Prepared For
GAF CORPORATION
Wayne, New Jersey

GAF Parking Lot Site
Binghamton, New York

Technical Work Plan

MALCOLM PIRNIE

July 1995

TECHNICAL WORK PLAN

SITE: **GAF Parking Lot Site**

CODE: **704011**

LOCATION: **Seymour and Charles Streets**
Binghamton/Broome County

Purpose

The purpose of this work plan is to describe the rationale and procedures that will be used to delineate the areal and vertical extent of fill material near test pit TP-1 that contains greater than 10 ppm of polychlorinated biphenyls (PCBs). Because the extent of affected fill is unknown, this plan will not cover remediation since selection of appropriate methods is dependent on the volume of affected material.

Introduction

The GAF Parking Lot Site is located north of and adjacent to the Anitec Image Corporation (Anitec) facility in Binghamton, New York (Figure 1). The site encompasses approximately 2.8 acres. The surface of the eastern third of the site is currently paved with asphalt (Figure 2). A relatively thin layer of fill (up to about five feet) was used to level this part of the site. The thickness of the fill increases to about 15 feet toward the south and west, as the original topography sloped in this direction.

A New York State Department of Environmental Conservation (NYSDEC) Phase II Investigation at the site was documented in a January 1990 report. Geophysical surveying, monitoring well installation, ground water sampling, and subsurface soil sampling were performed as part of the investigation. Additional ground water samples were collected from the on-site wells in August 1991. The analytical results indicated low levels of volatile organic compounds (VOCs) in the ground water, but no evidence of hazardous waste disposal.

Since the completion of the Phase II Investigation, the NYSDEC determined that additional work was necessary at the site to determine if hazardous waste disposal pursuant to 6 NYCRR Part 371 had occurred and whether the site posed a "significant threat" under 6 NYCRR Part 375. Malcolm Pirnie conducted a Supplementary Phase II Investigation, which was completed in May 1995. The investigation consisted of performing magnetometer and soil-gas surveys, advancing borings, excavating test pits (two rounds), collecting samples of the excavated fill materials for analysis, and sampling groundwater at existing wells and at other selected locations using discreet, direct-push sampling methods. One of the fill samples, collected from test pit TP-1, contained 190 ppm of the PCB Aroclor 1242. The sample containing the PCB was collected from a thin horizon of red-stained fill observed in the southeast quadrant of test pit TP-1 (Figure 2), at a depth of about three to four feet. Since soil containing greater than 50 ppm of PCBs is of concern, the NYSDEC required additional work to define the extent of the PCB-contaminated fill material.

Health and Safety Plan

The existing site health and safety plan (Malcolm Pirnie, 1994) has been updated to include data gathered during the second round of test-pitting conducted at the site and is included as Attachment 1. Level D Personal Protective Equipment is anticipated to be used for the PCB delineation.

Delineation Plan

The areal and vertical extent of the PCB-contaminated fill will be delineated by collecting subsurface soil samples and screening selected samples in the field for PCBs using an enzyme immunoassay test kit. Specifics regarding the test kit are included in Attachment 2. Results from these tests will determine, with 95% confidence of no false negatives, when total PCBs are present at concentrations above the NYSDEC cleanup goal of 10 mg/kg (ppm). To confirm the results of the screening, approximately 30% of the screening samples will be duplicated and sent to a ELAP off-site laboratory for PCB analysis according to EPA Method 8080. This will include samples showing both the presence and absence of PCBs during screening. Based on previous investigations conducted at the site, the extent of the PCB contamination is anticipated to be relatively small; therefore, it is estimated that no more than 20 screening samples and six fixed-base laboratory samples will be required to delineate the contamination. Sampling equipment will be decontaminated between locations according to the procedures outlined in Attachment 3. For Quality Assurance/Quality Control purposes, a rinsate blank and blind duplicate samples will also be collected and submitted for PCB analysis. The number of blind duplicate samples will be ten percent of the total number of samples analyzed.

Samples will be collected using either direct-push soil sampling apparatus or conventional augering and split-spoon sampling. The direct-push method is preferred because drilling cuttings are not generated, the equipment is easier to decontaminate between holes, and with the proper subsurface conditions, samples can be collected more rapidly than with conventional augering. The drilling equipment that will be used at the site will have the capability to use augers in case the direct-push method does not prove satisfactory. Direct-push samples will be collected using a four-foot long Geoprobe Macro-Core sampler. This device has the same inside diameter as conventional two-inch split spoons. Before each use, the sampler is lined with an acetate sleeve that is extracted, along with the sample, from the core after it is driven. The sampler is driven into the subsurface using a pneumatic or hydraulic driving system.

It is anticipated that a minimum of four sampling locations will be required (Figure 2). Sampling will begin along the southeast edge of TP-1 (where the red-stained horizon was observed during excavation), at the location labelled PCB-1 on Figure 2. The interval from one to five feet below grade will be continuously sampled. If the red-stained horizon is present, screening samples will be collected from three six-inch intervals. The first interval will be from 0.5 to 1.0 feet above the top of the horizon, the second interval will be centered on the red-stained horizon, and the third interval will be from 0.5 to 1.0 feet below the bottom of the horizon. If the horizon is not visible, samples will be collected at depths of 2.0 to 2.5 feet, 3.5 to 4.0 feet, and 4.5 to 5.0 feet below grade. The sampling methodology, including sampling equipment decontamination procedures, is described in detail in Attachment 2. The results of these screenings will determine whether additional screening tests are required at this location to delineate the vertical extent of fill containing more than 10 mg/kg PCBs. Once the vertical extent is determined, soil samples will be retrieved from three other locations (PCB-2 through PCB-4). These points will be located approximately

ten feet from, and will surround, PCB-1 (Figure 2). Location PCB-2 is designed to be in an area expected to be outside the limits of the red-stained horizon. Whether or not portions of the samples retrieved from these other locations are screened for PCBs will depend on the results of screening at PCB-1. If the results at PCB-1 demonstrate that the red-stained material is the source of the PCB contamination, then other borings where the red-staining is evident may not be screened, rather, another sampling location that is further away from TP-1 will be selected. This procedure will continue until samples are retrieved that do not contain the red staining. At this point, a 0.5-foot length of the sample will be screened. The depth of this 0.5-foot interval will be coincident with the depth of the red-stained material observed in the other borings. If no correlation between the red-stained material and PCBs can be established, a minimum of two 0.5-foot intervals will be screened at each location to identify the limits of PCB contamination greater than 10 ppm. Additional boring locations, if necessary, will be selected based on the results of the screenings.

Delineation Report

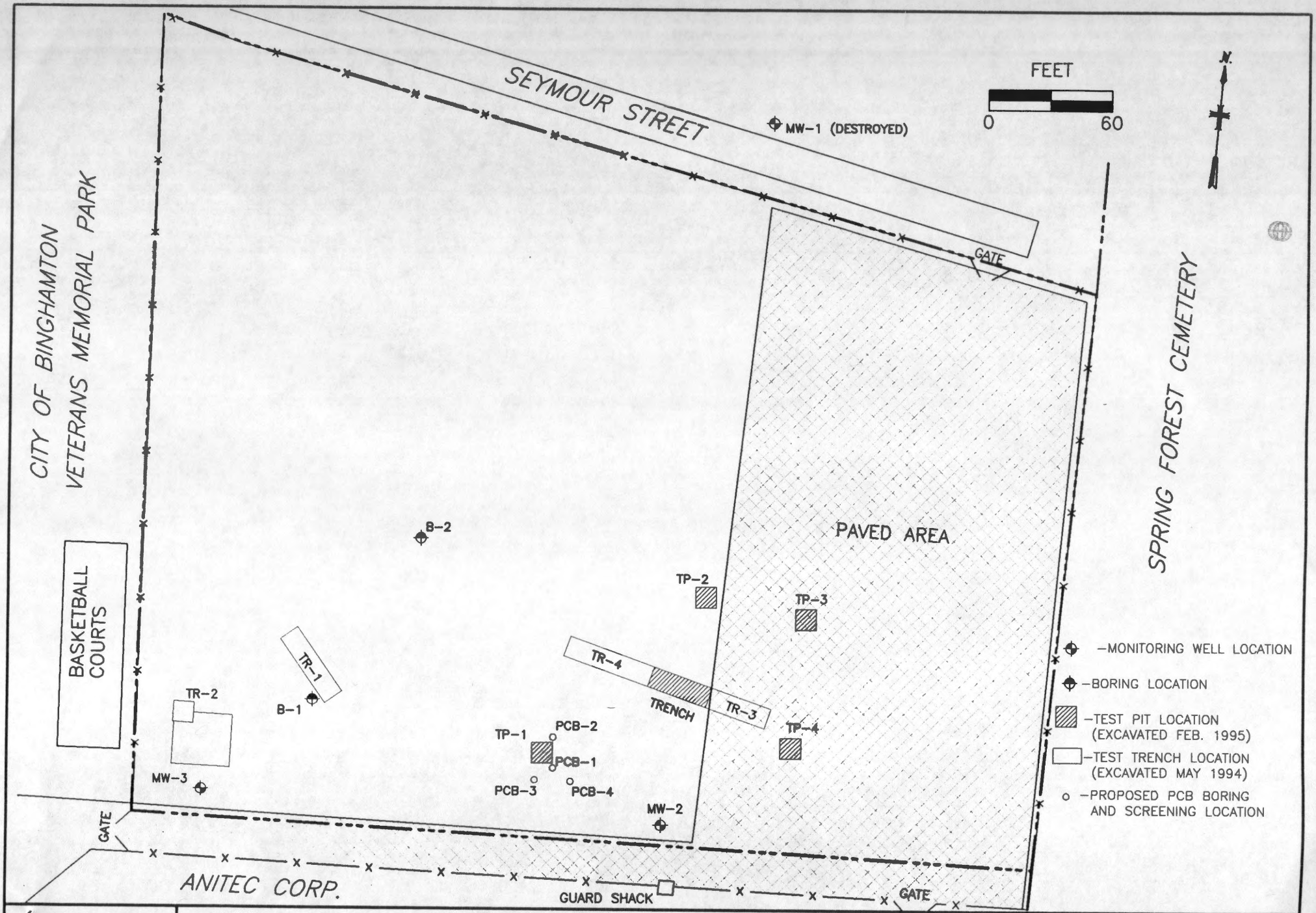
Following receipt and reduction of the analytical data, a letter report will be prepared and submitted to the NYSDEC. The report will present the results of the delineation effort and provide recommendations for remediation of the affected soil.

Investigation-Derived Waste (IDW)

Soil cuttings (if generated) and the portions of collected samples not submitted for analysis will be returned to the boring from which they were generated. The upper one foot of each borehole will be sealed with bentonite. Decontamination fluids will be contained for subsequent disposal.

Schedule

A bar chart depicting the project schedule is included as Attachment 4.



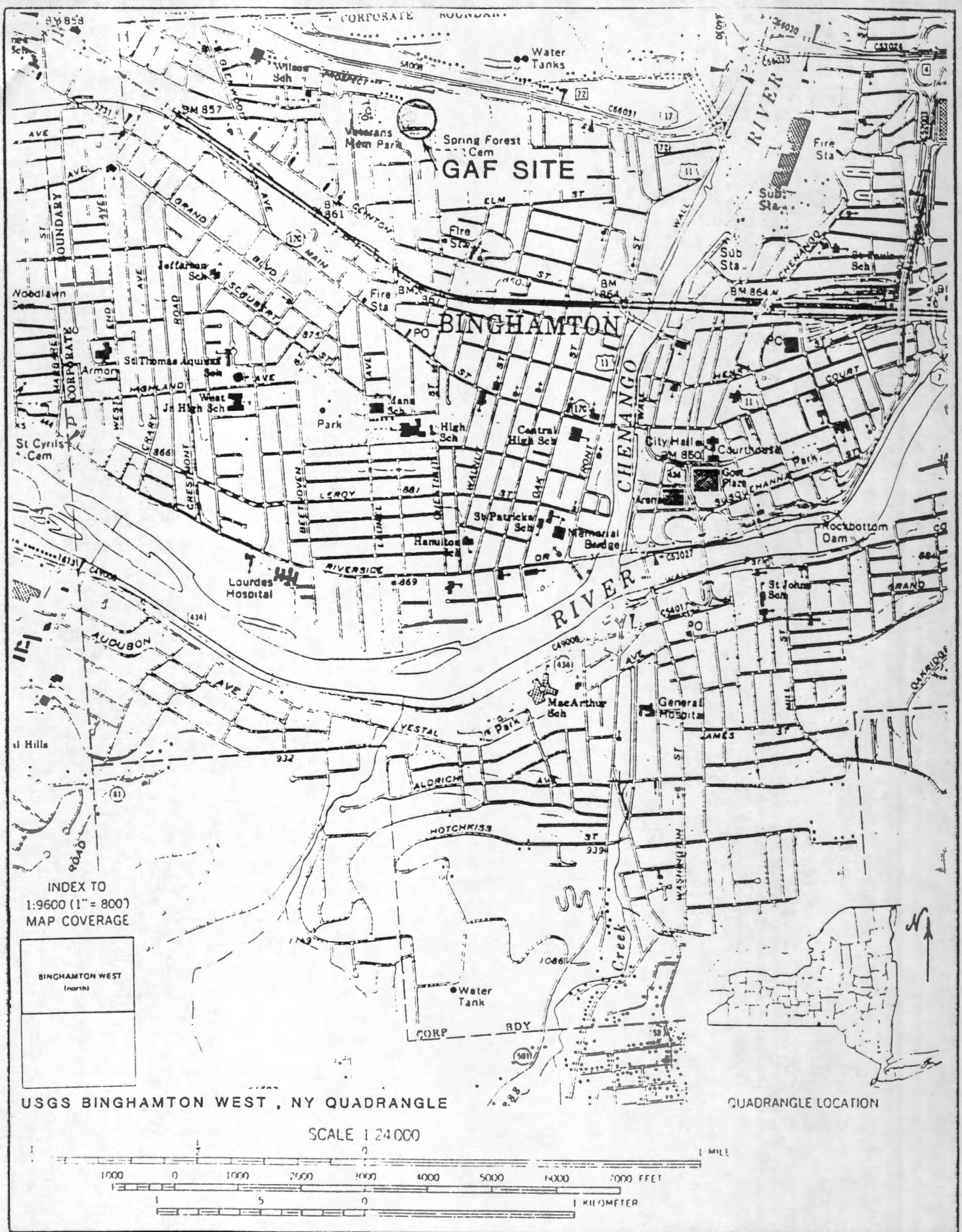
MALCOLM PIRNIE

GAF CORPORATION
GAF PARKING LOT SITE

PCB-DELINEATION SCREENING LOCATIONS

MALCOLM PIRNIE, INC.

FIGURE 2



MALCOLM PIRNIE

SITE LOCATION MAP

MALCOLM PIRNIE, INC.

FIGURE 1

159361

ATTACHMENT 1

HEALTH & SAFETY PLAN

MALCOLM PIRNIE

SITE SPECIFIC SAFETY AND HEALTH PLAN

SECTION 1: GENERAL INFORMATION & DISCLAIMER

CLIENT NAME: International Specialty Products PROJECT NAME: Supplemental Phase II Investigation GAF Parking Lot Site

PROJECT MANAGER: Thomas Barbieri

PROJECT LEADER: Keith A. White REVISION DATE: ~~7/24/95~~ 7/27/95 (previous sheet form was used as basis for preparing this sheet form)

SITE HEALTH & SAFETY OFFICER: Keith A. White

PREPARED BY: Keith A. White DATE: 7/24/95

NOTE: This Site Specific Safety and Health Plan (SSSHP) has been prepared for use by Malcolm Pirnie, Inc. employees for work at this site. Malcolm Pirnie, Inc. is not responsible for its use by others. **The plan is written for the specific site conditions, purposes, tasks, dates and personnel specified and must be amended and reviewed by those named in Section 16 if these conditions change.**

Subcontractors shall be solely responsible for the health and safety of their employees and shall comply with all applicable laws and regulations. In accordance with 1910.120(b)(1)(iv) and (v), Malcolm Pirnie, Inc. will inform subcontractors of the site emergency response procedures, and any potential fire, explosion, health, safety or other hazards by making this Site Specific Safety and Health Plan and site information obtained by others available during regular business hours. All contractors and subcontractors are responsible for: (1) developing their own Health and Safety Plan including a written Hazard Communication Program and any other written hazard specific programs required by federal, state and local laws and regulations; (2) providing their own personal protective equipment; (3) providing documentation that their employees have been health and safety trained in accordance with applicable federal, state and local laws and regulations; (4) providing evidence of medical surveillance and medical approvals for their employees; and (5) designating their own site safety officer responsible for ensuring that their employees comply with their own Health and Safety plan and taking any other additional measures required by their site activities.

If an upgrade to Level "C" or above is anticipated, this Site Specific Safety and Health Plan must be reviewed/approved by Health and Safety, Corporate.

SECTION 2: PROJECT INFORMATION

(1) SITE INFORMATION

Site Name: ISP-GAF Parking Lot

Address: Charles Street
Binghamton, NY

Site Project Client Contact: T. Kevin Shoehi

Phone No.: 201-628-4150

Site Health & Safety Contact: N/A

Phone No.: N/A

(2) SITE CLASSIFICATION: (check and circle all that apply)

	Hazardous (RCRA)
	Construction
	Sanitary or C and D Landfill
	First Entry
X	Hazardous (CERCLA/(State Superfund))
	UST/LUST
	Manufacturing
	Previously Characterized
	Active
X	(Inactive)

Other

Explain:

(3) ENTRY OBJECTIVES AND DATES OF FIELD VISIT(S):
PCB Delineation through Subsurface Soil Sampling.

(4) MALCOLM PIRNIE TASKS:
(1) Observe Drilling of several shallow Geoprobe borings - Collect samples for PCB Analysis.

TASKS PERFORMED BY OTHERS:
(1) Advancing Geoprobe boring

(5) PROJECT ORGANIZATION AND COORDINATION - The following Malcolm Pirnie personnel are designated to carry out the stated project job functions on site. (Note: One person may carry out more than one job function.)

PROJECT MANAGER	Tom Barba
SITE SAFETY OFFICER	Keith White
ALTERNATE SITE SAFETY OFFICER	Gary Mullen or Wes Jones
PUBLIC INFORMATION OFFICER	Tom Barba
SITE RECORDKEEPER	Site Safety Officer
ON-SITE PERSONNEL WITH CPR/FA	Keith White, Gary Mullen, Wes Jones
FIELD TEAM LEADER	Keith White or Gary Mullen
FIELD TEAM MEMBERS	Gary Mullen Wes Jones
VISITORS: FEDERAL AGENCY REPS (i.e., EPA, OSHA)	—
STATE AGENCY REPS	Tom Suozzo (NYSDEC)
LOCAL AGENCY REPS	—
SUBCONTRACTORS: SUBCONTRACTOR(S) SITE SAFETY OFFICERS	North Star Drilling

All personnel arriving or departing the site should log in and out with the Recordkeeper.

(6) ONSITE CONTROL

Site Safety Officer has been designated to coordinate access control and security for Malcolm Pirnie operations on site. A safe perimeter has been established at 25 feet from drilling area. Traffic CONES or Stakes w/barrier tape will be used to designate the exclusion zone.

No unauthorized person should be within this area.

The onsite Command Post and staging area have been established at the MPI field vehicle

The prevailing wind conditions are Westerly. A wind direction indicator is used to determine daily wind direction. The Command Post is located upwind from the Exclusion Zone or at a sufficient distance to prevent exposure should a release occur.

Control boundaries have been established and Exclusion Zone(s) (the contaminated area) have been identified. (Attach site map)

These boundaries are identified by: Traffic Cones or Stakes & Flagging. Exclusion zones will be established at the beginning of each work day.

SECTION 3: PHYSICAL HAZARDS INFORMATION

(1) IDENTIFY POTENTIAL PHYSICAL HAZARDS TO WORKERS:

___ Confined Space	___ Steep/uneven terrain	___ Surface water
X Heavy equipment	X Heat stress	___ Drum handling
X Moving parts	___ Extreme cold	X Noise
___ Heavy Lifting	___ Ionizing Radiation	___ Non-ionizing Radiation
___ Electrical	___ Traffic	X Falls
___ Overhead Hazards	___ Biological Hazards	

Describe other unsafe environments ___

(2) SAFETY EQUIPMENT REQUIRED FOR MALCOLM PIRNIE EMPLOYEES

___ Explosimeter	X Eye Wash	___ Snake Bite Kit
___ Fall Protection Equipment	___ Emergency Shower	___ Floatation Device (USCG Type III)
___ Confined Space Equipment	X Barrier Tape w/Stakes or X Traffic Cones	___ Emergency Air Horn
___ Ladder	___ Stretcher	___ Lights
X First Aid Kit	___ A-B-C Fire Extinguisher	___ Lights - emergency
	___ Tick Repellant	___ Communications - On Site
		X Communications - Off Site

Describe other ___

SECTION 4: CHEMICAL HAZARDS INFORMATION

(1) IDENTIFIED CONTAMINANTS

Known or suspected hazardous/toxic materials (attach historical information, physical description, map of contamination and tabulated data, if available)

Media	Substances Involved	Characteristics	Estimated Concentrations	PEL
	SEE TABLE 1 (Attached)			

Media types: GW (ground water), SW (surface water), WW (wastewater), AIR (air), SL (soil), SD (sediment), WL (waste, liquid), WS (waste, solid), WD (waste, sludge), WG (waste, gas), OT (other).

Characteristics: CA (corrosive, acid), CC (corrosive, caustic), IG (ignitable), RA (radioactive), VO (volatile), TO (toxic), RE (reactive), BIO (infectious), UN (unknown), OT (other, describe)

(2) DESCRIBE POTENTIAL FOR CONTACT WITH EACH MEDIA TYPE FOR EACH OF THE MPI TASKS LISTED IN SECTION 2.4:

MPI TASK #	ROUTE OF EXPOSURE	POTENTIAL FOR CONTACT	METHOD OF CONTROL
(1)	Dermal/Oral/Inhalation	low	PPE; Stay upwind

The Site Safety Officer will brief the MPI field team on symptoms and signs of overexposure to chemical hazards.

SECTION 5: HAZARD COMMUNICATION PROGRAM

If chemicals are introduced to the site by Malcolm Pirnie, Inc. (e.g., decontamination liquids, preservatives, etc.), bring a copy of the Malcolm Pirnie, Inc. Hazard Communication Program and Material Safety Data Sheets (MSDSs) to the site. The Site Safety Officer will review this information with all field personnel prior to the start of the project. The Comprehensive List of Chemicals for this site is:

Ascorbic Acid
Sodium hydroxide
Nitric Acid
Sodium Thiosulfate
Methanol

TABLE 1
MAXIMUM LEVELS DETECTED

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PARAMETER	MEDIA	MAXIMUM LEVEL DETECTED[1]
Volatiles		
Acetone	GW	0.087
	OT[2]	2.0
Benzene	GW	0.004
	OT	1.9
2-butanone	GW	0.075
	OT	0.56
Carbon tetrachloride	GW	0.0019
Chloroethane	GW	0.15
Chloroform	GW	0.0024
	WS	3.7
1,2-dichloroethane	GW	0.054
1,1-dichloroethene	GW	0.001
Methylene Chloride	GW	0.091
	OT	0.053
m&p Xylenes	OT	0.21
Tetrachloroethene	GW	0.0005
	OT[3]	0.16
Toluene	GW	0.0081
	WS	1.0
	OT	2.9
1,1,2,2-tetrachloroethane	OT	3.3
Chloroform	WS	3.7
	OT[3]	1.1
1,1,1-trichloroethane	WS	0.65
	OT[3]	19
1,2-dichloropropane	OT	1.6
Trichloroethene	GW	0.01
	WS	3.2
	OT[3]	0.16
4-methyl-2-pentanone	OT	0.23
Semi-volatiles		
Acenapthene	OT	3.2
Anthracene	OT	6.2
Butylbenzylphthalate	WS	0.52
Di-n-butylphthalate	WS	85
Bis (2-ethylhexyl) phthalate	WS	18
Benzo (a) anthracene	OT	15
Benzo (b) fluoranthene	OT	12
Benzo (g.h.i) perylene	OT	5.6
Benzo (k) fluoranthene	OT	10
Benzo (a) pyrene	OT	10
Chrysene	OT	20
Diethylphthalate	WS	320
2,4-Dinitrotoluene	OT	2

TABLE 1
MAXIMUM LEVELS DETECTED

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PARAMETER	MEDIA	MAXIMUM LEVEL DETECTED[1]
Fluoranthene	OT	41
Fluorene	OT	14
Ideno (1,2,3-cd)pyrene	OT	6.3
2-methylnapthalene	OT	200
Napthalene	OT	210
Phenanthrene	OT	34
Pyrene	OT	32
Phenol	WS	27
PCBs		
Aroclor 1242	OT	190
Inorganics		
Aluminum	OT	14000
Antimony	WS	8.2
	OT	13
	SL	17.1
Arsenic	SL	9.5
	OT	6.7
Barium	OT	310
	SL	181
Beryllium	SL	1.2
Cadmium	OT	170
Calcium	WS	140000
	OT	32000
Chromium	OT	110
Cobalt	SL	8.7
	OT	38
Copper	SL	3510
	OT	730
Iron	SL	130
	OT	71000
Lead	SL	502
	OT	120
Magnesium	WS	52000
	OT	5400
Manganese	SL	912
	OT	690
Mercury	WS	4.7
	OT	2.0
Nickel	OT	440
Potassium	OT	1000
Selenium	WS	5.2
	OT	9.0
	SL	8.8
Silver	SL	150
	OT	270

TABLE 1
MAXIMUM LEVELS DETECTED

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PARAMETER	MEDIA	MAXIMUM LEVEL DETECTED[1]
Sodium	WS	310
	OT	400
Vanadium	SL	21.9
Zinc	OT	1500
Cyanide	OT	27

[1] All levels in ppm unless noted otherwise.
[2] Medium designated "OT" consist of a mixture of soil and solid waste unless noted otherwise.
[3] This medium consists of soil gas. Values reported in mg/m^3.

SECTION 6: ENVIRONMENTAL MONITORING

(1) The following environmental monitoring instruments shall be used on site at the specified intervals.

EQUIPMENT		MONITORING PERIOD		PEL/REL/TLV	ACTION LEVEL
Combustible Gas Indicator	-	continuous/hourly/daily/other		25%	10%
O_2 Monitor	-	continuous/hourly/daily/other		19.5 - 25%	19.5
Colorimetric Tubes (type)	-	continuous/hourly/daily/other			
	-				
	-				
	-				
PID (Lamp 11.7 eV)	-	continuous/hourly/daily/other		See Table 2 Attached	X
FID	-	continuous/hourly/daily/other			
Radiation Meter	-	continuous/hourly/daily/other			
Respirable Dust Monitor	-	continuous/hourly/daily/other			
Toxic Gas Indicator	-				
(Type)	-	continuous/hourly/daily/other			
Other	-	continuous/hourly/daily/other			
	-	continuous/hourly/daily/other			

(2) Monitoring equipment is to be calibrated according to manufacturers' instructions. Record calibration data and air concentrations in the Health and Safety on-site log book.

(3) Recommended Action Levels for Upgrade or Downgrade of Respiratory Protection or Site Shutdown and Evacuation. These are average values. Consideration should be given to the potential for release of highly toxic compounds from the waste or from reaction by-products. Levels are for persistent (> 10 min) breathing zone measurements.

PID Action Level - 1ppm above background leave exclusion zone. Do not enter exclusion zone if levels are ≥ 1ppm above background.

Uncharacterized Airborne Vapors or Gases

Level D Background*

Level C Up to 5 ppm above background

Level B 5 ppm to 500 ppm above background

Level A 500 ppm to 1000 ppm above background

*Off-site "clean" air measurement.

Characterized Gases, Vapors, Particulates*

Up to 50% of PEL, REL or TLV

Up to 25 times PEL, REL or TLV

Up to 500 times PEL, REL or TLV

Up to 1000 times PEL, REL or TLV

*Use mixture calculations (% allowed = ΣC_n / PEL_n) if more than one contaminant is present.

Oxygen Deficiency

Concentration	Action Taken
< 19.5% O_2	Leave Area. Reenter only with supplied-air respirators.
19.5 % to 25% O_2	Work may continue. Investigate changes from 21%.
> 25% O_2	Work must stop. Ventilate area before returning.

Flammability

Concentration	Action Taken
< 10% of LEL	Work may continue. Consider toxicity potential.
10% to 25% LEL	Work may continue. Increase monitoring frequency.
> 25% LEL	Work must stop. Ventilate area before returning.

TABLE 2
THRESHOLD LIMITS FOR SITE INHALATION HAZARDS

P:\PROJ\2435003\TABLES\HASPTAB2.WK1

PARAMETER	ACGIH TLV-TWA (ppm[1])	ACGIH TLV-STEL (ppm)	OSHA PEL-TWA (ppm)	OSHA PEL-STEL (ppm)	OSHA PEL-CEILING (ppm)
Volatiles					
1,1,1-trichloroethane	350	450	350	450	—
1,1-dichloroethene	5	20	1	—	
1,1,2,2-tetrachloroethane	1	—	1	—	—
1,2-dichloroethane	10	—	1	2	—
1,2-dichloropropane	75	110	75	110	—
2-butanone	200	300	200	300	—
4-methyl-2-pentanone	50	75	50	75	—
Acetone	750	1000	750	1000	—[2]
Benzene	10	—	1	5	—
Carbon tetrachloride	5	10	2		—
Chloroethane	1000	—	1000	—	—
Chloroform	10	—	2	—	—
Methylene Chloride	50	—	25	125	—
Tetrachloroethene	25	100	25	—	—
Toluene	50	—	100	150	—
Trichloroethene	50	100	50	200	—
Xylene (o-,m-,p-isomers)	100	150	100	150	
Semi-volatiles					
dinitrotoluene	0.15*	—	1.5*	—	—
Napthalene	10	15	10	15	—
Phenol	5	—	5	—	—
PCBs					
Aroclor 1242 (skin)	1*	—	1*	—	—
Inorganics					
Antimony	0.5*	—	0.5*	—	—
Aluminum	10*	—	5*	—	—
Arsenic	0.01*	—	0.01*	—	—
Barium	0.5*	—	0.5*	—	—
Cadmium	0.01*	—	0.005*	—	—
Chromium	0.5*	—	0.5*	—	—
Cobalt	0.02*	—	0.1*	—	—
Copper	1*	—	1*	—	—
Lead	(0.15)*	—	0.05*	—	—
Manganese	5*	—	—	—	5*
Mercury	0.025*	—	—	—	0.1*
Nickel	(1)*	—	1*	—	—
Selenium	0.2*	—	0.2*	—	—
Silver	0.1*	—	0.01*	—	—
Zinc	5*	10*	5*	10*	—
Cyanide	—	—	5*	—	—

Radiation

Intensity	Action Taken
< .5 mR/hr	Work may continue.
< 1 mR/hr	Work may continue. Continue to monitor. Notify Corporate Health and Safety and Corporate Health Physicist.
5 mR/hr	Radiation work zone. Work must stop.

SECTION 7: HEALTH AND SAFETY TRAINING AND MEDICAL MONITORING PROGRAM

The project staff is included in the Malcolm Pirnie Health and Safety training and medical monitoring programs. (See the Health and Safety Procedures Manual, Sections 3, 4 and 5.)

NAME	MEDICAL (Date)	HAZWOPER TRAINING INITIAL (Hrs/Date)	REFESHER (Date)	MGR/SUPV (Date)	CPR / FA / BBP (Dates)	FIT TEST (Make/Size/Type/Date)
Keith White	5/5/94 ~~Status~~	40 / 4/22/88	~~Status~~	4/11/89	6/95 / 6/95 / 6/95	Scott / L / Full / 5/19/94
Erin Mullen	9/9/94	40 / 9/85	9/14/94	4/11/89	6/95 / 6/95 / 6/95	Scott / LG / Full / 9/15/94
Wes Jones	9/6/94	40 / 8/87	9/14/94	4/11/89	6/95 / 6/95 / 6/95	Scott / LG / Full / 2/3/95
		/			/ /	/ / /
		/			/ /	/ / /
		/			/ /	/ / /

SECTION 8: PERSONAL MONITORING

The following personal monitoring will be in effect on site:

Personal exposure sampling:

See attached heat stress monitoring section

Medical monitoring: The expected air temperature will be _____F. If it is determined that heat stress monitoring is required (mandatory for heavy exertion in PPE at temperatures over 70°F) the following procedures shall be followed (describe procedures in effect, i.e., monitoring body temperature, body weight, pulse rate):

MPI personnel will not be performing heavy exertion activities

A copy of personal monitoring results is to be sent to Corporate Health and Safety for inclusion in the Employee's Confidential Exposure Record File.

SECTION 9: CONFINED SPACE ENTRY

(1) WILL CONFINED SPACE ENTRY TAKE PLACE? Yes _____ No X

If yes, attach **Confined Space Entry Program** available from your Branch Health and Safety Coordinator and complete the **Pre-Entry Inspection Checklist** and **Confined Space Entry Permit** prior to entering each confined space, each work shift. The Confined Space Permit must be posted outside the confined space.

Permits will be saved and logged with project documentation.

HEAT STRESS

The wearing of Personal Protective Equipment (PPE) can place a hazardous waste worker at risk of developing heat stress. This can result in health effects ranging from transient heat fatigue to serious illness or death. Heat stress is caused by a number of interacting factors, including environmental conditions, clothing, work load, and the individual characteristics of the worker. Because heat stress is probably one of the most common (and potentially serious) illnesses at hazardous waste sites, regular monitoring and other preventive precautions are recommended.

The potential for heat stress is dependent on a number of factors, including environmental conditions, clothing, workload, physical conditioning, and age. The effects of heat stress can range from mild symptoms, such as fatigue, irritability and decreased mobility, to death. The body's response to heat stress include the following:

- Heat Rash: A result of continuous exposure to heat and humidity, heat rash decreases the body's ability to tolerate heat.

- Heat Cramps: A result of profuse perspiration with inadequate fluid intake and chemical replacement, heat cramps are signaled by muscle spasms and pain in the abdomen and the extremities.

- Heat Exhaustion: A result of increased stress on various organs. The signs of heat exhaustion include shallow breathing; pale, cool, moist skin; profuse sweating; dizziness and lassitude; and elevated body temperature.

- Heat Stroke: The most severe form of heat stress, heat stroke must be relieved immediately to prevent severe injury or death. The signs of heat stroke are red, hot, dry skin; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; elevated body temperature; and coma. The body must be cooled and medical attention sought immediately.

Preventive measures to preclude heat stress include regular work breaks during field activities, regular food replenishment and the availability of shelter (i.e., shaded area). All personnel will be made aware of the symptoms of heat stress. Should one or more symptoms be detected, the affected worker will be assisted to seek shade, drink plenty of fluids and seek medical attention, if required.

Heat stress monitoring should commence when personnel are wearing PPE, including Tyvek-type coveralls, and the ambient temperature exceeds 70°F. If standard work garments (cotton coveralls) are worn, monitoring should commence at 85°F.

HEAT STRESS MONITORING

For monitoring the body's recuperative ability to excess heat, one or more of the following techniques will be used as a screening mechanism. Monitoring of personnel wearing protective clothing will commence when the ambient air temperature is 70°F or above.

- Heart rate (HR) may be measured by the radial pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 100 beats per minute. If the HR is higher, the next work period should be shortened by 30 minutes (or 33%), while the length of the rest period remains the same. If the pulse rate is 100 beats per minute at the beginning of the next rest period, the following work cycle should be further shortened by 33%.

- Body temperature may be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature (OT) at the beginning of the rest period should not exceed 99.6 degrees Fahrenheit. If it does, the next work period will be shortened by ten minutes (or 33%), while the length of the rest period stays the same. However, if the OT exceeds 99.6 degrees Fahrenheit at the beginning of the next rest period, the following work cycle may be further shortened by 33%. OT should be measured again at the end of the rest period to make sure that it has dropped below 99.6 degrees Fahrenheit. No worker will be permitted to continue wearing semipermeable or impermeable garments when his/her oral temperature exceeds 100.6 degrees Fahrenheit.

- Body water loss (BWL) due to sweating may be measured by weighing the worker in the morning and in the evening. The clothing worn will be similar at both weighings; preferably the worker should be nude. The scale will be accurate to plus or minus 1/4 lb. BWL should not exceed 1.5% of the total body weight. If it does, workers will be instructed to increase their daily intake of fluids by the weight lost. Ideally, body fluids should be maintained at a constant level during the work day.

SECTION 10: COMMUNICATIONS PROCEDURES

The following standard hand signals will be used in case of failure of radio communications:

Hand gripping throat	-	Out of air, can't breathe
Grip partner's wrist or both hands around wrist	-	Leave area immediately
Hands on top of head	-	Need assistance
Thumbs up	-	OK, I am all right, I understand
Thumbs down	-	No, negative

If applicable, telephone communication to the Command Post should be established as soon as practicable. The stationary and/or (mobile phone) number(s) are 4310-8293 (portable) and 427-10464 (Truck).

SECTION 11: DECONTAMINATION PROCEDURES

Personnel and (monitoring) equipment leaving the Exclusion Zone shall be thoroughly decontaminated. The Site Safety Officer is responsible for monitoring adherence with this decontamination plan. The standard level D decontamination protocol shall be used with the following decontamination stations*:

(1) Equipment Dump: Place equipment + sample containers on plastic drop cloth.
(2) PPE/Equipment/Sample Container Wash/Scrub: Wash w/detergent + water; PPE is on.
(3) Rinse: Rinse washed items with water.
(4) Outer Boot + Glove removal: Place gloves in container w/plastic liner for disposal. Place boots in clean bag for transport.
(5) Outergarment Removal: Remove coveralls; if disposable place in container w/plastic liner.
(6) Inner Glove Removal: Place gloves in container w/plastic liner.
(7) Field Wash: Wash hands + face.
(8)
(9)
(10)

Other Technical work plan describes decontamination procedures for sampling equipment

*~~See the Malcolm Pirnie Health and Safety Procedures Manual, Section 8, Personal Protective Equipment, for sample decontamination station descriptions.~~ N/A HPT workers will use procedures described above

The following decontamination equipment is required:
Plastic drop cloth, 3-bucket stubs, Alconox + water, scrub brushes, plastic bags, + container for disposal of PPE, etc.

Detergent + water will be used as the decontamination solution.

SECTION 12: EMERGENCY PROCEDURES

The following standard emergency procedures will be used by onsite personnel. The Site Safety Officer shall be notified of any onsite emergencies and be responsible for ensuring that the appropriate procedures are followed.

Personnel Injury in the Exclusion Zone: Upon notification of an injury in the Exclusion Zone, the designated emergency signal 1 horn blast shall be sounded. All site personnel shall assemble at the decontamination line. An outside rescue team summoned by the field team leader or SSO will enter the Exclusion Zone (if required) to remove the injured person to the hotline. The Site Safety Officer and Field Team Leader should evaluate the nature of the injury, and the affected person should be decontaminated to the extent possible prior to movement to the Support Zone. The onsite CPR/FA personnel shall initiate the appropriate first aid, and contact should be made for an ambulance and with the designated medical facility (if required). No persons shall reenter the Exclusion Zone until the cause of the injury or symptoms is determined.

Personal Protective Equipment Failure: If any site worker experiences a failure or alteration of protective equipment that affects the protection factor, that person and his/her buddy shall immediately leave the Exclusion Zone. Reentry shall not be permitted until the equipment has been repaired or replaced.

Fire/Explosion: Upon notification of a fire or explosion on site, the designated emergency signal 2 horn blasts shall be sounded and all site personnel assembled at the decontamination line. The fire department shall be alerted and all personnel moved to a safe distance from the involved area.

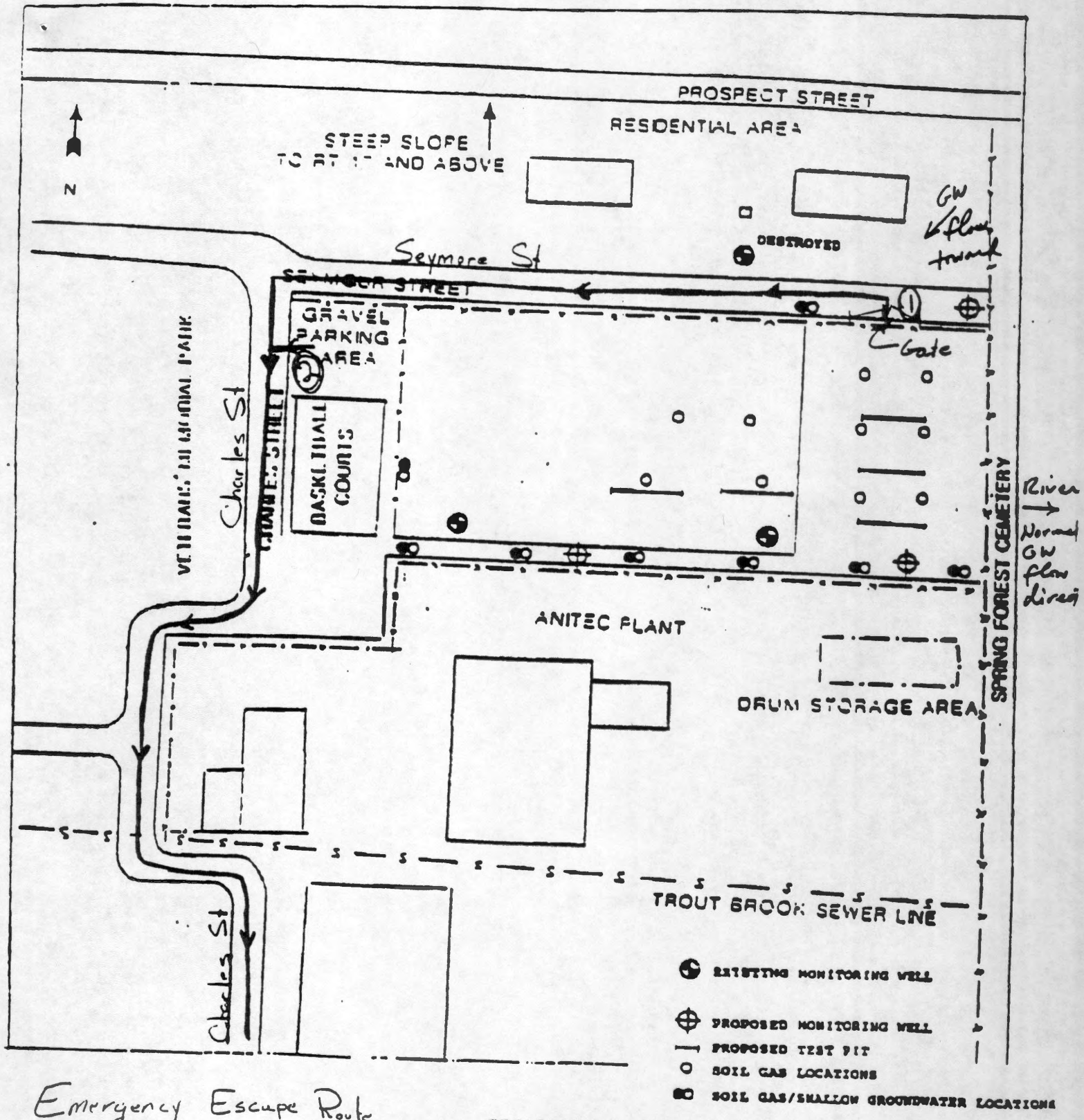
Other Equipment Failure: If any other equipment on site fails to operate properly, the Field Team Leader and Site Safety Officer shall be notified and then determine the effect of this failure on continuing operations on site. If the failure affects the safety of personnel or prevents completion of the Work Plan tasks, all personnel shall leave the Exclusion Zone until the situation is evaluated and appropriate actions taken.

The following emergency escape routes are designated for use in those situations where egress from the Exclusion Zone can not occur through the decontamination line (attach map if available):

Exit through gate to Sampson Street (See Figure 1)

In all situations, when an onsite emergency results in evacuation of the Exclusion Zone, personnel shall not reenter until:

1. The conditions resulting in the emergency have been corrected.
2. The hazards have been reassessed by the SSO.
3. The Site Safety Plan has been reviewed by the SSO and Corporate Health and Safety Manager.
4. Site personnel have been briefed on any changes in the Site Safety Plan by the SSO.



Emergency Escape Route

Figure 1

PRELIMINARY SITE ASSESSMENT
Technical Work Plan

GAF DUMP (704011)

Adapted from Phase II, Gibbs & Hill, January 1990

SECTION 13. EMERGENCY INFORMATION

TO BE POSTED IN SITE-TRAILER/OFFICE AND IN FIELD VEHICLES

(1) LOCAL RESOURCES

Ambulance (name):	Superior	Phone:	607-772-1456
Hospital (name):	Lourdes Hospital	Phone:	607-798-5111 -5231 (emergency)
Police (local or state):	Local Police Dept.	Phone:	607-723-5312
Fire Dept. (name):	City Fire Dept.	Phone:	607-723-7475
HAZ MAT Responder:		Phone:	
Nearest phone:	Vehicle		
On-Site CPR/FA(s):	Gary Mullen/Keith White		

The hospital is <5 (approx. 3 miles from site) minutes from the site and the ambulance response time is <5 min minutes. Gerry Rhodes of Lourdes Hospital was contacted on 2/10/95 and briefed on the situation, the potential hazards, and the substances involved. When IDLH conditions exist, arrangements should be made for onsite standby of emergency services.
Gave Mark McGowan name & number as contact for compliance with Ryan White act.

(2) DIRECTIONS TO NEAREST HOSPITAL - ATTACH MAP: (Figure 2) Exit through gate, turn left (west) on Seymore Street. Turn left on Charles St. (1st left-hand turn). Follow Charles St. to End. Turn right on Clinton St.; then turn left on Jarvis St. Follow Jarvis St. to Route 17C. Turn right on 17C (west); follow to Beethoven. Turn left on Beethoven to Lourdes Rd. Hospital is on right-hand side.

(3) CORPORATE RESOURCES

Mark A. McGowan, CIH, CSP
Manager, Corporate Health & Safety
(914) 641-2484 work
(203) 350-2186 home

Catherine Bobenhausen, CIH
(914) 641-2647 work

Angelo Musone, CSP, CET
(914) 641-2689 work

Alan Fellman, PhD
Corporate Health Physicist
(609) 860-0100 work

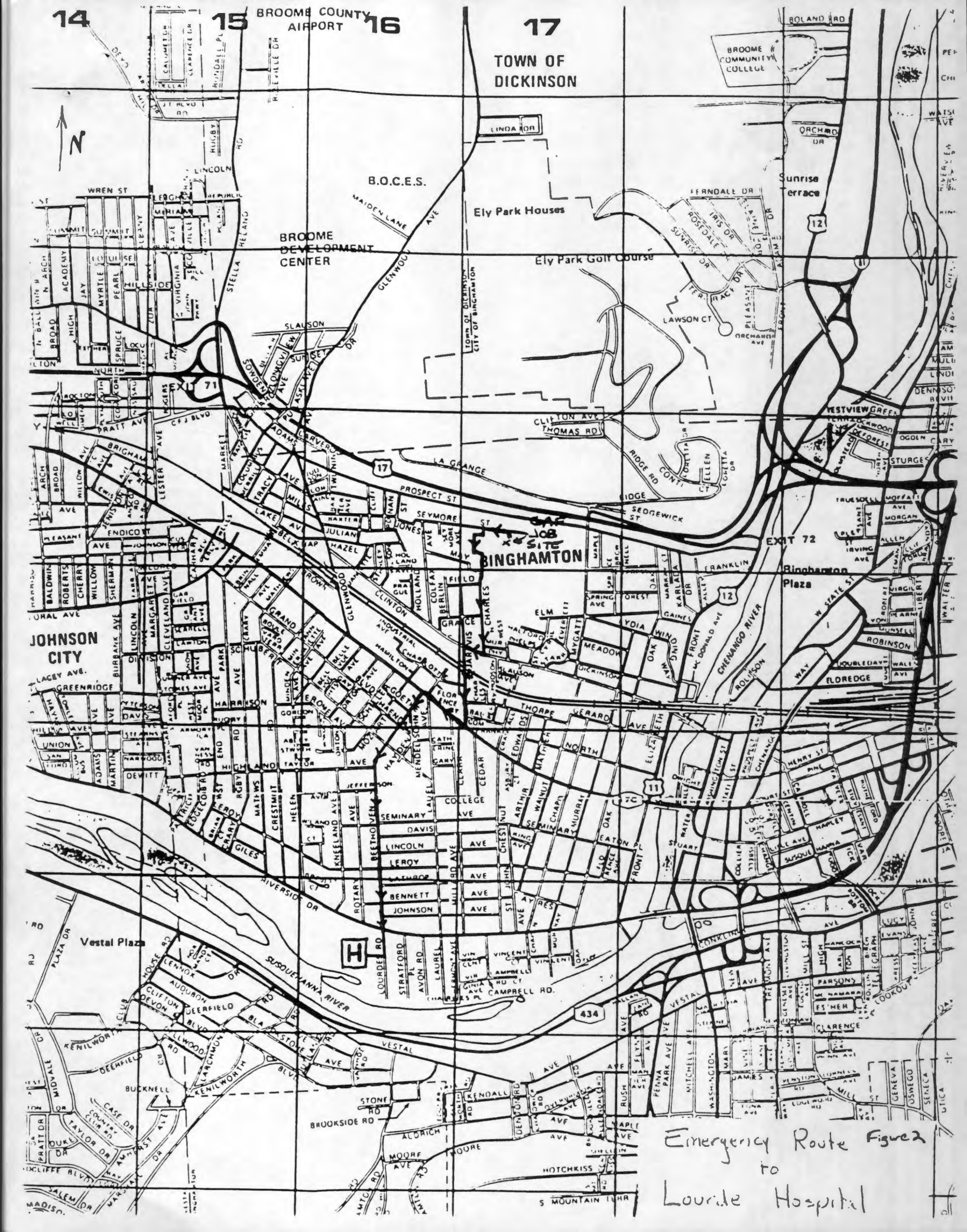
Marcia Cornell — 315-457-4105
(Branch Health & Safety Coordinator)

David L. Barnes, M.D.
Elayne F. Theriault, M.D.
Environmental Medicine Resources, Inc.
(Corporate Medical Consultant)
(800) 229-3674
24 Hour Number

George P. Tilley — 315-470-7945
(Branch Medical Consultant)

(4) WHOM TO NOTIFY IN CASE OF ACCIDENT:
David Smith (Syracuse Office Manager) or Thomas Barba (Associate) 315-457-4105

Also notify: Brenda Verdesi, MPI Benefits Administrator (914) 641-2551
MPI Legal Department (914) 694-2100


14
15
16
17
BROOME COUNTY AIRPORT
TOWN OF DICKINSON
BROOME COMMUNITY COLLEGE
BOLAND RD
LINDA RD
ORCHARD DR
Sunrise Terrace
B.O.C.E.S.
Ely Park Houses
Ely Park Golf Course
BROOME DEVELOPMENT CENTER
FERNDALE DR
IRIS DR
ROSEDALE DR
SUNRISE DR
MAIDEN LANE
GLENWOOD AVE
WREN ST
LINCOLN
STELLA
SLAUSON
LAWSON CT
EXIT 71
EXIT 72
CLIFTON AVE
THOMAS RD
WESTVIEW GREEN
LA GRANGE
PROSPECT ST
SEYMORE ST
SEDGEWICK ST
RIDGE RD
CONTI CT
GAC JOB SITE
BINGHAMTON
Binghamton Plaza
FRANKLIN
W STATE ST
CHENANGO RIVER
ROBINSON
FLOREDGE
JOHNSON CITY
GREENRIDGE
UNION
DEWITT
HARRISON
GERARD AVE
NORTH
SEMINARY
DAVIS
LINCOLN
LEROY
BENNETT
JOHNSON
COLLEGE AVE
CONKLIN
RIVERSIDE DR
Vestal Plaza
SUSQUEHANNA RIVER
CAMPBELL RD.
LOURDES RD
STRATFORD PL
AVON RD
LAUREL
VESTAL
STONE RD
BROOKSIDE RD
ALDRICH
MOORE
HOTCHKISS
S MOUNTAIN HWY
KENDALL
CLARENCE
PARSONS
MAPLE
Emergency Route Figure 2
to
Louride Hospital

SECTION 14: PROTECTIVE EQUIPMENT LIST

TASK*	RESPIRATORS & CARTRIDGE*	USE	CLOTHING	GLOVES	BOOTS	OTHER
1	D	Cont.*	S	B or N or T (for short periods of time)	F/S	Lab/brG/H

*Same as in Section 4(2).

*MPI Employees are to leave the exclusion zone if persistent levels ≥ 1 ppm are detected above background.

RESPIRATORS	APR CARTRIDGES	USE	CLOTHING	GLOVES	BOOTS	OTHER
B = SCBA	O = Organic vapor	Cont = Continuous	T = Tyvek	B = Butyl	F = Firemans	F = Face Shield
APR = APR	G = Organic vapor/acid gas	UP = Upgrade	P = PE Tyvek	L - Latex	L = Latex	G = Goggles
D = N/A	A = Asbestos (HEPA)		S = Saranex	N = Neoprene	N = Neoprene	L = Glasses
E = Escape	P = Particulate		C = Coveralls	T = Nitrile	S = Safety	H = Hardhat
AL = Airline	C = Combination organic vapor & particulate			V = Viton		N = Hearing Protection
	OTH = Other			CN = Cotton		
				P = PVC		
				PA = Polyvinyl Alcohol		
				SS = Silvershield		

SECTION 15: SAFE WORK PRACTICES

THE FOLLOWING PRACTICES MUST BE FOLLOWED BY PERSONNEL ON SITE

1. Smoking, eating, chewing gum or tobacco, or drinking are forbidden except in clean or designated areas.
2. Ignition of flammable liquids within or through improvised heating devices (e.g., barrels) is forbidden.
3. Contact with samples, excavated materials, or other contaminated materials must be minimized.
4. Use of contact lenses is prohibited at all times.
5. Do not kneel on the ground when collecting samples.
6. If drilling equipment is involved, know where the 'kill switch' is.
7. All electrical equipment used in outside locations, wet areas or near water must be plugged into ground fault circuit interrupter (GFCI) protected outlets.
8. A "Buddy System" in which another worker is close enough to render immediate aid will be in effect.
9. Good housekeeping practices are to be maintained.
10. Where the eyes or body may be exposed to corrosive materials, suitable facilities for quick drenching or flushing shall be available for immediate use.
11. In the event of treacherous weather-related working conditions (i.e., thunderstorm, limited visibility, extreme cold or heat) field tasks will be suspended until conditions improve or appropriate protection from the elements is provided.

Site Specific Safe Work Practices: Keep unnecessary personal away from drilling area

SECTION 16: EMPLOYEE ACKNOWLEDGEMENTS

PLAN REVIEWED BY:

		DATE
Corporate Health & Safety:		
Branch H&S Coordinator:	Maria Y. Connell	7/25/95
Project Manager:	Thomas Barba	07/25/95
Project Leader:		

I acknowledge that I have read the information on this Site Safety Plan Short Form and the attached Material Safety Data Sheets (MSDSs). I understand the site hazards as described and agreed to comply with the contents of this Plan.

EMPLOYEE (print name)	SIGNATURE	DATE
Keith White		
Evan Mullon		
Wes Jones		7/21/95

ATTACHMENT 2

MAXIMUM DECONTAMINATION PROCEDURES FOR LEVEL B

MAXIMUM LEVEL B DECONTAMINATION STATION DESIGNATIONS

EQUIPMENT WORN

This decontamination procedure outlined is the **maximum** number of decontamination stations necessary for Malcolm Pirnie workers wearing the following protective clothing and equipment:

- one-piece, hooded chemical-resistant splash suit
- SCBA
- hard hat
- chemical-resistant boots with steel toe and shank
- boot covers
- inner and outer gloves
- taped joints between gloves, boots, and suit

DECONTAMINATION PROCEDURES

Station 1: Segregated Equipment Dump Deposit equipment used on the site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Each piece of equipment may be contaminated to a different degree; therefore, segregation at the drop reduces the potential for contamination. Equipment needed:

- containers of various sizes
- plastic liners
- plastic drop cloths

Station 2: Suit, Boot Covers, and Glove Wash Thoroughly wash and scrub fully encapsulating suit, outer boot covers, and gloves with a decontamination solution or detergent-waste solution. Equipment needed:

- container (20 to 30 gallon)
- decontamination solution
- detergent-water solution
- two or three long-handled, soft-bristled scrub brushes

Station 3: Suit, Boot Covers, and Glove Rinse Rinse off the decontamination solution from Station 2 using copious amounts of water. Repeat as many times as necessary. Equipment needed:

- container (30 to 50 gallon)
- high-pressure spray unit and splash guard
- water
- two or three long-handled, soft-bristled scrub brushes

MAXIMUM DECONTAMINATION PROCEDURES FOR LEVEL B

MAXIMUM LEVEL B DECONTAMINATION STATION DESIGNATIONS . . . continued/2

Station 4: Tape Removal Remove tape around boots and gloves and deposit it in a container with a plastic liner. Equipment needed:

- container (20 to 30 gallon)
- plastic liners

Station 5: Boot Cover Removal Remove boot covers and deposit them in a container with a plastic liner. Equipment needed:

- container (30 to 40 gallon)
- plastic liners
- bench or stool

Station 6: Outer Glove Removal Remove outer gloves and deposit them in a container with a plastic liner. Equipment needed:

- container (20 to 30 gallon)
- plastic liners

Station 7: Suit, SCBA, Boot, and Glove Wash If design does not include *Station 2*, wash suit at this station. Thoroughly wash suit, SCBA, boots, and gloves with a long-handled, soft-bristled scrub brush and copious amounts of decontamination solution or detergent-water solution. Wrap SCBA regulator (if belt-mounted type) with plastic to keep out water. Wash backpack assembly with sponges or cloth. Equipment needed:

- container (30 to 50 gallon)
- decontamination solution
- detergent-water solution
- two or three long-handled bristled scrub brushes
- small buckets
- sponges or cloths

Station 8: Suit, SCBA, Boot, and Glove Rinse If design does not include *Station 3*, rinse suit at this station. Rinse off the decontamination solution or detergent-water solution using copious amounts of water. Repeat as many times as necessary. Equipment needed:

- container (30 to 50 gallon)
- high-pressure spray unit and splash guard
- water
- small buckets
- two or three long-handled, soft-bristled scrub brushes
- sponges or cloths

MAXIMUM DECONTAMINATION PROCEDURES FOR LEVEL B

MAXIMUM LEVEL B DECONTAMINATION STATION DESIGNATIONS . . . continued/3

Station 9: Tank Change If a worker leaves the exclusion zone to change their air tank, this is the last step in the decontamination procedure. They exchange the tank, don new outer gloves and boots, and have the joints taped. They then return to duty. Equipment needed:

- air tanks
- tape
- boot covers
- gloves

Station 10: Chemical-resistant Boot Removal Remove chemical-resistant boots and deposit them in a container with a plastic liner. Equipment needed:

- container (30 to 50 gallon)
- plastic liners
- bench or stool
- bootjack

Station 11: SCBA Backpack Removal While still wearing face piece, remove backpack and place it on a table. Disconnect hose from regulator valve and proceed to next station. Equipment needed:

- table

Station 12: Splash Suit Removal With assistance, remove splash suit. Deposit it in a container with a plastic liner. Equipment needed:

- container (30 to 50 gallon)
- plastic liners
- bench or stool

Station 13: Inner Glove Wash Wash with decontamination solution or detergent-water solution that will not harm skin. Repeat as many times as necessary. Equipment needed:

- basin or bucket
- decontamination solution
- detergent-water solution
- small table

Station 14: Inner Glove Rinse Rinse with water. Repeat as many times as necessary. Equipment needed:

- water
- basin or bucket
- small table

MAXIMUM DECONTAMINATION PROCEDURES FOR LEVEL B

MAXIMUM LEVEL B DECONTAMINATION STATION DESIGNATIONS . . . continued/4

Station 15: Face Piece Removal Remove face piece. Deposit it in a container with a plastic liner. Avoid touching face with fingers. Equipment needed:

- container (30 to 50 gallon)
- plastic liners

Station 16: Inner Glove Removal Remove inner gloves and deposit them in a container with a plastic liner. Equipment needed:

- container (20 to 30 gallon)
- plastic liners

Station 17: Inner Clothing Removal Remove inner clothing. Place it in a container with a plastic liner. Do not wear inner clothing off the site, since small amounts of contaminants may have been transferred in removing fully encapsulating suit. Equipment needed:

- container (30 to 50 gallon)
- plastic liners

Station 18: Field Wash Shower if highly toxic, skin-corrosive, or skin-absorbable materials are known or suspected to be present. Wash hands and face if shower is not available. Equipment needed:

- water
- soap
- small table
- basin or bucket
- field showers
- towels

Station 19: Redress Put on clean clothes. A dressing trailer is needed in inclement weather. Equipment needed:

- table
- chairs
- lockers
- clothes

MINIMUM DECONTAMINATION PROCEDURES FOR LEVEL B

MINIMUM LEVEL B DECONTAMINATION STATION DESIGNATIONS

EQUIPMENT WORN

This decontamination procedure outlined is the **minimum** number of decontamination stations necessary for Malcolm Pirnie workers wearing the following protective clothing and equipment:

- one-piece, hooded chemical-resistant splash suit
- SCBA
- hard hat
- chemical-resistant boots with steel toe and shank
- boot covers
- inner and outer gloves
- taped joints between gloves, boots, and suit

DECONTAMINATION PROCEDURES

Station 1: Segregated Equipment Dump Deposit equipment used on the site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Segregation at the drop reduces the probability for cross-contamination. During hot weather operations, cool-down station may be set up within this area. Equipment needed:

- containers of various sizes
- plastic liners
- plastic drop cloths

Station 2: Suit, Boot Covers, and Glove Wash and Rinse Thoroughly wash and scrub chemical-resistant splash suit, outer boots, and gloves with a decontamination solution or detergent-waste solution. Rinse off using copious amounts of water. Equipment needed:

- containers (20 to 30 gallon)
- decontamination solution
- detergent-water solution
- rinse water
- high-pressure spray unit and splash guard
- two or three long-handled, soft-bristled scrub brushes

Station 3: Outer Boot and Glove Removal Remove outer boots and gloves and deposit them in a container with a plastic liner. Equipment needed:

- container (30 to 40 gallon)
- plastic liners
- bench or stool
- water
- two or three long-handled, soft-bristled scrub brushes

MINIMUM DECONTAMINATION PROCEDURES FOR LEVEL B

MINIMUM LEVEL B DECONTAMINATION STATION DESIGNATIONS . . . continued/2

Station 4: Tank Change If a worker leaves the exclusion zone to change their air tank, this is the last step in the decontamination procedure. They exchange the tank, don new outer gloves and boots, and have the joints taped. They then return to duty. Equipment needed:

- air tanks
- tape
- boot covers
- gloves

Station 5: Outer Garment Removal Chemical-resistant splash suit, if worn outside the SCBA, is removed and deposited in separate containers with plastic liners. If the suit is worn underneath the SCBA, see station 5A. Equipment needed:

- containers (20 to 30 gallon)
- plastic liners

Station 5A: Suit Removal When Worn Underneath the SCBA If the chemical-resistant splash suit is worn beneath the SCBA, remove SCBA backpack, but not the facepiece, and hand to a buddy or lay down on plastic sheeting and remove suit. Equipment needed:

- plastic sheeting

Station 6: SCBA Removal and Decontamination Wrap SCBA regulator (if belt-mounted type) with plastic to keep out water. Wash backpack assembly with sponges or cloth. Remove facepiece while avoiding facial contact by fingers. SCBA is deposited on a clean plastic sheet. Equipment needed:

- water
- small buckets
- two or three long-handled, soft-bristled scrub brushes
- sponges or cloths
- plastic sheeting

Station 7: Inner Glove Removal Remove inner gloves and deposit them in a container with a plastic liner. Equipment needed:

- container (20 to 30 gallon)
- plastic liners

MINIMUM DECONTAMINATION PROCEDURES FOR LEVEL B

MINIMUM LEVEL B DECONTAMINATION STATION DESIGNATIONS ... continued/3

Station 8: Field Wash Shower if highly toxic, skin-corrosive, or skin-absorbable materials are known or suspected to be present. Wash hands and face if shower is not available. Equipment needed:

- water
- soap
- small table
- basin or bucket
- field showers
- towels

MAXIMUM DECONTAMINATION PROCEDURES FOR LEVEL C

LEVEL C DECONTAMINATION STATION DESIGNATIONS

EQUIPMENT WORN

This decontamination procedure outlined is the **maximum** number of decontamination stations necessary for Malcolm Pirnie workers wearing the following protective clothing and equipment:

- one-piece coverall
- full-face respirator
- hard hat
- safety boots with steel toe and shank
- boot covers
- inner and outer gloves
- taped joints between gloves, boots, and suit

DECONTAMINATION PROCEDURES

Station 1: Segregated Equipment Dump Deposit equipment used ont he site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Each piece of equipment may be contaminated to a different degree; therefore, segregation at the drop reduces the potential for contamination. Equipment needed:

- containers of various sizes
- plastic liners
- plastic drop cloths

Station 2: Boot Covers, and Glove Wash Thoroughly wash and scrub outer boot covers, and gloves with a decontamination solution or detergent-waste solution. Equipment needed:

- container (20 to 30 gallon)
- decontamination solution
- detergent-water solution
- two or three long-handled, soft-bristled scrub brushes

Station 3: Boot Covers, and Glove Rinse Rinse off the decontamination solution from Station 2 using copious amounts of water. Repeat as many times as necessary. Equipment needed:

- container (30 to 50 gallon)
- high-pressure spray unit and splash guard
- water
- two or three long-handled, soft-bristled scrub brushes

MAXIMUM DECONTAMINATION PROCEDURES FOR LEVEL C

MAXIMUM LEVEL C DECONTAMINATION STATION DESIGNATIONS . . . continued/2

Station 4: Tape Removal Remove tape around boots and gloves and deposit it in a container with a plastic liner. Equipment needed:

- container (20 to 30 gallon)
- plastic liners

Station 5: Boot Cover Removal Remove boot covers and deposit them in a container with a plastic liner. Equipment needed:

- container (30 to 40 gallon)
- plastic liners
- bench or stool

Station 6: Outer Glove Removal Remove outer gloves and deposit them in a container with a plastic liner. Equipment needed:

- container (20 to 30 gallon)
- plastic liners

Station 7: Canister or Mask Change If a worker leaves the exclusion zone to change their canister (or mask), this is the last step in the decontamination procedure. The worker's canister is exchanged, new outer gloves and boot covers are donned, joints are taped, and the worker returns to duty. Equipment needed:

- respirator canisters appropriate to the field hazard
- extra respirators
- tape
- boot covers
- gloves

Station 8: Outer Garment Removal One-piece coverall is removed and deposited in containers with plastic liners. Equipment needed:

- containers (20 to 30 gallon)
- plastic liners

Station 9: Inner Glove Wash Wash with decontamination solution or detergent-water solution that will not harm skin. Repeat as many times as necessary. Equipment needed:

- basin or bucket
- decontamination solution
- detergent-water solution
- small table

MAXIMUM DECONTAMINATION PROCEDURES FOR LEVEL C

MAXIMUM LEVEL C DECONTAMINATION STATION DESIGNATIONS . . . continued/3

Station 10: Inner Glove Rinse Rinse with water. Repeat as many times as necessary. Equipment needed:

- water
- basin or bucket
- small table

Station 11: Face Piece Removal and Decontamination Remove facepiece while avoiding facial contact by fingers. Face-piece is deposited on a clean plastic sheet. Canisters are removed and deposited in containers with plastic liners. Respirators are scrubbed with soap and water and rinsed with copious amounts of clean water. Equipment needed:

- water
- soap
- small buckets
- small brushes
- sponges or cloths
- plastic sheeting

Station 12: Inner Glove Removal Remove inner gloves and deposit them in a container with a plastic liner. Equipment needed:

- container (20 to 30 gallon)
- plastic liners

Station 13: Inner Clothing Removal Remove inner clothing. Place it in a container with a plastic liner. Do not wear inner clothing off the site, since small amounts of contaminants may have been transferred in removing outer suit. Equipment needed:

- container (30 to 50 gallon)
- plastic liners

Station 14: Field Wash Shower if highly toxic, skin-corrosive, or skin-absorbable materials are known or suspected to be present. Wash hands and face if shower is not available. Equipment needed:

- water
- soap
- small table
- basin or bucket
- field showers
- towels

MAXIMUM DECONTAMINATION PROCEDURES FOR LEVEL C

MAXIMUM LEVEL C DECONTAMINATION STATION DESIGNATIONS . . . continued/4

Station 15: Redress Put on clean clothes. A dressing trailer is needed in inclement weather. Equipment needed:

- table
- chairs
- lockers
- clothes

MINIMUM DECONTAMINATION PROCEDURES FOR LEVEL C

LEVEL C DECONTAMINATION STATION DESIGNATIONS

EQUIPMENT WORN

This decontamination procedure outlined is the **minimum** number of decontamination stations necessary for Malcolm Pirnie workers wearing the following protective clothing and equipment:

- one-piece coverall
- full-face respirator
- hard hat
- safety boots with steel toe and shank
- boot covers
- inner and outer gloves
- taped joints between gloves, boots, and suit

DECONTAMINATION PROCEDURES

Station 1: Segregated Equipment Dump Deposit equipment used on the site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Segregation at the drop reduces the probability for cross-contamination. During hot weather operations, cool-down station may be set up within this area. Equipment needed:

- containers of various sizes
- plastic liners
- plastic drop cloths

Station 2: Boot Covers, and Glove Wash and Rinse Thoroughly wash and scrub outer boots, and gloves with a decontamination solution or detergent-waste solution. Rinse off using copious amounts of water. Equipment needed:

- containers (20 to 30 gallon)
- decontamination solution
- detergent-water solution
- rinse water
- high-pressure spray unit and splash guard
- two or three long-handled, soft-bristled scrub brushes

Station 3: Outer Boot and Glove Removal Remove outer boots and gloves and deposit them in a container with a plastic liner. Equipment needed:

- container (30 to 40 gallon)
- plastic liners
- bench or stool
- water
- two or three long-handled, soft-bristled scrub brushes

MINIMUM DECONTAMINATION PROCEDURES FOR LEVEL C

MINIMUM LEVEL C DECONTAMINATION STATION DESIGNATIONS . . . continued/2

Station 4: Canister or Mask Change If a worker leaves the exclusion zone to change their canister (or mask), this is the last step in the decontamination procedure. The worker's canister is exchanged, new outer gloves and boot covers are donned, joints are taped, and the worker returns to duty. Equipment needed:

- respirator canisters appropriate to the field hazard
- extra respirators
- tape
- boot covers
- gloves

Station 5: Outer Garment Removal One-piece coverall is removed and deposited in containers with plastic liners. Equipment needed:

- containers (20 to 30 gallon)
- plastic liners

Station 6: Face Piece Removal and Decontamination Remove facepiece while avoiding facial contact by fingers. Face-piece is deposited on a clean plastic sheet. Canisters are removed and deposited in containers with plastic liners. Respirators are scrubbed with soap and water and rinsed with copious amounts of clean water. Equipment needed:

- water
- soap
- small buckets
- small brushes
- sponges or cloths
- plastic sheeting

Station 7: Inner Glove Removal Remove inner gloves and deposit them in a container with a plastic liner. Equipment needed:

- container (20 to 30 gallon)
- plastic liners

MINIMUM DECONTAMINATION PROCEDURES FOR LEVEL C

MINIMUM LEVEL C DECONTAMINATION STATION DESIGNATIONS . . . continued/2

Station 8: Field Wash Shower if highly toxic, skin-corrosive, or skin-absorbable materials are known or suspected to be present. Wash hands and face if shower is not available. Equipment needed:

- water
- soap
- small table
- basin or bucket
- field showers
- towels

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608 -03 ASCORBIC ACID PAGE: 1
EFFECTIVE: 01/04/94 ISSUED: 01/15/94

J.T.BAKER INC., 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: ASCORBIC ACID
COMMON SYNONYMS: L-ASCORBIC ACID; VITAMIN C; L-3-KETOTHREOHEXURONIC ACID LACTONE
CHEMICAL FAMILY: CARBOHYDRATES AND POLYSACCHARIDES
FORMULA: C6H8O6
FORMULA WT.: 176.12
CAS NO.: 50-81-7
NIOSH/RTECS NO.: CI7650000
PRODUCT USE: LABORATORY REAGENT
PRODUCT CODES: 8581,0936,0938,0937

PRECAUTIONARY LABELING

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	1	SLIGHT
FLAMMABILITY	-	1	SLIGHT
REACTIVITY	-	0	NONE
CONTACT	-	1	SLIGHT

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES; LAB COAT

U.S. PRECAUTIONARY LABELING

DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

INTERNATIONAL LABELING

AVOID CONTACT WITH EYES. AFTER CONTACT WITH SKIN, WASH IMMEDIATELY WITH PLENTY OF WATER. KEEP CONTAINER TIGHTLY CLOSED.

SAF-T-DATA* STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

CONTINUED ON PAGE: 2

SECTION II - COMPONENTS

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
ASCORBIC ACID	50-81-7	99-100	N/E	N/E

SECTION III - PHYSICAL DATA

BOILING POINT: N/A

VAPOR PRESSURE (MMHG): N/A

MELTING POINT: 191 C (375 F)
(AT 760 MM HG)

VAPOR DENSITY (AIR=1): N/A

SPECIFIC GRAVITY: 1.65
(H2O=1)

EVAPORATION RATE: N/A

SOLUBILITY(H2O): APPRECIABLE (>10%)

% VOLATILES BY VOLUME: 0
(21 C)

pH: N/A

ODOR THRESHOLD (P.P.M.): N/A

PHYSICAL STATE: SOLID

COEFFICIENT WATER/OIL DISTRIBUTION: N/A

APPEARANCE & ODOR: WHITE CRYSTALS OR POWDER. ODORLESS.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): N/A

AUTOIGNITION TEMPERATURE: N/A

FLAMMABLE LIMITS: UPPER - N/A LOWER - N/A

FIRE EXTINQUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

CONTINUED ON PAGE: 3

SECTION IV - FIRE AND EXPLOSION HAZARD DATA (CONTINUED)

UNUSUAL FIRE & EXPLOSION HAZARDS
NONE IDENTIFIED.

TOXIC GASES PRODUCED
CARBON MONOXIDE, CARBON DIOXIDE

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT
NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE
NONE IDENTIFIED.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): NOT ESTABLISHED

SHORT-TERM EXPOSURE LIMIT (STEL): NOT ESTABLISHED

PERMISSIBLE EXPOSURE LIMIT (PEL): NOT ESTABLISHED

TOXICITY OF COMPONENTS

INTRAVENOUS MOUSE LD50 FOR ASCORBIC ACID 518 MG/KG
CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

CARCINOGENICITY
NONE IDENTIFIED.

REPRODUCTIVE EFFECTS
NONE IDENTIFIED.

EFFECTS OF OVEREXPOSURE

INHALATION: NONE IDENTIFIED

SKIN CONTACT: NONE IDENTIFIED

EYE CONTACT: NONE IDENTIFIED

CONTINUED ON PAGE: 4

SECTION V - HEALTH HAZARD DATA (CONTINUED)

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: NONE IDENTIFIED

CHRONIC EFFECTS: NONE IDENTIFIED

TARGET ORGANS
NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

PRIMARY ROUTES OF ENTRY
NONE INDICATED

EMERGENCY AND FIRST AID PROCEDURES

INGESTION: IF SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION.

INHALATION: IF A PERSON BREATHES IN LARGE AMOUNTS, MOVE THE EXPOSED PERSON TO FRESH AIR.

SKIN CONTACT: IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH PLENTY OF SOAP AND WATER FOR AT LEAST 15 MINUTES.

EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: NO CHRONIC: NO FLAMMABILITY: NO PRESSURE: NO REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: NO
CERCLA HAZARDOUS SUBSTANCE: NO
SARA 313 TOXIC CHEMICALS: NO
TSCA INVENTORY: YES

CONTINUED ON PAGE: 5

SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: AIR, LIGHT

INCOMPATIBLES: STRONG OXIDIZING AGENTS

DECOMPOSITION PRODUCTS: CARBON MONOXIDE, CARBON DIOXIDE

SECTION VII - SPILL & DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SUITABLE PROTECTIVE CLOTHING. CAREFULLY SWEEP UP AND REMOVE.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

VENTILATION: USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP FUME OR DUST LEVELS AS LOW AS POSSIBLE.

RESPIRATORY PROTECTION: NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, USE AN APPROPRIATE RESPIRATOR OR DUST MASK.

EYE/SKIN PROTECTION: SAFETY GOGGLES, PROPER GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA* STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

STORAGE REQUIREMENTS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA. STORE IN LIGHT-RESISTANT CONTAINERS.

CONTINUED ON PAGE: 6

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME: CHEMICALS, N.O.S. (NON-REGULATED)
MARINE POLLUTANTS: NO

AIR (I.C.A.O.)

PROPER SHIPPING NAME: CHEMICALS, N.O.S. (NON-REGULATED)

U.S. CUSTOMS HARMONIZATION NUMBER: 2936270000

NOTE: WHEN HANDLING LIQUID PRODUCTS, SECONDARY PROTECTIVE CONTAINERS MUST BE USED FOR CARRYING.
-N/A = NOT APPLICABLE, OR NOT AVAILABLE;
N/E = NOT ESTABLISHED.-
THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES.
EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL.
BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE.
THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY

CONTINUED ON PAGE: 7

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REVISE THIS MATERIAL SAFETY DATA SHEET.
NOTE: CHEMTREC, CANUTEC, AND NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE
NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING
A SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL
NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE
(1-800-JTBAKER) FOR ASSISTANCE.

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APPROVED BY QUALITY ASSURANCE DEPARTMENT.

-- LAST PAGE --
"ISSUED BY VWR 06/25/94"

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J.T.BAKER INC., 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: NITRIC ACID
COMMON SYNONYMS: HYDROGEN NITRATE; AZOTIC ACID
CHEMICAL FAMILY: INORGANIC ACIDS
FORMULA: HNO3
FORMULA WT.: 63.01
CAS NO.: 7697-37-2
NIOSH/RTECS NO.: QU5775000
PRODUCT USE: LABORATORY REAGENT
PRODUCT CODES: 5555,9597,6901,5801,9605,5113,5371,4801,9604,9601,9600,9606 9598,9616,9602

PRECAUTIONARY LABELING

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	3	SEVERE (POISON)
FLAMMABILITY	-	0	NONE
REACTIVITY	-	3	SEVERE (OXIDIZER)
CONTACT	-	4	EXTREME (CORROSIVE)

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

U.S. PRECAUTIONARY LABELING

POISON DANGER
SPILLAGE MAY CAUSE FIRE OR LIBERATE DANGEROUS GAS. HARMFUL IF INHALED AND MAY CAUSE DELAYED LUNG INJURY. STRONG OXIDIZER. CONTACT WITH COMBUSTIBLE MATERIALS, FLAMMABLE MATERIALS, OR POWDERED METALS CAN CAUSE FIRE OR EXPLOSION. LIQUID AND VAPOR CAUSE SEVERE BURNS. MAY BE FATAL IF SWALLOWED OR INHALED.
KEEP FROM CONTACT WITH CLOTHING AND OTHER COMBUSTIBLE MATERIALS. DO NOT STORE NEAR COMBUSTIBLE MATERIALS. DO NOT GET IN EYES, ON SKIN, ON CLOTHING. DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE WATER SPRAY. IN CASE OF SPILL, NEUTRALIZE WITH SODA ASH OR LIME.

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PRECAUTIONARY LABELING (CONTINUED)

INTERNATIONAL LABELING

CAUSES SEVERE BURNS.
KEEP OUT OF REACH OF CHILDREN. DO NOT BREATHE VAPOUR. IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF WATER AND SEEK MEDICAL ADVICE. TAKE OFF IMMEDIATELY ALL CONTAMINATED CLOTHING.

SAF-T-DATA* STORAGE COLOR CODE: YELLOW (REACTIVE)

SECTION II - COMPONENTS

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
NITRIC ACID	7697-37-2	65-71	2 PPM	2 PPM
WATER	7732-18-5	29-35	N/E	N/E

SECTION III - PHYSICAL DATA

BOILING POINT: 121 C (249 F)
(AT 760 MM HG)

VAPOR PRESSURE (MMHG): 9
(20 C)

MELTING POINT: -42 C (-43 F)
(AT 760 MM HG)

VAPOR DENSITY (AIR=1): N/A

SPECIFIC GRAVITY: 1.41
(H2O=1)

EVAPORATION RATE: N/A

SOLUBILITY(H2O): COMPLETE (100%)

% VOLATILES BY VOLUME: 100
(21 C)

PH: 1.0 (0.1M SOLUTION)

ODOR THRESHOLD (P.P.M.): N/A

PHYSICAL STATE: LIQUID

COEFFICIENT WATER/OIL DISTRIBUTION: N/A

APPEARANCE & ODOR: CLEAR, COLORLESS LIQUID. SUFFOCATING ODOR.

CONTINUED ON PAGE: 3

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): N/A NFPA 704M RATING: 3-0-0 OXY

AUTOIGNITION TEMPERATURE: N/A

FLAMMABLE LIMITS: UPPER - N/A LOWER - N/A

FIRE EXTINQUISHING MEDIA
USE WATER SPRAY.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE EXPOSED CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL; DO NOT GET WATER INSIDE CONTAINERS.

UNUSUAL FIRE & EXPLOSION HAZARDS
STRONG OXIDIZER. CONTACT WITH COMBUSTIBLE MATERIALS, FLAMMABLE MATERIALS, OR POWDERED METALS CAN CAUSE FIRE OR EXPLOSION. REACTS WITH MOST METALS TO PRODUCE HYDROGEN GAS, WHICH CAN FORM AN EXPLOSIVE MIXTURE WITH AIR. A VIOLENT EXOTHERMIC REACTION OCCURS WITH WATER. SUFFICIENT HEAT MAY BE PRODUCED TO IGNITE COMBUSTIBLE MATERIALS.

TOXIC GASES PRODUCED
OXIDES OF NITROGEN, HYDROGEN

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT
NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE
NONE IDENTIFIED.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 5 MG/M3 (2 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 10 MG/M3 (4 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 5 MG/M3 (2 PPM)

CONTINUED ON PAGE: 4

SECTION V - HEALTH HAZARD DATA (CONTINUED)

TOXICITY OF COMPONENTS

INHALATION-1HR RAT LC50 FOR NITRIC ACID	2500 PPM
INTRAPERITONEAL MOUSE LD50 FOR WATER	190 G/KG
INTRAVENOUS MOUSE LD50 FOR WATER	25 G/KG

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

CARCINOGENICITY
NONE IDENTIFIED.

REPRODUCTIVE EFFECTS
NONE IDENTIFIED.

EFFECTS OF OVEREXPOSURE

INHALATION: SEVERE IRRITATION OR BURNS OF RESPIRATORY SYSTEM, COUGHING, DIFFICULT BREATHING, CHEST PAINS, PULMONARY EDEMA, LUNG INFLAMMATION, UNCONSCIOUSNESS, AND MAY BE FATAL.

SKIN CONTACT: SEVERE IRRITATION OR BURNS

EYE CONTACT: SEVERE IRRITATION OR BURNS

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: NAUSEA, VOMITING, SEVERE BURNS, ULCERATION - MOUTH, THROAT, STOMACH, AND MAY BE FATAL.

CHRONIC EFFECTS: DAMAGE TO LUNGS, TEETH

TARGET ORGANS
EYES, SKIN, MUCOUS MEMBRANES, RESPIRATORY SYSTEM, LUNGS, TEETH, GI TRACT

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
DAMAGED SKIN, EYE DISORDERS, CARDIOPULMONARY DISEASE, LUNG DISEASE

PRIMARY ROUTES OF ENTRY
INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

CONTINUED ON PAGE: 5

SECTION V - HEALTH HAZARD DATA (CONTINUED)

EMERGENCY AND FIRST AID PROCEDURES

INGESTION: CALL A PHYSICIAN. IF SWALLOWED, DO NOT INDUCE VOMITING. IF CONSCIOUS, GIVE WATER, MILK, OR MILK OF MAGNESIA.

INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

SKIN CONTACT: IN CASE OF CONTACT, IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CLOTHING BEFORE RE-USE.

EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: YES CHRONIC: YES FLAMMABILITY: YES PRESSURE: NO REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE:	YES	CONTAINS NITRIC ACID (RQ = 1,000 LBS, TPQ = 1,000 LBS)
CERCLA HAZARDOUS SUBSTANCE:	YES	CONTAINS NITRIC ACID (RQ = 1000 LBS)
SARA 313 TOXIC CHEMICALS:	YES	CONTAINS NITRIC ACID
GENERIC CLASS:		GENERIC CLASS REMOVED FROM CFR: 7/1/91
TSCA INVENTORY:	YES	

SECTION VI - REACTIVITY DATA

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, LIGHT, MOISTURE

INCOMPATIBLES: STRONG BASES, CARBONATES, SULFIDES, CYANIDES, COMBUSTIBLE MATERIALS, ORGANIC MATERIALS, STRONG REDUCING AGENTS, MOST COMMON METALS, POWDERED METALS, CARBIDES, AMMONIUM HYDROXIDE, WATER, ALCOHOLS

DECOMPOSITION PRODUCTS: OXIDES OF NITROGEN, HYDROGEN

CONTINUED ON PAGE: 6

SECTION VII - SPILL & DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. VENTILATE AREA. NEUTRALIZE SPILL WITH SODA ASH OR LIME. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.
KEEP COMBUSTIBLES (WOOD, PAPER, OIL, ETC.) AWAY FROM SPILLED MATERIAL.

J. T. BAKER NEUTRASORB(R) OR TEAM(R) 'LOW NA+' ACID NEUTRALIZERS ARE FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D001, D002 (IGNITABLE, CORROSIVE WASTE)

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 100 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ACID CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, NEOPRENE GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA* STORAGE COLOR CODE: YELLOW (REACTIVE)

STORAGE REQUIREMENTS
KEEP CONTAINER TIGHTLY CLOSED. STORE SEPARATELY AND AWAY FROM FLAMMABLE AND COMBUSTIBLE MATERIALS. ISOLATE FROM INCOMPATIBLE MATERIALS. KEEP PRODUCT OUT OF LIGHT.

CONTINUED ON PAGE: 7

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: NITRIC ACID (OTHER THAN RED FUMING WITH MORE THAN 70 PERCENT NITRIC ACID)
HAZARD CLASS: 8
UN/NA: UN2031 REPORTABLE QUANTITY: 1000 LBS. PACKAGING GROUP: I
LABELS: CORROSIVE
REGULATORY REFERENCES: 49CFR 172.101

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME: NITRIC ACID (OTHER THAN RED FUMING, ALL CONCENTRATIONS)
HAZARD CLASS: 8 I.M.O. PAGE: 8195
UN: UN2031 MARINE POLLUTANTS: NO PACKAGING GROUP: I
LABELS: CORROSIVE
REGULATORY REFERENCES: 49CFR 172.102; PART 176; IMO

(I.C.A.O.)

PROPER SHIPPING NAME: NITRIC ACID, OTHER THAN RED FUMING WITH MORE THAN 70 PERCENT NITRIC ACID
HAZARD CLASS: 8
UN: UN2031 PACKAGING GROUP: I
LABELS: CORROSIVE, (PASSENGER AIRCRAFT - FORBIDDEN)
REGULATORY REFERENCES: 49CFR 172.101; 173.6; PART 175; ICAO/IATA=== WE BELIEVE THE TRANSPORTATION DATA AND REFERENCES CONTAINED HEREIN TO BE FACTUAL AND THE OPINION OF QUALIFIED EXPERTS. THE DATA IS MEANT AS A GUIDE TO THE OVERALL CLASSIFICATION OF THE PRODUCT AND IS NOT PACKAGE SIZE SPECIFIC, NOR SHOULD IT BE TAKEN AS A WARRANTY OR REPRESENTATION FOR WHICH THE COMPANY ASSUMES LEGAL RESPONSIBILITY.=== THE INFORMATION IS OFFERED SOLELY FOR YOUR CONSIDERATION, INVESTIGATION, AND VERIFICATION. ANY USE OF THE INFORMATION MUST BE DETERMINED BY THE USER TO BE IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS. SEE SHIPPER REQUIREMENTS 49CFR 172.3 AND EMPLOYEE TRAINING 49CFR 173.1.

U.S. CUSTOMS HARMONIZATION NUMBER: 28080000000

CONTINUED ON PAGE: 8

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N/A = NOT APPLICABLE OR NOT AVAILABLE
N/E = NOT ESTABLISHED

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES.
EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL.
BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE.
THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET.
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===
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J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

S4034 M05 SODIUM HYDROXIDE PAGE: 1
EFFECTIVE: 01/04/94 ISSUED: 01/15/94

J.T.BAKER INC., 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: SODIUM HYDROXIDE
COMMON SYNONYMS: CAUSTIC SODA; SODIUM HYDRATE; LYE
CHEMICAL FAMILY: INORGANIC SODIUM COMPOUNDS
FORMULA: NAOH
FORMULA WT.: 40.00
CAS NO.: 1310-73-2
NIOSH/RTECS NO.: WB4900000
PRODUCT USE: LABORATORY REAGENT
PRODUCT CODES: 5104,5312,5022,3722,3730,5045,3728,3723,3726,3736,3729,3734
5565

PRECAUTIONARY LABELING

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	3	SEVERE (POISON)
FLAMMABILITY	-	0	NONE
REACTIVITY	-	2	MODERATE
CONTACT	-	4	EXTREME (CORROSIVE)

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

U.S. PRECAUTIONARY LABELING

POISON DANGER
HARMFUL IF INHALED. CAUSES SEVERE BURNS. MAY BE FATAL IF SWALLOWED. REACTS VIOLENTLY WITH WATER AND ACIDS.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING. AVOID SPATTERING BY SLOWLY ADDING TO SOLUTION. AVOID BREATHING DUST. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING.

INTERNATIONAL LABELING

CAUSES SEVERE BURNS.
KEEP OUT OF REACH OF CHILDREN. IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF WATER AND SEEK MEDICAL ADVICE. WEAR SUITABLE GLOVES AND EYE/FACE PROTECTION.

CONTINUED ON PAGE: 2

PRECAUTIONARY LABELING (CONTINUED)

SAF-T-DATA* STORAGE COLOR CODE: WHITE STRIPE (STORE SEPARATELY)

SECTION II - COMPONENTS

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
SODIUM HYDROXIDE	1310-73-2	98-100	2 MG/M	2 MG/M

THE TLV AND PEL LISTED DENOTE CEILING LIMITS.

SECTION III - PHYSICAL DATA

BOILING POINT: 1390 C (2534 F)
(AT 760 MM HG)

VAPOR PRESSURE (MMHG): <1
(20 C)

MELTING POINT: 318 C (604 F)
(AT 760 MM HG)

VAPOR DENSITY (AIR=1): N/A

SPECIFIC GRAVITY: 2.13
(H2O=1)

EVAPORATION RATE: N/A

SOLUBILITY(H2O): APPRECIABLE (>10%)

% VOLATILES BY VOLUME: 0
(21 C)

PH: 14.0 (1.0M SOLUTION)

ODOR THRESHOLD (P.P.M.): N/A

PHYSICAL STATE: SOLID

COEFFICIENT WATER/OIL DISTRIBUTION: N/A

APPEARANCE & ODOR: WHITE PELLETS OR FLAKES. ODORLESS.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): N/A

NFPA 704M RATING: 3-0-1

AUTOIGNITION TEMPERATURE: N/A

CONTINUED ON PAGE: 3

SECTION IV - FIRE AND EXPLOSION HAZARD DATA (CONTINUED)

FLAMMABLE LIMITS: UPPER - N/A LOWER - N/A

FIRE EXTINQUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. FLOOD WITH WATER SPRAY TO PREVENT SPLASHING OF MATERIAL.

UNUSUAL FIRE & EXPLOSION HAZARDS
CONTACT WITH MOISTURE OR WATER MAY GENERATE SUFFICIENT HEAT TO IGNITE COMBUSTIBLE MATERIALS. REACTS WITH MOST METALS TO PRODUCE HYDROGEN GAS, WHICH CAN FORM AN EXPLOSIVE MIXTURE WITH AIR.

TOXIC GASES PRODUCED
NONE IDENTIFIED

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT
NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE
NONE IDENTIFIED.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 2 MG/M

TLV LISTED DENOTES CEILING LIMIT.

SHORT-TERM EXPOSURE LIMIT (STEL): NOT ESTABLISHED

PERMISSIBLE EXPOSURE LIMIT (PEL): 2 MG/M

PEL LISTED DENOTES CEILING LIMIT.

TOXICITY OF COMPONENTS

INTRAPERITONEAL MOUSE LD50 FOR SODIUM HYDROXIDE 40 MG/KG

CONTINUED ON PAGE: 4

SECTION V - HEALTH HAZARD DATA (CONTINUED)

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

CARCINOGENICITY
NONE IDENTIFIED.

REPRODUCTIVE EFFECTS
NONE IDENTIFIED.

EFFECTS OF OVEREXPOSURE

INHALATION: SEVERE IRRITATION OR BURNS OF RESPIRATORY SYSTEM, PULMONARY EDEMA, LUNG INFLAMMATION, MAY CAUSE RESPIRATORY SYSTEM DAMAGE

SKIN CONTACT: SEVERE IRRITATION OR BURNS

EYE CONTACT: SEVERE IRRITATION OR BURNS, PERMANENT EYE DAMAGE

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: IS HARMFUL AND MAY BE FATAL, SEVERE BURNS TO MOUTH, THROAT, AND STOMACH, NAUSEA, VOMITING

CHRONIC EFFECTS: NONE IDENTIFIED

TARGET ORGANS
EYES, SKIN, RESPIRATORY SYSTEM, LUNGS

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
DAMAGED SKIN

PRIMARY ROUTES OF ENTRY
INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES

INGESTION: CALL A PHYSICIAN. IF SWALLOWED, DO NOT INDUCE VOMITING. IF CONSCIOUS, GIVE LARGE AMOUNTS OF WATER. FOLLOW WITH DILUTED VINEGAR, FRUIT JUICE OR WHITES OF EGGS BEATEN WITH WATER.

INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

CONTINUED ON PAGE: 5

SECTION V - HEALTH HAZARD DATA (CONTINUED)

SKIN CONTACT: IN CASE OF CONTACT, IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CLOTHING BEFORE RE-USE.

EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

NOTES TO PHYSICIAN
IN CASES OF SEVERE ESOPHAGEAL CORROSION, THE USE OF THERAPEUTIC DOSES OF STEROIDS SHOULD BE CONSIDERED. GENERAL SUPPORTIVE MEASURES WITH CONTINUAL MONITORING OF GAS EXCHANGE, ACID-BASE BALANCE, ELECTROLYTES, AND FLUID INTAKE ARE ALSO REQUIRED.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: YES CHRONIC: YES FLAMMABILITY: NO PRESSURE: NO REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: NO
CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS SODIUM HYDROXIDE (RQ = 1000 LBS)
SARA 313 TOXIC CHEMICALS: YES CONTAINS SODIUM HYDROXIDE
GENERIC CLASS: GENERIC CLASS REMOVED FROM CFR: 7/1/91
TSCA INVENTORY: YES

SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: MOISTURE

INCOMPATIBLES: WATER, STRONG ACIDS, MOST COMMON METALS, COMBUSTIBLE MATERIALS, ORGANIC MATERIALS, ZINC, ALUMINUM, PEROXIDES, HALOGENATED HYDROCARBONS

DECOMPOSITION PRODUCTS: NONE IDENTIFIED

CONTINUED ON PAGE: 6

SECTION VII - SPILL & DISPOSAL PROCEDURES

TEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

. T. BAKER NEUTRACIT(R)-2 OR BUCAIM(R) CAUSTIC NEUTRALIZERS ARE RECOMMENDED ILLS OF THIS PRODUCT.

SPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

A HAZARDOUS WASTE NUMBER: D002, D003 (CORROSIVE, REACTIVE WASTE)

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

NTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

SPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 100 PPM, A HIGH-EFFICIENCY PARTICULATE RESPIRATOR IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

E/SKIN PROTECTION: SAFETY GOGGLES, UNIFORM, APRON, NEOPRENE GLOVESARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

-T-DATA* STORAGE COLOR CODE: WHITE STRIPE (STORE SEPARATELY)

RAGE REQUIREMENTS
KEEP CONTAINER TIGHTLY CLOSED. STORE IN CORROSION-PROOF AREA. STORE IN A DRY AREA. ISOLATE FROM INCOMPATIBLE MATERIALS.

ELY

CONTINUED ON PAGE: 7

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

MESTIC (D.O.T.)

OPER SHIPPING NAME: SODIUM HYDROXIDE, SOLID
ZARD CLASS: 8
/NA: UN1823 REPORTABLE QUANTITY: 1000 LBS. PACKAGING GROUP: II
BELS: CORROSIVE
GULATORY REFERENCES: 49CFR 172.101

TERNATIONAL (I.M.O.)

OPER SHIPPING NAME: SODIUM HYDROXIDE, SOLID
ZARD CLASS: 8 I.M.O. PAGE: 8225
: UN1823 MARINE POLLUTANTS: NO PACKAGING GROUP: II
BELS: CORROSIVE
GULATORY REFERENCES: 49CFR PART 176; IMDG CODE

R (I.C.A.O.)

OPER SHIPPING NAME: SODIUM HYDROXIDE, SOLID
ZARD CLASS: 8
: UN1823 PACKAGING GROUP: II
BELS: CORROSIVE
GULATORY REFERENCES: 49CFR PART 175; ICAO=== WE BELIEVE THE TRANSPORTATION DATA AND REFERENCES CONTAINED HEREIN TO BE FACTUAL AND THE OPINION OF QUALIFIED EXPERTS. THE DATA IS MEANT AS A GUIDE TO THE OVERALL CLASSIFICATION OF THE PRODUCT AND IS NOT PACKAGE SIZE SPECIFIC, NOR SHOULD IT BE TAKEN AS A WARRANTY OR REPRESENTATION FOR WHICH THE COMPANY ASSUMES LEGAL RESPONSIBILITY.=== THE INFORMATION IS OFFERED SOLELY FOR YOUR CONSIDERATION, INVESTIGATION, AND VERIFICATION. ANY USE OF THE INFORMATION MUST BE DETERMINED BY THE USER TO BE IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS. SEE SHIPPER REQUIREMENTS 49CFR 171.2, CERTIFICATION 172.204, AND EMPLOYEE TRAINING 49 CFR 173.1(B).

.S. CUSTOMS HARMONIZATION NUMBER: 28151100008

CONTINUED ON PAGE: 8

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NOTE: WHEN HANDLING LIQUID PRODUCTS, SECONDARY PROTECTIVE CONTAINERS MUST BE USED FOR CARRYING.
N/A = NOT APPLICABLE, OR NOT AVAILABLE;
N/E = NOT ESTABLISHED.-
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(E)

chemists helping chemists in research & industry

aldrich chemical co.

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ATTN: SAFETY DIRECTOR
SYRACUSE RESEARCH CORPORATION
MERRILL LANE
SYRACUSE NY 13210

JULIE GRIMSLEY

DATE: 11/14/90
CUST#: 427853
PO#: 18008

MATERIAL SAFETY DATA SHEET

------------------- IDENTIFICATION -------------------

PRODUCT #: 21726-3 NAME: SODIUM THIOSULFATE, 99%
CAS #:7772-98-7
MF: NA2O3S2

NONYMS
CHLORINE CONTROL * CHLORINE CURE * DECLOR-IT * DISODIUM THIOSULFATE * S-HYDRIL * HYPO * SODIUM HYPOSULFITE * SODIUM OXIDE SULFIDE * SODIUM THIOSULFATE * SODIUM THIOSULFATE ANHYDROUS * SODIUM THIOSULPHATE * SODOTHIOL *

------------------- TOXICITY HAZARDS -------------------

ECS NO: XN6476000
THIOSULFURIC ACID, DISODIUM SALT
XICITY DATA
IPR-MUS LD50:5200 MG/KG NYKZAU 53,404,57
IEWS, STANDARDS, AND REGULATIONS
NOHS 1974: HZD 80153; NIS 107; TNF 11199; NOS 62; TNE 61158
NOES 1983: HZD 80153; NIS 116; TNF 13073; NOS 88; TNE 142977; TFE 54685
EPA TSCA CHEMICAL INVENTORY, 1989
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, APRIL 1990

ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES (RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR COMPLETE INFORMATION.

------------------- HEALTH HAZARD DATA -------------------

UTE EFFECTS
MAY BE HARMFUL BY INHALATION, INGESTION, OR SKIN ABSORPTION.
CAUSES EYE AND SKIN IRRITATION.
MATERIAL IS IRRITATING TO MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT.
TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.
RST AID
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES.
IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS AMOUNTS OF WATER.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.
CALL A PHYSICIAN.
WASH CONTAMINATED CLOTHING BEFORE REUSE.

------------------- PHYSICAL DATA -------------------

SPECIFIC GRAVITY: 1.667
PEARANCE AND ODOR
WHITE CRYSTALLINE POWDER

CONTINUED ON NEXT PAGE

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MATERIAL SAFETY DATA SHEET

CUST#: 427853
PO#: 18008

PRODUCT #: 21726-3 NAME: SODIUM THIOSULFATE, 99%
CAS #:7772-98-7
MF: NA2O3S2

FIRE AND EXPLOSION HAZARD DATA

XTINGUISHING MEDIA
NONCOMBUSTIBLE.
USE EXTINGUISHING MEDIA APPROPRIATE TO SURROUNDING FIRE CONDITIONS.
PECIAL FIREFIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.
NUSUAL FIRE AND EXPLOSIONS HAZARDS
EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

REACTIVITY DATA

NCOMPATIBILITIES
STRONG ACIDS
STRONG OXIDIZING AGENTS
AZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS
SULFUR OXIDES

SPILL OR LEAK PROCEDURES

TEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.
SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.
AVOID RAISING DUST.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.
ASTE DISPOSAL METHOD
FOR SMALL QUANTITIES: CAUTIOUSLY ADD TO A LARGE STIRRED EXCESS OF WATER. ADJUST 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.
OBSERVE ALL FEDERAL, STATE, AND LOCAL LAWS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.
SAFETY SHOWER AND EYE BATH.
MECHANICAL EXHAUST REQUIRED.
DO NOT BREATHE DUST.
AVOID CONTACT WITH EYES, SKIN AND CLOTHING.
AVOID PROLONGED OR REPEATED EXPOSURE.
WASH THOROUGHLY AFTER HANDLING.
IRRITANT.
KEEP TIGHTLY CLOSED.
HYGROSCOPIC

CONTINUED ON NEXT PAGE

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MATERIAL SAFETY DATA SHEET

CUST#: 427853
PO#: 18008

PRODUCT #: 21726-3 NAME: SODIUM THIOSULFATE, 99%
CAS #:7772-98-7
MF: NA2O3S2

--- PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE ---

AVOID CONTACT WITH ACID.
STORE IN A COOL DRY PLACE.

---------- ADDITIONAL PRECAUTIONS AND COMMENTS ----------

DDITIONAL INFORMATION
INCOMPATABLE WITH LEAD, SILVER AND MERCURY SALTS, AND IODINES.

HE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO BE LL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. ALDRICH SHALL NOT BE HELD IABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH THE BOVE PRODUCT. SEE REVERSE SIDE OF INVOICE OR PACKING SLIP FOR ADDITIONAL ERMS AND CONDITIONS OF SALE.

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FAX: 0732987139/239

J.T.BAKER INC., 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: METHANOL
COMMON SYNONYMS: METHYL ALCOHOL; WOOD ALCOHOL; CARBINOL; METHYLOL; WOOD SPIRIT
CHEMICAL FAMILY: ALCOHOLS
FORMULA: CH3OH
FORMULA WT.: 32.04
CAS NO.: 67-56-1
NIOSH/RTECS NO.: PC1400000
PRODUCT USE: LABORATORY REAGENT
PRODUCT CODES: 9075,5807,9093,9063,9072,5370,5217,5842,9098,5811,9091,9068 9070,9049,9077,5536,6808,9073,9090,9071,9090,9127,9069,9076 9074,P704,9263

PRECAUTIONARY LABELING

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	3	SEVERE (POISON)
FLAMMABILITY	-	4	EXTREME (FLAMMABLE)
REACTIVITY	-	1	SLIGHT
CONTACT	-	1	SLIGHT

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

U.S. PRECAUTIONARY LABELING

POISON DANGER

FLAMMABLE. HARMFUL IF INHALED. CANNOT BE MADE NON-POISONOUS. MAY BE FATAL OR CAUSE BLINDNESS IF SWALLOWED.
KEEP AWAY FROM HEAT, SPARKS, FLAME. DO NOT GET IN EYES, ON SKIN, ON CLOTHING. AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE ALCOHOL FOAM, DRY CHEMICAL, CARBON DIOXIDE - WATER MAY BE INEFFECTIVE. FLUSH SPILL AREA WITH WATER SPRAY.

CONTINUED ON PAGE: 2

PRECAUTIONARY LABELING (CONTINUED)

INTERNATIONAL LABELING

HIGHLY FLAMMABLE. TOXIC BY INHALATION AND IF SWALLOWED.
KEEP OUT OF REACH OF CHILDREN. KEEP CONTAINER TIGHTLY CLOSED. KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING. AVOID CONTACT WITH SKIN.

SAF-T-DATA* STORAGE COLOR CODE: RED (FLAMMABLE)

SECTION II - COMPONENTS

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
METHANOL	67-56-1	90-100	200 PPM	200 PPM

SECTION III - PHYSICAL DATA

BOILING POINT: 65 C (149 F)
AT 760 MM HG)

VAPOR PRESSURE (MMHG): 96
(20 C)

MELTING POINT: -98 C (-144 F)
(AT 760 MM HG)

VAPOR DENSITY (AIR=1): 1.11

SPECIFIC GRAVITY: 0.79
(H2O=1)

EVAPORATION RATE: 4.6
(BUTYL ACETATE = 1)

SOLUBILITY(H2O): COMPLETE (100%)

% VOLATILES BY VOLUME: 100
(21 C)

PH: N/A

ODOR THRESHOLD (P.P.M.): N/A

PHYSICAL STATE: LIQUID

COEFFICIENT WATER/OIL DISTRIBUTION: N/A

APPEARANCE & ODOR: CLEAR, COLORLESS LIQUID. PUNGENT ODOR.

CONTINUED ON PAGE: 3

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): 12 C (54 F) NFPA 704M RATING: 1-3-0

AUTOIGNITION TEMPERATURE: 463 C (867 F)

FLAMMABLE LIMITS: UPPER - 36.0 % LOWER - 6.0 %

FIRE EXTINQUISHING MEDIA
USE ALCOHOL FOAM, DRY CHEMICAL OR CARBON DIOXIDE. (WATER MAY BE INEFFECTIVE.)

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS
VAPORS MAY FLOW ALONG SURFACES TO DISTANT IGNITION SOURCES AND FLASH BACK. CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE. BURNS WITH A CLEAR + ALMOST INVISIBLE FLAME.

TOXIC GASES PRODUCED
CARBON MONOXIDE, CARBON DIOXIDE, FORMALDEHYDE

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT
NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE
YES.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 260 MG/M (200 PPM)

THE TLV LISTED DENOTES TLV (SKIN).

SHORT-TERM EXPOSURE LIMIT (STEL): 310 MG/M (250 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 260 MG/M (200 PPM)

CONTINUED ON PAGE: 4

SECTION V - HEALTH HAZARD DATA (CONTINUED)

TOXICITY OF COMPONENTS

ORAL RAT LD50 FOR METHANOL	5628 MG/KG
INTRAPERITONEAL RAT LD50 FOR METHANOL	9540 MG/KG
SUBCUTANEOUS MOUSE LD50 FOR METHANOL	9800 MG/KG
SKIN RABBIT LD50 FOR METHANOL	20 G/KG

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

CARCINOGENICITY
NONE IDENTIFIED.

REPRODUCTIVE EFFECTS
NONE IDENTIFIED.

EFFECTS OF OVEREXPOSURE

INHALATION: IS HARMFUL AND MAY BE FATAL. HEADACHE, NAUSEA, VOMITING, DIZZINESS, NARCOSIS, RESPIRATORY FAILURE, LOW BLOOD PRESSURE, CENTRAL NERVOUS SYSTEM DEPRESSION

SKIN CONTACT: IRRITATION, PROLONGED CONTACT MAY CAUSE DERMATITIS

EYE CONTACT: IRRITATION, MAY CAUSE TEMPORARY CORNEAL DAMAGE

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: IS HARMFUL AND MAY BE FATAL. BLINDNESS, HEADACHE, NAUSEA, VOMITING, DIZZINESS, GASTROINTESTINAL IRRITATION, CENTRAL NERVOUS SYSTEM DEPRESSION, HEARING LOSS

CHRONIC EFFECTS: KIDNEY DAMAGE, LIVER DAMAGE

TARGET ORGANS
EYES, SKIN, CENTRAL NERVOUS SYSTEM, GI TRACT, RESPIRATORY SYSTEM, LUNGS

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
EYE DISORDERS, SKIN DISORDERS, LIVER OR KIDNEY DISORDERS

PRIMARY ROUTES OF ENTRY
INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT, ABSORPTION

CONTINUED ON PAGE: 5

SECTION V - HEALTH HAZARD DATA (CONTINUED)

EMERGENCY AND FIRST AID PROCEDURES

INGESTION: CALL A PHYSICIAN. IF SWALLOWED, IF CONSCIOUS, GIVE LARGE AMOUNTS OF WATER. INDUCE VOMITING.

INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. PROMPT ACTION IS ESSENTIAL.

SKIN CONTACT: IN CASE OF CONTACT, IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CLOTHING BEFORE RE-USE.

EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: YES CHRONIC: YES FLAMMABILITY: YES PRESSURE: NO REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: NO
CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS METHANOL (RQ = 5000 LBS)
SARA 313 TOXIC CHEMICALS: YES CONTAINS METHANOL
GENERIC CLASS: GENERIC CLASS REMOVED FROM CFR: 7/1/91
TSCA INVENTORY: YES

SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION

INCOMPATIBLES: STRONG OXIDIZING AGENTS, STRONG ACIDS, ZINC, ALUMINUM, MAGNESIUM

DECOMPOSITION PRODUCTS: CARBON MONOXIDE, CARBON DIOXIDE, FORMALDEHYDE

CONTINUED ON PAGE: 6

SECTION VII - SPILL & DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. SHUT OFF IGNITION SOURCES; NO FLARES, SMOKING OR FLAMES IN AREA. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH AREA WITH WATER.

J. T. BAKER SOLUSORB(R) SOLVENT ADSORBENT IS RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: U154 (TOXIC WASTE)

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. THERE ARE NO CARTRIGES FOR METHANOL VAPORS. HANDLING OPERATIONS SHOULD BE CONDUCTED IN A CHEMICAL FUME HOOD. AT CONCENTRATIONS ABOVE 200 PPM, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM,PROTECTIVE SUIT, RUBBER GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA* STORAGE COLOR CODE: RED (FLAMMABLE)

STORAGE REQUIREMENTS
KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA.

CONTINUED ON PAGE: 7

SECTION IX - STORAGE AND HANDLING PRECAUTIONS (CONTINUED)

SPECIAL PRECAUTIONS
BOND AND GROUND CONTAINERS WHEN TRANSFERRING LIQUID.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: METHANOL
HAZARD CLASS: 3
UN/NA: UN1230 REPORTABLE QUANTITY: 5000 LBS. PACKAGING GROUP: II
LABELS: 3 FLAMMABLE LIQUID
REGULATORY REFERENCES: 49CFR 172.101

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME: METHANOL
HAZARD CLASS: 3.2, 6.1
UN: UN1230 MARINE POLLUTANTS: NO I.M.O. PAGE: 3251
LABELS: FLAMMABLE LIQUID, POISON PACKAGING GROUP: II
REGULATORY REFERENCES: 49CFR PART 176; IMDG CODE

AIR (I.C.A.O.)

PROPER SHIPPING NAME: METHANOL
HAZARD CLASS: 3, 6.1
UN: UN1230
LABELS: FLAMMABLE LIQUID, POISON PACKAGING GROUP: II
REGULATORY REFERENCES: 49CFR PART 175; ICAO=== WE BELIEVE THE TRANSPORTATION DATA AND REFERENCES CONTAINED HEREIN TO BE FACTUAL AND THE OPINION OF QUALIFIED EXPERTS. THE DATA IS MEANT AS A GUIDE TO THE OVERALL CLASSIFICATION OF THE PRODUCT AND IS NOT PACKAGE SIZE SPECIFIC, NOR SHOULD IT BE TAKEN AS A WARRANTY OR REPRESENTATION FOR WHICH THE COMPANY ASSUMES LEGAL RESPONSIBILITY.=== THE INFORMATION IS OFFERED SOLELY FOR YOUR CONSIDERATION, INVESTIGATION, AND VERIFICATION. ANY USE OF THE INFORMATION MUST BE DETERMINED BY THE USER TO BE IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS. SEE SHIPPER REQUIREMENTS 49CFR 171.2, CERTIFICATION 172.204, AND EMPLOYEE TRAINING 49 CFR 173.1(8).

CONTINUED ON PAGE: 8

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION (CONTINUED)

U.S. CUSTOMS HARMONIZATION NUMBER: 29051100009

NOTE: WHEN HANDLING LIQUID PRODUCTS, SECONDARY PROTECTIVE CONTAINERS MUST BE USED FOR CARRYING.
-N/A = NOT APPLICABLE, OR NOT AVAILABLE;
N/E = NOT ESTABLISHED.-
THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES.
EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS C' 'MICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES A SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL.
BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE.
THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET.
NOTE: CHEMTREC, CANUTEC, AND NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE (1-800-JTBAKER) FOR ASSISTANCE.
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APPROVED BY QUALITY ASSURANCE DEPARTMENT.

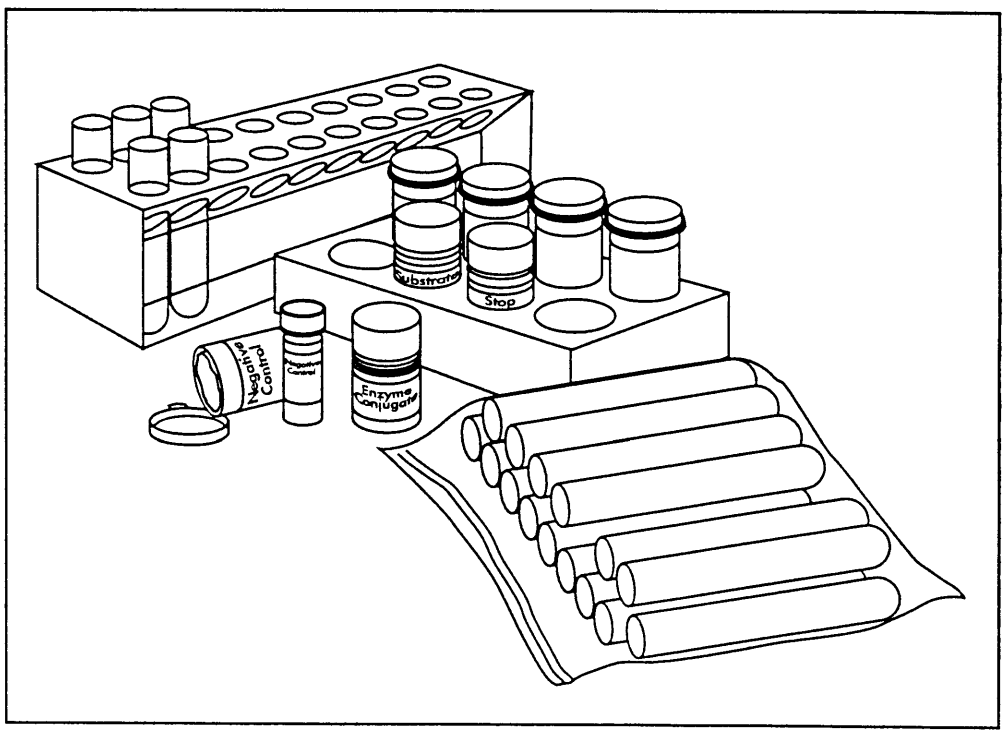
-- LAST PAGE --
"ISSUED BY VWR 11/05/94"

ATTACHMENT 2

PCB SCREENING KIT INFORMATION

MILLIPORE

EnviroGard PCB Test Kit User Guide



What is the EnviroGard PCB Test Kit?

This kit is an enzyme immunoassay that enables you to perform reliable, rapid testing for PCBs in soil at specified action levels. PCB was originally sold under the trade name Aroclor. This test can detect Aroclors 1016, 1242, 1248, 1254, and 1260. If you want to perform an actual quantification of PCBs, you must know the contaminating Aroclor and the assay must be standardized using that Aroclor. This kit is standardized using Aroclor 1248.

▲ **WARNING:** The kit contains a chemical known to the state of California to cause cancer, birth defects, or other reproductive harm. For details, call your local Millipore office to order Material Safety Data Sheet (MSDS) documents P34207, P34210, P34782, or P70002.

What Does It Do?

The EnviroGard PCB Test Kit enables you to:

- Perform a semi-quantitative test of soil samples for PCBs at the specified action levels of 1, 5, 10, and 50 parts per million (ppm)
- Screen for PCBs with 95% confidence of no false negatives at the specified action level

Use this test to determine the extent of PCB contamination on-site or to monitor clean-up procedures. To run a test, you need the EnviroGard PCB Test Kit, the Soil Extraction Bottle Kit, the equipment contained in the Soil Field Lab, methanol, and water. The test procedure requires that you collect a 5 gram (g) soil sample and extract the PCBs from it using methanol. The soil extract is then ready for analysis. To initiate the PCB test, you add the PCB-enzyme conjugate to the antibody-coated test tubes. Then add the sample or calibrators. After a 15 minute incubation, you decant and rinse the tubes. You then add the color developing solution (substrate) and incubate for five minutes. (The test tube contents should turn blue.) Color development is inversely related to the PCB concentration as shown in this chart:

Color as Compared to a Calibrator	Equals...
Darker	Less PCB than the calibrator
Lighter	More PCB than the calibrator

To measure the absorbance of each tube, you need to use a photometer. This enables you to quantitatively determine and compare the amount of color in a sample or calibrator control. For example, if the soil sample generates a signal greater than the 50 ppm assay calibrator, the soil sample has a 95 percent probability of containing less PCB than the assay calibrator.

NOTE: You should confirm positive results with standard methods. If you want to screen soil samples at other action levels, or you require alternative Aroclor standards, contact your local Millipore office. See "Technical Assistance" for phone listings.

Checklist of EnviroGard Products and Materials You Need

To perform the PCB test, you need to have purchased particular EnviroGard products. You also need to supply certain materials (some required, some recommended). Review this list before going to the test site to make sure you have all the supplies you need.

Kit or Part	Yes	No
EnviroGard PCB Test Kit (ENVR 000 09 or ENVR 0NC 09)—Store at 4°C to 8°C (39°F to 46°F). Do not freeze. Also, check the expiration date of the kit. If expired, do not use it or your results will be invalid. ▲ **WARNING:** The stop solution in the kit is hydrochloric acid. Do not let it come in contact with your skin or eyes.		
EnviroGard Soil Extraction Bottle Kit (ENSP 000 30)		
EnviroGard Soil Field Lab (ENVR L00 09) **CAUTION:** Make sure the portable balance works and has fresh batteries so you can weigh out the soil sample.		
Methanol (100 milliliter [mL])*		
Tap or distilled water (at least 500 mL)*		
Differential photometer* **CAUTION:** Make sure the photometer battery is properly charged in case you run the test in an area without a power supply.		
Marker with water-resistant ink**		
Lab coat, gloves, and goggles**		
Absorbent paper (paper towels)**		
Liquid and solid waste containers**		

* Required equipment you supply (You can order the methanol and differential photometer from Millipore. See "Ordering Information" near the back of this booklet.)
** Recommended equipment you supply

How to Perform the PCB in Soil Test

Once you have the necessary equipment, you can run the test to detect the range of PCBs in your sample. To do this, you need to complete a number of tasks. This chart overviews the testing process:

Step	Action
1	Collect the soil sample and extract the PCBs from it.
2	Organize your work area.
3	Run the PCB test. This consists of adding specified amounts of the conjugate, negative control, calibrators, and soil extract (sample) to test tubes. You then mix and incubate. Rinse out the tubes with water and add the substrate. Incubate and observe color development.
4	Stop color development and measure the absorbance using a photometer.
5	Interpret the results.

See the following sections to complete the tasks in the order shown.

Collect the Soil and Extract the Sample

If you have not collected the soil and extracted the sample yet, see the *EnviroGard Soil Extraction Bottle Kit* insert. It describes how to collect the soil and extract the sample for the test.

▲ **WARNING:** Treat PCBs, solutions that contain PCBs, and potentially contaminated soil samples as hazardous materials. (Wear gloves and protective clothing.) If appropriate, obtain permits pertaining to the handling, analysis, and transport of PCB containing materials.

In addition, you need to consider the following conditions to ensure accurate results:

Soil Sample Testing Considerations
The distribution of PCBs in different soils can be heterogeneous. You should thoroughly mix (homogenize) the soil samples before analysis to ensure reliable results. Split samples should always come from the same homogenate.
Clay soil samples may require additional methanol to extract the sample as described in the *EnviroGard Soil Extraction Bottle Kit* insert. (You also need to factor the dilution into your final calculations. See "Interpret the Photometer Readings" in this document for details.)
Soil samples containing >30% water may affect the efficiency of the extraction step. If you suspect the water content is greater than this, you should dry the sample through evaporation or by mixing it with sodium sulfate. Samples dried with sodium sulfate may require additional methanol to extract the sample as described in the previous consideration. (See the *EnviroGard Soil Extraction Bottle Kit* insert for details.)
Soil samples containing very high levels of petroleum fuels or transformer oil may affect results. If a sample has a very high concentration of fuel or oil, you see a cloudy suspension when you add the sample extract to the test tubes as described in step 2 of the "Run the PCB Test" section. If you see a cloudy suspension, the results may be invalid. Soil samples with up to 5% by weight of transformer oil and diesel fuel have been tested with no adverse affect on assay performance.

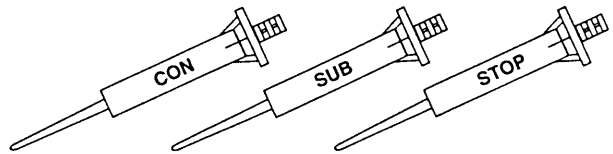
Once you extract the sample, see the next section to organize the work area and run the test.

Organize the Work Area

Step	Action
1	Remove the plastic work station tray from the EnviroGard Field Lab suitcase. Then unpack these items from the lower compartment: ■ Photometer (if you supplied or ordered one) ■ Charger (if necessary) ■ Repeater™ pipette ■ Positive displacement pipette ■ Timer ■ Wash bottle (500 mL) NOTE: The suitcase contains instructions for each packed component.
2	Place the work station tray back into the suitcase and secure it; you can use this as your work surface. Then remove these items from the upper compartment: ■ 12.5 mL Repeater pipette tips (3) ■ Repeater pipette tip labels ■ 6-place test tube rack(s) NOTE: Use the 20-place, cardboard test tube holder in the PCB Test Kit when you are working with more than six tubes at a time.

Continued

Organize the Work Area, Continued

Step	Action
3	Place the test tube rack on your work surface. Then label the Repeater pipette tips as follows: ■ One 12.5 mL tip with the "CON" label for PCB-enzyme conjugate ■ One 12.5 mL tip with the "SUB" label for chromogenic substrate ■ One 12.5 mL tip with the "STOP" label for stop solution  **CAUTION:** When done, do not throw out the labeled tips. Thoroughly rinse them in clean water (especially the CON tip) before placing them back in the Field Lab case. (The case has individual slots for each tip.) The labeled Repeater pipette tips help you identify the tip you used to dispense a particular reagent. By using the same tip for the same reagent each time you run the test, you can avoid cross contamination.
4	Remove the reagent bottles from the EnviroGard PCB Test Kit packing. Then remove the calibrators and negative control from their protective, sealed containers. NOTE: This document reflects the use of all four calibrators and the negative control in the steps to provide a complete overview. Always use the negative control. But only select the relevant calibrators for your action level. Let the reagents warm to an ambient temperature of 18°C to 27°C (64°F to 81°F). This usually takes at least 30 minutes. Also locate your vials of samples that you extracted with the EnviroGard Soil Extraction Bottle Kit. **CAUTION: Do not expose the substrate to direct sunlight to ensure its stability.**

Continued

Organize the Work Area, Continued

Step	Action
5	Remove the yellow (1 to 25 microliter [µL]) positive displacement pipette tips from the EnviroGard PCB Test Kit. Then remove up to 20 of the antibody-coated test tubes from the kit and label them as described in this chart:

Tube Label	Indicates ...
NC	Negative Control
1 ppm	1 ppm PCB calibrator*
5 ppm	5 ppm PCB calibrator*
10 ppm	10 ppm PCB calibrator*
50 ppm	50 ppm PCB calibrator*
S1	Sample 1
S2	Sample 2

* The 1, 5, 10, and 50 ppm calibrators have actual concentrations of 0.5, 3, 5, and 22 ppm of Aroclor 1248, respectively.

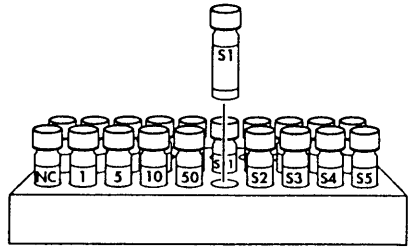
NOTE: You may not need to label your tubes exactly as shown in this step; it depends on your requirements. See the "NOTE" in step 4 for details.

6	Insert the labeled tubes into the rack by gently pressing them down from the top until secure.

Continued

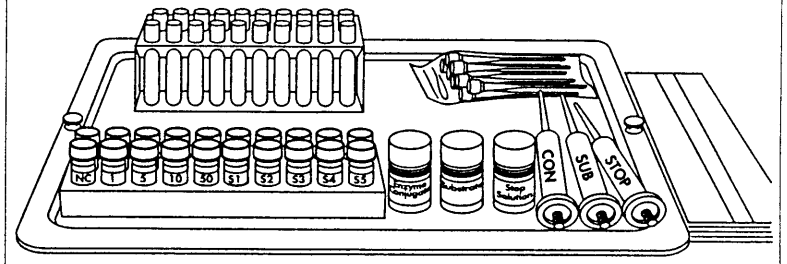
Organize the Work Area, Continued

Step	Action
7	Unpack the foam workstation from the Field Lab. Use it to line up the sample extraction vials and calibrator solutions in the order you need to use them. For example:



CAUTION: Do not mix reagents from test kits with different lot numbers.

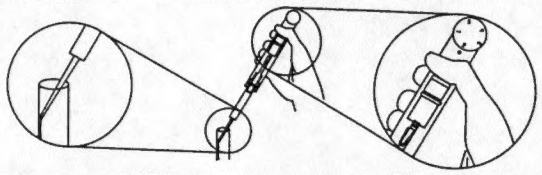
8	Locate some paper towels (or absorbent material) and lay a few sheets out near your work surface. Your work area set up should look like this:



9	Continue to the next section, "Run the PCB Test."

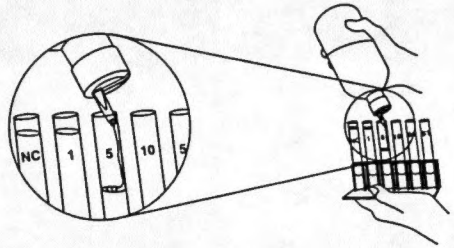
Run the PCB Test

Once you have a soil sample ready and finish setting up your work area, follow these steps:

Step	Action
1	Position the Repeater pipette setting to 2. Then attach the 12.5 mL Repeater tip marked "CON." Draw up enough volume to dispense 500 µL of enzyme conjugate into each tube. Dispense the first 500 µL back into the bottle labeled "Enzyme Conjugate" to remove bubbles. Then dispense 500 µL of the enzyme conjugate into each tube with the tip at an angle to prevent splash back. Return any unused conjugate to its bottle.  NOTE: Do not throw out the tip; rinse it and save it for later use.
2	Attach a clean, yellow pipette tip to the Positive displacement pipette. Position the dial to 250. Dispense 25 µL of the negative control, calibrators, and sample reagents into the appropriate test tubes. **CAUTION:** You must change the tips between reagents to avoid cross contamination. Discard tips into a suitable container. Also replace the calibrator vial caps immediately after use to minimize evaporation.
3	Shake the test tube rack thoroughly for five seconds to mix the contents. Then set the timer for 15 minutes and let the tubes incubate undisturbed.

Continued

Run the PCB Test, Continued

Step	Action
4	Empty the test tube contents into a sink or suitable container. Fill the tubes with cool tap or distilled water. Then empty them and shake out the remaining drops. Repeat the wash three times. Then invert the tubes and tap them on paper towels to remove excess water. 
5	Check that the Repeater pipette is set to 2. Attach the 12.5 mL pipette tip labeled "SUB." Then draw up enough volume to dispense 500 µL of the substrate into each tube. Dispense the first 500 µL back into the bottle labeled "Substrate" to remove bubbles. Then dispense 500 µL of the substrate into each tube with the tip at an angle to prevent splash back. Return any unused substrate to its bottle.

Continued

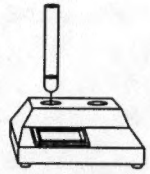
Run the PCB Test, Continued

Step	Action
6	Set the timer for five minutes and let the tubes incubate. During this time, you should see the tubes turn varying shades of blue, depending on the PCB concentration. **CAUTION:** If a blue color does not develop in the "NC" test tube within five minutes after adding the substrate, the test is invalid and you must repeat it. As described at the beginning of this document, color is inversely related to the PCB concentration. If the color is darker than a calibrator, it indicates a lower PCB concentration. A color lighter than the calibrator indicates a higher PCB concentration.
7	Attach a clean 12.5 mL pipette tip labeled "STOP" to the Repeater pipette. With the pipette still set to 2, draw up enough volume to add 500 µL of stop solution to each test tube in the rack. Dispense the first 500 µL back into the bottle labeled "Stop Solution." Then add 500 µL of the stop solution into each tube with the tip at an angle to prevent splash back. You should see the tube contents turn yellow. ▲ **WARNING:** Do not spill the stop solution on your skin or clothing since it is an acid.
8	Read the tube contents with a photometer within 30 minutes after adding the stop solution. See the next section, "How to Interpret Results," for details.

How to Interpret Results

This section describes how to use the photometer and interpret results.

Record Results Using a Photometer

Step	Action
1	Locate the photometer. Then attach a rinsed 12.5 mL pipette tip (labeled "STOP") to the Repeater pipette. Set the pipette to 4. Then add 1.0 mL of the stop solution or wash water to a new, empty test tube. (This is the photometer "blank" tube.)
2	Insert the blank tube into the left well of the photometer as shown: 
3	Dry the outside of each labeled tube with clean paper towel and place each tube (one by one) into the right well of the photometer as shown: 
4	Record the absorbance (optical density [OD]) reading of each tube. Then dispose the tube in an appropriate waste container.
5	See the following sections for details on interpreting results.

Interpret the Photometer Readings

Samples with OD_{450} Values...	Contain...	May Contain...
> OD of the 1 ppm PCB calibrator	Less than 1.0 ppm PCB	
≤ OD of the 1 ppm PCB calibrator		More than 1 ppm PCB
> OD of the 5 ppm PCB calibrator	Less than 5 ppm PCB	
≤ OD of the 5 ppm PCB calibrator		More than 5 ppm PCB
>OD of the 10 ppm PCB calibrator	Less than 10 ppm PCB	
≤ OD of the 10 ppm PCB calibrator		More than 10 ppm PCB
>OD of the 50 ppm PCB calibrator	Less than 50 ppm PCB	
≤ OD of the 50 ppm PCB calibrator		More than 50 ppm PCB

NOTE: If you extracted soil samples with more than 1.0 mL of methanol per gram of soil (for example, for clay samples), you need to multiply each of the calibrator concentrations by the ratio of the methanol (in milliliters) to soil (in grams). For example, if you extracted a 5.0 g soil sample with 10 mL of methanol, the ratio of methanol to soil is 2 (10 divided by 5). The calibrator levels used for analysis of this sample would represent 2 ppm (2 x 1), 10 ppm (2 x 5), 20 ppm (2 x 10), and 100 ppm (2 x 50).

Possible Interfering Substances

The following substances were tested and found to have less than 0.5% weight-to-weight of the immunoreactivity of Aroclor 1248:

1, 2-dichlorobenzene
1,3-dichlorobenzene
1, 4-dichlorobenzene
1, 2, 4-trichlorobenzene
2, 4-dichlorophenol
2, 5-dichlorophenol
2, 4, 5-trichlorophenol
2, 4, 6-trichlorophenol
biphenyl
pentachlorophenol (PCP)

Ordering Information

This section lists the catalogue numbers for the EnviroGard products and other Millipore equipment you may want to order. See "Technical Assistance" for a complete list of Millipore offices.

EnviroGard Products and Required Equipment

Product or Equipment	Catalogue Number
EnviroGard PCB Test Kit	ENVR 000 09 (with Aroclor 1248 calibrators) ENVR ONC 09 (without Aroclor calibrators)
EnviroGard Soil Extraction Bottle Kit	ENSP 000 30
EnviroGard Soil Field Lab	ENVR L00 09
Methanol (100 mL)	ELCR 000 07
Millipore Differential Photometer	ENVR 000 00 (115 V) ENVR 002 30 (230 V)

Accessory Equipment

Accessory	Catalogue Number
Field Lab Pipette Tip Replacement Pack (includes 5 mL pipette tips [3], 12.5 mL pipette tips [6], 500 mL pipette tips [1])	ENVR LRP 09
EnviroGard Replacement Pipette Bulk Tips:	
Positive displacement pipette tips, 1.0–25 µL, 200/pk	ENVR L04 09
Repeater tips, 12.5 mL, 100/pk	ENVR L02 09
Repeater tips, 50 mL, 10/pk	ENVR L03 09

METHOD 4020

DRAFT

SOIL SCREENING FOR POLYCHLORINATED BIPHENYLS BY IMMUNOASSAY

1.0 SCOPE AND APPLICATION

1.1 Method 4020 is a procedure for screening soils to determine when total polychlorinated biphenyls (PCBs) are present at concentrations above 5, 10, or 50 mg/Kg. Method 4020 provides an estimate for the concentration of PCBs by comparisons against up to three different standards.

1.2 Using the test kit from which this method was developed, the probability of reporting a false positive or false negative result is presented in Table 2(false positive) and Table 3(false negative).

1.3 In cases where the exact concentrations of PCBs are required, quantitative techniques (i.e., Methods 8080/8081) should be used.

2.0 SUMMARY OF METHOD

2.1 Test kits are commercially available for this method. The manufacturer's directions should be followed. In general, the method is performed using an extract of a soil sample. Sample and an enzyme conjugate reagent are added to immobilized antibody. The enzyme conjugate "competes" with PCBs present in the sample for binding to immobilized anti-PCB antibody. The test is interpreted by comparing the response produced by testing a sample to the response produced by testing standard(s) simultaneously.

3.0 INTERFERENCES

3.1 Chemically similar compounds and compounds which might be expected to be found in conjunction with PCB contamination were tested to determine the concentration required to produce a positive test result. These data are shown in Table 1.

4.0 APPARATUS AND MATERIALS

4.1 EnviroGard PCB Test Kits (Millipore Corporation), or equivalent. Each commercially available test kit will supply or specify the apparatus and

5.04, 9.78, 11.8, and 25.1 mg/kg by SW846 method 8080), at three different sites, using three different lots of assay kits, three times a day for 9 days. A total of 81 analyses were performed for each soil. Error attributable to site, lot, date, and operator were determined. Separately, the relative reactivity of Aroclors 1242, 1248, 1254, and 1260 were determined. Based on Aroclor heterogeinity, and method imprecision, concentrations of Aroclor 1248 were selected that would result in greater than 99% confidence for negative interpretation. False negative and false positive rates, and the probability of reporting an inaccurate result for any given contamination level are presented in tables 2 and 3. A study was conducted (Superfund SITE demonstration) on 114 field samples whose PCB concentration were also determined by Method 8080. 32 of the field samples were collected in duplicate (as coded field duplicates) and assayed by standard and immunoassay methods. The results for all 146 samples are summarized in tables 4 and 5.

10.0 REFERENCES

1. EnviroGard PCB in Soil Package Insert, Millipore Corp. 2/93.
2. Technical Evaluation Report on the Demonstration of PCB Field Screening Technologies, SITE Program. EPA Contract Number 68-CO-0047. 2/93.

Table 2. Calculated False Positive Probability Using The EnviroGard™ PCB Kit

ACTUAL SOIL CONTENT (ppm)[a]	5ppm Cut Off %Probability%	10ppm Cut Off %Probability	50ppm Cut Off %Probability
0	0.0	0.0	0.0
1	3.2	0.0	0.0
2	50.3	5.2	0.0
3	86.6	28.7	0.0
4	97.1	59.9	0.0
5		80.4	0.0
6		91.2	0.0
7		96.2	0.0
8		98.4	0.0
9		99.3	1.0
10			2.1
11			3.8
12			6.2
14			13.3
16			22.7
18			33.4
20			44.4
22			54.7
24			63.8
26			71.6
28			78.0
30			83.1
32			87.1
34			90.3
36			92.7
38			94.5
40			95.9
42			96.9
44			97.7
46			98.3
48			98.7
50			

CALCULATED FALSE POSITIVE RATE[a]

	AT 5 ppm	AT 10 ppm	AT 50 ppm
100 SOILS[b]	5.26%	5.59%	5.21%

[a] For Aroclors 1242, 1248, 1254, and 1260

[b] For a theoretical sample set of 100 soils having GC values evenly distributed between 0 and ten times the nominal action level (i.e., 0-50 ppm for 5 ppm; 0-100 ppm for 10 ppm; and 0 to 500 ppm for 50 ppm).

Table 4. Results for 146 Soil Samples Analyzed in the PCB Field Screening SITE Demonstration Using The EnviroGard PCB Kit[a]

SAMPLE NUMBER	SCREENING RESULT[b,d]	GC RESULT[c] [SW846-8080]	AGREEMENT[e] Y, FN, FP
001	>10	5.98	FP*
002	>10	1.27	FP
003	<10	0.11	Y
004	>10	6.71	FP*
005	>10	1.37	FP
006	>10	0.68	FP
007	>10	0.55	FP
008	>10	2.00	FP
009	>10	1.30	FP
010	>10	0.17	FP
011	>10	1.15	FP
012	<10	ND[f]	Y
013	<10	1.13	Y
014	<10	0.18	Y
015	>10	9.13	FP*
015D	>10	9.84	FP*
016	>10	2110	Y
017	>10	2.55	FP
018	>10	45.4	Y
019	>10	6.70	FP*
020	<10	0.07	Y
021	<10	0.06	Y
022	<10	0.54	Y
022D	<10	0.72	Y
023	>10	20.8	Y
024	<10	0.06	Y
024D	<10	0.05	Y
025	>10	11.7	Y
026	<10	1.96	Y
027	<10	0.06	Y
028	<10	0.22	Y
028D	<10	0.22	Y
029	<10	0.23	Y
030	<10	1.15	Y
031	<10	0.26	Y
032	>10	47.6	Y
033	>10	6.00	FP*
034	>10	34.0	Y
035	<10	ND[f]	Y
035D	<10	ND[f]	Y
036	>10	816	Y
037	<10	0.06	Y
037D	<10	0.04	Y
038	>10	1030	Y
039	<10	0.68	Y
040	>10	4.25	FP
041	<10	ND[f]	Y
042	>10	0.52	FP
042D	>10	0.47	FP

SAMPLE NUMBER	SCREENING RESULT[a,d]	GC RESULT[a] (SW846-8080)	AGREEMENT[c] Y, FN, FP
083	<10	0.48	Y
083D	<10	0.41	Y
084	>10	1.16	FP
084D	>10	1.08	FP
085	>10	428	Y
085D	>10	465	Y
086	<10	1.42	Y
086D	<10	1.25	Y
087	<10	0.08	Y
087D	<10	ND[e]	Y
088	>10	2.70	FP
088D	>10	1.77	FP
089	>10	45.0	Y
090	<10	1.01	Y
090D	<10	1.40	Y
091	>10	1630	Y
091D	>10	1704	Y
092	<10	1.21	Y
092D	<10	ND[e]	Y
093	<10	0.30	Y
094	<10	0.36	Y
095	>10	17.5	Y
095D	>10	31.2	Y
096	<10	0.06	Y
097	<10	1.23	Y
097D	<10	0.29	Y
098	>10	1.17	FP
098D	>10	0.83	FP
099	<10	ND[e]	Y
100	>10	177	Y
100D	>10	167	Y
101	>10	1.21	FP
102	>10	293	Y
102D	>10	177	Y
103	>10	40.3	Y
104	>10	7.66	FP
105	<10	0.21	Y
106	<10	2.50	Y
107	>10	14.1	Y
108	>10	3.84	FP
109	<10	ND[e]	Y
109D	<10	ND[e]	Y
110	<10	ND[e]	Y
111	<10	ND[e]	Y
112	>10	315	Y
113	>10	14.9	Y
114	>10	66.3	Y

[a] mg/kg (ppm)
[d] Screening Calibrator is 5 mg/kg Aroclor 1248
[c] Y=Yes, FN=False Negative, FP=False Positive
[e] ND = Not Detectable
[f] Expected Result Based on Calibrator Concentration

EnviroGard™ PCB in Soil Test Kit

•Field Validation Data

Application Note

Site Description

Location: Kansas City, MO

Site: Department of Energy - Contract manufacturing site

Source Material: Spills from a heat-transfer system

Analytical Methods

- **Laboratory Analysis:**
  Method 8080

  Analysis: EPA Region 7

  Analytical Plan: Extract samples by Soxhlet with pentane and analyze by Method 8080 (GC/ECD). A total of 146 samples were analyzed including 32 pairs of field duplicates. EPA Region 7 conducted a Level II data review.

- **Field Analysis:**
  Enzyme Immunoassay (EIA)

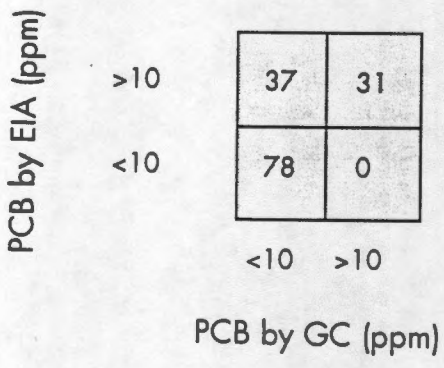
  Extraction: EnviroGard Soil Extraction Bottle Kit (catalogue number ENSP 000 30)

  Analysis: EnviroGard PCB in Soil Test Kit (catalogue number ENVR 000 09)

  Analytical Plan: A total of 146 samples were analyzed including 32 sets of field duplicates. A qualitative interpretation was utilized by comparison to a single assay calibrator equivalent to 10 ppm PCB.

Correlation Between EIA and Method 8080

The 146 samples were analyzed by both Method 8080 and EIA.



MILLIPORE

ATTACHMENT 3

SAMPLING AND DECONTAMINATION PROCEDURES

1.0 SUBSURFACE SOIL SAMPLING PROCEDURE

1.1 Sampling Equipment

- Drill rig
- Geoprobe Macro-core sampler or 2" split-spoon sampler
- Stainless steel spoons
- Stainless steel bowl
- Aluminum foil

1.2 Sampling Procedures

1. Remove the soil sample from the sampler in a way that minimizes sample disturbance.
2. Enter a detailed geologic description of the sample in the field notebook.
3. From the work plan, determine the number and depth of the six-inch intervals to be sampled.
4. Place each six-inch interval in a separate, pre-cleaned, stainless steel bowl using a pre-cleaned stainless steel spoon and homogenize the six-inch sample according to the procedure in 1.2.1 below.
5. Weigh out the required amount of sample for PCB screening and follow the manufacturer's instructions for the test kit being used. These instructions are contained in Attachment 2.
6. Jar the remaining homogenized sample in a pre-cleaned glass jar for potential analysis by an off-site laboratory.

1.1.2 Soil Sample Homogenization

1. Remove rocks, twigs, and other debris if they are not considered part of the sample.
2. Place the soil in a stainless steel pan and thoroughly mix using a stainless steel spoon. The sediment in the pan should be scraped from the sides and bottom of the pan, rolled to the middle of the pan and initially mixed. The sample should then be quartered and moved to the four corners of the pan. Each quarter of the sample should be mixed individually and then rolled to the center of the pan and the entire sample mixed again.
3. Transfer the sample to the appropriate containers.

2.0 EQUIPMENT DECONTAMINATION PROCEDURES

2.1 Introduction

To avoid cross-contamination of samples, equipment used in sampling must be clean and free from the residue of the previous sample. Non-dedicated sampling equipment must be cleaned initially and prior to being reused. Initial decontamination shall be performed in accordance with the requirements of Appendix B, NYSDEC, 1990. The following procedure for field decontamination does not apply to heavy equipment or drilling equipment, with the exception of split-spoon samplers or the macro-core sampler. Heavy equipment and drilling equipment will be steam cleaned in a predesignated location prior to use and between locations.

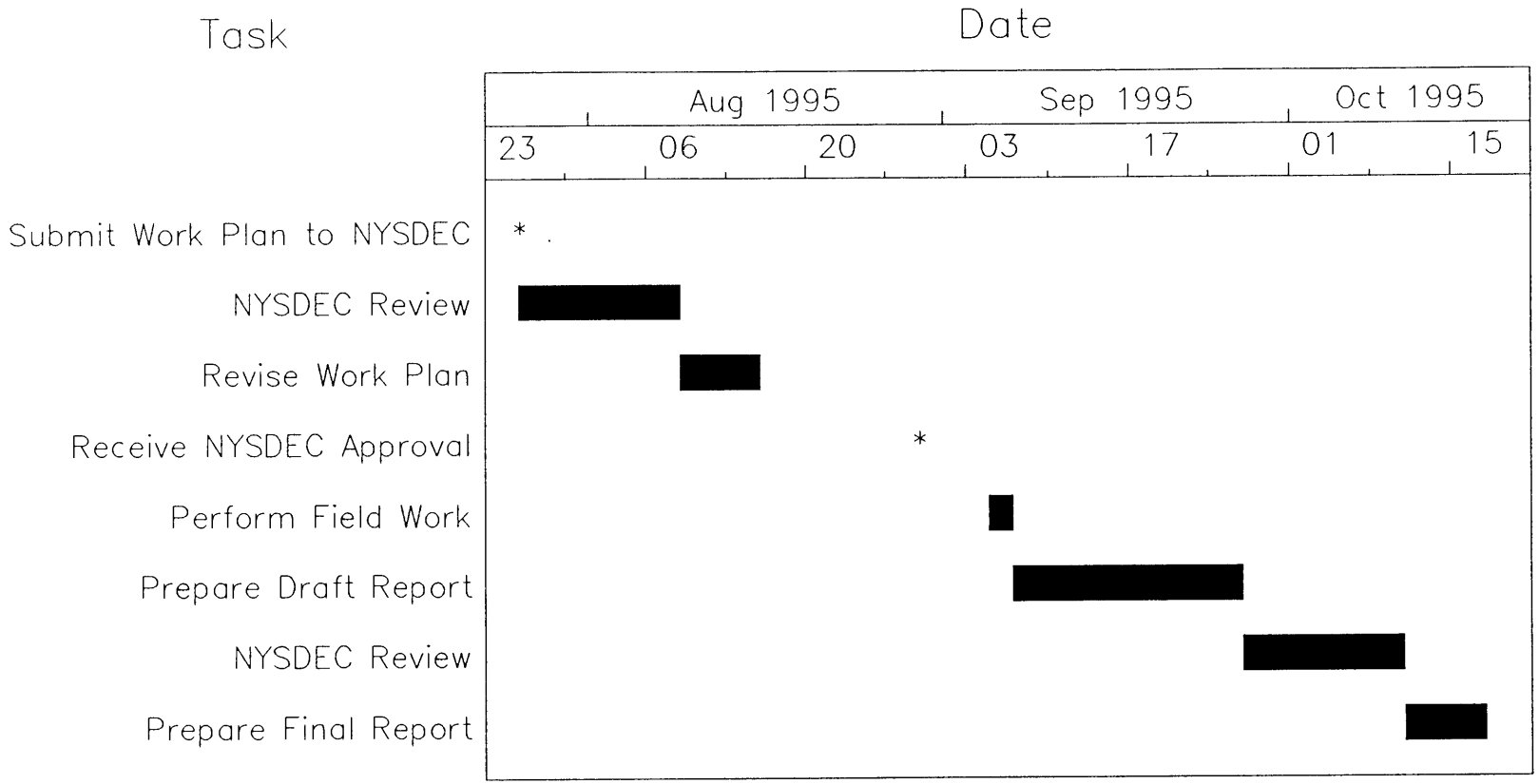
2.2 Decontamination Procedure

- Wash and scrub with low-phosphate, laboratory-grade detergent,
- Rinse with tap water,
- Rinse with methanol,
- Thoroughly rinse with distilled water,
- Wrap in aluminum foil for transport.

ATTACHMENT 4

PROJECT SCHEDULE

PCB DELINEATION SCHEDULE
GAF PARKING LOT SITE



2435-005

MALCOLM PIRNIE

LETTER OF TRANSMITTAL

To: NYS Department of Environmental Conservation
Rt 11
Kirkwood NY 13795

Attention: Mr. Thomas Suozzo

Date: 4/25/95

Re: GAF Parking Lot Site

We are sending you ☒ Enclosed ☐ Under separate cover via ☐ Mail ☐ Messenger, the following items:

☐ shop drawings ☐ prints ☐ data sheets ☒ Tech. Work Plan

☐ specifications ☐ sketches ☐ brochures ☐ _____

Our action relative to items submitted for approval has been noted on the drawings.

COPIES	PREPARED BY	REFERENCE NO.	DESCRIPTION
1	MPI	2435-005	Technical Work Plan w/ attachments

THESE ARE TRANSMITTED AS CHECKED BELOW:

☐ As requested
☐ For your use
☒ For review & comment
☐ For your information

☐ Approved
☐ Approved as Corrected
☐ Revise and Resubmit
☐ Not Approved

☐ Resubmit _____ copies for approval
☐ Submit _____ copies for distribution
☐ Return _____ corrected Prints
☐ _____

Remarks: _____

Copies to: Kevin Sheehy, ISP
Neil Kaye, ISP

Very truly yours
MALCOLM PIRNIE, INC.

by Kelley Koe for Kathy White

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