813 F (90%)		18	57

Extinguishing Media: Use dry chemical, "alcohol" foam, water spray or carbon dioxide. Cool fire-exposed containers with a water spray. Dilute spilled material to a non-flammable solution with water. Flush liquid away from hazardous exposures and disperse vapors with a water spray.
This combustible material is a moderate fire hazard when exposed to heat or flame.
Firefighters must use eye protection and self-contained breathing equipment with full protective clothing to fight fires in which this material is involved.

SECTION V. REACTIVITY DATA

Glacial formic acid undergoes slow decomposition at room temperature and will build up pressure in a sealed, unvented container; 90% formic acid is acceptably stable at room temperature in a sealed container. It does not polymerize. It is combustible.
Formic acid is a strong reducing agent and rather strongly corrosive as an acid. It is incompatible with oxidizing agents and with alkaline materials. It should be handled in 316 stainless steel, glass, ceramic, rubber- or resin-lined, or similar corrosion resistant materials of construction.
Formic acid reacts with concentrated sulfuric acid to produce carbon monoxide. It has been known to react explosively with hydrogen peroxide and with furfuryl alcohol.

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SECTION VI. HEALTH HAZARD INFORMATION

TLV 5 ppm or 9 mg/m^3

Formic acid is a highly toxic substance which also has corrosive action on any body tissues it contacts. Eye contact with liquid or high vapor concentrations will produce irritation and conjunctivitis and may cause corneal burns. Skin contact will cause irritation and burns with possible chronic effects from repeated exposures. Excessive inhalation of vapors is irritating to the upper respiratory tract and can produce coughing, difficulty in breathing, possible bronchitis, headache, and body weakness. Ingestion causes acute local tissue damage with other effects ranging from nausea and dizziness to unconsciousness.

FIRST AID:

Eye contact: Flush with plenty of running water for 15 minutes or more, including under the eye lids. Contact a physician promptly (an opthalmologist if available).

Skin contact: Wash well with soap and water. Promptly remove contaminated clothing (under a safety shower for gross contact). Get medical help if irritation persists or if contact area was large.

Inhalation: Remove to fresh air. Call physician immediately. Inhalation of an aerosol of 5% sodium bicarbonate in water may reduce the severity of irritation of the respiratory tract.

Ingestion: Do not induce vomiting! Give milk or water to drink to dilute, plus milk of magnesia or egg white mixed with water. Contact physician promptly for gastric lavage.

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Notify safety personnal if spill is large. Provide maximum ventilation. Eliminate ignition sources. Exclude from spill area all except assigned clean up personnal who are using protective equipment against contact with liquid or inhalation of vapors.

Contain spill and absorb on vermiculite or other suitable absorbent material; scrap up and place in an approved container for disposal. Neutralize remaining traces of residue with soda ash or sodium bicarbonate and flush to drain with large amounts of water.

DISPOSAL: Burn scrap material in an approved incinerator with afterburner. Flammable solvents may be added to improve burning characteristics. Follow Federal, State and local regulations.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide general ventilation and local exhaust ventilation to meet TLV requirements. Use of local exhaust hood with face velocity of 100+ linear feet per minute is recommended to keep vapor concentrations as low as possible. The ventilation equipment used should be acid-proof and of explosion-proof design. For nonroutine or emergency use above the TLV provide approved full facepiece, canister-type respirators for acid vapors and/or self-contained or air-supplied breathing equipment.

Use rubber or neoprene protective gloves and safety goggles or glasses with side shields to prevent contact with formic acid. Where conditions indicate the need, use protective impermeable clothing, aprons, boots, face shield, etc. to prevent liquid contact with the body. A full rubber suit may be needed under certain exposures.

A chemical safety shower and an eyewash station must be readily available to areas where formic acid is handled or used.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Store in cool, well-ventilated area away from direct sunlight, sources of heat, sources of ignition and incompatible materials (such as oxidizing agents, alkaline materials, concentrated sulfuric acid, etc.). Protect containers against physical damage and freezing. Electrically bond and ground containers for liquid transfers; use non-sparking tools with 90+% acid. Glacial formic acid can rupture containers by slow decomposition at room temperature which builds up pressure. Proper venting must be established for this material.

Prevent contact of formic acid with skin, eyes or clothing. Do not breath vapors. Clothing contaminated with formic acid must be properly laundered before re-use; if shoes are contaminated discarding them has been recommended.

DATA SOURCE(S) CODE: 1-12, 23

APPROVALS: MIS, CRD J. M. Neidzwski

Industrial Hygiene and Safety

MEDICAL REVIEW: 12/79

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MATERIAL SAFETY DATA SHEET

NOTICE:
The following confidential material is being provided on this proprietary product for the use of your medical and safety departments. This information, which is to be treated as a highly confidential disclosure, is essentially the same as required by the U.S. Department of Labor, Form No. OSHA-20, Rev. May, 1972.

SECTION I PRODUCT IDENTIFICATION

Vendor name ----> Parkem Industrial Services, Inc.	Emergency phone number -->
Chemical name ---> Not applicable	Trade name -----> Parkem PK626
Chemical family -> Liquid Detergent	Formula --------> Proprietary Product

SECTION II HAZARDOUS INGREDIENTS

NAME	% BY WT.	TLV (units)
Ethylene Glycol Monobutyl Ether	1.5	120 mg/m3 TWA

SECTION III PHYSICAL DATA

Boiling point ---------->	212° F	Specific gravity -------->	1.008
Vapor pressure ---------->	Same As Water	% volatile by volume ---->	97
Vapor density ---------->	Same As Water	Evaporation rate -------->	Same As Water
Solubility in water ----->	Miscible		
Appearance and odor ----->	Slightly turbid, pale yellow liquid with a faint detergent odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash point ---------->	None	Flammable limits->	N/A
Extinguishing media ----->	N/A		
Special fire fighting procedures ---------->	N/A		
Unusual fire and explosion hazards -------->	None		

LAST REVISION ----> MAY 1988

BRC 0679

SECTION V HEALTH HAZARD

Effects of overexposure: Eye irritation. Possible skin irritation with sensitive individuals.

Emergency and first aid procedures: Flush with water. If irritation persists, seek medical attention.

SECTION VI REACTIVITY DATA

Stability: Stable	Conditions to avoid: None
Materials to avoid: None	
Hazardous decomposition products: Thermal decomposition in air yields oxides of carbon.	
Hazardous polymerization: Will Not Occur	Conditions to avoid: None

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled: Flush With Water

Waste disposal method: Dilution or ponding

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiratory protection: None

Ventilation:	Local exhaust: Not Applicable	Special: N/A
	Mechanical (general): N/A	Other: N/A

Protective gloves: Rubber	Eye protection: Face shield or goggles

Other protective equipment: Rubber boots, and suits or aprons.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: None

Other precautions: None

BRC 0680

APPENDIX B

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BROWNSVILLE PLANT

VENDORS SAFETY INSTRUCTIONS

1. Matches and cigarette lighters are not allowed in the plant. Leave these items with the guard before you go into the plant.

2. Smoking in the plant is absolutely prohibited.

3. Permission and clearance must be obtained from operating personnel immediately prior to starting work.

4. The maximum plant speed limit is 20 MPH. In congested areas the speed limit is reduced to 5-15 MPH. Stop, warning or restriction, and safety signs will be followed.

5. Do not get off moving vehicles at any time. Riding on running boards, or having any part of the body extending outside truck bed is strictly forbidden. All riders must be seated.

6. Unauthorized personnel shall not congregate in the immediate area of a fire, explosion, etc. Vendors shall leave the area immediately in case of such an emergency.

7. Do not use unsafe tools. Ground all portable electric tools before using.

8. "Horseplay" in the plant will not be tolerated.

9. Hard hats and safety glasses must be worn at all times when you are in the manufacturing areas of the plant.

10. Drinking or the possession of liquor or habit forming drugs is prohibited on plant property. No one under their influence will be allowed to work.

11. Prohibited weapons, as defined by the Texas Penal Code, are not allowed in the plant.

GENERAL RULES

Vendors shall check with the guard at the main gate before entering or leaving the plant.

Vendors must always report incidents or accidents to the person responsible for bringing them in the plant. For instance, all fires, injuries, hazardous incidents, or potentially hazardous incidents must be reported.

Please detach, sign, and give to the guard:

I have read and understand the Brownsville Plant Vendors Safety Instructions.

_____

SIGNATURE

BRC 0682

SUBJECT: BROWNSVILLE PLANT SAFETY RULES FOR OUTSIDE CONTRACTORS AND VENDORS

I. PURPOSE:

To protect the physical well being and property of vendors and outside contractors, as well as plant employees, by making outside contractors aware of the hazards and necessary safety rules and regulations of the Brownsville Plant

II. POLICY:

When secondary contractors or vendors are brought into the plant, it wil be the responsibility of the Secondary Maintenance Contractor Coordinato or his designate to inform them of the general plant safety rules and regulations that are applicable to our plant operation. The Secondary Maintenance Contractor Coordinator or his designate will be accountable for issuing the prepared written copies of general plant safety instruct ions to the contractors or vendors and their employees. These instruct-ions are available at the gate house, building 259. The Secondary Maintenance Contractor Coordinator or his designate will include in his safety instructions steps that the contractor must take in case of emer-gency; for example, fire or injury. Contractors or vendors who come int the plant on evening or midnight shifts will receive their instructions from the Shift Coordinator. If work by the outside contractor or vend is to take place within a specific Operating Unit, the Secondary Maint-enance Contractor Coordinator will escort or direct them to the Operatin Unit. A departmental designate or Maintenance Area Coordinator will the beresponsible for giving unit safety instructions, providing the requir permits and assisting in coordinating the work. Work that involves more than one operating unit will be cleared with the Shift Coordinator on duty (i.e. utilities, steam lines, methane lines, etc.). Each and every

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SUBJECT: BROWNSVILLE PLANT SAFETY RULES FOR OUTSIDE CONTRACTORS AND VENDORS

II. POLICY: (Continued)

time a vendor or contractor enters the plant gate, the p shall stop the individual and ask that all matches or lighters be left at the Gate. The guard will also rem contractors or vendors of steps to take in case of a fire alarm.

Vendors who make routine deliveries to areas other than the o areas will not be issued written instructions. They will, howe given by the guard on duty at that time verbal instructions and as on each entrance for thier matches or cigarette lighters.

III. RULES:

A. Matches and cigarette lighters are not allowed in the plant. Leave these items with the guard before you go into the plant.

B. Smoking in the plant is absolutely prohibited.

C. Permission and clearance must be obtained from operating personnel immediately prior to starting work in the operating areas

D. All vehicles must pull off to the side of the road and stop if the fire alarm or other emergency signal sounds (siren, coded bells or whistles). They will remain in place until the all clear signal is sounded.

E. The maximum plant speed limit is 20 MPH. In congested areas the speed limit is reduced to 10 or 15 MPH. Stop, warning or restriction, and safety signs will be followed. Vehicles may not enter the operating areas without specific approval of the

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SUBJECT: BROWNSVILLE PLANT SAFETY RULES FOR OUTSIDE CONTRACTORS AND VENDORS

II. POLICY: (Continued)

E. (Continued)
operating personnel (permission may be in the form of a properly executed HWP, or White Work Permit.

F. Do not get off moving vehicles at any time. Riding on running boards, or having any part of the body extending outside truck bed is strictly forbidden. All riders must be seated.

G. Fire extinguishers, alarm boxes, emergency equipment, stretcher containers, hose houses, safety showers, etc., are to be kept free from any obstructions which would interfere with the emergency use of such protective equipment or passage.

H. Operation of internal combustion engines, use of spark producing tools, welding, cutting, or the use of any tool or machine which might, through its operation produce a spark or flame, will not be permitted within the operating areas without specific approval of the operating personnel (may require properly executed HWP). The work done by the outside contractor or vendor will be subject to the restrictions on the Hazardous Work Permit, and no changes will be allowed unless the permit is rewritten. The Hazardous Work Permit must remain posted at the job site throughout the duration of the work covered by the permit.

I. Electric switchgear, valves, and controlling instruments shall be operated by plant personnel only. Electrical repairs shall be made by plant electricians or under their supervision. Electrical control rooms and cable pits are to be entered by authorized personnel only

1.15.03

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SUBJECT: BROWNSVILLE PLANT SAFETY RULES FOR OUTSIDE CONTRACTORS AND VENDORS

III. RULES: (Continued)

J. Because of the possibility of toxic gases, no one is to enter a tank, trench, sewer, etc., until the necessary checks have been made to see that it is safe to do so.

K. Unauthorized personnel shall not congregate in the immediate area of a fire, explosion, etc. Contractor personnel or vendors shall immediately leave the area in case of such an emergency.

L. Do not use unsafe tools. Ground all portable electric tools before using.

M. "Horseplay" in the plant will not be tolerated.

N. Hard hats and safety glasses must be worn at all times when you are in the plant.

O. Contact lenses will not be worn in the plant.

IV. GENERAL RULES:

Outside contractors and vendors shall check with the guard at the main gate before entering or leaving the plant.

In addition to the above requirements, outside contractors and their personnel shall be responsible for any particular requirements so specified within their work contract.

Vendors must always proceed from the gate directly to the stores building and check in with stores personnel before making deliveries in the plant.

1.15.04

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SUBJECT: BROWNSVILLE PLANT SAFETY RULES FOR OUTSIDE CONTRACTORS AND VENDORS

IV. GENERAL RULES:

Contractors and vendors must always report incidents or accidents to the person responsible for bringing them in the plant. For instance, all fires, injuries, hazardous incidents, or potentially hazardous incidents must be reported.

1.15.05

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APPENDIX C

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IT CORPORATION

STANDARD PROCEDURE

PROCEDURE NO. ITC PRO 9531.1B

DATE December 4, 1985

SUPERSEDES 9531.1A (04/22/85)

APPROVED D R Smith

David R. Smith

SUBJECT:

Confined Spaces Industrial

I. PURPOSE: To set forth minimum requirements and procedures for the safety and health of employees who work in, about, and in connection with industrial confined spaces.

II. REFERENCES:

A. Title 8, Article 108, California Administrative Code; Cal-OSHA

B. American National Standards Institute, ANSI Z117.1-1977

C. NIOSH Criteria Document, "Working in Confined Spaces", December, 1979

D. American Petroleum Institute, API RP 2015, 11/76, "Recommended Practice for Cleaning Petroleum Storage Tanks"

III. ATTACHMENTS:

A. ITC Form 9531-1, Inspections and Tests for Entry Into Confined Spaces

B. ITC Form 9540-1, Tailgate Safety Meeting

C. Emergency Phone Number List

IV. DISCUSSION

The multiple hazards associated with entering and working in confined spaces are capable of causing bodily injury, illness, and death to the worker. Confined spaces can become unsafe as a result of: (1) possible atmospheric contamination by toxic or flammable vapors, or oxygen deficiency; (2) possible physical hazards when agitators or other moving parts are located therein; (3) the possibility of liquids, gases, or solids being admitted during occupancy; or (4) physical isolation of employees when in need of rescue.

This directive prescribes minimum requirements for safe entry, continued work in, and exit from tanks and other confined spaces; and procedures for preventing employee exposure to dangerous air contamination and/or oxygen deficiency. Specific requirements for work in marine spaces are prescribed in the IT Corporation Ship Repairing Regulation (ITC PRO 9531.2).

ITC FORM 1215-2 (Replaces 10-101 Rev. 1-79)

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V. DEFINITIONS - FOR THE PURPOSE OF THIS DIRECTIVE

A. Atmosphere - Refers to the gases, vapors, mists, fumes, and dusts within a confined space.

B. Confined Space - Enclosure having limited means for entry and exit, by reason of location, size, or number of openings; and unfavorable natural ventilation which could contain or produce dangerous air contaminants, flammable or explosive atmospheres, and/or oxygen deficiency.

Confined spaces include, but are not limited to, storage tanks, compartments of ships, process vessels, pits, silos, vats, degreasers, reaction vessels, boilers, ventilation and exhaust ducts, sewers, tunnels, underground utility vaults, bins, tubs, tank trucks, and pipelines.

C. Confined Space, Class "A" - A confined space in which the atmosphere is immediately dangerous to life and health, or poses an immediate threat of exposure that will probably cause delayed harm, and one from which a person cannot escape unprotected without irreversible health effects. (30 minutes)

These include but are not limited to oxygen deficient atmospheres, flammable atmospheres, and/or atmospheres containing air concentrations of toxic substances.

D. Confined Space, Class "B" - A confined space in which the atmosphere is not immediately dangerous to life and health but may cause immediate physical discomfort or irritation, produce harm after prolonged exposure, or cause chronic poisoning after repeated short exposures, but does not cause irreversible damage during a single exposure. Class "B" atmospheres may be further defined by the following:

1. Class "B-1" - Atmospheres containing toxic contaminants at concentrations greater than two times the TLV of the most toxic contaminant present and which require the use of air-line air-supplied respirators, lifelines and harnesses, and safety standby personnel.

2. Class "B-2" - Atmospheres with toxic contaminants in concentrations above the TLV for the most toxic contaminant present but not greater than two times that TLV and which require the use of air-purifying respirators such as the cartridge or canister type respirator.

E. Confined Space, Class "C" - A confined space in which the concentration of toxic contaminants can be maintained by ventilation below the TLV for the most toxic contaminant present, and does not require any special modification of the work procedure.

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F. Contaminant - Any organic or inorganic substance, dust, fume, mist, vapor, or gas, the presence of which in air can be harmful or hazardous to human beings.

G. Hot work - Any work involving burning, welding, riveting, or similar fire producing operations, as well as work which produces a source of ignition, such as drilling, abrasive blasting, and space heating.

H. Inerting - Displacement of the atmosphere by a nonreactive gas (such as nitrogen) to such an extent that the resulting atmosphere is nonflammable.

I. Isolation - A process whereby the confined space is removed from service and completely protected against the inadvertent release of materials by the following means: inserting a suitable full-pressure blank (skillet type metal blank between flanges) in all lines, misaligning sections of lines and pipes, or valve-chain lockout of lines; and lockout of all sources of electrical power and blocking or disconnecting all mechanical linkages.

J. Lead Hazard - Refers to the potential for exposure to organic (tetraethyl) lead in tanks which have been used for leaded petroleum products. Since these tanks will contain residual lead of varying concentrations, they must be regarded as dangerous to the extent that respiratory (supplied air respiratory protective equipment) and whole body skin protection must be used throughout the cleaning process. These tanks must not be considered lead-free until proven so by lead-in-air analysis.

K. LEL (lower explosive limit) - The minimum concentration of a flammable gas or vapor in air (usually expressed in percent by volume at sea level), which will ignite if an ignition source is present.

L. Oxygen Deficiency - Refers to an atmosphere with a partial pressure of oxygen of less than 132 mm Hg. Normal air contains approximately 21% oxygen. For the purpose of this directive, any atmosphere containing less than 20% oxygen shall be considered oxygen deficient and immediately dangerous to life and health. All requirements for work in Confined Space, Class "A", must be met.

M. Purging - The method by which gases, vapors, or other airborne impurities are displaced from a confined space. This may involve such measures as mechanical ventilation, steam ventilation, or introducing another gas such as nitrogen or carbon dioxide to control flammable vapors.

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N. Qualified Person - A person designated by the employer, in writing, as capable (by education and/or specialized training) of anticipating, recognizing, and evaluating employee exposure to hazardous substances or other unsafe conditions in a confined space.

Training in the evaluation of employee exposure to toxic substances and in the use of atmospheric testing instruments is required, plus knowledge or experience in specifying the necessary precautions to be taken for the protection of employees under the applicable conditions.

O. Standby Employee - Individual physically capable of rescuing another employee by use of hoist, lifeline and harness, or entry into a confined space and who has had current training in:

1. Cardiopulmonary resuscitation (CPR)

2. First aid

3. Air-supplied respiratory protective equipment

4. Self-contained respiratory protective equipment

P. Threshold Limit Value (TLV) - Refers to airborne concentrations of substances and represents conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effect.

TLV's shall be used as guidelines only, and shall be considered as one of many contributing factors in evaluating the overall degree of hazard for confined space work.

For the purposes of this directive, TLV's and PEL's (Permissible Exposure Limits) have the same definition.

VI. PROCEDURE

A. Precautions Before Entry - Before employees are permitted to enter a confined space, the following requirements shall be met.

1. Inspections and Tests

a. Before work begins, a qualified person shall select an emergency medical facility near the site, in accordance with ITC PRO 9462.

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b. A qualified person shall determine the type of product which the confined space previously contained, as well as the indicated amount of sludge, residual product, or other contaminants within, and the physical condition of the confined space itself.

c. A qualified person shall make a survey of the surrounding area, including atmospheric testing if appropriate, to determine whether it is safe to enter the area to perform cleaning operations.

d. Entry into a confined space is prohibited until initial testing of the atmosphere has been completed from the outside. Tests performed shall include, as a minimum, those for oxygen content, flammability, and toxic contaminants.

Additional tests shall be selected and performed to the satisfaction of the qualified person, based on consultation and recommendations of an IT Corporation Health and Safety Department representative. Such additional tests shall be made in a location which will be representative of the worst-case conditions that might be anticipated. All tests shall be repeated as often as necessary to assure safety since changing conditions can result in changing atmospheric concentrations.

Testing instruments shall conform to applicable provisions of ITC PRO 9521 for maintenance and periodic calibration.

e. All test results shall be recorded on ITC Form 9531-1, "Inspections and Tests for Entry Into Confined Spaces" (attachment A).

This form shall be clearly posted on the vessel as near as possible to the point where employees will enter the confined space.

After job completion, the Form is to be retained indefinitely.

f. Entry into a confined space for any type of work is prohibited when tests indicate the concentration of flammable gases in the atmosphere is greater than 10% of the lower explosive limit (LEL).

g. Entry into a confined space for any type of work is prohibited when tests indicate the concentration of oxygen to be less than 20% or greater than 25%.

1-7

TESTS - [illegible] often as necessary

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h. Entry into a confined space containing toxic contaminants in concentrations at or above the threshold limit value (TLV) shall be permitted only when personal protective equipment appropriate for the specific contaminants is provided to all affected employees, based on recommendations of a Health and Safety Department representative.

i. The confined space shall be tested as often as necessary to ensure the safety of employees, and whenever conditions in the confined space change, such as temporary stoppage of mechanical ventilation, agitation of tank product by workers, increase in ambient temperature, etc.

Required frequency of retesting shall be a decision of the qualified person, based on the ongoing evaluation of the degree of hazard and recommendations from Health and Safety Department representatives.

j. In addition to atmospheric testing, a qualified person shall take positive steps to ensure that employees are protected from other physical hazards, which would include, but are not limited to the following:

(1) Discharge of steam, high-pressure air, water or oil into the confined space, or against personnel working outside.

(2) Structural failure of the tank shell, roof, roof support members, swing line cables or other tank members.

(3) Tools or other objects dropping from overhead.

(4) Falls through or from the roof, or from scaffolds, stairs or ladders.

(5) Tripping over hoses, pipes, tools, or equipment.

(6) Slipping on wet, oily surfaces or colliding with objects in inadequately lighted interiors.

(7) Insufficient or faulty personal protective equipment.

(8) Insufficient or faulty operations equipment and tools.

(9) Noise in excess of acceptable levels.

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(10) Temperature extremes which may require additional protection or shorter work periods.

k. If the confined space contains or has contained leaded products, and the vessel has not been certified lead-free by lead-in-air analysis, a qualified person shall take all additional steps necessary to ensure compliance with the provisions of ITC PRO 9531.3, Confined Spaces, Leaded Products.

2. Isolation

a. General: A qualified person shall take positive steps to:

(1) Depressurize the confined space.

(2) Prevent accidental introduction into the confined space of hazardous materials through interconnecting equipment such as piping, ducts, vents, drains, or other means.

(3) De-energize, lockout, and tagout machinery, mixers, agitators, or other equipment containing moving parts that are in a confined space.

Before a method of isolation is selected, a qualified person shall consider the hazards that may exist or develop from temperature, pressure, flammability, or toxicity of the material in the piping, including reactions with cleaning or purging agents.

b. Detail: Before employees are permitted to enter a confined space, the confined space shall be isolated to preclude the entry of hazardous materials by one or more of the following methods:

(1) Removing a valve, spool piece, or expansion joint in piping to, and as close as possible to, the confined space, and blanking or capping the open end of the pipe leading to the confined space.

(2) Inserting a suitable full-pressure blank in piping between the flanges nearest to the confined space.

(3) Closing, locking, and tagging at least two valves in the piping leading to the confined space, and locking or tagging open to atmosphere a drain valve between the two closed valves, which shall be checked to ensure that it is not plugged.

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In all cases, blanks or caps shall be of a material that is compatible with the liquid, vapor, or gas with which they are in contact.

The material shall also have sufficient strength to withstand the maximum operating pressure, including surges, which can be built up in the piping.

(4) In addition, all electrical and mechanical devices within or attached to the confined space shall be disconnected, or locked, and tagged to prevent accidental movement or energizing of such systems.

All employees who will be working in the confined space shall be informed of the isolation devices in use at the jobsite during Tailgate Safety Meetings.

3. Ventilation

a. Prior to ventilating a confined space, a qualified person shall take positive steps to ensure that no pyrophoric materials that will ignite flammable vapor in the presence of air are present in the confined space.

b. All confined spaces shall be mechanically ventilated to prevent accumulation of:

(1) Flammables in the atmosphere at concentrations above 10% of the LEL.

(2) Concentrations of combustible dusts.

(3) Toxic contaminants in the atmosphere above the TLV.

(4) Toxic and other contaminants having no rated TLV.

(5) Oxygen excess or deficient atmospheres.

c. Only air or steam driven air movers shall be used to ventilate confined spaces. Use of electric powered ventilators is strictly prohibited.

d. Oxygen shall not be used to power air-driven ventilators.

e. A qualified person shall check periodically to ensure that contaminated air from a confined space is exhausted to a location where it presents no hazard.

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f. Whenever possible, air movers shall be used with ducting to increase the efficiency of ventilation in the confined space and to prevent recirculation of contaminated air due to ventilation "short circuiting".

g. When two or more air movers are used for ventilation, all such units should be operated in the same flow direction to maximize efficiency, i.e., all in the exhaust mode or all in the supply mode.

4. Employee Training and Indoctrination

a. Employees assigned to work in confined spaces shall have completed formal classroom and practical training which shall include the following:

(1) Types of confined spaces associated with the industrial activity;

(2) Chemical and physical hazards involved;

(3) Safe work practices and techniques;

(4) Testing requirements, evaluation, and test methods;

(5) Safety equipment, to include:

(a) Respiratory Protective Devices,

(b) Protective clothing, and other protection such as harnesses, lifelines, eye protection, etc.

(c) Explosion proof lighting, power cords, and connectors;

(6) Emergency first aid and rescue procedures for safety-standby personnel;

(7) Applicable federal, state, and local regulations;

(8) IT Corporation confined space entry policies and procedures.

b. Tailgate Safety Meetings detailing specific hazards of the work to be performed and safety precautions and procedures specific for the job shall be conducted by a qualified person at the beginning of each shift, for each job, and shall be documented in writing by use of ITC Form 9540-1 (attachment 8), in accordance with ITC PRO 9540.1 Tailgate Safety Meetings.

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c. Retraining - Personnel shall be retrained for the subject areas listed in "4.a." above at least annually.

Proof of training and retraining shall be fully documented in writing. Records shall be maintained by the Corporate Training Department.

d. The aforenamed training shall be complemented with effective, on-going on-the-job training and one-on-one instruction by regional management, as part of standard employee supervision, and to the extent necessary to assure compliance with this directive, other IT Corporation policies and procedures, and good health and safety practices.

5. Illumination

When temporary lighting is used in confined spaces, the following requirements shall be met:

a. All lighting shall be approved for use in Class I, Division I, Groups A, B, C and D atmospheres.

b. Extension cords used for temporary lighting shall be equipped with connectors or switches approved for hazardous locations.

c. Temporary lighting shall be equipped with adequate guards to prevent accidental contact with the bulb.

d. The lighting shall not be suspended by the electric cords, unless they are designed for this method of suspension.

e. Electric cords shall be kept clear of working spaces and walkways or other locations in which they may be exposed to damage.

f. Temporary lighting and electric cords shall be inspected regularly for signs of damage to insulation and wiring.

B. Personal Protective Devices

1. Confined Space, Class "A" - Entry into class "A" confined spaces is presently prohibited. Contact the Health and Safety Department for information, if necessary.

2. Confined Space, Class "B-1" - When the atmosphere of the confined space to be entered is found to contain contaminants at concentrations in the class B-1 range, as defined in Section VI.D.1. and the concentration cannot be reduced by mechanical ventilation, the following requirements shall be met:

1-1

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a. Employees entering the confined space shall be equipped with positive pressure air-line air-supplied respirators with breathing air supplied from breathing air compressors, as described in ITC PRO 9561; or compressed breathing air cylinders manifolded to a "cascade" system as described in ITC PRO 9561.

b. Employees entering the confined space shall be equipped with body harness and lifelines as follows:

(1) A Class II chest harness may be used for side entry (opening not greater than three and one half feet from ground level) where there is no vertical free fall hazard. A quick release catch, which permits escape in case of lifeline fouling, shall be used.

(2) When entry must be made through a top opening, the harness shall be a Class III full-body parachute type that will suspend a person in an upright position. A man-rated hoisting device shall be provided for lifting employees out of the space.

c. At least one employee shall stand by on the outside of the confined space ready to give assistance in case of an emergency.

The employee shall have an approved, maintained, self-contained breathing apparatus ready for donning.

The standby person shall also have a lifeline and harness and all other protective gear required for entry.

d. All employees, including the standby person, shall use applicable protective equipment, such as head and eye protection, gloves, boots, and impervious clothing, as required by the nature of the residues to be removed and atmospheric contaminants.

3. Confined Space, Class "B-2" - When the atmosphere of the confined space to be entered is found to contain contaminants at concentrations in the class B-2 range, as defined in Section VI.D.2., and the concentration cannot be reduced by mechanical ventilation, the following requirements shall be met:

a. Employees entering the confined space shall be equipped with approved air-purifying cartridge or canister respirators with appropriate cartridges or canisters, as required by the nature of the residues to be removed and atmospheric contaminants.

1-13

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b. All employees shall use applicable protective equipment, such as head and eye protection, gloves, boots, and impervious clothing, as required by the nature of the residues to be removed and atmospheric contaminants.

4. Confined Space, Class "C" - When the atmosphere of the confined space is found to be free of contaminants at or above the TLV of the most toxic contaminant present, no special modification of the work procedure should be necessary, except as indicated below:

a. Nature of the residue and the proposed cleaning process, such as mechanical cleaning of the tank surfaces, may require the use of air-purifying dust masks, head and eye protection, gloves, boots, and impervious clothing.

b. Other physical stresses such as temperature extremes and excessive noise may require the use of specialized safety equipment in any confined space.

C. Confined Space - Rescue

1. General

a. When conditions in a confined space as determined by testing of atmosphere are such that supplied-air respiratory equipment, lifelines, and harnesses are required, standby employees shall be used. They shall have been trained and drilled in rescue procedures.

b. Standby personnel shall be familiar with pertinent types of atmospheric testing, respiratory protection, rescue procedures, and the proper use of safety and rescue equipment.

c. Rescuers shall be instructed not to enter a confined space unless others are notified and standing by in case additional help is required.

d. Tanks, vessels, or other confined spaces with both side and top openings shall be entered from side openings when practical.

(1) A Class II chest harness may be used for side entry (not greater than three and one half feet from ground level) where there is no vertical free fall hazard. A quick-release catch, which permits escape in case of lifeline fouling, shall be used.

(2) When entry must be made through a top opening, the following requirements shall also apply.

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(a) The safety belt shall be of the parachute harness type (Class III, full body) that suspends a person in an upright position.

(b) A man-rated hoisting device shall be provided for lifting employees out of the space.

e. An OSHA Emergency phone number list (attachment C) with numbers entered that are geographically appropriate to the job (see ITC PRO 9462) shall be posted at the job site.

f. A Supervisors Employee Injury Report, when appropriate, shall be completed. Other provisions of ITC PRO 9462 "Industrial Injuries & Illnesses", as appropriate, shall be carried out.

g. If emergency medical personnel are needed they shall be summoned in accordance with ITC PRO 9462.

2. Standby Personnel

a. Definition - Individuals physically capable of rescuing by use of hoist, lifeline & harness, or entry into a confined space and who have current training in:

(1) Cardiopulmonary resuscitation (CPR)

(2) First aid

(3) Air-supplied respiratory protective equipment

(4) Self-contained supplied-air respiratory protective equipment.

b. Duties

(1) When conditions are such that air-supplied respiratory protective equipment and lifelines & harnesses are required, at least one employee shall stand by on the outside of the confined space ready to give assistance in case of an emergency.

(2) When conditions become immediately dangerous to life or health, at least one additional employee, who may have other duties, shall be within sight or call of the primary standby employee(s).

(3) The employee shall have an approved, maintained, self-contained respiratory protective device outside of the carrying case, ready for donning.

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(4) If a lifeline & harness are required for work inside the confined space the standby shall wear the same.

(5) An effective means of communication between employees inside a confined space and a standby employee shall be provided and used whenever atmospheric conditions of the confined space require the use of air-supplied respiratory protective equipment, lifelines & harnesses, or whenever employees inside a confined space are out of sight of the standby employee(s).

All affected employees shall be trained in the use of such communication system and the system shall be tested before each use to confirm its effective operation.

(6) Prior to the worker entry into the confined space the standby employee shall have determined, and entered in the "Special Instructions" section of Attachment A, the location of the nearest:

(a) Fire alarm

(b) Phone

(c) Fire extinguisher

(d) Eyewash and shower (tests shall be performed by the standby to be sure the equipment is in proper working order).

(7) The standby employee(s) will enter the vessel only after alerting at least one additional employee outside the confined space of the existence of an emergency and of the standby employee's intent to enter the confined space, and only in case of emergency such as:

(a) A worker inside suffers an injury

(b) A worker inside indicates breathing difficulties

(8) The standby shall call the worker(s) out of the vessel:

(a) If the standby employee(s) has to leave for any reason

(b) If an emergency signal or alarm is sounded

(c) If the standby employee(s) detects or suspects presence of any harmful substance.

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INSPECTIONS AND TESTS FOR ENTRY INTO CONFINED SPACES

Date _____
Job Number _____
Page _____ of _____

Division: _____ Division Location: _____
Customer: _____ Customer Address: _____
General Job Location: _____ Tank Or Vessel No. / Name: _____
Describe Material In Space: _____
Description Of Work Planned: _____ Chemicals Introduced Into Space: _____

TESTS

TIME	PERCENT LOWER EXPLOSION LIMIT	PERCENT OXYGEN	BENZENE (ppm)	TOLUENE (ppm)	XYLENE (ppm)	H_2S (ppm)	CO (ppm)	OTHERS _____ (ppm)	_____ (ppm)	_____ (ppm)	ATMOSPHERE CLASS	INI

CHECK LIST

	Initial: Yes	Initial: Does Not Apply
All lines leading to and from confined space have been blinded or disconnected.		
Electrical service disconnected or locked out.		
All grounding and bonding cables in place.		
All lighting, fittings, and extension cords are approved explosion proof equipment.		
Ground Fault Circuit Indicator (GFCI) checked and functioning.		
All ignition sources have been isolated.		
Breathing supply and alarms checked and are in proper condition.		
The complete respiratory supply system has been checked and is in proper condition.		
All safety harnesses and life lines checked and in proper condition.		
Required protective clothing, gloves, boots, etc., being used.		
Employees have been trained in the use, care, and limitations of their respiratory protective equipment.		
Outside safety watch trained in emergency procedures and resuscitation.		
Vessel contains leaded product.		
All emergency systems such as air packs, fire extinguishers, backup breathing supply, alarms, etc., ready for use.		
Special warning / caution signs posted.		
Ventilation equipment in use.		
No employee with facial hair, eye glasses, or other gas tight seal obstructions will do work which requires a respirator, or act as emergency standby.		
Employees will not wear contact lenses in an atmosphere where a respirator is required.		

PERSONNEL PROTECTIVE EQUIPMEN

EYES
- ☐ Chemical Goggles
- ☐ Face Shield
- ☐ Safety Glasses

EXTREMITIES
- ☐ Hard Hat
- ☐ Gloves
- ☐ Boots ☐ PVC ☐ Neoprene
- ☐ Hoods ☐ PVC ☐ Neoprene
- ☐ Foot Coverings, Disposable ☐ Latex ☐ White Nylon

BODY
- Encapsulating Suit: ☐ PVC ☐
- Heavy Suit: ☐ PVC ☐ Neoprene
- Intermediate Suit: ☐ PVC ☐
- Light Suit: ☐ PVC ☐ Other
- Tyvek Suit: ☐ White ☐ Yellow ☐

RESPIRATORY
- ☐ Self-Contained Respirato
- ☐ Air Line Respirator
- ☐ Air Line W/Egress
- ☐ Cartridge Respirator

Cartridge Type _____

OTHER
- ☐ Hearing Protection
- ☐ Parachute Harness and Lifeline (Top Entry)
- ☐ Chest Harness and Lifeline (Side Entry)

Special Instructions: _____

Qualified Person _____ (Name Printed) _____ (Signature) _____ (Date)

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Diagram the Confined Space. Indicate the location of manways and ventilators Indicate the locations where tests were conducted.

View From Top (Indicate North)	View From Side

—) (— **MANWAYS** (∞) **VENTILATOR** **X- TEST LOCATIO.**

THIS LOG OF INSPECTIONS AND TESTS FOR PERMIT TO ENTER A CONFINED SPACE IS APPLICABLE AND VALID **ONLY FOR ONE SHIFT AND ONLY FOR THE EMPLOYEES** DESIGNATED BELOW.

EMPLOYEES ASSIGNED (PRINT NAMES)

STANDBY PERSON(s) ASSIGNED (PRINT NAMES)

QUALIFIED PERSON(s) (PRINT NAMES)

SUPERVISOR PRINT NAME _____

SIGNATURE _____ DATE _____

SEE REVERSE

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BRC 0704

IT TAILGATE SAFETY MEETING

Division/Subsidiary _____ Facility _____

Date _____ Time _____ Job Number _____

Customer _____ Address: _____

Specific Location _____

Type of Work _____

Chemicals Used _____

SAFETY TOPICS PRESENTED

Protective Clothing/Equipment _____

Chemical Hazards _____

Physical Hazards _____

Emergency Procedures _____

Hospital / Clinic _____ Phone ( ) _____ Paramedic Phone ( ) _____

Hospital Address _____

Special Equipment _____

Other _____

ATTENDEES

NAME PRINTED	SIGNATURE

Meeting conducted by:

_____ NAME PRINTED _____ SIGNATURE

Supervisor _____ Manager _____

ITC Form 9540-1C (Revised 10/84)

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IT NUMBERS TO KNOW:

EMERGENCY NUMBERS

Ambulance	911
Doctor	911
Hospital	911
Fire Dept.	911
Police	911
Sheriff	911
U.S. EPA (24 Hour Hotline)	800-424-8802
Chemtrec	800-424-9300
National Poison Control Center	404-588-4400

UTILITY NUMBERS

Electric Co.	NA
Water Co.	NA
Gas Co.	NA

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