US EPA RECORDS CENTER REGION 5
466171

522

ecology and environment, inc.

# SITE SAFETY PLAN

Version 988

## A. GENERAL INFORMATION

Project Title: Irathane Systems, Inc. Project No.: FT 1305

TDD/Pan No.: F05-8910-012 / FMN02305B

Project Manager: Ted Nehrkorn Project Dir.: N/A

Location(s): 3516 13th Ave. E., Hibbing, Minnesota 55746

Prepared by: Cortney Schmidt Date Prepared: 3-19-90

Approval by: Laura Gwaro Date Approved: 3-23-90

Site Safety Officer Review: Sam Barrier Date Reviewed: 3-22-90

Scope/Objective of Work: Site representative(s) interview, site reconnaissance inspection, collect 6 soil samples.

Proposed Date of Field Activities: April 4, 1990

Background Info: Complete [ ] Preliminary (No analytical data available) [X]

Documentation/Summary:

Overall Chemical Hazard: Serious [ ] Moderate [ ] Low [X] Unknown [ ]

Overall Physical Hazard: Serious [ ] Moderate [ ] Low [X] Unknown [ ]

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## B. SITE/WASTE CHARACTERISTICS

Waste Type(s):

Liquid [X] Solid [X] Sludge [ ] Gas/Vapor [X]

Characteristic(s):

Flammable/Ignitable [X] Volatile [X] Corrosive [ ] Acutely Toxic [X]

Explosive [ ] Reactive [ ] Carcinogen [X] Radioactive* [ ]

Other:

Physical Hazards:

Overhead [ ] Confined* Space [ ] Below Grade [ ] Trip/Fall [X]

Puncture [ ] Burn [ ] Cut [ ] Splash [ ]

Noise [X] Heat/Cold Stress [X] Other: truck traffic

*Requires completion of additional form and special approval from the Corporate Health/Safety Group. Contact RSC or HQ.

Site History/Description and Unusual Features (see Sampling Plan for detailed description):

See Next Page

Locations of Chemicals/Wastes: Assume entire site to be contaminated

Estimated Volume of Chemicals/Wastes: Unknown

Site Currently in Operation Yes [X] No [ ]

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## C. HAZARD EVALUATION

List Hazards by Task (i.e., drum sampling, drilling, etc.) and number them. (Task numbers are cross-referenced in Section D)

Physical Hazard Evaluation: 1. Site Reconnaissance Inspection - Trip/Fall - Noise

2. Soil Sample Collection - Trip/Fall - Noise

3.

4.

5.

6.

7.

8.

Chemical Hazard Evaluation:

| Compound | PEL/TWA | Route of Exposure | Acute Symptoms | Odor Threshold | Odor Description |
|---|---|---|---|---|---|
| 4,4'-methylene-bis-2-chloraniline | .02 ppm | oral, inhal. | An eye irr. | – | – |
| " Trichloroethylene | 50 ppm | Inhal, oral ocular | irritate, none/throat eyes, nausea | 82 ppm | Sweet/etherish |
| Methylene Chloride | 500 ppm | Inhal, oral eye | mental confusion fatigue, headache | 160 ppm | Sweet |
| MEK | 200 ppm | Inhal, dermal, oral, eye | eye burns irr. eyes, nose, throat | 16 ppm | Sweet/sharp |
| Toluene | 100 ppm | Inhal, dermal ocular, oral | eye irr, skin irr, respiratory irr. | 1.2 ppm | Sour |
| Xylene | 100 ppm | Inhal, oral ocular | dizziness, cough headache | 20 ppm | Sweet |
| Mercury Chromium | $1 mg/10 m^3$ | Inhal, dermal ocular, oral | Chest pain, headache tightness, diffic breath | – | – |
| 4-4 methylene Dianiline | .1 ppm | oral, inhal. | An eye. irr. | – | – |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Note: Complete and attach a Hazard Evaluation Sheet for major known contaminant.

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Site Name Irathane Systems, Inc.
Job No. FT1305
TDD/PAN F05-8910-012/FMN023058

SITE HISTORY (Continued)

Irathane Systems, Inc. is a small quantity hazardous waste generator that manufactures polymers, plastics, and urethanes. During the manufacturing process, solvents and prepolymer wastes are generated. When properly cured, the urethane forms a solid non hazardous material, which is codisposed with non hazardous wastes from a local casting company at a local sanitary landfill. This practice was approved by the MPCA in 1986. The remaining quantities of waste solvents are considered to be hazardous and are drummed and sent out-of-state.

During the 1970's and early 1980's, Irathane sent a number of different wastes generated in its process to two local landfills. Some of these wastes contained MOCA, 4-4'-methylene-bis 2-chloraniline, a listed hazardous waste. Waste solvents were also disposed of at these two locations. In 1978, OSHA inspected the facility because of workers' complaints pertaining to health problems, possibly associated with solvents and MOCA.

In 1980, the U.S. EPA received a hot line call alleging improper disposal practices by Irathane. An inspection by EPA and MPCA officials revealed areas of past spillage and leakage of drums, possible sewering of wastes, and storage of hundreds of various sized containers. Water quality samples collected at several locations at the facility found solvents and MOCA to be present.

The facility is currently active.

## D. SITE SAFETY WORK PLAN

Site Control: Attach map, or sketch of site showing hot zone, contamination reduction, zone, etc.

Perimeter identified? Yes [X] No [ ] Site secured? Yes [X] No [ ]

Work Areas Designated? Yes [ ] No [X] Zone(s) of Contamination Identified? Yes [ ] No [X]

Personnel Protection: TLD badges required for all field personnel.

Anticipated Level of Protection (Cross-reference task numbers to Section C):

| | TASK DESCRIPTION | A | B | C | D |
|---|---|---|---|---|---|
| Task 1 | Site Reconnaissance Inspection | | | | X |
| Task 2 | Soil Sample Collection | | | | X |
| Task 3 | | | | | |
| Task 4 | | | | | |
| Task 5 | | | | | |
| Task 6 | | | | | |
| Task 7 | | | | | |
| Task 8 | | | | | |

Upgrade to level C if:
1. Monitoring Equipment Action levels are reached.
2. Dry/Dusty/Windy Conditions exist.

Modifications: Rad-Mini >0.1 mR/hr (alarm sounds) and/or Monitox readings >0 ppm, evacuate work zone and then call Health and Safety Staff.

Action Levels for Evacuation of Work Zone Pending Reassessment of Conditions: CONTACT HEALTH AND SAFETY STAFF IF EVACUATION OCCURS.

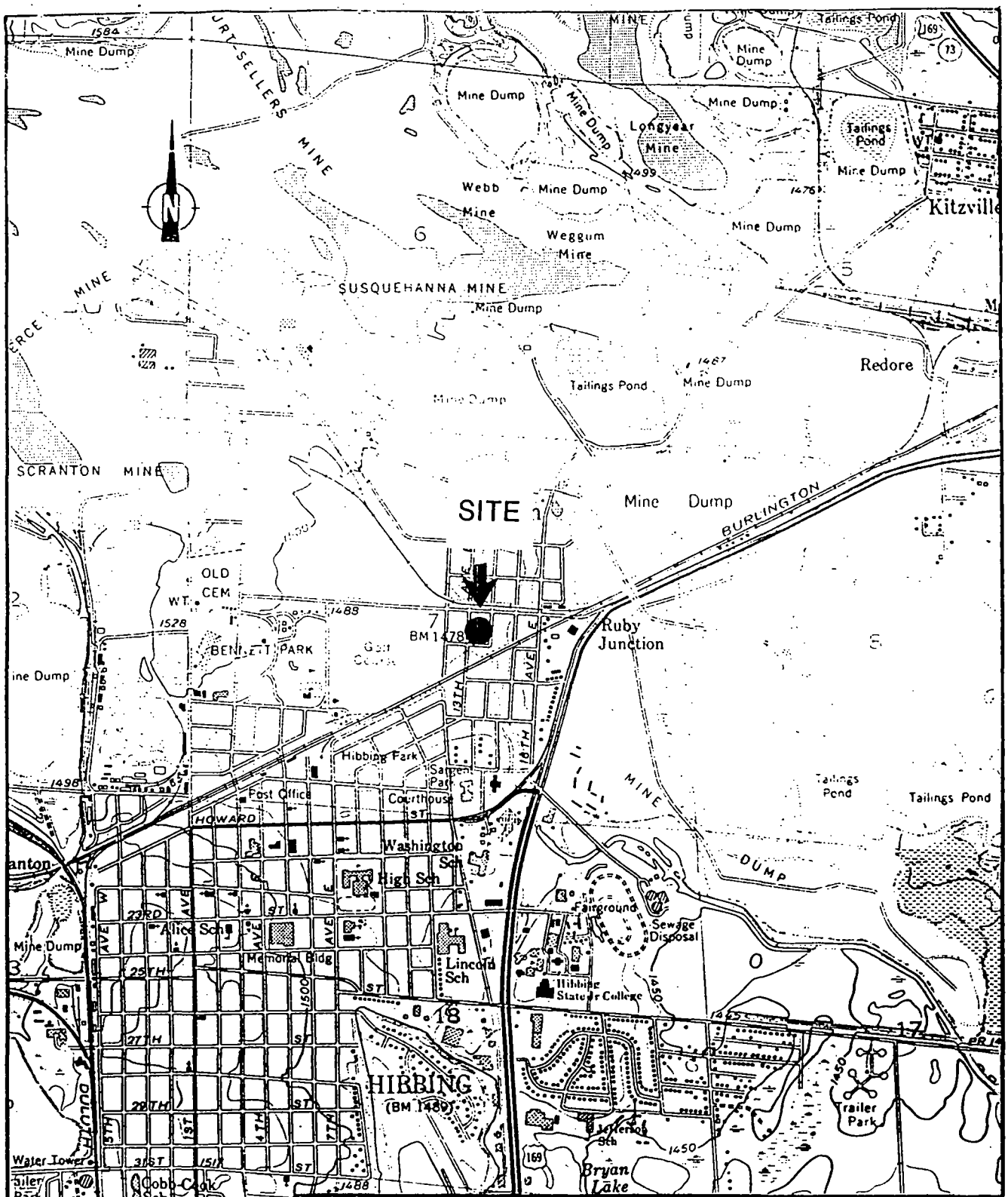
- Level D: $O_2$ <19.5% or >25%, explosive atmosphere >10% LEL, organic vapors above background levels, particulates > NA mg/m$^3$, other NA.
- Level C: $O_2$ <19.5% or >25%, explosive atmosphere >25% LEL (California-20%), unknown organic vapor (in breathing zone) >5 ppm, particulates > NA mg/m$^3$, other NA.
- Level B: $O_2$ <19.5% or >25%, explosive atmosphere >25% LEL (California-20%), unknown organic vapors (in breathing zone) >500 ppm, particulates > NA mg/m$^3$, other NA.
- Level A: $O_2$ <19.5% or >25%, explosive atmosphere >25% LEL (California-20%), unknown organic vapors >500 ppm, particulates > NA mg/m$^3$, other NA.

Air Monitoring (daily calibration unless otherwise noted):

| Contaminant of Interest | Type of Sample (area, personal) | Monitoring Equipment | Frequency of Sampling |
|---|---|---|---|
| NA | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Decontamination Solutions and Procedures for Equipment, Sampling Gear, etc.:

All equipment will be washed with an Alconox solution and triple rinsed with distilled water. All wash and rinse water will be left on site with prior permission of site owner/operator.




**ecology and environment, inc.**

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| | |
|---|---|
| TITLE: SITE LOCATION MAP | FIGURE #: 1 |
| SITE: IRATHANE SYSTEMS | SCALE: 1:24000 |
| CITY: HIBBING STATE: MINNESOTA | P.A.N.: FMN0230SA |
| SOURCE: USGS TOPOGRAPHIC MAP HIBBING, MN QUAD | DATE: 1957 REVISED: 1976 |

Personnel Decon Protocol: Gloves will be washed in the Alconox solution and rinsed with distilled water. Disposable Clothing will be double bagged and left on site with prior permission of owner/operator.

Decon Solution Monitoring Procedures, if Applicable: NA

Special Site Equipment, Facilities, or Procedures (Sanitary Facilities and Lighting Must Meet 29 CFR 1910.120):

Obey Facility safety regulations at a minimum.

Site Entry Procedures and Special Considerations: Permission will be obtained prior to site entry. Stay upwind of contamination when possible. The buddy system will be maintained at all times.

Work Limitations (time of day, weather conditions, etc.) and Heat/Cold Stress Requirements:

Work is restricted to daylight hours only and workers are to be monitored for heat/cold stress. When vermiculite is used to pack samples, dust masks will be worn.

General Spill Control, if applicable: NA

Investigation-Derived Material Disposal (i.e., expendables, decon waste, cuttings):

Investigative-derived materials will be decontaminated in accordance with procedures listed above. The decontaminated material will be bagged and left on-site in appropriate waste containers with prior permission of site owner/operator.

Sample Handling Procedures Including Protective Wear:

After samples have been collected, the outside of the sample bottles will be decontaminated by washing (not submerging) the bottles in an Alconox solution and rinsing in distilled water. The protective clothing level (i.e. suits, gloves, boots) worn during on-site job activities will be maintained while decontaminating the bottles. Respiratory protection will be worn based on professional judgment. Latex gloves, at a minimum, will be worn, while handling the bottles after decontamination.

| Team Member* | Responsibility |
| --- | --- |
| Ted Nehrkorn | Team Leader |
| Sam Borries | Site Safety Officer |
| Nathan Russell | Sampler |
| Mike McAteer | Team Member |
| Jennifer Dubay | Team Member |
| Cortney Schmidt | Team Member / Alternate S.S.O. |

*All entries into exclusion zone require Buddy System use. All E & E field staff participate in medical monitoring program and have completed applicable training per 29 CFR 1910.120. Respiratory protection program meets requirements of 29 CFR 1910.134, and ANSI Z88.2 (1980).

## E. EMERGENCY INFORMATION

(Use supplemental sheets, if necessary)

### LOCAL RESOURCES

(Obtain a local telephone book from your hotel, if possible)

Ambulance Health Transport Inc., 1500 E 3 Av. Hibbing --- 218-263-4643

Hospital Emergency Room Mesabi Regional Medical Center 218-262-4881

Poison Control Center 1-800-322-5330 or 1-800-222-1222

Police (include local, county sheriff, state) Hibbing police (218)-263-3601

County Sheriff (218)-263-8395, State - call operator ask for Zenith 7000.

Fire Department Hibbing (218)-262-6161

Airport Airport Terminal Hibbing (218)-262-6641

Agency Contact (EPA, State, Local USCG, etc.) Jeanne Griffin (312)-886-3007

Local Laboratory NONE

UPS/Fed. Express 1-800-238-5355

Client/EPA Contact Ron Swenson (612)-297-1793

Site Contact Don Foster (218)-262-5211, Joseph Barach (719) 636-5286

### SITE RESOURCES

Site Emergency Evacuation Alarm Method To be determined prior to site entry

Water Supply Source To be supplied by FIT

Telephone Location, Number To be determined prior to site entry

Cellular Phone, if available NA

Radio NA

Other NA

### EMERGENCY CONTACTS

1. Dr. Raymond Harbison (Univ. of Florida) ..... (501) 221-0465 or (904) 462-3277, 3281
   Alachua, Florida (501) 370-8263 (24 hours)

2. Ecology and Environment, Inc., Safety Director
   Paul Jonmaire ..... (716) 684-8060 (office)
   (716) 655-1260 (home)

3. Regional Office Contact .....Paul Moss..... (~~312~~ 708) 541-6635 (home)
   (312) 663-9415 (office)

4. Office Manager .....Jerry Oskvarek..... (312) 545-6016 (home)
   (312) 663-9415 (office)

## MEDTOX HOTLINE

1. Twenty-four hour answering service: (501) 370-8263

   What to report:

   - State: "this is an emergency."
   - Your name, region, and site.
   - Telephone number to reach you.
   - Your location.
   - Name of person injured or exposed.
   - Nature of emergency.
   - Action taken.

2. A toxicologist, (Drs. Raymond Harbison or associate) will contact you. Repeat the information given to the answering service.

3. If a toxicologist does not return your call within 15 minutes, call the following persons in order until contact is made:

   a. 24 hour hotline - (716) 684-8940
   b. Corporate Safety Director - Paul Jonmaire - home # (716) 655-1260
   c. Assistant Corp. Safety Officer - Steven Sherman - home # (716) 688-0084

## EMERGENCY ROUTES

(NOTE: Field Team must Know Route(s) Prior to Start of Work)

Directions to hospital (include map) East on 13th Ave, turn South on Hwy 169. Exit West off of 169 onto 37th Street, Turn North on May Fair Ave. Hospital on Left side or west side of Road. Total distance x 4 miles
750 East 34th Street, Hibbing, Minn. 55746
(218) - 262 - 4881

Emergency Egress Routes to Get Off-Site To be determined on-site - when determined it will be entered into field logbook.

Hospital Route Map

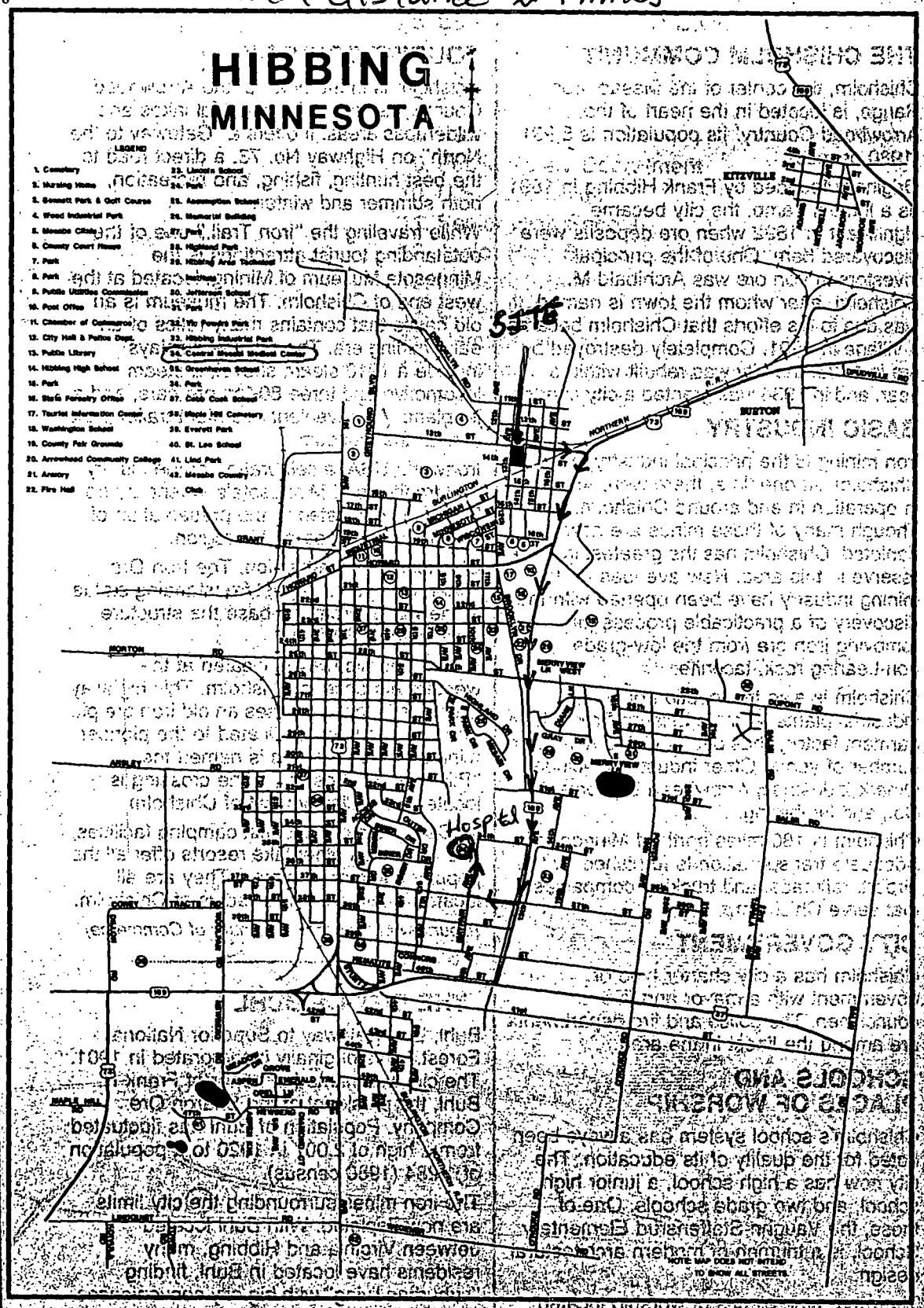
Total distance ≈ 4 miles

EZ 3

Irathane Sys.

FMNO2303B

# HIBBING
## MINNESOTA

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EASY REFERENCE GUIDE

# Hazard Evaluation of Chemicals
## Region V - Chicago

DATE : 3/19/90
JOB NO: FMN023058

CHEMICAL NAME: Mercury

SYN : Quicksilver, Inorganic Mercury
CAS NO: 7439-97-6 FORMULA: Hg
DOT CLASS: 2809

## CHEMICAL PROPERTIES

| | | | |
|---|---|---|---|
| Phys St: Liquid | Boil Pt: 675.00°F | Ionz Pot : -- | Fl Pt: -- |
| Mol Wt : 200.59 | Melt Pt: -38.00°F | Vap Press: 0.0012 mmHg | LFL : -- |
| Sp Gr : 13.55 | Frz Pt : -38.00°F | Odr Thr : -- | UFL : -- |

Odor : none
INCOMPAT/REACT: acetylene,ammnia gs,halgens,strg oxdizers,ht sulfuric acid,chlorine dioxide,azides,chlorates,nitrate
SOLUBILITY : insoluble

## TOXICOLOGICAL PROPERTIES

Exposure Limits: TLV-TWA (ACGIH): 0.001 ppm SKIN PEL (OSHA): 0.01 ppm SKIN
STEL: -- IDLH: 3.41 ppm

OTHER PROPERTIES : PEL IS A CEILING; DO NOT EXCEED IN 15 MIN.
Tox Data: INHAL : hom TCLO: 150ug/m3/46D
DERMAL : -
ORAL : -
CARCIN : -
MUTAGEN : -
REPRO TOX: animal teratogen
AQUATIC : 0.29ppm/48hr/marine fish/TLm/salt water
OTHER TOX: TARGET ORGANS: Skin, Resp Sys, CNS, Kidney, Eye
ROUTES OF EXP: Ingestion, Eye(Ocular), Dermal Absorption, Skin Contact, Inhalation

## PERSONAL PROTECTIVE MEASURES

RESPIRATORS : AFR: dusty/windy condit or known high concent or >1 but <5ppm; SCBA: >5ppm
CARTRIDGE TYPE : GMC-H
PROTECTIVE CLOTHING: Coverall: PE Tyvek Gloves: Neoprene
SPEC PRECAUTIONS : High concentrations in air are dangerous to skin, eyes, mucous membranes. Other Exposure Limits are given for different Mercury types.

## FIRST AID

INHALATION: move to fresh air, artf resp is nec., SEEK MEDICAL ATTENTION
EYE/SKIN : remove contamtd. clothes, flush w/water 15 min, wash skin w/soap & water, SEEK MEDICAL ATTENTION
INGESTION : SEEK MEDICAL ATTENTION

## SYMPTOMS

ACUTE : headaches,cough,chest pain/tightness,diffic. breath,chemical pneumanitis, sore mouth,loss of teeth,naus,diarrhea,skin irritation
CHRONIC: shaking of hands, eyelids, lips, tongue or jaw; allergic skn rash, headache, sores in mouth, sore/swollen gums, loose teeth, insomnia, excess salivation, personality changes, irritatibility

## DISPOSAL, FIRE, SPILLS (see attached sheet)

DISPOSAL: P FIRE: 11,13 LEAKS & SPILLS: 18
DECOMPOSITION PRODUCTS: toxic fumes

## REFERENCES CONSULTED

NIOSH/OSHA Pocket Guide, Chris(vol. III), ACGIH TLV Booklet, RTECS
OTHER REFERENCES: NIOSH Guide, Sigma-Aldrich

LAST REVISION DATE: 05/03/89

CHEMICAL CLASSIFICATION: Metal

FMN023OSB
3/19/90

YLBIS(THIOCYANATO)ARSINE)

TA: CODEN:
4H MUREAV 40,19,76

a. See also arsenic compounds, thiocya-

When heated to decomp it emits very
As, $SO_x$ and $CN^-$.

NYL ACETYLENE

2 NIOSH #: MM 3470000
92.15

5-HEXADIENE-3-YNE

TA: 2 CODEN:
ng/kg WADTAA 55-250,2,55
ng/kg WADTAA 55-250,2,55

l and ipr.
When heated to decomp it emits acrid
nes.

-DI(2,4-XYLYLIMINO)-2-
NE

611 NIOSH #: ZF 0480000
mw: 293.45

PHENYL-3- ENT 27967
AZAPENTA- N-METHYL-N' -2,4-XYLYL-N-(N-2,4-XYLYLFORMIMIDOYL) FORMAMIDINE
HENYL)-
PHENYL)
-METHYL-
DE

TA: 3-2 CODEN:
g/kg FMCHA2 -,D16,80
g/kg SPEADM 78-1,22,78

; MOD orl.
When heated to decomp it emits tox

**N,N'-METHYLENEBIS(2-AMINO-1,3,4-THIADIAZOLE)**

CAS RN: 26907379 NIOSH #: XI 4300000
mf: $C_5H_6N_6S_2$; mw: 214.29

SYN: TK-5477

TOXICITY DATA: 3 CODEN:
orl-ham TDLo:30 mg/kg/(8D preg):TER TJADAB 9,A-28,74

*THR:* An exper TER.
*Disaster Hazard:* When heated to decomp it emits very tox fumes of $NO_x$ and $SO_x$.

**METHYLENEBIS(N-CARBAMYLMALEIMIDE)**

CAS RN: 6970974 NIOSH #: ON 5620000
mf: $C_{11}H_8N_4O_6$; mw: 292.23

SYN: N,N' METHYLENEBIS(2,5-DIHYDRO-2,5-DIOXO)-1H-PYRROLE-1-CARBOXAMIDE

TOXICITY DATA: 2 CODEN:
orl-rat LD50:1420 mg/kg GISAAA 40(11),109,75
orl-mus LD50:710 mg/kg GISAAA 40(11),109,75

*THR:* MOD orl.
*Disaster Hazard:* When heated to decomp it emits tox fumes of $NO_x$.

**4,4'-METHYLENE-BIS(2-CHLOROANILINE) HYDROCHLORIDE**

CAS RN: 64049292 NIOSH #: BY 5080000
mf: $C_{13}H_{12}Cl_2N_2 \cdot ClH$; mw: 303.63

TOXICITY DATA: 3 CODEN:
orl-rat TDLo:14 gm/kg/78W-C:ETA TXAPA9 31,47,75
orl-mus TDLo:66 gm/kg/78W-C:CAR TXAPA9 31,47,75

*THR:* An exper ETA, CARC.
*Disaster Hazard:* When heated to decomp it emits very tox fumes of $Cl^-$, $NO_x$ and HCl.

ivn-rat LD50:17
orl-mus LD50:1
orl-dog LD50:2
orl-gpg LD50:12
unk-mam LD50:

*Toxicology R*
TSCA Inve
*THR:* HIGH
irr to skn.
similar to
*Disaster Haz*
fumes of C

METHYLEN

CAS RN: 16
mf: $C_9H_{22}O_6$

TOXICITY
ivn-mus LD50:

Reported in
*THR:* HIGH
*Disaster Haz*
fumes of P

4,4'-METH

CAS RN: 10
mf: $C_{17}H_{22}N$

SYNS:
P,P'-BIS(DIMETH
DIPHENYLME
4,4'-BIS(DIMETH
DIPHENYLME
BIS(P-DIMETHYL
METHANE
BIS(P-(N,N-DIME
PHENYL)MET
P,P'-BIS(N,N-DI
PHENYL)MET
P,P-DIMETHYLA
METHANE

Sax 6th Edition

# Hazard Evaluation of Chemicals
## Region V - Chicago

DATE : 3/19/90
JOB NO: FMN02305B

CHEMICAL NAME: Methylene Chloride

SYN : Dichloromethane, Methylene dichloride
CAS NO: 75-09-2 FORMULA: CH2Cl2
DOT CLASS: 1593

## CHEMICAL PROPERTIES

| | | | |
|---|---|---|---|
| Phys St: Liquid | Boil Pt: 104.00°F | Ionz Pot : 11.35ev | Fl Pt: — |
| Mol Wt : 84.93 | Melt Pt: -142.00°F | Vap Press: 350.00 mmHg | LFL : 12.00% |
| Sp Gr : 1.33 | Frz Pt : -142.00°F | Odr Thr : 160.00ppm | UFL : 19.00% |

Odor : like chloroform, sweet, pleasant
INCOMPAT/REACT: heat, moisture, strong oxidizers, strong caustics, chemically active metals, alkali metals, aluminum
SOLUBILITY : slightly-water; alcohol, ether

## TOXICOLOGICAL PROPERTIES

Exposure Limits: TLV-TWA (ACGIH): 50.00 ppm SKIN PEL (OSHA): 500.00 ppm SKIN
STEL: — IDLH: 5000.00 ppm

OTHER PROPERTIES : OSHA CEILING: 1000ppm/ MAX PEAK: 2000ppm/5M/any 2H
Tox Data: INHAL : rat LC50 8000mg/m3/30min
DERMAL : -
ORAL : rat: LD50 2136mg/kg
CARCIN : human/animal suspect
MUTAGEN : exper
REPRO TOX: -
AQUATIC :
OTHER TOX: TARGET ORGANS: Skin, Eye, CVS, CNS
ROUTES OF EXP: Ingestion, Eye(Ocular), Dermal Absorption, Skin Contact, Inhalation

## PERSONAL PROTECTIVE MEASURES

RESPIRATORS : any detectable concentration - SCBA
CARTRIDGE TYPE : no cartridge available
PROTECTIVE CLOTHING: Coverall: PE Tyvek Gloves: PVA, Viton (PVA degrades in water)
SPEC PRECAUTIONS :

## FIRST AID

INHALATION: move to fresh air, artf resp if nec, SEEK MEDICAL ATTENTION
EYE/SKIN : flush w/water 15 minutes, wash skin with soap/water, SEEK MEDICAL ATTENTION
INGESTION : SEEK MEDICAL ATTENTION IMMEDIATELY

## SYMPTOMS

ACUTE : mental confusion, light headedness, naus/vomt, headache, staggering, unconscious, irritation of eyes/resp/skin, possible skin burns, heart palpitations, fatigue, giddiness, exhaustion, malaise,death
CHRONIC: skin irritation.

## DISPOSAL, FIRE, SPILLS (see attached sheet)

DISPOSAL: 8 FIRE: 11,13 LEAKS & SPILLS: 1,4,6,9
DECOMPOSITION PRODUCTS: HCl, CO, phosgene

## REFERENCES CONSULTED

NIOSH/OSHA Pocket Guide, Chris(vol. III), ACGIH TLV Booklet
OTHER REFERENCES: NIOSH Guides, Sigma-Aldrich, Poison Handbook, 1st Aid for Chem Accid, Cassarett

CHEMICAL CLASSIFICATION: Halogenated or Chlorinated Hydrocarbon

LAST REVISION DATE: 06/10/89

FMIN 02305B
3/19/90



SYNS:
L-ALPHA-AMINO-BETA-METHYLENECYCLOPROPANE-PROPIONIC ACID
ALPHA-AMINOMETHYLENE-CYCLOPROPANEPROPIONIC ACID
HYPOGLYCINE
HYPOGLYCINE A

TOXICITY DATA: 3 CODEN:
ipr-rat TDLo:150 mg/kg (1-5D preg) NATWAY 55,39,68
ipr-rat TDLo:30 mg/kg (3-6D preg) NATWAY 55,39,68

*Toxicology Review:* ADTEAS 5,77,72.
*THR:* HIGH ipr.
*Disaster Hazard:* When heated to decomp it emits tox fumes of $NO_x$.

## 2,4'-METHYLENEDIANILINE

CAS RN: 1208522 NIOSH #: BY 5400000
mf: $C_{13}H_{14}N_2$; mw: 198.29

SYNS:
2',4-BIS(AMINOPHENYL)METHANE
O,P'-DIAMINODIPHENYLMETHANE
2,4'-DIAMINODIPHENYLMETHAN (GERMAN)
2,4'-DIAMINODIPHENYLMETHANE
2,4'-DIPHENYLMETHANEDIAMINE
2,4'-METHYLENEBIS(ANILINE)

TOXICITY DATA: 2 CODEN:
scu-rat LD50:3300 mg/kg NATWAY 57,247,70

NIOSH Current Intelligence Bulletin 8, 1976. Reported in EPA TSCA Inventory, 1980. EPA TSCA 8(a) Preliminary Assessment Information Proposed Rule FERREAC 45,13646,80.
*THR:* MOD scu.
*Disaster Hazard:* When heated to decomp it emits tox fumes of $NO_x$.

## 4,4'-METHYLENEDIANILINE

CAS RN: 101779 NIOSH #: BY 5425000
mf: $C_{13}H_{14}N_2$; mw: 198.29

Tan flakes or lumps, faint amine-like odor; mp: 90°; flash p: 440°F.

SYNS:
4-(4-AMINOBENZYL)ANILINE
BIS-P-AMINOFENYLMETHAN (CZECH)
BIS(P-AMINOPHENYL)METHANE
BIS(4-AMINOPHENYL)METHANE
P,P'-DIAMINODIFENYLMETHAN (CZECH)
4,4'-DIAMINODIPHENYLMETHAN (GERMAN)
DIAMINODIPHENYLMETHANE
P,P'-DIAMINODIPHENYLMETHANE
4,4'-DIAMINODIPHENYLMETHANE
DI-(4-AMINOPHENYL)METHANE
DIANALINEMETHANE
4,4'-DIPHENYLMETHANEDIAMINE
METHYLENEBIS(ANILINE)
4,4'-METHYLENEBISANILINE
METHYLENEDIANILINE
P,P'-METHYLENEDIANILINE
NCI-C54604

TOXICITY DATA: 3 CODEN:
eye-rbt 100 mg/24H SEV 28ZPAK -,71,72
mmo-sat 250 ug/plate MUREAV 67,123,79
mma-sat 50 ug/plate MUREAV 67,123,79
orl-rat TDLo:320 mg/kg/I TFX:ETA NATUAS 219,1162,68
scu-rat TDLo:1410 mg/kg/I TFX:ETA NATWAY 57,247,70
orl-man TDLo:8420 ug/kg TFX:SYS BMJOAE 1,514,66
orl-rat LD50:347 mg/kg 28ZPAK -,71,72
scu-rat LD50:200 mg/kg NATWAY 57,247,70
ipr-mus LD50:74 mg/kg RCOCB8 14,677,76
orl-dog LDLo:300 mg/kg TXCYAC 11,185,78
scu-dog LDLo:400 mg/kg AEXPBL 58,167,1907

Carcinogenic Determination: Indefinite IARC** 4,79,74.
*TLV:* Air: 0.1 ppm (skin) DTLVS* 4,278,80. *Toxicology Review:* CTOXAO 6(1),45,73. Currently Tested by NTP for Carcinogenesis by Standard Bioassay Protocol as of December 1980. Reported in EPA TSCA Inventory, 1980.
*THR:* MUT data. An eye irr. An exper ETA, ± CARC. A hmn SYS. HIGH orl, scu, ipr. It does not seem to be rapidly absorbed thru skin in dangerous quantities or to irr the eye. No information regarding allergy.
*Disaster Hazard:* HIGHLY tox fumes of aniline and $NO_x$.

## METHYLENEDIANTHRANILIC ACID DIMETHYL ESTER

CAS RN: 34481840 NIOSH #: CB 3315000
mf: $C_{17}H_{18}N_2O_4$; mw: 314.37

SYNS:
METHYLENEBIS(2-AMINO-BENZOIC ACID) DIMETHYL ESTER (9CI)
4,4'-METHYLENEBIS(2-CARBOMETHOXYANILINE)
METHYLENE-BIS(METHYL ANTHRANILATE)

TOXICITY DATA: 3 CODEN:
orl-rat TDLo:490 gm/kg/78W-C:CARC JEPTDQ 1,199,78
orl-rat TD:410 gm/kg/78W-C:ETA JEPTDQ 1,199,78

*THR:* An exper CARC, ETA. See also esters.
*Disaster Hazard:* When heated to decomp it emits tox fumes of $NO_x$.

## METHYLENE DIMETHANESULFONATE

CAS RN: 156729 NIOSH #: PA 89250000
mf: $C_3H_8O_6S_2$; mw: 204.23

SYN: METHYLENE BIS(METHANESULFONATE)

TOXICITY DATA: 3 CODEN:
dnd-rat-ipr 10 mg/kg CBINA8 3,149,71
dlt-rat ipr 15 mg/kg CCPTAY 13,639,76
msc-mus:lym 50 umol/L MUREAV 25,107,74
ipr-rat TDLo:15 mg/kg (13D preg) JRPFA4 17,325,68
ipr-rat TDLo:15 mg/kg (15D preg) JRPFA4 17,325,68

*THR:* MUT data. An exper TER. See also sulfonates.
*Disaster Hazard:* When heated to decomp it emits tox fumes of $SO_x$.

## 4,4'-METHYLENEDIMORPHOLINE

CAS RN: 5625901 NIOSH #: QE 6125000
mf: $C_9H_{18}N_2O_2$; mw: 186.29

SYNS:
BIS(MORPHOLINO-)METHAN (GERMAN)
BISMORPHOLINO METHANE

TOXICITY DATA: 3 CODEN:
scu-rat TDLo:50 mg/kg:ETA FCTXAV 6,576,68
scu-rat TD:2000 mg/kg/40W-I:ETA ZEKBAI 71,105,68
scu-rat LD50:1000 mg/kg ZEKBAI 71,105,68

Sax 6th edition

# Hazard Evaluation of Chemicals
## Region V - Chicago

DATE : 3/19/90
JOB NO: FMN02305B

CHEMICAL NAME: Methyl Ethyl Ketone

SYN : MEK, 2-Butanone
CAS NO: 78-93-3 FORMULA: CH3COCH2CH3
DOT CLASS: 1193-FL LIQ CL3

## CHEMICAL PROPERTIES

Phys St: Liquid | Boil Pt: 175.30°F | Ionz Pot : 9.53ev | Fl Pt: 20.00°F
Mol Wt : 72.11 | Melt Pt: -124.60°F | Vap Press: 70.00 mmHg | LFL : 1.80%
Sp Gr : 0.80 | Frz Pt : -123.30°F | Odr Thr : 16.00ppm | UFL : 11.50%
Odor : like acetone, pleasant, pungent, sweet, sharp
INCOMPAT/REACT: sulfuric acid, nitric acid, aliphatic amines, oxidizing agents, bases, strong reducing agents
SOLUBILITY : water soluble

## TOXICOLOGICAL PROPERTIES

Exposure Limits: TLV-TWA (ACGIH): 200.00 ppm PEL (OSHA): 200.00 ppm
STEL: 300.00 ppm IDLH: 3000.00 ppm

OTHER PROPERTIES :
Tox Data: INHAL : human Tclo: 100 ppm/5min
DERMAL : skn rbt LD50: 13 gm/kg
ORAL : rat LD50: 2737 mg/kg
CARCIN : -
MUTAGEN : -
REPRO TOX: exper teratogen
AQUATIC : 5640mg/l/48hr/bluegill/TLm/fresh water
OTHER TOX: TARGET ORGANS: CNS, Lungs
ROUTES OF EXP: Ingestion, Eye(Ocular), Dermal Absorption, Skin Contact, Inhalation

## PERSONAL PROTECTIVE MEASURES

RESPIRATORS : APR: dusty/windy condit or known high concent or >1 but <5ppm; SCBA: >5ppm
CARTRIDGE TYPE : GMC-H or AP3 (RACAL)
PROTECTIVE CLOTHING: Coverall: Tyvek Gloves: Butyl
SPEC PRECAUTIONS :

## FIRST AID

INHALATION: move to fresh air, CPR if nec, SEEK MEDICAL ATTENTION
EYE/SKIN : flush w/water at least 15min, SEEK MEDICAL ATTENTION
INGESTION : DO NOT INDUCE VOMITING, SEEK MEDICAL ATTENTION IMMEDIATELY

## SYMPTOMS

ACUTE : eye burns, vapor: irritates eyes/nose/throat, headache, dizziness, weakness, nausea, CNS depressant, neuropathy

CHRONIC: dermatitis

## DISPOSAL, FIRE, SPILLS (see attached sheet)

DISPOSAL: D FIRE: 3,7 LEAKS & SPILLS: 1,3,4,6,9
DECOMPOSITION PRODUCTS: CO, CO2

## REFERENCES CONSULTED

Chris(vol. III), ACGIH TLV Booklet, RTECS
OTHER REFERENCES: Sigma-Aldrich, Poison Handbook

LAST REVISION DATE: 05/10/89

CHEMICAL CLASSIFICATION: Ketone, Aliphatic & Alicyclic

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

DATE : 3/19/90
JOB NO: FMN023098

CHEMICAL NAME: Toluene

SYN : Toluol, Methylbenzene
CAS NO: 108-88-3 FORMULA: C6H5CH3
DOT CLASS: 1294/FLAM LIQ 3

## CHEMICAL PROPERTIES

Phys St: Liquid | Boil Pt: 231.10°F | Ionz Pot : 8.82ev | Fl Pt: 40.00°F
Mol Wt : 92.14 | Melt Pt: -139.00°F | Vap Press: 22.00 mmHg | LFL : 1.27%
Sp Gr : 0.87 | Frz Pt : -139.00°F | Odr Thr : 1.20ppm | UFL : 7.00%
Odor : pungent, aromatic, benzene-like, sour
INCOMPAT/REACT: nitric acid, strong oxidizers, peroxides
SOLUBILITY : water-slightly

## TOXICOLOGICAL PROPERTIES

Exposure Limits: TLV-TWA (ACGIH): 100.00 ppm PEL (OSHA): 100.00 ppm
STEL: 150.00 ppm IDLH: 2000.00 ppm
OTHER PROPERTIES : CEILING: 300ppm, MAX PEAK: 500ppm/10M/8H shift, IRRITANT
Tox Data: INHAL : human Tclo: 200ppm
DERMAL : skn rbt: LD50 12124 mg/kg
ORAL : rat: LD50 5000mg/kg
CARCIN : exper
MUTAGEN : exper
REPRO TOX: exper teratogen
AQUATIC : 1180mg/l/96hr/sunfish/flow/fresh water
OTHER TOX: TARGET ORGANS: CNS, Liver, Skin, Kidney
ROUTES OF EXP: Ingestion, Eye(Ocular), Skin Contact, Inhalation

## PERSONAL PROTECTIVE MEASURES

RESPIRATORS : APR: dusty/windy condit or known high concent or >1 but <5ppm; SCBA: >5ppm
CARTRIDGE TYPE : GMC-H
PROTECTIVE CLOTHING: Coverall: Saranex Gloves: Viton
SPEC PRECAUTIONS :

## FIRST AID

INHALATION: move to fresh air, artf resp if nec, SEEK MEDICAL ATTENTION
EYE CONTACT : flush w/water 15 minutes, SEEK MEDICAL ATTENTION
INGESTION : DO NOT INDUCE VOMITING, SEEK MEDICAL ATTENTION IMMEDIATELY

## SYMPTOMS

ACUTE : eye/respiratory/skin irritation, fatigue, weakness, confusion, headachedizziness, drowsiness, tingling skin, numbness, vision disturbances, mild macrocytic anemia, narcotic in high concentrations,coma
CHRONIC: drying & cracking of skin, fatty degeneration of the heart, liver, and adrenals, and hemorrhages, anemia

## DISPOSAL, FIRE, SPILLS (see attached sheet)

DISPOSAL: D FIRE: 6,7 LEAKS & SPILLS: 3,4,5,6,9
DECOMPOSITION PRODUCTS: CO2, CO

## REFERENCES CONSULTED

NIOSH/OSHA Pocket Guide, Chris(vol. III), ACGIH TLV Booklet, RTECS
OTHER REFERENCES: NIOSH Guides, Sigma-Aldrich

LAST REVISION DATE: 06/10/89

CHEMICAL CLASSIFICATION: Aromatic Hydrocarbon

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

DATE : 3/19/90
JOB NO: EMN023058

CHEMICAL NAME: Trichloroethylene

SYN : Trichloran, Triclene, Trilene
CAS NO: 79-01-6 FORMULA: CHCl=CCl2
DOT CLASS: 1710

## CHEMICAL PROPERTIES

Phys St: Liquid | Boil Pt: 189.00°F | Ionz Pot : 9.47ev | Fl Pt: 90.00°F
Mol Wt : 131.39 | Melt Pt: -120.64°F | Vap Press: 58.00 mmHg | LFL : 11.00%
Sp Gr : 1.46 | Frz Pt : -123.50°F | Odr Thr : 82.00ppm | UFL : 41.00%
Odor : chloroform-like, ethereal
INCOMPAT/REACT: strong caustics, chemically active metals
SOLUBILITY : insoluble

## TOXICOLOGICAL PROPERTIES

Exposure Limits: TLV-TWA (ACGIH): 50.00 ppm PEL (OSHA): 50.00 ppm
STEL: 200.00 ppm IDLH: 1000.00 ppm
OTHER PROPERTIES : CEILING: 200ppm,MAX PEAK: 300ppm/5M/2H in 8H shift
Tox Data: INHAL : human Tclo: 160ppm/53min
DERMAL : -
ORAL : rat: LD50: 7193 mg/kg
CARCIN : YES-anim-pos, human-sus
MUTAGEN : exper
REPRO TOX: exper teratogen
AQUATIC : 660mg/l/40hr/daphnia/kill/fresh water
OTHER TOX: TARGET ORGANS: Resp Sys, Heart, Liver, CNS, Skin
ROUTES OF EXP: Ingestion, Eye(Ocular), Skin Contact, Inhalation

## PERSONAL PROTECTIVE MEASURES

RESPIRATORS : APR: dusty/windy condit or known high concent or >1 but <5ppm; SCBA: >5ppm
CARTRIDGE TYPE : GMC-H or AP3 (NACAL)
PROTECTIVE CLOTHING: Coverall: PE Tyvek Gloves: Viton, PVA (PVA degrades in water)
SPEC PRECAUTIONS :

## FIRST AID

INHALATION: move to fresh air, CPR if nec, SEEK MEDICAL ATTENTION
EYE/SKIN : flush w/water 15min, wash skin with soap/water, SEEK MEDICAL ATTENTION
INGESTION : give large amt of water, induce vomiting, SEEK MEDICAL ATTENTION

## SYMPTOMS

ACUTE : irritation of nose/throat/eyes, nausea, blurred vision, dermatitis, symptoms similar to alcohol inebriation. Narcotic effects in high concent, CNS depression
CHRONIC: liver and/or kidney damage, cardiac degeneration, central nervous system degeneration, dermatitis, anorexia

## DISPOSAL, FIRE, SPILLS (see attached sheet)

DISPOSAL: A FIRE: 11,13 LEAKS & SPILLS: 1,4,6,9
DECOMPOSITION PRODUCTS: CO, CO2, HCl, Phosgene

## REFERENCES CONSULTED

NIOSH/OSHA Pocket Guide, Merck Index, Chris(vol. III), ACGIH TLV Booklet, RTECS
OTHER REFERENCES: Sigma-Aldrich, Poison Handbook, 1st Aid for Chem Accid

LAST REVISION DATE: 06/10/89

CHEMICAL CLASSIFICATION: Halogenated Hydrocarbon, Aliphatic & Alicyclic

...ogy and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

DATE : 3/19/90
JOB NO: FMN023053

CHEMICAL NAME: Xylene, all isomers

SYN : Dimethylbenzene, Xylol
CAS NO: 1330-20-7 FORMULA: C6H4(CH3)2
DOT CLASS: FLAMMABLE

## CHEMICAL PROPERTIES

Phys St: Liquid Boil Pt: — Ionz Pot : 8.56ev Fl Pt: 81.00°F
Mol Wt : 106.20 Melt Pt: — Vap Press: 9.00 mmHg - LFL : 1.00%
Sp Gr : 0.86 Frz Pt : — Odr Thr : 26.00ppm UFL : 7.00%
Odor : aromatic odor, sweet
INCOMPAT/REACT: strong oxidizers
SOLUBILITY : practically insoluble in water

## TOXICOLOGICAL PROPERTIES

Exposure Limits: TLV-TWA (ACGIH): 100.00 ppm PEL (OSHA): 100.00 ppm
STEL: 150.00 ppm IDLH: 1000.00 ppm

OTHER PROPERTIES :
Tox Data: INHAL : hum TClo: 200ppm
DERMAL : -
ORAL : rat LD50: 4300 mg/kg
CARCIN : -
MUTAGEN : exper
REPRO TOX: exper teratogen
AQUATIC : -
OTHER TOX: TARGET ORGANS: CNS, Eyes, GI Tract, Blood, Liver, Kidneys, Skin
ROUTES OF EXP: Ingestion, Eye(Ocular), Dermal Absorption, Skin Contact, Inhalation

## PERSONAL PROTECTIVE MEASURES

RESPIRATORS : APR: dusty/windy condit or known high concent or >1 but <5ppm; SCBA: >5ppm
CARTRIDGE TYPE : GMC-H or AF3 (RACAL)
PROTECTIVE CLOTHING: Coverall: PE Tyvek Gloves: PVA, Viton (PVA degrades in water)
SPEC PRECAUTIONS :

## FIRST AID

INHALATION: move to fresh air, artf resp if nec, SEEK MEDICAL ATTENTION
EYE/SKIN : flush w/water 15 minutes, wash skin with soap/water, SEEK MEDICAL ATTENTION
INGESTION : DO NOT INDUCE VOMITING, SEEK MEDICAL ATTENTION IMMEDIATELY

## SYMPTOMS

ACUTE : vapor cause dizziness, headache, cough, pulmonary distress/edema, nausea/vomiting, abdominal cramps, narcotic in high concent, mild skin irritant
CHRONIC: possible liver and/or kidney damage, pulmonary congestion. Ingestion may be fatal.

## DISPOSAL, FIRE, SPILLS (see attached sheet)

DISPOSAL: D FIRE: 6,7 LEAKS & SPILLS: 3,4,5,6,9
DECOMPOSITION PRODUCTS: CO, CO2

## REFERENCES CONSULTED

NIOSH/OSHA Pocket Guide, Merck Index, Chris(vol. III), ACGIH TLV Booklet, RTECS
OTHER REFERENCES: NIOSH Guides, Sigma-Aldrich

CHEMICAL CLASSIFICATION: Hydrocarbons, Aromatic

LAST REVISION DATE: 05/10/89

# WASTE-DISPOSAL METHODS

The disposal methods outlined below are intended only as guides. We do not assume responsibility for their use. Careful consideration must be given to the chemical and physical properties of the substance. In addition, local laws and regulations may preclude the use of these methods which are primarily designed for small quantities. Observe all federal, state, and local laws.

The disposal of some chemicals may require deactivation or modification of the material by chemical means. Chemical waste-disposal reactions must be handled with the same care and consideration used with synthetic procedures. Appropriate consideration must be given to reaction conditions, *i.e.*, stoichiometry, order and rate of addition, heat of reaction, evolution of gaseous products, pH, efficiency of stirring, rate of reaction, atmospheric sensitivity, etc.

Chemical waste-disposal reactions should be carried out in a chemical fume hood and in appropriate laboratory glassware. Because these reactions are often vigorous, protective safety equipment such as safety goggles, respirator, gloves, face and/or safety shield and other protective equipment must be used.

Initial reactions in a disposal sequence should be carried out on a small scale (5-10g). The reactant concentrations should not exceed 10% of the reaction volume and the final reaction volume should not exceed 50% of the working capacity of the reaction vessel, regardless of the reaction scale. Larger quantities of the material should be handled in several small-size reactions. To ensure completion of reaction, the waste disposal procedure should be run for at least an additional 4 to 8 hours after all materials have been mixed.

All reactions should be run by technically qualified persons familiar with the potential hazards of the chemical reactions.

A Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

B The material should be ignited in the presence of sodium carbonate and slaked lime (calcium hydroxide). The substance should be mixed with vermiculite and then with the dry caustics, wrapped in paper and burned in a chemical incinerator equipped with an afterburner and scrubber.

C This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber.

D Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable.

E To a solution of the product in water, add an excess of dilute sulfuric acid. Let stand overnight. Remove any insolubles and bury in a landfill site approved for hazardous-waste disposal.

F Cautiously dissolve the material in water. Neutralize immediately with sodium carbonate or, if the material does not dissolve completely, add a little hydrochloric acid followed by sodium carbonate. Add calcium chloride in excess of the amount needed to precipitate the fluoride and/or carbonate. Separate the insolubles and bury in a landfill site approved for hazardous-waste disposal.

G Under an inert atmosphere, cautiously add the material to dry butanol in an appropriate solvent. The chemical reaction may be vigorous and/or exothermic. Provisions must be made for venting of large volumes of highly flammable hydrogen and/or hydrocarbon gases. Neutralize the solution with aqueous acid. Filter off any solid residues for disposal as hazardous waste. Burn the liquid portion in a chemical incinerator equipped with an afterburner and scrubber.

H Neutralize the solution and add filtering agent (10g per 100ml). Evaporate the liquid and bag the residual solid for burial in a landfill site approved for hazardous-waste disposal.

I Dissolve the solid in (or dilute the solution with) a large volume of water. Carefully add a dilute solution of acetic acid or acetone to the mixture in a well ventilated area. Provisions should be made to vent safely the hydrogen gas given off during the decomposition. Check acidity of the solution and adjust to pH 1 if necessary. Let stand overnight. Neutralize the solution (pH 7). Evaporate the solution and bury the residue in a landfill site approved for hazardous-waste disposal.

J Cautiously acidify a 3% solution or a suspension of the material to pH 2 with sulfuric acid. Gradually add a 50% excess of aqueous sodium bisulfite with stirring at room temperature. An increase in temperature indicates that a reaction is taking place. If no reaction is observed on the addition of 10% of the sodium bisulfite solution, initiate it by cautiously adding more acid. If manganese, chromium, or molybdenum is present, adjust the pH of the solution to 7 and treat with sulfide to precipitate for burial as hazardous waste. Destroy excess sulfide, neutralize and flush solution down the drain.

K Please contact the Technical Services Department. Be sure to mention name, catalog number and quantity of the material.

L The material should be dissolved in 1) water; 2) acid solution or 3) oxidized to a water-soluble state. Precipitate the material as the sulfide, adjusting the pH of the solution to 7 to complete precipitation. Filter the insolubles and dispose of them in a hazardous-waste site. Destroy any excess sulfide with sodium hypochlorite. Neutralize the solution before flushing down the drain.

M A slurry of the arenediazonium salt with water can be disposed of by adding it gradually to a stirred solution of 5-10% excess 2-naphthol in 3% aqueous sodium hydroxide at 0-20°C. After 12 hours, the resulting azo dye is filtered and either incinerated or buried in a landfill site approved for hazardous-waste disposal. Neutralize the remaining solution before disposal.

N For small quantities: cautiously add to a large stirred excess of water. Adust the pH to neutral, separate any insoluble solids or liquids and package them for hazardous-waste disposal. Flush the aqueous solution down the drain with plenty of water. The hydrolysis and neutralization reactions may generate heat and fumes which can be controlled by the rate of addition.

O Bury in a landfill site approved for the disposal of chemical and hazardous waste.

P Material in the elemental state should be recovered for reuse or recycling.

Q Cautiously make a 5% solution of the material in water or dilute acid. There may be a vigorous, exothermic reaction and fumes may be generated due to the hydrolysis of the material. Control any reaction by cooling and by the rate of addition of the material. Gradually add dilute ammonium hydroxide to pH 10. Filter off any precipitate for disposal in a chemical landfill. If there is no precipitation, gradually adjust the pH from 10 to 6, stopping when precipitation occurs.

R Catalysts and expensive metals should be recovered for reuse or recycling.

S Treat a dilute basic solution (pH 10-11) of the material with a 50% excess of commercial laundry bleach. Control the temperature by the addition rate of bleach and adjust pH if necessary. Let stand overnight. Cautiously adjust solution to pH 7. Vigorous evolution of gas may occur. Filter any solids for burial in a chemical landfill. Precipitate any heavy metals by addition of sulfide and isolate for burial. Additional equivalents of hypochlorite may be needed if the metal can be oxidized to a higher valence state. For metal carbonyls, the reaction should be carried out under nitrogen.

T Cautiously make a 5% solution of the product in water; vent because of possible vigorous evolution of flammable hydrogen gas. Acidify the solution to pH 1 by adding 1*M* sulfuric acid dropwise. Acidification will cause vigorous evolution of hydrogen gas. Allow the solution to stand overnight. Evaporate the solution to dryness and bury the residue in a landfill site approved for hazardous-waste disposal.

U Take the material (or a solution) and make a 5% solution in tetrahydrofuran. Cautiously add the solution dropwise to an ice-cooled, stirred basic solution of commercial bleach. Oxidation may release flammable hydrocarbon gases which must be vented. Let stand overnight. Adjust the pH to 7 and destroy excess hypochlorite with sodium bisulfite before disposal of the solution.

V Under an inert atmosphere cautiously add dry butanol or a mixture of dry butanol in an appropriate solvent, to a solution of the material in tetrahydrofuran. The chemical reaction may be vigorous and/or exothermic. Provisions must be made for the venting of a large volume of flammable hydrogen gas. When gas evolution ceases, cautiously add a basic hypochlorite solution dropwise to the reaction solution. Let stand overnight. Neutralize the solution and treat with sodium bisulfite to destroy any excess hypochlorite. Filter any solids for burial in a landfill site approved for hazardous-waste disposal.

***These recommendations are intended only as guides. Sigma-Aldrich shall not be held liable for any damage resulting from their use. See Foreword of the Sigma-Aldrich Library of Chemical Safety Data for more information.***

# THE SIGMA-ALDRICH LIBRARY OF CHEMICAL SAFETY DATA

## Explanation of Codes

### PROCEDURES FOR SPILLS OR LEAKS

1 Absorb on sand or vermiculite and place in closed container for disposal.
2 Cover with dry lime, sand, or soda ash. Place in covered containers using nonsparking tools and transport outdoors.
3 Shut off all sources of ignition.
4 Evacuate area.
5 Cover with an activated carbon adsorbent, take up and place in closed container. Transport outdoors.
6 Ventilate area and wash spill site after material pickup is complete.
7 Sweep up, place in a bag and hold for waste disposal.
8 Avoid raising dust.
9 Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves.
10 Wear respirator, chemical safety goggles, rubber boots and heavy rubber gloves.
11 Cover with dry lime or soda ash, pick up, keep in a closed container and hold for waste disposal.
12 Carefully sweep up and remove.
13 Flush spill area with copious amounts of water.
14 Mix with solid sodium bicarbonate.
15 Place in appropriate container.
16 Wear protective equipment.
17 Wash spill site with soap solution.
18 Please contact the Technical Services Department. Be sure to mention the name and catalog number of the material.

### FIRE-EXTINGUISHING MEDIA

1 Carbon dioxide.
2 Dry chemical powder.
3 Water spray.
4 Alcohol or polymer foam.
5 Class D fire-extinguishing material only.
6 Water may be effective for cooling, but may not effect extinguishment.
7 Carbon dioxide, dry chemical powder, alcohol or polymer foam.
8 Foam and water spray are effective but may cause frothing.
9 Do not use dry chemical powder extinguisher on this material.
10 Do not use carbon dioxide extinguisher on this material.
11 Noncombustible.
12 Do not use water.
13 Use extinguishing media appropriate to surrounding fire conditions.

Z14,866-0

Sigma-Aldrich Corporation, P.O. Box 355, Milwaukee, Wisconsin 53201 USA
(Sigma: 314-771-5765; Aldrich: 414-273-3850)

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SITE DOSIMETER LOG

PROJECT/PAN # FT1305/FMN0230SA SITE NAME Irathane Systems, Inc.

SITE SAFETY OFFICER S. Borries WEEK OF April 1, 1990

| NAME AND DOSIM. # | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY |
|---|---|---|---|---|---|---|---|
| T. Nehrkorn # 225 | | | | | | | |
| S. Borries # 252 | | | | | | | |
| N. Russell # 234 | | | | | | | |
| M. McAteer # 195 | | | | | | | |
| J. Dubay # 250 | | | | | | | |
| C. Schmidt # 242 | | | | | | | |
| | | | | | | | |
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| | | | | | | | |
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| | | | | | | | |

To the nearest half-hour, record time spent downrange as "S" (e.g., S:2.5hrs), time spent in active PDS operation as "P", and any time spent downrange in rescue activity as "R".

HS005(2/24/89)

Warehouse Phone (312) 775-7763

F. EQUIPMENT CHECKLIST

Job/PAN FT1305 LEMN023058

Team Leader Nehrkorn

PROTECTIVE GEAR

| Level A | No. |
|---|---|
| SCBA | |
| SPARE AIR TANKS | |
| ENCAPSULATING SUIT (Type _____) | |
| SURGICAL GLOVES (Latex) | |
| NEOPRENE SAFETY BOOTS | |
| BOOTIES (Latex) | |
| GLOVES: Type _____ SM _____ M _____ L _____ | |
| OUTER WORK GLOVES | |
| CASCADE SYSTEM | |
| 5-MINUTE ESCAPE MASK | |
| COOLING VEST | |
| HARD HAT | |
| | |
| **Level C** | |
| ULTRA-TWIN RESPIRATOR | ✓ |
| POWER AIR PURIFYING RESPIRATOR | |
| CARTRIDGES (Type GMC-H) | 5 pr. |
| PROTECTIVE COVERALL: Type Tyvek SM _____ M _____ L _____ | XL 5 L 2 |
| BUTYL APRON | |
| SURGICAL GLOVES (LATEX) | 1 box |
| GLOVES: Type Viton SM _____ M _____ L _____ | 5 pr. |
| OUTER WORK GLOVES | |
| HARD HAT | |
| FACE SHIELD | |
| HARDHAT | 5 |
| RAIN SUIT | 5 |
| NEOPRENE SAFETY BOOTS | |
| BOOTIES (LATEX) | 10 pairs |
| STEEL TOED BOOTS | 5 pairs |

| Level B | No. |
|---|---|
| SCBA | |
| SPARE AIR TANKS | |
| PROTECTIVE COVERALL: Type _____ SM _____ M _____ L _____ | |
| BUTYL APRON | |
| SURGICAL GLOVES (LATEX) | |
| GLOVES: Type _____ SM _____ M _____ L _____ | |
| NEOPRENE SAFETY BOOTS | |
| BOOTIES (LATEX) | |
| HARD HAT | |
| FACE SHIELD | |
| MANIFOLD SYSTEM WITH AIRLINE | |
| CASCADE SYSTEM | |
| RAIN SUIT | |
| OUTER WORK GLOVES | |
| | |
| **Level D** | |
| ULTRA-TWIN RESPIRATOR (Available) | ✓ |
| CARTRIDGES (Type GMC-H) | ✓ |
| 5-MINUTE ESCAPE MASK (Available) | 2 |
| PROTECTIVE COVERALL: Type Tyvek SM _____ M _____ L _____ | ✓ |
| OUTER WORK GLOVES | ✓ |
| HARD HAT | ✓ |
| FACE SHIELD | |
| RAIN SUIT | ✓ |
| WINTER BOOTS | ✓ |
| BOOTIES (LATEX) | ✓ |
| NEOPRENE SAFETY BOOTS | |
| STEEL TOED BOOTS | ✓ |
| SAFETY GLASSES | 5 pairs |
| Hearing Protection | 10 pairs |
| glove Liners | 10 pairs |
| Winter Clothing | ✓ |

HS017(03/07/89)

| INSTRUMENTATION | No. |
|---|---|
| OVA | 1 |
| THERMAL DESORBER | |
| O2/EXPLOSIMETER W/CAL. KIT / Separate | 1/1 |
| PHOTOVAC TIP | |
| HNu (Probe 10.2 OR 11.7) | |
| MAGNETOMETER | |
| PIPE LOCATOR | |
| WEATHER STATION | |
| DRAEGER PUMP, TUBES HCN | 1 or |
| BRUNTON COMPASS | |
| MONITOX CYANIDE | 1 |
| HEAT STRESS MONITOR | |
| NOISE EQUIPMENT | |
| PERSONAL SAMPLING PUMPS (Type ) | |
| DUST MONITOR (MDA OR GCA System) | |
| | |
| RADIATION EQUIPMENT | |
| TLD BADGES | 5 |
| DOCUMENTATION FORMS | |
| PORTABLE RATEMETER | |
| SCALER/RATEMETER | |
| NaI Probe | |
| ZnS Probe | |
| GM Pancake Probe | |
| GM Side Window Probe | |
| MICRO R METER / RAD-MINI | 1 |
| ION CHAMBER | |
| ALERT DOSIMETER | |
| POCKET DOSIMETER | |
| | |
| FIRST AID EQUIPMENT | |
| FIRST AID KIT | 1 |
| OXYGEN ADMINISTRATOR | |
| STRETCHER | |
| PORTABLE EYE WASH | 1 |
| BLOOD PRESSURE MONITOR | |
| FIRE EXTINGUISHER | 1 |

| DECON EQUIPMENT | No. |
|---|---|
| WASH TUBS | 2 |
| BUCKETS | 2 |
| SCRUB BRUSHES | 4 |
| PRESSURIZED SPRAYER | |
| DETERGENT (Type Alonox ) | 1 |
| SOLVENT (Type ) | |
| PLASTIC SHEETING | 20 feet |
| TARPS AND POLES | |
| TRASH BAGS | ✓ |
| TRASH CANS | |
| MASKING TAPE | ✓ |
| DUCT TAPE | ✓ |
| PAPER TOWELS | ✓ |
| DUST MASK | ✓ |
| FACE MASK SANITIZER | 5 |
| FOLDING CHAIRS | |
| STEP LADDERS | |
| DISTILLED WATER | ✓ |
| | |
| | |
| SAMPLING EQUIPMENT | |
| 80 OZ. AMBER GLASS BOTTLES | |
| 1 L. AMBER GLASS BOTTLES | |
| 40 ML. VIALS | |
| 1 L. PLASTIC | |
| 8 OZ. GLASS | 16 |
| 120 ML. GLASS | 16 |
| SPOONS / trowels | 6 |
| KNIVES | |
| FILTER PAPER | |
| PERSONAL SAMPLING PUMP SUPPLIES | |
| BUCK CALIBRATOR | |
| HAND BAILERS | |
| THIEVING RODS WITH BULBS | |
| DIOXIN SAMPLE KIT | |
| PRESERVATIVES: HNO3 ___ NaOH ___ Other ___ | |
| STRING | |

HS017(03/07/89)

| VAN EQUIPMENT | No. |
|---|---|
| TOOL KIT | 1 |
| HYDRAULIC JACK | |
| LUG WRENCH | |
| TOW CHAIN | |
| VAN CHECK OUT | |
| Gas | |
| Oil | |
| Antifreeze | |
| Battery | |
| Windshield Wash | |
| Tire Pressure | |
| | |
| MISCELLANEOUS | |
| CHALK | |
| LEVEL/TRIPOD AND ROD | |
| BOWLS | 6 |
| PITCHER PUMP | |
| SURVEYOR'S TAPE | |
| 100 FIBERGLASS TAPE | |
| 300 NYLON ROPE | |
| NYLON STRING | |
| SURVEYING FLAGS | |
| FILM | 3 rolls |
| WHEEL BARROW | |
| BUNG WRENCH | |
| SOIL AUGER | 1 |
| PICK | |
| SHOVEL / Posthole digger | 1/1 |
| CATALYTIC HEATER | |
| PROPANE GAS | |
| BANNER TAPE | |
| SURVEYING METER STICK | |
| CHAINING PINS & RING | |
| TABLES | |
| WEATHER RADIO | |
| BINOCULARS | |
| MEGAPHONE | |

| MISCELLANEOUS (Cont.) | No. |
|---|---|
| HEARING PROTECTION | |
| LIFE VESTS | |
| WALKIE-TALKIE | |
| CONDUCTIVITY METER | |
| PH METER | |
| CAMERA | 1 |
| WATER-LEVEL INDICATOR | |
| SPLIT SPOON SAMPLERS | |
| PVC HAND PUMP | |
| RESISTIVITY METER | |
| WELL POINT SAMPLER | |
| ROBAIR PUMP SYSTEM | |
| THERMOMETER | |
| MASTERFLEX PUMP & FILTER APPARATUS | |
| SHIPPING EQUIPMENT | |
| COOLERS | 2 |
| PAINT CANS WITH LIDS, 7 CLIPS EACH | |
| VERMICULITE | 2 |
| SHIPPING LABELS | ✓ |
| DOT LABELS: "DANGER" | ✓ |
| "UP" | ✓ |
| "INSIDE CONTAINER COMPLIES ..." | ✓ |
| "HAZARD GROUP" | ✓ |
| STRAPPING TAPE | ✓ |
| BOTTLE LABELS | ✓ |
| BAGGIES | ✓ |
| CUSTODY SEALS | ✓ |
| CHAIN-OF-CUSTODY FORMS | ✓ |
| FEDERAL EXPRESS FORMS | ✓ |
| CLEAR PACKING TAPE | ✓ |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

ecology and environment, inc.

# ON-SITE SAFETY MEETING

Project Irathane Systems TDD/Tem F05-8910-012/FMN023058

Date _____ Time _____ Job No. FT1305

Address 3516 13th Ave E.

Specific Location Hibbing, Minnesota

Type of Work Screening Site Investigation to include reconn. inspection 6 soil samples and site interview.

## SAFETY TOPICS PRESENTED

Protective Clothing/Equipment _____

Chemical Hazards _____

Radiation Hazards _____

Physical Hazards _____

Emergency Procedures _____

Hospital/Clinic Mesabi Regional Medical Center Telephone (218)-262-4881

Hospital Address 750 E. 34th Street Hibbings, MN.

Special Equipment _____

Other _____

**Checklist**

1. Emergency information reviewed? _____ and made familiar to all team members? _____
2. Route to nearest hospital driven? _____ and its location known to all team members? _____
3. Site safety plan readily available and its location known to all team members? _____

Meeting shall be attended by all personnel who will be working within the exclusion area. Daily informal update meetings will be held when site tasks and/or conditions change.

## ATTENDERS

(Expand on back of sheet if necessary)

| Name Printed | Signature |
|---|---|
| J. Dubay | |
| C. Schmidt | |
| M. McAteer | |
| T. Nehrkorn | |
| S. Borries | |
| N. Russell | |

Meeting Conducted by: _____ (Print) _____ (Signature)

_____ (Site Safety Coordinator) _____ (Team Leader)

ECOLOGY AND ENVIRONMENT, INC. - CHICAGO

ON-SITE SAFETY LOG

Name: Irathane Systems

Date:

PAN #/Job #: FMN02035B / FT1305

Weather

| | Equipment (Circle All Used) | ID# | Calibration/ Operation Check | Initials and Date | Background Readings | On-Site Readings |
|---|---|---|---|---|---|---|
| 1. | OVA | | | | | |
| | HNu | | | | | |
| | Photovac Tip | | | | | |
| 2. | $O_2$ Meter | | | | | |
| | Explosimeter | | | | | |
| | Combo Meter | | | | | |
| 3. | Rad-Mini | | | | | |
| | Monitor 4 | | | | | |
| 4. | HCN Draeger | | | | | |
| | Monitox | | | | | |
| 5. | Other: | | | | | |
| | | | | | | |

Attendees At Site:

Protective Clothing Worn:

Comments on Monitoring or Protective Clothing:

Team Leader Ted Nehrkorn
Name

Signature/Date

Site Safety Officer Sam Borries
Name

Signature/Date

Please submit original to Paul Moss, and a copy to the project file.

HS018E(12/27/89)

Vehicle Safety Checklist
Ecology & Environment, Inc.
Chicago Office

Date: _____ Time: _____ Odometer: _____

Vehicle Model: _____ Color: _____ License Plate No. _____

INTERIOR:
____ All Safety Belts-Proper Locking
____ Parking Brake

START ENGINE:
____ Oil Pressure
____ Instrument Panel
(Warning Lights or Buzzers)
____ Horn
____ Windshield Wiper & Washer
____ Heater/Defroster
____ Mirrors
____ Steering (Loose)
____ Interior Lights
____ Emergency Flashers
____ Starts Properly

FRONT:
____ Headlights (Dim/Bright)
____ Turn Signals
____ Emergency Flashers

REAR:
____ Tail Lights
____ Brake Lights
____ Back up Lights
____ Turn Signals
____ Emergency Flashers

MECHANICAL OPERATION:
____ Engine (misses, knocks, etc.)
____ Check Oil
____ Water/Anti-freeze
____ Wiper Fluid
____ Brake Fluid

OUTSIDE:
____ Tires (properly inflated)
____ Gas Tank Cap

EMERGENCY EQUIPMENT:
____ Fire Extinguisher
____ First Aid Kit
____ Flags, Flares,
____ Spare tire (properly inflated)
____ Tire Changing Kit
(jack, tools, etc.)

REMARKS:
_____
_____
_____
_____
_____
_____
_____
_____

TEAM MEMBER/OPERATOR: _____ / _____
(print name) signature

SITE NAME/ADDRESS: IRATHANE SYSTEMS, Hibbings Minn.

PAN/JOB NUMBER: FMN0230SB / FT1305

RETURN OF VEHICLE TO DUTY STATION

Vehicle Cleanliness: _____

Remarks: _____
_____
_____
_____

Corrections Necessary: _____
_____

TEAM MEMBER/OPERATOR: _____ / _____
(print name) signature

Date: _____ Time: _____ Odometer: _____

9/88