SITE SAFETY PLAN
RECORD OF SITE PROJECT TEAM REVIEW

Site Safety Plans (SSPs) are to be used for projects performed at potentially hazardous sites by Natural Resource Group (NRG) personnel.

ALL NRG STAFF WORKING AT A SITE REQUIRING THE PREPARATION OF A SITE SAFETY PLAN WILL SIGN THIS PAGE DOCUMENTING THEY HAVE READ AND UNDERSTOOD THE REQUIREMENTS OF THE SITE SAFETY PLAN AND THEIR INDIVIDUAL RESPONSIBILITIES.

I verify that I have read the attached Site Safety Plan (SSP) and I understand and will comply with the requirements of this SSP.

Name/Signature		DATE
Mark Mason/	Project Manager	2-6-07
Steve Lorentz/	Site Safety Officer	
	Site Team Member	
	Site Team Member	
	Site Team Member	
	Site Team Member	
	Site Team Member	

A. GENERAL INFORMATION

PROJECT: Phase II Site Investigation

NRG PROJECT NUMBER: NRT2006-057.02

LOCATION: Roblin Steel Site, Tonawanda, New York

PLAN PREPARED BY: Dan Opsahl

DATE: February 6, 2007

PLAN REVIEWED BY: Mark Mason

DATE: February 6, 2007

OBJECTIVE(S): The purpose of this Site Safety Plan is to identify and protect NRG employees from health and safety hazards they might encounter in the performance of:

PLANNED FIELD ACTIVITIES: Soil boring/monitoring well installations/well sampling/test pit installations. Figure 1 shows location of site, Figure 2 shows test pit locations, and Figure 3 shows well locations.

ANTICIPATED DATE OF FIELD ACTIVITIES: February, 2007 through April, 2007

DOCUMENTATION SUMMARY: OVERALL HAZARD --

Serious	_____
Moderate	_____
Low	____X
Unknown	_____

BACKGROUND INFORMATION FOR SITE HAZARDS:

Contamination of fill, soil and groundwater near and under the former Roblin Steel and Envirotek II sites with volatile organic compounds (VOCs), semi volatile organic compounds (SVOCs), Target Analyte List (TAL) metals, hexavelent chromium and cyanide. Potential buried tunnels.

B. SITE/WASTE CHARACTERISTICS

WASTE TYPE(S):

Liquid _x__ Solid _x_ Sludge ___ Gas ___

CHARACTERISTICS:

Corrosive ___ Ignitable __ Radioactive ___ Volatile __ Toxic _x__
Reactive ___ Unknown ___ Other (specific) _____

CONFINED ENTRY:

Yes _____ No __x__ (if no entry into excavation pits)

Hazards - Physical	_____
Oxygen Deficiency	_____
Explosivity	_____
Toxic Atmosphere	_____

FACILITY DESCRIPTION:

Operational Status (active, inactive, unknown): Inactive

Site Contamination History (worker or non-worker injury; complaints from public; previous agency action): The site is registered in the NYSDEC Inactive Hazardous Waste Disposal Sites and is designated as a Class 2. Typical steel manufacturing wastes consisting of slag, ash and debris.

Utilities Ownership/Location: All utilities will be located by subcontractor prior to the initiation of work.

Topography: The site was originally backfilled with slag and other industrial debris to raise the land surface above the Niagara River flood stage but the land is relatively flat with mounds of fill and concrete vaults, and underground tunnels.

Principal Disposal Method used at facility: No known disposal other than surface water pond in the northwest portion of the property.

Unusual Features: The Niagara River runs adjacent to the site. Envirotec Superfund site is part of the property.

Adjacent Site Activities: Commercial, industrial, and vacant properties surround site. Across the Niagara River is a residential neighborhood.

Heavy/Powered Equipment to be used: Soil boring truck for monitoring well installations, track excavator and hydraulic hammer for test pit and miscellaneous tools for groundwater quality sampling.

C. HAZARD EVALUATION

Parameter	TWA	STEL	LEL/UEL	DERM	EYE	INGEST
TCE	50 ppm	200 ppm	11/41%	I/T	I/T	I/T/CA
1,1-Dichloroethane	100 ppm		5.6/11.4%	I/t	I/T	I/T
Arsenic	0.01 mg/m^3 TLV					T
Lead	0.05 m mg/m^3 TWA (ACGIH)					T

I - irritant

T - toxic

CA = potential human carcinogen

D. SITE SAFETY WORK PLAN PERSONEL

Team Member	Responsibility
Mark Mason	Project Manager
Stephen Lorentz	Field Team Leader/SSO

E. MONITORING AND PERSONNEL PROTECTION

Entry Level E as described below

Other Minimum or Predetermined Level NA

PPE Upgrade:

Action Levels

Work will be conducted at level E only. If Organic Vapor Monitor exceeds 20 ppm in breathing zone for more than 5 min **stop work and Consult the NRG Site Safety Officer and Project Manager. If high levels of organic vapors persist in the breathing zone greater than 10 ppm for 10 minutes top work and consult with the NRG Site Safety Officer and Project Manager. No work above level D authorized.**

Be aware that the presence of certain contaminants may automatically require a given level of minimum protection, due to extreme toxicity and/or real time monitoring restrictions.

Action Levels: Explosimeter NA

**Requirements for Protection Levels:

Level E - Standard Work Uniform (including hard hat, eye and hearing protection, high visibility vest, safety boots and disposable gloves as needed)

Level D - Protective coverall (Tyvek, at minimum)
Protective gloves (latex or nitrile inner, viton, nitrile, etc. outer)
Steel-toed boots and outer booties
Hard hat, eye protection, hearing protection, high visibility vest

Level C - Level D + Full face respirator (impervious suit, at minimum coated Tyvek or Saranex)

Level B - Level D + Supplied air SCBA/Airline

Level A - Fully encapsulating suit + supplied air

F. CONFINED ENTRY REQUIREMENTS:

Retrieval Equipment NA

Air Supply Equipment NA

Monitoring Equipment Organic Vapor Monitor

G. PERIMETER ESTABLISHMENT:

Map/Sketch Attached establish work zones for each field locations (Attached Figures 2 and 3)

Site Secured X (by owner)

Zone(s) of Contamination Not Identified

Work Zone, Clean Zone, Decontamination Zone Identified Use standard zone configuration

H. DECONTAMINATION PROCEDURE:

Special Equipment, Facilities, or Procedures:

Standard decontamination equipment: containers for wash and rinse solutions, brushes, drop cloths, trash bags, decontamination solutions, and paper towels.

First Aid Procedures: Field first aid kit and eye wash will be on-site.

Personnel Protective Equipment Required (Type or quantity): Level E Standard Work Uniform (including hard hat, eye and hearing protection, high visibility vest, safety boots and disposable gloves as needed).

Work Limitations (Time of day, weather, heat/cold stress): During daylight hours.

Disposal of Investigation-Derived Material: No contaminated Soil/slag and groundwater will be removed from site. Disposable protective gear will be discarded and disposed as solid waste.

I. EMERGENCY INFORMATION

(To be filled in by SSO)

LOCAL RESOURCES

AMBULANCE:	911
HOSPITAL EMERGENCY ROOM:	(716)-447-6020
POISON CONTROL CENTER:	911
POLICE:	911
FIRE DEPARTMENT:	911
STATE ENVIRONMENTAL AGENCY:	(716) 851-7000
CLIENT:	

SITE RESOURCES

WATER SUPPLY:	On-site
TELEPHONE:	Field Phone
RESTROOMS:	On-site
SITE POINT OF CONTACT:	Bonnie Leto from River World (716-877-1233)
OTHER:	Glenn May NYDEC (716-851-7220)

J. EMERGENCY CONTACTS

1.	NRG Main Number	(612) 347-6789
2.	NRG Safety Coordinator	(612) 215-6082
3.	NRG Project Manager	(612) 215 6082

K. EMERGENCY ROUTES

(Include road or other directions; attach map with routes highlighted - to be filled out by Site Safety Officer)

HOSPITAL: Kenmore Mercy Hospital, 2950 Elmwood Ave, Kenmore, New York, 14217 (716)-447-6020 Directions from Roblin Steel Site/Envirotek II site to Kenmore Mercy Hospital

1) Start out going SOUTHEAST on RIVER RD / NY-266 toward JAMES AVE (1.2 miles)
2) Turn LEFT onto NY-325 / SHERIDAN DR (1.4 miles)
3) Turn SLIGHT RIGHT onto NY-324 E / SHERIDAN DR (1.1 miles)
4) Turn RIGHT onto ELMWOOD AVE / CR-119 (0.1 miles)
5) End at 2950 Elmwood Ave Kenmore, NY 14217-1304, US

Total distance roughly four miles with an estimated time of eight minutes

OTHER:

L. SITE SKETCH

(Attached)

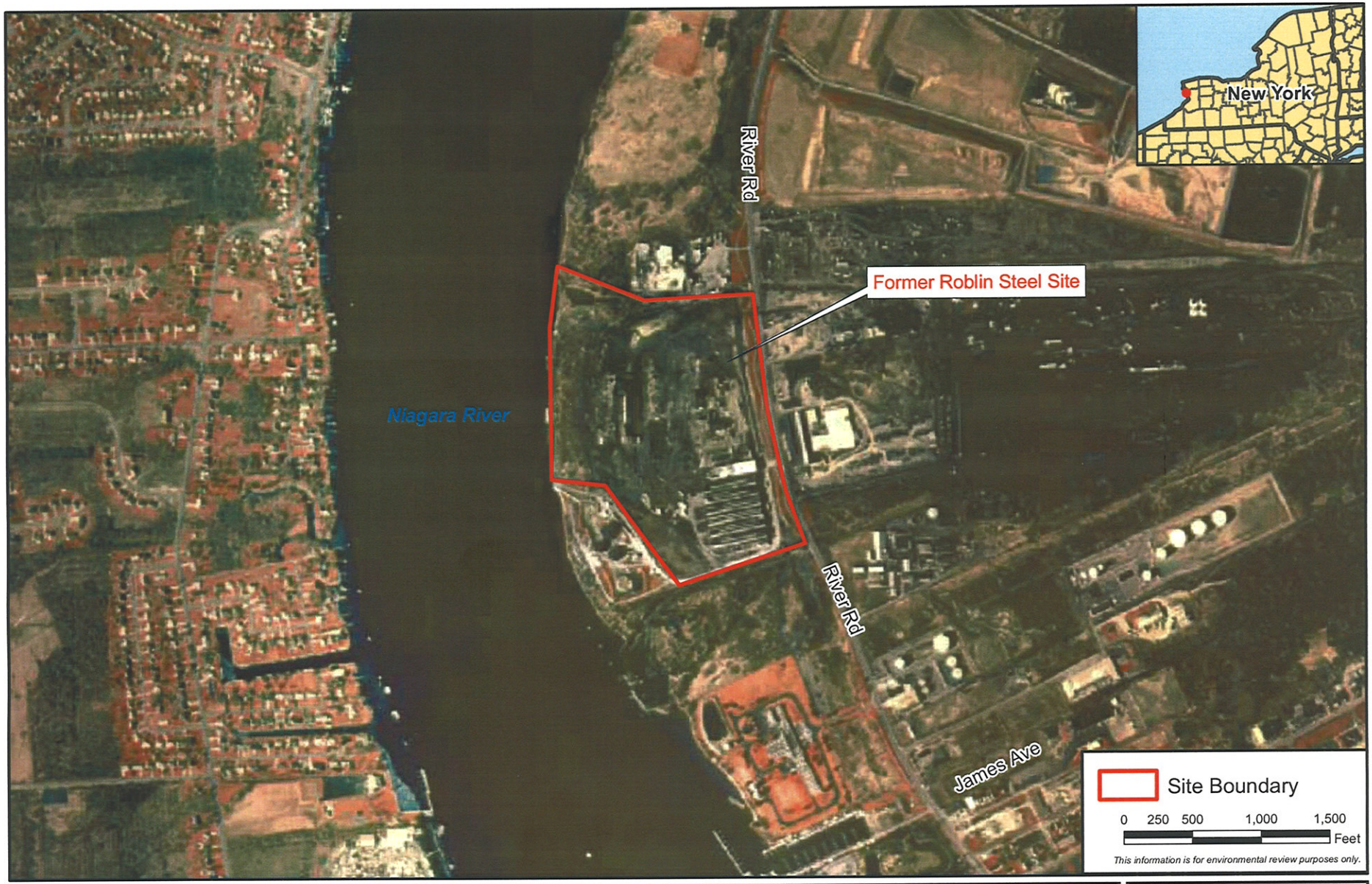
M. EMERGENCY INCIDENT REPORT

Date: _____ Site: _____

Personnel involved:

Description of incident (personnel, times, event):
First Aid and Emergency Assistance required:

SSO _____
Date _____



NRG Thermal

Figure 1-1
Site Location
Tonawanda, NY

DATE:	10/12/06
REVISED:	02/06/07
SCALE:	1:12,000
DRAWN BY:	JPBOENTJE
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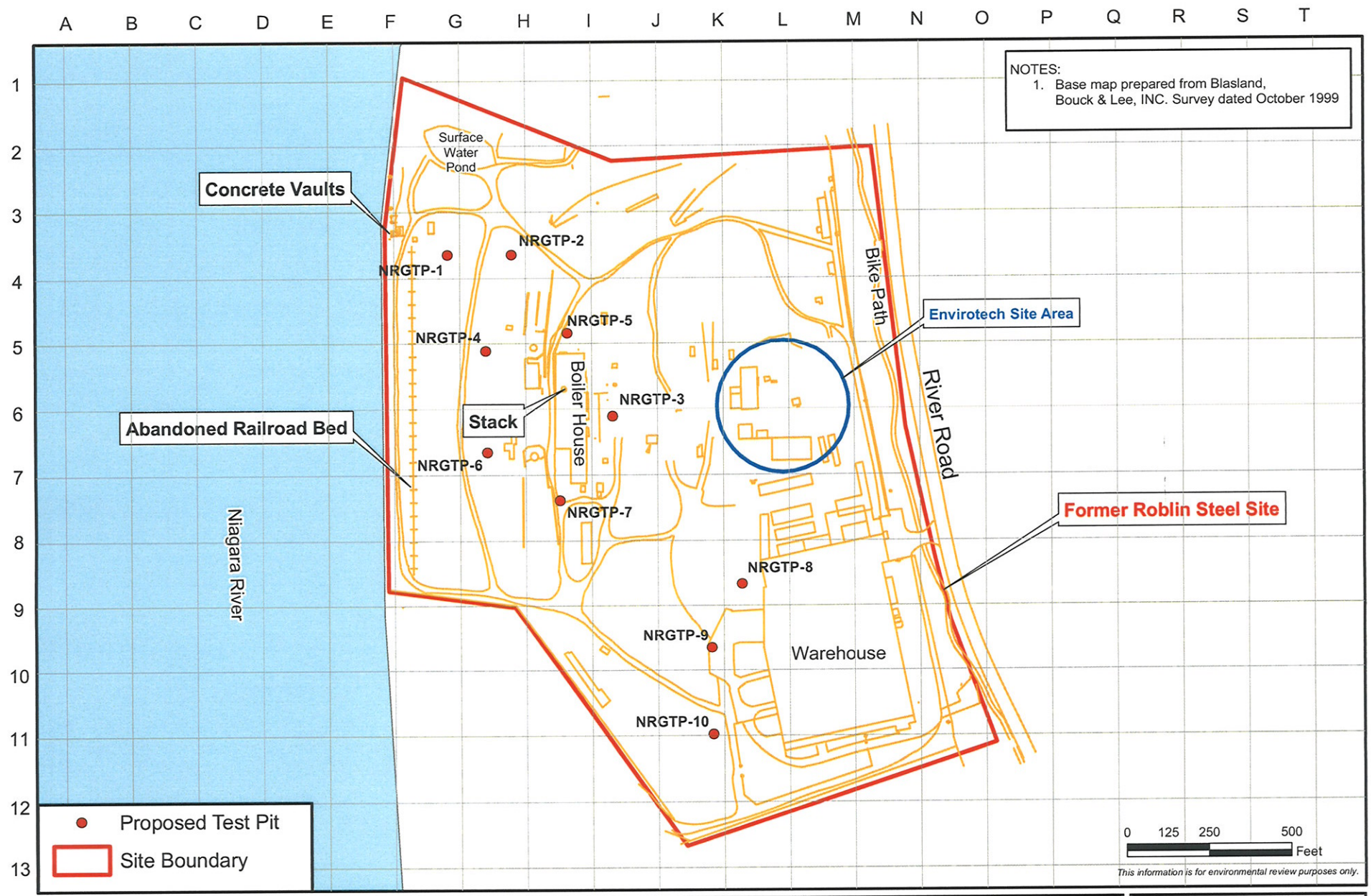
NATURAL RESOURCE GROUP, INC.



NRG Thermal

Figure 2
Proposed Test Pit Locations
Tonawanda, NY

DATE: 10/12/06
REVISED: 02/06/07
SCALE: 1:4,900
DRAWN BY: JPBOENTJE
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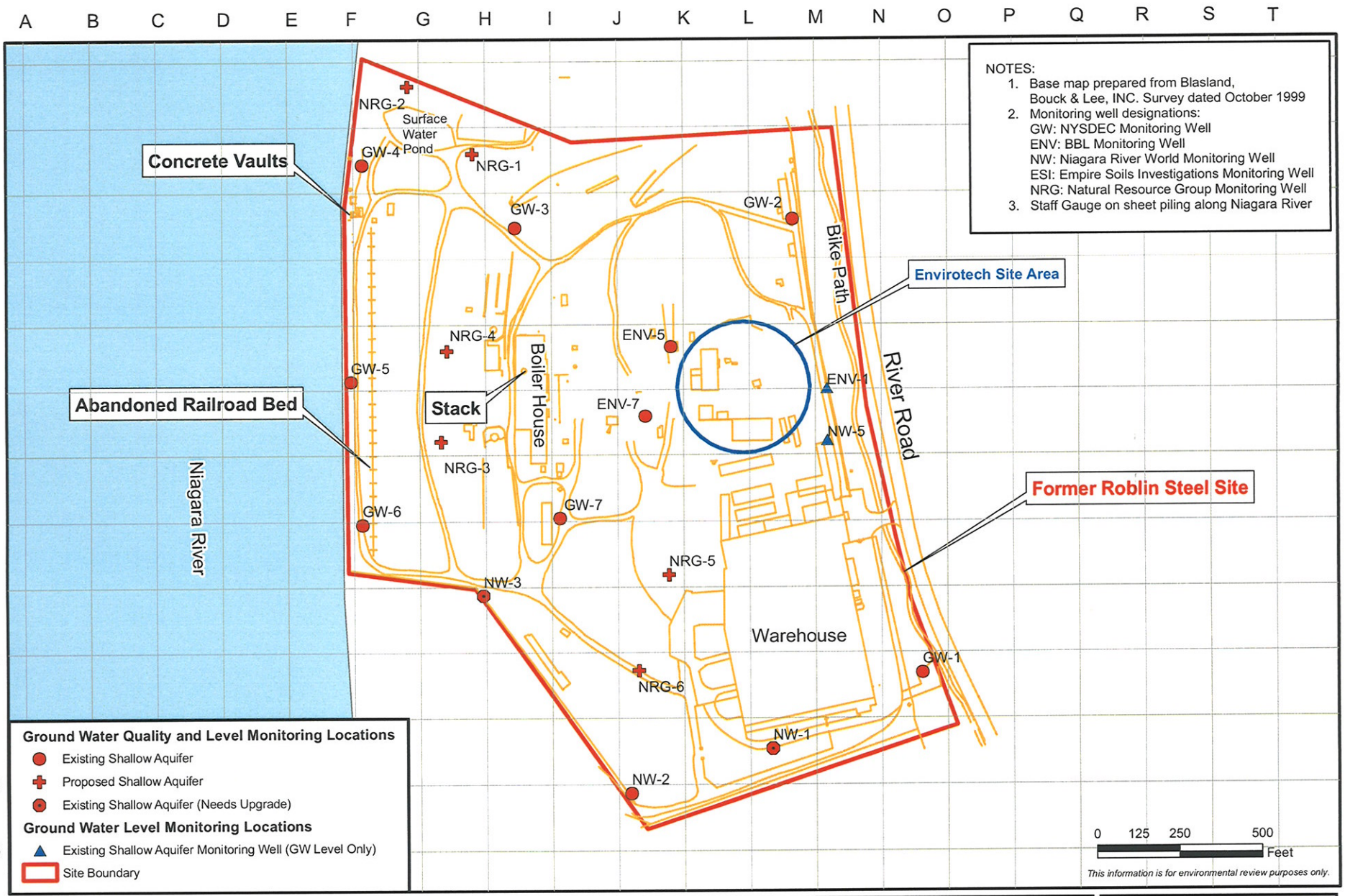

NRG Thermal

Figure 3
Proposed Monitoring Well Sample Array
Tonawanda, NY

DATE: 10/12/06
REVISED: 02/06/07
SCALE: 1:4,900
DRAWN BY: JPBOENTJE
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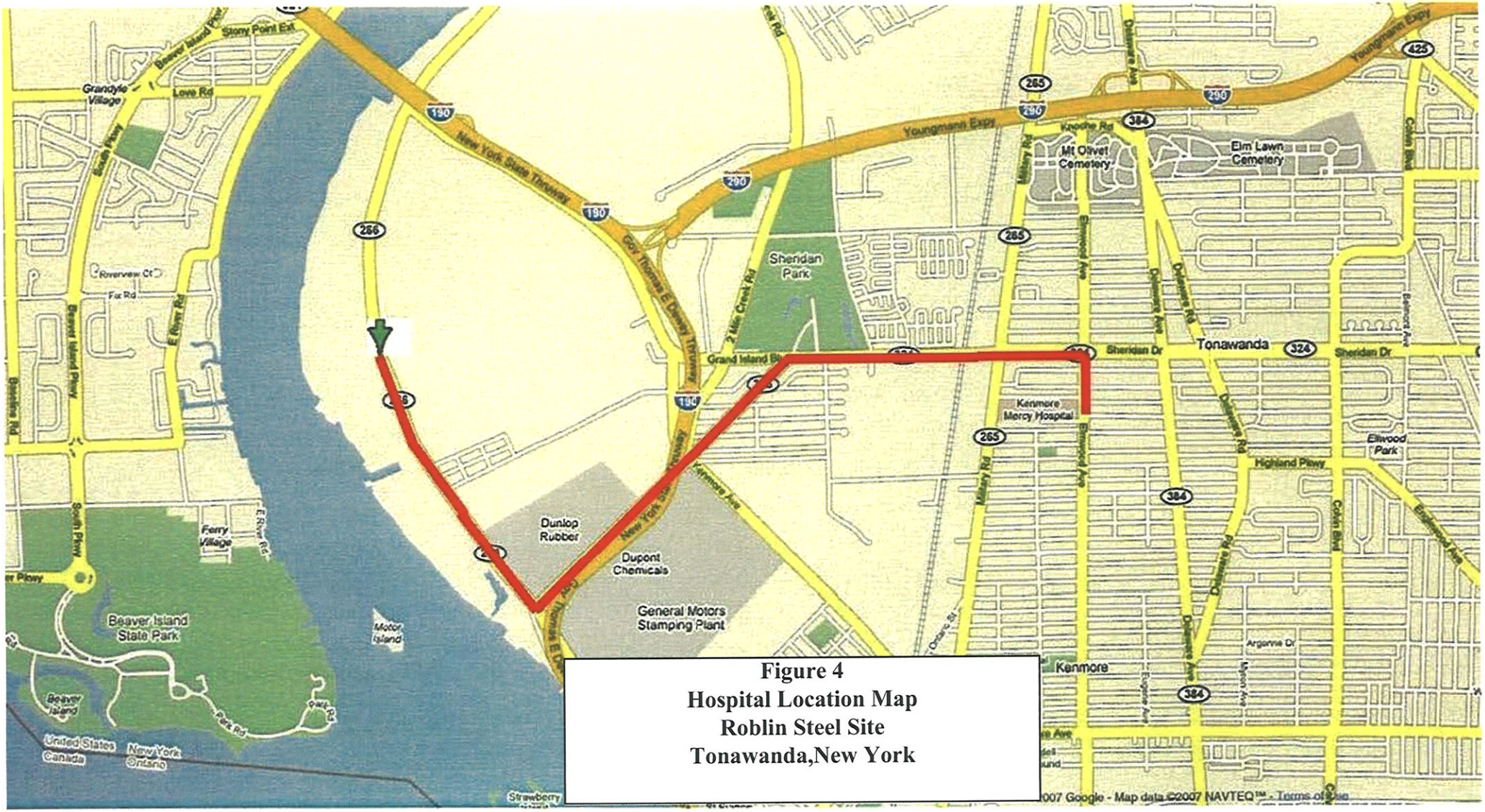

Figure 4
Hospital Location Map
Roblin Steel Site
Tonawanda,New York

Material Safety Data Sheet

Trichloroethylene, reagent ACS, stabilized with 0.5% ethanol

ACC# 01651

Section 1 - Chemical Product and Company Identification

MSDS Name: Trichloroethylene, reagent ACS, stabilized with 0.5% ethanol
Catalog Numbers: AC421520000, AC421520040, AC421520200, AC421525000
Synonyms: Ethylene trichloride; triclene; trichloroethene; benzinol cecolene
Company Identification:

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

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

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
79-01-6	Trichloroethylene	100	201-167-4
64-17-5	Ethyl alcohol	0.5	200-578-6

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear, colorless liquid.
Warning! Causes eye and skin irritation. Aspiration hazard if swallowed. Can enter lungs and cause damage. May cause central nervous system depression. May cause cancer based on animal studies. Potential cancer hazard. May cause liver damage.
Target Organs: Central nervous system, liver, eyes, skin.

Potential Health Effects
Eye: Causes moderate eye irritation. May result in corneal injury. Contact produces irritation, tearing, and burning pain.
Skin: Causes mild skin irritation. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis. May cause peripheral nervous system function impairment including persistent neuritis, and temporary loss of touch. Damage to the liver and other organs has been observed in workers who have been overexposed.
Ingestion: Aspiration hazard. May cause irritation of the digestive tract. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.
Inhalation: Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. May cause respiratory tract irritation. May cause liver abnormalities. May cause peripheral nervous system effects.
Chronic: Possible cancer hazard based on tests with laboratory animals. Chronic inhalation may cause effects similar to those of acute inhalation. Prolonged or repeated skin contact may cause defatting and dermatitis. May cause peripheral nervous system function impairment including persistent neuritis, and temporary loss of touch. Damage to the liver and other organs has been observed in workers who have been overexposed.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid imme diately.
Skin: Get medical aid if irritation develops or persists. Flush skin with plenty of soap and water.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Possible aspiration hazard. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors can travel to a source of ignition and flash back. Combustion generates toxic fumes. Containers may explode in the heat of a fire.
Extinguishing Media: Use water spray to cool fire-exposed containers. Use water spray, dry chemical, carbon dioxide, or chemical foam.
Flash Point: Not applicable.
Autoignition Temperature: 778 deg F (414.44 deg C)
Explosion Limits, Lower:12.5
Upper: 90.0
NFPA Rating: (estimated) Health: 2; Flammability: 1; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use only in a well-ventilated area. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.
Storage: Keep away from sources of ignition. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Trichloroethylene	50 ppm TWA; 100 ppm STEL	1000 ppm IDLH	100 ppm TWA; 200 ppm Ceiling
Ethyl alcohol	1000 ppm TWA	1000 ppm TWA; 1900 mg/m3 TWA 3300 ppm IDLH	1000 ppm TWA; 1900 mg/m3 TWA

OSHA Vacated PELs: Trichloroethylene: 50 ppm TWA; 270 mg/m3 TWA Ethyl alcohol: 1000 ppm TWA; 1900 mg/m3 TWA

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: clear, colorless
Odor: sweetish odor - chloroform-like
pH: Not available.
Vapor Pressure: 58 mm Hg @20C
Vapor Density: 4.53
Evaporation Rate:0.69 (CCl4=1)
Viscosity: 0.0055 poise
Boiling Point: 189 deg F
Freezing/Melting Point:-121 deg F
Decomposition Temperature: Not available.
Solubility: Insoluble in water.
Specific Gravity/Density:1.47 (water=1)
Molecular Formula:C2HCl3
Molecular Weight:131.366

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Light.
Incompatibilities with Other Materials: Alkalis (sodium hydroxide), chemically active metals (aluminum, beryllium, lithium, magnesium), epoxies and oxidants. Can react violently with aluminum, barium, lithium, magnesium, liquid oxygen, ozone, potassium hydroxide, potassium nitrate, sodium, sodium hydroxide, titanium, and nitrogen dioxide. Reacts with water under heat and pressure to form hydrogen chloride gas.
Hazardous Decomposition Products: Hydrogen chloride, carbon dioxide, chloride fumes.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 79-01-6: KX4550000
CAS# 64-17-5: KQ6300000
LD50/LC50:
CAS# 79-01-6:
Draize test, rabbit, eye: 20 mg/24H Moderate;
Draize test, rabbit, skin: 2 mg/24H Severe;
Inhalation, mouse: LC50 = 8450 ppm/4H;

Inhalation, mouse: LC50 = 220000 mg/m3/20M;
Inhalation, mouse: LC50 = 262000 mg/m3/30M;
Inhalation, mouse: LC50 = 40000 mg/m3/4H;
Inhalation, rat: LC50 = 140700 mg/m3/1H;
Oral, mouse: LD50 = 2402 mg/kg;
Oral, mouse: LD50 = 2400 mg/kg;
Oral, rat: LD50 = 4920 mg/kg;
Skin, rabbit: LD50 = >20 gm/kg;
Skin, rabbit: LD50 = 20 mL/kg;

.

CAS# 64-17-5:
Draize test, rabbit, eye: 500 mg Severe;
Draize test, rabbit, eye: 500 mg/24H Mild;
Draize test, rabbit, skin: 20 mg/24H Moderate;
Inhalation, mouse: LC50 = 39 gm/m3/4H;
Inhalation, rat: LC50 = 20000 ppm/10H;
Oral, mouse: LD50 = 3450 mg/kg;
Oral, rabbit: LD50 = 6300 mg/kg;
Oral, rat: LD50 = 7060 mg/kg;
Oral, rat: LD50 = 9000 mg/kg;

.

Carcinogenicity:
CAS# 79-01-6:

- **ACGIH:** Not listed.
- **California:** carcinogen, initial date 4/1/88
- **NTP:** Suspect carcinogen
- **IARC:** Group 2A carcinogen

CAS# 64-17-5: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: Suspected carcinogen with experimental carcinogenic, tumorigenic, and teratogenic data.
Teratogenicity: No information available.
Reproductive Effects: Experimental reproductive effects have been observed.
Mutagenicity: Human mutation data has been reported. IARC and the National Toxicology Program (NTP) stated that variability in the mutagencity test results with trichloroethylene may be due to the presence of various stabilizers used in TCEwhich are mutagens (e.g.epoxybutane, epichlorohydrin).See actual entry in RTECS for complete infomation.R68 Mutagen Category 3 (CHIP 2002, UK).
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. Bluegill sunfish, LD50= 44,700 ug/L/96Hr. Fathead minnow, LC50=40.7 mg/L/96Hr.
Environmental: In air, substance is photooxidized and is reported to form phosgene, dichloroacetyl chloride, and formyl chloride. In water, it evaporates rapidly.
Physical: No information available.
Other: None.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 79-01-6: waste number U228.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	TRICHLOROETHYLENE	No information available.
Hazard Class:	6.1	
UN Number:	UN1710	
Packing Group:	III	

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 79-01-6 is listed on the TSCA inventory.
CAS# 64-17-5 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
CAS# 79-01-6: 100 lb final RQ; 45.4 kg final RQ
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 79-01-6: immediate, delayed, reactive.
CAS # 64-17-5: immediate, delayed, fire.
Section 313
This material contains Trichloroethylene (CAS# 79-01-6, 100%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR
Clean Air Act:
CAS# 79-01-6 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
CAS# 79-01-6 is listed as a Hazardous Substance under the CWA. CAS# 79-01-6 is listed as a Priority Pollutant under the Clean Water Act. CAS# 79-01-6 is listed as a Toxic Pollutant under the Clean Water Act.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 79-01-6 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.
CAS# 64-17-5 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Trichloroethylene, a chemical known to the state of California to cause cancer.
WARNING: This product contains Ethyl alcohol, a chemical known to the state of California to cause developmental reproductive toxicity.
California No Significant Risk Level: CAS# 79-01-6: 50 æg/day NSRL (oral); 80 æg/day NSRL (inhalation)

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T

Risk Phrases:

R 36/38 Irritating to eyes and skin.
R 45 May cause cancer.
R 52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R 67 Vapours may cause drowsiness and dizziness.
R 68 Possible risk of irreversible effects.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 53 Avoid exposure - obtain special instructions before use.
S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)

CAS# 79-01-6: 3
CAS# 64-17-5: 0

Canada - DSL/NDSL

CAS# 79-01-6 is listed on Canada's DSL List.
CAS# 64-17-5 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D1B, D2B.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 79-01-6 is listed on the Canadian Ingredient Disclosure List.
CAS# 64-17-5 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 9/02/1997
Revision #7 Date: 10/03/2005

1,1-DICHLOROETHANE

0249
September 1993

CAS No: 75-34-3
RTECS No: KI0175000
UN No: 2362
EC No: 602-011-00-1

Ethane, 1,1-dichloro-
Ethylidene chloride
CH_3CHCl_2
Molecular mass: 99.0

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Highly flammable. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking.	Water spray, foam, powder, carbon dioxide.
EXPLOSION	Vapour/air mixtures are explosive.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		**PREVENT GENERATION OF MISTS!**	
Inhalation	Dizziness. Drowsiness. Dullness. Nausea. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Dry skin. Roughness.	Protective gloves	Remove contaminated clothes. Rinse skin with plenty of water or shower.
Eyes	Redness. Pain.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion	Burning sensation. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Personal protection: self-contained breathing apparatus.	F Symbol Xn Symbol R: 11-22-36/37-52/53 S: (2-)16-23-61 UN Hazard Class: 3 UN Pack Group: II Marine pollutant.

EMERGENCY RESPONSE	SAFE STORAGE
Transport Emergency Card: TEC (R)-30GF1-I+II NFPA Code: H 2; F 3; R 0	Fireproof. Separated from: see Chemical Dangers. Cool.

IPCS
International Programme on Chemical Safety

Prepared in the context of cooperation between the International Programme on Chemical Safety and the European Commission

IMPORTANT DATA

Physical State; Appearance
COLOURLESS LIQUID, WITH CHARACTERISTIC ODOUR.

Physical dangers
The vapour is heavier than air and may travel along the ground; distant ignition possible.

Chemical dangers
The substance decomposes on heating and on burning producing toxic and corrosive fumes including phosgene (see ICSC 0007) and hydrogen chloride (see ICSC 0163). Reacts violently with strong oxidants, alkali metals and earth-alkali metals, powdered metals, causing fire and explosion hazard. Attacks aluminium, iron and polyethylene. Contact with strong caustic will cause formation of flammable and toxic acetaldehyde gas.

Occupational exposure limits
TLV: 100 ppm as TWA; A4 (not classifiable as a human carcinogen); (ACGIH 2004).
MAK: 100 ppm, 410 mg/m^3; Peak limitation category: II(2); Pregnancy risk group: D; (DFG 2004).

Routes of exposure
The substance can be absorbed into the body by inhalation and by ingestion.

Inhalation risk
A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20 C.

Effects of short-term exposure
The substance may cause effects on the central nervous system. Exposure at high levels may result in unconsciousness.

Effects of long-term or repeated exposure
The liquid defats the skin. The substance may have effects on the kidneys and liver.

PHYSICAL PROPERTIES

Boiling point: 57 C
Melting point: -98 C
Relative density (water = 1): 1.2
Solubility in water, g/100 ml at 20 C: 0.6
Vapour pressure, kPa at 20 C: 24
Relative vapour density (air = 1): 3.4
Flash point: -6 C c.c.
Auto-ignition temperature: 458 C
Explosive limits, vol% in air: 5.6-11.4
Octanol/water partition coefficient as log Pow: 1.8

ENVIRONMENTAL DATA

NOTES

Do NOT use in the vicinity of a fire or a hot surface, or during welding.
Card has been partly updated in October 2005. See sections Occupational Exposure Limits, EU classification, Emergency Response.

ADDITIONAL INFORMATION

ARSENIC

0013
October 1999

CAS No: 7440-38-2
RTECS No: CG0525000
UN No: 1558
EC No: 033-001-00-X

Grey arsenic
As
Atomic mass: 74.9

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Combustible. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames. NO contact with strong oxidizers. NO contact with hot surfaces.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Risk of fire and explosion is slight when exposed to hot surfaces or flames in the form of fine powder or dust.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		**PREVENT DISPERSION OF DUST! AVOID ALL CONTACT! AVOID EXPOSURE OF (PREGNANT) WOMEN!**	**IN ALL CASES CONSULT A DOCTOR!**
Inhalation	Cough. Sore throat. Shortness of breath. Weakness. See Ingestion.	Closed system and ventilation.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
Skin	Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
Eyes	Redness.	Face shield or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion	Abdominal pain. Diarrhoea. Nausea. Vomiting. Burning sensation in the throat and chest. Shock or collapse. Unconsciousness.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING	
Evacuate danger area! Sweep spilled substance into sealable containers. Carefully collect remainder, then remove to safe place. Chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment.	T Symbol N Symbol R: 23/25-50/53 S: (1/2-)20/21-28-45-60-61 UN Hazard Class: 6.1 UN Pack Group: II	Do not transport with food and feedstuffs. Marine pollutant.

EMERGENCY RESPONSE	SAFE STORAGE
Transport Emergency Card: TEC (R)-61GT5-II	Separated from strong oxidants, acids, halogens, food and feedstuffs. Well closed.

IPCS
International Programme on Chemical Safety

Prepared in the context of cooperation between the International Programme on Chemical Safety and the European Commission

IMPORTANT DATA

Physical State; Appearance
ODOURLESS, BRITTLE, GREY, METALLIC-LOOKING CRYSTALS.

Chemical dangers
Upon heating, toxic fumes are formed. Reacts violently with strong oxidants and halogens, causing fire and explosion hazard. Reacts with acids to produce toxic arsine gas (see: ICSC 0222).

Occupational exposure limits
TLV: 0.01 mg/m^3 as TWA; A1 (confirmed human carcinogen); BEI issued; (ACGIH 2004).
MAK: Carcinogen category: 1; Germ cell mutagen group: 3A; (DFG 2004).

Routes of exposure
The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.

Inhalation risk
Evaporation at 20 C is negligible; a harmful concentration of airborne particles can, however, be reached quickly, when dispersed.

Effects of short-term exposure
The substance is irritating to the eyes, the skin and the respiratory tract. The substance may cause effects on the gastrointestinal tract, cardiovascular system, central nervous system and kidneys, resulting in severe gastroenteritis, loss of fluid, and electrolytes, cardiac disorders, shock, convulsions and kidney impairment. Exposure above the OEL may result in death. The effects may be delayed. Medical observation is indicated.

Effects of long-term or repeated exposure
Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the mucous membranes, skin, peripheral nervous system, liver and bone marrow, resulting in pigmentation disorders, hyperkeratosis, perforation of nasal septum, neuropathy, liver impairment, anaemia. This substance is carcinogenic to humans. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

PHYSICAL PROPERTIES

Sublimation point: 613 C
Density: 5.7 g/cm^3

Solubility in water: none

ENVIRONMENTAL DATA

The substance is toxic to aquatic organisms. It is strongly advised that this substance does not enter the environment.

NOTES

The substance is combustible but no flash point is available in literature.
Depending on the degree of exposure, periodic medical examination is suggested.
Do NOT take working clothes home.
Refer also to cards for specific arsenic compounds, e.g., Arsenic pentoxide (ICSC 0377), Arsenic trichloride (ICSC 0221), Arsenic trioxide (ICSC 0378), Arsine (ICSC 0222).
Card has been partly updated in October 2004. See sections Occupational Exposure Limits, EU classification, Emergency Response.
Card has been partly updated in October 2005 in section Effects of long-term or repeated exposure.

ADDITIONAL INFORMATION

HIGH-PURITY STANDARDS
P.O. Box 41727
Charleston, SC 29423

Phone: (843) 767-7900
Fax: (843) 767-7906

MATERIAL SAFETY DATA SHEET

Lead
Cat. No. 100028-1

Issue Date: 7-7-03

SECTION I - Product Identification/Hazardous Ingredients

Formula: Pb Concentration: 1000 µg/mL Molecular Weight: 207.2

TSCA: YES CAS NO: 7439-92-1/7697-37-2

Component: Pb metal in 2% HNO_3 + 98% H_2O TLV/TWA: 8 h Not Estab; 5 mg/m^3

STEL: N/A PEL: N/A Toxicity: N/A

SECTION II - Physical/Chemical Characteristics

Boiling Point: 100°C Vapor Pressure (mm): N/A Vapor Density (air+1): N/A

Freezing Point: N/A Specific Gravity (H_20) = 1.0101 Solubility in H_20: Complete

SECTION III - Fire and Explosion Hazard Data

Flash Point: N/A Auto Ignition Temperature: N/A Lower Explosion Level: N/A

NFPA - Rating: N/A Extinguishing Media: Use appropriate

Special Fire-Fighting Procedures: Firefighters should wear proper protective equipment and self-contained breathing apparatus with full face piece operated in positive pressure mode.

Unusual Fires Explosion Hazards: N/A

Toxic Gases Produced: NO_x

Pb in 2% HNO_3

SECTION IV - Reacting Data

Unstable : () Stable: (X)

Conditions to Avoid: Metals, hydroxides, carbonates, cyanides

Incompatibles: Strong reducing agents

Hazardous Decomposition: NO_x

SECTION V - Health Hazard Data

Routes of Entry: Inhalation, eye contact, skin contact

Signs and Symptoms of Exposure: Liquid may cause burns to skin and eyes

Medical Conditions Generally Aggravated by Exposure: None identified

Carcinogenicity: NTP: No IARC: No ZLIST: No OSHA reg.: No

Emergency First Aid Procedures: CALL A PHYSICIAN; If swallowed, do not induce vomiting, if conscious give water, milk. In case of contact, flush eyes or skin with plenty of water.

SECTION VI - Precautions for Safe Handling and Use

Special Precautions: Keep container tightly closed

In Case of Spill or Discharge: Remove source of ignition if hydrogen is a hazard. Provide optimum ventilation. Flush to holding area for neutralization.

Disposal Procedures: Follow Federal, State and Local regulations for proper disposal.

EPA Hazardous Waste #: N/A

SECTION VII - Protective Equipment

Respiratory Protection: NIOSH approved respirator

Ventilation: Local Exhaust (X) Mechanical ()

Protective Gloves: Proper gloves

Eye Protection: Safety glasses with side shields

Other: Lab coat/apron; vent hood

NOTICE

The data and information as stated was furnished by the manufacturer of the product. HPS products are intended for laboratory use only. All products should be handled and used by trained