December 20, 1985

signetics
a subsidiary of U.S. Philips Corporation

Signetics Corporation
9201 Pan American Freeway NE
P.O. Box 10272
Albuquerque, New Mexico 87184

Jamie Wright
(6AW-HT)
USEPA
1201 Elm Street
Interfirst 2 Building
Dallas, TX 75270

Resubmitted because of corrections on 1-20-86

Dear Jamie,

Attached you will find the updated Part B, per your request. We sent the complete set due to the fact that our word processor reset all the page numbers and we were unable to match page for page. I will also send Boyd a copy for the State's record. If you have any questions, please contact me at (505) 822-7188.

Thanks, and have a Happy Holiday season.

Gary M. Mavrakis

Gary M. Mavrakis
Chemical Support Section Head

CC: Boyd Hamilton
Environmental Improvement Division
State of New Mexico

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2 1985
HAZARDOUS WASTE SECTION

PERMIT ATTACHMENT B

RECEIVED

FEB 0 8 1985

HAZARDOUS WASTE SECTION

February 6, 1985

Signetics
a subsidiary of U.S. Philips Corporation

Signetics Corporation
9201 Pan American Freeway NE
P.O. Box 10272
Albuquerque, New Mexico 87184

Ms. Denise Fort
Director
Environmental Improvement Divison
State of New Mexico
Crown Building
725 St. Michael's Drive
P. O. Box 968
Santa Fe, NM 87504-0968

Dear Ms. Fort:

Signetics agrees that the following conditions of the Solid Waste Disposal Act, P. L. 96-482, as amended by the Hazardous and Solid Waste Amendments of 1984, P. L. 98-616, be made a condition of Signetics' final permit. On the effective date(s) of the permit conditions, Signetics Corporation will comply with said conditions and any regulations pertaining to those conditions which may be promulgated by the U. S. Environmental Protection Agency or the New Mexico Environmental Improvement Board.

Condition 1.

On September 1, 1985, Signetics agrees that any manifest required by the New Mexico Hazardous Waste Act and Regulations, shall contain a certification by the generator that:

(a) the generator of the hazardous waste has a program in place to reduce the volume or quantity and toxicity of such waste to the degree determined by the generator to be economically practicable; and

(b) the proposed method of treatment, storage, or disposal is that practicable method currently available to the generator which minimizes the present and future threat to human health and the environment.

Condition 2.

Signetics shall submit reports to the Director at least once every two years, setting out:

(a) the quantities and nature of hazardous waste identified or listed under the New Mexico Hazardous Waste Act and Regulations that we have generated during the year;

(b) the disposition of all hazardous waste reported under the preceding paragraph;

Signetics Corporation
9201 Pan American Freeway NE
P.O. Box 10272
Albuquerque, New Mexico 87184

(c) the efforts undertaken during the year to reduce the volume and toxicity of waste generated; and

(d) the changes in volume and toxicity of waste actually achieved during the year in comparison with previous years, to the extent such information is available for years prior to enactment of the Hazardous and Solid Waste Amendments of 1984.

Condition 3.

Effective September 1, 1985, if Signetics treats, stores, or disposes of hazardous waste on the premises where such waste is generated, we shall certify, no less often than annually, that:

(a) we have, in place, a program to reduce the volume or quantity and toxicity of such wastes to the degree determined by the generator to be economically practicable; and

(b) the proposed method of treatment, storage, of disposal is that practicable method currently available to the generator which minimizes the present and future threat to human health and the environment.

If you have any questions or comments, please contact us. The contact person and party responsible for the hazardous waste management activities at Signetics Albuquerque facility is:

Gary M. Mavrakis
Chemical Support Section Head
(505) 822-7188

Sincerely,

J.R. McGerigle

John R. McGerigle
Plant Manager

fm

cc: Bob Smith - ABQ
Trent Thomas - EID
Jim Davison - SV

SIGNETICS ALBUQUERQUE

HAZARDOUS WASTE MANAGEMENT PLAN

&

RCRA PART B APPLICATION

NMD 000709782

JAN. 20 1987

SIGNETICS ALBUQUERQUE

HAZARDOUS WASTE MANAGEMENT PLAN

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Exhibit H-6	Job Title and Required Training, Training Frequency, Duration and Type
Exhibit I-1	Anticipated Closure Schedule
Exhibit I-2	Financial Assurance for Closure
Exhibit I-3	Financial Assurance for Sudden and Accidental Occurrences

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05	1-11-85	Waste Description	19	G. Mavrakis
06	1-11-85	Surveillance System	32	G. Mavrakis
07	1-11-85	Means To Control Entry	33	G. Mavrakis
08	1-11-85	General Information	47	G. Mavrakis
09	1-11-85	Waste Description	48	G. Mavrakis
10	1-11-85	Waste Description	49	G. Mavrakis
11	1-11-85	Emergency Coordinators	50	G. Mavrakis
12	1-11-85	Coordination Agreements	59	G. Mavrakis
13	1-11-85	Plan Update Procedures	61	G. Mavrakis
14	1-11-85	Job Titles and Duties	62	G. Mavrakis
15	1-11-85	Position Titles	63, 64	G. Mavrakis
16	1-11-85	Position Titles	65	G. Mavrakis
17	1-11-85	Training Director	68	G. Mavrakis
18	1-11-85	Spills or Material Release	54	G. Mavrakis
19	1-11-85	Post-Emergency Equipment Maintenance	56	G. Mavrakis
20	1-14-85	Tank Management Practices	29	G. Mavrakis
21	1-16-85	Waste Description	18	R. J. Fraatz
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DISTRIBUTION

SIGNETICS DISTRIBUTION:

NAME	TITLE	M/S
Jim Davison	Corp. Envt. Manager	0458 - SV
Gary Mavrakis	Chemical Support Section Head	02 - ABQ
Faith Martin	Chemical Purchasing	02 - ABQ
Pat Herring	Safety Supervisor	19 - ABQ
Jeff Pritt	Chemical Laboratory	02 - ABQ

SPECIAL DISTRIBUTION:

The following locations will receive updated versions of Signetics' Contingency Plan:

LOCATION

Albuquerque Fire Academy
1510 Kit Carson, S.W.
Albuquerque, NM 87103
(505) 766-7900

St. Joseph's Hospital
Emergency Room
400 Walter Street, N.E.
Albuquerque, NM 87102
(505) 848-8000

Environmental Improvement Division
Harold Runnels Building
1190 St. Francis Drive
P. O. Box 968
Santa Fe, NM 87504-0968
(505) 827-2929

Albuquerque Police Department
9500 Montgomery, N.E.
Albuquerque, NM 81111
(505) 766-4680

Albuquerque Fire Department
Station 15
6600 Academy Road, S.E.
Albuquerque, NM 87109
(505) 766-7130

PURPOSE

Signetics - Albuquerque is a manufacturer of integrated circuits (Standard Industrial Classification: 3674). Certain hazardous wastes are generated from the manufacturing process. The facility is authorized through Interim Status from the Environmental Protection Agency (EPA) to operate as a generator and storer of hazardous waste (although no off-site hazardous waste will be accepted or stored).

The purpose of this document is to devise a comprehensive plan to manage and control Signetics' hazardous wastes and to fulfill the requirements of the Resource Conservation and Recovery Act, New Mexico Hazardous Waste Management Regulation (HWMR) Part B Permit Application.

This documented plan is reviewed, updated, and implemented by the Chemical Support Section Head:

Gary M. Mavrakis
Signetics Corporation
9201 Pan American Freeway, N.E.
Albuquerque, NM 87113
(505) 822-7188

JAN 2 0 1986

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Exhibit B-2 Signetics Site Plat

Exhibit B-3 Detail of Site Plat

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Exhibit B-5 Windrose

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Exhibit C-1 Laboratory Analyses of Hazardous Wastes

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Exhibit D-2 Container Specifications

Exhibit D-3 Hazardous Waste Storage Areas

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Exhibit H-4 Resumes of Training Personnel

Exhibit H-5 Hazardous Waste Personnel Training Record

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SIGNETICS DISTRIBUTION:

NAME	TITLE	M/S
Jim Davison	Corp. Envt. Manager	0458 - SV
Cal Wright	Security Manager	19 - ABQ
Robert Smith	Facilities/Materials Manager	04 - ABQ
Jim Buhler	Facilities Manager	04 - ABQ

SPECIAL DISTRIBUTION:

The following persons will receive updated versions of Signetics' Contingency Plan:

NAME	TITLE	ADDRESS
Capt. Frank Chavez		Albuquerque Fire Academy 1510 Kit Carson, SW Albuquerque, NM 87103 (505) 766-7900
Dr. Jerry Montgomery		St. Joseph's Hospital Emergency Room 400 Walter Street, NE Albuquerque, NM 87102 (505) 848-8000
Mr. Peter Pache	Acting Chief	Environmental Improvement Division Crown Building 725 St. Michael's Drive P. O. Box 968 Santa Fe, NM 87504-0968 (505) 984-0020
Captain J. T. Powell	Captain	Albuquerque Police Dept. 9500 Montgomery, NE Albuquerque, NM 81111 (505) 766-4680
Captain Gerald Grimm	Captain	Albuquerque Fire Dept. Station 15 6600 Academy Road, NE Albuquerque, NM 87109 (505) 766-7130

PURPOSE

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This documented plan is reviewed, updated, and implemented by the Chemical Support Section Head:

Gary M. Mavrakis
Signetics Corporation
9201 Pan American Freeway, NE
Albuquerque, NM 87113
(505) 822-7188

SECTION A

PART A APPLICATION

The Part A application includes the completed and revised forms* that follow and a facility map.

Exhibit A-1 is a facility scale drawing delineating hazardous waste storage areas and Exhibit A-2 is a facility photograph.

In 1984, the plant is operating at 10% of the manufacturing capacity. The estimated quantities of wastes are based on full capacity production since this may comprise a 10-year permit.

* The original Part A was submitted to EPA, Region VI August 14, 1980.

SECTION A

PART A APPLICATION

The Part A application includes the completed and revised forms* that follow* and a facility map.

Exhibit A-1 is a facility scale drawing delineating hazardous waste storage areas and Exhibit A-2 is a facility photograph.

In 1984, the plant is operating at 10% of the manufacturing capacity. The estimated quantities of wastes are based on full capacity production since this may comprise a 10-year permit.

*The original Part A was submitted to EPA, Region VI August 14, 1980.

Please print or type in the unshaded areas only
(fill—in areas are spaced for elite type, i.e., 12 characters/inch).

Form Approved OMB No. 158-R0175

FORM 1 GENERAL

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program
(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER

F N M D 0 0 0 7 0 9 7 8 2 D

LABEL ITEMS

- EPA I.D. NUMBER
- III. FACILITY NAME
- V. FACILITY MAILING ADDRESS
- VI. FACILITY LOCATION

PLEASE PLACE LABEL IN THIS SPACE

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill—in area below. Also, if any of the preprinted data is absent *(the area to the left of the label space lists the information that should appear)*, please provide it in the proper fill—in area*(s)* below. If the label is complete and correct, you need not complete Items I, III, V, and VI *(except VI-B which must be completed regardless)*. Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of **bold—faced terms.**

SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED	SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED
A. Is this facility a **publicly owned treatment works** which results in a **discharge** to **waters of the U.S.**? (FORM 2A)		X		B. Does or will this facility *(either existing or proposed)* include a **concentrated animal feeding operation** or **aquatic animal production facility** which results in a **discharge** to **waters of the U.S.**? (FORM 2B)		X	
C. Is this a facility which currently results in **discharges** to **waters of the U.S.** other than those described in A or B above? (FORM 2C)		X		D. Is this a proposed facility *(other than those described in A or B above)* which will result in a **discharge** to **waters of the U.S.**? (FORM 2D)		X	
E. Does or will this facility treat, store, or dispose of **hazardous wastes**? (FORM 3)	X			F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X	
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X		H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X	
I. Is this facility a proposed **stationary source** which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an **attainment area**? (FORM 5)		X		J. Is this facility a proposed **stationary source** which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an **attainment area**? (FORM 5)		X	

III. NAME OF FACILITY

1 SKIP SIGNETICS CORPORATION

IV. FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)*	B. PHONE *(area code & no.)*
2 MAVRAKIS GARY CHEM. SUPPORT SECTION HEAD	505 822 7188

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX

3 P.O. BOX 10272

B. CITY OR TOWN	C. STATE	D. ZIP CODE
4 ALBUQUERQUE	NM	87184

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

5 9201 PAN AMERICAN FREEWAY NE

B. COUNTY NAME

BERNALILLO

C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE *(if known)*
6 ALBUQUERQUE	NM	87113	

CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

VII. SIC CODES *(4-digit, in order of priority)*

A. FIRST	B. SECOND
3674 *(specify)* Integrated Circuits Manufacturer	*(specify)*
C. THIRD	**D. FOURTH**
(specify)	*(specify)*

VIII. OPERATOR INFORMATION

A. NAME: SIGNETICS CORPORATION

B. Is the name listed in Item VIII-A also the owner? [X] YES [ ] NO

C. STATUS OF OPERATOR *(Enter the appropriate letter into the answer box; if "Other", specify.)*
F = FEDERAL
S = STATE
P = PRIVATE
M = PUBLIC *(other than federal or state)*
O = OTHER *(specify)*

P *(specify)*

D. PHONE *(area code & no.)*: A 505 822 7188

E. STREET OR P.O. BOX: 9201 PAN AMERICAN FREEWAY NE

F. CITY OR TOWN: ALBUQUERQUE

G. STATE: NM

H. ZIP CODE: 87113

IX. INDIAN LAND
Is the facility located on Indian lands? [ ] YES [X] NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES *(Discharges to Surface Water)*: 9 N	**D. PSD** *(Air Emissions from Proposed Sources)*: 9 P
B. UIC *(Underground Injection of Fluids)*: 9 U	**E. OTHER** *(specify)*: 9 *(specify)*
C. RCRA *(Hazardous Wastes)*: 9 R	**E. OTHER** *(specify)*: 9 *(specify)*

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property bounderies. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS *(provide a brief description)*

The company is an integrated circuits manufacturer. The fabrication process consists of a series of chemical processes. These consist of masking, etching, cleaning, oxidation, metallization and doping.

XIII. CERTIFICATION *(see instructions)*

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE *(type or print)*	B. SIGNATURE	C. DATE SIGNED
John R. McGerigle, Plant Manager	John R. McGerigle	1/31/85

COMMENTS FOR OFFICIAL USE ONLY

C

Please print or type in the unshaded areas only
(fill–in areas are spaced for elite type, i.e., 12 characters/inch).

Form Approved OMB No. 158-S80004

FORM 3 RCRA

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

HAZARDOUS WASTE PERMIT APPLICATION

Consolidated Permits Program

(This information is required under Section 3005 of RCRA.)

I. EPA I.D. NUMBER

S													T/A	C
F	N	M	D	0	0	0	7	0	9	7	8	2		1

1 2 - 13 14 15

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS
23	24 - 29	

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below *(mark one box only)* to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility's EPA I.D. Number in Item I above.

A. FIRST APPLICATION *(place an "X" below and provide the appropriate date)*

[X] 71 **1. EXISTING FACILITY** *(See instructions for definition of "existing" facility. Complete item below.)*

[ ] 71 **2. NEW FACILITY** *(Complete item below.)*

C 8 15

YR.	MO.	DAY
8 0	1 1	1 5
73 74	75 76	77 78

FOR EXISTING FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* **OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED** *(use the boxes to the left)*

YR.	MO.	DAY
73 74	75 76	77 78

FOR NEW FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* **OPERATION BEGAN OR IS EXPECTED TO BEGIN**

B. REVISED APPLICATION *(place an "X" below and complete Item I above)*

[X] 72 **1. FACILITY HAS INTERIM STATUS**

[ ] 72 **2. FACILITY HAS A RCRA PERMIT**

III. PROCESSES – CODES AND DESIGN CAPACITIES

A. PROCESS CODE – Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code*(s)* in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the form *(Item III-C)*.

B. PROCESS DESIGN CAPACITY – For each code entered in column A enter the capacity of the process.
1. AMOUNT – Enter the amount.
2. UNIT OF MEASURE – For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER *(barrel, drum, etc.)*	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D79	GALLONS OR LITERS
LANDFILL	D80	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER
LAND APPLICATION	D81	ACRES OR HECTARES
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OTHER *(Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)*	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G	LITERS PER DAY	V	ACRE-FEET	A
LITERS	L	TONS PER HOUR	D	HECTARE-METER	F
CUBIC YARDS	Y	METRIC TONS PER HOUR	W	ACRES	B
CUBIC METERS	C	GALLONS PER HOUR	E	HECTARES	Q
GALLONS PER DAY	U	LITERS PER HOUR	H		

EXAMPLE FOR COMPLETING ITEM III *(shown in line numbers X-1 and X-2 below):* A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

S													T/A	C
C	D	U	P											1

1 2 - 13 14 15

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. 1. AMOUNT	B. 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
	16 - 18	19 - 27	28	29 - 32		16 - 18	19 - 27	28	29 - 32
X-1	S 0 2	600	G		5				
X-2	T 0 3	20	E		6				
1	S 0 2	15,000			7				
2	S 0 1	5,500			8				
3					9				
4					10				

Continued from the front.

III. PROCESSES *(continued)*

C. SPACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESSES *(code "T04")*. FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPACITY.

IV. DESCRIPTION OF HAZARDOUS WASTES

A. **EPA HAZARDOUS WASTE NUMBER** – Enter the four–digit number from 40 CFR, Subpart D for each listed hazardous waste you will handle. If you handle hazardous wastes which are not listed in 40 CFR, Subpart D, enter the four–digit number*(s)* from 40 CFR, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. **ESTIMATED ANNUAL QUANTITY** – For each **listed waste** entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each **characteristic** or **toxic contaminant** entered in column A estimate the total annual quantity of all the non–listed waste*(s)* that will be handled which possess that characteristic or contaminant.

C. **UNIT OF MEASURE** – For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. **PROCESSES**

1. PROCESS CODES:
   For listed hazardous waste: For each **listed** hazardous waste entered in column A select the code*(s)* from the list of process codes contained in Item III to indicate how the waste will be stored, treated, and/or disposed of at the facility.
   For non–listed hazardous wastes: For each characteristic or toxic contaminant entered in column A, select the code*(s)* from the list of process codes contained in Item III to indicate **all** the processes that will be used to store, treat, and/or dispose of all the non–listed hazardous wastes that possess that characteristic or toxic contaminant.
   Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code*(s)*.

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER – Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B,C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE FOR COMPLETING ITEM IV *(shown in line numbers X-1, X-2, X-3, and X-4 below)* – A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non–listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
X-1	K 0 5 4	900	P	T 0 3 D 8 0	
X-2	D 0 0 2	400	P	T 0 3 D 8 0	
X-3	D 0 0 1	100	P	T 0 3 D 8 0	
X-4	D 0 0 2				*included with above*

CONTINUE ON PAGE 3

Continued from page 2.

NOTE: Photocopy this page before completing if you have more than 26 wastes to list.

Form Approved OMB No. 158-S80004

EPA I.D. NUMBER (enter from page 1)	FOR OFFICIAL USE ONLY
W N M D 0 0 0 7 0 9 7 8 2 — T/A 1	W DUP — T/A 2 DUP

DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1					
2	D001	600	T	S02	"Solvent" Waste
3	F003				Included with Above
4	D001	30	T	S01	Drummed "Ignitables"
5	F003				Included with Above
6	D004	400	P	S01	Arsenic Contaminated Waste
7	D002	1,200	T	S02	Waste HF/BOE
8	D009	400	P	S01	Mercury Contaminated Waste
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

Continued from the front.

IV. DESCRIPTION OF HAZARDOUS WASTES *(continued)*

E. USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM D(1) ON PAGE 3.

EPA I.D. NO. *(enter from page 1)*

F N M D 0 0 0 7 0 9 7 8 2 T/A 6

V. FACILITY DRAWING

All **existing** facilities must include in the space provided on page 5 a scale drawing of the facility *(see instructions for more detail).*

VI. PHOTOGRAPHS

All existing facilities must include photographs *(aerial or ground—level)* that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas *(see instructions for more detail).*

VII. FACILITY GEOGRAPHIC LOCATION

LATITUDE *(degrees, minutes, & seconds)*	LONGITUDE *(degrees, minutes, & seconds)*
35 05 020	106 39 015

VIII. FACILITY OWNER

[X] A. If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left end skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. *(area code & no.)*
E	

3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST.	6. ZIP CODE
F	G		

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

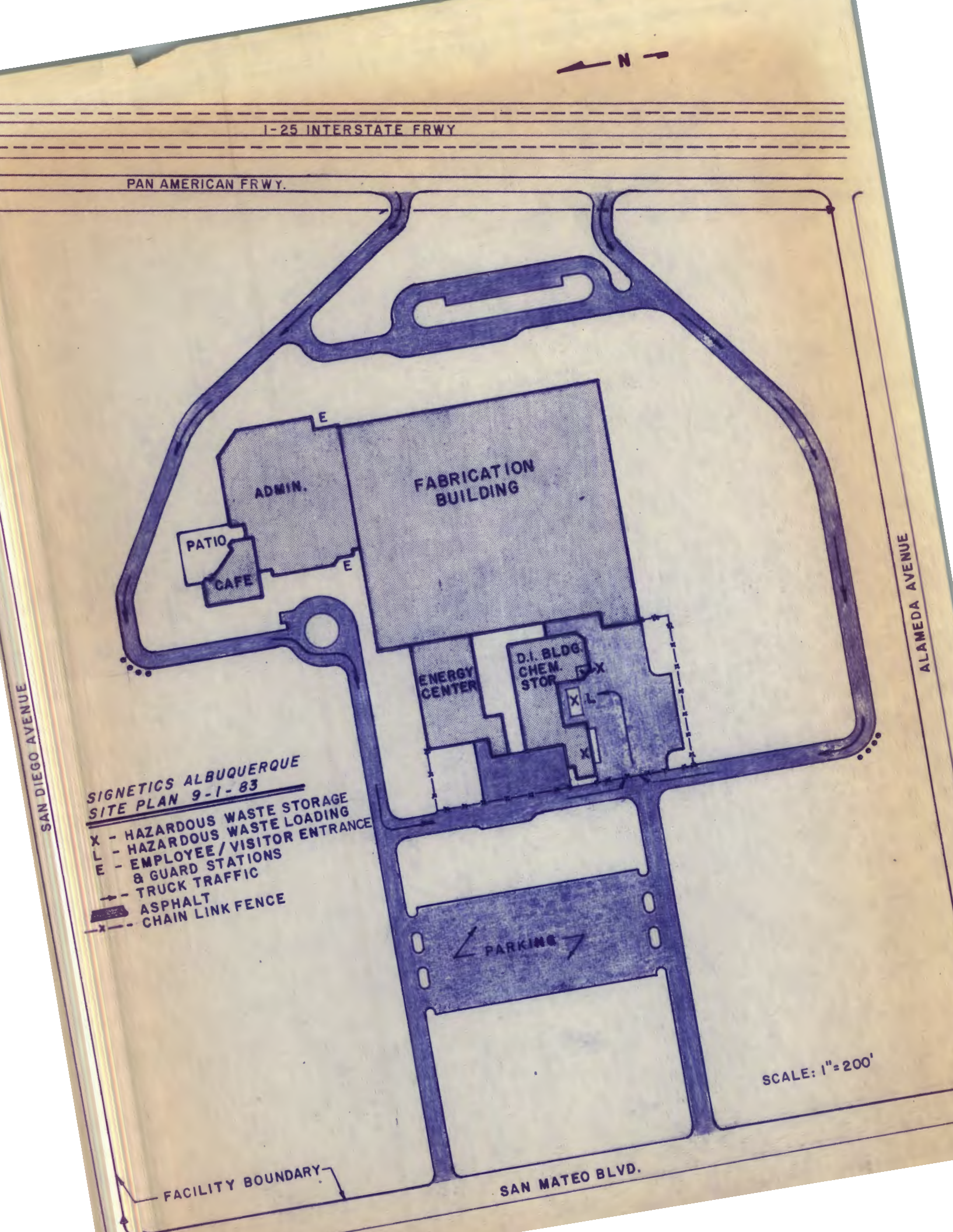
A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED
John R. McGerigle	John R. McGerigle	1/31/85

X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED
John R. McGerigle	John R. McGerigle	1/31/85

CONTINUE ON P.


N
I-25 INTERSTATE FRWY
PAN AMERICAN FRWY.
ADMIN.
FABRICATION BUILDING
PATIO
CAFE
E
E
ENERGY CENTER
D.I. BLDG. CHEM. STOR.
X
X
L
X
PARKING
SAN DIEGO AVENUE
ALAMEDA AVENUE
SAN MATEO BLVD.
FACILITY BOUNDARY
SCALE: 1"=200'
SIGNETICS ALBUQUERQUE
SITE PLAN 9-1-83
X - HAZARDOUS WASTE STORAGE
L - HAZARDOUS WASTE LOADING
E - EMPLOYEE/VISITOR ENTRANCE & GUARD STATIONS
TRUCK TRAFFIC
ASPHALT
CHAIN LINK FENCE

TO VIEW THE MAP AND/OR MAPS WITH THIS DOCUMENT, PLEASE CALL THE HAZARDOUS WASTE BUREAU AT 505-476-6000 TO MAKE AN APPOINTMENT

SECTION B

FACILITY DESCRIPTION

This section provides a general description of the hazardous waste management facility as required by HWMR 302.A.1.b. This description is intended to acquaint the permit application reviewer/permit writer with an overview of the facility.

B.1 General Description:

Signetics Corporation (EPA ID No. NMD 000709782) is located on the northern boundary of the City of Albuquerque, New Mexico. The street address is:

Signetics Corporation
9201 Pan American Freeway, N.E.
Bernalillo County
Albuquerque, NM 87113

The mailing address is:

Signetics Corporation
P. O. Box 10272
Albuquerque, NM 87184

The geographic coordinates are: Latitude 35 degrees 05', Longitude 106 degrees 39' 015".

Signetics Corporation legally controls operation of the facility and is the owner of the facility and the land on which the facility is located. There are 4 x 27,000 sq. foot manufacturing areas within the 500,000 sq. foot complex.

This facility is primarily a manufacturer of integrated circuits (I.C.'s). Three types of hazardous wastes result from Signetics' activities: Corrosive Wastes, Toxic Wastes, and Ignitable Wastes. The Process steps which generate these hazardous wastes are mentioned below.

The etching step in I. C. production generates Hydrofluoric Acid wastes. These streams are collected through segregated pipes into 5,000-gallon storage tanks. The wastes are then shipped to commercial Treatment Storage Disposal Facilities (TSDF's) by permitted transporters. Most I. C. cleaning steps involve acid (sulfuric, nitric) solutions. These wastes are diverted to elementary wastewater neutralization system.

The treatment of wastewater, whose only hazardous characteristic is Corrosivity, by pH neutralization, is exempt from RCRA requirement per 40 CFR 264.1 (g) (6) and HWMR 206.A.4.f.

Mixed Ignitable "Solvent I" wastes contain components that have ignitable or corrosive characteristics. These mainly result from the photo stripping process. This waste is stored in a 5,000 gal. tank. Other waste photolithographic chemicals (Waste "Solvent II") are segregated in 55-gallon drums. Toxic wastes comprise gloves, containers, and rags contaminated with arsenic which is used in the "doping" process. Discarded lamps that contain mercury are stored separately on site in 55-gallon drums. These wastes are then removed as in the Hydrofluoric Acid Wastes.

Because this is a modern facility, all conceivable wastes are segregated through appropriate plumbing at work stations at the time of construction. In addition, there are no "hidden" pipes or drains. All plumbing are accessible to routine visual inspections.

Signetics-Albuquerque stores only the hazardous wastes generated on site. No off-site wastes are accepted. Signetics operates no injection or withdrawal wells, and there are no surface impoundments, waste piles, incinerators, land treatment facilities, or landfills in use at this facility. Rain water drains along the north and south property boundary via "arroyos" or channels.

The contact person and party responsible for the hazardous waste management activities at Signetics Albuquerque facility is:

Gary M. Mavrakis
Chemical Support Section Head
(505) 822 7188

The electronics industry is a dynamic industry which is responsive to changes in the economy and new technology. Changes in the industry can result in changes in the waste stream quantity, composition, and handling procedures. This is also a facility with expansion capacities; any additional changes will be reviewed and updated in this plan.

JAN. 20 1986

B.2 Illustrations:

The following maps are attached to illustrate the facility.

Exhibit A-2 - Facility Photograph with Contours
Items Shown:
- Topographic Map - 1" = 100 feet
- Legal property line boundaries of the facility
- Flood control, drainage barriers
- Facility photograph

Exhibit B-1 - Floodplain/Land Use Map
Items Shown:
- 1000-foot perimeter from facility property line
- 100-year flood plain area
- Surrounding land use
- Flood control, drainage barriers

Exhibit B-2/B-3 - Signetics Site Plat and Detailed Hazardous Waste Operation Units
Items Shown:
- Access control
- Building structures
- Intake & discharge structure
- Sewers
- Loading and unloading areas
- Fire control
- Location of hazardous waste operation units

Exhibit B-4 - Water Wells
Items Shown:
- Patterns of surface water flow
- Injection and withdrawal wells
  (According to the New Mexico Environmental Improvement Division, there are no Class I through Class V injection wells within a 3-mile radius from the facility.)

Exhibit B-5 - Wind Rose
Items Shown:
- Wind Rose

Exhibit B-6 - Facility Traffic
Items Shown:
- Facility Parking and Traffic

B.3 Traffic Patterns:

The facility is bounded by San Diego Avenue on the north, San Mateo Boulevard on the west, Alameda Avenue on the south and Pan American Freeway Frontage Road on the east.

The major highways leading to the facility are Interstate highway I-40 which runs east and west of Albuquerque and I-25 which runs north and south. The facility can be reached by exiting on Tramway Boulevard from I-25 and travelling south on west Frontage Road or by exiting on San Mateo/Osuna from I-25 and travelling north on east Frontage Road. The plant is situated on the west side of west Frontage Road and I-25 (See Exhibit B-6). Hazardous Waste Transportation trucks travel to the west end of the building through controlled access gates to the hazardous waste storage areas.

The on-site traffic is primarily employee passenger cars. The cars are confined to parking lots. Access to the hazardous waste storage area is controlled by keeping the gates on the driveways locked. Shipping personnel open the gates for authorized entry. The driveway is paved with asphalt - 2" base course 1500 lb./sq. in. stability and 1" surface course 1500 lb./sq. in. stability. About 8-10 local delivery trucks come on site daily.

The facility roads are capable of bearing loads up to 25,000 lbs. per axle. The bulk tanker trucks weigh approximately 90,000 lbs. when full and the flatbed trucks weigh 90,000 when full. Therefore, the facility roads can bear the weight of the trucks. These tanker trucks currently come on site once per month. Public road traffic is controlled by lanes painted on the road and by stop signs.

B.4 Floodplain Area (HWMR 206.B.8.b, 302.A.4.b(1).(k).(iii)):

Exhibit B-1 is a map spliced from panels 3, 4, 9, and 10 (out of 50) of the Bernalillo County Floodway maps which are effective October 14, 1983. 1 As indicated, Signetics is not in the 100-year flood zone. According to Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA), the flood waters from the east side historically have exhibited a flow rate of 1300 cu. ft./sec. The concrete channel south of the facility has a capacity of 1600 cu. ft./sec. and the north side channel has a capacity of 5500 cu. ft./sec. This channel was reinforced with concrete in December 1984 by

1 National Flood Insurance Program, Federal Emergency Management Agency. Copies of panels are available at Signetics. The panels and the spliced maps were prepared by Bohannan-Huston, Inc. 4125 Carlisle Boulevard, N.E., Albuquerque, NM 87107 (505) 881-2000.

AMAFCA. The general drainage is towards the Rio Grande, 2-3 miles west of the facility. In addition, drainage on the facility is designed to slope away from the physical buildings. No flood preparations for hazardous waste are necessary for this facility.

B.5 Seismic Standard:

Existing facilities are not required to comply with the seismic standards (HWMR 206.B.8.a, 302.A.4.b.(1).(k)).

SECTION B

FACILITY DESCRIPTION

This section provides a general description of the hazardous waste management facility as required by HWMR 302.A.1.b. This description is intended to acquaint the permit application reviewer/permit writer with an overview of the facility.

B.1 General Description:

Signetics Corporation (EPA ID No. NMD 000709782) is located on the northern boundary of the City of Albuquerque, New Mexico. The street address is:

Signetics Corporation
9201 Pan American Freeway, N.E.
Bernalillo County
Albuquerque, NM 87113

The mailing address is:

Signetics Corporation
P. O. Box 10272
Albuquerque, NM 87184

The geographic coordinates are: Latitude 35 degrees 05' 020", Longitude 106 degrees 39' 015".

Signetics Corporation legally controls operation of the facility and is the owner of the facility and the land on which the facility is located. There are 4 x 27,000 sq. foot manufacturing areas within the 500,000 sq. foot complex.

This facility is primarily a manufacturer of integrated circuits (I.C.'s). Three types of hazardous wastes result from Signetics' activities: Corrosive Wastes, Toxic Wastes, and Ignitable Wastes. The process steps which generate these hazardous wastes are mentioned below.

The etching step in I. C. production generates Hydrofluoric Acid wastes. These streams are collected through segregrated pipes into 5,000-gallon storage tanks. The wastes are then shipped to commercial Treatment Storage Disposal Facilities (TSDF's) by permitted transporters. Most I. C. cleaning steps involve acid (sulfuric, nitric) solutions. These wastes are diverted to elementary wastewater neutralization system.

The treatment of wastewater, whose only hazardous characteristic is Corrosivity, by pH neutralization, is exempt from RCRA requirement per 40 CFR 264.1 (g) (6) and HWMR 206.A.4.f.

Mixed Ignitable "Solvent I" wastes contain components that have ignitable or corrosive characteristics. These mainly result from the photo stripping process. This waste is stored in a 5,000 gal. tank. Other waste photolithographic chemicals (Waste "Solvent II") are segregated in 55-gal. drums. Toxic wastes comprise gloves, containers, and rags contaminated with arsenic which is used in the "doping" process discarded lamps that contain mercury are stored separately on site in 55-gallon drums. These wastes are then removed as in the Hydrofluoric Acid Wastes.

Because this is a modern facility, all conceivable wastes are segregated through appropriate plumbing at work stations at the time of construction. In addition, there are no "hidden" pipes or drains. All plumbing are accessible to routine visual inspections.

Signetics-Albuquerque stores only the hazardous wastes generated on site. No off-site wastes are accepted. Signetics operates no injection or withdrawal wells, and there are no surface or sub-surface leachates or landfills. In addition, there are no surface impoundments, waste piles, incinerators, land treatment facilities, or landfills in use at this facility. Rain water drains along the north and south property boundary via "arroyos" or channels.

The contact person and party responsible for the hazardous waste management activities at Signetics Albuquerque facility is:

Gary M. Mavrakis
Chemical Support Section Head
(505) 822-7188

The electronics industry is a dynamic industry which is responsive to changes in the economy and new technology. Changes in the industry can result in changes in the waste stream quantity, composition, and handling procedures. This is also a facility with expansion capacities; any additional changes will be reviewed and updated in this plan.

B.2 Illustrations:

The following maps are attached to illustrate the facility:

Exhibit A-2 - Facility Photograph with Contours
Items Shown:
- Topographic Map - 1" = 100 feet
- Legal property line boundaries of the facility
- Flood control, drainage barriers
- Facility photograph

Exhibit B-1 - Floodplain/Land Use Map
Items Shown:
- 1000-foot perimeter from facility property line
- 100 year flood plain area
- Surrounding land use
- Flood control, drainage barriers

Exhibit B-2/B-3 - Signetics Site Plat and Detailed Hazardous Waste Operation Units
Items Shown:
- Access control
- Building structures
- Intake & discharge structure
- Sewers
- Loading and unloading areas
- Fire control
- Location of hazardous waste operation units

Exhibit B-4 - Water Wells
Items Shown:
- Patterns of surface water flow
- Injection and withdrawal wells
  (According to the New Mexico Environmental Improvement Division, there are no Class I through Class V injection wells within a 3-mile radius from the facility.)

Exhibit B-5 - Wind Rose
Items Shown:
- Wind Rose

Exhibit B-6 - Facility Traffic
Items Shown:
- Facility Parking and Traffic

B.3 Traffic Patterns:

The facility is bounded by San Diego Avenue on the north, San Mateo Blvd. on the west, Alameda Avenue on the south and Pan American Freeway Frontage Road on the east.

The major highways leading to the facility are Interstate highway I-40 which runs east and west of Albuquerque and I-25 which runs north and south. The facility can be reached by exiting on Tramway Boulevard from I-25 and travelling south on west Frontage Road or by exiting on San Mateo/Osuna from I-25 and travelling north on east Frontage Road. The plant is situated on the west side of west Frontage Road and I-25 (See Exhibit B-6). Hazardous waste Transportation trucks travel to the west end of the building through controlled access gates to the hazardous waste storage areas.

The on-site traffic is primarily employee passenger cars. The cars are confined to parking lots. Access to the hazardous waste storage area is controlled by keeping the gates on the driveways locked. Shipping personnel open the gates for authorized entry. The driveway is paved with asphalt - 2" base course 1500 lb./sq. in. stability and 1" surface course 1500 lb./sq. in stability. About 8-10 local delivery trucks come on site daily.

The facility roads are capable of bearing loads up to 25,000 lbs. per axle. The bulk tanker trucks weigh approximately 90,000 lbs. when full and the flatbed trucks weigh 90,000 when full. Therefore, the facility roads can bear the weight of the trucks. These tanker trucks currently come on site once per month. Public road traffic is controlled by lanes painted on the road and by stop signs.

B.4 Floodplain Area (HWMR 206.B.8.b, 302.A.4.b.(1).(k).(iii)):

Exhibit B-1 is a map spliced from panels 3, 4, 9, and 10 (out of 50) of the Bernalillo County Floodway maps which are effective October 14, 1983.[1] As indicated, Signetics is not in the 100-year flood zone. According to Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA), the flood waters from the east side historically have exhibited a flow rate of 1300 cu. ft./sec. The concrete channel south of the facility has a capacity of 1600 cu. ft./sec. and the north side channel has a capacity of 5500 cu. ft./sec. This channel is due to be reinforced with concrete by

[1] National Flood Insurance Program, Federal Emergency Management Agency. Copies of panels are available at Signetics. The panels and the spliced maps were prepared by Bohannan-Huston, Inc. 4125 Carlisle Blvd., N. E., Albuquerque, NM 87107 (505) 881-2000.

December 1984 by AMAFCA. The general drainage is towards the Rio Grande, 2-3 miles west of the facility. In addition, drainage on the facility is designed to slope away from the physical buildings. No flood preparations for hazardous waste are necessary for this facility.

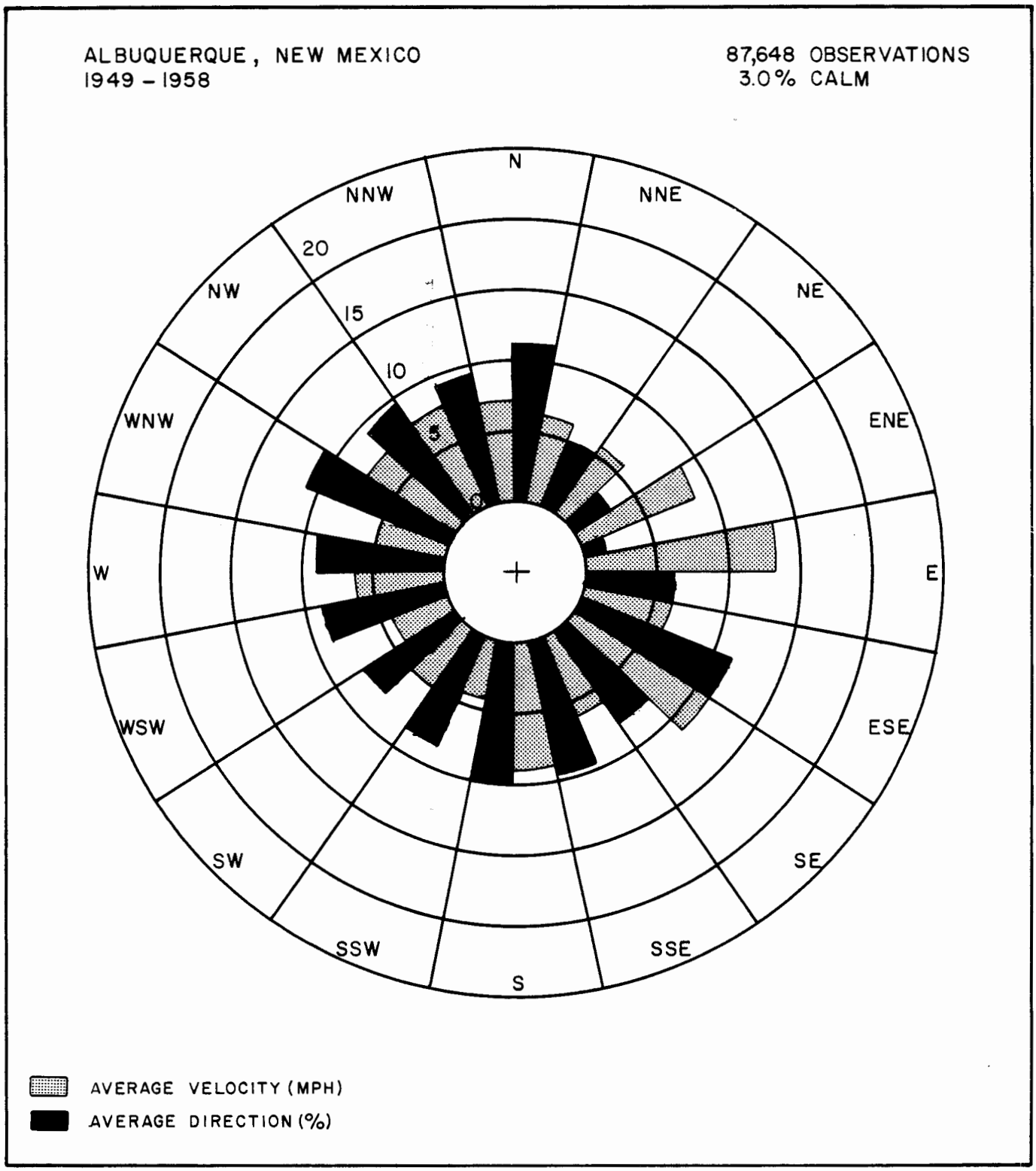
B.5 Seismic Standard:

Existing facilities are not required to comply with the seismic standards (HWMR 206.B.8.a, 302.A.4.b.(1).(k)).

EXHIBIT B-5

Date: 8/11/83
Revision No.: 0

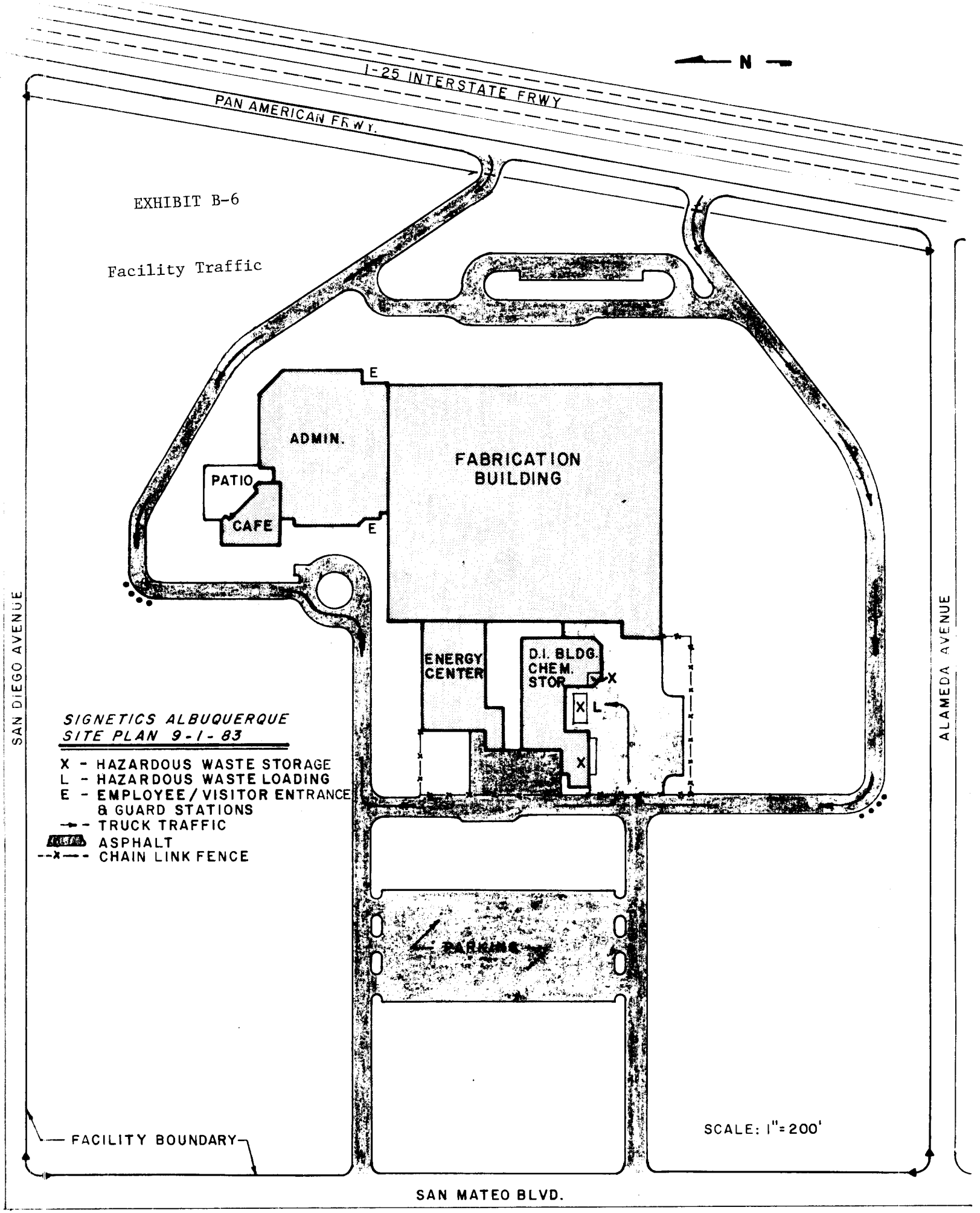
Windrose



Extracted from National Oceanic and Atmospheric Administration, National Climatic Center.

WIND ROSE

BASED ON STATE CLIMATOLOGICAL DATA ASSEMBLED BY SIGNETICS


N
I-25 INTERSTATE FRWY
PAN AMERICAN FRWY.
EXHIBIT B-6
Facility Traffic
ADMIN.
PATIO
CAFE
E
E
FABRICATION BUILDING
ENERGY CENTER
D.I. BLDG. CHEM. STOR.
X
X
L
X
SIGNETICS ALBUQUERQUE
SITE PLAN 9-1-83
X - HAZARDOUS WASTE STORAGE
L - HAZARDOUS WASTE LOADING
E - EMPLOYEE/VISITOR ENTRANCE & GUARD STATIONS
TRUCK TRAFFIC
ASPHALT
CHAIN LINK FENCE
PARKING
SAN DIEGO AVENUE
ALAMEDA AVENUE
FACILITY BOUNDARY
SCALE: 1"=200'
SAN MATEO BLVD.

SECTION C

WASTE CHARACTERISTICS

C.1 Waste Description:

This section describes the chemical and physical nature of the hazardous wastes stored at the Signetics Albuquerque facility and the waste Analysis Plan for sampling, testing, and evaluating the wastes to assure that sufficient information is available for their safe handling (HWMR 206.B.3).

The list of hazardous wastes generated at the facility is as follows:

Waste Name	Disposition	Approximate Quantity (1984)
a) Waste Solvent I	5000-gl Tank Storage	40,000 Gallons
b) Waste Hydrofluoric Acid	5000-gl Tank Storage	50,000 Gallons
c) Waste Buffered Oxide Etch	5000-gl Tank Storage	30,000 Gallons
d) Arsenic Contaminated Wastes	55-gl Drum Storage	2 Drums
e) Waste Solvent II	55-gl Drum Storage	15 Drums
f) Mercury-contaminated Wastes	55-gl Drum Storage	2 Drums

a) Waste Solvent I (flash pt. 120 degrees F) - These photolithographic cleaning wastes consist primarily of: Methanol (flash pt. 54 degrees F), Acetone (flash pt. 15 degrees F), Ethylene Glycol (flash pt. 240.8 degrees F), Ethanolamine (flash pt. 195 degrees F), Diethylene Glycol Monobutyl Ether (flash pt. 230 degrees F), and water -- pH 11-12. Due to the low flash points of several materials, it is assigned as category D001 and F003. There may also be trace levels (less than 1%) of 1,1,1-Trichloroethane. Efforts are underway to decrease water from draining into "Solvent" tank in order to allow for cost effective reclamation. The maximum density of the solvent mixture should not exceed 1.5 g/ml (13.2 lbs. per gallon) and it is normally about 1.1 g/ml (9 lbs. per gallon).

b) Waste Hydrofluoric Acid is a product of silicon oxide etching and consists mainly of dilute (.1 - 15%) Hydrofluoric Acid (pH < 1). Due to the low pH, this waste is assigned a D002 label. The maximum expected density of waste is 1.15 g/ml (10.1 lbs. per gallon).

c) Waste Buffered Oxide Etch is also a product of silicon etching and consists of Hydrofluoric Acid (0.1 - 15%) and Ammonium Fluoride (0.1 - 40%). This waste is sometimes mixed with (b) for transport. The waste is found to have a high concentration of fluorides and a pH of about 4. It has been assigned a D002 label. The maximum density anticipated for this waste is 1.2 g/ml (10.6 lbs/gallon.

d) Arsenic Contaminated Wastes: This group includes all materials that have been contaminated with solid arsenic like gloves, containers, and rags used in the handling of arsenic. In addition, used vacuum pump oil obtained from selected equipment may be contaminated. While all of these are assigned as D004, not all may meet the extractability criteria, however, they are all viewed as potentially toxic and are disposed as such.

e) Waste Solvent II is a drummed mixture of proprietary vendor formulas of positive photoresists which include propylene glycol esters (flash pt. 116 Deg. F), resins, glycol esters (flash pt. 240 Deg. F), and acetone (flash pt. 15 degrees F). This is classified as D001 and F003.

f) Mercury Waste: This group includes all materials that are contaminated with liquid mercury. This includes used mercury vapor lamps, broken mercury thermometers and any material used to clean up mercury spills. It is assigned D009.

Signetics has no reactive wastes generated at this facility and no reactive wastes are managed at this location.

This Section is part of the operating record at Signetics' Chemistry Lab.

C.2 Waste Analysis Plan (HWMR 206.B.3.b):

C.2.a Rationale for Hazardous Waste Designation (206.B.3.b.1):

Table C-1 shows the bases for hazard designation of these hazardous wastes. Exhibit C-1 includes laboratory analyses of the hazardous wastes.

TABLE C-1

SIGNETICS ALBUQUERQUE WASTES - HAZARDS & RATIONALE FOR SELECTION

WASTE	HAZARD	EPA WASTE #	RATIONALE FOR SELECTION
Solvent I	Ignitable	D001, F003	Flashpoint: < 120 Deg F
Hydrofluoric Acid	Corrosive Toxic	D002	pH < 1
Buffered Oxide Etch	Corrosive Toxic	D002	It contains Hydrofluoric Acid. It also has large concentrations of fluorides.
Arsenic Contaminated Waste	EP Toxic	D004	By definition, HWMR 201. B.5.
Solvent II	Ignitable	D001, F003	Flash Pt. < 120 Deg. F
Mercury Contaminated	EP Toxic	D009	By definition, HWMR 201. B.5.

C.2.b Hazardous Waste Parameters and Test Methods (HWMR 206.B.3.b.2):

Table C-2 shows the hazardous waste parameters, the test methods and references. These methods are done by in-house and/or commercial laboratories.

TABLE C-2

HAZARDOUS WASTE PARAMETERS AND THEIR TEST METHODS

HW Parameter	Test Method	Reference
Corrosivity: pH	Electrometric Method 9040	Test Methods for Evaluating Solid Waste, Physical/ Chemical Methods U.S. EPA SW-846, 2nd Edition
Corrosion Rate	NACE Test TM-01-69 Method 1110	Ibid
Flash Point	Pensky-Martens Closed Cup Tester Method 1010	Ibid
EP Toxicity	EP Extraction/ Toxicity Method 1310	Ibid
Arsenic	Atomic Absorption Method 7061	Ibid
Acetone	GC/FID Method 8015 (Direct Injection)	-Test Methods for Evaluating Solid Waste, Physical/ Chemical Methods U.S. EPA SW-846 2nd Edition
Methanol	GC/FID Method 8015	-Ibid
Isopropanol	GC/FID Method 8015	-Ibid
1,1,1-Trichloro-ethane (b)	GC/HSD Method 8010	-Ibid
Ethanolamine	GC/FID Method 8015	-Ibid
Diethylene Glycol Monobutyl Ether	GC/FID Method 8015	-Ibid
Hydrofluoric Acid	Titration Method C2.STD.8	-SEMI BOSS 1982 (a)
Ammonium Fluoride	Titration Method C2.STD.2	-SEMI BOSS 1982 (a)

TABLE C-2 (CONTINUED)

HAZARDOUS WASTE PARAMETERS AND THEIR TEST METHODS

HW PARAMETER	TEST METHOD	REFERENCE
Fluorides	Colorimetric (SPADNS) Method 413C	-Std. Methods for Water & Waste Water 15th Ed.
Normality	Electrochemical Method 413B Titration	-Ibid
Mercury-contaminated Waste	Atomic Absorption Method 7470, 7471	-Test Methods for Evaluating Solid Waste, Physical/ Chemical Methods U.S. EPA SW-846, 2nd Edition

(a) Book of Semi Standards 1982 Volume 1.
(b) This test is done by outside laboratories only.

C.2.c <u>Sampling Methods</u> (HWMR 206.B.3.b(3)):

Table C-3 lists the hazardous wastes stored at the facility and the methods used to sample each. These wastes are sampled by in-house Chemistry Lab personnel. Sampling is controlled by Signetics specification #861-1096.

JAN 20 1986

TABLE C-3

METHODS USED TO SAMPLE HAZARDOUS WASTES

HAZARDOUS WASTE	SAMPLING METHOD	DESCRIPTION OF SAMPLING	REFERENCE
Solvent I	Sampling of Solid Wastes, Composite Liquid Waste Sampler, P.7	Composite sample using a "Safety Sampler"-American Scientific Products #H378 02 or a Manning Sampler.	Note 1
Solvent II	Coliwasa	Coliwasa Composite.	Ibid
Hydrofluoric Acid	"Safety Sampler"	"Safety Sampler" Composite from top, middle and bottom of tank.	Ibid
Buffered Oxide Etch	"Safety Sampler"	"Safety Sampler" Composite from top, middle and bottom of tank.	Ibid
Arsenic Contaminated Waste	Sampling of Solid Wastes, Thief-P. 12 Trier-P. 12-14	Representative composite sample from 3 grab samples at top, middle and bottom of drum using a Trier type scoop (laboratory scoop).	Ibid
Mercury Contaminated Waste	Sampling of Solid Wastes, Thief-P. 12 Trier-P. 12-14	Representative composite sample from 3 grab samples at top, middle, and bottom of drum using a Trier type scoop (laboratory scoop).	Ibid

Note 1 Test Methods for the Evaluation of Solid Waste. Physical Methods EPA-SW-846, Second Edition 1982.

C.2.d Analysis Criteria and Frequency:

The analyses criteria and sampling frequencies are listed in Table C-4. This analysis plan will be revised annually. Additional analyses will be performed and Tables revised if a process change could affect the hazardous characteristics of a waste. These analyses are sufficient to meet HWMR 206.B.3.b.

TABLE C-4

ANALYSIS CRITERIA AND FREQUENCY

WASTE	PARAMETERS	FREQUENCY
Solvent I	Corrosion rate or pH, Flash Point, Methanol, Acetone, Isopropanol, Ethanol Amine, and Diethylene Glycol Monobutyl Ether.	Biannually
Solvent II	Corrosion rate or pH, Flash Point.	As needed for disposal-at least every 2500 gallons
Hydrofluoric Acid	Corrosion rate or pH, Hydrofluoric Acid, Fluoride, Normality.	Biannually
Buffered Oxide Etch	Corrosion rate of pH, Hydrofluoric Acid, Fluoride, Normality.	Biannually
Arsenic Contaminated Waste	EP Toxicity, (Arsenic)	Annually
Mercury Contaminated Waste	EP Toxicity, (Mercury)	Annually

C.2.e Additional Requirements for Waste Generated Offsite:

This facility only handles on-site generated wastes, therefore, requirements for wastes received from offsite generators do not apply.

SECTION C

WASTE CHARACTERISTICS

C.1 Waste Description:

This section describes the chemical and physical nature of the hazardous wastes stored at the Signetics Albuquerque facility and the waste Analysis Plan for sampling, testing, and evaluating the wastes to assure that sufficient information is available for their safe handling (HWMR 206.B.3).

The list of hazardous wastes generated at the facility is as follows:

Waste Name	Disposition	Approximate Quantity (1984)
a) Waste Solvent I	5000-gal. Tank Storage	40,000 Gallons
b) Waste Hydrofluoric Acid	5000-gal. Tank Storage	50,000 Gallons
c) Waste Buffered Oxide Etch	5000-gal. Tank Storage	30,000 Gallons
d) Arsenic Contaminated Wastes	55-gal. Drum Storage	2 Drums
e) Waste Solvent II	55-gal. Drum Storage	15 Drums
f) Mercury-contaminated Wastes	55-gal. Drum Storage	2 Drums

a) Waste Solvent I (flash pt. 120° F) - These photolithographic cleaning wastes consist primarily of: Methanol (flash pt. 54° F), Acetone (flash pt. 15° F), Ethylene Glycol (flash pt. 240.8° F), Ethanolamine (flash pt. 195° F), Diethylene Glycol Monobutyl Ether (flash pt. 230° F), and water -- pH 11 - 12. Due to the low flash points of several materials, it is assigned as category D001 and F003. There may also be trace levels (less than 1%) of 1,1,1-Trichloroethane. Efforts are underway to decrease water from draining into "Solvent" tank in order to allow for cost effective reclamation. The maximum density of the solvent mixture should not exceed 1.5 g/ml (13.2 lbs. per gallon) and it is normally about 1.1 g/ml (9 lbs. per gallon).

b) Waste Hydrofluoric Acid is a product of silicon oxide etching and consists mainly of dilute (.1 - 15%) Hydrofluoric Acid (pH<1). Due to the low pH, this waste is assigned a D002 label. The maximum expected density of this waste is 1.15 g/ml (10.1 lbs. per gallon).

c) Waste Buffered Oxide Etch is also a product of silicon etching and consists of Hydrofluoric Acid (0.1 - 15%) and Ammonium Fluoride (0.1 - 40%). This waste is sometimes mixed with (b) for transport. The waste is found to have a high concentration of fluorides and a pH of about 4. It has been assigned a D002 label. The maximum density anticipated for this waste is 1.2 g/ml (10.6 lbs/gallon.

d) Arsenic Contaminated Wastes: This group includes all materials that have been contaminated with solid arsenic like gloves, containers, and rags used in the handling of arsenic. While all of these are assigned as D004, not all may meet the extractability criteria, however, they are all viewed as potentially toxic and are disposed as such.

e) Waste Solvent II is drummed mixtures of proprietary vendor formulas of positive photoresists which include cellosolve acetate (flash pt. 124° F), other glycol esters, and acetone (flash pt. 15° F). This is classified as D001 and F003.

f) Mercury Waste: This group includes all materials that are contaminated with liquid mercury. This includes used mercury vapor lamps, broken mercury thermometers and any material used to clean up mercury spills. It is assigned D009.

This Section is part of the operating record at Signetics' Chemistry Lab.

C.2 Waste Analysis Plan (HWMR 206.B.3.b):

C.2.a Rationale for Hazardous Waste Designation (206.B.3.b.1):

Table C-1 shows the bases for hazard designation of these hazardous wastes. Exhibit C-1 includes laboratory analyses of the hazardous wastes.

TABLE C-1

SIGNETICS ALBUQUERQUE WASTES - HAZARDS & RATIONALE FOR SELECTION

WASTE	HAZARD	EPA WASTE #	RATIONALE FOR SELECTION
Solvent I	Ignitable	D001, F003	Flashpoint: <120° F
Hydrofluoric Acid	Corrosive Toxic	D002	pH <1
Buffered Oxide Etch	Corrosive Toxic	D002	It contains Hydrofluoric Acid. It also has large concentrations of fluorides.
Arsenic Contaminated Waste	EP Toxic	D004	By definition, HWMR 201.B.5.
Solvent II	Ignitable	D001, F003	Flash Pt. <20° F
Mercury Contaminated Waste	EP Toxic	D009	By definition, HWMR 201.B.5.

C.2.b **Hazardous Waste Parameters and Test Methods** (HWMR 206.B.3.b.2):

Table C-2 shows the hazardous waste parameters, the test methods and references. These methods are done by in-house and/or commercial laboratories.

TABLE C-2

HAZARDOUS WASTE PARAMETERS AND THEIR TEST METHODS

HW PARAMETER	TEST METHOD	REFERENCE
Corrosivity: pH	Electrometric Method 9040	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods U. S. EPA SW-846, 2nd Edition
Corrosion Rate	NACE Test TM-01-69 Method 1110	Ibid
Flash Point	Pensky-Martens Closed Cup Tester Method 1010	Ibid
EP Toxicity	EP extraction/toxicity	40 CFR 261 Appendix II
Arsenic	Atomic Absorption Method 7061	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods U. S. EPA SW-846, 2nd Edition
	Spectrophotometric SDDC Method 206.4	Methods for Chemical Analysis of Water and Wastes, EPA-600014-79/020 March 1979
Acetone	GC/FID Method 8015 (Direct Injection)	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods U. S. EPA SW-846, 2nd Edition
Methanol	GC/FID Method 8015	Ibid
Isopropanol	GC/FID Method 8015	Ibid
1,1,1-Trichloroethane (b)	GC/HSD Method 8010	Ibid

TABLE C-2 (Continued)

HW PARAMETER	TEST METHOD	REFERENCE
Ethanolamine	GC/FID Method 8015	Ibid
Diethylene Glycol Monobutyl Ether	GC/FID Method 8015	Ibid
Hydrofluoric Acid	Titration Method C1.STD.8	SEMI BOSS 1982 (a)
Ammonium Fluoride	Titration Method C2.STD.2	SEMI BOSS 1982 (a)
Fluorides	Colorimetric (SPADNS) Method 413C	Std. Methods for Water and Waste water 15th Ed.
Normality	Electrochemical Method 413B Titration	Ibid
Mercury-contaminated Waste	Atomic Absorption Method 7470, 7471	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods U. S. EPA SW-846, 2nd Edition

(a) Book of Semi Standards 1982 Volume 1.
(b) This test is done by outside laboratories only.

C.2.c **Sampling Methods** (HWMR 206.B.3.b.(3)):

Table C-3 lists the hazardous wastes stored at the facility and the methods used to sample each. These wastes are sampled by in-house Chemistry Lab personnel.

TABLE C-3

METHODS USED TO SAMPLE HAZARDOUS WASTES

HAZARDOUS WASTE	SAMPLING METHOD	DESCRIPTION OF SAMPLING	REFERENCE
Solvent I	Sampling of Solid Wastes, Composite Liquid Waste Sampler, P.7	Composite sample using a "Safety Sampler"-American Scientific Products #H37802 or a Manning Sampler	Note [1]
Solvent II	Coliwasa	Coliwasa Composite	Ibid
Hydrofluoric Acid	"Safety Sampler"	"Safety Sampler" Composite from top, middle and bottom of tank.	Ibid
Buffered Oxide Etch	"Safety Sampler"	"Safety Sampler" Composite from top, middle and bottom of tank.	Ibid
Arsenic Contaminated Waste	Sampling of Solid Wastes, Thief - p. 12 Trier - p. 12-14	Representative composite sample from 3 grab samples at top, middle and bottom of drum using a Trier type scoop (laboratory scoop).	Ibid
Mercury-contaminated Waste	Sampling of Solid Wastes, Thief - p. 12 Trier - p. 12 - 14	Representative composite sample from 3 grab samples at top, middle, and bottom of drum using a Trier type scoop (laboratory scoop).	Ibid

Note [1] Test Methods for the Evaluation of Solid Waste. Physical Chemical Methods EPA-SW-846, Second Edition 1982.

C.2.d Analysis Criteria and Frequency:

The analyses criteria and sampling frequencies are listed in Table C-4. This analysis plan will be revised annually. Additional analyses will be performed and Tables revised if a process change could affect the hazardous characteristics of a waste. These analyses are sufficient to meet HWMR 206.B.3.b.

TABLE C-4

ANALYSIS CRITERIA AND FREQUENCY

WASTE	PARAMETERS	FREQUENCY
Solvent I	Corrosion rate or pH, Flash point, Methanol, Acetone, Isopropanol, Ethanol Amine, and Diethylene Glycol Monobutyl Ether	Biannually
Solvent II	Corrosion rate or pH, Flash point	As needed for disposal - at least every 2500 gallons
Hydrofluoric Acid	Corrosion rate or pH, Hydrofluoric Acid, Fluoride, Normality	Biannually
Buffered Oxide Etch	Corrosion rate of pH, Hydrofluoric Acid, Fluoride, Normality	Biannually
Arsenic Contaminated Waste	EP Toxicity, (Arsenic)	Annually
Mercury-contaminated Waste	EP Toxicity, (Mercury)	Annually

C.2.e Additional Requirements for Waste Generated Offsite:

This facility only handles on-site generated wastes, therefore, requirements for wastes received from offsite generators do not apply.

EXHIBIT C-1
Laboratory Analyses
of Hazardous Wastes

FORM B

HF & BOE WASTE
ANALYSIS REPORT

SAMPLE NUMBER: 83-10-006 1:1 mix of HF & BOE waste

DATE: 22 Sept. 1983

TAKEN BY: B.K.

ANALYSIS BY: M. Malburne

APPROVED BY: R J Fretz

RESULTS

RUN NUMBER	NORMALITY	AMT HF	AMT NH_4F
1	1.63	3.05 %	8.75 %
2	1.63	3.03 %	8.68 %
3	1.62	3.00 %	8.66 %
Average NH_4F	1.63	3.03 % HF	8.70 %
Std. Dev.	0.0	0.02	0.04

pH = 3

Sulfate NA ppm

Fluoride 85,000 ppm

FORM A

HYDROFLUORIC ACID WASTE ANALYSIS REPORT

SAMPLE NUMBER: 83-10-006

DATE: 23 Sept. 1983

TAKEN BY: B. K.

ANALYSIS BY: M. MALBURNE APPROVED BY: R J Frantz

RESULTS

RUN NUMBER	NORMALITY	AMT. HF
1	1.20	2.42 %
2	1.20	2.46 %
3	1.22	2.45 %
Average	1.20	2.44 %
Std. Dev.	0.0	0.02

pH = less than 1

Sulfate NA ppm

FORM B

BOE WASTE
ANALYSIS REPORT

SAMPLE NUMBER: 83-10-006

DATE: 23 Sept. 1983

TAKEN BY: B.K.

ANALYSIS BY: M. MALBURNE APPROVED BY: R J Fraatz

RESULTS

RUN NUMBER	NORMALITY	AMT HF	AMT NH_4F
1	1.97	3.70 %	16.84 %
2	2.00	3.64 %	16.83 %
3	1.97	3.63 %	16.86 %
Average NH_4F	1.98	3.64 % HF	16.84 %
Std. Dev.	0.01	0.01	0.01

pH = 4.

Sulfate NA ppm

FORM A

SOLVENT WASTE ANALYSIS REPORT

SAMPLE NUMBER: 83-07-018
SAMPLE TAKEN BY: s.g. and m.m.
DATE: - July 1983

ANALYSIS BY: M. Malburne
APPROVED BY: R g Frantz

RUN NUMBER	METHANOL	ACETONE	IPA	ETHANOL-AMINE	GLYCOL ETHER	WATER
1	0.0045%	4.49%	0 %	3.32%	15.04%	69.5%
2	0.0053	4.58	0	3.65	14.99	75.5
3	0.0056	4.30	0	3.42	14.9	74.6
AVERAGE	0.0051%	4.46%	0%	3.46%	14.98%	73.2%
STD. DEV.	0.0005	0.12	0	0.14	0.06	3.

---

pH 11

FLASH PT. 124° F

SECTION D

PROCESS INFORMATION

This section discusses specific process information for the storage of containers and tanks (HWMR 206.D.4).

D.1 Containers:

D.1.a Description of Containers:

The primary containment devices are 55-gallon metal drums. The two types of drums used at Signetics are reconditioned DOT 17H and reconditioned DOT 17E containers. Signetics buys all drums needed for waste disposal. The DOT 17H drums are open-head, 18 gauge body/bottom, with 14 gauge heads. The DOT 17E drums are bung type, 18 gauge body/bottom/head (see Exhibit D-2).

The DOT 17H drums are used for contaminated solid Toxic wastes while the DOT 17E drums are used for Ignitable Wastes. Steel drums for the Ignitable Wastes are recommended by the manufacturers of the virgin chemicals.

D.1.b Container Management Practices:

All drums are stored indoors between 60-80 degrees F. For liquid wastes, the drums are filled from smaller containers in the storage areas. The transferred wastes are brought by personnel to the storage areas in 5-gallon Nalgene carboys. For solid wastes, these are bagged and brought to the drum storage and transferred into the drums. The wastes include used Photoresist Acetone Mixture and Arsenic or Mercury-contaminated solid materials. These wastes are accompanied by chemical manifests during transit (see Exhibit D-1).

In the storage areas (Chemical Storage #2 and Flammable Storage #4) (Exhibit D-3), the recipient drums are placed on pallets, four drums/pallet. Before any drums are used, and EPA hazardous waste label is attached to the recipient drums and a drum number assigned. Each label is filled out with the following information: Proper D.O.T. shipping name, UN number, generator name, address, city, state, zip, EPA identification number, EPA waste number, and the accumulation start date. Labels required by the D.O.T. are applied to the drums prior to shipment. The age of the drums is tracked by the date on the EPA label. The drums are stored on pallets to elevate them from contact with standing liquids. All drums are single stacked.

A drum will be opened to add wastes approximately 10-20 times before it is filled. The only tool used for opening and closing drums is a bung wrench. To transfer liquid wastes, the Chemical Tech pours the waste through a spigot carefully to avoid spillage. The two-inch bung caps are replaced each time waste chemicals are poured into the drums. To transfer contaminated solid materials, the Chemical Tech places the Hazardous Waste plastic bag into the drum and replaces the top head and bolt ring to the drum. This procedure is followed for every addition to the drum. When additions are made to either drum, the Chemical Tech fills out on a Hzardous Waste Drum Log (See Exhibit D-9) the date the addition was made, type of waste added, chemical manifest reference no., and the Tech's initials. These logs are filled out for each drum used and are placed in same area as drums. After the drums are full, the drum logs are maintained in a permanent file by drum number.

The drums are placed by the Chemical Tech in the designated area as outlined by yellow-striped warning tape.

The Ignitable Wastes and Arsenic-Contaminated Solid Wastes are stored in separate areas due to possible incompatibility. No smoking or open flames are allowed in the vicinity of the storage areas.

The storage areas are inspected daily to assure that the drums are in good condition and that the base remains impervious and is in good condition. Inspection logs are completed and kept on file in Chemical Support for the life of the facility.

D.1.c <u>Location of Waste Storage:</u>

The two areas where the wastes are stored are: 1) Chemical Storage #2 (solid waste contaminated with mercury or arsenic) and 2) Flammable Storage #4 (Ignitable Waste). Both areas have signs designating them as DANGER areas with only authorized personnel allowed to enter. (Signs are in both English and Spanish.)

Flammable Storage #4 has total capacity of 36 drums single stack, while Chemical Storage #2 has a potential total capacity of 64 drums double stacked whose maximum height does not exceed 8'. When necessary, the two storage areas can be expanded with more floor space allocated for hazardous wastes.

D.1.d Description of Container Storage Area:

There are two container storage areas located inside the facility. The area where the Arsenic or Mercury-Contaminated Waste is located is within Chemical Storage #2. The Ignitable Waste is stored in Flammable Storage #4 (See Exhibit D-3).

Flammable Storage #4 - has inside dimensions of 22' by 26' with 572 square feet of floor space. The floor is an 8" concrete slab and the walls are 8" concrete masonry units. (All walls are one hour fire-rated.) The room is also equipped with make-up and exhaust air. The room has 6' double doors on the west, north, and east walls. There is a 3' door in the southeast section of the room. The doors on the north and east walls are fire rated for one hour. The doors on the west and southeast are strictly for occupancy separation. The floor-to-ceiling height slopes from north to south (26-1/4' to 25-1/2').

The roof has a 4' x 4' x 1/4" explosion vent which will open when the internal pressure of the room exceeds 600 pounds per square inch. The roof is metal beam with a 10.5" concrete waffle slab covered with a 4" concrete topping over a waterproof membrane.

The floor is at a slope which drops four inches from each wall to the center. The floor has a 4" floor drain which is attached to a drain line running to the "Solvent" Waste Tank. The tank has a 5,000 gallon capacity which is sufficient to contain 10% (200 gals.) of the stored drums. Spills or leaks will be cleaned up by applying commercial flammable absorbing agents and disposed of properly.

Chemical Storage #2 - has 2611 square feet of floor space (See Exhibit D-3 for dimensions of the room). The floor is an 8" concrete slab with walls which are 8" masonry units. The container storage area is located in the southwest corner of the room and is bound by yellow stripe tape with 172 square feet of available storage space. The room has 10' wide electric roll-up gates on the north and south walls of the room. The room also has 3' doors on the north and south walls. The floor-to-ceiling height slopes from north to south (26-1/4' to 25-1/2').

JAN. 20 1986

The roof is metal beam with two layers of 1-5/8" rigid fiberglass insulation covered with a 4" concrete topping over a waterproof membrane.

The floor has a 3" drain line that runs north into the piping trench. Here the line is attached to a 6" acid waste drain which is connected to the waste water treatment system. The piping trench is equipped with a sump, air pump, and level controls in case of a spill. As the level rises, the float turns on the air pump. The discharge enters the wastewater treatment system. Since the hazardous wastes stored in this room are in solid state, no drainage of hazardous waste will occur. Run-on into both storage areas is controlled by the asphalt drive on south side of each area being sloped away from the storage areas.

D.1.e Test for Free Liquids:

Elemental arsenic is purchased as a solid and used in the manufacturing process as a solid. It does not come into contact with liquids. The only wastes are the rags and gloves used to transfer the material. These wastes are collected from the glove box, bagged, labelled, and accumulated in drums. From knowledge of the process, there are no liquids in the arsenic waste drums. The same applies to the mercury containing lamps.

D.2 Tanks (HWMR 206.D.5):

D.2.a Description of Tanks:

There are three tanks in use at this facility for storage of hazardous wastes. These tanks were purchased as new during June, 1982. The location of the three tanks is shown in Exhibit D-3. Tank 5 is a 5000-gallon tank holding Hydrofluoric Acid Waste. Tank 4 is 5000-gallon tank containing Buffered Oxide Etch Waste. Tank 3 is 5000-gallon tank containing mixed Ignitable Solvent Waste. The waste in these three tanks is picked up by a waste transporter and taken to a TSD facility.

All three tanks are supported vertically, underground in covered vaults. These vaults are concrete and coated with chemically-resistant resins. The tanks are UL labelled. (See Exhibit D-4).Tanks 4 and 5 are flat bottom with flat tops. The tanks are fiberglass with reinforced plastic filament and supported by 5/16" nominal diameter Siemen-Martin grade steel PVC (ASTM-A - 475) extended jackets. They are made

by the reinforced plastic filament winding process providing a smooth inner surface, an interior layout from 20-30% by weight of noncontinuous glass strands having fiber lengths from 0.5 to 2.0 inches and an exterior layer of continuous roving interspersed with chopped strand glass reinforcement. The ultimate stress is 120,000 psi. The tanks are 10' in diameter and 8'6" high. The tanks were built in 1982 and conform to PS 15-69 (Voluntary Product Standard) and ASTM D3299-74 tank design criteria. The seams were constructed using the Centrifugal Molding Process. The tanks are synthetic veiled (corrosion barrier veil resistant) with a thickness of 7/32-11/32". They are corrosion resistant to 10% HF @ 150 degrees F or to 30% HF @ 100 degrees F. Other pertinent characteristics:

- Wind Load 25psf (87mph)
- Wind Stress safety 3 to 1
- Resin to glass ratio 75/25-30
- Minimum 300 lbs live load with safety factor
- 3" vent with polypropylene screen
- Seismic load = 0.1 Zone III

Tank 3 is flat bottom with a flat top. The tank is constructed of mild steel with a wall thickness of 3/16". The tank is 10' in diameter and 8' 6" in height. The tank was constructed in 1982 and conforms to UL58-76 (steel underground tank for flammable and combustible liquids) and ASTM A36 tank design criteria. The seams are double welded butt, API 12F. The tank has a corrosion allowance of <0.002" per year.

Each tank is equipped with a 3" fill line which attaches to the main drain system from the process area. The piping material used to carry the waste from the generation point to the waste tanks is as follows:

1. From generation points to main drain line:

   - HF & BOE Lines 2" SCH 80 DWV Pipe
   - Solvent Line 2" SCH 40 Mild Steel Pipe

2. From main drain line to waste storage tanks:

   - HF & BOE Lines 4" SCH 80 PVC Pipe
   - Solvent Line 4" SCH 40 Mild Steel Pipe

3. Welding Method:

   - DWV Line Fuse SEal
   - PVC Line Glue
   - Mile Steel Line Jointed by Threaded Steel Fittings

The tanks are attached to the bottom of each vault by four tank tie-down lugs. Each lug has two anchor 3/4" stainless steel bolts for attachment. Tanks 4 and 5 use viton gaskets with the bolts and tank 3 uses a teflon gasket. The tanks are designed to contain the highest specific gravity chemical used at Signetics.

Each tank is equipped with 24" standard manways, suction line, one feed line, level sensor, and two 3" blind flanges. Tanks 4 and 5 are equipped with goose-neck vents while tank 3 has a 3" vent line which runs through the trench system and attaches to the outside of the building and vents to atmosphere. The tanks are normally closed. None of the tanks has an inner liner. Due to the nature of the design and construction of the tanks, outer coatings are not required. All the tanks have 3" hose connections on the manhole covers for ease of unloading onto tank trucks. (See Exhibit D-4).

D.2.b <u>Tank Management Practices:</u>

The waste tanks collect liquids through gravity feed from the sinks in the manufacturing process. The segregated wastes drain through pipes in the manufacturing area service aisles. The pipes penetrate the floor to the basement which then follow the service trench for 270 feet until connection with each tank. The pipes are accessible for visual inspections (see Exhibit D-5). The levels of the tanks are monitored daily by reading the Wesmar DLM 12 Digital level monitor. This information is recorded daily onto the Hazardous Waste Storage Tank Log. The tanks are equipped with level monitors which have visual alarms that light up when the levels of each tank reach 5'9" and again when level reaches 7'6". (Full tank height is 8'.) The daily level monitoring ensures that the Chemical Tech is aware of the level of each tank.

When the storage of Tanks 4 and 5 reach a combined total of 4700 gallons, the waste is transported to a TSD facility. Since Tank 3 is used as the containment "sump" for FS#4, the waste is transported to a TSD facility when the level reaches 4000 gallons. So that the "sump" condition is maintained at all times, waste solvent generation is stopped when the level in the tank reaches 4800 gallons.

The tanks are vented to atmosphere so there exists no pressure buildup in the tanks and the tanks are operated outside at ambient temperatures. Since no off-site wastes are collected, the tank wastes are "predictable" due to permanent drain hookups in manufacturing.

On a daily basis, an inspection log (See Section F) for the tanks is completed. The items checked are: visual inspection of tanks, visual inspection of vault, waste chemical feed systems, and the presence of odors. Every month the trench area is inspected. The visual inspection program allows for identification of potential problems and expedites preventive maintenance and good housekeeping procedures for the plant. During the inspection, the Chemical Tech checks for leaking pipes and pumps, tank corrosion, puddles, deterioration of support or foundations, stains on walls, stains along drainage areas, and all forms of deterioration in containment facilities. Construction plans specify that none or minimal buried or concealed drain lines be installed in order to facilitate inspection and easy detection or problems.

A complete record of the inspection logs and preventive maintenance actions is kept at the facility.

D.2.c <u>Description of Secondary Containment:</u>

Secondary containment for the underground storage tanks is provided by a concrete vault for each tank. See Exhibit D-6. The overall inside dimensions for each vault is 11' wide by 11' long and 13' 10" deep. Each vault has a one-foot blockout used for ventilation of the areas. Usable containment dimensions are 11' wide by 11' long and 10' 8" deep. Vault 3 is coated on the base and walls with Ceilcote Ceilcrete 6650 B (See Exhibit D-7a). Vaults 4 and 5 are coated with Ceilcote Flakeline 232 (See Exhibit D-7b) on the base and the walls.

There exists no drains in the secondary containment vaults. The usable containment capacity for each vault is 9,600 gallons which represents 192% of the 5000 gallon tank capacity.

The concrete walls and base are 8" thick and reinforce with rebar. The rebar is 3/4" running vertically while being crosshatched with 1/2" rebar.

Each vault is covered with a 1/4" thick checker plate vault cover whose dimensions are 11' 7-3/4" x 11' 7-3/4". Each cover has a continuous neoprene gasket glued to the edge so that water seepage is minimal. Each cover has a 25-5/8" x 25-5/8" manhole with hinged cover for access to vault. Two 12" x 12" handholds with hinged covers are also attached for access to the suction line and the open vault (see Exhibit D-8).

D.3 Wastes Piles, Surface Impoundment and Landfill:

There are no waste piles, surface impoundments, incinerators or land treatment, or landfill fcilities at this site.

SECTION D

PROCESS INFORMATION

This section discusses specific process information for the storage of containers and tanks (HWMR 206.C.4).

D.1 Containers:

D.1.a Description of Containers:

The primary containment devices are 55-gallon metal drums. The two types of drums used at Signetics are reconditioned DOT 17H and reconditioned DOT 17E containers. Signetics buys all drums needed for waste disposal. The DOT 17H drums are open-head, 18 gauge body/bottom, with 14 gauge heads. The DOT 17E drums are bung type, 18 gauge body/bottom/head (see Exhibit D-2).

The DOT 17H drums are used for contaminated solid Toxic wastes while the DOT 17E drums are used for Ignitable Wastes. Steel drums for the Ignitable Wastes are recommended by the manufacturers of the virgin chemicals.

D.1.b Container Management Practices:

All drums are stored indoors between 60-80°F. For liquid wastes, the drums are filled from smaller containers in the storage areas. The transferred wastes are brought by personnel to the storage areas in 5-gallon Nalgene carboys. For solid wastes, these are bagged and brought to the drum storage and transferred into the drums. The wastes include used Photoresist-Acetone Mixture and Arsenic or Mercury-contaminated solid materials. These wastes are accompanied by chemical manifests during transit (see Exhibit D-1).

In the storage areas (Chemical Storage #2 and Flammable Storage #4) (Exhibit D-3), the recipient drums are placed on pallets, four drums/pallet. Before any drums are used, an EPA hazardous waste label is attached to the recipient drum and a drum number assigned. Each label is filled out with the following information: Proper D.O.T. shipping name, UN number, generator name, address, city, state, zip, EPA identification number, EPA waste number, and the accumulation start date. Labels required by the D.O.T. are applied to the drums prior to shipment. The age of the drums is tracked by the date on the EPA label. The drums are stored on pallets to elevate them from contact with standing liquids. All pallets are single stacked.

A drum will be opened to add wastes approximately 10-20 times before it is filled. The only tool used for opening and closing drums is a bung wrench. To transfer liquid wastes, the Chemical Tech pours the waste through a spigot carefully to avoid spillage. The two-inch bung caps are replaced each time waste chemicals are poured into the drums. To transfer contaminated solid materials, the Chemical Tech places the Hazardous Waste plastic bag into the drum and replaces the top head and bolt ring to the drum. This procedure is followed for every addition to the drum. When additions are made to either drum, the Chemical Tech fills out on a Hazardous Waste Drum Log (See Exhibit D-9) the date the addition was made, type of waste added, chemical manifest reference no., and the Tech's initials. These logs are filled out for each drum used and are placed in same area as drums. After the drums are full, the drum logs are maintained in a permanent file by drum number.

The drums are placed by the Chemical Tech in the designated area as outlined by yellow-striped warning tape.

The Ignitable Wastes and Arsenic-Contaminated Solid Wastes are stored in separate areas due to possible incompatibility. No smoking or open flames are allowed in the vicinity of the storage areas.

The storage areas are inspected daily to assure that the drums are in good condition and that the base remains impervious and is in good condition. Inspection logs are completed and kept on file in Chemical Support for the life of the facility.

D.1.c **Location of Waste Storage:**

The two areas where the wastes are stored are: 1) Chemical Storage #2 (solid waste contaminated with mercury or arsenic) and 2) Flammable Storage #4 (Ignitable Waste). Both areas have signs designating them as DANGER areas with only authorized personnel allowed to enter. (Signs are in both English and Spanish.) Yellow stripe tape is used to mark boundaries of storage areas (See Exhibit D-3).

Flammable Storage #4 has total capacity of 36 drums single stack, while Chemical Storage #2 has a potential total capacity of 64 drums double stacked whose maximum height does not exceed 8'. When necessary, the two storage areas can be expanded with more floor space allocated for hazardous wastes.

D.1.d **Description of Container Storage Area:**

There are two container storage areas located inside the facility. The area where the Arsenic or Mercury-Contaminated Waste is stored is marked off with yellow striped tape and is located within Chemical Storage #2.

The Ignitable Waste is stored in Flammable Storage #4 (See Exhibit D-3).

Flammable Storage #4 - has inside dimensions of 22' by 26' with 572 square feet of floor space. The floor is an 8" concrete slab and the walls are 8" concrete masonry units. (All walls are one hour fire-rated.) The room is also equipped with make-up and exhaust air. The room has 6' double doors on the west, north, and east walls. There is a 3' door in the southeast section of the room. The doors on the north and east walls are fire rated for one hour. The doors on the west and southeast are strictly for occupancy separation. The floor-to-ceiling height slopes from north to south (26-1/4' to 25-1/2').

The roof has a 4' x 4' x 1/4" explosion vent which will open when the internal pressure of the room exceeds 600 pounds per square inch. The roof is metal beam with a 10.5" concrete waffle slab covered with a 4" concrete topping over a waterproof membrane.

The floor is at a slope which drops four inches from each wall to the center. The floor has a 4" floor drain which is attached to a drain line running to the "Solvent" Waste Tank. The tank has a 5,000 gallon capacity which is sufficient to contain 10% (200 gals.) of the stored drums. Spills or leaks will be cleaned up by applying commercial flammable absorbing agents and disposed of properly.

Chemical Storage #2 - has 2611 square feet of floor space (See Exhibit D-3 for dimensions of the room). The floor is an 8" concrete slab with walls which are 8" masonry units. The container storage area is located in the southwest corner of the room and is bound by yellow stripe tape with 172 square feet of available storage space. The room has 10' wide electric roll-up gates on the north and south walls of the room. The room also has 3' doors on the north and south walls. The floor-to-ceiling height slopes from north to south (26-1/4' to 25-1/2').

The roof is metal beam with two layers of 1-5/8" rigid fiberglass insulation covered with a 4" concrete topping over a waterproof membrane.

The floor has a 3" drain line that runs north into the piping trench. Here the line is attached to a 6" acid waste drain which is connected to the waste water treatment system. The piping trench is equipped with a sump, air pump, and level controls in case of a spill. As the level rises, the float turns on the air pump. The discharge enters the wastewater treatment system. Since the hazardous wastes stored in this room are in solid state, no drainage of hazardous waste will occur.

Run-on into both storage areas is controlled by the asphalt drive on south side of each area being sloped away from the storage areas.

D.1.e **Test for Free Liquids:**

Elemental arsenic is purchased as a solid and used in the manufacturing process as a solid. It does not come into contact with liquids. The only wastes are the rags and gloves used to transfer the material. These wastes are collected from the glove box, bagged, labelled, and accumulated in drums. From knowledge of the process, there are no liquids in the arsenic waste drums. The same applies to the mercury containing lamps.

D.2 **Tanks** (HWMR 206.C.5):

D.2.a **Description of Tanks:**

There are three tanks in use at this facility for storage of hazardous wastes. These tanks were purchased as new during June, 1982. The location of the three tanks is shown in Exhibit D-3. Tank 5 is a 5000-gallon tank holding Hydrofluoric Acid Waste. Tank 4 is a 5000-gallon tank containing Buffered Oxide Etch Waste. Tank 3 is a 5000-gallon tank containing mixed Ignitable Solvent Waste. The waste in these three tanks is picked up by a waste transporter and taken to a TSD facility.

All three tanks are supported vertically, underground in covered vaults. These vaults are concrete and coated with chemically-resistant resins. The tanks are UL labelled. (See Exhibit D-4.)

Tanks 4 and 5 are flat bottom with flat tops. The tanks are fiberglass with reinforced plastic filament and supported by 5/16" nominal diameter Siemen-Martin grade steel PVC (ASTM - A - 475) extended jackets. They are made by the reinforced plastic filament winding process providing a smooth inner surface, an interior layout from 20-30% by weight of noncontinuous glass strands having fiber lengths from 0.5 to 2.0 inches and an exterior layer of continuous roving interspersed with chopped strand glass reinforcement. The ultimate stress is 120,000 psi. The tanks are 10' in diameter and 8'6" high. The tanks were built in 1982 and conform to PS 15-69 (Voluntary Product Standard) and ASTM D3299-74 tank design criteria. The seams were constructed using the Centrifugal Molding Process. The tanks are synthetic veiled (corrosion barrier veil resistant) with a thickness of 7/32-11/32". They are corrosion resistant to 10% HF @ 150°F or to 30% HF @ 100°F. Other pertinent characteristics:

- Wind Load 25psf (87mph)
- Wind stress safety 3 to 1
- Resin to glass ratio 75/25-30
- Minimum 300 lbs live load with safety factor
- 3" vent with polypropylene screen
- Seismic load = 0.1 Zone III

Tank 3 is flat bottom with a flat top. The tank is constructed of mild steel with a wall thickness of 3/16". The tank is 10' in diameter and 8' 6" in height. The tank was constructed in 1982 and conforms to UL58-76 (steel underground tank for flammable and combustible liquids) and ASTM A36 tank design criteria. The seams are double welded butt, API 12F. The tank has a corrosion allowance of <0.002" per year and will be tested on an annual basis for corrosion.

Each tank is equipped with a 3" fill line which attaches to the main drain system from the process area. The piping material used to carry the waste from the generation point to the waste tanks is as follows:

1. From generation points to main drain line:

   - HF & BOE Lines 2" SCH 80 DWV Pipe
   - Solvent Line 2" SCH 40 Mild Steel Pipe

2. From main drain line to waste storage tanks:

   - HF & BOE Lines 4" SCH 80 PVC Pipe
   - Solvent Line 4" SCH 40 Mild Steel Pipe

3. Welding Method:

   - DWV Line Fuse Seal
   - PVC Line Glue
   - Mild Steel Line Jointed by Threaded Steel Fittings

The tanks are attached to the bottom of each vault by four tank tie-down lugs. Each lug has two anchor 3/4" stainless steel bolts for attachment. Tanks 4 and 5 use viton gaskets with the bolts and tank 3 uses a teflon gasket. The tanks are designed to contain the highest specific gravity chemical used at Signetics.

Each tank is equipped with 24" standard manways, suction line, one feed line, level sensor, and two 3" blind flanges. Tanks 4 and 5 are equipped with goose-neck vents while tank 3 has a 3" vent line which runs through the trench system and attaches to the outside of the building and vents to atmosphere. The tanks are normally closed. None of the tanks has an inner liner. Due to the nature of the design and construction of the tanks, outer coatings are not required. All

the tanks have 3" hose connections on the manhole covers for ease of unloading onto tank trucks. (See Exhibit D-4.)

D.2.b **Tank Management Practices:**

The waste tanks collect liquids through gravity feed from the sinks in the manufacturing process. The segregated wastes drain through pipes in the manufacturing area service aisles. The pipes penetrate the floor to the basement which then follow the service trench for 270 feet until connection with each tank. The pipes are accessible for visual inspections (see Exhibit D-5). The levels of the tanks are monitored daily by reading the Wesmar DLM 12 Digital level monitor. This information is recorded daily onto the Hazardous Waste Storage Tank Log. The tanks are equipped with level monitors which have visual alarms that light up when the levels of each tank reach 5'9" and again when level reaches 7'16". (Full tank height is 8'.) The alarms are visual/audible and are located on the wastewater treatment panel in D. I. Water Department. The daily level monitoring ensures that the Chemical Tech is aware of the level of each tank.

When the total storage of each tank reaches 4700 gallons, the waste is transported to a TSD facility.

The tanks are vented to atmosphere so there exists no pressure buildup in the tanks and the tanks are operated outside at ambient temperatures. Since no off-site wastes are collected, the tank wastes are "predictable" due to permanent drain hookups in manufacturing.

On a daily basis, an Inspection Log (See Section F) for the tanks is completed. The items checked are: visual inspection of tanks, visual inspection of vault, waste chemical feed systems, and the presence of odors. Every month the trench area is inspected. The visual inspection program allows for identification of potential problems and expedites preventive maintenance and good housekeeping procedures for the plant. During the inspection, the Chemical Tech checks for leaking pipes and pumps, tank corrosion, puddles, deterioration of support or foundations, stains on walls, stains along drainage areas, and all forms of deterioration in containment facilities. Construction plans specify that none or minimal buried or concealed drain lines be installed in order to facilitate inspection and easy detection or problems.

A complete record of the inspection logs and preventive maintenance actions is kept at the facility.

D.2.c Description of Secondary Containment:

Secondary containment for the underground storage tanks is provided by a concrete vault for each tank. See Exhibit D-6. The overall inside dimensions for each vault is 11' wide by 11' long and 13' 10" deep. Each vault has a one-foot blockout used for ventilation of the areas. Usable containment dimensions are 11' wide by 11' long and 10' 8" deep. Vault 3 is coated on the base and walls with Ceilcote Ceilcrete 6650 B (See Exhibit D-7a). Vaults 4 and 5 are coated with Ceilcote Flakeline 232 (See Exhibit D-7b) on the base and the walls.

There exists no drains in the secondary containment vaults. The usable containment capacity for each vault is 9,600 gallons which represents 192% of the 5000 gallon tank capacity.

The concrete walls and base are 8" thick and reinforced with rebar. The rebar is 3/4" running vertically while being crosshatched with 1/2" rebar.

Each vault is covered with a 1/4" thick checker plate vault cover whose dimensions are 11' 7-3/4" x 11' 7-3/4". Each cover has a continuous neoprene gasket glued to the edge so that water seepage is minimal. Each cover has a 25-5/8" x 25-5/8" manhole with hinged cover for access to vault. Two 12" x 12" handholds with hinged covers are also attached for access to the suction line and the open vault (see Exhibit D-8).

D.3 Wastes Piles, Surface Impoundment and Landfill:

There are no waste piles, surface impoundments, incinerators or land treatment, or landfill facilities at this site.

EXHIBIT D-1

Chemical Waste Manifest

SIGNETICS ALBUQUERQUE
WASTE CHEMICAL MANIFEST

No. 0014

GENERATOR **EPA ID NO. NMD000709782**

ORDER PLACED BY _____ EXT. _____ DEPT. NO. _____

LOC. FOR PICKUP _____ DATE SCHEDULED _____

NO. OF CONTAINERS _____ TYPE _____ VOL. _____ UNIT _____

DESCRIPTION: (CALL CHEM SUPPORT X7188 IF YOU NEED ASSISTANCE.)

COMPONENTS	% (approx.)

OTHER APPROPRIATE DESCRIPTION: pH _____

MFG. PROCESS _____

☐ UNABLE TO ESTIMATE

I have labelled the container(s) as: _____

I certify that the above information is correct. Inaccurate descriptions may result in incompatibilities/injuries when the waste is mixed or stored with other chemicals. If I am unable to estimate the contents I authorize laboratory analyses fees to be charged to my department.

_____ *Supervisor Signature* _____/_____/_____ *Month Day Year*

Call ext. 7079 or pager No. 110 when the waste is ready for pickup.
This manifest must accompany the waste during transportation.

DO NOT WRITE BELOW THIS LINE

TRANSPORTER

THE ABOVE WAS COLLECTED BY: _____

DATE _____/_____/_____ *Month Day Year* TIME _____ DESTINATION _____

STORER / DISPOSER

DISPOSITION: (Check)

☐ MIXED ACID DRAIN ☐ DRUM STORAGE DRUM NO. _____ LOC. _____
☐ B.O.E. DRAIN ☐ HF DRAIN
☐ "SOLVENT" DRAIN ☐ OTHER: _____

THE ABOVE WAS DISPOSED OF BY: _____

☐ COPY SENT TO GENERATOR DATE _____/_____/_____ *Month Day Year* TIME _____

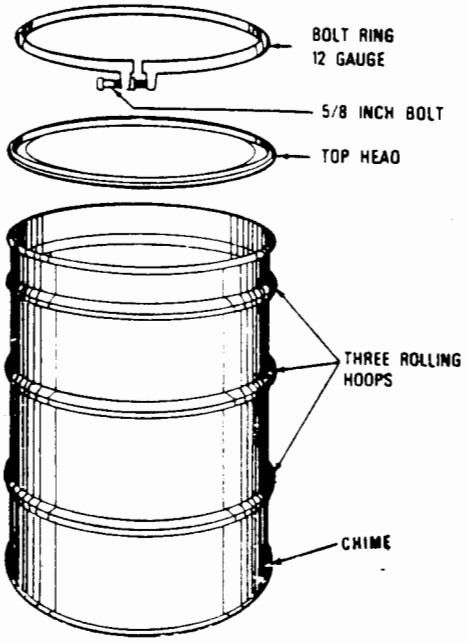
GENERATOR

EXHIBIT D-2

Container Specifications

EXAMPLES OF TYPICAL DOT SPECIFICATION PACKAGINGS

TYPICAL DOT OPEN HEAD DRUMS
DOT-17C OR DOT 17H



55 GALLON

SPECIFICATION 17E; STEEL DRUM. SINGLE TRIP CONTAINER (STC) REMOVABLE HEAD CONTAINERS NOT AUTHORIZED

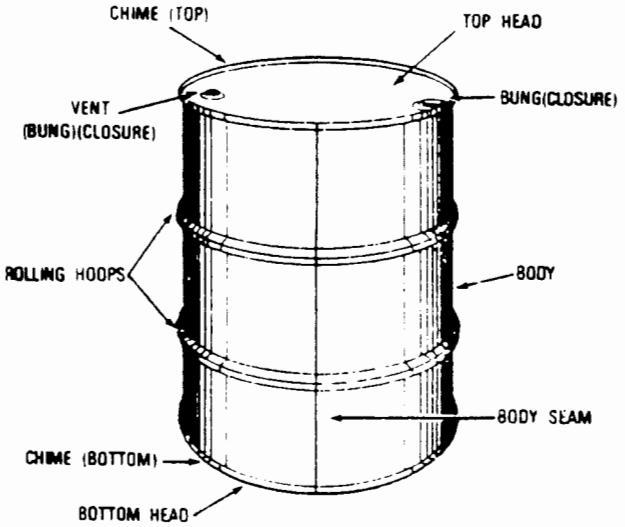


EXHIBIT D-7

Vault Coating

Technical Bulletin

Ceilcote

October, 1979
Supersedes December, 1978

TECHNICAL BULLETIN 601

FLAKELINE® 600 HIGH BUILD EPOXY

FLAKELINE 600 is a corrosion resistant, high build epoxy topcoat which offers many advantages over conventional epoxies. It combines the superior alkali resistance of traditional epoxy formulations with a significant improvement in resistance to inorganic acids and provides superior resistance to water, moisture and corrosive solutions.

This coating also provides good resistance to many aromatic and aliphatic solvents. Ceilcote should be consulted for specific recommendations.

The superiority of Flakeline 600 is derived from two important advances in epoxy coating formulation; the use of flake pigments to reduce film permeation and a special curing system which provides increased chemical resistance.

The use of overlapping flake pigments to reduce film permeation was perfected by Ceilcote over 10 years ago in the development of spray applied polyester coatings. These flake reinforced coatings have been unequalled in resistance to moisture and chemical permeation. The use of micro-thin, overlapping flake-pigments in the formulation of Flakeline 600 provides performance altogether superior to other epoxies and actually equivalent to vinyls and coal tar epoxy in resistance to moisture permeation.

A blend of selected epoxy resins and a proprietary curing system developed by Ceilcote provides exceptional chemical resistance. Flakeline 600 offers alkaline resistance that is equivalent to the best traditional epoxy formulations while providing improved resistance to inorganic acids in fume, spillage and mild immersion service. Extensive laboratory testing has shown that while polyester coatings are still superior in acid resistance, Flakeline 600 epoxy is equivalent to the best vinyl coatings in resistance to moisture and acids.

Flakeline 600 provides a medium gloss finish that has good gloss retention and color stability comparable to the best polyamide epoxies. As with all epoxies, gradual chalking and slight yellowing will occur during extended exposure to sunlight.

The cured film demonstrates a hard, abrasion resistant finish that is comparable to amine cured epoxies, but does not exhibit the same tendency to embrittle upon extended aging.

Although Flakeline 600 is primarily intended as a protective coating for use in corrosive fumes, weathering, marine or chemical spillage environments, it is suitable for immersion service in water, sour crude, brine, and mild chemical solutions at ambient temperature. Dry heat resistance is usually adequate for temperatures up to 350°F. although color changes will occur at temperatures above 200°F.

Flakeline 600 also offers several advantages in application properties. Its unique curing system allows application at temperatures well below freezing, and the coating will cure at temperatures as low as 10°F. This feature allows painting in cold weather without the necessity of providing heat and permits increased flexibility and reduced costs where low temperature application is required. Both Flakeprime™ Epoxy Primer and Polyzinc™ Zinc Rich Primer provide this same low temperature capability so that complete Ceilcote epoxy systems are available for low temperature applications.

Flakeline 600 also provides good tolerance for moisture, and when used with Flakeprime Primer, the coatings system can be applied successfully on damp concrete. Application to visually damp metal surfaces is not recommended.

The coating demonstrates excellent application properties and can be applied by spray at film thickness of 6 to 8 dry mils per coat. Higher film thicknesses will exhibit a slight "orange peel" surface, but smooth, slick films can be obtained at 4-5 mils by slight thinning. Brushing or rolling can be employed, but lower film thicknesses and slower curing will result. Flow-out and edge coverage are excellent and thinning is normally required only at very low temperatures.

Due to its unusually high volume solids, Flakeline 600 covers more square feet per gallon than most coatings, which substantially reduces its actual applied cost. The material contains no metals or carcinogenic materials prohibited by EPA and meets all existing or anticipated air emission standards such as Rule #66.

For more specific qualification and product recommendations, consult your local Ceilcote representative

PRODUCT DATA

Generic Type:	High build, catalyzed epoxy
Weight Per Gallon:	10.3 ± .2 lbs.
Viscosity:	700 ± 200 cps (mixed)
Flash Point: (Pensky-Martens Closed Cup)	Resin Component 'A'—35°F. (2°C.) Catalyst Component 'B'—210°F. (99°C.) Mixed — 61°F. (16°C.)
Impact And Abrasion Resistance:	Excellent
Adhesion:	Excellent. Bond strength exceeds 3000 psi.
Solids Content:	By Volume—83% ± 2% By Weight—88% ± 2%
Mixing/Ratio:	1.4 to 1 by volume
Gloss and Color Retention:	Semi-gloss finish. Surface may dull or yellow slightly with age, but chalk resistance and color retention are better than with most epoxies.
Colors:	Complete color range; see color chart. Other colors available on special order.
Coverage:	Theoretical coverage is 1330 sq. ft. per gal. at 1.0 dry mil. Actual coverage (with 20% loss factor) should average 175 sq. ft. per gal. at 6.0 dry mils depending upon application conditions and film thickness. 8 wet mils will yield 6.5 dry mils.
Number of Coats and Thickness:	Chemical fumes or weathering normally require only one coat at 6.0 dry mils. For direct spillage or immersion apply two coats at 6.0—8.0 mils per coat. Apply only over recommended primers.
Pot Life:	@25°F.-8 hours @50°F.-3 hours @75°F.-2 hours @90°F.-45 minutes
Recoat and Curing Time:	To Recoat @25°F.-24 hours @50°F.-15 hours @75°F.- 4 hours @90°F.- 3 hours To Handle @25°F.-24 to 48 hours @50°F.-18 to 24 hours @75°F.- 6 to 12 hours @90°F.- 4 hours May be recoated up to 30 days. After 30 days, sand or sweep blast to remove gloss and roughen surface for proper adhesion.
Recommended Uses:	For corrosion protection in chemical fumes, spillage, or marine environments. Recommended for structural steel, piping, tanks, or equipment in chemical, paper, marine and petroleum facilities. May also be used as a light duty lining in water or mild chemical solutions at ambient temperatures.
Surface Preparation:	Apply only to clean, dry, properly primed surfaces.
Priming:	Use **Flakeprime** Epoxy Primer or **Polyzinc** Zinc Rich Primers.
Service Temperature Limits:	Dry—350°F. Splash or spillage—160°F. Immersion—100-120°F
Mixing:	Add Catalyst Component 'B' into Resin Component 'A' and mix thoroughly with mechanical agitation. Material will become much thinner when mixed. Add minimum quantities of solvent only if required. **Observe pot life limitations.** If material thickens in pot at end of pot life, discard material and flush pot and lines.
Thinning:	Use up to 4 oz. of Solvent T-470 per gal. at temperatures between 10°—60°F. Use up to 4 oz. of Solvent T-460 per gal. at temperatures above 70°F.
Application Equipment:	**Air Spray** — Use Binks 18 or 62 spray gun, minimum 3/8" I.D. fluid line, with #66 (.070) fluid tip and needle with 63PJ or 63PB air caps. For high production spraying substitute #67 (.086) fluid tip and needle with 67PD air cap. Adjust fluid pressure to provide adequate material to spray gun and use minimum atomization pressure to provide break-up and flow-out with minimum overspray. **Airless Spray** — Minimum 28:1 ratio pump with 60 mesh filter recommended. A Spraying Systems 25-A Gunjet spray gun with Rotoclean tip and tungsten carbide orifices of .017—.026" and 25-60° fan angle is recommended. Adjust material pressure between 1200—2500 psi as required. Slower curing will result with brush or roller application. Equivalent equipment by other manufacturers is acceptable. **Brush or Roller** are generally recommended only for touch-up; use short nap rollers and medium stiff natural bristle brushes. Thin with small amounts of T-460 Solvent if required.
Cleanup:	Use MEK, other ketone solvents, or Ceilcote Solvent T-410.
Storage:	Store in a cool, dry place (40-90°F.) and away from direct sunlight, flame, or other hazards.
Shelf Life:	Six months at temperatures below 90°F.
Packaging:	Shipped in 1 gal. and 5 gal. units only.
Material Returns:	All returns must be approved by Ceilcote in writing prior to shipment and must be shipped prepaid at customer's expense to a designated warehouse. Customer must advise date of shipment and invoice number when requesting returns. Only unopened cans containing usable materials which have not exceeded shelf life from date of sale can be accepted. Returns are subject to a 20% restocking charge plus any additional charges required for repackaging.
Safety:	WARNING—FLAMMABLE LIQUID. Vapor may be harmful. Contains epoxy resins, amine catalyst, petroleum distillate and ester solvents. May cause skin sensitation or other allergic responses. Keep away from heat, sparks, or open flame. In enclosed areas or where ventilation is poor, use an approved air mask and utilize adequate safety precautions to prevent fire or explosion. In case of skin contact, wash with soap and water. For eyes, flush immediately with water for 15 minutes and call a physician. If swallowed, call a physician immediately — do not induce vomiting.

The technical data furnished herein is true and accurate to the best of our knowledge; however, no guarantee of accuracy is given or implied. Ceilcote assumes no responsibility for any loss of damage resulting from the handling or use of the products by the buyer. Seller warrants only that the products to be delivered will conform to Ceilcote's manufacturing standards. In no event shall Ceilcote be responsible for consequential damages of any such breach of warranty including, but not limited to, the Buyer's loss of material or profits, increased expense of operation, down-time or reconstruction of the work, and, in no event shall the Ceilcote obligation under this warranty exceed the price of the defective material.
THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTY OR OBLIGATION, EXPRESSED OR IMPLIED, AND NO LIABILITY IS ASSUMED BY THE CEILCOTE COMPANY, EXCEPT AS IS EXPRESSLY STATED ABOVE.
Statements concerning the use of products are not to be construed as recommending the infringement of any patent, and no liability for infringement arising out of such use is assumed by Ceilcote.

NOTE: USE 2 OUNCES HARDENER #3 PER GALLON OF CEILCRETE 2500 LIQUID.

CEILCRETE®

June, 1979
Supersedes November, 1977

TECHNICAL BULLETIN 5-13

GLASS CLOTH REINFORCED POLYESTER LINING FOR CONCRETE

CEILCRETE is a time-tested and proven development in corrosion proof surfacing, designed especially for the protection of concrete and steel against the attack of corrosive chemicals.

CEILCRETE has three components: a liquid resin, a liquid hardener, and a powder, which are mixed together immediately before use. Ceilcrete is trowel applied in combination with a heavy-duty reinforcing layer of fiberglass or synthetic cloth. The resultant mixture hardens to 75% of its ultimate strength in 8-16 hours at 75° F. and will withstand light service at that time. Ultimate strength is developed in two or three days. P-380 Primer is used to insure excellent bond strength to concrete. When Ceilcrete is used as a tank or trench lining on concrete it is essential to add a conductive filler to P-380 Primer so the lining can be spark tested.

TYPES

CEILCRETE 2500 S AND B (Silica and Carbon filled)—Resistant to alkali and acid. B type is electrically conductive and non-sparking; is best for strong alkali and chromic acid.

CEILCRETE 6400 S AND B — Unusual resistance to strong acids such as nitric, sulfuric, and chromic. Limited resistance to alkalis.

CEILCRETE 6650 S AND B — Same resistance to alkalis and acid as 2500; also excellent for many solvents, chlorinated aromatics and aliphatics.

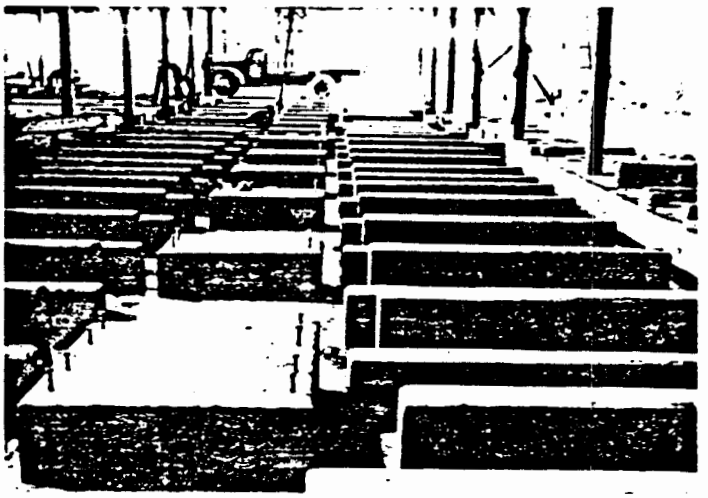
CEILCRETE "AR" designation refers to more abrasion resistant version which incorporates a special hard filler in the topcoat.

USES

- Tank lining
- Trench lining
- Equipment foundation covering
- Tank pads
- Pump bases
- Piers
- Concrete pipe lining
- Chimney lining
- Scrubber lining
- Floor covering
  - Acid proof
  - Spark proof
  - Conductive

PHYSICAL PROPERTIES

The Ceilcrete types differ somewhat in physical properties, but generally meet or exceed the following standards:



Tensile (ASTM C-307-55)	2200 psi
Compressive (ASTM C-306-55)	12,900 psi
Taber abrasion factor* (CS17F wheel, 1000 gm. wt., 5000 revolutions.)	40
Coefficient of expansion (in/in/°F) range 70°—210° reinforced with type H Cloth	12-15 x 10^{-6} etc.
Electrical Properties*	
Megger Reading	0 to 200,000 ohms. (500 to 10,000 ohms typical)

*Refers to carbon filled

FLASH POINT: Pensky-Martens Closed Cup

Ceilcrete 2500, 6650	91°F. (32.8°C.)
Ceilcrete 6400	87°F. (30.6°C.)
Primer P-370	73°F. (22.8°C.)
Primer P-380	83°F. (28.3°C.)
Hardener No. 2	175°F. (79.4°C.)
Hardener No. 3	210°F. (98.9°C.)

CHEMICAL RESISTANCE

With the types of Ceilcrete available, most chemical requirements can be met. There are limitations which require special investigation:

1.) Certain strong solvents and organic chemicals.

2.) Very strong alkalis.

3.) Very strong oxidizing acids.

For specific chemical resistance, refer to the Ceilcote Master Corrosion Resistance Chart (Bulletin 1-4), or contact The Ceilcote Company.

TEMPERATURE RESISTANCE

Ceilcrete can withstand fairly constant high temperatures when it is not bonded to concrete. When bonded to concrete heat is limited to spills of 300°F., or in constant immersion, to 160°F. This is due to the differences in thermal expansion between Ceilcrete and concrete.

DESIGN INFORMATION

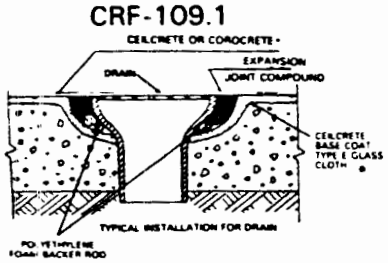
Reinforcement

CEILCRETE is installed with a reinforcing layer of fiberglass fabric. The reinforcement performs the following functions:

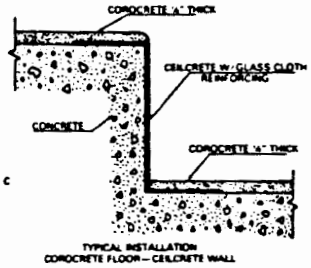
1. Lowers the coefficient of expansion.
2. Minimizes effects of resin shrinkage.
3. Allays effects of varying concrete quality and preparation.
4. Minimizes possibility of thin spots because of the multi-layer application used.

Engineering Design

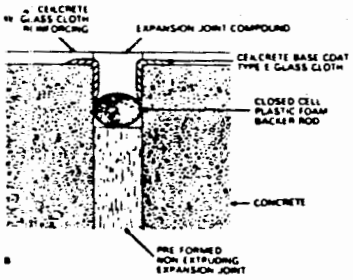
CRF-109.1



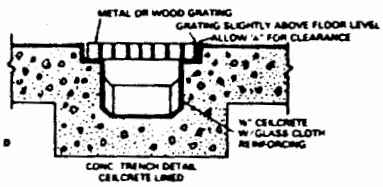
CUF-1112



CRF-10 3.1



CRF-104.1



ESTIMATING AND ORDERING

Coverage (with type H glass fabric-lbs./sq. ft. at ⅛" thick)

	Liquid	Hardener	Powder	Primer
Ceilcrete 2500 S	0.50	0.015 (2%) Hardener No. 2 (note 1)	1.00	0.1 P-380 Primer
Ceilcrete 2500 B	0.55	0.025 (4%) Hardener No. 2	0.60	0.1 P-380 Primer
Ceilcrete 6400 S	0.55	0.006 (1%) Hardener No. 3	1.00	0.1 P-380 Primer
Ceilcrete 6400 B	0.60	0.012 (2%) Hardener No. 3	0.60	0.1 P-380 Primer
P-380 Primer		200-250 sq. ft./gal.		
P-370 Primer		300 sq. ft./gal.		

Note: Hardener #2 can be varied from 2% to 4% (2½-5 oz./gal.) without detriment. Maximum for Hardener #3 is 3% (1½-4½ oz./gal.).

Ordering

1. Calculate the square feet of area to be covered.
2. Refer to chart above for the material required per square foot. Multiply total footage by the material required per square foot.
3. Increase the total material required to the nearest quantity of standard packages.
4. Note the different hardeners required for each resin formula.
5. Order glass cloth with 3% overage for lapping.
6. Order T-430 Smoothing Liquid (solvent) for smoothing Ceilcrete and cleaning tools. One gallon is needed for a small job, and five or more for larger jobs.

Standard Packages

Ceilcrete 2500 ..... gallons (8 lbs.), 5 gallons (40 lbs.), 55 gallon drums (450 lbs.)

Ceilcrete 6400 & 6650 gallons (9 lbs.), 5 gallons (45 lbs.), 55 gallon drums (500 lbs.)

Type S Powder No. 1 ..... 100 lb. bags

Type B Powder No. 4 ..... 70 lb. bags

Hardener No. 2 ..... 4 oz., 1 lb., 2 lbs., 8 lbs., 40 lbs.

Hardener No. 3 ..... 2 oz., 1 lb., 2 lbs., 8 lbs.

T-~~430~~ 431 Smoothing Liquid gallons (7½ lbs.), 5 gallons (37½ lbs.), 55 gallon drums (412 lbs.)

H Cloth ..... 44" wide rolls of 1230 sq. ft. (102 lbs.)

P-380 (includes Hardener) gallons (9 lbs.), 5 gallons (45 lbs.), 30 gallon drums (270 lbs.)

P-370 (includes Hardener) gallons (8 lbs.), 5 gallons (45 lbs.), 30 gallons drums (240 lbs.)

Storage

Ceilcrete liquids, Primer Liquids, and hardeners should be stored in a cool place, away from flames. The liquids may harden after 4-6 months at 70°F., faster at higher temperatures. Powders are stable indefinitely at all temperatures if kept dry.

INSTALLATION PROCEDURES

Installation procedures are contained in Ceilcote bulletin 5-13.1. These procedures are as specific as possible, but cannot cover all variations in field conditions. Therefore, supervisors experienced in installing Ceilcote materials may sometimes deviate slightly from the published procedures. This is done to give a better installation by using the most up-to-date methods to fit specific field and service conditions.

The concrete should have a minimum compressive strength of 3000 psi. The strength of the concrete surface is one of the most important factors in the proper adhesion of floor topping. It should be dense, free of voids and finished to the required grade (including slopes), less allowance for the total overall thickness of acid proof surfacing. Use a light steel trowel finish (do not machine trowel.) Curing additives containing waxes, oils or similar substances must not be used. Let the concrete cure 28 days and dry thoroughly before applying P-380 and Ceilcrete. Contact Ceilcote if use of faster curing concrete is required.

STEEL PREPARATION

For immersion or intermittent splash and spillage conditions sandblast to "White Metal" in accordance with Steel Structures Painting Council Specifications SP-5-63 or NACE Specification #1. For fumes and dry environments sandblast to "Near White" SP-10-63 or NACE Specification #2.

Following surface preparation, apply one coat of Ceilcote P-370 Primer at a film thickness of 1-4 mils.

Concrete Preparation

All concrete substrates must be prepared and primed with P-380 Primer before application of CEILCRETE to insure adhesion.

New Concrete Floors

The new concrete base should be cured for 28 days at normal temperatures, then treated with 1:3

hydrochloric acid: water solution, flushed with clear water and allowed to dry prior to applying the P-380 primer. The acid treatment will remove any glaze present, remove cement which is uncured because of surface drying, and it will remove dust. Sandblast is also excellent preparation. Contact Ceilcote if use of faster curing concrete is required. See Bulletin CP14 for more information.

Concrete Walls

See Ceilcote Bulletins CS10 and CP11 for proper procedure.

Old Concrete

Because CEILCRETE will not adhere to loose, dusty or poorly cured concrete, special attention is called to the treating of old concrete prior to P-380 Primer application. Old coatings, grease, dirt, dust, loose concrete and other contaminating materials must be removed. A number of cleaning methods can be utilized. The simplest and one of the most effective chemical methods is treatment with a 1:2 hydrochloric acid: water solution.

Mechanical methods such as chipping or sandblasting are also useful. Surfaces contaminated with old coating of asphalt sometimes require a combination of mechanical and chemical treatment before CEILCRETE can be applied. Oil and grease soaked concrete frequently cannot be cleaned sufficiently, and must be removed and replaced.

In any event the user is cautioned to apply P-380 and CEILCRETE only over solid concrete surfaces that are free from organic materials, salts, dust and loose particles. Small holes in the concrete can be filled with CEILCRETE prior to over-all surfacing. Refer to Bulletin CP14 for additional information.

Proportions

	Primer	
	Regular	Conductive
P-380 Liquid	1 gal.	1 gal.
Hardener No. 2	2½ fl. oz.	5 fl. oz.
No. 10 Powder		1 pt.
P-370 Liquid	1 gal.	
Hardener No. 3	2½ fl. oz.	

	Ceilcrete S grades			
	Primer	Base Coat	Saturant	Top Coat
Ceilcrete Liquid*	—	1 gal.	1 gal.	1 gal.
Hardener No. 2	—	2½ fl. oz.	2½ fl. oz.	2½ oz.[1]
Type S Powder No. 1	—	18-22 lbs.	—	22-24 lbs.
	Ceilcrete B grades			
Ceilcrete Liquid*	—	1 gal.	1 gal.	1 gal.
Hardener No. 2	—	5 fl. oz.[2]	2½ fl. oz.[1]	5 oz.[2]
Type B Powder No. 4	—	13 lbs.	—	13 lbs.

*Ceilcrete 2500 and 6650

1. For 6400 use 1½ oz./gal. of Hardener No. 3.

2. For 6400 use 3 oz./gal. of Hardener No. 3.

Mixing

1. Always add Hardener to Liquid and mix well before adding Powder. No powder is used with P-380 unless spark testing is required.
2. More or less powder may be added to Ceilcrete, as required for best handling.
3. Use within 15-30 minutes after adding Hardener.

Application

1. Prime concrete surfaces with P-380. Allow to cure completely before proceeding.
2. Spread base coat 1/16" thick.
3. Immediately press the glass into the base coat, pressing out all air pockets. A dry paint roller is best for this procedure.
4. Saturate by brushing or rolling on the saturating liquid until whiteness of glass disappears. Allow to become completely hard before applying top coat.
5. Spread 1/16" top coat as evenly as possible, then smooth by brushing lightly with a soft brush damp with T-430 smoothing liquid. Hardening will take place in 2-4 hours at 75°F.
6. After topcoat is hard, spark test with 15,000 to 20,000 volts on steel or concrete only if the conductive primer has been used.
7. The surfaces to be lined should be at a minimum temperature of 50°F. for proper application. It is suggested that after proper surface preparation and priming, a small basecoat sample be installed and allowed to cure. Attempt removal by chipping to test bond strength.

SAFETY — Contains polyester resin and styrene monomer. The Hardener (catalyst) is an organic oxidizing peroxide.

1. No flames, smoking, matches, sparks, or welding should be permitted within 50' of work area.
2. There should be at least two men on all enclosed tank jobs. One should be on the outside. Approved air hoods, a rope, and a safety belt should be used.
3. Provide sufficient ventilation to change the air inside an enclosed tank every 6 minutes. Make certain fresh air is circulated into all parts of the tank.
4. In semi-confined areas, an absorptive respirator should be used. In open air, material may be applied without a respirator, but if strong or toxic odors are evident while applying, use a respirator.
5. Mix in a well ventilated place. Wear eye protection when handling hardeners and liquids. Gloves should be worn. Do not allow liquid or hardener to remain on hands. Wash skin immediately and frequently with soap and water. If liquid or hardener spills on clothing, remove, rinse in water, and launder before wearing again. For hardener or liquid in eyes - flush with water for 15 minutes and consult physician immediately. Resin and hardener must not be taken internally. If taken internally, consult physician immediately.
6. Liquid resin, catalyst, and cleaning solvents are flammable. Keep away from open fire or flames. Store materials in a cool, dry, safe area away from flames.
7. Hardeners with RED Ceilcote labels must never be combined with hardeners with YELLOW Ceilcote labels. They will react violently if mixed together in the same container. Do not store packages with RED labels near packages with YELLOW labels. Use only in accordance with manufacturer's instructions.
8. Fumes from the application of materials may contaminate certain foods, particularly meats and fatty food products. The finished lining may impart odor and taste to certain food products if not properly sanitized. Consult Ceilcote for procedures.

The technical data furnished herein is true and accurate to the best of our knowledge; however, no guarantee of accuracy is given or implied. Ceilcote assumes no responsibility for any loss of damage resulting from the handling or use of the products by the buyer. Seller warrants only that the products to be delivered will conform to Ceilcote's manufacturing standards. In no event shall Ceilcote be responsible for consequential damages of any such breach of warranty including, but not limited to, the Buyer's loss of material or profits, increased expense of operation, down-time or reconstruction of the work, and, in no event shall the Ceilcote obligation under this warranty exceed the price of the defective material.

THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTY OR OBLIGATION, EXPRESSED OR IMPLIED, AND NO LIABILITY IS ASSUMED BY THE CEILCOTE COMPANY, EXCEPT AS IS EXPRESSLY STATED ABOVE.

Statements concerning the use of products are not to be construed as recommending the infringement of any patent, and no liability for infringement arising out of such use is assumed by Ceilcote.

Reprinted November, 1982
Supersedes March, 1982

FLAKELINE® 222 H.T.

TECHNICAL BULLETIN 5-23B

- DRY TEMPERATURE RESISTANCE UP TO 350°F. (177°C.)
- EXCELLENT SULFURIC ACID RESISTANCE
- IMPROVED WET AND DRY TEMPERATURE RESISTANCE
- OUTSTANDING SOLVENT RESISTANCE
- GLASS FLAKES GREATLY IMPROVE BARRIER EFFECT AGAINST PERMEATION

SELECTION DATA

Generic Type: Vinyl ester resin with inert flake glass filler.

Recommended Uses: Intermediate lining for organic and inorganics up to 150°F. (65°C.) or where severe corrosive environments exist.

Temperature Resistance:
Dry 350°F. (177°C.)
Wet 150°F. (65°C.)

RECOATABILITY: FLAKELINE 222 H.T. MUST BE RECOATED WITHIN 4 HRS. WHEN EXPOSED TO DIRECT SUNLIGHT. INDIRECT SUNLIGHT EXPOSURE RECOAT TIME IS EXTENDED TO 7 DAYS.

Properties of Cured Film:

Tensile Bond Strength	1500-1700 PSI (10-12 MPa)
Flexural Strength (ASTM-D790)	7500 PSI (52 MPa)
Flexural Modulus (ASTM-D790)	8.9×10^5 PSI (610 MPa)
Tabor Abrasion (CS 17 Wheel, 1000 gm, 1000 Revolutions)	19 mg
Moisture Permeability (ASTM E 96 Proc. E)	.0011 perm in. (.0018 Perm cu.)
Tensile Strength (ASTM D-638)	5700 PSI (39 MPa)
Tensile Elongation	.44%

SPECIFICATION DATA

Total Volume Solids: 100% reactive by weight and volume.

Recommended Dry Film Thickness:
15 to 20 mils per coat.
2 or 3 coats required.

Coverage: Actual coverage averages 25-35 sq. ft./gal. at 35 mils. (2.3-3.2 m^2/gal. at 0.9 mm.)

Shelf Life: 3 months at 70-80°F.

Color: Cream

Pot Life:
@ 50°F. 1 1/2 Hrs.
@ 75°F. 1 Hr.
@ 90°F. 45 Min.

Flash Point: 89°F. (Pensky-Martens Closed Cup)

Shipping Weight: 10.3 ± .2 lbs./gal.

Application: Conventional spray but can be brushed for small areas.

APPLICATION INSTRUCTIONS

For complete installation instructions refer to Ceilcote Installation Procedure S-222 H.T.

Surface Preparation: Immersion or elevated temperature - "White Metal" sandblast (SSPC #5 or NACE #1) with 3 mil minimum profile.

Application Equipment: Use air spray or low pressure (4:1 or 8:1) pump. Airless spray equipment is normally not recommended. When brushing, three coats may be required to achieve recommended film thicknesses.

Mixing:
1. Stir liquid thoroughly, then add 3 fl. oz. Hardener No. 2R/gal.
2. Flakeline 222 H.T. is packaged in short filled containers: Add 2 1/2 fl. oz. of Hardener No. 2R to the 3/4 gal. can; add 13 fl. oz. Hardener No. 2R to the 4 gal. pail.

Thinning: Not required.

Clean Up: Use Solvent T-410, methyl ethyl ketone or lacquer thinner. DO NOT USE ACETONE.

Curing:

To Recoat @ 50°F. (10°C.) 12 hrs.
@ 75°F. (24°C.) 4 hrs.
@ 90°F. (32°C.) 3 hrs.

To Handle @ 50°F. (10°C.) 24 hrs.
@ 75°F. (24°C.) 6-8 hrs.
@ 90°F. (32°C.) 4-6 hrs.

Allow 48 hrs. final cure before placing into immersion service.

Storage: Store in a cool, dry place away from fire hazards. Shelf life is approx. 3 months below 80°F., less at higher storage temperatures. Consult Ceilcote if high storage temperatures are expected. Store Hardener No. 2 in original tightly closed containers to avoid spillage, leakage, or contamination.

DUE TO LIMITED SHELF LIFE CEILCOTE WILL NOT WARRANTEE THE SHELF LIFE OF FLAKELINE 222 H.T. AND WILL NOT ACCEPT RETURN OF THIS MATERIAL.

Safety: WARNING - Flakeline 222 is a flammable liquid. Hardener No. 2 is an oxidizing peroxide. Store at temperatures below 100°F. and avoid contamination from other materials.

Vapor may be harmful. May cause skin sentitation or other allergic responses. Keep away from heat, sparks, or open flame. In enclosed areas or where ventilation is poor, use an approved air mask and utilize adequate safety precautions to prevent fire or explosion. In case of skin contact, wash with soap and water. For eyes, flush immediately with water for 15 minutes (seconds count) and call a physician. If taken internally, call a physician immediately.

Refer to Ceilcote Installation Bulletin and container labels for safety requirements before using these materials.

Hardeners with RED Ceilcote labels must never be combined with hardeners with YELLOW Ceilcote labels. They will react violently if mixed together in the same container. Do not store packages with RED labels near packages with YELLOW labels. Use only in accordance with manufacturer's instructions. NOTE: THE ABOVE WARNING DOES NOT REFER TO DOT DIAMOND SHAPED SHIPPING LABELS - ONLY TO CEILCOTE LABEL COLORS.

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A UNIT OF GENERAL SIGNAL

CEILCOTE

November, 1982
Supersedes March, 1982

FLAKELINE® 232, 242

TECHNICAL BULLETIN 5-23C

VINYL ESTER COATINGS

Flakeline 232 and Flakeline 242 Vinyl Ester Coatings combine the superior chemical resistance of lining materials with the simplicity of spray applied thin film coatings.

These materials are recommended for immersion, splash-spillage or corrosive fume conditions.

Utilizing the technology which has made Ceilcote the world leader in flake reinforced polyester linings and coatings, the Flakeline 200 Series Vinyl Ester Coatings were developed to provide spray applied, two coat, 30-40 mil protective systems which provide unparalled resistance to acids, corrosive liquids, salts, and many solvents.

Formulated with the same advanced chemically resistant vinyl ester resins used in fabricating fiberglass reinforced plastic (FRP) tanks, piping, and equipment, Flakeline 200 Vinyl Ester Coatings are reinforced with laminar flake pigments which form dozens of micron-thick layers within the coating film. These overlapping layers provide a permeation resistant film which restricts the passage of moisture and chemicals through the coating to prevent under-film corrosion. The permeability is actually so low that no inhibitive primer is required, corrosion being prevented solely by the coating's film integrity.

The properties of Flakeline 200 Vinyl Ester Coatings recommend their use as both light duty linings and as maximum duty protective coatings. They are recommended for immersion service up to 130° F., for many splash-spillage applications at temperatures to 180° F., and for dry environment exposures at temperatures up to 350° F.

The superior adhesion of Flakeline 200 Coatings contributes to their overall performance. Exhibiting bond strength between 2500-3000 psi assures permanent bonding, and eliminates failure due to adhesion loss. If mechanical damage should occur due to extremely high impact loads (above 150 inch lbs.), the coating will chip only at point of impact; surrounding areas will be unaffected. This superior adhesion also prevents corrosive undercutting if damage occurs and localized repairs can be made easily and inexpensively.

Flakeline 200 Coatings exhibit good impact and abrasion resistance and are resistant to mild slurry abrasion conditions encountered in agitated or flowing chemical solutions.

FLAKELINE 232 is a proprietary vinyl ester formulation based on Derakane* 470 resin. It exhibits better resistance to organic solvents than do either Flakeline 242 or other Flakeline 200 polyester resin coatings. Its resistance to organic and inorganic acids is excellent although its resistance to alkalies is only fair.

FLAKELINE 242 is a proprietary formula based upon vinyl ester resins. It offers excellent resistance to organic and inorganic acid solutions and is resistant to many aliphatic solvents. Its resistance to alkalies is generally poor and inferior to both Flakeline 232 and Flakeline 252.

*Registered trademark of Dow Chemical Co.

FOR SPECIFIC CHEMICAL RESISTANCE PROPERTIES, REFER TO CEILCOTE BULLETIN NO. 1-4 AND YOUR CEILCOTE REPRESENTATIVE.

Flakeline 200 Vinyl Ester Coatings are recommended for use where optimum acid and moisture resistance are required. Typical usage includes interior of chemical process vessels and waste treatment clarifiers, chemical storage tanks, for marine equipment, or wherever long term corrosion resistance is required.

IMPORTANT NOTE

Flakeline 232 has a limited recoat time. When exposed to direct sunlight (ultraviolet) it must be recoated within 8 hours to obtain proper adhesion between coats. In indirect sunlight it must be recoated with 7 days.

PRODUCT DATA

Generic Type:	Vinyl ester resin, styrene monomer and inert flake pigments, cured with organic peroxide hardener.
Solids:	100% reactive by weight and volume
Viscosity:	3500-4000 CPS
Flash Point:	83° F. (Pensky-Martens Closed Cup)
Color:	Off-white and grey. Other colors on special order.
Weight Per Gallon:	10.0 ± 0.2 lbs.
Properties of Cured Film:	Hardness is excellent; Barcol Hardness factor of 30-40. Tensile strength is 2500-3000 psi. Abrasion resistance is excellent. Tabor Coefficient of 78 (CS17 wheel, 1000

grams, 1000 revolutions). Exhibits a low moisture vapor permeability of 0.0016 perm inches.

Number of Coats & Thickness Two coats at 15-20 dry mils per coat.

Coverage: Theoretical coverage is 45 sq. ft./gal. Actual coverage averages 25-35 sq. ft./gal @ 35 mils.

Pot Life: @ 50°F. 1½ hrs.
@ 75°F.1hr.
@ 90°F. 45 minutes

Recoatability: Flakeline 242 can be recoated with no adhesion problems up to 30 days. FLAKELINE 232 MUST BE RECOATED WITHIN 8 HOURS WHEN EXPOSED TO DIRECT SUNLIGHT. INDIRECT EXPOSURE RECOAT TIME IS EXTENDED TO 7 DAYS.

Curing: **To Recoat** @ 50°F. 12 hrs.
@ 75°F. 4 hrs.
@ 90°F. 3 hrs.

To Handle @ 50°F. 12-24 hrs.
@ 75°F. 4-8 hrs.
@ 90°F. 3-4 hrs.

Allow 48 hrs. final cure before placing into immersion service.

Surface Preparation: **Steel** - For immersion or high temperature service a "White Metal" sandblast. (SSPC #5 or NACE #1) is required; for atmospheric service use a "Near White" sandblast (SSPC #10 or NACE #2). An anchor pattern profile of 3 mils minimum is required.

Concrete - Surfaces must be thoroughly cured, uncontaminated, dry, and primed using **P-380 Concrete Primer.** Acid etching or sandblasting are suitable methods of surface preparation.

REFER TO INSTALLATION BULLETIN NO. 5-23.1 FOR SPECIFIC SURFACE PREPARATION REQUIREMENTS.

Priming: Use **P-370 Metal Primer** for high temperature applications on steel surfaces. **P-380 Concrete Primer** must be used on all masonry surfaces.

Thinning: DO NOT THIN - WILL NOT TOLERATE SOLVENTS.

Mixing:

1. Stir liquid thoroughly, then add 3.0 oz. of Hardener No. 2 per gal.
2. Flakeline 232 and 242 are packaged in short filled containers: Add 2.5 oz. of Hardener No. 2C or No. 2R to the 3/4 gal. can; add 12 oz. of Hardener No. 2C or No. 2R to the 4 gal. pail.
3. Flakeline 232 and 242 use 3.0 oz. of Hardener No. 2C or No. 2R per gal.

Application and Equipment:

Spray application recommended, but brush or roller are acceptable for small areas. Use air spray or low pressure (4:1 or 8:1) pump. Airless spray equipment is normally not recommended. Refer to Bulletin No. 5-23.1 for specific equipment and application instructions. When rolling or brushing, three coats will be required to achieve recommended film thicknesses.

Clean Up:

Use Solvent T-410, methyl ehtyl ketone or lacquer thinner. DO NOT USE ACETONE.

Shelf Life And Storage:

Store in a cool, dry place, away from fire hazards. Shelf life is 4 months @ 40-64°F., 3 months @ 65-79°F., 1 month @ storage temperatures of 80-90°F. Store Hardener No. 2 in original, tightly closed containers to avoid spillage, leakage or contamination. DUE TO LIMITED SHELF LIFE, CEILCOTE WILL NOT WARRANTEE THE SHELF LIFE OF FLAKELINE 232 AND WILL NOT ACCEPT RETURN OF THIS MATERIAL.

Service Temperature Limits:

Immersion - 130°F.; splash and spillage - 180°F.; continuous dry temperature - 350°F. Consult Ceilcote for specific temperature limitations.

Packaging:

Packaged in shor-filled containers containing 3/4 gal., 4 gal. and 25 gal. quantities. Hardener No. 2 is provided at 2.5 oz. of Hardener for the 3/4 gal. of Flakeline Liquid; 12 oz. for 4 gal.; and 75 oz. for 25 gal. drums.

Safety:

Flakeline 232 and 242 Liquids are Flammable materials. Use only with adequate ventilation. Hardener No. 2 is an organic peroxide.

Use only in accordance with SAFETY INSTRUCTIONS PRINTED ON PRODUCT LABELS AND AS DESCRIBED IN BULLETIN NO. 5-23.I.

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EXHIBIT D-9

Hazardous Waste Drum Log

SIGNETICS DRUM LOG

DRUM NO._____ EPA NO. _____ UN NO. _____

DATE	MANIFEST NO.	GENERATOR DEPT.	DESCRIPTION	VOLUME	CUM.	INITIALS

☐ CONTINUED

The container was sealed by_____ Date:_____

1 Copy Chem Support
1 Copy Chem Lab

2 Copies ENVT Affairs

SECTION E

GROUNDWATER MONITORING

The requirements for Groundwater Monitoring apply to surface impoundment landfill or land treatment facilities HWMR 206.D.1.a. Signetics, Albuquerque is a storage facility which stores wastes in tanks and containers, therefore, groundwater monitoring is not applicable.

SECTION E

GROUNDWATER MONITORING

The requirements for Groundwater Monitoring apply to surface impoundment landfill or land treatment facilities HWMR 206.C.1.a. Signetics, Albuquerque is a storage facility which stores wastes in tanks and containers, therefore, groundwater monitoring is not applicable.

SECTION F

PROCEDURES TO PREVENT HAZARDS

The information provided in this section is submitted in accordance with the requirements of HWMR 302.A.4.b.(d),(e),(f),(h),(i). Other regulations addressed to complete this section include HWMR 206.B.4, 206.B.5, 206.B.7, 206.D.4.e, and 206.D.5.d.

F.1 Security:

F.1.a Security Procedures and Equipment:

F.1.a(1) 24-Hour Surveillance System:

Security at Signetics-Albuquerque is provided by Safety and Security Department whose primary task is to monitor entry and exit from the facility, provide security measures for the facility as a whole, and assist in safety measures. Additional guards are subcontracted by Signetics. In the Security Control Center by the lobby entrance, the guards are able to monitor the facility and outside fence by the use of a modular command unit. This unit monitors all outside doors, smoke detectors, duct detectors, the fire system for the plant, and access to the gate into the Shipping/Receiving area. If any alarms are set off, guards are dispatched to that area to investigate. The Security Control Center is manned by two guards 24 hours a day, 7 days a week.

During plant shutdowns, the guards conduct a walkthrough every hour. During the hours of 6:00 p.m. and 6:00 a.m., the guards patrol all areas every two hours. The guards normally work 12-hour shifts.

The guards carry hand-held, two-way radios to report any problems immeditely. In addition to the radios, a base station for the speaker system is located in the Control Center. An internal phone system is also available for use by the guards.

Emergency alarm pull stations are also located throughout the facility. All hazardous waste personnel are equipped with pagers and two-way radios so that security personnel can communicate with them.

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A television monitor system is installed which has cameras located in the fences shipping/receiving area with the video screen in the Security Control Center.

F.1.a(2) Barrier and Means to Control Entry:

F.1.a(2)(a) Barrier

The entire area, where the hazardous waste storage is located, is enclosed within a 10-foot-high chain link fence. The only entrance is through the Shipping/Receiving gate which is controlled remotely through shipping. The gate is monitored by Security every time the gate is opened. The hazardous waste containers are located inside the fence and behind locked doors.

F.1.a(2)(b) Means to Control Entry:

Access to the facility is controlled by the guards at the plant entrance. All employees are required to show identification badges when reporting to work, and visitors and contractors entering the facility must sign a log sheet and obtain visitor badges. Access to the hazardous waste storage areas are limited to Chemical Support and Faciity personnel only. All doors are locked. Other persons requiring access to the rooms must obtain permission from the Chemical Support Section Head and be escorted by an employee of the Chemial Support Department. The hazardous waste tank storage area is located outdoors with tanks underground in protective vaults with metal covers. Access to the vaults is limited to trained personnel who are properly suited with safety equipment.

F.1.a(3) Warning Signs:

Signs which are legible from a distance of 25 feet are posted at the fence gate and on all doors leading into storage areas. The signs are in english and spanish and bear the legend "Danger - All Unauthorized Personnel Keep Out/Peligro - Personal Autorizado Solamente." Also, "Danger - No Smoking" signs have been posted in those areas holding ignitable material.

F.1.b Waiver:

The Signetics-Albuquerque facility does not request a waiver of the requirements stated in HWMR 206.B.4.a regarding injury to intruders and violations by intruders.

F.2 Inspection Schedule:

F.2.a General Inspection Requirements:

The personnel at Signetics-Albuquerque conduct regular inspections of the facility for structural deterioration, operator errors, equipment malfunctions, and discharges that could cause or lead to the release of hazardous waste constituents and adversely affect the environment or threaten human health. Facility security personnel conduct inspections of all plant areas for general health, security, fire, and structural problems. The hazardous waste container and hazardous waste tank storage areas are inspected daily by Chemical Support personnel. The "two man rule" exists when all waste storage areas are being used or inspected. If no other Chemical Support personnel are available at the time of entry, the guard desk will be notified and a guard will accompany the person. There must be a Chemical Support or Facilities employee present whenever entry to the rooms is necessary.

Table F-1 shows the inspection schedule used at Signetics-Albuquerque. The items listed in the Exhibit are considered important because of their role in preventing, detecting, or responding to environmental or human health hazards. Provided on the schedule is a list of problems normally encountered and a designation of the facility department that will conduct the inspection.

F.2.a(1) Types of Problems:

The types of potential problems that are identified during the inspection are also listd in Table F-1.

F.2.a(2) Frequency of Inspection:

The frequency of inspection as well as the facility department that will conduct the inspections are also listed in Table F-1.

F.2.b Specific Process Inspection Requirements:

F.2.b(1) Container Inspection:

Inspections of the container storage area will be conducted by the Chemical Support Department per the inspection schedule labelled "Inspection Schedule for Drummed Hazardous Waste Storage" (See Tables F-2 and

F-3). The Inspection Schedule attached to the Inspection Log notes the items to be inspected and the frequency of that inspection. Typical problems encountered with each item of the inspection are provided on the inspection schedule to serve as a reminder to the inspector and to ensure a complete inspection. The inspector is required to check the status of each item and indicate whether its condition is acceptable or unacceptable. If the status of a particular item is unacceptable, appropriate and complete information is recorded, including date and nature of repairs and remedial action.

The inspection sheets are filed in a 3-ring binder in the Chemical Support Office. (A description of the container storage area is detailed in Section D.1.d).

F.2.b(2) <u>Tank Inspection:</u>

Inspections of the tank storage area will be conducted by the Chemical Support Department per the inspection schedule labelled "Inspection Schedule for H. W. Storage Tanks" (See Tables F-4 and F-5). Upon completion of the inspection logs, the sheets will be maintained in a 3-ring binder in the Chemical Support Office (a description of the storage tank area is detailed in Section d.2).

Visual inspections will be completed daily or weekly as follows: the inspector will enter the vault area through the vault cover; the inspector will examine the tank, vault walls, lighting system, and waste feedlines for cracks, leaks, corrosion or erosion of surface; the inspector will also examine whether there has been any accumulation of spills or precipitation in the bottom of the vault. This inspection will be completed from the top of the tank using the vault lighting system and flashlights. Any discrepancies will be recorded on the log and reported to Environmental Affairs.

The overfilling control equipment is the secondary containment vault in which each storage tank is contained. Normally, trucks are scheduled in advance for tank emptying. If the tank overfilled, the waste will collect into the vault. The production process areas will be immediately shut down through verbal communication from Chemical Support personnel and a licensed hazardous waste transporter will be contracted to drain the vault and the tank. The vaults are designed to contain any spill-over that may occur (see Section D.2.c).

The mechanism for waste feed cut-off is by verbal notification to the Production Manager who will hault production at the affected drains. After notification of cut-off, the waste levels in the tanks will be monitored every half hour until the problem is resolved, the waste is removed, and cleanup is completed. Waste feed cut-off systems are not used for safety measures. The wastes would back up into the production equipment and emergency showers causing a health and cleanup hazard. The vaults provide a means where there is minimal exposure of hazardous wastes to employees should there be a tank spill or overflow.

At least once every 2 years, during production shutdown, the vault covers will be removed and a complete inspection of the tank and vault will be made. A ladder will be lowered into the vault so that all areas of the tank and vault are examined. The storage tanks will be emptied by the use of a waste disposer, and inspections will be made of the interior of the tank. Those items inspected will be corrosion, cracking, and bulging of the tank. The inspector will be fully clothed in safety protective gear with air packs. Care will be taken to ensure the avoidance of spills, avoidance of hazardous conditions (reaction, ignition, or toxic exposure), proper cleaning procedures, proper ventilation, adequate lighting and standby and safety equipment are available. An outside lab will be contracted to perform the following:

a) Interior inspection of the solid-steel tanks:
    1) Roof and Structural Supports
        a) Loss of metal thickness by ultrasonic examination
        b) Cracks and leaks around or at weld joints
        c) Cracks and leaks at all nozzle connections
        d) Visual examination for corrosion

    2) Tank Shell
        a) Cracking of plate joints
        b) Loss of metal thickness by ultrasonic examination
        c) Cracks or splitting at seams
        d) Visual examinaiton for corrosion

    3) Tank Bottom
        a) Unevenness of the bottom
        b) Visual examination for corrosion, pitting
        c) Cracks or splitting at seams
        d) Hammer testing for weak spots
        e) Metal thickness

b) Interior inspection of fiberglass-reinforced plastic tanks:

1) Visual examination for bulging, cracking, exposed fibers, splitting or discoloration
2) Cracks at nozzle connections
3) Hardness test, and
4) Air bubble detection by translucency

F.2.c Remedial Action:

If inspections reveal that non-emergency maintenance is needed, they will be completed as soon as possible to preclude further damage and reduce the need for emergency repairs. If a hazard is imminent or has already occurred during the course of an inspection or any time between inspections, remedial action will be taken immediately. Signetics personnel will notify the appropriate authorities per the Contingency Plan (See Section G.4) and initiate remedial actions. In the event of an emergency involving the release of hazardous constituents to the environment, efforts will be directed towards containing the hazard, removing it, and subsequently decontaminating the affected area. Refer to the Contingency Plan for further details (Section G.4).

F.2.d Inspection Log:

An inspection log for each area is maintained as part of the Facility Hazardous Waste Operations Record for each calendar year in separate 3-ring binders. These logs will be maintained for the life of the facility.

F.3 Waiver of Preparedness and Prevention Requirements:

The applicant does not wish to request a waiver of the preparedness and prevention requirements under HWMR 206.B.9.

F.4 Preventive Procedures, Structures, and Equipment:

Sufficient aisle space is maintained for personnel and equipment access. The aisle spacing is also inspected daily. (See exhibit D-3).

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F.4.a Loading/Unloading Operations:

Loading/unloading operations in the facility involve the transfer of material to the container storage areas as described in Section D.1.b. When the containers are prepared for shipment, there is ample space to move the containers by fork lift. The container area is indoors with easy access to all containers. The containers, four per pallet are moved to the loading dock by use of an "EE" fork lift (explosion-proof, non-sparking motor). The containers are then loaded onto the transporter trucks.

Tanks:

When the tank contents reach 4700 gallons, a permitted hazardous waste transporter is contacted to ship the waste to a TSD facility.

The tanks are drained by connecting a drain hose from the truck to the tank. The truck uses a vacuum system to pull the waste into the tanker trailer. Levels of the tank are checked constantly while filling by manually dipping the tanks. The Techs and drivers presently use all safety equipment including goggles, hard hats, rubbersuits, acid/solvent gloves, and rubber boots. Located just east of the loading area is a safety eyewash/shower with easy access. When the waste pickup has been completed, the Tech completes the proper paperwork, makes certain the truck displays the appropriate placards, and examines the surrounding area for any spills which are cleaned up immediately.

F.4.b Runoff:

Runoff from storage areas is described in Section D.1.d. Section B describes the flood plain runoff.

F.4.c Water Supplies:

Ground water contamination is prevented by eliminating the discharge of hazardous materials onto the unprotected ground. The containment structures used are detailed in Section D.2.c.

F.4.d Equipment and Power Failure:

In the event of a brief power interruption, emergency generators will be started to maintain process operations, and the emergency lighting system will activate automatically supplying lighting to all facility buildings and property. If there is a prolonged power outage, process equipment will not be operating, and thus wastes will not be generated.

F.4.e Personnel Protection Equipment:

General information concerning the major chemical components of the wastes in the containers and tanks is provided in Section C - Analysis Plan. Section C presents information regarding various waste streams' toxicity, fire and explosion hazards, and corrosivity. Available protective equipment is presented under Emergency Equipment and Provisions of the Contingency Plan (see Section G.5). Use of protective equipment is covered in the initial and annual Personnel Training Programs (see Section H.1.b), which satisfies the Occupational Safety and Health Standards of 29 CFR Part 1910 Subpart I Personal Protective Equipment.

F.5 Prevention of Reaction of Ignitable, Reactive, or Incompatible Wastes:

F.5.a Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Waste:

Flammable Storage #4 (ignitable waste) and the solvent storage tank are the only areas on the facility property where ignitable wastes are stored. The containers and tanks, as discussed in Section D.1, are compatible with the contained wastes; therefore, the only source of ignition is external to the containers. To prevent a possible source of external ignition, no sparking equipment or flames are allowed in either area. The "Solvent" tank is covered and sealed. Signs are on the areas with legends: "Danger - No Smoking" and "Danger - All Unauthorized Personnel Keep Out."

F.5.b General Precaution for Handling Ignitable Wastes or Accidentally Mixing Incompatible Wastes:

General precautions for handling ignitable or reactive wastes were discussed above. Job specifications prohibit the mixing of "new, non-routine", or incompatible wastes, The storage areas for corrosive and ignitable wastes are in separate rooms ad described in Section D.1.d.

F.5.c Management of Ignitable or Reactive Wastes in Containers:

Precautions taken in the container storage area to prevent accidental fire and explosion include the proper storage of containers (e.g., stacking, labeling, and sealing of containers), sloped drains,

and appropriate warning signs. Prior to storage, each container is sealed and labelled. This prevents moisture from entering the drum and identifies the contents of the container and the date wastes are accumulated. Containers are stored on pallets to minimize contact with leaks, or spills, and are not stacked. The area just outside the container area is kept clear of all obstruction in order to allow a non-sparking forklift easy access to all drums. The area incorporates a fire sprinkler system which activates at 286 degrees F.

The flammable container storage area is located 600 feet from the closest company property line (see Exhibit B-2), which is in compliance with the National Fire Code Standards for outdoor storage of containers holding ignitable or reactive wastes.

F.5.d <u>Management of Incompatible Wastes in Containers:</u>

The container filling and storage areas for corrosive and solvent (flammable and nonflammable) wastes are located in different rooms as described in Section D.1.d. Since the areas are physically separated and all 5-gallon carboys brought to these reas are labelled for contents, the possibility of mixing these incompatible wastes are minimized. Once filled and labelled, the waste storage drums are not moved from their original storage area until they are shipped out for disposal. The area incorporates a fire sprinkler system which activates at 286 degrees F. Steel drum storage of Ignitable Wastes are recommended by the chemical suppliers.

F.5.e <u>Management of Ignitable or Reactive Wastes in Tanks:</u>

Only one of the 5,000 gallon tanks contains a flammable (ignitable) mixture. This flammable waste mixture is gravity fed through a piped system from its point of generation in the production area. Since it is an enclosed system, there is no possibility of mixing this waste stream with an incompatible waste.

The location of the waste storage tanks comply with the siting requirements for flammable liquids contained in the National Fire Protection Association's "Flammable and Combustible Liquid Code." Signetics' waste storage tanks are 850' from property line, 40' from an "important building," and 40' from load-bearing foundations.

Regular inspections, as discussed in Section F.2b(2) will be conducted to ensure safe operations. Venting of the tank is described in Section D.2.b.

F.5.f **Management of Incompatible Waste in Tanks:**

As described in Section D.2.c, each tank is separated from the other and is a separate unit. The waste mixtures are drained through a closed system from its point of generation in the production area. Since it is an enclosed system, there is no possibility of mixing the wastes with each other.

TABLE F-1

INSPECTION SCHEDULE

Area Equipment (Responsible Group)	Items to be Inspected	Types of Inspections	Frequency
Safety/Emergency Equipment (Chemical Support)	- Industrial Absorbents.	- Out of stock.	Daily
	- Air Purifying Respirator and cartridges.	- Clean, new cartridges.	Monthly
	- Shovels, garden hose.	- Broken or worn.	Monthly
	- Gloves, safety goggles, Safety suits, boots.	- Out of stock, worn out, clean, broken.	Monthly
Tank Storage Area (Chemical Support)	- Vault.	- Cracks, deterioration, uneven settling.	Weekly
	- Pipes, fittings, valves.	- Leaks, corrosion, damage.	Weekly
	- Warning signs.	- Damaged, missing.	Weekly
	- Tank shell.	- Corrosion, discoloration, cracks, leakage.	
	- Chemical feed lines.	-Cracks, deterioration, corrosion, leakage.	Weekly
	- Presence of odors.	-Leakage.	Daily
	- Level of wastes.	-High level.	Daily
Tank-internal (Facilities)	- Tank shell.	-Corrosion, cracking, bulging.	Every 2 years
Container Storage Area (Chemical Support)	- Drums.	- Corrosion, in proper section, leaks, spills, open lids.	Daily
	- Labeling on drums.	- Improper ID, date missing.	Daily
	- Personal Protective Equipment.	- All items present and clean.	Daily
	- Structural.	- Floors, doors, roofs, intact.	Daily
	- Spills.	- No visible chemical spills.	Daily
	- Signs.	- All signs undamaged.	Daily
	- Doors.	- Unlocked.	Daily
	- Drains.	- Plugged, corrosion.	Weekly
	- Aisle space.	- Items piled up in front of storage.	Daily
	- Forklift.	- Non-functional.	Daily

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TABLE F-1 (Continued)

Area/Equipment Responsible Group	Items to be Inspected	Types of Problems	Frequency
- Security Devices (Security Department)	- Radio Communication	- All Units Operational.	- Upon Failure
	- Telephone System	- All Lines Operational.	- Upon Failure
	- Emergency Paging System	- All Lines Operatioal.	- Monthly
	- Emergency Shower/Eyewash	- Water Pressure, Leaking, Upkeep.	- Monthly
	- Air packs	- Air pressure, hose and mask condition.	- Monthly
	- Fire Extinguishers	- Needs charging.	- Monthly
	- Fire Alarm System	- Power failure.	- Per NFPA
	- Emergency Lighting System	- Lights.	- Per NFPA
	- Property Line Fence	- Corrosion, Damage to fence.	- Daily
	- First Aid Equipment and Supplies	- Items out of stock or in-operative	- As used
	- Security Cameras	- All units operational	- Upon Failure
	- Sprinkler System	- Sprinkler pressures.	- 2 x/yr

NFPA = National Fire Protection Association.

TABLE F-2

INSPECTION SCHEDULE FOR DRUMMED HAZARDOUS WASTE STORAGE

ITEM	DAILY	WEEKLY	MONTHLY
- Visual inspection of area for containers in proper section (By Classification).	X		
- Visual inspection of waste containers for leaking or deterioration.	X		
- Inspection for proper container marking as per Signetics' Specification #854-5004.	X		
- Inspection for proper segregation of waste as per Signetics' Specification #854-5004.	X		
- Check height of drum stacking (no stacking allowed).	X		
- Visual inspection of walls, floors, and ceiling for discoloration and stains.	X		
- Check for locked doors to storage areas.		X	
- Inspect slotted drains in storage areas.		X	
- Check emergency showers.			X
- Check warning signs on exterior of containment rooms.	X		
- Check for aisle space needed for drum movement.	X		
- Check that drums are elevated on pallets.	X		
- Check inventory of industrial absorbents used to contain spills or leaks per inventory list.	X		
- Check forklift for corrosion, malfunction.	X		

The above inspections are performed by Chemical Support Technicians.

TABLE F-3

INSPECTION LOG FOR DRUMMED HAZARDOUS WASTE STORAGE

ITEM	FREQUENCY	RECORD INSPECTION SATISFACTORY	RECORD INSPECTION UNSATISFACTORY
1. Visual inspection of area for containers in proper section.	Daily	_____	_____
2. Visual inspection of waste containers for leaking or discoloration.	Daily	_____	_____
3. Inspection for proper container marking/per Signetics' Specification #854-5004.	Daily	---------	---------
4. Inspection for proper segregation of waste per Signetics' Specification #854-5004	Daily	---------	---------
5. Check height of drum stacking (no stacking allowed).	Daily	_____	_____
6. Visual inspection of walls, floors, and ceiling for discoloration and stains.	Daily	---------	---------
7. Check for locked doors.	Daily	---------	---------
8. Inspect slotted drains.	Weekly	---------	---------
9. Check emergency showers.	Monthly	---------	---------
10. Check warning signs on exterior of containment rooms.	Daily	---------	---------
11. Check for aisle space needed for drum movement 20".	Daily	---------	---------
12. Check that drums are elevated on pallets.	Daily	---------	---------
13. Check inventory of chemical absorbents used to contain spills or leaks per Inventory List.	Daily	---------	---------
14. Check forklift for corrosion, malfunction.	Daily	---------	---------

Necessary Action:----------

Environmental Affairs Notified of Discrepancy By:----------Date:----------

Inspected by:---------- Shift:---------- Date:---------- Time:----------am/pm

Action was completed by:---------- Date:----------

THIS RECORD WILL BE RETAINED AT CHEMICAL SUPPORT FOR THE LIFE OF THE FACILITY

TABLE F-4

INSPECTION SCHEDULE FOR HAZARDOUS WASTE STORAGE TANKS

ITEM	DAILY	WEEKLY
1. Visual Inspection of Vault Cover & Ladder:		
. Corroding parts		X
. Loose rivets or bolts		X
. Worn or broken parts		X
2. Visual Inspection of Waste Tanks:		X
. Discoloration of paint		X
. Cracks at connections, seams		X
. Buckles, bulges		X
. Water collection on tank top		X
. Vents are clear		X
3. Electrical:		
. Light bulb on		X
. Corrosion on conduit		X
. Defective switches for lights		X
. Vent fan on	X	
4. Visual Inspection of Vault:		
. Rust spots		X
. Blisters, film-lifting		X
. Cracks or spalled concrete		X
. Low spots where liquids can collect		X
. Anchor bolt distortion		X
. Presence of odors	X	
5. Visual Inspection of Piping:		
. Cracks and distortion		X
. Bulging		X
. Corrosion		X
. Leaks	X	
. Flange seal leaks	X	
. Loose or corroded bolts		X
. Inspect trench for liquids		X
6. Check Tank Levels:		
. Waste Hydrofluoric Acid	X	X
. Waste BOE	X	
. Waste Solvent	X	

The above inspections are performed by Chem Support Technicians.

TABLE F-5
INSPECTION LOG FOR HAZARDOUS WASTE STORAGE TANKS

ITEM	FREQUENCY	RECORD INSPECTION SATISFACTORY	RECORD INSPECTION UNSATISFACTORY
1. Visual Inspection of Vault Cover and Ladder	Weekly	---------	---------
. Corroding parts	Weekly	---------	---------
. Loose rivets or bolts	Weekly	---------	---------
2. Visual Inspection of Waste Tanks:			
. Discoloration of paint	Weekly	---------	---------
. Cracks at connections, seams	Weekly	---------	---------
. Buckles, bulges	Weekly	---------	---------
. Water collection on tank top	Weekly	---------	---------
. Vents are clear	Weekly	---------	---------
3. Electrical:			
. Light bulb on	Weekly	---------	---------
. Corrosion on conduit	Weekly	---------	---------
. Defective switches for lights	Weekly	---------	---------
. Vent fan on	Daily	---------	---------
4. Visual Inspection of Vault:		---------	---------
. Rust spots	Weekly	---------	---------
. Blisters, film-lifting	Weekly	---------	---------
. Cracks or spalled concrete	Weekly	---------	---------
. Low spots where liquids can collect	Weekly	---------	---------
. Anchor bolt distortion	Weekly	---------	---------
. Presence of odors	Daily	---------	---------
5. Visual Inspection of Piping:		---------	---------
. Cracks and distortion	Weekly	---------	---------
. Bulging	Weekly	---------	---------
. Corrosion	Weekly	---------	---------
. Leaks	Daily	---------	---------
. Flange seal leaks	Daily	---------	---------
. Loose or corroded bolts	Weekly	---------	---------
. Inspect trench for liquids	Weekly	---------	---------
6. Check Tank Levels:			
. Waste Hydrofluoric Acid	Daily	FT-------	IN-------
. Waste BOE	Daily	FT-------	IN-------
. Waste Solvent	Daily	FT-------	IN-------

Necessary Action----------

Environmental Affairs Notified if Discrepancy: ----------

Inspected by:---------- Shift:-------- Date:---------- Time:--------am/pm

SECTION F

PROCEDURES TO PREVENT HAZARDS

The information provided in this section is submitted in accordance with the requirements of HWMR 302.A.4.b.(d),(e),(f),(h),(i). Other regulations addressed to complete this section include HWMR 206.B.4, 206.B.5, 206.B.7, 206.C.4.e, and 206.C.5.d.

F.1 Security:

F.1.a Security Procedures and Equipment:

F.1.a(1) 24-Hour Surveillance System:

Security at Signetics-Albuquerque is provided by Safety and Security Department whose primary task is to monitor entry and exit from the facility, provide security measures for the facility as a whole, and assist in safety measures. Additional guards are subcontracted by Signetics. In the Security Control Center by the lobby entrance, the guards are able to monitor the facility and outside fence by the use of a modular command unit. This unit monitors all outside doors, smoke detectors, duct detectors, the fire system for the plant, and access to the gate into the Shipping/Receiving area. If any alarms are set off, guards are dispatched to that area to investigate. The Security Control Center is manned by two guards 24 hours a day, 7 days a week.

During plant shutdowns, the guards conduct a walkthrough every hour. During the hours of 6:00 p.m. and 6:00 a.m., the guards patrol all areas every two hours. The guards normally work 12-hour shifts.

The guards carry hand-held, two-way radios to report any problems immediately. In addition to the radios, a base station for the speaker system is located in the Control Center. An internal phone system is also available for use by the guards.

Emergency alarm pull stations are also located throughout the facility. All hazardous waste personnel are equipped with pagers so that security personnel can communicate with them.

A television monitor system is installed which has cameras located in the fenced shipping/receiving area with the video screen in the Security Control Center.

F.1.a(2) Barrier and Means to Control Entry:

F.1.a(2)(a) Barrier

The entire area, where the hazardous waste storage is located, is enclosed within a 10-foot-high chain link fence. The only entrance is through the Shipping/Receiving gate which is controlled remotely through shipping. The gate is monitored by Security every time the gate is opened. The hazardous waste containers are located inside the fence and behind locked doors.

F.1.a(2)(b) Means to Control Entry:

Access to the facility is controlled by the guards at the plant entrance. All employees are required to show identification badges when reporting to work, and visitors and contractors entering the facility must sign a log sheet and obtain visitor badges. Access to the hazardous waste storage areas are limited to Chemical Support and Facility personnel only. All doors are locked. Other persons requiring access to the rooms must obtain permission from the Chemical Support Section Head and be escorted by an employee of the Chemical Support Department. The hazardous waste tank storage area is located outdoors with tanks underground in protective vaults with metal covers. Access to the vaults is limited to trained personnel who are properly suited with safety equipment.

F.1.a(3) Warning Signs:

Signs which are legible from a distance of 25 feet are posted at the fence gate and on all doors leading into storage areas. The signs are in english and spanish and bear the legend "Danger - All Unauthorized Personnel Keep Out/Peligro - Personal Autorizado Solamente." Also, "Danger - No Smoking" signs have been posted in those areas holding ignitable material.

F.1.b Waiver:

The Signetics-Albuquerque facility does not request a waiver of the requirements stated in HWMR 206.B.4.a. regarding injury to intruders and violations by intruders.

F.2 Inspection Schedule:

F.2.a General Inspection Requirements:

The personnel at Signetics-Albuquerque conduct regular inspections of the facility for structural deterioration, operator errors, equipment

malfunctions, and discharges that could cause or lead to the release of hazardous waste constituents and adversely affect the environmentor threaten human health. Facility security personnel conduct inspections of all plant areas for general health, security, fire, and structural problems. The hazardous waste container and hazardous waste tank storage areas are inspected daily by Chemical Support personnel.

Table F-1 shows the inspection schedule used at Signetics - Albuquerque. The items listed in the Exhibit are considered important because of their role in preventing, detecting, or responding to environmental or human health hazards. Provided on the schedule is a list of problems normally encountered and a designation of the facility department that will conduct the inspection.

F.2.a(1) Types of Problems:

The types of potential problems that are identified during the inspection are also listed in Table F-1.

F.2.a(2) Frequency of Inspection:

The frequency of inspection as well as the facility department that will conduct the inspections are also listed in Table F-1.

F.2.b Specific Process Inspection Requirements:

F.2.b(1) Container Inspection:

Inspections of the container storage area will be conducted by the Chemical Support Department per the inspection schedule labelled. "Inspection Schedule for Drummed Hazardous Waste Storage" (See Tables F-2 and F-3). The Inspection Schedule attached to the Inspection Log notes the items to be inspected and the frequency of that inspection. Typical problems encountered with each item of the inspection are provided on the inspection schedule to serve as a reminder to the inspector and to ensure a complete inspection. The inspector is required to check the status of each item and indicate whether its condition is acceptable or unacceptable. If the status of a particular item is unacceptable, appropriate and complete information is recorded, including date and nature of repairs and remedial action.

The inspection sheets are filed in a 3-ring binder in the Chemical Support Office. (A description of the container storage area is detailed in Section D.1.d).

F.2.b(2) Tank Inspection:

Inspections of the tank storage area will be conducted by the Chemical Support Department per the inspection schedule labelled "Inspection Schedule for H. W. Storage Tanks" (See Tables F-4 and F-5). Upon completion of the inspection logs, the sheets will be maintained in a 3-ring binder in the Chemical Support Office (A description of the storage tank area is detailed in Section D.2).

Visual inspections will be completed daily or weekly as follows: the inspector will enter the vault area through the vault cover; the inspector will examine the tank, vault walls, lighting system, and waste feedlines for cracks, leaks, corrosion or erosion of surface; the inspector will also examine whether there has been any accumulation of spills or precipitation in the bottom of the vault. This inspection will be completed from the top of the tank using the vault lighting system and flashlights. Any discrepancies will be recorded on the log and reported to the Chem Support Section Head.

The overfilling control equipment is the secondary containment vault in which each storage tank is contained. Normally, trucks are scheduled in advance for tank emptying. If the tank is overfilled, the waste will collect into the vault. The production process areas will be immediately shut down through verbal communications and a licensed hazardous waste transporter will be contracted to drain the vault and the tank. The vaults are designed to contain any spill-over that may occur (see Section D.2.c).

The mechanism for waste feed cut-off is by verbal notification to the Production Manager who will halt production at the affected drains. Waste feed cut-off systems are not used for safety measures. The wastes would back up into the production equipment and emergency showers causing a health and cleanup hazard. The vaults provide a means where there is minimal exposure of hazardous wastes to employees should there be a tank spill or overflow.

At least once every 5 years, during production shutdown, the vault covers will be removed and a complete inspection of the tank and vault will be made. A ladder will be lowered into the vault so that all areas of the tank and vault are examined. The storage tanks will be emptied by the use of a waste disposer, and inspections will be made of the interior of the tank. Those items inspected will be corrosion, cracking, and bulging of the tank. The inspector will be fully clothed in safety protective gear with air packs. Care will be taken to ensure the avoidance of spills, avoidance of hazardous conditions (reaction, ignition, or toxic exposure), proper cleaning procedures, proper ventilation, adequate lighting and standby and safety equipment

are available. An outside lab will be contracted to perform the following:

a) Interior inspection of the solid-steel tanks:
   1) Roof and Structural Supports
      a) Loss of metal thickness by ultrasonic examination
      b) Cracks and leaks around or at weld joints
      c) Cracks and leaks at all nozzle connections
      d) Visual examination for corrosion

   2) Tank Shell
      a) Cracking of plate joints
      b) Loss of metal thickness by ultrasonic examination
      c) Cracks or splitting at seams
      d) Visual examination for corrosion

   3) Tank Bottom
      a) Unevenness of the bottom
      b) Visual examination for corrosion, pitting
      c) Cracks or splitting at seams
      d) Hammer testing for weak spots
      e) Metal thickness

b) Interior inspection of fiberglass-reinforced-plastic tanks:
   1) Visual examination for bulging, cracking, exposed fibers, splitting or discoloration
   2) Cracks at nozzle connections
   3) Hardness test
   4) Ultrasonic examination of laminate thickness, and
   5) Air bubble detection by translucency

F.2.c **Remedial Action:**

If inspections reveal that non-emergency maintenance is needed, they will be completed as soon as possible to preclude further damage and reduce the need for emergency repairs. If a hazard is imminent or has already occurred during the course of an inspection or any time between inspections, remedial action will be taken immediately. Signetics personnel will notify the appropriate authorities per the Contingency Plan (see Section G.4) and initiate remedial actions. In the event of an emergency involving the release of hazardous constituents to the environment, efforts will be directed towards containing the hazard, removing it, and subsequently decontaminating the affected area. Refer to the Contingency Plan for further details (Section G.4).

F.2.d **Inspection Log:**

An inspection log for each area is maintained as part of the Facility Hazardous Waste Operations Record for each calendar year in separate 3-ring binders. These logs will be maintained for the life of the facility.

F.3 **Waiver of Preparedness and Prevention Requirements:**

The applicant does not wish to request a waiver of the preparedness and prevention requirements under HWMR 206.B.9.

F.4 **Preventive Procedures, Structures, and Equipment:**

Sufficient aisle space is maintained for personnel and equipment access. The aisle spacing is also inspected daily. (See exhibit D-3).

F.4.a **Loading/Unloading Operations:**

Loading/unloading operations in the facility involve the transfer of material to the container storage areas as described in Section D.1.b. When the containers are prepared for shipment, there is ample space to move the containers by fork lift. The container area is indoors with easy access to all containers. The containers, four per pallet, are moved to the loading dock by use of an "EE" fork lift (explosion-proof, non-sparking motor). The containers are then loaded onto the transporter trucks.

Tanks:

When the tank contents reach 4700 gallons, a permitted hazardous waste transporter is contacted to ship the waste to a TSD facility.

The tanks are drained by connecting a drain hose from the truck to the tank. The truck uses a vacuum system to pull the waste into the tanker trailer. Levels of the tank are checked constantly while filling by manually dipping the tanks. The Techs and drivers presently use all safety equipment including goggles, hard hats, rubbersuits, acid/solvent gloves, and rubber boots. Located just east of the loading area is a safety eyewash/shower with easy access. When the waste pickup has been completed, the Tech completes the proper paperwork, makes certain the truck displays the appropriate placards, and examines the surrounding area for any spills which are cleaned up immediately.

F.4.b **Runoff:**

Runoff from storage areas is described in Sectio D.1.d. Section B describes the flood plain runoff.

F.4.c **Water Supplies:**

Ground water contamination is prevented by eliminating the discharge of hazardous materials onto the unprotected ground. The containment structures used are detailed in Section D.2.c.

F.4.d **Equipment and Power Failure:**

In the event of a brief power interruption, emergency generators will be started to maintain process operations, and the emergency lighting system will activate automatically supplying lighting to all facility buildings and property. If there is a prolonged power outage, process equipment will not be operating, and thus wastes will not be generated.

F.4.e **Personnel Protection Equipment:**

General information concerning the major chemical components of the wastes in the containers and tanks is provided in Section C - Analysis Plan. Section C presents information regarding various waste streams' toxicity, fire and explosion hazards, and corrosivity. Available protective equipment is presented under Emergency Equipment and Provisions of the Contingency Plan (see Section G.5). Use of protective equipment is covered in the initial and annual Personnel Training Programs (see Section H.1.b), which satisfies the Occupational Safety and Health Standards of 29 CFR Part 1910 Subpart I Personal Protective Equipment.

F.5 **Prevention of Reaction of Ignitable, Reactive, and Incompatible Wastes:**

F.5.a **Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Waste:**

Flammable Storage #4 (ignitable waste) and the solvent storage tank are the only areas on the facility property where ignitable wastes are stored. The containers and tanks, as discussed in Section D.1, are compatible with the contained wastes; therefore, the only source of ignition is external to the containers. To prevent a possible source of external ignition, no sparking equipment or flames are allowed in either area. The "Solvent" tank is covered and sealed. Signs are on the areas wih legends: "Danger - No Smoking" and "Danger - All Unauthorized Personnel Keep Out."

F.5.b **General Precaution for Handling Ignitable or Reactive Wastes or Accidentally Mixing Incompatible Wastes:**

General precautions for handling ignitable or reactive wastes were discussed above. Job specifications prohibit the mixing of "new, non-routine", or incompatible wastes. The storage areas for corrosive and ignitable wastes are in separate rooms as described in Section D.1.d.

F.5.c **Management of Ignitable or Reactive Wastes in Containers:**

Precautions taken in the container storage area to prevent accidental fire and explosion include the proper storage of containers (e.g., stacking, labelling, and sealing of containers), sloped drains, and appropriate warning signs. Prior to storage, each container is sealed and labelled. This prevents moisture from entering the drum and identifies the contents of the container and the date wastes are accumulated. Containers are stored on pallets to minimize contact with leaks, or spills, and are not stacked. The area just outside the container area is kept clear of all obstructions in order to allow a non-sparking forklift easy access to all drums. The area incorporates a fire sprinkler system which activates at 286°F.

The flammable container storage area is located 600 feet from the closest company property line (see Exhibit B-2), which is in compliance with the National Fire Code Standards for outdoor storage of containers holding ignitable or reactive wastes.

F.5.d **Management of Incompatible Wastes in Containers:**

The container filling and storage areas for corrosive and solvent (flammable and nonflammable) wastes are located in different rooms as described in Section D.1.d. Since the areas are physically separated and all 5-gallon carboys brought to these areas are labelled for contents, the possibility of mixing these incompatible wastes are minimized. Once filled and labelled, the waste storage drums are not moved from their original storage area until they are shipped out for disposal. The area incorporates a fire sprinkler system which activates at 286°F. Steel drum storage of Ignitable Wastes are recommended by the chemical suppliers.

F.5.e **Management of Ignitable or Reactive Wastes in Tanks:**

Only one of the 5,000 gallon tanks contains a flammable (ignitable) mixture. This flammable waste mixture is gravity fed through a piped system from its point of generation in the production area. Since it is an enclosed system, there is no possibility of mixing this waste stream with an incompatible waste.

The location of the waste storage tanks comply with the siting requirements for flammable liquids contained in the National Fire Protection Association's "Flammable and Combustible Liquid Code." See Section D.2.b.

Regular inspections, as discussed in Section F.2b(2) will be conducted to ensure safe operations. Venting of the tank is described in Section D.2.b.

F.5.f **Management of Incompatible Waste in Tanks:**

As described in Section D.2.c, each tank is separated from the other and is a separate unit. The waste mixtures are drained through a closed system from its point of generation in the production area. Since it is an enclosed system, there is no possibility of mixing the wastes with each other.

TABLE F-1

INSPECTION SCHEDULE

Area/Equipment (Responsible Group)	Items to be Inspected	Types of Inspections	Frequency
Safety/Emergency Equipment (Chemical Support)	Industrial Absorbents,	Out of stock	Daily
	Air Purifying Respirator and cartridges,	Clean, new cartridges	Monthly
	Shovels, Garden Hose,	Broken or worn	Monthly
	Gloves, Safety Goggles, Safety Suits, Boots,	Out of stock, worn out, clean, broken	Monthly
Tank Storage Area (Chemical Support)	Vault	Cracks, deterioration, uneven settling	Weekly
	Pipes, Fittings, Valves	Leaks, corrosion damage	Weekly
	Warning Signs	Damaged, missing,	Weekly
	Tank Shell	Corrosion, discoloration, cracks, leakage	
	Chemical Feed Lines	Cracks, deterioration, corrosion, leakage	Weekly
	Presence of odors	Leakage	Daily
	Level of Wastes	High level	Daily
Tank-internal Facilities	Tank Shell	Corrosion, cracking, bulging	Every 5 Years
Container Storage Area (Chemical Sup.)	Drums	Corrosion, in proper section, leaks, spills, open lids	Daily
	Labeling on Drums	Improper ID, date missing	Daily
	Personal Protective Equipment	All items present and clean	Daily
	Structural	Floors, doors, roofs intact	Daily
	Spills	No visible chemical spills	Daily
	Signs	All signs undamaged	Daily
	Doors	Unlocked	Daily
	Drains	Plugged, corrosion	Weekly
	Aisle Space	Items piled up in front of storage	Daily
	Forklift	Non-functional	Daily

TABLE F-1 (Continued)

Area/Equipment Responsible Group	Items to be Inspected	Types of Problems	Frequency
Security Devices (Security Dept.)	Radio Communication	All Units Operational	Upon Failure
	Telephone System	All Lines Operational	Upon Failure
	Emergency Paging System	All Lines Operational	Monthly
	Emergency Shower/Eye-wash	Water Pressure, Leak-age, upkeep	Monthly
	Air packs	Air pressure, hose and mask condition	Monthly
	Fire Extinguishers	Needs Charging	Monthly
	Fire Alarm System	Power Failure	Per NFPA
	Emergency Lighting System	Lights	Per NFPA
	Property Line Fence	Corrosion, Damage to Fence	Daily
	First Aid Equipment and supplies	Items out of stock or inoperative	As used
	Security cameras	All units operational	Upon Failure
	Sprinkler System	Sprinkler pressures	2 X/yr.

NFPA = National Fire Protection Association.

TABLE F-2

INSPECTION SCHEDULE FOR DRUMMED HAZARDOUS WASTE STORAGE

Item	DAILY	WEEKLY	MONTHLY
Visual inspection of area for containers in proper section	X		
Visual inspection of Waste containers for leaking or deterioration	X		
Inspection for proper container marking	X		
Inspection for proper segregation of waste	X		
Check height of drum stacking (not to exceed double stacking, no stacking for ignitables)	X		
Visual inspection of walls, floors, and ceiling for discoloration and stains	X		
Check for locked doors		X	
Inspect slotted drains		X	
Check emergency showers			X
Check fire extinguisher			X
Check warning signs on exterior of containment rooms	X		
Check for aisle space needed for drum movement	X		
Check that drums are elevated on pallets	X		
Check inventory of industrial absorbents used to contain spills or leaks	X		
Check forklift for corrosion, malfunction	X		

The above inspections are performed by Chemical Support Techs.

TABLE F-3

INSPECTION LOG FOR DRUMMED HAZARDOUS WASTE STORAGE

	ITEM	FREQ.	RECORD INSPECTION
1.	Visual inspection of area for containers in proper section	Daily	_____
2.	Visual inspection of waste containers for leaking or discoloration	Daily	_____
3.	Inspection for proper container marking	Daily	_____
4.	Inspection for proper segregation of waste	Daily	_____
5.	Check height of drum stacking (not to exceed double stacking, no stacking for ignitables)	Daily	_____
6.	Visual inspection of walls, floors, and ceiling for discoloration and stains	Daily	_____
7.	Check for locked doors	Daily	_____
8.	Inspect slotted drains	Weekly	_____
9.	Check emergency showers	Monthly	_____
10.	Check fire extinguisher	Monthly	_____
11.	Check warning signs on exterior of containment rooms	Daily	_____
12.	Check for aisle space needed for drum movement	Daily	_____
13.	Check that drums are elevated on pallets	Daily	_____
14.	Check inventory of chemical absorbents used to contain spills or leaks	Daily	_____
15.	Check forklift for corrosion, malfunction	Daily	_____

Necessary Action:_____

_____

_____

_____

Inspected by:_____ Shift:_____ Date:_____ Time:_____

Action was completed by:_____ Date:_____

THIS RECORD WILL BE RETAINED AT CHEMICAL SUPPORT FOR A MINIMUM OF 3 YEARS

TABLE F-4

INSPECTION SCHEDULE FOR HAZARDOUS WASTE STORAGE TANKS

ITEM	DAILY	WEEKLY
1. Visual Inspection of Vault Cover & Ladder:		
. Corroding parts		X
. Loose rivets or bolts		X
. Worn or broken parts		X
2. Visual Inspection of Waste Tanks:		
. Discoloration of paint		X
. Cracks at connections, seams		X
. Buckles, bulges		X
. Water collection on tank top		X
3. Electrical		
. Light bulb on		X
. Corrosion on conduit		X
. Defective switches for lights		X
. Vent fan on	X	
4. Visual Inspection of Vault		
. Rust spots		X
. Blisters, film-lifting		X
. Cracks or spalled concrete		X
. Low spots where liquids can collect		X
. Anchor bolt distortion		X
. Presence of odors	X	
5. Visual Inspection of Piping		
. Cracks and distortion		X
. Bulging		X
. Corrosion		X
. Leaks	X	
. Flange seal leaks	X	
. Loose or corroded bolts		X
. Inspect trench for liquids		X
6. Check Tank Levels		
. Waste Hydrofluoric Acid	X	
. Waste BOE	X	
. Waste Solvent	X	

The above inspections are performed by Chem Support Techs.

TABLE F-5

INSPECTION LOG FOR HAZARDOUS WASTE STORAGE TANKS

ITEM	FREQ.	RECORD INSPECTION
1. VISUAL INSPECTION OF VAULT COVER AND LADDER		
. Corroding parts	Weekly	_____
. Loose rivets or bolts	Weekly	_____
. Worn or broken parts	Weekly	_____
2. VISUAL INSPECTION OF WASTE TANKS:		
. Discoloration of paint	Weekly	_____
. Cracks at connections, seams	Weekly	_____
. Buckles, bulges	Weekly	_____
. Water collection on tank top	Weekly	_____
3. ELECTRICAL:		
. Light bulb on	Weekly	_____
. Corrosion on conduit	Weekly	_____
. Defective switches for lights	Weekly	_____
. Vent fan on	Daily	_____
4. VISUAL INSPECTION OF VAULT:		
. Rust spots	Weekly	_____
. Blisters, film-lifting	Weekly	_____
. Cracks or spalled concrete	Weekly	_____
. Low spots where liquids can collect	Weekly	_____
. Anchor bolt distortion	Weekly	_____
. Presence of odors	Daily	_____
5. VISUAL INSPECTION OF PIPING:		
. Cracks and distortion	Weekly	_____
. Bulging	Weekly	_____
. Corrosion	Weekly	_____
. Leaks	Daily	_____
. Flange seal leaks	Daily	_____
. Loose or corroded bolts	Weekly	_____
. Inspect trench for liquids	Weekly	_____
6. CHECK TANK LEVELS:		
. Waste Hydrofluoric Acid	Daily	____FT____IN
. Waste BOE	Daily	____FT____IN
. Waste Solvent	Daily	____FT____IN

Necessary Action:_____

_____

_____

_____

Inspected by:_____ Shift:_____ Date:_____ Time:_____

Action was Completed by:_____ Date:_____

THIS RECORD WILL BE RETAINED AT FACILITIES FOR A MINIMUM OF 3 YEARS.

SECTION G

CONTINGENCY PLAN

This Contingency Plan is designed to minimize hazards to human health or the environment from fires, explosions, or any unplanned sudden or nonsudden release of hazardous waste or hazardous constituents to air, soil, or surface water. The provisions of the plan will be carried out immediately whenever there is a fire, explosion, spill or release of hazardous waste constituents which could threaten human health or the environment. The plan is submitted in compliance with New Mexico Hazardous Waste Management Regulations 1984 Part 206.B.10.

G.1 General Information:

Name:	Signetics Corporation (NMD 000709782)
Location:	9201 Pan American Freeway, N.E. Albuquerque, NM 87113
Phone:	(505) 822-7000, 822-7188
Operation:	Generator and Storer Metal-oxide semiconductor Integrated Circuits Manufacturing (SIC 3674)
Site Plan:	See Exhibit G-1
Description of Activities:	1 x 5000 gal. waste Hydrofluoric Acid storage tank. 1 x 5000 gal. waste Buffered Oxide Etch storage tank. 1 x 5000 gal. waste "Solvent" storage. 100 x 55 gal. drummed hazardous waste storage. Exhibit G-4 includes a maximum inventory of virgin chemicals, should contingencies arise.

G.1.a **Waste Description:**

This section describes the chemical and physical nature of the Hazardous Wastes stored at the Signetics Albuquerque facility:

Waste Name	Disposition	Approximate Quantity (1984)
a) Waste Solvent I	5000/gl Tank Storage	40,000 Gallons
b) Waste Hydro-fluoric Acid	5000/gl Tank Storage	50,000 Gallons
c) Waste Buffered Oxide Etch	5000/gl Tank Storage	30,000 Gallons
d) Arsenic Contam-inated Wastes	55/gl Drum Storage	2 Drums
e) Waste Solvent II	55/gl Drum Storage	15 Drums
f) Mercury-contam-inated Wastes	55/gl Drum Storage	2 Drums

a) Waste Solvent I (flash pt. 120 degrees F) - These photolithographic cleaning wastes consist primarily of: Methanol (flash pt. 54 degrees F), Acetone (flash pt. 15 degrees F), Ethylene Glycol (flash pt. 240.8 degrees F), Ethanolamine (flash pt. 195 degrees F), Diethylene Glycol Monobutyl Ether, (flash pt. 230 degreed F), and water - pH 11-12. Due to the low flash points of several materials, it is assigned as category D001 and F003. There may also be trace levels (< 1%) of 1,1,1-Trichloroethane. Efforts are underway to decrease water content from draining into "Solvent" tank in order to allow for cost effective reclamation.

b) Waste Hydrofluoric Acid is a product of silicon oxide etching and consisting mainly of .1-5% Hydrofluoric Acid (pH < 1). Due to the low pH, it is assigned D002.

c) Waste Buffered Oxide Etch is also a product of silicon etching and includes Hydrofluoric Acid (0.1 - 5%) and Ammonium Fluoride (0.1 - 20%). The pH is 4. This waste is sometimes mixed with (c) for transport. It has also a high concentration of fluorides and is therefore segregated. It is assigned D002.

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d) Arsenic Contaminated Wastes: This group includes all materials that have been contaminated with solid arsenic like gloves, containers, and rags used in the handling of arsenic. While all of these are assigned as D004, not all may meet the extractability criteria, however, they are all viewed as potentially toxic and are disposed as such.

e) Waste Solvent II is drummed mixtures of proprietary vendor formulas of positive photoresists which include cellosolve acetate (flash pt. 124 degrees F), other glycol esters, and acetone (flash pt. 15 degrees F). This is classified as D001 and F003.

f) Mercury Waste: This group includes all materials that are contaminated with liquid mercury. This includes used mercury vapor lamps, broken mercury thermometers and any material used to clean up mercury spills. It is assigned D009.

Wastes designated for 5,000/gl tank storage are drained through plumbing connected to the manufacturing area. All plumbing are accessible to routine visual inspection, except the drain lines in the HW storage areas, CS1 and FS4.

Most drummed wastes are accumulated in the work area and removed as soon as the drum is full (within 72 hours) to the proper hazardous waste storage area. Other drums re situated in the storage area and small quantities are brought to the area and accumulated.

G.2 Emergency Coordination:

In the event of an emergency involving hazardous chemical release or discharge, the Emergency Coordinators have the responsibility of determining the extent of the hazard and the authority to initiate emergeny response. The Emergency Coordinators are accessible by telephone and pager (see below).

The Emergency Coordinators are familiar with all aspects of the facility Contingency Plan and the locations and characteristics of wastes handled. Secondary and backup Coordinators are also familiar with the above Hazardous Waste Management Contingency Plan. In addition, the Emergency Coordinators have the authority to commit the resources needed to carry out the Contingency Plan. Secondary and Backup coordinators are also familiar with above Hazardous Waste Management activities and plans and also, in the absence of Primary Emergency Coordinators, are authorized to carry out coordination responsibilities and actions.

Emergency Coordinators:

Primary

Pat Herring - Ext. 7255 or Pager #73
Safety and Security Manager
Home: 785-9 Tramway Ln., N.E.
Albuquerque, NM 87122
(505)

Gary M. Mavrakis - Ext. 7188 or Pager #163
Chemical Support Section Head
Home: 4504 Bryan, N.W.
Albuquerque, NM 87114
(505) 897-2773

Secondary

Bill Boyce - Ext. 7308
Human Resources Manager
Home: 5816 Nugget Avenue, N. E.
Albuquerque, NM 87111
(505) 292-6394

G.3 Implementation of the Contingency Plan:

The decision to implement the Contingency Plan depends upon whether or not an imminent or actual incident could threaten human health or the environment. The purpose of this section is to provide guidance to the emergency coordinator in making this decision by providing decision-making situations in those areas where HW is stored:

1. Fire and/or Explosion That Could Effect the HW Storage Areas:

   a. A fire causes the release of toxic fumes.

   b. The fire spreads and could possibly ignite materials at other locations onsite or could cause heat-induced explosions.

   c. The fire could possibly spread to offsite areas.

   d. Use of water or water and chemical fire suppressant could result in contaminated runoff.

   e. An imminent danger exists that an explosion could occur, causing a safety hazard because of flying fragments or shock waves.

f. An imminent danger exists that an explosion could ignite other hazardous waste at the facility.

g. An imminent danger exists that an explosion could result in release of toxic material.

h. An explosion has occurred.

2. Spills or Material Release:

a. The spill could result in release of flammable liquids or vapors, thus causing a fire or gas explosion hazard.

b. The spill could cause the release of toxic liquids or fumes.

c. The spill that could contaminate soil or water on site.

d. The spill cannot be contained onsite, resulting in offsite soil contamination and/or ground or surface water pollution.

G.4 Emergency Response Procedures: (HWMR 206.B.10.m):

G.4.a Notification:

Whenever there is an imminent or actual emergency situation, the Emergency Coordinator, or his designee when the emergency coordinator is not on call or the on scene personnel if the emergency coordinator is in route, must immediately:

(1) Activate internal facilities alarm or communication systems, where applicable, to notify all facility personnel; and
(2) Notify appropriate state or local agencies with designated response roles if their help is needed.

G.4.b Identification:

Whenever there is a release, fire, or explosion from the HW storage areas, the Emergency Coordinator will immediately identify the character, exact source, amount, and a real extent of any released materials. He may do this by observation or review of facility records or manifests and, if necessary, by chemical analysis.

G.4.c Assessment:

Concurrently, the emergency coordinator assesses possible hazards to human health and/or the environment that may result from the release, fire, or explosion. This assessment considers both direct and indirect effects of the release, fire, or explosion (e.g., the effects of any toxic, irritating, or asphyxiating gases that are generated, or chemical agents used to control fire and heat-induced explosions). If needed, the National Response Center will be called (800-424-8802).

If the emergency coordinator determines that the facility has had a release, fire, or explosion which could threaten health, or the environment, outside the facility, he will report his findings as follows:

(1) If his assessment indicates that evacuation of local areas may be advisable, he will immediately notify appropriate authorities. He is available to help appropriate officials decide whether local areas should be ecacuated; and

(2) He will immediately notify either the government officials designated as the on-scene coordinator for that geographical area (in the applicable regional contingency plan, or the National Response Center (using their 24-hour toll-free number (800) 424-8802 and the New Mexico Environmental Improvement Division (505) 827-9329.

The report includes:

a. Name and telephone number of reporter;
b. Name and address of facility;
c. Time and type incident (e.g., release, fire);
d. Name and quantity of material(s) involved to the extent known;
e. The extent of injuries, if any; and
f. The possible hazards to human health, or the environment, outside the facility.

G.4.d Control Procedures:

Potential accidents fall under three general classifications: (1) fire and/or explosions, (2) spills or material release, (3) floods. Natural disasters such as earthquakes or tornados are assumed to fall into one of these three classifications.

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Fire and/or Explosion:

The drum and tank storage areas can be easily accessed by fire-fighting and other emergency vehicles and equipment. Paved blacktop within these areas is kept clear at all times.

During times of power failure or severe weather, Security personnel will be assigned to protect personnel and property. If a fire should break out, concentration will be placed on preventing the fire from spreading to nearby areas.

The following actions will be taken in the areas affected by the fire or explosion:

1. Fire doors in buildings will be closed.
2. Hazardous work in all areas will be shut down immediately.
3. All additional equipment and ignition sources will be shut down, as necessary and practical.
4. The area will be cleared of all personnel not actively involved in fighting the fire. These persons are to report to the designated rally points for accountability.
5. Traffic will be blocked off.
6. All injured persons will be removed, and medical treatment will be administered by qualified personnel.
7. Signetics Safety and Security Department personnel will respond with extinguishers and fire hoses.

The switchboard operator will not be called unless absolutely necessary so that he remains free to handle only emergency calls.

Area or plan evacuation will be necessary in case of major fire or explosion. Specifics are outlined under general evacuation procedures (see exhibit G-2). All personnel have been trained in evacuation procedures and means of exit from their respective work areas. Until evacuation is signaled, personnel who are not in an affected area will stay in their respective work areas. Contract personnel and visitors will be cleared from the area and instructed to report to a security area or office area. An "all clear" signal will be given when the fire has been extinguished and the safety of personnel is no longer endangered. All emergency equipment used in the emergency must be cleaned and fit for use prior to resumption of plant operation in the affected areas.

Spills or Material Release:

In the event of a major emergency involving a chemical spill, the following general procedures will be used for rapid and safe response and control of the situation:

If an employee discovers a chemical spill or process upset resulting in a vapor release, he or she will immediately report it to the area supervisor.

The area supervisor will contact the Guard Station at the time of the incident. The Guard Station will then contact the Emergency Coordinator or their designee. When contacted, the Emergency Coordinator will obtain information pertaining to the following:

1. The material spilled or released.
2. Location of the release or spillage of hazardous material.
3. An estimate of quantity released and the rate at which it is being released.
4. The direction in which the spill or vapor or smoke release is heading. Any injuries involved.
5. Fire and/or explosion or possibility of these events.
6. The area and materials involved and the intensity of the fire or explosion.

This information will help the Emergency Coordinator to assess the magnitude and potential seriousness of the spill or release. If the accident is determined to lie within the company's emergency response capabilities, the Emergency Coordinator will contact and utilize the necessary inplant personnel. If the accident is beyond plant capabilities, the Emergency Coordinator will contact the appropriate agencies.

In the event of a leak or spill from drums in Flammable Storage #4, the released material will be contained due to the structure of the room and drain to the solvent tank. The level of the solvent tank will be checked by reading the digital level monitor located in the Chemical Support office.

The initial response to any emergency will be to protect human health and safety, and then the environment. Identification, containment, treatment, and disposal assessment will be the secondary response.

In the event of a leak or spill in the tank area, production will be halted. The vault surrounding the tank storage area has the capacity to hold the largest tank and any rainfall. Immediately after the spill is detected, a transporter will be summoned to remove any standing liquids and ship the spilled material to a TSD facility.

If, for some reason, a chemical spill is not contained within the vault, an area of isolation will be established around the spill. The size of the area will generally depend on the size of the spill and the materials involved. If the spill is large and involves a tank or a pipeline rupture, initial isolation of at least 100 feet from the nearest sewer drain will be used. Small spills or leaks from a tank or pipe will require evacuation of at least 50 feet in all directions to allow cleanup and repair and to prevent exposure. When any spill occurs, only those persons involved in overseeing or performing emergency operations will be allowed within the designated hazard area. If possible, the area will be roped or otherwise blocked off.

If the spill results in the formation of a toxic vapor cloud (by reaction with surrounding materials or by outbreak of fire) and its release (due to high vapor pressures under ambient conditions), further evacuation will be enforced. Where necessary, an area at least 500 feet wide and 1000 feet long will be evacuated downwind if volatile materials are spilled.

If a large quantity of spilled material ignites, neighboring residents and industries will be notified. Because winds in the areas tend to vary, the quickest and most accurate assessment of meteorological conditions is accomplished by calling the National Weather Service at (505) 243-1371 or 243-1453.

If the control and cleanup of a spill, release, or fire is within the capabilities of company personnel and local response teams, the New Mexico Environmental Improvement Division, the National Response Center or the City of Albuquerque Water Dept. will not be notified unless one of the following occurs:

- A spill discharges to the sewer or storm drains and the quantity of hazardous material spilled is equal to or greater than the reportable quantity specified under 40 CFR Part 117.
- The spill involves other hazardous materials not listed in CFR but used at the plant if they pose an actual or potential hazard to life or property.

G.4.e Prevention of Recurrence of Spread of Fires, Explosions, or Releases:

During the emergency, the Emergency Coordinator takes all reasonable measures necessary to ensure that fires, explosions, and releases do not occur, recur, or spread to other material or hazardous waste at the facility. These measures include, where applicable, stopping processes and operations, collecting and containing released waste, and removal and/or isolation of containers. If the facility stops operations in response to a fire, explosion or release, the Emergency oordinator will monitor for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment, wherever this is appropriate.

G.4.f Storage and Treatment of Released Material:

Immediately after an emergency, the Emergency Coordinator directs the treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other materials that results from release, fire, or explosion at the facility. (This will be carried out in accordance with all Hazardous Waste regulations.)

G.4.g Incompatible Wastes:

The Emergency Coordinator ensures that in the affected area(s) of the facility no waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed.

G.4.h Post-Emergency Equipment Maintenance:

After an emergency event, all emergency equipment listed in Section G5 will be cleaned so that it is fit for use or it will be replaced. Before operations are resumed, an inspection of all safety equipment will be conducted as discussed in Section F-2. The level of the solvent tank will be checked by reading the digital level monitor to determine if any material was released from Flammable Storage #4. The contents will then be pumped out for proper hazardous waste disposal. The Regional Administrator, state, and local authorities will be notified that post-emergency equipment maintenance has been performed and operations will be resumed.

G.4.i Container Spills and Leakage:

The only containers that may spill are those containing Ignitable Wastes. The Arsenic Contaminated Wastes are in solid state. The Ignitables are stored in a room with floors that slope towards a drain that leads to the "Solvent" Waste Tank. Any residuals will be absorbed with absorbents like neutrasorb and disposed of appropriately. Should the wastes ignite, fire extinguishers or the sprinkler systems will be activated. The City Fire Dept. will be called for aid. All water will drain towards "Solvent" tank, and will subsequently be removed by hazardous waste transporters to Treatment, Storage, Disposal facilities.

G.4.j Tank Spills and Leakage:

Any tank spills or leakage will be contained in the vaults. Commercial hazardous waste vendors will be called for an emergency pick up. The tank will be repaired or replaced. The vault will be inspected for integrity of coatings and cracks.

Should the "Solvent" tank contents ignite, the vault cover will be left on to deplete air. Drain valves leading o the tank will also be closed. After cooling, the lid will be raised and halon or chemicals will be used to extinguish any flames. Should the tank ignite while the vault cover is off, fire extinguishers and hoses will be used. Attempts will be made to extinguish the flame and the City Fire Dept. will be called upon. The water should be contained in the vault which will be disposed of by a commercial hazardous waste facility.

G.5 Emergency Equipment (HWMR 206.B.10.h):

The following equipment items are located in the vicinity of the hazardous waste storage areas:

a) Portable fire extinguishers
b) Self-contained breathing apparaus
c) First Aid Kit
d) Emergency eye wash and shower
e) Spill control and clean up equipment
f) Protective clothing and equipment
g) Communication and alarm equipment
h) Water sprinklers
i) Telephones and extensions
j) Atmospheric chemical contamination detectors
k) Oxygen deficiency detector

G.5.a Portable Fire Extinguishers:

Portable fire extinguishers are available for fire control. The extinguishers are ABC type. Type A is capable of extinguishing fires involving ordinary combustible materials such as wood, cloth, paper, rubber, and many plastics; Type B is capable of extinguishing fires involving flammable liquids, oils, greases, tars, oil base paints, lacquers, and flammable gases; and Type C is capable of extinguishing fires involving energized electrical equipment. All extinguishers comply with National Fire Code standards for portable fire extinguishers, and they are inspected after each use or at least monthly. Records of these inspections are noted on the fire extinguishers by Security. These are loated along walls outside Flammable Storage areas.

G.5.b Self-Contained Breathing Apparatus:

Self-contained breathing apparati (18-minute capacity) are located in the hallway between Corrosive and Flammable Storage in cases of hazardous fumes. The equipment is inspected by Security once/month and the log is kept in Security. If any discrepancies are found, the air pack is serviced. There are spare cylinders on hand.

G.5.c First Aid Kit:

First Aid Supplies include: bandages, slings, first aid ointments, disinfectants, and emergency oxygen supply. These are located in Chem Support and in Security Control Center.

G.5.d Emergency Eye Wash and Shower:

Emergency eyewash and showers are located in each storage area and also outdoors by the tank storage. Each unit consists of a drench showerhead with a "panic bar" operated valve. A sign reading "EMERGENCY SHOWER AND EYEWASH FOUNTAIN" is posted at each unit.

G.5.e Spill Control and Clean Up Equipment:

Equipment for use in containing and cleaning up spilled hazardous wastes are stored in the respective corrosive or flammable storage areas. These include:

Hydrofluoric Acid pretreatment	Dust Pan
Acid-neutralizing absorbent	Brush
Alkali-neutralizing absorbent	Shovel
Solvent absorbing material	Empty DOT Drums
Vermiculite	

G.5.f Protective Clothing and Equipment:

Protective clothing and equipment are provided for employees during normal and emergency operations. Hard hats, protective eyewear, steel-toed boots or close-toed shoes and universal gloves are minimum protective clothing required.

Other clothing and equipment available in Chem Support include:

Plastic aprons and gauntlets	Face Shield
Rubber Boots	Disposable respirators
Chemical cartridge respirators	Rain suits
Chemical-resistant suits	Self-contained breathing apparatus

G.5.g Communication and Alarm Equipment:

General Purpose Plant-wide Emergency Equipment include:

1 Esterline modular command evacuation alarm system (Plant Wide)
1 Motorola two-way radios
1 Motorola pager system
1 Esterline modular command security supervisor system (Plant Wide)
1 Emergency vehicle
Emergency exits tied into modular command and
1 Public address system

The above equipment are located in Security Control Center.

G.5.h Water Sprinklers:

The sprinkler head spacing in the hazardous waste storage area is 144 sq. feet. The sprinkler system is designed such that the water flow from one head will trigger an alarm in Security. The system is inspected on a twice yearly basis.

G.5.i Telephones and Extensions:

The telephones and their extensions are located by the hazardous waste storage area. Ext. 7171 is an emergency number and will reach Security.

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G.5.j Atmospheric Chemical Contamination Detectors:

These "Draeger" tubes are used to detect a variety of fumes in acid, flammable and poison groups. These are stored in the Safety Department.

G.5.k Oxygen Deficiency Detector:

This is equipment used to detect less than 19.5% oxygen content in the atmosphere. This equipment is stored in Chem Support area.

G.6 Coordination Agreements (HWMR 206.B.10.j):

Signetics has made the following arrangements to assist in response to emergency situations:

1. Commercial Disposal companies with emergency response capabilities will provide 48-hour response for waste pickups. Commercial Disposal companies will also provide 10-hour response to aid in emergency response services.

2. Copies of the Contingency Plan have been given to the local police and fire departments, the hospital, and the state and local Emergency Response Teams. These agencies have received a copy of the plan (acknowledgement of receipt are in Exhibit G-3).

Albuquerque Fire Academy
1510 Kit Carson, S. W.
Albuquerque, NM 87103
(505) 766-7900

St. Joseph's Hospital Emer. Rm.
400 Walter Street, N. E.
Albuquerque, NM 87102
(505) 848-8000

Hazardous Waste Bureau
Environmental Impr. Div.
Harold Runnels Building
1190 St. Francis Drive
P. O. Box 968
Santa Fe, NM 87504-0968
(505) 827-2929

Albuquerque Police Dept.
9500 Montgomery, N. E.
Albuquerque, NM 87111
(505) 766-4680

Fire Dept.
Station 15
6600 Academy Road, N. E.
Albuquerque, NM 87109
(505) 766-7130

G.7 Evacuation Plan (HWMR 206.B.10.i):

The facility personnel will be evacuated if the Emergency Coordinator decides that their personal safety is in danger. The evacuation is initiated by the Emergency Coordinator, who is also the Safety and Security Manager and is carried out with the assistance of the Safety and Security Department. His directions will be given verbally on the P. A. system. The safety rules and evacuation procedures are attached (Exhibit G-3). Evacuation routes from the Hazardous Waste Management facility are indicated by the arrows. The Hazardous Waste Management area is outside, so any direction away from the building is a recommended route. Hazardous Waste Management personnel will go to the evacuation holding area in the west parking lot and remain there awaiting further instructions from the Emrgency Coordinator.

G.8 Required Reports (HWMR 206.B.10.m(10)):

In the event of an environmental incident, the owner or operator must notify the State Environmental Improvement Division's Emergency Response office at (505) 827-9329. The secondary Emergency Coordinator will call the New Mexio Environmental Improvement Division Emergency Number and report the incident.

After an environmental incident, the Emergency Coordinator will insure that:

a. No waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed; and

b. All emergency equipment listed in the Contingency Plan is cleaned and fit for its intended use before operations are resumed.

Operations may only be resumed when the facility is in compliance and cleanup procedures are completed.

The Emergency Coordinator notes in the operating record the time, date, and details of any incident that requires implementing the Contingency Plan. Within 15 days after the incident, he will submit a written report of the incident to the Director. The report must include:

a. Name, address, and telephone number of the owner or operator;
b. Name, address, and telephone number of the facility;
c. Date, time, and type of incident (e.g., fire, explosion);

d. Name and quantity of material(s) involved;
e. The extent of injuries, if any;
f. An assessment of actual or potential hazards to human health or the environment, where this is applicable; and
g. Estimated quantity and disposition of recovered material that resulted from the incident.

G.9 Plan Update Procedures (HWMR 206.B.10.j):

The Emergency Coordinator will revise this Contingency Plan in accordance with the experience acquired during each emergency situation and will send copies of the revisions to each holder to the original plan.

1. Albuquerque Fire Department (2)
2. Albuquerque Police Department
3. St. Joseph's Hospital
4. Pat Herring (Security Manager)
5. Jim Buhler (Facilities Manager)
6. Signetics Corporate Environmental Affairs Group
7. Director, Environmental Improvement Division

The Contingency Plan will be amended by the secondary Emergency Coordinator if: facility permit is revised, facility changes substantially in design, construction, etc., list of emergency coordinators or equipment changes, and if the plan fails in an emergency. The plan will be reviewed for completeness at a minimum of once every two years.

SECTION G

CONTINGENCY PLAN

This Contingency Plan is designed to minimize hazards to human health or the environment from fires, explosions, or any unplanned sudden or nonsudden release of hazardous waste or hazardous constituents to air, soil, or surface water. The provisions of the plan will be carried out immediately whenever there is a fire, explosion, spill or release of hazardous waste constituents which could threaten human health or the environment. The plan is submitted in compliance with New Mexico Hazardous Waste Management Regulations 1984 Part 206.B.10.

G.1 General Information:

Name:	Signetics Corporation (NMD 000709782)
Location:	9201 Pan American Freeway, N.E. Albuquerque, NM 87113
Phone:	(505) 822-7000, 822-7188
Operation:	Generator and Storer Metal-oxide semiconductor Integrated Circuits Manufacturing (SIC 3674)
Site Plan:	See Exhibit G-1
Description of Activities	1 x 5000 gal. waste Hydrofluoric Acid storage tank. 1 x 5000 gal. waste Buffered Oxide Etch storage tank. 1 x 5000 gal. waste "Solvent" storage. 100 x 55 gal. drummed hazardous waste storage. Exhibit G-4 includes a maximum inventory of virgin chemicals, should contingencies arise.

G.1.a Waste Description:

This section describes the chemical and physical nature of the Hazardous Wastes stored at the Signetics Albuquerque facility:

Waste Name	Disposition	Approximate Quantity(1984)
a) Waste Solvent I	5000-gal. Tank Storage	40,000 Gallons
b) Waste Hydrofluoric Acid	5000-gal. Tank Storage	50,000 Gallons
c) Waste Buffered Oxide Etch	5000-gal. Tank Storage	30,000 Gallons
d) Arsenic Contaminated Wastes	55-gal. Drum Storage	2 Drums
e) Waste Solvent II	55-gal. Drum Storage	15 Drums
f) Mercury-contaminated Wastes	55-gal. Drum Storage	2 Drums

a) Waste Solvent I (flash pt. 120°F) - These photolithographic cleaning wastes consist primarily of: Methanol (flash pt. 54°F), Acetone (flash pt. 15°F), Ethylene Glycol (flash pt. 240.8°F), Ethanolamine (flash pt. 195°F), Diethylene Glycol Monobutyl Ether, (flash pt. 230°F), and water -- pH 11-12. Due to the low flash points of several materials, it is assigned as category D001 and F003. There may also be trace levels (<1%) of 1,1,1-Trichloroethane. Efforts are underway to decrease water content from draining into "Solvent" tank in order to allow for cost effective reclamation.

b) Waste Hydrofluoric Acid is a product of silicon oxide etching and consisting mainly of .1 - 5% Hydrofluoric Acid (pH<1). Due to the low pH, it is assigned D002.

c) Waste Buffered Oxide Etch is also a product of silicon etching and includes Hydrofluoric Acid (0.1 - 5%) and Ammonium Fluoride (0.1 - 20%). The pH is 4. This waste is sometimes mixed with (c) for transport. It has also a high concentration of fluorides and is therefore segregated. It is assigned D002.

d) Arsenic Contaminated Wastes: This group includes all materials that have been contaminated with solid arsenic like gloves, containers, and rags used in the handling of arsenic. While all of these are assigned as D004, not all may meet the extractability criteria, however, they are all viewed as potentially toxic and are disposed as such.

e) Waste Solvent II is drummed mixtures of proprietary vendor formulas of positive photoresists which include cellosolve acetate (flash pt. 124°F), other glycol esters, and acetone (flash pt. 15°F). This is classified as D001 and F003.

f) Mercury Waste: This group includes all materials that are contaminated with liquid mercury. This includes used mercury vapor lamps, broken mercury thermometers and any material used to clean up mercury spills. It is assigned D009.

Wastes designated for 5,000-gal. tank storage are drained through plumbing connected to the manufacturing area. There are no "hidden" pipes or drains. All plumbing are accessible to routine visual inspection.

Most drummed wastes are accumulated in the work area and removed as soon as the drum is full (within 72 hours) to the proper hazardous waste storage area. Other drums are situated in the storage area and small quantities are brought to the area and accumulated.

G.2 Emergency Coordination:

In the event of an emergency involving hazardous chemical release or discharge, the Emergency Coordinator has the responsibility of determining the extent of the hazard and the authority to initiate emergency response. The Emergency Coordinator is accessible by telephone and pager (see below).

The Emergency Coordinator is familiar with all aspects of the facility Contingency Plan and the locations and characteristics of wastes handled. Secondary and backup Coordinators are also familiar with the above Hazardous Waste Management Contingency Plan. In addition, the Emergency Coordinator has the authority to commit the resources needed to carry out the Contingency Plan. Secondary and Backup coordinators are also familiar with above Hazardous Waste Management activities and plans and also, in the absence of Primary Emergency Coordinator, are authorized to carry out coordination responsibilities and actions.

Emergency Coordinators:

Primary Calvin Wright - ext. 7115 or 7171 - Pager #101
Safety and Security Manager
Home: 700 Cardenas, S. E.
Albuquerque, NM 87108
(505) 268-1248

Secondary Gary M. Mavrakis - ext. 7188 - Pager #163
Chemical Support Section Head
Home: 4504 Bryan, N.W.
Albuquerque, NM 87114
(505) 897-2773

Backup Robert Smith - ext. 7026 - Pager #104
Facilities/Materials Manager
Home: 3600 Oakmount Drive
Rio Rancho, NM 87124
(505) 892-6458

G.3 Implementation of the Contingency Plan:

The decision to implement the Contingency Plan depends upon whether or not an imminent or actual incident could threaten human health or the environment. The purpose of this section is to provide guidance to the emergency coordinator in making this decision by providing decision-making criteria. The Contingency Plan will be implemented in the following situations:

1. Fire and/or Explosion:

   a. A fire causes the release of toxic fumes.

   b. The fire spreads and could possibly ignite materials at other locations onsite or could cause heat-induced explosions.

   c. The fire could possibly spread to offsite areas.

   d. Use of water or water and chemical fire suppressant could result in contaminated runoff.

   e. An imminent danger exists that an explosion could occur, causing a safety hazard because of flying fragments or shock waves.

   f. An imminent danger exists that an explosion could ignite other hazardous waste at the facility.

   g. An imminent danger exists that an explosion could result in release of toxic material.

h. An explosion has occurred.

2. Spills or Material Release:

a. The spill could result in release of flammable liquids or vapors, thus causing a fire or gas explosion hazard.

b. The spill could cause the release of toxic liquids or fumes.

c. The spill cannot be contained onsite, resulting in offsite soil contamination and/or ground or surface water pollution.

3. Floods:

a. The potential exists for surface water contamination.

G.4 **Emergency Response Procedures:** (HWMR 206.B.10.m):

G.4.a **Notification:**

Whenever there is an imminent or actual emergency situation, the Emergency Coordinator (or his designee when the emergency coordinator is not on call) must immediately:

(1) Activate internal facilities alarm or communication systems, where applicable, to notify all facility personnel; and
(2) Notify appropriate state or local agencies with designated response roles if their help is needed.

G.4.b **Identification:**

Whenever there is a release, fire, or explosion, the Emergency Coordinator will immediately identify the character, exact source, amount, and a real extent of any released materials. He may do this by observation or review of facility records or manifests and, if necessary, by chemical analysis.

G.4.c **Assessment:**

Concurrently, the emergency coordinator assesses possible hazards to human health and/or the environment that may result from the release, fire, or explosion. This assessment considers both direct and indirect effects of the release, fire, or explosion (e.g., the effects of any toxic, irritating, or asphyxiating gases that are generated, or chemical agents used to control fire and heat-induced explosions). If needed, the National Response Center will be called (800 424-8802).

If the emergency coordinator determines that the facility has had a

release, fire, or explosion which could threaten human health, or the environment, outside the facility, he will report his findings as follows:

(1) If his assessment indicates that evacuation of local areas may be advisable, he will immediately notify appropriate authorities. He is available to help appropriate officials decide whether local areas should be evacuated; and

(2) He will immediately notify either the government officials designated as the on-scene coordinator for that geographical area (in the applicable regional contingency plan, or the National Response Center (using their 24-hour toll-free number (800) 424-8802 and the New Mexico Environmental Improvement Division (505) 827-9329.

The report includes:

a. Name and telephone number of reporter;
b. Name and address of facility;
c. Time and type incident (e.g., release, fire);
d. Name and quantity of material(s) involved to the extent known;
e. The extent of injuries, if any; and
f. The possible hazards to human health, or the environment, outside the facility.

G.4.d **Control Procedures:**

Potential accidents fall under three general classifications: (1) fire and/or explosions, (2) spills or material release, (3) floods. Natural disasters such as earthquakes or tornados are assumed to fall into one of these three classifications.

Fire and/or Explosion:

The drum and tank storage areas can be easily accessed by fire-fighting and other emergency vehicles and equipment. Paved blacktop within these areas is kept clear at all times.

During times of power failure or severe weather, Security personnel will be assigned to protect personnel and property. If a fire should break out, concentration will be placed on preventing the fire from spreading to nearby areas.

The following actions will be taken in the areas affected by the fire or explosion:

1. Fire doors in buildings will be closed.
2. Hazardous work in all areas will be shut down immediately.

3. All additional equipment and ignition sources will be shut down, as necessary and practical.
4. The area will be cleared of all personnel not actively involved in fighting the fire. These persons are to report to the designated rally points for accountability.
5. Traffic will be blocked off.
6. All injured persons will be removed, and medical treatment will be administered by qualified personnel.
7. Signetics Safety and Security Department personnel will respond with extinguishers and fire hoses.

The switchboard operator will not be called unless absolutely necessary so that he remains free to handle only emergency calls.

Area or plant evacuation will be necessary in case of major fire or explosion. Specifics are outlined under general evacuation procedures (see exhibit G-2). All personnel have been trained in evacuation procedures and means of exit from their respective work areas. Until evacuation is signaled, personnel who are not in an affected area will stay in their respective work areas. Contract personnel and visitors will be cleared from the area and instructed to report to a security area or office area. An "all clear" signal will be given when the fire has been extinguished and the safety of personnel is no longer endangered. All emergency equipment used in the emergency must be cleaned and fit for use prior to resumption of plant operation in the affected areas.

Spills or Material Release:

In the event of a major emergency involving a chemical spill, the following general procedures will be used for rapid and safe response and control of the situation:

If an employee discovers a chemical spill or process upset resulting in a vapor release, he or she will immediately report it to the area supervisor.

The area supervisor will contact the Emergency Coordinator at the time of the incident. When contacted, the Emergency Coordinator will obtain information pertaining to the following:

1. The material spilled or released.
2. Location of the release or spillage of hazardous material.
3. An estimate of quantity released and the rate at which it is being released.
4. The direction in which the spill or vapor or smoke release is heading. Any injuries involved.
5. Fire and/or explosion or possibility of these events.

6. Fire and/or explosion or possibility of these events.
7. The area and materials involved and the intensity of the fire or explosion.

This information will help the Emergency Coordinator to assess the magnitude and potential seriousness of the spill or release. If the accident is determined to lie within the company's emergency response capabilities, the Emergency Coordinator will contact and utilize the necessary inplant personnel. If the accident is beyond plant capabilities, the Emergency Coordinator will contact the appropriate agencies.

In the event of a leak or spill from drums in Flammable Storage #4, the released material will be contained due to the structure of the room and drain to the solvent tank. The level of the solvent tank will be checked by reading the digital level monitor located in the Chemical Support office.

The initial response to any emergency will be to protect human health and safety, and then the environment. Identification, containment, treatment, and disposal assessment will be the secondary response.

In the event of a leak or spill in the tank area, production will be halted. The vault surrounding the tank storage area has the capacity to hold the largest tank and any rainfall. Immediately after the spill is detected, a transporter will be summoned to remove any standing liquids and ship the spilled material to a TSD facility.

If, for some reason, a chemical spill is not contained within the vault, an area of isolation will be established around the spill. The size of the area will generally depend on the size of the spill and the materials involved. If the spill is large and involves a tank or a pipeline rupture, initial isolation of at least 100 feet from the nearest sewer drain will be used. Small spills or leaks from a tank or pipe will require evacuation of at least 50 feet in all directions to allow cleanup and repair and to prevent exposure. When any spill occurs, only those persons involved in overseeing or performing emergency operations will be allowed within the designated hazard area. If possible, the area will be roped or otherwise blocked off.

If the spill results in the formation of a toxic vapor cloud (by reaction with surrounding materials or by outbreak of fire) and its release (due to high vapor pressures under ambient conditions), further evacuation will be enforced. Where necessary, an area at least 500 feet wide and 1000 feet long will be evacuated downwind if volatile materials are spilled.

If a large quantity of spilled material ignites, neighboring residents and industries will be notified. Because winds in the areas tend to

vary, the quickest and most accurate assessment of meteorological conditions is accomplished by calling the National Weather Service at (505) 243-1371 or 243-1453.

If the control and cleanup of a spill, release, or fire is within the capabilities of company personnel and local response teams, the New Mexico Environmental Improvement Division, the National Response Center or the City of Albuquerque Water Resources Dept. will not be notified unless one of the following occurs:

- A spill discharges to the sewer or storm drains and the quantity of hazardous material spilled is equal to or greater than the reportable quantity specified under 40 CFR Part 117.
- The spill involves other hazardous materials not listed in CFR but used at the plant if they pose an actual or potential hazard to life or property.

G.4.e **Prevention of Recurrence of Spread of Fires, Explosions, or Releases:**

During the emergency, the Emergency Coordinator takes all reasonable measures necessary to ensure that fires, explosions, and releases do not occur, recur, or spread to other material or hazardous waste at the facility. These measures include, where applicable, stopping processes and operations, collecting and containing released waste, and removal and/or isolation of containers. If the facility stops operations in response to a fire, explosion or release, the Emergency Coordinator will monitor for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment, wherever this is appropriate.

G.4.f **Storage and Treatment of Released Material:**

Immediately after an emergency, the Emergency Coordinator directs the treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other materials that results from release, fire, or explosion at the facility. (This will be carried out in accordance with all Hazardous Waste regulations).

G.4.g **Incompatible Wastes:**

The Emergency Coordinator ensures that in the affected area(s) of the facility no waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed.

G.4.h **Post-Emergency Equipment Maintenance:**

After an emergency event, all emergency equipment listed in section G5

will be cleaned so that it is fit for use or it will be replaced. Before operations are resumed, an inspection of all safety equipment will be conducted as discussed in Section F-2. The level of the solvent tank will be checked by reading the digital level monitor to determine if any material was released from Flammable Storage #4. The contents will then be pumped out for proper hazardous waste disposal. The Regional Administrator, state, and local authorities will be notified that post-emergency equipment maintenance has been performed and operations will be resumed.

G.4.i **Container Spills and Leakage:**

The only containers that may spill are those containing Ignitable Wastes. The Arsenic Contaminated Wastes are in solid state. The Ignitables are stored in a room with floors that slope towards a drain that leads to the "Solvent" Waste Tank. Any residuals will be absorbed with absorbents like neutrasorb and disposed of appropriately. Should the wastes ignite, fire extinguishers or the sprinkler systems will be activated. The City Fire Dept. will be called for aid. All water will drain towards "Solvent" tank, and will subsequently be removed by hazardous waste transporters to Treatment, Storage, Disposal facilities.

G.4.j **Tank Spills and Leakage:**

Any tank spills or leakage will be contained in the vaults. Commercial hazardous waste vendors will be called for an emergency pick up. The tank will be repaired or replaced. The vault will be inspected for integrity of coatings and cracks.

Should the "Solvent" tank contents ignite, the vault cover will be left on to deplete air. Drain valves leading to the tank will also be closed. After cooling, the lid will be raised and halon or chemicals will be used to extinguish any flames. Should the tank ignite while the vault cover is off, fire extinguishers and hoses will be used. Attempts will be made to extinguish the flame and the City Fire Dept. will be called upon. The water should be contained in the vault which will be disposed of by a commercial hazardous waste facility.

G.5 **Emergency Equipment** (HWMR 206.B.10.h):

The following equipment items are located in the vicinity of the hazardous waste storage areas:

a) Portable fire extinguishers
b) Self-contained breathing apparatus
c) First Aid Kit
d) Emergency eye wash and shower

e) Spill control and clean up equipment
f) Protective clothing and equipment
g) Communication and alarm equipment
h) Water sprinklers
i) Telephones and extensions
j) Atmospheric chemical contamination detectors
k) Oxygen deficiency detector

G.5.a **Portable Fire Extinguishers:**

Portable fire extinguishers are available for fire control. The extinguishers are ABC type. Type A is capable of extinguishing fires involving ordinary combustible materials such as wood, cloth, paper, rubber, and many plastics; Type B is capable of extinguishing fires involving flammable liquids, oils, greases, tars, oil base paints, lacquers, and flammable gases; and Type C is capable of extinguishing fires involving energized electrical equipment. All extinguishers comply with National Fire Code standards for portable fire extinguishers, and they are inspected after each use or at least monthly. Records of these inspections are noted on the fire extinguishers by Security. These are located along walls outside Flammable Storage areas.

G.5.b **Self-Contained Breathing Apparatus:**

Self-contained breathing apparati (18-minute capacity) are located in the hallway between Corrosive and Flammable Storage in cases of hazardous fumes. The equipment is inspected by Security once/month and the log is kept in Security. If any discrepancies are found, the air pack is serviced. There are spare cylinders on hand.

G.5.c **First Aid Kit:**

First Aid Supplies include: bandages, slings, first aid ointments, disinfectants, and emergency oxygen supply. These are located in Chem Support and in Security Control Center.

G.5.d **Emergency Eye Wash and Shower:**

Emergency eyewash and showers are located in each storage area and also outdoors by the tank storage. Each unit consists of a drench showerhead with a "panic bar" operated valve. A sign reading "EMERGENCY SHOWER AND EYEWASH FOUNTAIN" is posted at each unit.

G.5.e **Spill Control and Clean Up Equipment:**

Equipment for use in containing and cleaning up spilled hazardous wastes are stored in the respective corrosive or flammable storage areas. These include:

Hydrofluoric Acid pretreatment	Dust Pan
Acid-neutralizing absorbent	Brush
Alkali-neutralizing absorbent	Shovel
Solvent absorbing material	Empty DOT Drums
Vermiculite	

G.5.f **Protective Clothing and Equipment:**

Protective clothing and equipment are provided for employees during normal and emergency operations. Hard hats, protective eyewear, steel-toed boots or close-toed shoes and universal gloves are minimum protective clothing required.

Other clothing and equipment available in Chem Support include:

Plastic aprons and gauntlets	Face shield
Rubber boots	Disposable respirators
Rain suits	Chemical cartridge respirators
Chemical-resistant suits	Self-contained breathing apparatus

G.5.g **Communication and Alarm Equipment:**

General Purpose Plant-wide Emergency Equipment include:

1 Esterline modular command evacuation alarm system (Plant Wide)
1 Motorola two-way radios
1 Motorola pager system
1 Esterline modular command security supervisor system (Plant Wide)
1 Emergency vehicle
Emergency exits tied into modular command and
1 Public address system

The above equipment are located in Security Control Center.

G.5.h **Water Sprinklers:**

The sprinkler head spacing in the hazardous waste storage area is 144 sq. feet. The sprinkler system is designed such that the water flow from one head will trigger an alarm in Security. The system is inspected on a twice yearly basis.

G.5.i **Telephones and Extensions:**

The telephones and their extensions are located by the hazardous waste storage area. Ext. 7171 is an emergency number and will reach Security.

G.5.j **Atmospheric Chemical Contamination Detectors:**

These "Draeger" tubes are used to detect a variety of fumes in acid, flammable and poison groups. These are stored in the Safety Department.

G.5.k **Oxygen Deficiency Detector:**

This is equipment used to detect less than 19.5% oxygen content in the atmosphere. This equipment is stored in Chem Support area.

G.6 **Coordination Agreements** (HWMR 206.B.10.j):

Signetics has made the following arrangements to assist in response to emergency situations:

1. Commercial Disposal facilities will provide 48-hour response for waste pickups. They will also provide 6-hour response to aid in emergency response services.

2. Copies of the contingency plan have been given to the local police and fire departments, the hospital, and the state and local Emergency Response Teams. These agencies have received a copy of the plan (acknowledgement of receipt are in Exhibit G-3).

Capt. Frank Chavez
Albuquerque Fire Academy
1510 Kit Carson, S. W.
Albuquerque, NM 87103
(505) 766-7900

Dr. Jerry Montgomery
St. Joseph's Hospital Emer. Room
400 Walter Street, N.E.
Albuquerque, NM 87102
(505) 848-8000

Mr. Peter Pache
Hazardous Waste Bureau
Environmental Imp. Div.
Crown Building
725 St. Michael's Drive
P. O. Box 968
Santa Fe, NM 87504-0968
(505) 984-0020

Capt. J. T. Powell
Albuquerque Police Department
9500 Montgomery, N.E.
Albuquerque, NM 87111
(505) 766-4680

Capt. Gerald Grimm
Albuquerque Fire Dept.
Station 15
6600 Academy Road, N.E.
Albuquerque, NM 87109
(505) 766-7130

G.7 **Evacuation Plan** (HWMR 206.B.10.i):

The facility personnel will be evacuated if the emergency coordinator decides that their personal safety is in danger. The evacuation is initiated by the Emergency Coordinator, who is also the Safety and Security Manager and is carried out with the assistance of the Safety and Security Department. His directions will be given verbally on the P. A. system. The safety rules and evacuation procedures are attached (Exhibit G-3). Evacuation routes from the Hazardous Waste Management facility are indicated by the arrows. The Hazardous Waste Management area is outside, so any direction away from the building is a recommended route. Hazardous Waste Management personnel will go to the evacuation holding area in the west parking lot and remain there awaiting further instructions from the Emergency Coordinator.

G.8 **Required Reports** (HWMR 206.B.10.m.(10)):

In the event of an environmental incident, the owner or operator must notify the State Environmental Improvement Division's Emergency Response office at (505) 827-9329. The secondary Emergency Coordinator will call the New Mexico Environmental Improvement Division Emergency Number and report the incident.

After an environmental incident, the Emergency Coordinator will insure that:

a. No waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed; and

b. All emergency equipment listed in the Contingency Plan is cleaned and fit for its intended use before operations are resumed.

Operations may only be resumed when the facility is in compliance and cleanup procedures are completed.

The secondary Emergency Coordinator notes in the operating record the time, date, and details of any incident that requires implementing the Contingency Plan. Within 15 days after the incident, he will submit a written report of the incident to the Director. The report must include:

a. Name, address, and telephone number of the owner or operator;
b. Name, address, and telephone number of the facility;
c. Date, time, and type of incident (e.g., fire, explosion);
d. Name and quantity of material(s) involved;
e. The extent of injuries, if any;

f. An assessment of actual or potential hazards to human health or the environment, where this is applicable; and
g. Estimated quantity and disposition of recovered material that resulted from the incident.

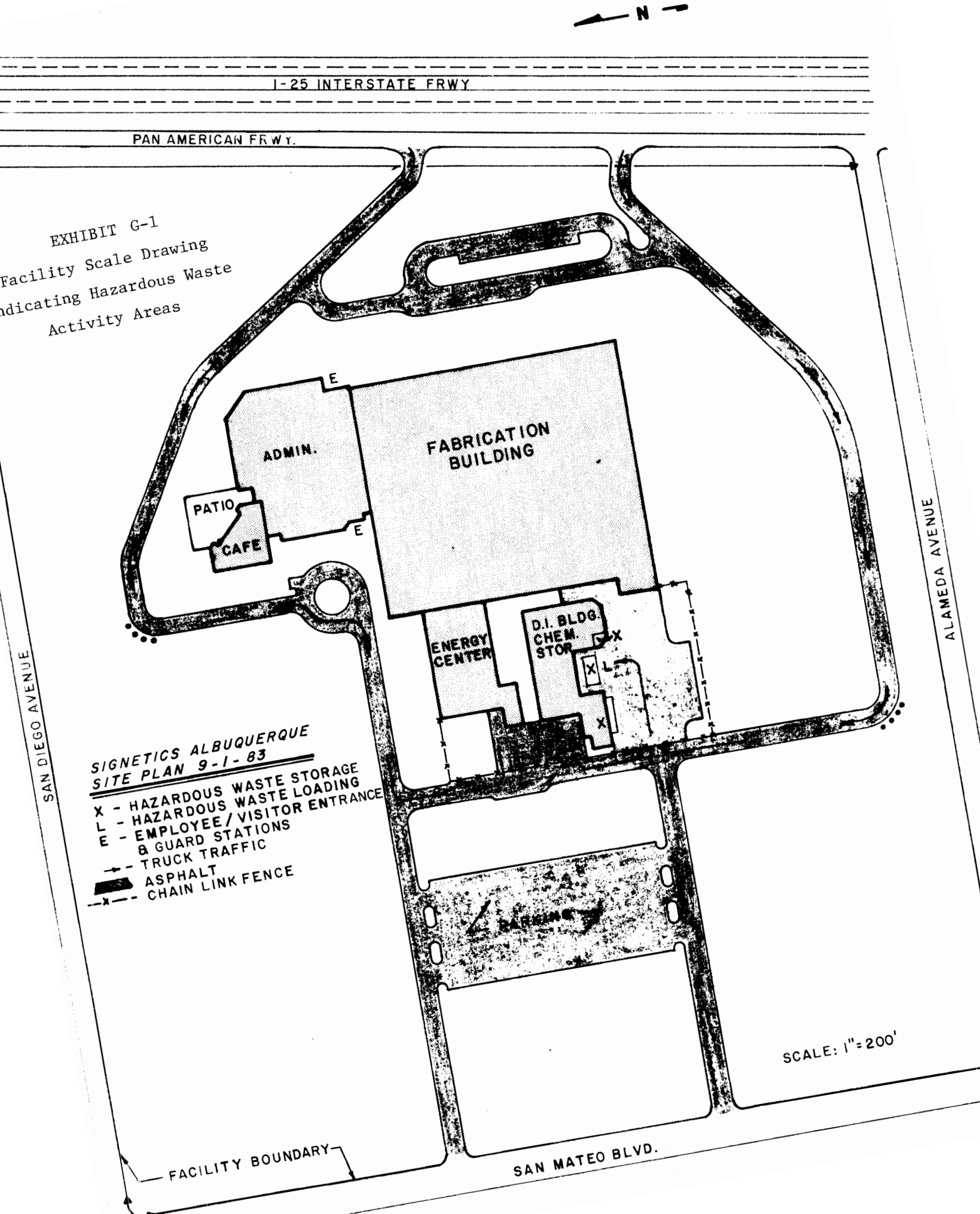
G.9 **Plan Update Procedures** (HWMR 206.B.10.j):

The secondary Emergency Coordinator will revise this Contingency Plan in accordance with the experience acquired during each emergency situation and will send copies of the revisions to each holder of the original plan.

1. Albuquerque Fire Department (2)
2. Albuquerque Police Department
3. St. Joseph's Hospital
4. Calvin Wright (Security Manager)
5. Bob Smith (Facilities Manager)
6. Signetics Corporate Environmental Affairs Group
7. Peter Pache

The Contingency Plan will be amended by the secondary Emergency Coordinator if: facility permit is revised, facility changes substantially in design, construction, etc., list of emergency coordinators or equipment changes, and if the plan fails in an emergency. The plan will be reviewed for completeness at a minimum of once every two years.

EXHIBIT G-1
Facility Scale Drawing
ndicating Hazardous Waste
Activity Areas



EVACUATION PLAN
PROCEDURES & RESPONSIBILITIES

ALBUQUERQUE PLANT

EVACUATION PROCDURES AND RESPONSIBILITIES

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EMERGENCY PROCEDURES AND RESPONSIBILITIES

1.0 Purpose

To define conditions and procedures for emergency situations which may arise.

1.1 Supervisors will assure that all new employees read and understand this document.

2.0 Reporting System

The following procedures will be used to report any plant emergencies.

2.1 THE EMERGENCY NUMBER IS "7171".

This number is a hot line. Any emergency may be reported by anyone by picking up any inhouse phone and dialing "7171". The receptionist or guard will ask for specific information concerning the emergency and take the necessary action.

2.2 Reporting Procedure

Normally any person of supervisory level may request an immediate evacuation or the dispatching of an emergency team by dialing 7171. The caller should:

2.2.1 Give his/her name.

2.2.2 Give the nature and location of the problem and report any injuries or blocked exists that may have resulted from the emergency.

2.2.3 Give the extension number called from.

2.2.4 Give instructions to evacuate (how large an area?) or to dispatch an emergency team to the area.

2.2.5 The receptionist or guard will proceed with dispatching the emergency team or evacuating the area required.

3.0 Guidelines for Calling Evacuations

3.1 Evacuation is required where there is a severe threat to life and property such as a fire, explosion, toxic gas leak, power failure, etc.

3.1.1 Three types of incidents may occur:

a. Major
b. Intermediate
c. Minor

Each needs a different response.

3.1.2 If first aid is needed, it must be administered only by a trained individual.

3.2 Major Incident (Requires Evacuation)

NOTE: The evacuation order may effect the entire building if the person ordering the evacuation feels it is necessary to protect the health and safety of the employees.

3.2.1 Types of incidents which are classified as major:

a. Major power failure
b. Garlic or garlic like smell (Arsine)
c. Decaying fish smell (Phosphine)
d. Fire
e. Explosions
f. Major chemical spills
g. Toxic Gas monitor alarm
h. Hydrogen leak detector alarm

These are conditions which will require evacuation. The size of the evacuation must be determined at the time the incident occurs.

3.2.2 Evacuation procedures detailed in Section 6 must be followed.

3.3 Intermediate Incident (Requires evacuation, but on a more limited scale)

TYPES: Presence of a strong irritant such as HCL, CL, BCL, etc., sufficient to cause coughing, gagging, or irritation of the eyes, nose, and throat. (A burning sensation in the nose and throat accompanied by tearing of the eyes). A small fire may also qualify as an intermediate incident.

3.3.1 The size of the evacuation will vary from a single line to a room or larger. The area of the problem determines the size of the evacuation.

3.4 Both major and intermediate incidents require an evacuation of some kind. This evacuation must be performed according to Section 6.

3.5 Minor Incidents (No evacuation required).

TYPES: Unusual odors which do not fall into the categories already covered are:

a. faint chlorine odor
b. diesel odor
c. paint odor
d. burning rubber odor
e. peanut butter odor
f. natural gas odor

These types of incidents do not require evacuation. The area personnel should try to determine the source of the odor. If the source cannot be found, Safety may be called in for assistance.

NOTE: Evacuation is not required because these odors are not indicative of any health hazard. If the odor reaches a level which interferes with the employees' work, an evacuation may be ordered.

3.6 Other incidents may require evacuation.

TYPES: Any situation where a supervisor or someone of supervisor level determines there is a threat to the health and safety of the employees. Not all situations which may require an evacuation can be addressed in this document. An example of a situation which would require evacuation is:

Large amount of water spilled where employees must stand and work with live electrical equipment.

4.0 Routine Evacuations

Any evacuation where there is no immediate threat to life or property.

4.1 Fire drills

4.2 Suspected chemical spills

4.3 Minor accidents

5.0 Drill requirements

Supervisors shall conduct evacuation drills at least twice a year. The employees will physically leave the building and go to their grouping areas.

5.1 A log of these drills shall be kept by the supervisor with a notice of drill forwarded to the Safety Manager.

5.2 Safety will maintain a master log of drills held.

6.0 Evacuation Procedure (General Instructions)

6.1 Call the emergency number 7171 as soon as is possible considering the situation.

6.2 No Smoking!

6.3 Have employees move at a safe pace.

6.4 Do not stop to gather personal belongings.

6.5 There is to be no loitering in the building or exit areas.

6.6 Flashlights or other portable emergency light source will be kept and maintained by area supervisors and managers as necessary.

6.7 Supervisors will keep their employees in the group area.

6.8 Supervisors must establish grouping areas outside the building. The choice of grouping areas must be cleared by the Safety Department.

6.9 Supervisors will check the restrooms and remote areas for personnel.

6.10 Supervisors will know all emergency exit routes out of their area and all the grouping areas associated with the different routes.

6.11 Regardless of the exit used, all personnel must report to their assigned grouping area for counting.

7.0 Evacuation Procedures for Major Power Failures

Personal Specific Instructions

7.1 Operators shall leave their work areas immediately and proceed to their assigned grouping areas.

7.2 Supervisors or next designated ranking authority shall:

7.2.1 Supervise the evaucation.

7.2.2 Cover all open acid containers where covers are provided.

7.2.3 Dump all acids in use in sinks by turning drain switch.

7.2.4 Check outlying areas for personnel.

7.2.5 Report to the grouping area for headcount.

7.2.6 Designate an evacuation leader to act in the absence of the supervisor. A list of evacuation leaders shall be filed and kept by Plant Safety.

7.3 Supervisors/Techs shall survey the work area, follow process spec. for shutdown or wafer pull. (See Section 7.6).

7.4 Maintenance/Facilities shall

7.4.1 Clear all contractors from the building.

7.4.2 Assure that the power company has been notified of the power failure.

7.5 Security shall coordinate and control communications to the outside.

7.5.1 Direct outside emergency services and assist evacuations.

7.6 Each fabrication area shall designate a "power out" team to shutdown or startup equipment if the need arises. The team shall have written procedures for shutdown and startup of equipment. Copies of these procedures must be sent to the Manager of Safety and Health.

8.0 Major Emergencies/Specific Responsibilities

8.1 Follow General Evacuation Procedures, Section 6.

8.2 The supervisor or his/her designate should stand by the area to advise the Emergency Response Team sent by Security.

8.3 Emergency Response Team will resolve the problem and communicate results to the Safety Department.

8.4 Safety Department will clear area for re-entry and inform upper management of the nature of the emergency.

8.5 Security will assist the evacuation and call for any additional help requested by the Emergency Response Team of the Safety Department.

9.0 Earthquakes

9.1 If indoors:

9.1.1 Do not leave the building or area unless ordered to.

9.1.2 Do not use matches, lighters, candles, or operate electrical switches.

9.1.3 Watch for falling objects or furniture which could topple over.

9.1.4 Stay away from glass materials.

9.1.5 If in danger of falling objects, get under a table, desk, or other protection from falling objects.

9.2 If outdoors:

9.2.1 Do not enter a building.

9.2.2 Avoid tall buildings, walls, power poles, or other tall items which could topple over.

9.2.3 If possible, get at least 1 1/2 times the height of any object which might topple, away from the object.

9.2.4 Do not use telephones except to apprise Security (7171) of conditions.

9.3 After the earthquake:

9.3.1 Do not use matches, lighters, candles, or operate electrical switches.

9.3.2 Stay away from damaged structures.

9.3.3 Check for broken gas lines, chemical spills, and fires; if any are found, follow the appropriate emergency procedure for that emergency.

9.3.4 Check for damage to equipment and/or structures.

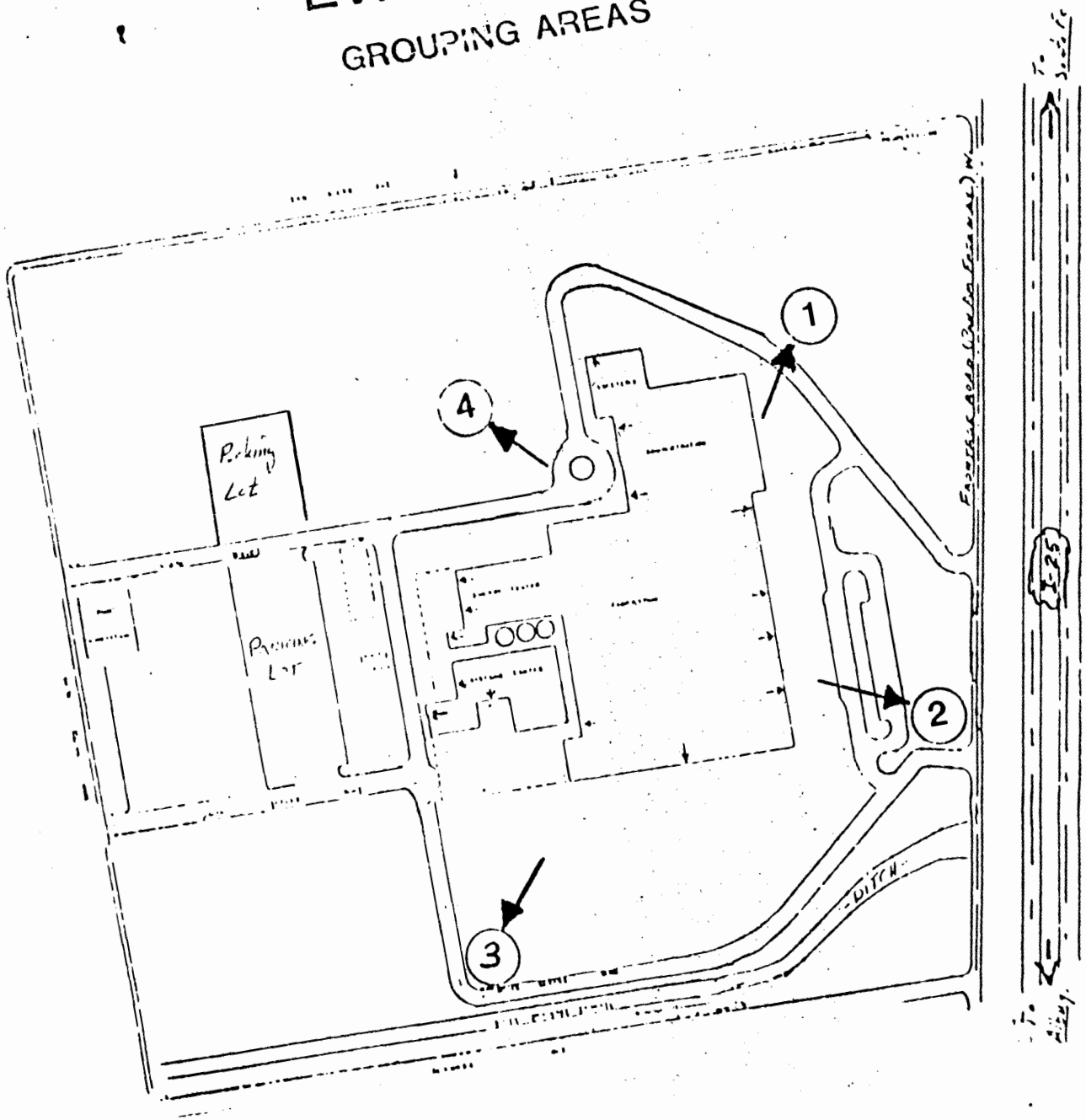
9.3.5 Do not touch broken and/or downed power lines.

9.3.6 Do not use the telephone except to report on conditions to Security (7171).

9.3.7 Should an evacuation of a building or area be ordered, follow the normal evacuation procedure in Section 6.

EVACUATION

GROUPING AREAS



GROUPING AREAS

1. N.E. corner of building across roadway.

2. S.E. corner of building between parking area and frontage road just north of south entrance to plant.

3. S.W. corner of building next to roadway at turn.

4. N.W. from lobby in futur parking area.

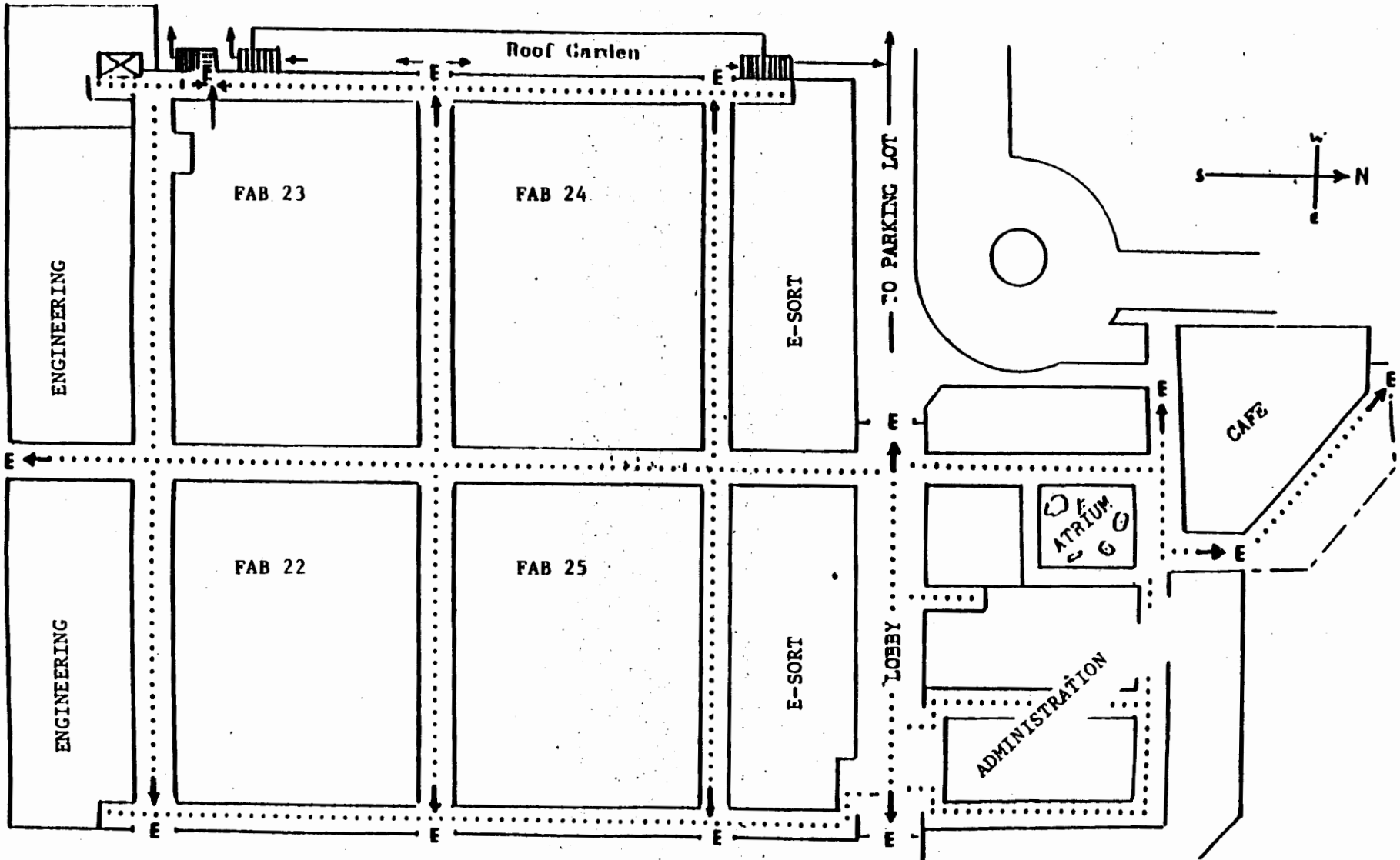
Note: Supervisor's are responsible for selecting and informing their perso of Grouping Areas.

FOR EMERGENCY - CALL 7171

OR

PULL EVAC ALARM

MAIN FLOOR

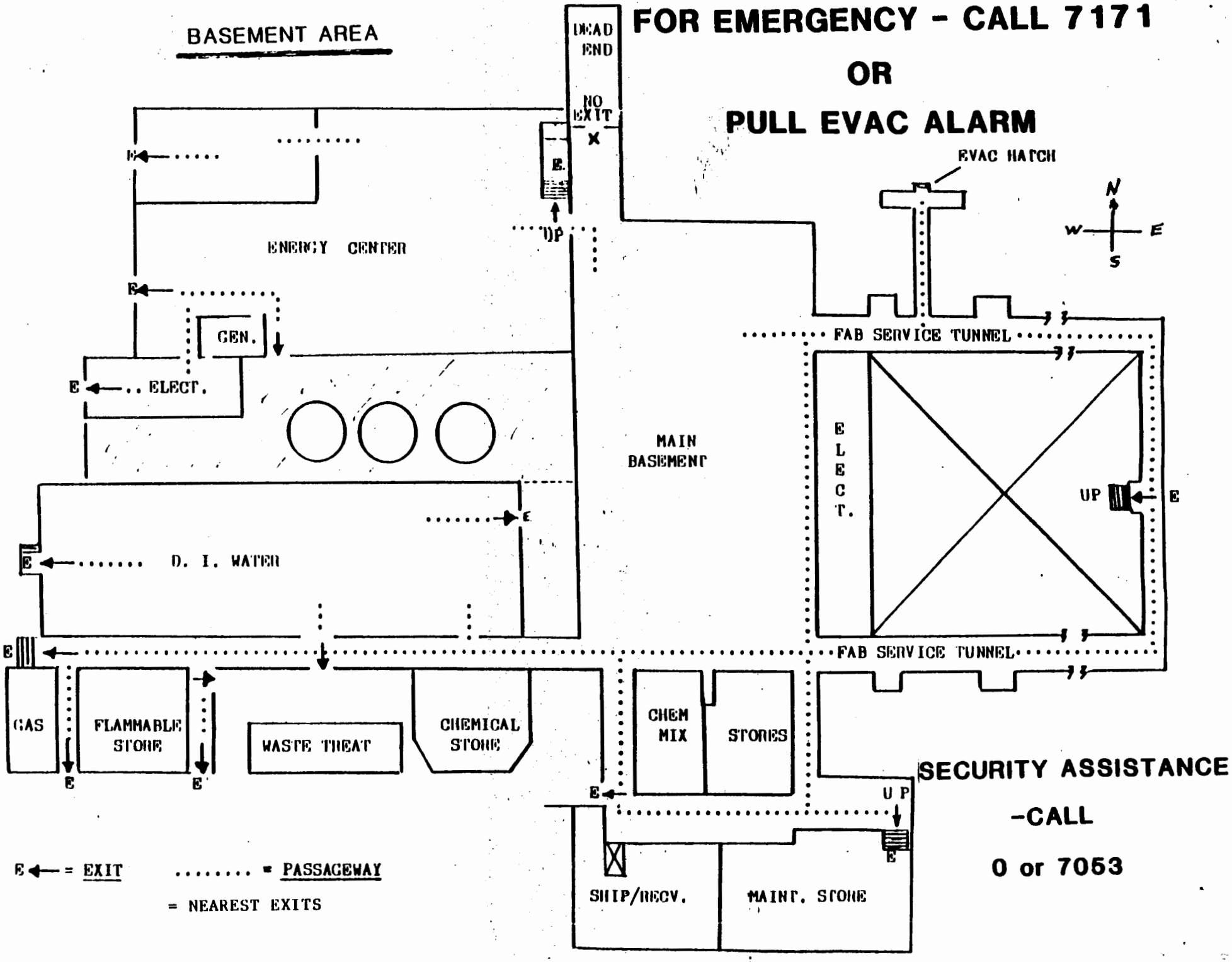


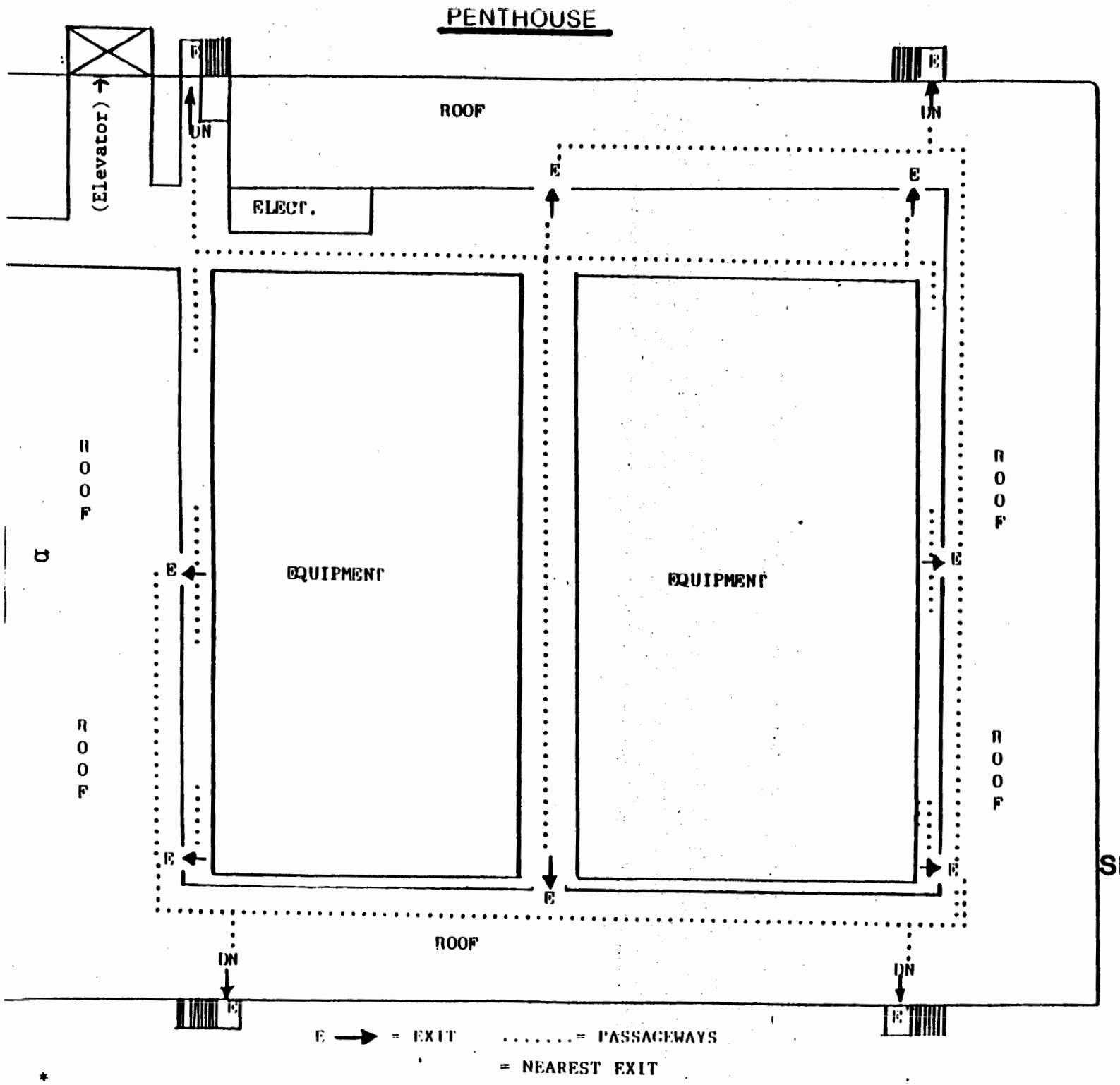
→ E = EXITS ..... = PASSAGEWAYS =NEAREST EXIT

SECURITY ASSISTANCE

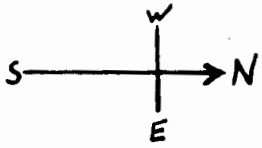
-CALL

0 or 7053


BASEMENT AREA
FOR EMERGENCY - CALL 7171
OR
PULL EVAC ALARM
DEAD END
NO EXIT
EVAC HATCH
N
W
E
S
ENERGY CENTER
GEN.
ELECT.
UP
MAIN BASEMENT
FAB SERVICE TUNNEL
ELECT.
UP
D. I. WATER
GAS
FLAMMABLE STORE
WASTE TREAT
CHEMICAL STORE
CHEM MIX
STORES
SHIP/RECV.
MAINT. STORE
SECURITY ASSISTANCE
-CALL
0 or 7053
E ← = EXIT
..... = PASSAGEWAY
= NEAREST EXITS



FOR EMERGENCY -CALL 7171 OR PULL EVAC ALARM



SECURITY ASSISTANCE -CALL 0 or 7053

EXHIBIT G-3

Letters of Acknowledgement

February 24, 1984

signetics
a subsidiary of U.S. Philips Corporation

Signetics Corporation
9201 Pan American Freeway NE
P.O. Box 10272
Albuquerque, New Mexico 87184

Captain J. T. Powell
Albuquerque Police Department
9500 Montgomery, N.E.
Albuquerque, NM 87111

Dear Captain Powell:

Per the requirements of the Resource Conservation and Recovery Act (40 CFR 264 Subpart D) and New Mexico Hazardous Waste Management Regulation 1984 (Section 206.B.10.j.(2)), I am submitting a copy of Signetics' Hazardous Waste Contingency Plan. You will also be on the mailing list for copies of future revisions.

Please review the plan and discuss any comments you may have with me. I can be reached at 505 822-7027.

To indicate receipt of this document by you, please sign one copy of this letter and return to me in the self-addressed, stamped envelope by March 7, 1984.

Thank you for your cooperation.

Sincerely,

Phyllis C. Pei
Chemical Support Supervisor

fm

cc: Calvin Wright

****

I have received one (1) copy of Section G (Contingency Plan) of the RCRA Permit from Signetics Corporation.

SIGNATURE 2/28/84
DATE

Please mail receipt to:
Phyllis Pei
Signetics Corporation
9201 Pan American Frwy., N.E.
Albuquerque, NM 87113
(505) 822 7027

February 24, 1984

signetics
a subsidiary of U.S. Philips Corporation

Signetics Corporation
9201 Pan American Freeway NE
P.O. Box 10272
Albuquerque, New Mexico 87184

Mr. Raymond Sisneros
Hazardous Waste Bureau
Environmental Improvement Division
Crown Bldg.
725 St. Michael's Drive
Santa Fe, NM 87504-0968

Dear Mr. Sisneros:

Per the requirements of the Resource Conservation and Recovery Act (40 CFR 264 Subpart D) and New Mexico Hazardous Waste Management Regulation 1984 (Section 206.B.10.j.(2)), I am submitting a copy of Signetics' Hazardous Waste Contingency Plan. You will also be on the mailing list for copies of future revisions.

Please review the plan and discuss any comments you may have with me. I can be reached at 505 822-7027.

To indicate receipt of this document by you, please sign one copy of this letter and return to me in the self-addressed, stamped envelope by March 7, 1984.

Thank you for your cooperation.

Sincerely,

Phyllis C. Pei
Chemical Support Supervisor

fm

cc: Calvin Wright

****

I have received one (1) copy of Section G (Contingency Plan) of the RCRA Permit from Signetics Corporation.

SIGNATURE _____ DATE 2/29/84

Please mail receipt to:
Phyllis Pei
Signetics Corporation
9201 Pan American Frwy., N.E.
Albuquerque, NM 87113
(505) 822 7027

February 24, 1984

signetics
a subsidiary of U.S. Philips Corporation

Signetics Corporation
9201 Pan American Freeway NE
P.O. Box 10272
Albuquerque New Mexico 87184

Captain Frank Chavez
Albuquerque Fire Academy
1510 Kit Carson, S.W.
Albuquerque, NM 87103

Dear Captain Chavez:

Per the requirements of the Resource Conservation and Recovery Act (40 CFR 264 Subpart D) and New Mexico Hazardous Waste Management Regulation 1984 (Section 206.B.10.j.(2)), I am submitting a copy of Signetics' Hazardous Waste Contingency Plan. You will also be on the mailing list for copies of future revisions.

Please review the plan and discuss any comments you may have with me. I can be reached at 505 822-7027.

To indicate receipt of this document by you, please sign one copy of this letter and return to me in the self-addressed, stamped envelope by March 7, 1984.

Thank you for your cooperation.

Sincerely,

Phyllis C. Pei
Chemical Support Supervisor

fm

cc: Calvin Wright

****

I have received one (1) copy of Section G (Contingency Plan) of the RCRA Permit from Signetics Corporation.

Capt George W. Jackson 2-28-84
SIGNATURE DATE

Please mail receipt to:
Phyllis Pei
Signetics Corporation
9201 Pan American Frwy., N.E.
Albuquerque, NM 87113
(505) 822 7027

PS Form 3811, Jan. 1978

RETURN RECEIPT, REGISTERED, INSURED AND CERTIFIED MAIL

SENDER: Complete items 1, 2, and 3.
Add your address in the "RETURN TO" space on reverse.

1. The following service is requested (check one.)
- [x] Show to whom and date delivered.....¢
- [ ] Show to whom, date and address of delivery.....¢
- [ ] RESTRICTED DELIVERY
  Show to whom and date delivered.....¢
- [ ] RESTRICTED DELIVERY.
  Show to whom, date, and address of delivery.$____

(CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:

Capt. Gerald Grimm
ABQ Fire Dept.
6600 Academy Rd., Abq. NM 87109

3. ARTICLE DESCRIPTION:

REGISTERED NO.	CERTIFIED NO.	INSURED NO.
	P242 639 247	

(Always obtain signature of addressee or agent)

I have received the article described above.

SIGNATURE [ ] Addressee [ ] Authorized agent

4. DATE OF DELIVERY
2-28-84

POSTMARK
ALBUQUERQUE, N.M. 87103
FEB 28 1984
CLERK'S INITIALS

5. ADDRESS (Complete only if requested)

6. UNABLE TO DELIVER BECAUSE:

☆GPO : 1979 300-459

PS Form 3811, Jan. 1979

RETURN RECEIPT, REGISTERED, INSURED AND CERTIFIED MAIL

● SENDER: Complete items 1, 2, and 3.
Add your address in the "RETURN TO" space on reverse.

1. The following service is requested (check one.)
   - ☒ Show to whom and date delivered..... ___¢
   - ☐ Show to whom, date and address of delivery.... ___¢
   - ☐ RESTRICTED DELIVERY
     Show to whom and date delivered..... ___¢
   - ☐ RESTRICTED DELIVERY.
     Show to whom, date, and address of delivery.$ ___

   (CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:
   DR. Jerry Montgomery
   ST. Joseph Hospital
   400 Water ST NE.
   Albq. N.M. 87102

3. ARTICLE DESCRIPTION:

REGISTERED NO.	CERTIFIED NO.	INSURED NO.

(Always obtain signature of addressee or agent)

I have received the article described above.

SIGNATURE ☐ Addressee ☐ Authorized agent

X [signature]

4. DATE OF DELIVERY

5. ADDRESS (Complete only if requested)

6. UNABLE TO DELIVER BECAUSE:

POSTMARK

ALBUQUERQUE, N. MEX. FEB 28 1984 CLERK'S INITIALS

☆GPO : 1979-289-848

EXHIBIT G-4
Inventory of Virgin Chemicals

Signetics Maximum Quantities of Chemical Storage (Solids/Liquids) *

Description	Unit	Max. Quantity	Extended
Sulfuric Acid 96% (H_2SO_4)	9 lb/bt	5,475 bt	49,275 lb
Hydrofluoric Acid 49% (HF 49%)	10 lb/bt	1,500 bt	15,000 lb
Nitric Acid 70% (HNO_3 70%)	7 lb/bt	1,000 bt	7,000 lb
Phosphoric Acid 86% (H_3PO_4)	12 lb/bt	20 bt	240 lb
Hydrogen Peroxide 30% (H_2O_2)	1 gl/bt	2,100 bt	2,100 gl
Hydrochloric Acid 37% (HCl 37%)	10 lb/bt	330 bt	3,300 lb
Acetic Acid 99.7% (CH_3COOH)	5 lb/bt	20 bt	100 lb
Ammonium Fluoride: HF 34:5	10 lb/bt	1,200 bt	12,000 lb
Ammonium Fluoride: HF 20:1	9 lb/bt	700 bt	6,300 lb
Potassium Hydroxide Pellets (KOH)	25 lb/dr	30 dr	750 lb
Phosphorous Oxychloride ($POCl_3$)	500 gm/bt	10 bt	5,000 gm
Arsenic Solid (As)	50 gm/vl	10 vl	500 gm
Methanol (CH_3OH)	1 gl/bt	150 bt	150 gl
Isopropanol $(CH_3)_2CHOH$)	1 gl/bt	300 bt	300 gl
Acetone (H_3COCH_3)	1 gl/bt	750 bt	750 gl
Triton X-100	100 ml/bt	10 bt	1,000 ml
Hexamethyldisilazane 100%	1 gl/bt	150 bt	150 gl
Thinner E (Glycol Ester)	1 gl/bt	20 bt	20 gl
Ammonium Hydroxide 29% (NH_4OH)	8 lb/bt	300 bt	2,400 lb
Ethylene Glycol $(CH_2OH)_2$	1 gl/bt	125 bt	125 gl
Hydrofluoric Acid 10:1 (5%)	10 lb/bt	2,000 bt	20,000 lb
Hydrofluoric Acid 100:1 (.5%)	10 lb/bt	600 bt	6,000 lb

1-26-84

*Excludes all waste storage quantities.

Signetics Maximum Quantities of Chemical Storage (Solids/Liquids)*

Description	Unit	Max. Quantity	Extended
1,1,1-Trichloroethane	5 gl/cn	20 cn	100 gl
Freon TF	5 gl/cn	200 cn	1,000 gl
Developer (tetramethylammonium Hydroxide 2.6%	1 gl/bt	1,000 bt	1,000 gl
Stripper (Diethyleneglycol Monobutyl Ether, Ethanolamine F. P. 195°F)	1 gl/bt	1,500 bt	1,500 gl
Positive Photoresist (proprietary) Aliphatic Esters, Butyl Acetate, Xylenes, Cellosolve Acetate F. P. 100°F	1 gl/bt	100 bt	100 gl
Hydrochloric Acid 32%	5,000 gl/tk	1 tk	5,000 gl
Sodium Hydroxide 50% (Caustic Soda)	5,000 gl/tk	1 tk	5,000 gl
Sulfuric Acid 96%	700 gl/tk	1 tk	700 gl
Sulfuric Acid 96%	700 lb/dr	20 dr	14,000 lb
1,1,1-Trichloroethane	1 gl/bt	40 bt	40 gl

*Excludes all waste storage quantities.

Signetics Maximum Quantities of Chemical Storage (Compressed Gases)*

Description	Unit	Max. Quantity	Extended
8% Oxygen in Freon 14 (O_2/CF_4)	167 cf/cy	2 cy	334 cf
Freon 11 (CCl_3F)	35 lb/cy	2 cy	70 lb
Freon 13B1 ($CBrF_3$)	4 lb/cy	2 cy	8 lb
Freon 14 (CF_4)	70 lb/cy	2 cy	140 lb
Freon 23 (CHF_3)	70 lb/cy	2 cy	140 lb
Carbon Dioxide (CO_2)	60 lb/cy	2 cy	120 lb
Ammonia (NH_3)	50 lb/cy	2 cy	100 lb
Silane (SiH_4)	5000 gm/cy	4 cy	20 Kg
Dichlorosilane (H_2SiCl_2)	90 lb/cy	4 cy	360 lb
Nitrogen (N_2)	257 cf/cy	15 cy	3855 cf
Helium (He)	245 cf/cy	2 cy	490 cf
Boron Trifluoride (BF_3)	50 gm/cy	2 cy	100 gm
Argon (Ar)	245 cf/cy	4 cy	980 cf
Sulfur Hexafluoride (SF_6)	115 lb/cy	2 cy	230 lb
Chlorine (Cl_2)	200 cf/cy	3 cy	600 cf
Nitrogen Trifluoride (NF_3)	Not Determined	1 cy	
Hydrogen Chloride (HCl)	60 lb/cy	2 cy	120 lb
10% Phosphine in Argon (PH_3/Ar)	200 cf/cy	2 cy	400 cf
Boron Trichloride (BCl_3)	40 lb/cy	2 cy	80 lb
Hydrogen (H_2)	216 cf/cy	1/cy	216 cf

*Excludes all waste storage quantities.

1-26-84

SECTION H

PERSONNEL TRAINING

H.1 Outline of Training Program (HWMR 206.B.6):

H.1.a Job Titles and Duties (HWMR 206.B.6.d.(1),(2)):

Table H-1 shows the organization of personnel at the facility. Only three levels of employees are directly involved with the handling of waste: Chemical Support Section Head and Chemical Techs. The Chemistry Lab Supervisor and technicians may run analyses of the wastes. Maintenance personnel (electricians and mechanics) may work in the waste handling area as well as other parts of the facility. These individuals do not handle wastes per se and are under the direct supervision of the Chemical Support Section Head should they be in the hazardous waste area. The duties, responsibilities of each position follow.

TABLE H-1

ORGANIZATION OF PERSONNEL INVOLVED IN HAZARDOUS WASTE ACTIVITIES

```
                    PLANT MANAGER
                    John McGerigle
                          |
FACILITIES/MATERIALS MGR--------------PERSONNEL MANAGER
     Robert Smith                          Bill Boyce
          |                                     |
CHEMICAL SUPPORT SECTION HEAD*          SAFETY AND SECURITY*
     Gary M. Mavrakis                          Bill Boyce
          |                                     |
          |                                     |
          |                             INDUSTRIAL HYGIENIST
          |                               Patrick Herring
          |
CHEM LAB SUPERVISOR----CHEM SUPPORT SECTION HEAD*
   Jeffrey Pritt            Gary M. Mavrakis
          |                        |
   LAB TECHNICIANS          CHEM TECHNICIANS
```

* Indicates those persons directly involved with hazardous waste activities.

JAN 2 0 1988

Position Title: Chemical Support Section Head

Name of Employee: Gary M. Mavrakis

Position Responsibilities and Duties:

- Secondary Emergency Coordinator for all Hazardous Waste activities
- Training of plant personnel in the handling of hazardous wastes
- Responsible for auditing all air, water, and solid waste control systems on site
- Responsible for plant compliance with air, water, & solid waste regulations
- Obtains all required permits, licenses and/or modifications of same from local, state, and federal regulatory bodies
- Notifies proper authorities in emergency situations in conjunction with primary emergency coordinator
- Designs training programs
- Purchases raw chemicals
- Contracts with hazardous waste vendors
- Reports to Facilities/Materials Manager
- Supervises Chemical Services Supervisor & Chemistry Lab Supervisor
- Overall operation & maintenance of the hazardous waste storage facility
- Maintains facility compliance with RCRA and other permits
- Supervises Chemical Techs who handle virgin and waste chemicals
- Maintains operating log, monitoring records, maintenance, inspection, personnel & all other required records
- Prepares hazardous wastes for shipments
- Schedules all maintenance and repairs to structures and equipment for hazardous waste facility
- Provides on-the-job (OJT) training with regard to material handling, leaks, and spills included
- Oversees mechanic/electrician doing both scheduled & unscheduled maintenance and repair work to be sure he is not releasing hazardous wastes to the environment or contaminating himself
- Coordinates and implements logistics in chemical handling
- Plans material requirements and disposals

Experience and Qualifications

Minimum: Bachelor's degree in Chemistry plus 4 years chemical related work experience, supervisor experience necessary, minimum 2 years experience in hazardous waste management. Business/Management Degree helpful but not required.

Position Title: Chemical Tech

Name(s) of Employee(s): S. Kolling
S. Gunther
K. Luhr
R. Hill
J. Diehl

Position Responsibilities:

- Reports to Chemical Support Section Head
- Operates chemical handling equipment
- Transfers all wastes generated in the plant to waste storage areas
- Reviews all incoming wastes and assigns and stores wastes at proper storge location
- Inspects tanks, drums, and other storage equipment, and any gauges, dials, and recorders as required for proper operation and structural integrity
- Inspects drum storage area for evidence of leaks and spills and inappropriately placed drums
- Inspects emergency equipment on a regular basis
- Assists in training of new Techs and mechanics to handle hazardous waste spills and leaks safely and in such a way as to avoid exposures
- Makes appropriate entries into operating log, monitoring records, inspection records, and maintenance records, and files them according to established system
- Takes emergency action on own authority in accordance with established procedures
- Notifies supervisor and other plant authorities as necessary in emergency situations
- Assists in preparing for hazardous waste shipments

Experience and Qualifications:

- High school diploma
- 2-3 years experience as plant Tech with chemical-related activities

H.1.b Training Content, Frequency & Technique (HWMR 206.B.6.(3)):

The program developed at Signetics Albuquerque for training hazardous waste employees overlaps with their job training and consists of the following:

A) Chemical Handling
B) Lift Truck Safety
C) Respiratory Protection
D) Fire Extinguisher
E) First Aid
F) Cardiopulmonary Resuscitation
G) Material Safety Data Sheet Worksheet
H) Air Monitoring
I) Hazardous Waste Handling, and
J) Other Training

Outside courses or seminars are also used, where applicable, for further training of supervisors.

Exhibit H-6 describes required courses for different job positions, the duration, type and the frequency of each course. A brief description of each course follows:

A) Chem Handling (Exhibit H-1):

This course is divided into the Liquids/Solids section and the gas section. Each section is 5 hours of instruction. The student is acquainted with the types of characteristics and hazards associated with the chemicals used at Signetics. The guidelines for the use of protective clothing and equipment are introduced. The employee will also learn how to control and clean up spills.

B) Lift Truck Safety:

This course covers the safe operation of industrial forklifts. The course includes both a written test, covering forklift inspection, operation and safety procedures, and a driving test to ensure that the individual can negotiate a forklift through a typical "tight" situation.

C) Respiratory Protection:

This course instructs the student in the selection of the proper respiratory device, the identification of respiratory hazards, the limitations of the equipment and fit testing.

JAN 20 1986

D) Fire Extinguisher:

In this course, the student learns: 1) what causes fire and fire prevention, 2) evacuation procedures, 3) characteristics of fire, and 4) fire extinguisher classification system.

E) First Aid:

The student will be trained in the knowledge and skills needed to administer basic emergency care. The format certifies the employee for the American Red Cross - Multimedia Standard First Aid Course. The topics include: wounds, injuries, shock, poisoning, choking, burns, exposures, dressings, and bandages and handling victims.

F) Cardiopulmonary Resuscitation:

The skills learned in this course include:

1) identification of the early-warning signs of the heart attack state, 2) resuscitation of a victim, 3) management and treatment of the obstructed airway, and 4) resuscitation and airway management of the infant.

G) Material Safety Data Sheet Workshop:

The student here learns to interpret Material Safety Data Sheets for identification of health hazards, safety precautions, procedures for spills and disposal.

H) Air Monitoring:

This course instructs the student in the measurement of airborne contaminants and the use of the Oxygen Monitor, Draeger Tubes, and the Combustible Gas Detector.

I) Hazardous Waste Handling Course (Exhibit H-2):

This course aims to teach the student: (1) the responsibilities of a hazardous waste generator, storer, and shipper; (2) the proper storage and handling of hazardous wastes; (3) the inspection of hazardous waste storage areas; and (4) to prepare hazardous wastes for shipping. The employee is also taught the ramifications and penalties for non-compliance. This course is taught in conjunction with an outside environmental consultant.

J) Other Training:

For supervisors, Signetics plans to supplement the training outlined with attendance at one or more state or regional technical seminars or training programs on hazardous wastes/materials. At present, the favored programs are: the J. T. Baker Seminar on Hazardous Waste Management and local seminars. Examples of Certificates are enclosed in Exhibit H-3.

H.1.c Training Director:

The personnel training programs, except for Hazardous Waste Handling, are directed by Mr. Pat Herring. Mr. Herring has a Master's degree in Industrial Hygiene (1980) and a Bachelor's in Industry Safety (1979), both from Central Missouri State University. He is also a Board Certified Industrial Hygienist in Training. He is a member of American Industrial Hygiene Association and American Conference of Governmental Industrial Hygiene.

The Hazardous Waste Handling Course is conducted by Gary Mavrakis. Mr. Mavrakis has a Bachelor's degree in Chemistry (1975) from University of New Mexico and a Master of Business Administrtion degree (1983) from New Mexico Highlands University. He has also attended the J. T. Baker HWM Seminar and local seminars conducted in Albuquerque by consultants. In order to keep up with hazardous waste regulations, he frequently consults The Environmental Reporter, Signetics' Environmental Affairs Department, and hazardous waste consultants. He is also a member of the New Mexico Hazardous Waste Management Society.

Mr. Herring and Mr. Mavrakis are also supported by the Corporate Environmental Trainers, Mr. Mark Zuckerman and Mr. Harlan Anderson, from Sunnyvale, Ca.

H.1.d Relevance of Training to Job Position:

The audience for the above-mentioned courses are at the Tech levels. Supervisors and management personnel will receive additional training from outside. The supervisors will be given details of regulations and ramifications for non-compliance. They will also be instructed in the "management" of hazardous wastes. The Job Title and Required Training are summarized in Exhibit H-6. The job descriptions are in Section H.1.a.

H.1.e Training for Emergency Response (HWMR 206.B.6.a.(3)):

The above training courses are designed to ensure that personnel working with hazardous wastes daily can properly respond to emergency situations in their area.

Training elements addressing non-routine and emergency situations (unscheduled shutdowns related to storms, power outages, fires, explosions, spills, etc.) include:

- Procedures for locating, inspecting, and using emergency equipment;
- Emergency communication procedures and alarm systems;
- Responses to fires and explosions;
- Response procedures for containing, controlling, and mitigating spills to prevent ground water contamination;
- Power failure procedures;
- Evacuation procedures; and
- Shutdown of operations.

In addition, plant-wide Emergency Response Teams (ERT) are organized to respond to health and property damage emergencies. ERT members receive training in Chemical Handling, Self-Contained Breathing Apparatus usage, Fire Control, First Aid, Cardio-Pulmonary Resuscitation and Evacuation Procedures. This program is administered by the Safety and Security Department.

H.2 Implementation of Training Program (HWMR 206.B.6.b.):

All new personnel will complete their required training within 6 months of assignment to the hazardous waste position or within 6 months of their date of employment, whichever is later. Prior to training, the Chemical Tech will not work unsupervised. A sample of the employee training records is shown in Exhibit H-5.

The Chem Support Section Head will also review the training programs annually to ensure they are up-to-date, particularly in the following areas:

1) The types and volumes of waste materials generated;
2) The status of storage and operating conditions and procedures (especially problem or potential problem areas);
3) Requirements contained in the facility's hazardous waste permit, noting any changes that have occurred during the past year (especially noting areas where maintenance or compliance was a problem and developing effective solutions to these problems);

JAN 20 1986

4) Incidents that have occurred in the past year that warranted use of contingency plans and/or emergency action. This review focuses on the causes of the incident and the identification of steps to be taken to prevent or to ensure better handling of such incidents in the future (e.g. revisions to Plant's Contingency Plan).

Records documenting the job title for each position, job descriptions, names of employees, and completed training programs (both introductory and review) will be kept onsite in the Hazardous Waste Management Training File of Signetics-Albuquerque. These records will be kept until closure of the facility (see Exhibit H-5) per HWMR 206.B.6.e. In addition, training records are kept on an Employee Profile Data base for the life of the facility.

SECTION H

PERSONNEL TRAINING

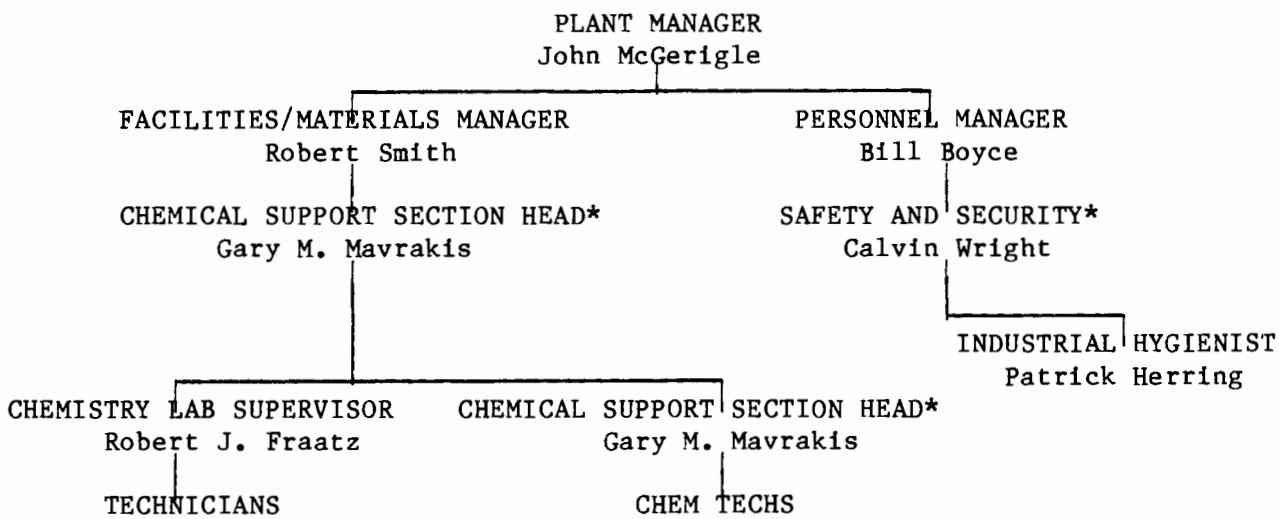
H.1 **Outline of Training Program** (HWMR 206.B.6):

H.1.a **Job Titles and Duties** (HWMR 206.B.6.d.(1),(2)):

Table H-1 shows the organization of personnel at the facility. Only three levels of employees are directly involved with the handling of waste: Chemical Support Section Head and Chemical Techs. The Chemistry Lab Supervisor and technicians may run analyses of the wastes. Maintenance personnel (electricians and mechanics) may work in the waste handling area as well as other parts of the facility. These individuals do not handle wastes per se and are under the direct supervision of the Chemical Support Section Head should they be in the hazardous waste area. The duties, responsibilities of each position follow.

TABLE H-1

ORGANIZATION OF PERSONNEL INVOLVED IN HAZARDOUS WASTE ACTIVITIES



*Indicates those persons directly involved with hazardous waste activities.

Position Title: Chemical Support Section Head

Name of Employee: Gary M. Mavrakis

Position Responsibilities and Duties:

- Secondary Emergency Coordinator for all Hazardous Waste activities
- Training of plant personnel in the handling of hazardous wastes
- Responsible for auditing all air, water, and solid waste control systems on site
- Responsible for plant compliance with air, water, and solid waste regulations
- Obtains all required permits, licenses and/or modifications of same from local, state, and federal regulatory bodies.
- Notifies proper authorities in emergency situations in conjunction with primary emergency coordinator.
- Designs training programs
- Purchases raw chemicals
- Contracts with hazardous waste vendors
- Reports to Facilities/Materials Manager
- Supervises Chemical Services Supervisor and Chemistry Lab Supervisor
- Overall operation and maintenance of the hazardous waste storage facility.
- Maintains facility compliance with RCRA and other permits.
- Supervises Chemical Techs who handle virgin and waste chemicals.
- Maintains operating log, monitoring records, maintenance, inspection, personnel training and all other required records.
- Prepares hazardous wastes for shipments.
- Schedules all maintenance and repairs to structures and equipment for hazardous waste facility.
- Provides on-the-job (OJT) training with regard to material handling, leaks, and spills included.
- Oversees mechanic/electrician doing both scheduled and unscheduled maintenance and repair work to be sure he is not releasing hazardous wastes to the environment or contaminating himself.
- Coordinates and implements logistics in chemical handling.
- Plans material requirements and disposals.

Experience and Qualifications:

Minimum: Bachelor's degree in Chemistry plus 4 years chemical related work experience, supervisor experience necessary, minimum 2 years experience in hazardous waste management. Business/Management Degree helpful but not required.

Position Title: Chemical Tech

Name(s) of employee(s): P. Lopez
S. Gunther
K. Luhr
R. Hill
C. Jackson
J. Diehl

Position Responsibilities:

- Reports to Chemical Support Section Head
- Operates chemical handling equipment
- Transfers all wastes generated in the plant to waste storage areas
- Reviews all incoming wastes and assigns and stores wastes at proper storage location
- Inspects tanks, drums, and other storage equipment, and any gauges, dials, and recorders as required for proper operation and structural integrity
- Inspects drum storage area for evidence of leaks and spills and inappropriately placed drums
- Inspects emergency equipment on a regular basis
- Assists in training of new Techs and mechanics to handle hazardous waste spills and leaks safely and in such a way as to avoid exposures
- Makes appropriate entries into operating log, monitoring records, inspection records, and maintenance records, and files them according to established system.
- Takes emergency action on own authority in accordance with established procedures.
- Notifies supervisor and other plant authorities as necessary in emergency situations.
- Assists in preparing for hazardous waste shipments

Experience and Qualifications:

- High school diploma
- 2-3 years experience as plant Tech with chemical-related activities

H.1.b **Training Content, Frequency and Technique** (HWMR 206.B.6.(3)):

The program developed at Signetics Albuquerque for training hazardous waste employees overlaps with their job training and consists of the following:

A) Chemical Handling
B) Lift Truck Safety
C) Respiratory Protection
D) Fire Extinguisher
E) First Aid
F) Cardiopulmonary Resuscitation
G) Material Safety Data Sheet Workshop
H) Air Monitoring
I) Hazardous Waste Handling, and
J) Other Training

Outside courses or seminars are also used, where applicable, for further training of supervisors.

Exhibit H-6 describes required courses for different job positions, the duration, type and the frequency of each course. A brief description of each course follows:

A) Chem Handling (Exhibit H-1):

This course is divided into the Liquids/Solids section and the gas section. Each section is 5 hours of instruction. The student is acquainted with the types of characteristics and hazards associated with the chemicals used at Signetics. The guidelines for the use of protective clothing and equipment are introduced. The employee will also learn how to control and clean up spills.

B) Lift Truck Safety:

This course covers the safe operation of industrial forklifts. The course includes both a written test, covering forklift inspection, operation and safety procedures, and a driving test to ensure that the individual can negotiate a forklift through a typical "tight" situation.

C) Respiratory Protection:

This course instructs the student in the selection of the proper respiratory device, the identification of respiratory hazards, the limitations of the equipment and fit testing.

D) Fire Extinguisher:

In this course, the student learns: 1) what causes fire and fire prevention, 2) evacuation procedures, 3) characteristics of fire, and 4) fire extinguisher classification system.

E) First Aid:

The student will be trained in the knowledge and skills needed to administer basic emergency care. The format certifies the employee for the American Red Cross - Multimedia Standard First Aid Course. The topics include: wounds, injuries, shock, poisoning, choking, burns, exposures, dressings, and bandages and handling victims.

F) Cardiopulmonary Resuscitation:

The skills learned in this course include:

1) identification of the early-warning signs of the heart attack state, 2) resuscitation of a victim, 3) management and treatment of the obstructed airway, and 4) resuscitation and airway management of the infant.

G) Material Safety Data Sheet Workshop:

The student here learns to interpret Material Safety Data Sheets for identification of health hazards, safety precautions, procedures for spills and disposal.

H) Air Monitoring:

This course instructs the student in the measurement of airborne contaminants and the use of the Oxygen Monitor, Draeger Tubes, and the Combustible Gas Detector.

I) Hazardous Waste Handling Course (Exhibit H-2):

This course aims to teach the student: (1) the responsibilities of a hazardous waste generator, storer, and shipper; (2) the proper storage and handling of hazardous wastes; (3) the inspection of hazardous waste storage areas; and (4) to prepare hazardous wastes for shipping. The employee is also taught the ramifications and penalties for non-compliance.

J) Other Training:

For supervisors, Signetics plans to supplement the training outlined with attendance at one or more state or regional technical seminars or training programs on hazardous wastes/materials. At present, the favored programs are: the J. T. Baker Seminar on Hazardous Waste Management and local seminars. Examples of Certificates are enclosed in Exhibit H-3.

H.1.c Training Director:

The personnel training programs, except for Hazardous Waste Handling, are directed by Mr. Pat Herring. Mr. Herring has a Master's degree in Industrial Hygiene (1980) and a Bachelor's in Industry Safety (1979), both from Central Missouri State University. He is also a Board Certified Industrial Hygienist in Training. He is a member of American Industrial Hygiene Association and American Conference of Governmental Industrial Hygiene.

The Hazardous Waste Handling Course is conducted by Gary Mavrakis. Mr. Mavrakis has a Bachelor's degree in Chemistry (1975) from University of New Mexico and a Master of Business Adminstration degree (1983) from New Mexico Highlands University. He has also attended the J. T. Baker HWM Seminar and local seminars conducted in Albuquerque by consultants. In order to keep up with hazardous waste regulations, he frequently consults The Environmental Reporter, Signetics' Environmental Affairs Department, and hazardous waste consultants. He is also a member of the New Mexico Hazardous Waste Management Society.

Mr. Herring and Mr. Mavrakis are also supported by the Corporate Environmental Trainers, Mr. Mark Zuckerman and Mr. Harlan Anderson, from Sunnyvale, CA.

All of the above personnel resumes are attached in Exhibit H-4.

H.1.d Relevance of Training to Job Position:

The audience for the above-mentioned courses are at the Tech levels. Supervisors and management personnel will receive additional training from outside. The supervisors will be given details of regulations and ramifications for non-compliance. They will also be instructed in the "management" of hazardous wastes. The Job Title and Required Training are summarized in Exhibit H-6. The job descriptions are in Section H.1.a.

H.1.e **Training for Emergency Response** (HWMR 206.B.6.a.(3)):

The above training courses are designed to ensure that personnel working with hazardous wastes daily can properly respond to emergency situations in their area.

Training elements addressing non-routine and emergency situations (unscheduled shutdowns related to storms, power outages, fires, explosions, spills, etc.) include:

- Procedures for locating, inspecting, and using emergency equipment,
- Emergency communication procedures and alarm systems,
- Responses to fires and explosions,
- Response procedures for containing, controlling and mitigating spills to prevent ground water contamination,
- Power failure procedures,
- Evacuation procedures, and
- Shutdown of operations.

In addition, plant-wide Emergency Response Teams (ERT) are organized to respond to health and property damage emergencies. ERT members receive training in Chemical Handling, Self-Contained Breathing Apparatus usage, Fire Control, First Aid, Cardio-Pulmonary Resuscitation and Evacuation Procedures. This program is administered by the Safety and Security Department.

H.2 **Implementation of Training Program** (HWMR 206.B.6.b.):

All new personnel will complete their required training within 6 months of assignment to the hazardous waste position or within 6 months of their date of employment, whichever is later. Prior to training, the Chemical Tech will not work unsupervised. A sample of the employee training records is shown in Exhibit H-5.

The Chem Support Section Head will also review the training programs annually to ensure they are up-to-date, particularly in the following areas:

1) The types and volumes of waste materials generated

2) The status of storage and operating conditions and procedures (especially problem or potential problem areas)

3) Requirements contained in the facility's hazardous waste permit, noting any changes that have occurred during the past year (especially noting areas where maintenance of compliance was a problem and developing effective solutions to these problems).
4) Incidents that have occurred in the past year that warranted use of contingency plans and/or emergency action. This review focuses on the causes of the incident and the identification of steps to be taken to prevent or to ensure better handling of such incidents in the future (e.g. revisions to Plant's Contingency Plan).

Records documenting the job title for each position, job descriptions, names of employees, and completed training programs (both introductory and review) will be kept onsite in the Hazardous Waste Management Training File of Signetics-Albuquerque. These records will be kept until closure of the facility (see Exhibit H-5) per HWMR 206.B.6.e. In addition, training records are kept on an Employee Profile Database for the life of the facility.

HAZARDOUS WASTE HANDLING COURSE

SIGNETICS CORPORATION

PREPARED FOR

CHEMICAL OPERATORS

OBJECTIVES

- TO KNOW THE RESPONSIBILITIES OF A HAZARDOUS WASTE GENERATOR, STORER, AND SHIPPER
- TO KNOW THE PROPER STORAGE AND HANDLING OF HAZARDOUS WASTES
- TO BE ABLE TO INSPECT HAZARDOUS WASTE STORAGE AREAS
- TO PREPARE HAZARDOUS WASTES FOR SHIPPING

SCOPE

- WASTE HYDROFLUORIC ACID
- WASTE BUFFERED OXIDE ETCH
- WASTE "SOLVENT"
- WASTE PHOTORESIST/ACETONE
- WASTE CONTAMINATED WITH ARSENIC OR MERCURY
- OTHER

PREREQUISITES

- CHEMICAL HANDLING
- FIRE EXTINGUISHER
- SELF-CONTAINED BREATHING APPARATUS
- FORKLIFT
- FIRST AID
- AIR MONITORING

LAWS THAT AFFECT US

- RESOURCE CONSERVATION AND RECOVERY ACT (RCRA 1976)
- CLEAN WATER ACT (CWA 1980)
- COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA 1980) ALSO KNOWN AS "SUPERFUND"
- HAZARDOUS MATERIALS TRANSPORTATION ACT (HMTA 1980)
- PENALTIES $25,000/DAY/OFFENCE + IMPRISONMENT

40, 49 CFR (CODE OF FEDERAL REGULATIONS)

DEFINITIONS

EPA	(ENVIRONMENTAL PROTECTION AGENCY)
DOT	(DEPARTMENT OF TRANSPORTATION)
OSHA	(OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION)
RQ	(REPORTABLE QUANTITY)
HW	(HAZARDOUS WASTE)
TSDF	(TREATMENT, STORAGE, DISPOSAL FACILITY)
ORM	(OTHER REGULATED MATERIAL)
N.O.S.	(NOT OTHERWISE SPECIFIED)
N.O.I.	(NOT OTHERWISE INDEXED)
MSDS	(MATERIAL SAFETY DATA SHEET) OR (OSHA FORM 20)

HAZARDOUS MATERIAL

HAZARDOUS SUBSTANCE

HAZARDOUS CHEMICAL

HAZARDOUS WASTE

HAZARDOUS CHARACTERISTICS

EPA	DOT
° CORROSIVE (HF)	1) RADIOACTIVE MATERIAL
° TOXIC (ARSENIC)	2) POISON A (PHOSPHINE)
° REACTIVE	3) FLAMMABLE GAS
° IGNITABLE (ACETONE)	4) NON-FLAMMABLE GAS (NITROGEN)
° PROCESSES (DEGREASING)	5) FLAMMABLE LIQUID (ACETONE)
	6) OXIDIZER (HYDROGEN PEROXIDE)
	7) FLAMMABLE SOLID
	8) CORROSIVE MATERIAL (LIQUID) (HF)
	9) POISON B (ARSENIC)
	10) CORROSIVE MATERIAL (SOLID)
	11) IRRITATING MATERIALS
	12) COMBUSTIBLE LIQUID >110 GAL CAP
	13) ORM-B
	14) ORM-A
	15) COMBUSTIBLE LIQUID < 110 GAL CAP
	16) ORM-E

REQUIREMENTS FOR A GENERATOR:

- DETERMINE WASTE CHARACTERISTIC
- INTERNAL TRACKING OF HAZARDOUS WASTE
- CLEAN CONTAINERS, LABELS
- GENERATOR ID, ACCOUNTABILITY
- RECORD KEEPING
- ANNUAL REPORT
- EXTERNAL MANIFEST
- EXCEPTION REPORT (35 DAYS)

REQUIREMENTS FOR A STORER:

STORAGE AREAS:

- COMPATIBILITY
- AISLE SPACE
- SECURITY
- SAFETY EQUIPMENT
- DRAINS
- VENTILATION
- FIRE EQUIPMENT
- COMMUNICATION EQUIPMENT/ALARMS

EQUIPMENT MAINTENANCE

PERSONNEL TRAINING

MANANGEMENT OF CONTAINERS/TANKS

CONTINGENCY PLANS

REQUIREMENTS FOR A STORER:

WASTE CHEMICAL MANIFEST

DRUM LOG

PERIOD REPORT

ANNUAL REPORT

INSPECTION AND MAINTENANCE LOGS

SPECIFICATIONS

INSPECTION SCHEDULE FOR DRUMMED HAZARDOUS WASTE STORAGE

ITEM	DAILY	WEEKLY	MONTHLY
Visual inspection of area for containers in proper section	X		
Vis. Insp. of Waste Containers for leaking or deterioration	X		
Insp. for proper container marking	X		
Insp. for proper segregation of waste	X		
Check height of drum stacking (not to exceed double stacking, no stacking for ignitables)	X		
Vis. insp. of walls, floors, and ceiling for discoloration and stains	X		
Check for locked doors		X	
Inspect slotted drains		X	
Check emergency showers			X
Check fire extinguisher			X
Check warning signs on exterior of containment rooms	X		
Check for aisle space needed for drum movement	X		
Check that drums are elevated on pallets	X		
Check inventory of industrial absorbents used to contain spills or leaks	X		
Check forklift for corrosion, malfunction	X		

The above inspections are performed by Chemical Support Operators.

INSPECTION LOG FOR DRUMMED HAZARDOUS WASTE STORAGE

	ITEM	FREQ.	RECORD INSPECTION
1.	Visual Inspection of area for containers in proper section	Daily	_____
2.	Vis. Insp. of waste containers for leaking or discoloration	Daily	_____
3.	Insp. for proper container marking	Daily	_____
4.	Insp. for proper segregation of waste	Daily	_____
5.	Check height of drum stacking (not to exceed double stacking, no stacking for ignitables)	Daily	_____
6.	Vis. insp. of walls, floors, and ceiling for discoloration and stains	Daily	_____
7.	Check for locked doors	Daily	_____
8.	Insp. slotted drains	Weekly	_____
9.	Check emergency showers	Monthly	_____
10.	Check fire extinguisher	Monthly	_____
11.	Check warning signs on exterior of containment rooms	Daily	_____
12.	Check for aisle space needed for drum movement	Daily	_____
13.	Check that drums are elevated on pallets	Daily	_____
14.	Check inventory of chemical absorbents used to contain spills or leaks.	Daily	_____
15.	Check forklift for corrosion, malfunction	Daily	_____

Necessary Action:_____

_____

_____

_____

Inspected by_____Shift:_____Date:_____Time:_____

Action was completed by:_____Date:_____

THIS RECORD WILL BE RETAINED AT CHEMICAL SUPPORT FOR A MINIMUM OF 3 YEARS

INSPECTION LOG FOR HAZARDOUS WASTE STORAGE TANKS

ITEM	FREQ.	RECORD INSPECTION
1. VISUAL INSPECTION OF VAULT COVER AND LADDER:		
. Corroding parts	Weekly	_____
. Loose rivets or bolts	Weekly	_____
. Worn or broken parts	Weekly	_____
2. VISUAL INSPECTION OF WASTE TANKS:		
. Discoloration of paint	Weekly	_____
. Cracks at connections, seams	Weekly	_____
. Buckles, bulges	Weekly	_____
. Water collection on tank top	Weekly	_____
3. ELECTRICAL:		
. Light bulb on	Weekly	_____
. Corrosion on conduit	Weekly	_____
. Defective switches for lights	Weekly	_____
. Vent fan on	Daily	_____
4. VISUAL INSPECTION OF VAULT:		
. Rust spots	Weekly	_____
. Blisters, film-lifting	Weekly	_____
. Cracks or spalled concrete	Weekly	_____
. Low spots where liquids can collect	Weekly	_____
. Anchor bolt distortion	Weekly	_____
. Presence of odors	Daily	_____
5. VISUAL INSPECTION OF PIPING:		
. Cracks and distortion	Weekly	_____
. Bulging	Weekly	_____
. Corrosion	Weekly	_____
. Leaks	Daily	_____
. Flange seal leaks	Daily	_____
. Loose or corroded bolts	Weekly	_____
. Inspect trench for liquids	Weekly	_____
6. CHECK TANK LEVELS:		
. Waste Hydrofluoric Acid	Daily	____FT ____IN
. Waste BOE	Daily	____FT ____IN
. Waste Solvent	Daily	____FT ____IN

Necessary Action:_____

_____

_____

_____

Inspected by:_____ Shift:_____ Date:_____ Time:_____

Action was Completed by _____ Date:_____

THIS RECORD WILL BE RETAINED AT FACILITIES FOR A MINIMUM OF 3 YEARS.

INSPECTION SCHEDULE FOR HAZARDOUS WASTE STORAGE TANKS

ITEM	DAILY	WEEKLY
1. Visual Inspection of Vault Cover & Ladder:		
. Corroding parts		X
. Loose rivets or bolts		X
. Worn or broken parts		X
2. Visual Inspection of Waste Tanks:		
. Discoloration of paint		X
. Cracks at connections, seams		X
. Buckles, bulges		X
. Water collection on tank top		X
3. Electrical		
. Light bulb on		X
. Corrosion on conduit		X
. Defective switches for lights		X
. Vent fan on	X	
4. Visual Inspection of Vault		
. Rust spots		X
. Blisters, film-lifting		X
. Cracks or spalled concrete		X
. Low spots where liquids can collect		X
. Anchor bolt distortion		X
. Presence of odors	X	
5. Visual Inspection of Piping		
. Cracks and distortion		X
. Bulging		X
. Corrosion		X
. Leaks	X	
. Flange seal leaks	X	
. Loose or corroded bolts		X
. Inspect trench for liquids		X
6. Check Tank Levels		
. Waste Hydrofluoric Acid	X	
. Waste BOE	X	
. Waste Solvent	X	

The above inspections are performed by Chem Support Operators.

REQUIREMENTS OF A SHIPPER:

HAZARDOUS MATERIALS TABLE 49 CFR 172.101

- +, E, A, W
- PROPER SHIPPING NAME
- HAZARD CLASS
- ID NO.
- LABEL REQUIRED
- PACKAGING
- PLACARDS

REQUIREMENTS OF A SHIPPER:

- SHIPPING PAPERS
- MANIFEST
- MARKING
- LABELLING
- PLACARDING
- EMPTY
- PACKAGING
- VEHICLE INSPECTIONS

REQUIREMENTS OF A SHIPPER:

- SHIPPING PAPERS:
  - PRIORITY FOR HAZARDOUS MATERIALS
  - LOCATION IN TRUCK
  - REPORTABLE QUANTITIES

    "RQ, HYDROFLUORIC ACID SOLUTION, CORROSIVE MATERIAL UN 1790"
  - CERTIFICATION

    LEGIBLY SIGNED

REQUIREMENTS OF A SHIPPER:

- MANIFEST
  - DOCUMENT NOS,
  - GENERATOR ID
  - TRANSPORTER ID
  - TSDF ID
  - SHIPPING NAMES, QUANTITIES
  - CERTIFICATION
  - PRINTED <u>AND</u> SIGNED NAME
  - DISCREPANCIES

REQUIREMENTS OF A SHIPPER:

- MARKING
  - PROPER SHIPPING NAME
  - IDENTIFICATION NO.
  - LEGIBLE, DURABLE, UNOBSCURED
  - CONSIGNEE ADDRESS

REQUIREMENTS OF A SHIPPER:

- LABELLING
  - "FLAMMABLE", "CORROSIVE", ETC.
  - CARGO AIRCRAFT ONLY
  - "THIS END UP"
  - LABELS ON <u>EACH</u> PACKAGE
  - LEGIBLE, DURABLE, UNOBSCURED

REQUIREMENTS OF A SHIPPER:

- PLACARDING
  - ANY AMOUNT EVEN WHEN "EMPTY"

    CLASS A EXPLOSIVES
    CLASS B EXPLOSIVES
    POISON A
    FLAMMABLE SOLID
    RADIOACTIVE MATERIAL
  - < 1,000 LBS OTHER CLASSES, NO PLACARDS NECESSARY
  - ≥ 1,000 LBS PLACARDS REQUIRED
  - MIXED LOAD PLACARD AS "DANGEROUS" IF EACH COMPONENT < 5,000 LBS
  - IF ANY COMPONENT > 5,000 LBS, INDIVIDUAL PLACARD
  - SHIPPER PROVIDES AND AFFIXES PLACARDS ON ALL FOUR SIDES OF TRUCK
  - VISIBLE, UNOBSCURED

REQUIREMENTS OF A SHIPPER:

- EMPTY
  - WHEN A CONTAINER IS TRIPLE-RINSED
  - A CONTAINER OR INNER LINER CONTAINS LESS THAN 1 INCH OF HAZARDOUS WASTE
  - A CONTAINER CONTAINS LESS THAN 3% OF THE ORIGINAL TOTAL CONTENTS WHEN FULL.

REQUIREMENTS OF A SHIPPER:

- PACKAGING
  - DOT DRUMS 17E, 17H

° SHIPPING DRUMS:

- LABEL
- HAZARDOUS WASTE LABEL
- "THIS SIDE UP"
- NAME AND ADDRESS OF CONSIGNEE

REQUIREMENTS OF A SHIPPER:

° VEHICLE INSPECTIONS

TANK TRUCK

- HOSES INTACT
- PLACARDS ON FOUR SIDES
- TIRES IN GOOD CONDITION
- UN NOS.
- VALVE ON TANK WITH LOCK
- COMPATIBLE LINER
- DRIVER EQUIPPED WITH SAFETY GEAR

TRAILER

- APPEARANCE
- ODORS
- SECURED CARGO
- SEGREGATION OF CARGO
- PLACARDS ON FOUR SIDES
- TIRES IN GOOD CONDITION

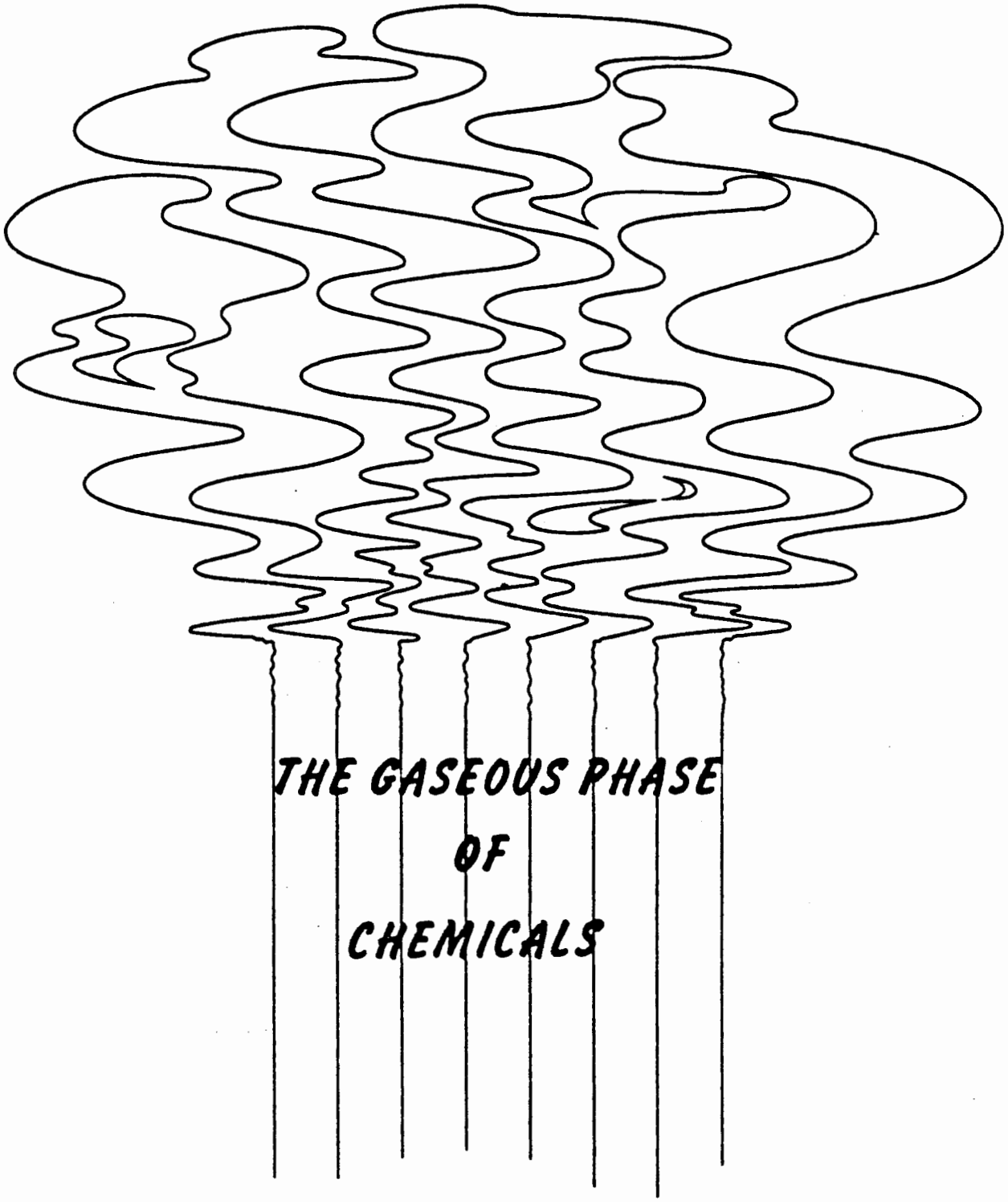
DRIVER SIGNS MANIFEST!

SOME METHODS OF HAZARDOUS WASTE DISPOSAL

- UNDERGROUND INJECTION WELL
- LANDFILL
- TREATMENT, CHEMICAL, BIOLOGICAL
- SOLIDIFICATION
- EVAPORATION, AERATION
- LANDFARMING
- INCINERATION
- <u>RECLAMATION</u>

WHAT DO WE DO TO INSURE COMPLIANCE?

- SEGREGATE WASTES
- TRAINING
- ENVIRONMENTAL AFFAIRS, LEGAL
- CONSULTANTS
- LAB ANALYSES
- REGULATORY AGENCIES
- PLANT PHILOSOPHIES
- SPECIFICATIONS - ZERO DEFECTS
- INTERNAL AUDITS
- DISPOSAL SITE AUDITS



THE GASEOUS PHASE OF CHEMICALS

PROTECTIVE SAFETY EQUIPMENT TO BE USED IN A FAB AREA

1. Protective equipment will be provided by the company and must be worn as required in the work area.

2. Lab Coats (White or Blue Smocks) - This garment is issued to the employee not as safety or protective equipment for the employee, but for protection of our delicate products. Clothing usually has a high degree of lint, dirt and other contaminating debris which can destroy our products if not properly controlled. Smocks should never be used in place of safety equipment for any reason.

3. Hair Covering - There are a few Fab areas that require the wearing of hats. This is to protect the delicate products that are being produced from hair contaminates. They are to be worn at all times in the Fab area and must not be taken off. Keep long hair tucked into hats or tied back.

4. Glasses - Protective glasses should be worn at all times in the Fab area. The kind of glasses worn must be chosen with consideration given to the job being performed, location of your work station, and the working environment.

   A. Safety Glasses with Side Shields - Mandatory in the Wafer Fab area. They are used for protection from chips, flying objects and splashed chemicals. Operators using microscopes and other optical equipment may remove glasses ONLY during actual inspections, when glasses may interfere with optical accuracy.

   B. Safety Glasses with Tinted Lenses - These should be used to protect eyes of operators working around ultra violet lights. Tinted glasses will be provided at all U.V. inspection stations. Ask your Supervisor if your U.V. station does not have them available.

   C. Prescription Safety Glasses with Tinted Shields - Any employee who must wear eye glasses will be supplied with prescription safety glasses by Signetics. You may choose to have either plain or tinted lenses. Supervisors can provide purchase requisitions for these glasses. Expenses for new examinations will not be covered by the company.

   D. Contact Lenses - These shall not be worn by an employee engaged in operations involving the following:

      (1) Exposure to dusts

      (2) Exposure to corrosive or irritant liquids, gases, or smokes

      (3) Exposure to flammable liquids

      (4) Exposure to fiberglass

   E. Visitor Glasses - These must be worn by any visitor coming into the Fab area. They are plastic, non-tinted glasses which protect only against chemical spills. They are not shatter resistant, and therefore provide no protection from flying objects such as chips.

   F. Chemical Goggles with Safety Strap - These provide better protection for the eyes when working with chemicals because of a closer fit to the face.

G. Visor with Full Face Shield (Tinted or Clear Lens) - These provide the best protection for the face and eyes from flying objects and chemical accidents. The curvature of the shield gives added protection to the chin area as well.

5. Gloves - Gloves are probably the most important item of your protective equipment. If you make sure your gloves are free from defects, select those appropriate to the materials being used, and wear your gloves according to specification, they will provide the necessary hand protection from burns and from contact with toxic substances.

Safety Rules for Gloves:

(1) Test Gloves - Protective gloves must be tested by the wearer for defects before and after each use. Partially inflate gloves with N_2 air jet or twisting motion. While holding the base of the glove closed, test glove for leaks by visual inspection and by listening for escaping air. The gloves may also be immersed in water for bubble test. If any detection of a leak is suspected, discard the gloves. Gloves showing evidence of deterioration must also be discarded, even if not leaking.

(2) Glove Disposal - Mutilate gloves, by cutting them, when throwing away so they cannot be used accidentally by others.

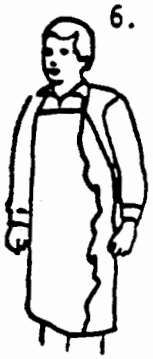
(3) Chemical Exposure of Gloves - Chemically contaminated gloves must be disposed of with other chemically contaminated waste.

(4) Remove Jewelry - Rings and bracelets should not be worn since they can cause punctures in the gloves. They should be left in your locker if worn to work.

(5) Trim Fingernails - To prevent puncturing gloves, keep your nails smooth and trimmed with no jagged edges.

(6) Rinse Gloves - Rinse gloves in water immediately following any chemical contact. NEVER touch your face, glasses or any other part of your body in order to avoid chemical burns. Frequent rinsing of gloves while working with chemicals also prolongs glove life.

(7) Form Cuff - Roll down the top of gloves ½ to 1 inch, to form a cuff. This will prevent fluids from running down the glove and onto exposed skin of the arm.



6. Vinyl Aprons - This protective apron is worn over the bunnysuit in all operations (class 100 room) where hazardous chemical contact is expected and chemical resistant protection is required.

Safety Rules for Aprons:

Label Apron - A distinguishing mark must be placed on the front side of the apron to identify the front from the back of the apron. This will prevent confusing the two sides of the apron and alleviate contact with chemical spills and personal clothing.

7. Armguards (Gauntlets) - These are made of translucent vinyl material and should be worn by employees handling or working near hazardous chemicals. They are worn over gloves, keeping gloves cuffed. The top of the gauntlets should come above the elbows.

8. Shoes - Shoes must be completely enclosed. Sandals, clogs, and canvas tennis shoes cannot be worn. Leather or vinyl tennis shoes can be worn. The Supervisor will interpret the heel height requirement for each employee in accordance with safety policy G-4.

A. Closed shoes are required in all areas except:

(1) Office areas

(2) Cafeterias

(3) Data Processing & Computer Room (R&D and Arques building)

(4) Circuit Layout & Computer Room (R&D)

(5) Main Hallways

B. An individual who has occasion to go in any area other than the above specified locations will be required to have closed shoes. This will be strictly enforced by the Area Supervisor.

SAFETY EQUIPMENT DEMONSTRATION

- REQUIRED BY LAW
- ALL AVAILABLE IN STORES
- SIGNETICS WILL PROVIDE
- SHOES LEATHER OR SIMULATED LEATHER
- HEELS NOT GREATER THAN 2 INCHED
- SAFETY GLASSES (MINIMUM)
  1. SHIELD
  2. PLAIN OR DARK
  3. PRESCRIPTION FREE, EXCLUDES EXAM
- APRON
  - FULL LENGTH
- GLOVES (PROBCOTS)
  1. TEST EACH TIME
  2. WASH WITH WATER AFTER USE

GLOVES

A protective covering for the hands. When wearing gloves, our hands have a tendency to sweat excessively. If you suspect a leak in your gloves, remove your gloves, wash your hands and recheck your gloves.

TYPES OF GLOVES USED AT SIGNETICS

GLOVES	COLOR	PRIMARY AREA OF USE	PROTECTIVE PURPOSE	
Vinyl Dust Free	Clear	Fab Operations	Worn as part of the Bunny suit in ultra clean Class 100 rooms where lint control is most strict. Protects product from body contamination (hair, skin, oil).	
Pacific Polymers	Orange	Fab Operations	Handling of either acids or solvents.	Check for air leaks before, during, and after use - fully rinse w H_2O
Neopreme	Black	Fab Operations	Handling of either acids or solvents.	Check for air leaks before, during, and after use - fully rinse w H_2O
Thermal-Resistant Cloth (asbestos form)	White		1) Handling of larger hot quartz glass. 2) Cryoprotective - handling extreme cold situations. Example: Liquid nitrogen tanks.	
Edmunts	White	Outside Fab	General Maintenance	

ACCIDENT PREVENTION SIGNS

Industry has currently adopted a set of key terms as developed under the Occupational Safety and Health Act (O.S.H.A.) that may be used for accident prevention and general safety measures within the workplace. These words, known as "Signal Words" are listed below and are arranged in a decreasing order of severity. The purpose is to allow you, a safety conscious employee, a means of evaluating the degree of a potential hazard within the working environment.

Highest Degree of Hazard

Color(s)

Danger signs have a white background with "Danger" in white letters on a red oval inside a black rectangular panel. Wording in black letters.

Use: Danger signs should be used only where an immediate hazard exists. There should not be any variation in the type of design or signs posted to warn of specific dangers and radiation hazards.

Danger signs indicate immediate danger and warning that special precautions are necessary. The skull and crossbones must also be displayed with the word "DANGER" for highly toxic chemicals.

****

Intermediate Degree of Hazard (Specific)

Color(s)

Caution signs have a yellow background. "Caution" should be in yellow letters on a black rectangular panel. Other wording must be in black letters.

Use:

Caution Signs should be used only to warn against potential hazards or to caution against unsafe practices. All employees shall be instructed that caution signs indicate a possible hazard against which proper precautions should be taken.

Low Degree of Hazard
(Informational)

Color(s)

Notice Signs have a white background. "Notice" should be in white letters on a blue rectangle. Wording is in black letters.

Use:

Notice Signs are primarily used as information signs for employees.

****

Lowest Degree of Hazard

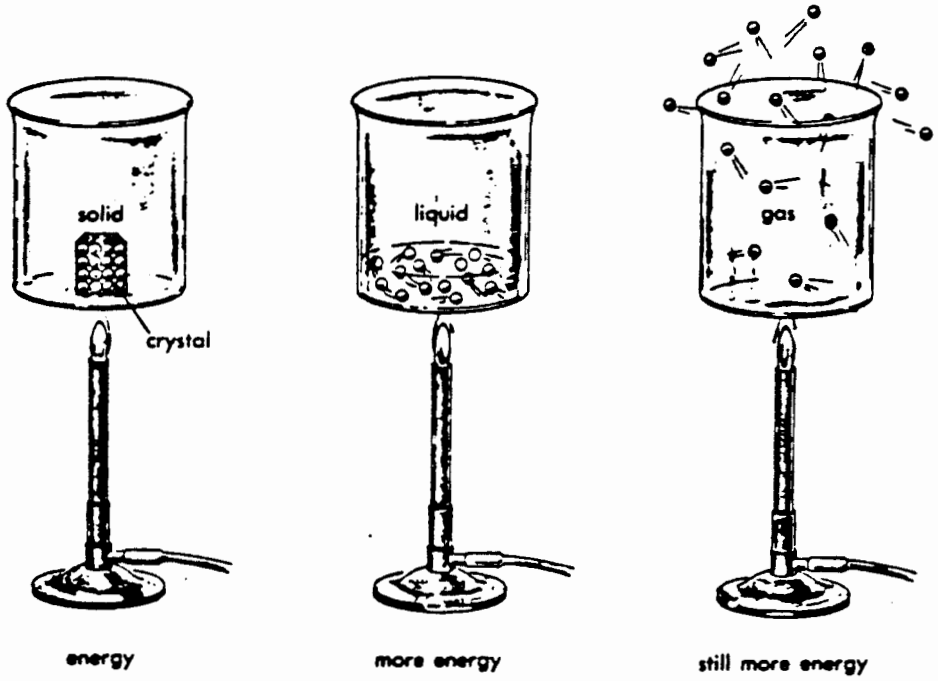
Color(s)

Be Careful Signs have a white background. "BE CAREFUL" should be in white letters on a green rectangle. Wording is in black letters.

Use:

Be Careful Signs are designed as safety instruction signs and should be used where there is a need for general instructions and suggestions relative to safety measures.

Other Information Signs and Safety Instruction Signs may be of a variety of designs and colors. Information Signs will convey information not necessarily of a safety nature, and Safety Instruction Signs should be used for general instruction relative to safety measures.



GASEOUS DIFFUSION

Gas movement or diffusion is defined as the ability of a gas to spead out spontaneously and to move through another gas until it completely fills the container. For example, suppose a container of a particularly odorous gas, say hydrogen sulfide (H_2S), were opened in the front of a crowded lecture hall. Those people in the front row would soon detect it, and gradually, the odor would become noticeable to the people sitting farther and farther back, until eventually, the gas could be smelled in every spot in the room. The H_2S molecules would spontaneously make their way throughout the entire room, moving between and intermingling with the gaseous molecules of the air.

DEFINITION OF A COMPRESSED GAS:

For regulatory purposes, a compressed gas is defined by the D.O.T. as any material or mixture that, when enclosed in a container, has an absolute pressure, (addition of all the gas pressures in the mixture), exceeding 40.0 pounds per square inch (psia) at 70°F; or 2) regardless of the pressure at 70°F, has an absolute pressure exceeding 104 psi at 130°F; or 3) any flammable liquid material having a vapor pressure exceeding 40.0 psi absolute at 100°F.

CHEMICAL HANDLING

THE GAS PHASE

Compressed gas containers, when constructed according to the applicable Department of Transportation (D.O.T.) specifications and maintained in accordance with D.O.T. Hazardous Materials Regulations, are considered safe for the purposes in which they are intended. ACCIDENTS OCCURRING DURING THE TRANSPORTATION, HANDLING, USAGE, AND STORAGE OF THESE CONTAINERS CAN ALMOST INVARIABLY BE TRACED TO FAILURE IN FOLLOWING THE D.O.T. REGULATIONS OR TO ABUSE OR MISHANDLING OF THE CONTAINERS - - Therefore, any reduction in accident levels can be directly related to the employees' knowledge, joined with a safe working environment.

THE GASEOUS STATE

PROPERTIES AND UNIQUE HAZARDS:

The air that surrounds us is a sea of mixed gases, called the atmosphere. It is not necessary, then, to search very far to find a gas whose properties we may study. Among the familiar characteristics of air which are, in fact, properties of all gases, are listed below.

1. GASES MAY BE COMPRESSED. A fixed quantity of gas may be made to occupy a smaller volume by applying pressure.

2. GASES EXPAND TO FILL THEIR CONTAINERS UNIFORMLY. This property is known as diffuseness. (see definition sheet on diffusion).

3. ALL GASES HAVE LOW DENSITY. The density of air, for example, is 0.0013 g/cc. This means that a cubic foot of air weighs less than 1.2 ounces--a very small weight for that large a volume, compared with the weight of a similar volume of things we can "see" physically.

4. GASES MAY BE MIXED. "There's always room for more," is a phrase that may be applied to gases. You may add the same or a different gas to that gas already occupying a rigid container of fixed volume, provided there is no chemical reaction between them.

5. A CONFINED GAS EXERTS PRESSURE ON THE WALLS OF ITS CONTAINER UNIFORMLY IN ALL DIRECTIONS. This pressure is a unique property of the gas, independent of external factors such as gravitational forces.

6. LOW FLASH POINT. The flash point is the lowest temperature at which a liquid (compressed gas) or volatile solid gives off a vapor sufficient to form an ignitable mixture with the air near the surface of the liquid. (i.e. propane> acetone> H_2O> H_2SO_4)

7. USUALLY HAS NO ODOR. Most gases usually show no detectable odor or visable characteristics to the human senses. Examples would be Carbon Monoxide (CO) or Carbon dioxide CO_2.

INTRODUCTION TO HAZARDOUS MATERIALS
VOCABULARY WORDS

Hazardous Material

Any material that is a flammable, corrosive, oxidizer, poison, explosive or radioactive is considered by the D.O.T. (Dept. of Transportation) to be hazardous. Hazardous materials have properties which make them harmful if used improperly.

Flammable

A flammable material is capable of being easily ignited and of burning with extreme force.

Pyrophoric

Pyrophoric refers to materials that are spontaneously combustible, which means they will burn when released into the air without an ignition source such as a flame or spark.

Flash Point

When talking about flammables, a flash point refers to the temperature at which a liquid gives off enough vapors to support ignition.

Corrosive

Corrosive materials are highly reactive and will cause destruction of many materials upon contact. Corrosives are divided into two major groups - acids and bases. Corrosive acids have a pH of less than 2, while corrosive bases have a pH of greater than 12.5.

Oxidizer

Oxidizing materials will decompose readily to yield oxygen. Since oxygen is needed to create or sustain a fire, violent reactions may occur when an oxidizer is mixed with a combustible material, such as wood, paper, or powders.

Poison

A material is considered a poison if it causes serious damage or death to a person when it is inhaled, absorbed or eaten, even in small amounts. Poisonous materials are often referred to as toxic materials.

Explosive

An explosive material has the capacity to react with great force and speed.

Radioactive

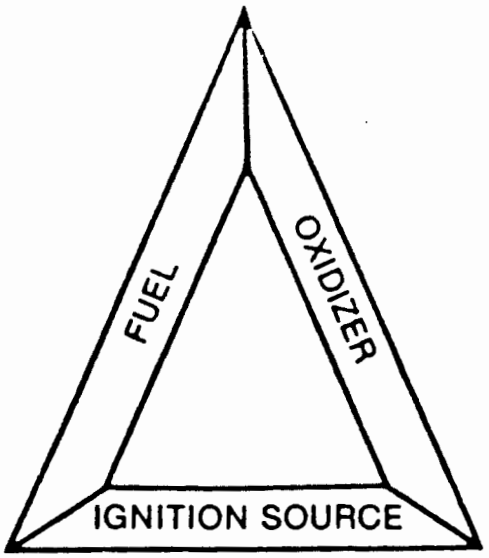
A radioactive material emits certain atomic particles or energy that are destructive to human tissue, thus radioactive materials are always used under strict controls in specified areas.

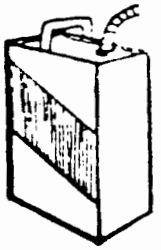
Cryogenic

Cryogenic refers to a state of extreme cold - temperatures below -101° C. Gases are usually stored and transferred in a cryogenic (liquified) state to conserve space.

Organic

Refers to materials that contain the element carbon as a basic unit of structure. These materials are often derived from living matter. Examples of organic materials include oil, grease, wood, and rubber.

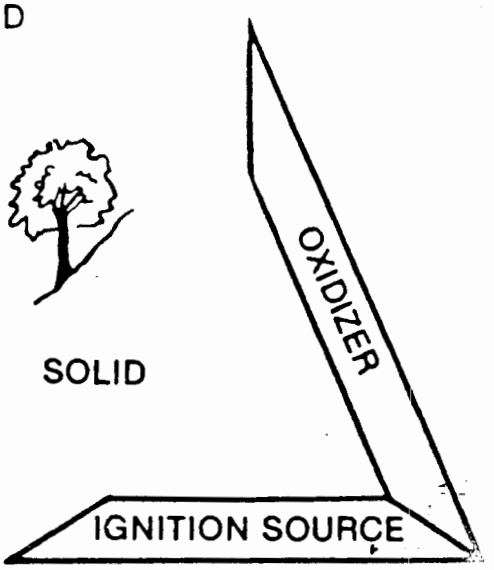


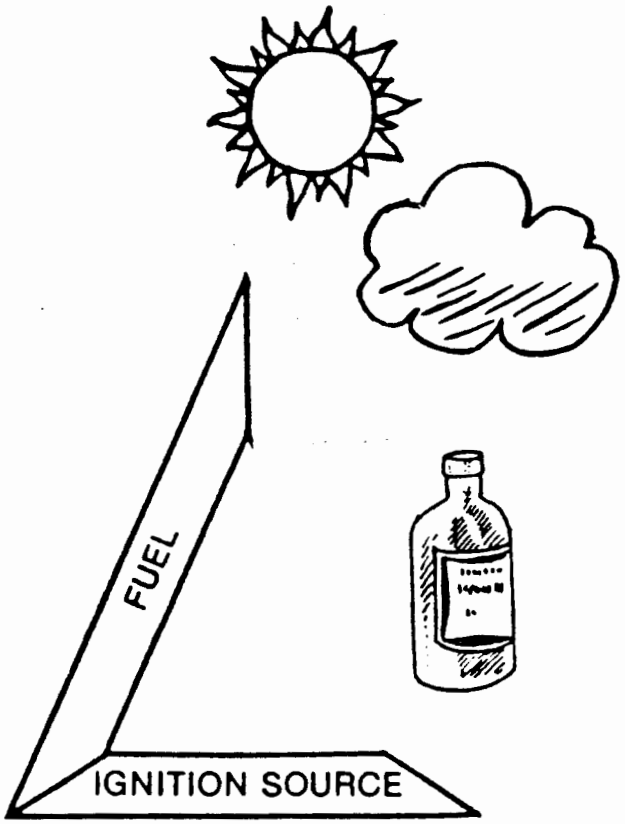


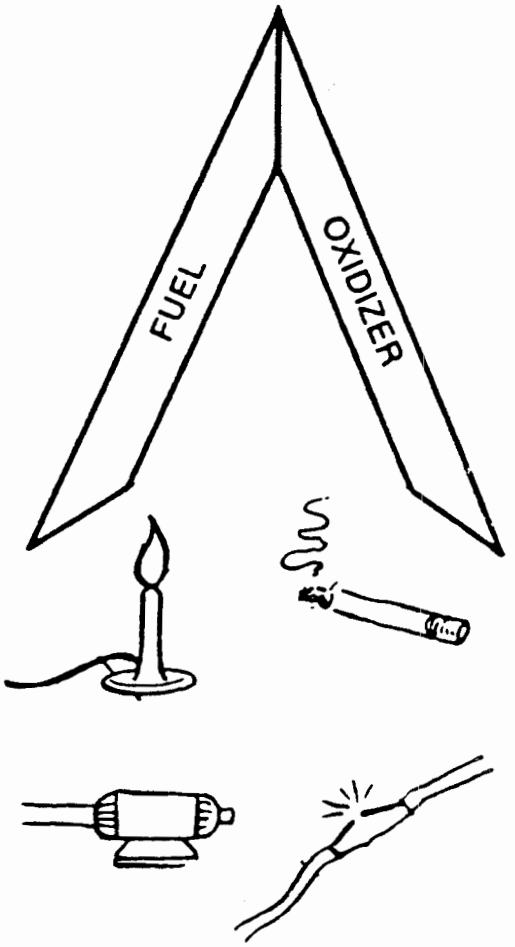
LIQUID

SOLID

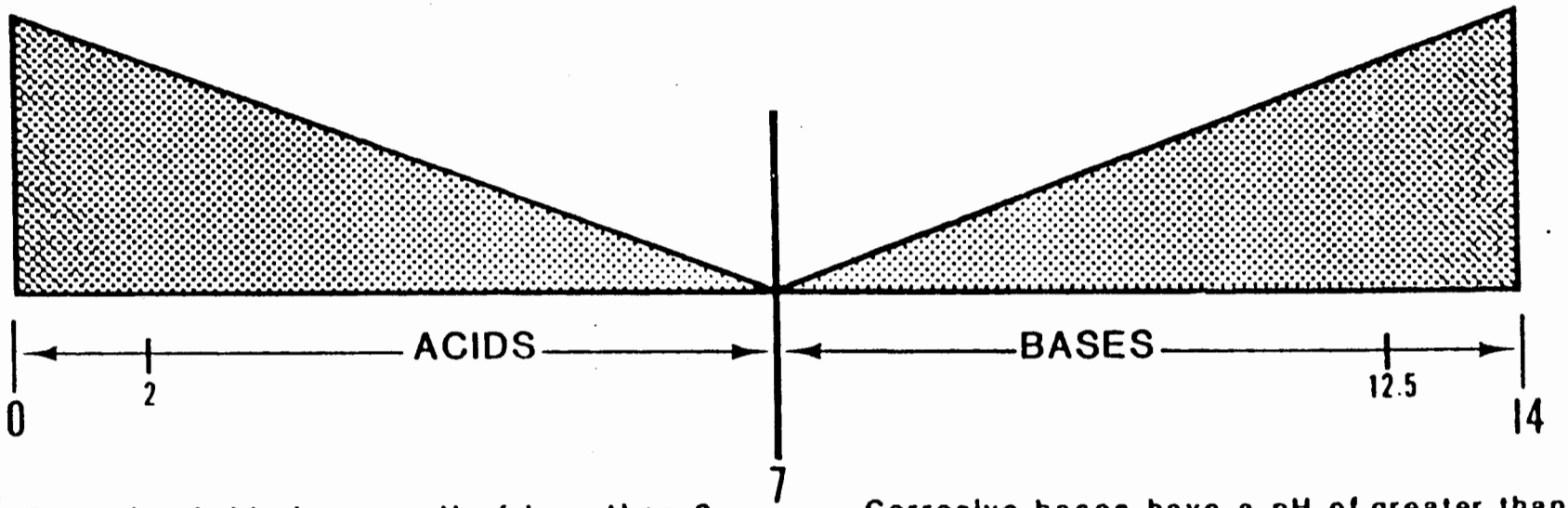
GAS







pH CHART



Corrosive Acids have a pH of less than 2

Corrosive bases have a pH of greater than 12.5

A neutralized material will have a pH of between 5 and 9

CHEMICALS AND GASES

Table of Contents

Acetic Acid, Glacial
Acetone
* Ammonia
Ammonium Hydroxide
* Argon
Arsenic Lump
* Boron Trichloride
* Boron Trifluoride
Buffered Oxide Etch 20:1
Buffered Oxide Etch 34:5
* Carbon Dioxide
* Chlorine
Chromium Trioxide
Developer MF-312
Developer MF-315
Developer NMD-3
Developer MF-317
* Dichlorosilane
Ethylene Glycol
* Freon-11
* Freon-13B1
* Freon-14
* Freon-23
Freon-TF
Garratt-Callahan SS-Cat
Garratt-Callahan 12L
Garratt-Callahan 23L
Garratt-Callahan 34A
Garratt-Callahan 38A
Garratt-Callahan 42NF
Garratt-Callahan 82
Garratt-Callahan 202
Garratt-Callahan 291
* Helium
* Hexamethyldisilazane (H.M.D.S.)
Hydrochloric Acid
Hydrofluoric Acid
* Hydrogen
* Hydrogen Chloride
Hydrogen Peroxide
Isopropyl Alcohol
Lecanol Detergent
* Mapp Gas
Methanol
Mity Etch (Aluminum)

Nitric Acid
* Nitrogen, Gas
Nitrogen, Liquid
* Nitrogen, Trifluoride
* Oxygen
* Phosphine
Phosphoric Acid
Phosphorus Oxychloride
Positive Photoresist OFPR-800
Positive Photoresist 1400-27
Positive Photoresist Kodak 820
Potassium Hydroxide
* Silane
Stripper R-10
* Sulfur Hexafluoride
Sulfuric Acid
1,1,1, - Trichloroethane (TCA)
Triton X-100

SIGNETICS GASES

I. FLAMMABLE-ignites easily, burns rapidly. Isolate from all combustible materials.

A. Hydrogen-colorless, odorless

B. Silane-pyrophoric

C. *Phosphine-highly toxic, pyrophoric, decayed fish smell

D. Dichlorosilane-acid gas

E. Propane

F. MAPP Gas

II. CORROSIVES-destructive to human skin and metals when gas comes in with moisture or water.

A. Hydrogen Cloride

B. Boron Trichloride

C. Boron Trifluoride

D. Ammonia

III. OXIDIZERS-store away from all combustible material and sources of ignition. Keep lubricants away (never use grease or oil on valves or compressed gas cylinder threads).

A. Oxygen

IV. POISONS-hazardous in small quantities.

A. Chlorine

B. Phosphine-*DOT designated poison

V. NON-FLAMMABLE-stable, inert gas. Will cause suffocation or asphyxiation.

A. Nitrogen

B. Helium

C. Argon

D. Freon

E. Sulfur Hexafluoride

F. Carbon Dioxide

VI. CRYOGENS-extremely cold gases.

A. Liquid Oxygen

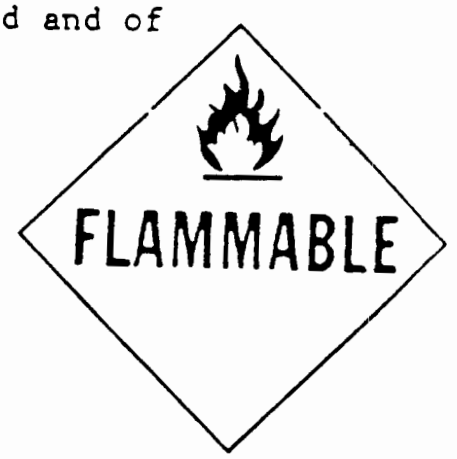
B. Liquid Nitrogen

C. Liquid Hydrogen

F L A M M A B L E S

CHARACTERISTICS

Flammables are capable of being easily ignited and of burning with extreme force.



EXAMPLES

Gases:

Propane
Acetylene
Hydrogen
*Phosphine
Dichlorosilane

*Silane

(*Pyrophoric)

Liquids:

Alcohols - Methonol, Ethanol, and Isopropyl Alcohol
Aromatic Hydrocarbons - Hexamethyldisilazane(H.M.D.S.)
Ethers - Diethylene glycol monobutyl ether(R-10), Resist 820
Ketones - Acetone

Other - 1400 Photo Resist

Solids:

RED PHOSPHORUS

SAFETY MEASURES

Gases:

1-Keep away from flames and other ignition sources.
2-Store separately from all other F-COPER materials.
3-Observe the General Cylinder Safety Rules.

Liquids:

1-Keep away from flames and other ignition sources.
2-Store separately from all other F-COPER materials.
3-Do not pour any large quantities outside of a fume hood.

Solids:

1-Separate from oxidizers and corrosive liquids.
2-Keep away from high moisture areas.

C O R R O S I V E S

CHARACTERISTICS

Corrosives will cause destruction and degeneration of many materials, including human tissue, upon contact.

EXAMPLES

Gases:

Hydrogen Chloride
Dichlorosilane
Boron Trichloride
Boron Trifluoride

Liquids-Acids:

Hydrofluoric
Sulfuric
Nitric
Acetic
Phosphoric

Liquids-Bases:

Ammonium Hydroxide
Sodium Hydroxide

SAFETY MEASURES

Gases:

1-Keep away from high moisture areas.

2-Store separately from other F-COPER materials.

3-Observe the General Cylinder Safety Rules.

Liquids:

1-Avoid skin and eye contact by wearing all appropriate safety equipment.

2-Store separately from all other F-COPER materials.

3-Avoid inhalation of these materials.

O X I D I Z E R S

CHARACTERISTICS

An oxidizer will decompose readily to yield oxygen, and may react with other materials.

EXAMPLES

Gases:

Oxygen
Chlorine

Liquids:

Hydrogen Peroxide
Nitric Acid
Sulfuric Acid

SAFETY MEASURES

Gases:

1. Keep all organic materials such as solvents, oils, and lubricants away from gas fittings and connectors.

2-Store separately from other F-COPER materials.

3-Follow the General Cylinder Safety Rules.

Liquids:

1-Avoid skin and eye contact by wearing all appropriate safety equipment.

2-Store separately from all other F-COPER materials, particularly avoiding contact with acids, solvents, and lubricating substances such as oils and greases.

3-Handle only in well-ventilated areas.

P O I S O N S

CHARACTERISTICS

A poison may cause serious damage upon exposure to even low concentrations.

EXAMPLES

Gases:

Hydrogen Fluoride
Chlorine
Carbon Monoxide

Boron Trifluoride
Hydrogen Chloride
Phosphine

Liquids and Solids:

Arsenic
Arsenic- containing materials

Mercury

SAFETY MEASURES

Gases:

1-Avoid inhalation.

2-Store separately from other F-COPER materials.

3-Follow the General Cylinder Safety Rules.

Liquids and Solids:

1-Avoid inhalation.

2-Keep off of skin and clothes.

3-Store separately from other F-COPER materials.

IT IS THE EMPLOYEES' RESPONSIBILITY TO REPORT IMMEDIATELY ANY CONTACT WITH A POISONOUS MATERIAL TO THE IMMEDIATE SUPERVISOR AND TO THE PLANT HEALTH SERVICES.

E X P L O S I V E S

CHARACTERISTICS

Explosives have the capacity to react with great speed and force.

EXAMPLES

No explosive materials are used in I.C. production.

SAFETY MEASURES

Extreme caution should be used around any material labeled as an explosive.

R A D I O A C T I V E S

CHARACTERISTICS

A radioactive material has radioactive properties which may cause intense and immediate damage upon exposure.

EXAMPLES

Gases:

Krypton

Liquids and Solids:

Cadmium
Thallium
Thorium

SAFETY MEASURES

Gases, Liquids, and Solids:

1-Refer to the job specification for details. Special training will be supplied by the company for any employee handling radioactive materials.

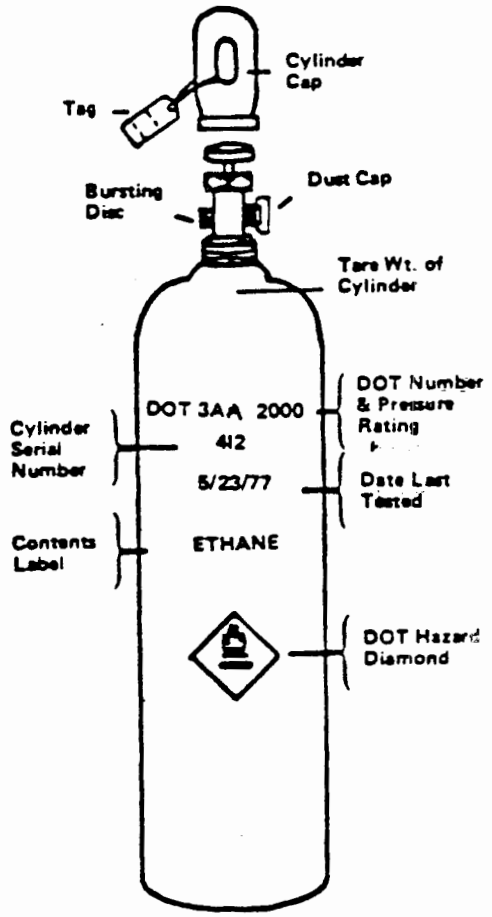
COMPONENTS OF
THE COMPRESSED GAS CYLINDER

The cylinder itself should be received in good condition with properly identified and fitted components as indicated to the left. Cylinder caps must always be in place except when the cylinder is in service.

A tag should identify the contents and warn of any special dangers. Color coding is not a standardized means of identification and should never be used as such. Content markings on the shoulder of the cylinder comply with OSHA 1910.252 and ANSI Z 48.1-1954.

Except for Class A poisons, fluorine, and lecture bottles, safety devices specified by DOT protect the cylinder from rupturing due to excess heat and/or pressure. Safety devices are located on the bottom of acetylene cylinders. Never tamper with any safety device.

A DOT hazard diamond is required for the interstate transportation of cylinders.



PROTECT FROM

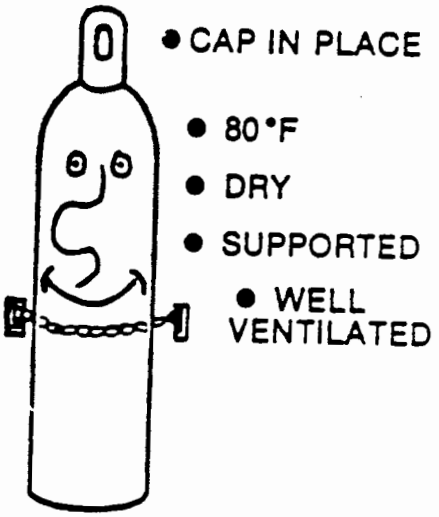
HEAT

RUST

CORROSION

DENTS

VALVE DAMAGE



LEAK TESTING

SECTION 1: VISUAL INSPECTION

Visual inspection is the simplest way to find gross leaks in a gas system. Examine the lines and fittings for signs of corrosion or deposits. Hydrogen chloride (HCl) and other chloride gases will cause corrosion at the point of leakage. Silane (SiH_4) and diborane (B_2H_6) leave powdery deposits around leaks. Leaks should be found by other methods, however, before they become large enough for this method to be applicable.

SECTION 2: BUBBLE TESTING

Using a soap solution or a liquid leak-test solution (such as Snoop) on gas lines and fittings is a good way to locate leaks. The system must be pressurized to above the normal operating pressure with an inert gas (usually nitrogen or hydrogen), and the solution should be applied carefully to all connections and welds. Flooding with the solution is not required. A leak is indicated by bubbles. To detect small leaks in areas that are hard to see, a bright light and a mirror are useful.

NOTE:

Do not use Snoop or any other solution on a line that contains a hygroscopic gas (one that will absorb moisture) such as HCl or ammonia (NH_3), because even a small leak will draw a significant amount of moisture into the line.

SECTION 3: PRESSURE DROP TEST

This leak test method can be used only where a pressure gauge or a transducer is available in the system. The principal areas where this test can be used are:

- A bell jar
- Gas supply lines
- A dopant source line in a gas panel. (To use this method, the pressure on both sides of the regulator must be equalized by turning the regulator all the way in. Do not forget to readjust the regulator after the test.)
- A dichlorosilane (SiH_2Cl_2) line in a gas panel. To perform a pressure-drop test, turn of the source and allow the gas system temperatue and pressure to stabilize. Record the starting pressure and time and leave the system overnight. Then record the final pressure and time and compare them to the original readings. For proper test conditions, ambient temperature must be the same at the beginning and end of the test.

SECTION 4: VACUUM LEAK TEST

This method can be used to test any reactor that has an exhaust vacuum pump or to which a vacuum pump can be attached. A vacuum gauge or a transducer also must be installed in the system. To use this method, close the inlet valves to the process chamber and operate the vacuum pump to create a vacuum in the system. Then close the exhaust gate valve to isolate the chamber. Record the beginning vacuum reading and compare it to a final reading taken after a known period of time. Initial leak-up rate may be high due to outgassing. If so, the test should be repeated until the leak rates are reproducible.

SECTION 5: HYDROGEN LEAK TESTING

A hydrogen leak tester can be used to find leaks in the process chamber and in portions of the gas panel. The system is pressurized with hydrogen (H_2), and a hydrogen detector is used to probe the lines and fittings for leaks. This method can be used on any line that can be pressurized with hydrogen ($SiCl_4$, $SiHCl_3$, or dopant lines).

SECTION 6: LEAK TEST WITH AMMONIA FUMES

Chloride leaks can be located by using ammonia (NH_3) fumes from a sqeeze bottle. Use ammonia detergent or ammonium hydroxide. Use only the fumes; do not use the liquid. When ammonia fumes contact a chloride gas, white smoke or white powder will appear around the leak. This test can be used on gas lines that contain HCl, $SiCl_4$, $SiHCl_3$, or SiH_2Cl_2.

SECTION 7: LEAK TEST WITH CHLORIDE FUMES

Ammonia leaks can be located by using chloride fumes from a squeeze bottle. Use diluted HCl. Use only the fumes; do not use the liquid. Leaks will appear as white smoke or white power around the point of leakage.

SECTION 8: HELIUM LEAK TESTING

This is the most precise way to test a gas panel for leaks. The following paragraphs provide a general guideline that can be used on most reactors. The following equipment is needed:

1. Helium leak detector
2. Liquid nitrogen (LN_2) source
3. Regulated helium tank
4. Assorted caps and plugs.

Begin the leak test with the following preliminary steps as they apply to your reactor:

1. Ensure that the main vacuum pump (if used) is running and that the pump ballast valve is closed.

2. Install the leak detector connecting plumbing and the 30-0-30 compound pressure gauge valve assembly to the leak check port in the gas panel.

3. Cap all lines at the entrance to the gas panel.

4. Close the foreline purge valve.

5. Open all manual valves at the gas panel inlet.

6. Ensure all flow controllers are open.

7. Turn down all gas panel regulators.

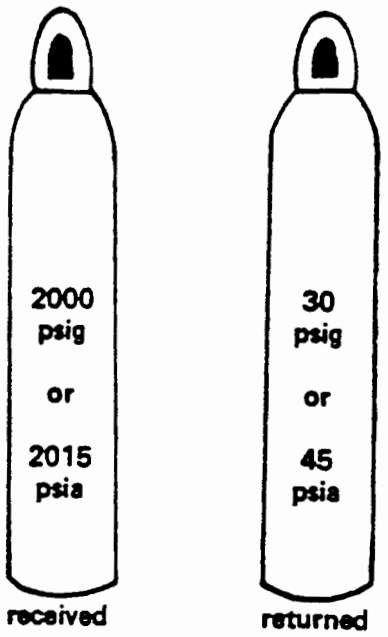
8. Verify that the helium leak detector is operational and properly calibrated.

9. Cap the atmospheric vent.

10. Install an isolation valve on any vacuum vents.

11. Install the caps and plugs in any open jets and lines.

To do an orderly test of the gas panel, begin with a leak check of a core unit of the gas panel. Once the leak integrity of this core section has been established, test additional portions of the system. Establish the leak integrity of these additional portions before proceeding to the next portion of the system. By adding parts of the system and establishing their respective leak integrity, a complete system leak check can be done with a minimum of time and effort.



psia = psig + 15 psi

{pounds per square inch absolute} = {pounds per square inch gauge} + {15 pounds per square inch}

GENERAL PROCEDURES FOR CORRECT HANDLING OF GASES IN CYLINDERS:

1) Avoid exposing stored cylinders to moisture, corrosive chemicals or fumes. Rust will damage the cylinders and will often cause the valve caps to stick.

2) Always ensure that the valve caps are on when moving or transporting gas cylinders. Never drop a gas cylinder, full or empty, and never bump them into each other.

3) Never use pilers or a similar tool to open the cylinder valve. Some valves are opened with a special key supplied by UNITOR and other valves are equipped with hand wheels. It is dangerous to force the valve open by knocking or heating. All valves should be closed when not in use.

4) Never try to refill gas cylinders on your own. This also applies to mixing gases in cylinders and transferring gas from one cylinder to another.

5) Initials and stamps engraved on the cylinder shells must not be changed or obliterated. Labels and tage should not be removed.

6) Gas cylinders which have been exposed to fire must be put aside for inspection and not be returned together with other empty cylinders.

7) Always make sure that used cylinders are returned with valve protection caps on.

8) Containers must not be filled except by the owner or with owners consent. (Containers and pressure design vary for certain gases, plus, many gases can not be mixed safely.)

9) Containers should always bear legible content markings. Labels, decals, stencils, and tags must never be removed or defaced.

11) Almost all gases must be stored standing upright. They should be secured properly and be located where they can not be knocked over. (Liquid gases are sometimes used in a horizontal position. Always ask if you notice containers laying down-- this is very unsafe.)

12) Containers must never be painted.

13) Damaged compressed gas containers should not be used. They should be immediately returned to the Gas Supplier.

14) Containers should never be misused! (Never used compressed gas containers as rollers, supports, stools or for any other purpose than to contain the content as received).

15) Compressed gas containers are subject to EXPLOSION when exposed to high temperatures. Contaiers should always be in a cool place(never over 125°F).

16) Empty containers should be appropriately labeled. Empty containers mean: CYLINDER IS USED -- DOES NOT MEAN VOID OF CONTENTS!

17) Cylinders should be stored with like gases only. Many gases can not be mixed safely. Storage area temperature should be regulated so that it does not exceed 100°F (37.8°C)

18) Containers should never be located where they block exits, stairways or normal pathways.

19) Compressed gases should be used only for its intended purpose! Compressed gas should not be used to dust off clothing or fool around -- this may cause serious injury to eyes or body, or create a fire hazard.

20) Containers not in use - The user shall keep the container valves closed at all times (charged or empty) except when the container is in use. By "in use" it is meant when gas is flowing from the container, when the container gas is maintaining pressure in a supply line, or when the container is standing by during and between operations utilizing the gas.

21) Returning empty containers - Before returning empty containers, the valve shall be closed and container valve protective caps, if used, shall be replaced. Cylinders equipped with valve outlet caps or plugs, or sealing valve caps shall be returned with these caps or plugs in a gas tight condition. Empty containers shall be labeled or maked according to DOT regulations.

22) Trucks - Containers shall not be dragged or slid. Where practical, the user should use a suitable hand truck, fork truck, roll platform or similar device with container secured for transporting.

23) Pressure regulators - A suitable pressure regulating device shall be used where gas is admitted to a system of lower pressure rating than the supply pressure, and where, due to the gas capacity of the supply source, the system pressure rating may be exceeded. *Note - this is a requirement regardless of the possible presence of a pressure-relief device protecting the system.

24) System pressure relief device - A suitable pressure relief device shall be used to protect a system utilizing a compressed gas where the system has a pressure rating less than the compressed gas supply source and where, due to the gas capacity of the supply source, the system pressure rating may be exceeded.

25) Connections - Connections that do not fit shall not be forced. Threads on regulator connections or other auxiliary equipment shall match those on container valve outlet. Detailed dimensioned drawings of standard container valve outlet and inlet connections are published in the "American National and Canadian Standard Compressed Gas Cylinder Valve Outlet and Inlet Connections". (ANSI B 57.1 and CSA B 96).

26) Leaking containers - If a container leaks, and the leak cannot be remedied by tightening a valve gland or packing nut, the valve shall be closed, and a tag attached to it stating that the container is unserviceable. If the gas is toxic, utilize appropriate gas mask or self-contained breathing apparatus. If it is flammable, keep away from ignition sources. Remove the leaking container outdoors to a well ventilated location, or place under an exhaust ventilating system suitable for the product (gas cabinet).

If the gas is flammable, toxic or corrosive, place an appropriate sign at the container (or hood or cabinet) warning against these hazards. The gas supplier shall be notified and his instructions followed as to the return or disposition of the container.

27) Container valve - Container valve shall be opened slowly. Valve outlets shall be pointed away from yourself and other persons. On valves without handwheels, the wrenches provided by, or recommended by, the gas supplier shall be used. On valves with handwheels, wrenches shall not be used except when designed for that purpose. Valve wheels shall not be hammered in attempting to open or close the valve. For valves that are hard to open, or frozen because of corrosion, the supplier shall be contacted for instructions.

28) PURGING

To purify or to make free of an unwanted substance, such as an impurity or foreign material, in a closed system, where maintaining the highest degree of purity is essential.

PRINCIPLES OF PURGING

WHY?

The PRIMARY reason for a purging procedure, at Signetics, is to remove all reactive elements regarded as undesirable (such as air) so that gas purity is maintained during the cylinder change.

A SECONDARY reason for purging a gas system is for general employee safety during the compressed gas cylinder changeover.

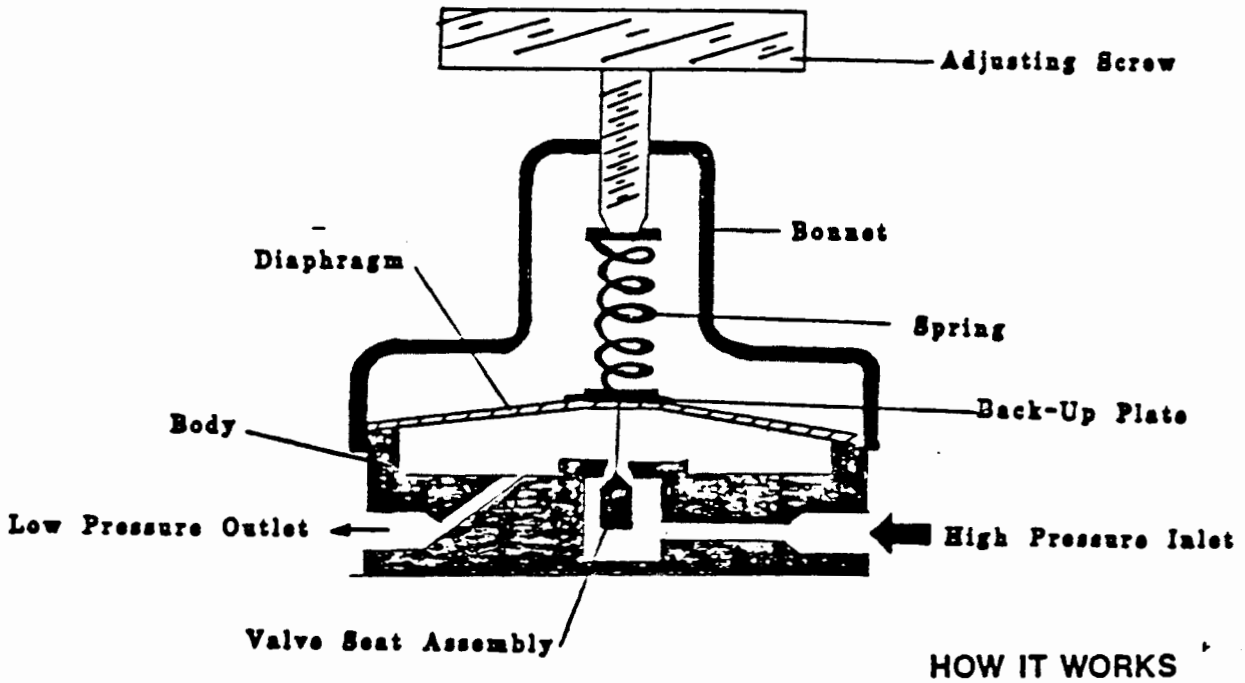
PRINCIPLES OF PURGING

PURGING GASES

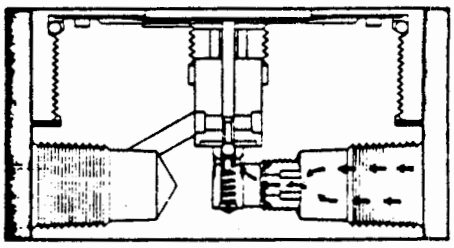
The purging process is routinely performed by utilizing a nonreactive or inert gas such as

nitrogen (N_2)

THE SINGLE STAGE
PRESSURE REDUCTION REGULATOR

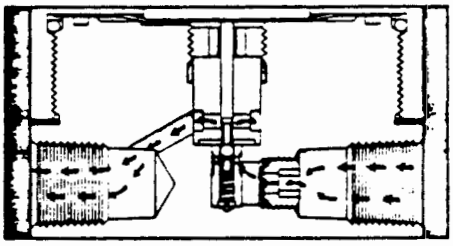


HOW IT WORKS



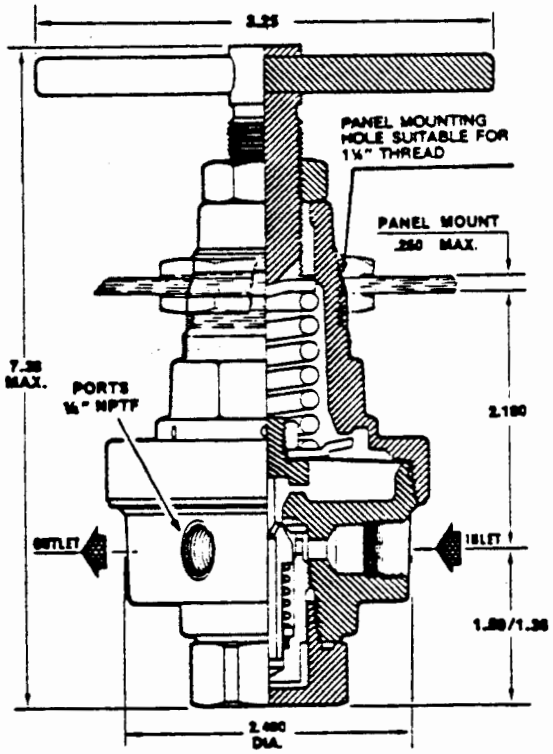
CLOSED

With poppet against seat, full upstream pressure is applied to poppet effecting a dead tight seal.



REGULATING

As downstream process demands flow, the pressure acting on the bottom of the diaphragm decays, allowing the adjusting spring force to push the poppet down. This in turn unseats the poppet allowing flow to begin and pressure under the diaphragm to increase until balance is achieved between adjusting spring force and downstream pressure. This condition continues until process ceases. At this point, increasing pressure overcomes spring force, moving diaphragm up and allowing piston to close.



INTRODUCTION TO HAZARDOUS MATERIALS
REVIEW 2

_____

_____

_____

_____

_____

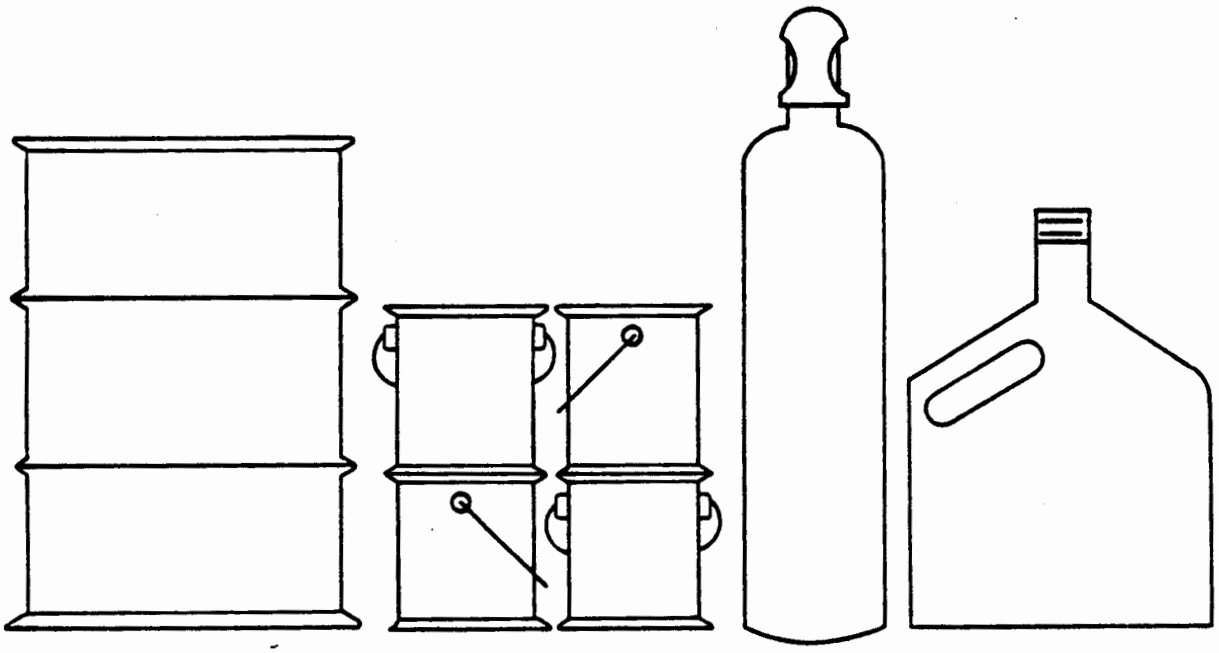
_____

Instructions: Match each characteristic with the appropiate placard by placing the letter in the space below the placard.

A. Will decompose readily to yield oxygen.
B. Capable of being easily ignited and burning with extreme force.
C. May cause acute damage or death when exposed to even low concentrations.
D. Has radioactive properties
E. Will cause degeneration and destruction of many materials upon contact.
F. Must be treated with extreme caution to avoid explosion.

INTRODUCTION TO

HAZARDOUS MATERIALS



PROTECTIVE SAFETY EQUIPMENT TO BE USED IN A FAB AREA

1. Protective equipment will be provided by the company and must be worn as required in the work area.

2. Lab Coats (White or Blue Smocks) - This garment is issued to the employee not as safety or protective equipment for the employee, but for protection of our delicate products. Clothing usually has a high degree of lint, dirt and other contaminating debris which can destroy our products if not properly controlled. Smocks should never be used in place of safety equipment for any reason.

3. Hair Covering - There are a few Fab areas that require the wearing of hats. This is to protect the delicate products that are being produced from hair contaminates. They are to be worn at all times in the Fab area and must not be taken off. Keep long hair tucked into hats or tied back.

4. Glasses - Protective glasses should be worn at all times in the Fab area. The kind of glasses worn must be chosen with consideration given to the job being performed, location of your work station, and the working environment.

   A. Safety Glasses with Side Shields - Mandatory in the Wafer Fab area. They are used for protection from chips, flying objects and splashed chemicals. Operators using microscopes and other optical equipment may remove glasses ONLY during actual inspections, when glasses may interfere with optical accuracy.

   B. Safety Glasses with Tinted Lenses - These should be used to protect eyes of operators working around ultra violet lights. Tinted glasses will be provided at all U.V. inspection stations. Ask your Supervisor if your U.V. station does not have them available.

   C. Prescription Safety Glasses with Tinted Shields - Any employee who must wear eye glasses will be supplied with prescription safety glasses by Signetics. You may choose to have either plain or tinted lenses. Supervisors can provide purchase requisitions for these glasses. Expenses for new examinations will not be covered by the company.

   D. Contact Lenses - These shall not be worn by an employee engaged in operations involving the following:

      (1) Exposure to dusts

      (2) Exposure to corrosive or irritant liquids, gases, or smokes

      (3) Exposure to flammable liquids

      (4) Exposure to fiberglass

   E. Visitor Glasses - These must be worn by any visitor coming into the Fab area. They are plastic, non-tinted glasses which protect only against chemical spills. They are not shatter resistant, and therefore provide no protection from flying objects such as chips.

   F. Chemical Goggles with Safety Strap - These provide better protection for the eyes when working with chemicals because of a closer fit to the face.

G. Visor with Full Face Shield (Tinted or Clear Lens) - These provide the best protection for the face and eyes from flying objects and chemical accidents. The curvature of the shield gives added protection to the chin area as well.

5. Gloves - Gloves are probably the most important item of your protective equipment. If you make sure your gloves are free from defects, select those appropriate to the materials being used, and wear your gloves according to specification, they will provide the necessary hand protection from burns and from contact with toxic substances.

Safety Rules for Gloves:

(1) Test Gloves - Protective gloves must be tested by the wearer for defects before and after each use. Partially inflate gloves with N_2 air jet or twisting motion. While holding the base of the glove closed, test glove for leaks by visual inspection and by listening for escaping air. The gloves may also be immersed in water for bubble test. If any detection of a leak is suspected, discard the gloves. Gloves showing evidence of deterioration must also be discarded, even if not leaking.

(2) Glove Disposal - Mutilate gloves, by cutting them, when throwing away so they cannot be used accidentally by others.

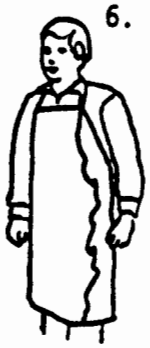
(3) Chemical Exposure of Gloves - Chemically contaminated gloves must be disposed of with other chemically contaminated waste.

(4) Remove Jewelry - Rings and bracelets should not be worn since they can cause punctures in the gloves. They should be left in your locker if worn to work.

(5) Trim Fingernails - To prevent puncturing gloves, keep your nails smooth and trimmed with no jagged edges.

(6) Rinse Gloves - Rinse gloves in water immediately following any chemical contact. NEVER touch your face, glasses or any other part of your body in order to avoid chemical burns. Frequent rinsing of gloves while working with chemicals also prolongs glove life.

(7) Form Cuff - Roll down the top of gloves ½ to 1 inch, to form a cuff. This will prevent fluids from running down the glove and onto exposed skin of the arm.



6. Vinyl Aprons - This protective apron is worn over the bunnysuit in all operations (class 100 room) where hazardous chemical contact is expected and chemical resistant protection is required.

Safety Rules for Aprons:

Label Apron - A distinguishing mark must be placed on the front side of the apron to identify the front from the back of the apron. This will prevent confusing the two sides of the apron and alleviate contact with chemical spills and personal clothing.

7. Armguards (Gauntlets) - These are made of translucent vinyl material and should be worn by employees handling or working near hazardous chemicals. They are worn over gloves, keeping gloves cuffed. The top of the gauntlets should come above the elbows.

GLOVES

A protective covering for the hands. When wearing gloves, our hands have a tendency to sweat excessively. If you suspect a leak in your gloves, remove your gloves, wash your hands and recheck your gloves.

TYPES OF GLOVES USED AT SIGNETICS

GLOVES	COLOR	PRIMARY AREA OF USE	PROTECTIVE PURPOSE	SAFE USAGE
Vinyl Dust Free	Clear	Fab Operations	Worn as part of the Bunny suit in ultra clean Class 100 rooms where lint control is most strict. Protects product from body contamination (hair, skin, oil).	
Pacific Polymers	Orange	Fab Operations	Handling of either acids or solvents.	Check for air leaks before and after use-fully rinse with water.
Neoprene	Black	Fab Operations	Handling of either acids or solvents.	"
Nitrile Rubber	Blue-Green	Fab Operations	Handling of solvents	"
Latex	Tan	Fab Operations	Handling of acids	"
Thermal-Resistant Cloth (asbestos form)	White		1) Handling of larger hot quartz glass. 2) Cryoprotective - handling extreme cold situations. Example: Liquid nitrogen tanks.	
Edmunts	White	Outside Fab	General Maintenance	

ACCIDENT PREVENTION SIGNS

Industry has currently adopted a set of key terms as developed under the Occupational Safety and Health Act (O.S.H.A.) that may be used for accident prevention and general safety measures within the workplace. These words, known as "Signal Words" are listed below and are arranged in a decreasing order of severity. The purpose is to allow you, a safety conscious employee, a means of evaluating the degree of a potential hazard within the working environment.

Highest Degree of Hazard

Color(s)

Danger signs have a white background with "Danger" in white letters on a red oval inside a black rectangular panel. Wording in black letters.

Use: Danger signs should be used only where an immediate hazard exists. There should not be any variation in the type of design or signs posted to warn of specific dangers and radiation hazards.

Danger signs indicate immediate danger and warning that special precautions are necessary. The skull and crossbones must also be displayed with the word "DANGER" for highly toxic chemicals.

****

Intermediate Degree of Hazard (Specific)

Color(s)

Caution signs have a yellow background. "Caution" should be in yellow letters on a black rectangular panel. Other wording must be in black letters.

Use:

Caution Signs should be used only to warn against potential hazards or to caution against unsafe practices. All employees shall be instructed that caution signs indicate a possible hazard against which proper precautions should be taken.

Low Degree of Hazard
(Informational)

Color(s)

Notice Signs have a white background. "Notice" should be in white letters on a blue rectangle. Wording is in black letters.

Use:

Notice Signs are primarily used as information signs for employees.

****

Lowest Degree of Hazard

Color(s)

Be Careful Signs have a white background. "BE CAREFUL" should be in white letters on a green rectangle. Wording is in black letters.

Use:

Be Careful Signs are designed as safety instruction signs and should be used where there is a need for general instructions and suggestions relative to safety measures.

Other Information Signs and Safety Instruction Signs may be of a variety of designs and colors. Information Signs will convey information not necessarily of a safety nature, and Safety Instruction Signs should be used for general instruction relative to safety measures.

INTRODUCTION TO HAZARDOUS MATERIALS
VOCABULARY WORDS

Hazardous Material

Any material that is a flammable, corrosive, oxidizer, poison, explosive or radioactive is considered by the D.O.T. (Dept. of Transportation) to be hazardous. Hazardous materials have properties which make them harmful if used improperly.

Flammable

A flammable material is capable of being easily ignited and of burning with extreme force.

Pyrophoric

Pyrophoric refers to materials that are spontaneously combustible, which means they will burn when released into the air without an ignition source such as a flame or spark.

Flash Point

When talking about flammables, a flash point refers to the temperature at which a liquid gives off enough vapors to support ignition.

Corrosive

Corrosive materials are highly reactive and will cause destruction of many materials upon contact. Corrosives are divided into two major groups - acids and bases. Corrosive acids have a pH of less than 2, while corrosive bases have a pH of greater than 12.5.

Oxidizer

Oxidizing materials will decompose readily to yield oxygen. Since oxygen is needed to create or sustain a fire, violent reactions may occur when an oxidizer is mixed with a combustible material, such as wood, paper, or powders.

Poison

A material is considered a poison if it causes serious damage or death to a person when it is inhaled, absorbed or eaten, even in small amounts. Poisonous materials are often referred to as toxic materials.

Explosive

An explosive material has the capacity to react with great force and speed.

Radioactive

A radioactive material emits certain atomic particles or energy that are destructive to human tissue, thus radioactive materials are always used under strict controls in specified areas.

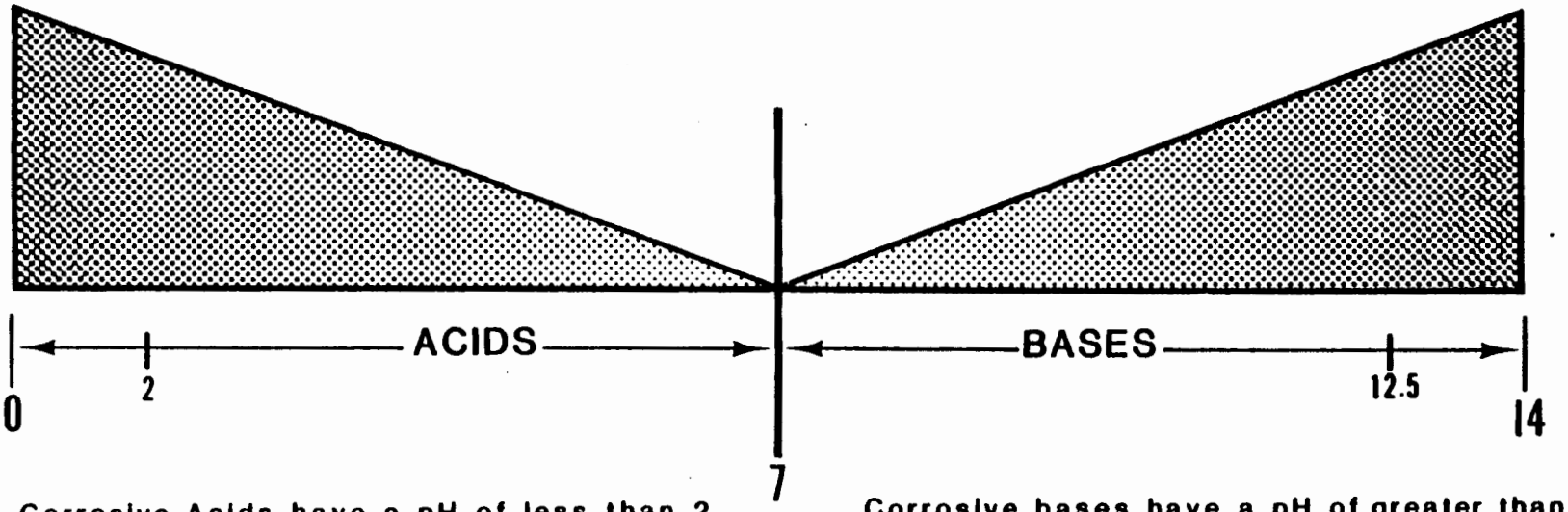
Cryogenic

Cryogenic refers to a state of extreme cold - temperatures below -101° C. Gases are usually stored and transferred in a cryogenic (liquified) state to conserve space.

Organic

Refers to materials that contain the element carbon as a basic unit of structure. These materials are often derived from living matter. Examples of organic materials include oil, grease, wood, and rubber.

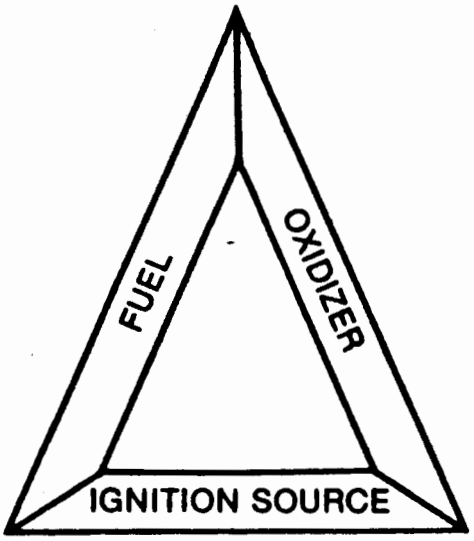
pH CHART

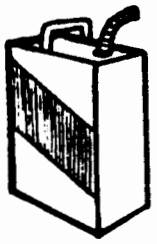


Corrosive Acids have a pH of less than 2

Corrosive bases have a pH of greater than 12.5

A neutralized material will have a pH of between 5 and 9

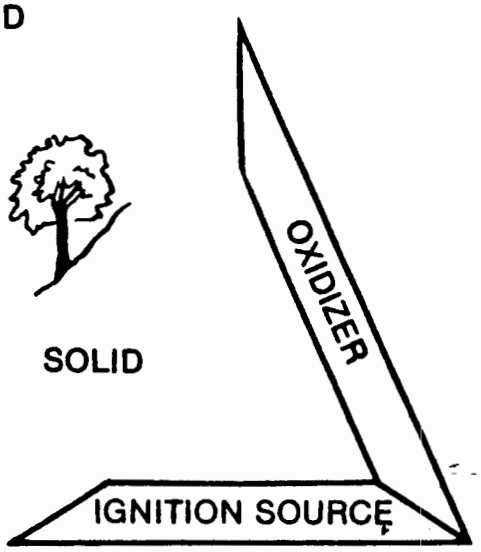


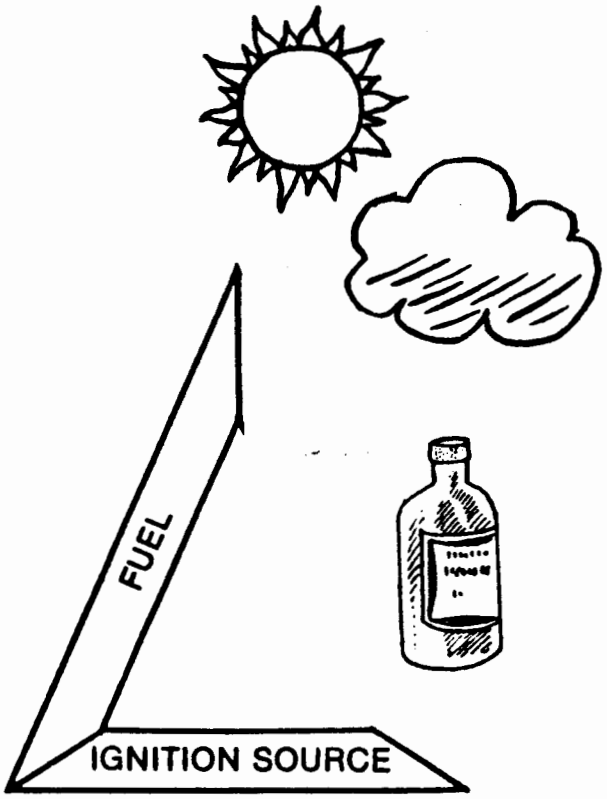


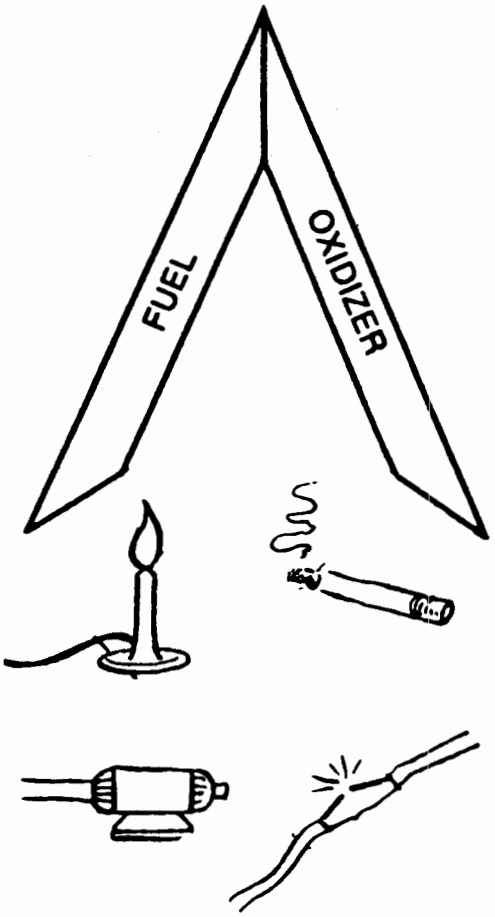
LIQUID

SOLID

GAS







GENERAL CHEMICAL SAFETY RULES

General

1. Do not eat, drink, or smoke in any area where chemicals are used. Anything you put in your mouth may have been contaminated by chemicals.

2. Do not lean against sinks. The plastic sinks absorb a certain amount of acid that cannot be cleaned off.

Safety Equipment

1. Proper safety equipment, as issued by the company, must be worn as required by the spec when working with chemicals.

2. Proper methods for checking safety equipment must be followed. Defective equipment should be discarded and replaced immediately.

3. Never touch your face or body with your safety equipment on to avoid transferring a harmful substance.

4. Always rinse off safety equipment (especially gloves) and wipe them dry before removing to reduce any possibility of contact.

Storing and Using

1. Whenever possible, store all hazardous materials below eye level.

2. Be sure all chemicals are accurately labeled and dated.

3. Insure that chemical storage areas have adequate lighting to avoid selecting the wrong chemical by mistake.

4. When carrying bottles of chemicals, support them from below as well as at the neck.

5. Always carry hazardous materials in their proper containers.

6. Never pour water into acid. This may cause a reaction which will splash acid everywhere. Always pour acid slowly into running water. Remember AAA - Always Add Acid to water.

Storing and Using (continued)

7. Check for sources of ignition before pouring flammable liquids.

8. Wipe up all small spills and splashes immediately, and always clean your work area with water after using acids.

9. Never mix two or more chemicals together unless you are completely sure of the reaction that will occur. Many chemicals react violently when mixed together, while others will release poisonous fumes when mixed.

10. Properly discard old chemicals which may contain unknown decomposition products.

First Aid

1. The immediate first aid for a corrosive burn is to place the affected area under cold running water for 15 to 20 minutes.

2. In the event of contact with a large amount of a corrosive use the showers and eyewash stations located in every chemical use area. It is wise to become familiar with the operation of this equipment to expedite the washing of an affected area in an actual emergency. Remember that a person with a corrosive splashed in the eye will not be able to see and must be led quickly to the eye wash station by a fellow worker.

3. If clothing comes into contact with chemicals, change immediately and wash any affected area. Contaminated clothing should be discarded.

POURING CHEMICALS

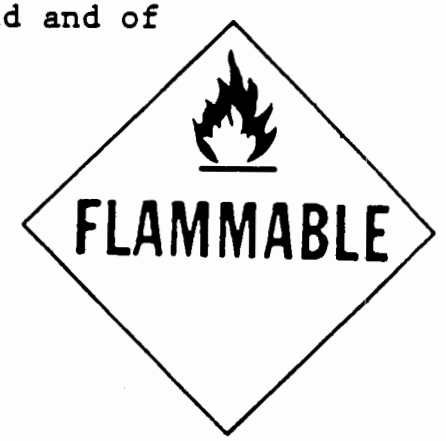
When pouring chemicals always:

1. Wear all of the proper safety equipment and clothing.
2. Read labels carefully and positively identify product.
3. Open all containers slowly.
4. Pour with the handle in the downward position.
5. Pour under a fume hood.

F L A M M A B L E S

CHARACTERISTICS

Flammables are capable of being easily ignited and of burning with extreme force.



EXAMPLES

Gases:

Propane *Silane
Acetylene
Hydrogen
*Phosphine
Dichlorosilane (*Pyrophoric)

Liquids:

Alcohols - Methonol, Ethanol, and Isopropyl Alcohol
Aromatic Hydrocarbons - Hexamethyldisilazane(H.M.D.S.)
Ethers - Diethylene glycol monobutyl ether(R-10), Resist 820
Ketones - Acetone
Other - 1400 Photo Resist

Solids:

RED PHOSPHORUS

SAFETY MEASURES

Gases:

1-Keep away from flames and other ignition sources.
2-Store separately from all other F-COPER materials.
3-Observe the General Cylinder Safety Rules.

Liquids:

1-Keep away from flames and other ignition sources.
2-Store separately from all other F-COPER materials.
3-Do not pour any large quantities outside of a fume hood.

Solids:

1-Separate from oxidizers and corrosive liquids.
2-Keep away from high moisture areas.

C O R R O S I V E S

CHARACTERISTICS

Corrosives will cause destruction and degeneration of many materials, including human tissue, upon contact.

EXAMPLES

Gases:

Hydrogen Chloride
Dichlorosilane
Boron Trichloride
Boron Trifluoride

Liquids-Acids:

Hydrofluoric
Sulfuric
Nitric
Acetic
Phosphoric

Liquids-Bases:

Ammonium Hydroxide
Sodium Hydroxide

SAFETY MEASURES

Gases:

1-Keep away from high moisture areas.

2-Store separately from other F-COPER materials.

3-Observe the General Cylinder Safety Rules.

Liquids:

1-Avoid skin and eye contact by wearing all appropriate safety equipment.

2-Store separately from all other F-COPER materials.

3-Avoid inhalation of these materials.

O X I D I Z E R S

CHARACTERISTICS

An oxidizer will decompose readily to yield oxygen, and may react with other materials.

EXAMPLES

Gases:

Oxygen
Chlorine

Liquids:

Hydrogen Peroxide
Nitric Acid
Sulfuric Acid

SAFETY MEASURES

Gases:

1. Keep all organic materials such as solvents, oils, and lubricants away from gas fittings and connectors.

2-Store separately from other F-COPER materials.

3-Follow the General Cylinder Safety Rules.

Liquids:

1-Avoid skin and eye contact by wearing all appropriate safety equipment.

2-Store separately from all other F-COPER materials, particularly avoiding contact with acids, solvents, and lubricating substances such as oils and greases.

3-Handle only in well-ventilated areas.

P O I S O N S

CHARACTERISTICS

A poison may cause serious damage upon exposure to even low concentrations.

EXAMPLES

Gases:

Hydrogen Fluoride
Chlorine
Carbon Monoxide

Boron Trifluoride
Hydrogen Chloride
Phosphine

Liquids and Solids:

Arsenic
Arsenic- containing materials

Mercury

SAFETY MEASURES

Gases:

1-Avoid inhalation.

2-Store separately from other F-COPER materials.

3-Follow the General Cylinder Safety Rules.

Liquids and Solids:

1-Avoid inhalation.

2-Keep off of skin and clothes.

3-Store separately from other F-COPER materials.

IT IS THE EMPLOYEES' RESPONSIBILITY TO REPORT IMMEDIATELY ANY CONTACT WITH A POISONOUS MATERIAL TO THE IMMEDIATE SUPERVISOR AND TO THE PLANT HEALTH SERVICES.

E X P L O S I V E S

CHARACTERISTICS

Explosives have the capacity to react with great speed and force.

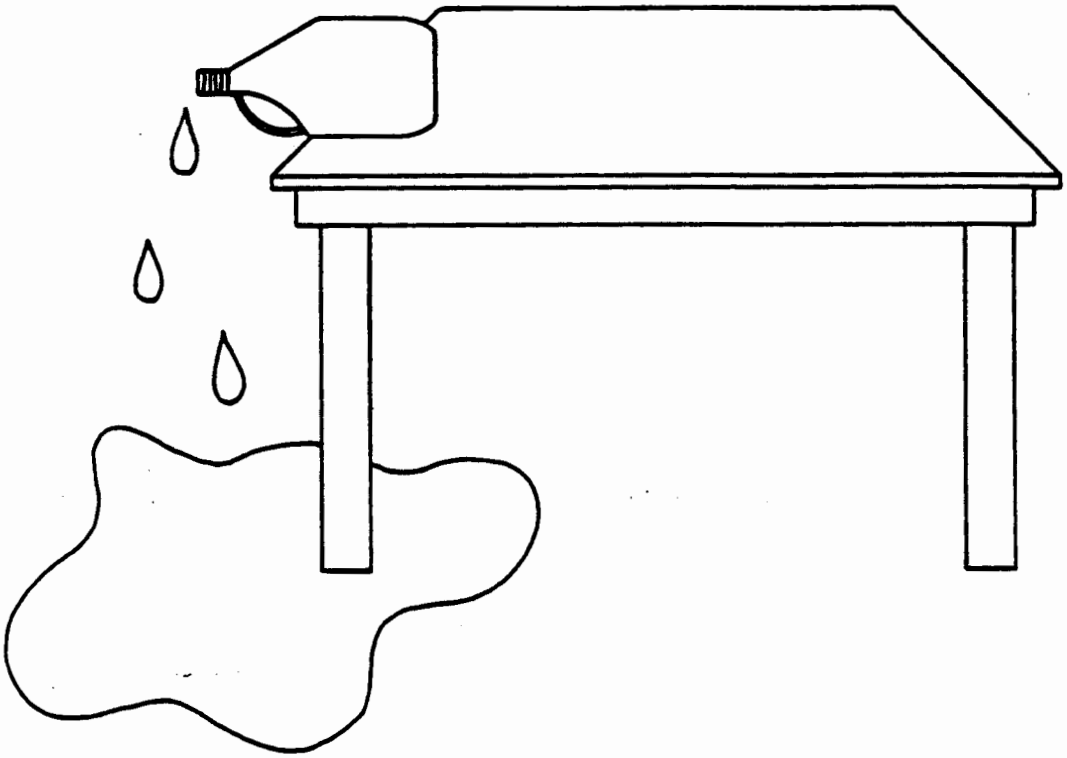
R A D I O A C T I V E S

CHARACTERISTICS

A radioactive material has radioactive properties which may cause intense and immediate damage upon exposure.

INTRODUCTION TO

SPILL CONTROL AND CLEANUP



SPILL CONTROL AND CLEANUP OUTLINE

I INTRODUCTION

Knowing the procedures of safe spill cleanup is necessary to prevent hazardous situations in production areas.

II SPILL CLASSIFICATION & RESPONSE

A. Very Small Spills

1. Six inches or less in diameter
2. These are cleaned up by workers in the area using "paper" towels and water.
3. EXCEPTIONS- arsenic and mercury - see your specs for these materials

B. Larger Spills

1. Take the Following Immediate Action Steps
   a) Notify workers in the Area
   b) Increase ventilation
   c) Notify supervisor
   d) If spill is greater than one gallon, also notify Security

III CLEANUP PROCEDURES FOR LARGER SPILLS

A. Exceptions

1. Again, this procedure does not apply to arsenic, lead or mercury - refer to your job spec. for these materials.

B. General Control & Cleanup Steps

1. Identify - container markings, pH indicator or characteristic odor
2. Contain - keep from spreading
3. Neutralize & Absorb - use commercial neutralizer/absorbent with color indicator or use other available substitutes/
4. Bag & Label

INTRODUCTION TO SPILL CONTROL AND CLEANUP VOCABULARY

Common Spill Substances:

Solvents

Any material which is capable of dissolving another material is considered to be a solvent. Solvents generally have a sweet odor and most are flammable.

Corrosives

A corrosive is a highly reactive material that will cause destruction of many materials upon contact, including human tissue. Corrosives are either strong acids, with a pH of less than 2, or strong bases, with a pH of greater than 12.5. Because different types of corrosives require different spill control materials, the following groups of corrosives are referred to in this module.

- Normal Acids: This refers to acids such as hydrochloric, phosphoric, hydrofluoric and sulfuric. All of these acids have a pH of less than 2, and have no other unusual characteristics when in normal concentrations.
- Fume-Producing Acids: In addition to having a pH of less than 2, certain highly concentrated acids produce acidic fumes when exposed to air. Such acids are highly concentrated hydrofluoric, nitric, and sulfuric.
- Bases: Bases are characterized by pH levels of greater than 12.5. Sodium Hydroxide is an example of a base.

Spill Related Terms:

Absorbent

A material which is dry and porous enough to contain liquid material is an absorbent. Examples of common absorbents are sand, paper towels, and diatamaceous earth. There are also available commercially available absorbents such as Solusorb™, Neutrasorb™, Neutracit™ and Neutrasol™.

Spill Related Terms continued:

Neutralize

To neutralize means to counteract the corrosive activity or a material. Bases and acids both must be neutralized before they are absorbed. Sodium bicarbonate and soda ash are "natural" neutralizers. Commercially available neutralizers include Neutrasorb™, Neutrasol™ and Neutracit™.

SPILL CONTROL AND CLEANUP PROCEDURE

The Spill Control and Cleanup Procedure you will use in cleaning up most types of spills is as follows:

ONE IDENTIFY THE SPILL

TWO CONTAIN THE SPILL

THREE NEUTRALIZE THE SPILL IF NECESSARY AND ABSORB THE SPILL

FOUR PROPERLY BAG ALL SPILL CLEANUP MATERIALS AND CLEAN THE SPILL AREA

Note: The above procedure is not to be used on spills of Arsenic, Lead Dust, or Mercury.

IMMEDIATE ACTION STEPS

Immediately after a spill occurs that is six inches or greater in diameter, the following steps should be taken

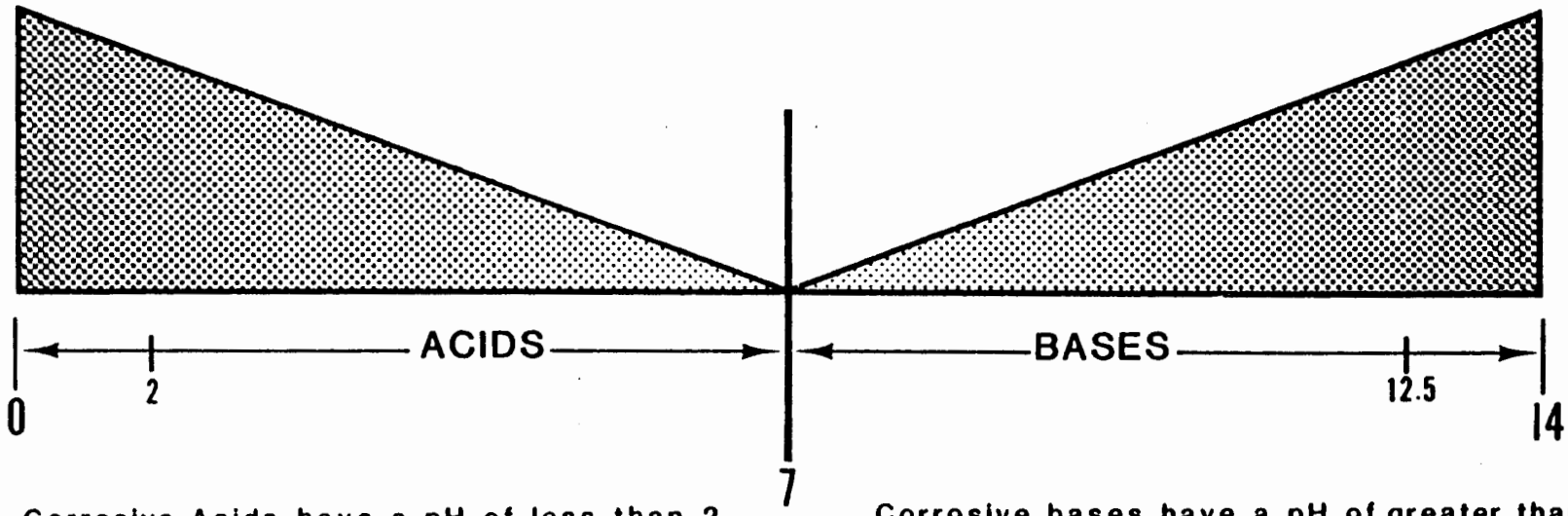
FIRST All workers in the immediate area should be notified to stay clear of the spill area.

SECOND If the spill is in enclosed or poorly ventilated area outside of a fab, attempt to increase fresh air ventilation.

THIRD Notify the immediate supervisor in the area.

Note: If the spill is of one gallon or more, the safety and security department must also be notified.

pH CHART



Corrosive Acids have a pH of less than 2

Corrosive bases have a pH of greater than 12.5

A neutralized material will have a pH of between 5 and 9

J. T. Baker Chemical Co.

awards this certificate to

Gary Mavrakis

for participation in

The Management and Disposal of Hazardous and Chemical Wastes

Paul Kloos
President, J.T. Baker

H. H. Norton
Director, Safety Training

JAN 24 1984
Certified

Instructor

Instructor

J.T.Baker

© GOES 746

LITHO IN U.S.A.

EXHIBIT H-4

Resumes of

Training Personnel

Patrick S. Herring
6500 Montgomery, N.E., #324
Albuquerque, NM 87109
505 881 6077

OBJECTIVE: I would like a job in a contemporary industry where my comprehensive industrial hygiene skills will result in a healthier working environment and, thus, a more profitable organization.

EXPERIENCE: Supervised six Industrial Hygienists in a nation-wide survey sponsored by the National Institute for Occupational Safety and Health. I also:

- Inspected and monitored 31 companies involved in the manufacture and utilization of semiconductor materials. The information that I gathered will soon be published by the Federal government.
- Trained Industrial Hygienists in safety procedures, survey techniques, and computer data coding.
- Developed employee efficiency monitoring systems that saved NIOSH over $40,000 in one year (11/80 - 5/83).

CERTIFICATION: Passed the American Board of Industrial Hygiene Core examination, 1982.

EDUCATION: M.S. in Industrial Hygiene, 1980.
Central Missouri State University.

Highlights: G.P.A. - 3.5 (4.0 index); courses included Toxicology, Radiation Protection, Noise Protection, and Ergonomics.

B.S. in Industrial Safety, 1979.
Central Missouri State University.

OTHER FACTS: Member of American Industrial Hygiene Association . . . Member of American Conference of Governmental Industrial Hygienists . . . Member of Toastmasters . . . Single.

RESUME

Gary M. Mavrakis
4504 Bryan N.W.
Albuquerque, New Mexico 87114

Education:

Masters of Business Administration, New Mexico Highlands University, 1983.

Bachelor of Arts; Chemistry, University Of New Mexico, 1975.

Experience:

1984-1985 Chemical Support Section Head, Signetics Corporation, Albuquerque, New Mexico. Managed the functions of chemical procurement, incoming quality control, distribution, and disposal for semiconductor manufacturing. Established computerized inventory system for the operations of the group and negotiated pricing of photochemicals for the Corporation. Tasks included completion of the Part B RCRA Permit, establishing pricing and shipping concerns for the Corporation, and the set up of a state of the art Chemical Laboratory. Manage a department of ten (10) employees with ~ $1.5 million budget.

1983-1984 Chemical Services Supervisor, Signetics Corporation, Albuquerque, New Mexico. Supervised the storage, distribution, and disposal of all chemicals used in wafer manufacture. Maintained bulk process gas storage farms. Published specifications on delivery, disposal, storage, IQC interface with the Chemical Laboratory, and inventory of chemicals used at Signetics. Supervised a department of six (6) employees.

1982 Laboratory Services Manager, Chemical Operations, General Technology Corporation, Albuquerque, New Mexico. (This group was formally the Special Projects Department of Missouri Research Laboratories). Responsible for the Quality Assurance Program, Production and Q.C. Program, and the Analytical Services Laboratory. Managed ten (10) laboratory technicians, cost accounting of all programs, purchasing supplies and new equipment, and writing new proposals for government and industry contracts.

1980-1981 Laboratory Supervisor, Chemical Group, Special Projects, Missouri Research Laboratories, Albuquerque, New Mexico. Supervised the Quality Assurance Program and two (2) laboratory technicians. At the end of 1981, MRL sold the Special Projects Group which became General Technology Corporation in 1982.

1979 Office Manager (interim) and Business Development Officer, Transamerica Title Company, Littleton, Colorado. Responsible for business development in the Aurora, Colorado, area and the management of the west side office. Supervised four (4) employees.

1978-1979 Soil Chemist, Denver Wholesale Florists, Denver, Colorado. Managed laboratory and performed complete soil and plant analysis. Worked closely with growers on their crop problems. Operational knowledge of many analytical instruments.

Accomplishments:

Project Engineer: Redesigned heater and pneumatic system of the Arson Investigation Detection System. Co-developed arson unit from theory to prototype to production model. Assisted in establishing testing and performance criteria for the production model.

Laboratory: Designed and implemented the construction of both Denver Wholesale Florist's and General Technology Corporation's laboratories. Supported and purchased the equipment needed to maintain state of the art laboratory at Signetics.

Chemist: Authored reports on soil and plant tissue studies used in the production of carnations and roses. Assisted in developing system for retention of hydrocarbons in arson detection. Assisted in development of soil and plant analysis business to outside growers in the State of Colorado.

Manager: Directed both the Production and Quality Assurance Programs at GTC from problem programs to stable, profitable groups. Also was rewarded special R&D contract to discover new packages for forensic dyes. Developed progressive and professional Chemical Operations Group at Signetics.

Professional Activities:

American Chemical Society
New Mexico Hazardous Waste Society
American Society of Testing And Materials

Seminars:

Program Management, University of New Mexico, 1980
Process Management Skills, Signetics, 1984
Management of Hazardous Chemical Wastes, J. T. Baker, 1985
Crosby "14 Step" Quality Improvement Program, Signetics, 1983

Harlan "Andy" Anderson
1133 Laurie Avenue
San Jose, CA 95125
(408) 265-9247

EDUCATION:

Bachelor of Science in Biology/Chemistry, University of Santa Clara

Masters of Science in Safety Systems Management, University of Southern California, currently enrolled.

CERTIFICATIONS:

Paramedic
Coronary Technician
Toxic/Hazardous Management Program
Hazardous Chemical Safety
Hazardous Meterials/Waste Management
National Safety Council Forklift Training
Tube Line Fabrication & Safety

COMMITTEES:

Member American Electronic Association - Environmental Occupational & Health (EOH) Training and Services Committee

Chemical Action Board, Signetics Corporation

Co-Chairman Emergency Response Team (ERT), Signetics Corporation

PROGRAMS/PUBLICATIONS:

Chemical Hazard Management - Training the Trainer

Inorganic Arsenic - Substance Information Pamphlet

Fire Extinguishers Training Manual

Chemical Handling Safety

Orientation to Fab Safety

TRAINING/CONSULTING:

Fab Safety
Chemical Handling Safety for Hazardous Materials (Gas, Liquid, Solid)
Fire Extinguisher
Inorganic Arsenic
Radiation Safety
Forklift Operation
Emergency Preparedness - Disaster Planning
Chemical Interpretation/Evaluation - Material Safety Data Sheet (MSDS)
Coronary Pulmonary Resuscitation
First Aid

MARK ZUCKERMAN
5315 Shafter Avenue
Oakland, CA 94618

Summary of Qualifications

- Over eight years working in the environmental, technical and investigative fields.
- Well developed research, writing, communication and training skills.
- Education in the engineering, biological, chemical and planning fields.

Managing/Coordinating

- As project officer for two major hazardous waste disposal sites, was required to work with various local, state and federal agencies and industrial coordinators to assure proper cleanup of site.
- As project officer of three large-scale regional reclamation studies and the Lake Tahoe EIS was required to interface with managers of water supply and sanitation districts and representatives from the business, agricultural, stqate, federal, local and environmental communities.
- As EIS Coordinator, acted as liaison and mediator with various local, regional, state and federal officials; responsible for assuring the consistency and quality of over 20 federal environmental impact statements, and keeping the EIS(s) on time and on budget.
- As EPA technical coordinator in small wastewater systems, water conservation and land application systems, was responsible for the review and distribution of "state of the art" information in those areas; participated in several state and regional technical advisory committees on reclamation, including the impact of industrial waste on reclamation and the cost savings of recycling.

Writing/Research and Reporting

- As an investigator, prepared numerous investigative reports in such areas as sanitation, consumer complaints, accident/injury inquiries for possible criminal or civil action.
- Worked with the State of California in developing and implementing a system for rating the hazardous waste sites in California.
- As a federal EIS Coordinator, was responsible for interpreting, reviewing, writing, nd commenting on various environmental and administrative regulations.

- Participated in federally funded studies on water conservation and small wastewater treatment systems. In addition, as Lake Tahoe EIS project officer, was responsible for writing and tracking various mitigation measures to offset the adverse impacts of the project.

Training/Communication

- Used various teaching/training methods such as humorous plays, technical workshops, seminars, and dramatizations to convert complicated information effectively.
- As teacher/coordinator, successfully worked with a wide range of ages and cultural and educational backgrounds including consultants, students, government employees and foreigners.
- Developed and assisted in developing: public participation programs for three regional reclamation studies in California; workshops on environmental regulations, small wastewater systems, water conservation, and land application, for governmental employees and consultants.

EMPLOYMENT HISTORY

1974 to 1982	Environmental Protection Scientist, U.S. Environmental Protection Agency, San Francisco, California
1973 - 1974	Inspector, U.S.E.P.A. Edison, New Jersey
1972 - 1973	Inspector, U.S. Food and Drug Administration Newark, New Jersey
1971 - 1972	Teacher, Mt. Vernon Jr. High School Mt. Vernon, New York
1968 - 1970	Teacher, Peace Corps Ethiopia
1966 - 1967 (summer)	Teacher's Aide, Children's Village Dobbs Ferry, New York

EDUCATION

M.S. (pending), Environmental Planning, San Francisco State University, California

M.S., Environmental Science, University of Connecticut

B.A., Biology, Seton Hall University, New Jersey

HAZARDOUS WASTE
PERSONNEL TRAINING RECORD

EMPLOYEE	EMPLOYEE NUMBER	DATE OF HIRE	FA	CPR	FE	RP	CH	HWH	AM	LTS	OTHER
P. LOPEZ	D21809	03-MAY-82	11/82	4/83	11/82	1/85	8/82	3/84	1/84	1/84	
M. MALBURNE	D22570	17-JAN-83	12/81	2/84	10/84	10/84	4/83				
S. GUNTHER	D22581	24-JAN-83	4/83	9/84	6/84	10/84	4/83	3/84	1/84	1/84	
G. MAVRAKIS	D22687	21-FEB-83	11/83	4/83	12/83	4/83	4/83	3/84			1/84
R. FRAATZ	D22745	20-APR-83	11/83	12/83							
R. HILL	D22859	06-JUN-83	12/83	9/84	6/84	10/84	7/83	3/84	1/84	1/84	
C. JACKSON	D23618	05-DEC-83		2/84	12/83	2/84	3/84	3/84	1/84	1/84	
J. KERLEY	D23658	13-FEB-84	7/84	6/84		6/84	7/84				
K. LUHR	D24603	30-JUL-84		9/84		1/85	11/84			8/84	
S. BRITTON	D24656	01-OCT-84			12/84						
J. DIEHL	D24681	07-JAN-85				1/85					

FA=FIRST AID
CPR=CARDIOPULMONARY RESUSCITATION
FE=FIRE EXTINGUISHER
RP=RESPIRATORY PROTECTION
CH=CHEMICAL HANDLING
HWH=HAZARDOUS WASTE HANDLING
AM=AIR MONITORING
LTS=LIFT TRUCK SAFETY
OTHER=SEPARATE HAZARDOUS WASTE CLASSES

EXHIBIT H-6

Job Title & Required Training, Training Frequency, Duration and Type

EXHIBIT H-6 JOB TITLE AND REQUIRED TRAINING,

TRAINING FREQUENCY, DURATION, AND TYPE

Course	Chem Operator	Supervisor	Duration	TYPE CI	AV	HO	TT	Frequency
A. Chem Handling	Required	Required	10 hrs	X	X	X	X	1 x/2yr
B. Lift Truck Safety	Required	--	3 hrs	X	X	X	X	1 x/2yr
C. Respiratory Protection	Required	Required	3 hrs	X	X	X	X	
D. Fire Extinguisher	Required	Required	2 hrs	X		X		1 x/1yr
E. First Aid	Required	Required	8 hrs	X	X	X	X	1 x/3yr
F. Cardiopulmonary Resuscitation	Required	Required	8 hrs	X	X	X	X	1 x/1yr
G. Air Monitoring	Recommended	--	1 hr	X	X	X		--
H. Material Safety Data Sheet	Recommended	--	3 hrs	X				--
I. Hazardous Waste Handling	Required	Required	4 hrs	X		X	X	1 x/yr
J. Other	--	Required	Varies	V A R I E S				1 x/yr

CI = Classroom Instruction

AV = Audio Visual

HO = Hands On

TT = Test

SECTION I

CLOSURE PLAN, POST-CLOSURE PLAN, AND FINANCIAL REQUIREMENTS

This Section is submitted in accordance with the requirements of HWMR 206.D.2. This plan identifies all steps that will be necessary to partially close the facility at any point during its intended operating life and to completely close the facility at the end of its intended operating life. A post-closure plan is not required because this is not a disposal facility and all wastes will be removed at closure.

Signetics will maintain an onsite copy of the approved closure plan and all revisions to the plan until the certification of closure completeness has been submitted and accepted by the Director of EID. Signetics will notify the Director at least 180 days prior to beginning final closure. The closure date for the entire facility will be AD 2050. Upon completion of closure, we will submit to the EID a certification by both Signetics and by Professional Engineer that the facility has been closed in accordance with the specifications in the approved closure plan.

I.1 Closure Plan:

I.1.a Closure Performance Standard (HWMR 206.D.2.b):

This Closure Plan is a controlled maintenance system designed to minimize or eliminate threats to human health and discharge of hazardous waste into the environment. The facility stores wstes generated solely from its manufacturing operations. If there is evidence of any spills or leaks, samples will be taken and analyzed to determine the extent of contamination in the soil and if necessary, in groundwater. Any contaminated soil will be excavated, removed, and disposed of at a proper disposal facility. Any contaminated groundwater will be remedied. The following sections discuss in detail efforts to be made at Signetics to satisfy the closure performance standard.

I.1.b Partial and Final Closure Activities (HWMR 206.D.2.C.(a)):

At the time of this writing, no partial closures are planned. However, the cleanup procedures are outlined by area so that the appropriate sections of the final closure plan may be used for partial closure. In the event of a

partial closure, the closure plan will be rewritten to reflect the change. At a maximum, we expect the operation to consist of storage of 100 drums and 3 x 5,000 gallon tanks during the life of the facility. The closure date for the entire facility is scheduled to be AD 2050.

I.1.c <u>Maximum Waste Inventory</u> (HWMR 206.D.2.C.(b)):

The following table shows the maximum inventory of wastes in storage at any given time during the operating life of Signetics.

1 x 5,000 gl	Waste Hydrofluoric Acid
1 x 5,000 gl	Waste Buffered Oxide Etch (Hydrofluoric Acid/Ammonium Fluoride)
1 x 5,000 gl	Waste "Solvent I"
36 x 55 gl	Waste "Solvent II"
64 x 55 gl	Arsenic or Mercury-Contaminated Waste

I.1.d <u>General Closure Procedures:</u>

A) Signetics will utilize its employees and outside contractors for final closure of the faciity. The activities involved are:

1) Removal of hazardous waste inventory
2) Decontamination of hazardous waste drain pipes
3) Disposal of tank contents
4) Decontamination of tanks
5) Decontamination of containment vaults
6) Disposal of tanks
7) Disposal of drum inventory
8) Clean up drum storage area

The work involved in decontamination will be supervised and performed by qualified Signetics personnel, except where stated otherwise. Safety precautions will be taken during decontamination procedures to prevent personal injury. Personnel will be equipped with the necessary safety equipment such as goggles, gloves, boots, respirators and coverall clothing.

No open flames, sparking tools, or smoking will be allowed near the Ignitable Storage Area. A combustible gas detector capable of measuring lower explosion limits (LEL) will be available to the workers to assess any hazards posed by ignitable vapors. Fire extinguishers will be made available.

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The appropriate absorbent and neutralizing materials will be available in case of a spill during clean-up procedures (i.e., Solusorb for organic solvents, Neutrasorb for acids, and Neutracit for bases). Should any spill-control materials be employed, the resulting waste will be placed in a 55-gallon drum available at the clean-up site. This drum will be disposed of with the other drummed wastes generated during clean-up.

Before leaving the work area, members of the clean-up team will rinse off their boots, and other contaminated clothing, and wash areas of exposed skin. They will be inspected for cleanliness by a supervisor before leaving the site.

Equipment used in the clean-up (pumps, safety gear, scrub brushes, steam-cleaning equipment, etc.) will be washed with water, or steam cleaned if necessary, to ensure it is clean after its final use. A visual inspection or lab analysis of each article will be made before it is declared decontaminated and can be stored or returned.

The inspections of equipment cleanliness and personnel will be made by the clean up team supervisor. Visual inspections made by clean-up personnel to assure decontamination will be recorded by the supervisor.

The soil is not expected to be contaminated by waste storage at Signetics. Soil contamination is avoided because the wastes are stored in tanks situated within coated concrete vaults to provide primary and secondary containment. Any spills in the past will have been decontaminated at the time, as specified in the Container Management Plan and "Contingency Plan." This closure plan will be revised should contamination or leaks be detected during the operating life of the facility.

The following is a suggested list of clean-up materials:

1 long handled squeegee
1 long handled shovel
1 - 2 brooms
Dustpan
3 mil thick plastic bags
40 55-gl drums
5 sets of clean-up clothing
Sampling bottles and equipment

Steam cleaner
Scrub brushes
Pump (Hand or electric)
Neutralizing and Absorbent materials
Portable combustible gas detector
Fire extinguisher
Garden hose and water
pH paper

I.1.e Decontamination and Closure of Drum Storage:

The last of the hazardous waste containing drums will be properly labelled, marked, manifested and shipped by a permitted transporter to a disposal facility (e.g. IT Corporation, Chemical Waste Management). If spills or leaks remain, the storage area will be cleaned by scraping or absorbing with Neutrasorb. The residuals will be drummed and analyzed (if necessary) and shipped to a TSDF as above. Analysis of residual material will depend on the location where they are obtained from, either Chemical Storage #2 or Flammable Storage #4. For material collected in Chemical Storage #2, analysis will determine the level of mercury and/or arsenic in the residue. Material obtained from Flammable Storage #4 will be tested to determine if it should be considered as an ignitable material.

I.1.f Decontamination and Closure of Tank Storage:

After manufacturing shutdown, the drain lines leading to the hazardous waste storage tanks will be rinsed copiously with water. The pH of the rinsate will be tested to be greater than 5 at the last clean-out trap. The two acid storage tanks will be rinsed with water and the rinsate removed by a commercial vendor or, where appropriate, pumped into wastewater neutralization. The procedures will be repeated until the pH of the rinsate is greater than 5.

The solvent-containing tank will be rinsed and filled with 5,000 gallons of water and pumped out for hazardous waste disposal. It will then be visually inspected for sludge. If there is sludge in the tank, a sample will be collected and analyzed for ignitability and EP toxicity.

Sludge which is non-hazardous will be left alone. Sludge with hazardous characteristics will be removed from the tanks by scraping the tank bottom with long-handled shovels and sqeegees from outside the tank through the 24-inch manhold. The sludge will be collected in a 55-gallon drum and then stored with the other wastes generated during clean-up until the final waste pick-up. It is anticipated that less than one drum of waste sludge will be collected.

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Many of the solvents stored in this tank have flash points below 100 degrees C and the residue of these solvents may result in a sludge that is ignitable. The solvent waste stream does not include any EP toxic material, however, as many solvents are used for cleaning purposes, it is possible that over the life of the tank insoluble EP toxic materials may be partitioned and concentrate as a sludge on the bottom of the tank.

A steam-cleaning unit will be rented to decontaminate the tanks. Steam (a typical unit operated at 700 psi and 22 degrees F) will be injected into the tank.

The resulting wash water will be sampled for total organic carbon (TOC), and be pumped into 55-gallon drums to be stored until the final waste pick-up. Waste water discharge which will meet the POTW waste water discharge requirements will be directed into the waste water treatment system.

The solvent tank collects both routine, large-volume, process solvents and the small volume special-purpose solvents. The mixture of these solvents is complex and the use of TOC measurements will give an accurate indication of when all solvents or oily residue have been removed from the surfaces of the tank.

The decontaminated tanks will be disconnected from the pipes and the tie-down straps and then be removed from the concrete vault by crane. The tanks will either be sold for scrap or transferred to another Signetics site. All hazardous waste pipes will be dismantled and collected for disposal at Class I facilities.

Residual liquids remaining in vaults as a result of decontamination will be pumped into wastewater neutralization or drums. Surfaces will be washed down. It is estimated that a maximum of 1,000 gallons or 20 drums of liquids will be generated from the above procedures. The drums will be disposed of as hazardous wastes.

I.1.g <u>Schedule for Closure</u> (HWMR 206.D.2.d.):

Exhibit I-1 is the anticipated closure schedule. The Director will be notified 180 days before beginning closure. Final closure will be supervised and certified by an independent Professional Engineer in addition to Signetics' personnel.

I.1.h Extension for Closure Time:

At this time, we do not require an extension for closure time.

I.2 Post-Closure Plans:

Post-closure care will not be needed for this facility because this is not a disposal facility.

I.3 Notice in Deed and Notice to Local Land Authority:

Because Signetics is only a hazardous waste storage facility and not a disposal facility, notation is not necessary in the deed informing potential purchasers of restrictions associated with a disposal site, as required by HWMR 206.D.2.i.j.

I.4 Closure Cost Estimate (HWMR 206.D.3.c):

An estimated $80,000 (June 1985 cost estimate) will be needed to close the Signetics hazardous waste storage facilities. The closure costs are presented by activity in Table I-1. Activities include removal of waste inventory, decontamination, disposal of rinsates, removal of tanks, lab analyses, and closure certification.

This closure cost estimate will be kept on file at the Signetics facility. It will be revised whenever a change in the closure plan affects the cost of closure. It will be adjusted annually (from the date of its original development) to reflect changes in closure cost brought about by inflation. The Department of Commerce's Annual Implicit Price Deflator for Gross National Product* will be used to make this adjustment.

* Department of Commerce, Survey of Current Business.

TABLE I-1

COST OF CLOSURE ESTIMATE

A. Tanks	
a) Chemicals for neutralization of rinsate	$ 1,000
b) Disposal Cost of 20,000 gallons of contents and rinsates	26,000
c) Disposal Cost of 20 drums of contaminated liquids from vaults @ $100/drum	2,000
d) Disposal of contaminated scraps, plumbing	5,000
e) Crane rental - 8 hours @ $100/hour	800
f) Steam cleaner rental 2 days @ $100/day	200
g) Laboratory analyses of sludges and residuals	2,000
h) Plant labor 96 hours @ $10/hour	960
i) Supervision 50 hours @ $30/hour	1,500
Sub Total.....	$39,460
B. Other Containers	
a) Disposal cost of 100 drums @ $100/drum	$10,000
b) Plant labor 16 hours at $10/hour	160
c) Lab analyses of various drums	5,000
Sub Total.....	$15,160

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TABLE I-1 (CONTINUED)

C. General	
a. Safety clothing and equipment @ $100/worker	$ 500
b. Certification	
1) Signetics supervisor 24 hours @ $30/hour	720
2) New Mexico Professional Engineer 60 hours @ $60/hour	3,600
c. Solid wastes left from clean-up 10 drums @ $100/drum	1,000
Sub Total.....	$ 5,820
D. Total of Subtotals	
a. Tanks	$39,460
b. Other Containers	15,160
c. General	5,820
	$60,440
E. Peripheral	
a. 15% Administrative	$ 9,426
b. 15% Contingencies	9,426
Total Closure Cost (1985 Dollars).....	$79,292

I.5 Financial Assurance Mechanism for Closure (HWMR 206.D.3.d.):

I.5.a Financial Test and Corporate Guarantee for Closure (HWMR 206.D.3.d.(5)):

Per the document in Exhibit I-2, Signetics has elected to utilize the Financial Test as a mechanism for assuring closure funds. This document will be updated within 90 days after the close of each succeeding fiscal year.

I.6 Post-Closure Cost Estimate (HWMR 206.D.3.e):

Since all wastes will be disposed of offsite, there will be no post-closure activities or costs.

I.7 Financial Assurance Mechanism for Post-Closure (HWMR 206.D.3.f):

Since all wastes will be disposed of offsite, there will be no post-closure activities or costs.

I.8 Liability Insurance (HWMR 206.D.3.h):

I.8.a Sudden Insurance (HWMR 206.D.3.h.(1)):

Signetics has obtained liability insurance for sudden and accidental occurrences in the amount of $4 million per occurrence with an annual aggregate of $8 million exclusive of legal defense costs. A copy of the signed certificate of liability insurance has been sent to the Director by certified mail. The certificate is worded as specified in HWMR 206.D.3.j.(10) (see Exhibit I-3).

I.8.b Nonsudden Insurance (HWMR 206.D.3.h.(2)):

Signetics is a storage facility, therefore, no liability insurance is required for a nonsudden accidental occurrence.

I.8.c Financial Test (HWMR 206.D.3.h.(6)):

Signetics has an insurance policy for sudden and accidental occurrences, therefore, the financial test is not necessary.

I.8.d Variance Procedures (HWMR 206.D.3.h.(3)):

Signetics will not request the Director for a reduction of liability amounts.

I.8.e <u>Adjustment Procedures</u> (HWMR 206.D.3.h.(4)):

If the Director increases the amounts of liability coverage or elects to improve nonsudden liability coverage requirements, Signetics will immediately seek an adjustment to the insurance policy discussed above.

SECTION I

CLOSURE PLAN, POST-CLOSURE PLAN, AND FINANCIAL REQUIREMENTS

This Section is submitted in accordance with the requirements of HWMR 206.C.2 and 206.C.3. This plan identifies all steps that will be necessary to partially close the facility at any point during its intended operating life and to completely close the facility at the end of its intended operating life. A post-closure plan is not required because this is not a disposal facility and all wastes will be removed at closure.

Signetics will maintain an onsite copy of the approved closure plan and all revisions to the plan until the certification of closure completeness has been submitted and accepted by the Director of EID. Signetics will notify the Director at least 180 days prior to beginning final closure. The closure date for the entire facility will be AD 2050. Upon completion of closure, we will submit to the EID a certification by both Signetics and by Professional Engineer that the facility has been closed in accordance with the specifications in the approved closure plan.

I.1 Closure Plan:

I.1.a Closure Performance Standard (HWMR 206.C.2.b):

This Closure Plan is a controlled maintenance system designed to minimize or eliminate threats to human health and discharge of hazardous waste into the environment. The facility stores wastes generated solely from its manufacturing operations. If there is evidence of any spills or leaks, samples will be taken and analyzed to determine the extent of contamination in the soil and if necessary, in groundwater. Any contaminated soil will be excavated, removed, and disposed of at a proper disposal facility. Any contaminated groundwater will be remedied. The following sections discuss in detail efforts to be made at Signetics to satisfy the closure performance standard.

I.1.b Partial and Final Closure Activities (HWMR 206.C.2.C.(a)):

At the time of this writing, no partial closures are planned. However, the cleanup procedures are outlined by area so that the appropriate sections of the final closure plan may be used for partial closure. In the event of a partial closure, the closure plan will be

rewritten to reflect the change. At a maximum, we expect the operation to consist of storage of 100 drums and 3 x 5,000 gallon tanks during the life of the facility. The closure date for the entire facility is scheduled to be AD 2050.

I.1.c **Maximum Waste Inventory** (HWMR 206.C.2.C.(b)):

The following table shows the maximum inventory of wastes in storage at any given time during the operating life of Signetics.

1 x 5,000 gal.	Waste Hydrofluoric Acid
1 x 5,000 gal.	Waste Buffered Oxide Etch (Hydrofluoric Acid/Ammonium Fluoride)
1 x 5,000 gal.	Waste "Solvent I"
36 x 55 gal.	Waste "Solvent II"
64 x 55 gal.	Arsenic or Mercury-Contaminated Waste

I.1.d **General Closure Procedures:**

A) Signetics will utilize its employees and outside contractors for final closure of the facility. The activities involved are:

1) Removal of hazardous waste inventory
2) Decontamination of hazardous waste drain pipes
3) Disposal of tank contents
4) Decontamination of tanks
5) Decontamination of containment vaults
6) Disposal of tanks
7) Disposal of drum inventory
8) Clean up drum storage area

The work involved in decontamination will be supervised and performed by qualified Signetics personnel, except where stated otherwise. Safety precautions will be taken during decontamination procedures to prevent personal injury. Personnel will be equipped with the necessary safety equipment such as goggles, gloves, boots, respirators and coverall clothing.

No open flames, sparking tools, or smoking will be allowed near the Ignitable Storage Area. A combustible gas detector capable of measuring lower explosion limits (LEL) will be available to the workers to assess any hazards posed by ignitable vapors. Fire extinguishers will be made available.

The appropriate absorbent and neutralizing materials will be available in case of a spill during clean-up procedures (i.e., Solusorb for organic solvents, Neutrasorb for acids, and Neutracit

for bases). Should any spill-control materials be employed, the resulting waste will be placed in a 55-gallon drum available at the clean-up site. This drum will be disposed of with the other drummed wastes generated during clean-up.

Before leaving the work area, members of the clean-up team will rinse off their boots, and other contaminated clothing, and wash areas of exposed skin. They will be inspected for cleanliness by a supervisor before leaving the site.

Equipment used in the clean-up (pumps, safety gear, scrub brushes, steam-cleaning equipment, etc.) will be washed with water, or steam cleaned if necessary, to ensure it is clean after its final use. A visual inspection or lab analysis of each article will be made before it is declared decontaminated and can be stored or returned.

The inspections of equipment cleanliness and personnel will be made by the clean up team supervisor. Visual inspections made by clean-up personnel to assure decontamination will be recorded by the supervisor.

The soil is not expected to be contaminated by waste storage at Signetics. Soil contamination is avoided because the wastes are stored in tanks situated within coated concrete vaults to provide primary and secondary containment. Any spills in the past will have been decontaminated at the time, as specified in the Container Management Plan and "Contingency Plan." This closure plan will be revised should contamination or leaks be detected during the operating life of the facility.

The following is a suggested list of clean-up materials:

1 long handled squeegee
1 long handled shovel
1 - 2 brooms
Dustpan
3 mil thick plastic bags
40 55-gallon drums
5 sets of clean-up clothing
Sampling bottles and equipment
Steam cleaner
Scrub brushes
Pump (hand or electric)
Neutralizing and Absorbent materials
Portable combustible gas detector
Fire extinguisher
Garden hose and water
pH paper

I.1.e Decontamination and Closure of Drum Storage:

The last of the hazardous waste containing drums will be properly labelled, marked, manifested and shipped by a permitted transporter to a disposal facility (e.g. IT Corporation, Chemical Waste Management). If spills or leaks remain, the storage area will be cleaned by scraping or absorbing with Neutrasorb. The residuals will be drummed and analyzed (if necessary) and shipped to a TSDF as above. Analysis of residual material will depend on the location where they are obtained from, either Chemical Storage #2 or Flammable Storage #4. For material collected in Chemical Storage #2, analysis will determine the level of mercury and/or arsenic in the residue. Material obtained from Flammable Storage #4 will be tested to determine if it should be considered as an ignitable material.

I.1.f Decontamination and Closure of Tank Storage:

After manufacturing shutdown, the drain lines leading to the hazardous waste storage tanks will be rinsed copiously with water. The pH of the rinsate will be tested to be greater than 5 at the last clean-out trap. The 2 acid storage tanks will be rinsed with water and the rinsate removed by a commercial vendor or, where appropriate, pumped into wastewater neutralization. The procedures will be repeated until the pH of the rinsate is greater than 5.

The solvent-containing tank will be rinsed and filled with 5,000 gallons of water and pumped out for hazardous waste disposal. It will then be visually inspected for sludge. If there is sludge in the tank, a sample will be collected and analyzed for ignitability and EP toxicity.

Sludge which is non-hazardous will be left alone. Sludge with hazardous characteristics will be removed from the tanks by scraping the tank bottom with long-handled shovels and sqeegees from outside the tank through the 24-inch manhole. The sludge will be collected in a 55-gallon drum and then stored with the other wastes generated during clean-up until the final waste pick-up. It is anticipated that less than one drum of waste sludge will be collected.

Many of the solvents stored in this tank have flash points below 100°C and the residue of these solvents may result in a sludge that is ignitable. The solvent waste stream does not include any EP toxic material, however, as many solvents are used for cleaning purposes, it is possible that over the life of the tank insoluble EP toxic materials may be partitioned and concentrate as a sludge on the bottom of the tank.

A steam-cleaning unit will be rented to decontaminate the tanks. Steam (a typical unit operated at 700 psi and 220°F) will be injected into the tank.

The resulting wash water will be sampled for total organic carbon (TOC), and be pumped into 55-gallon drums to be stored until the final waste pick-up. Waste water discharge which will meet the POTW waste water discharge requirements will be directed into the waste water treatment system.

The solvent tank collects both routine, large-volume, process solvents and the small volume special-purpose solvents. The mixture of these solvents is complex and the use of TOC measurements will give an accurate indication of when all solvents or oily residue have been removed from the surfaces of the tank.

The decontaminated tanks will be disconnected from the pipes and the tie-down straps and then be removed from the concrete vault by crane. The tanks will either be sold for scrap or transferred to another Signetics site. All hazardous waste pipes will be dismantled and collected for disposal at Class I facilities.

Residual liquids remaining in vaults as a result of decontamination will be pumped into wastewater neutralization or drums. Surfaces will be washed down. It is estimated that a maximum of 1,000 gallons or 20 drums of liquid will be generated from the above procedures. The drums will be disposed of as hazardous wastes.

I.1.g **Schedule for Closure** (HWMR 206.C.2.d.):

Exhibit I-1 is the anticipated closure schedule. The Director will be notified 180 days before beginning closure. Final closure will be supervised and certified by an independent Professional Engineer in addition to Signetics' personnel.

I.1.h **Extension for Closure Time:**

At this time, we do not require an extension for closure time.

I.2 **Post-Closure Plans:**

Post-closure care will not be needed for this facility because this is not a disposal facility.

I.3 **Notice in Deed and Notice to Local Land Authority:**

Because Signetics is only a hazardous waste storage facility and not a disposal facility, notation is not necessary in the deed informing

potential purchasers of restrictions associated with a disposal site, as required by HWMR 206.C.2.i,j.

I.4 **Closure Cost Estimate** (HWMR 206.C.3.c):

An estimated $82,000 (June 1984 cost estimate) will be needed to close the Signetics hazardous waste storage facilities. The closure costs are presented by activity in Table I-1. Activities include removal of waste inventory, decontamination, disposal of rinsates, removal of tanks, lab analyses, and closure certification.

This closure cost estimate will be kept on file at the Signetics facility. It will be revised whenever a change in the closure plan affects the cost of closure. It will be adjusted annually (from the date of its original development) to reflect changes in closure cost brought about by inflation. The Department of Commerce's Annual Implicit Price Deflator for Gross National Product* will be used to make this adjustment.

* Department of Commerce, Survey of Current Business.

TABLE I-1

COST OF CLOSURE ESTIMATE

A. Tanks	
a) Chemicals for neutralization of rinsate	$ 1,000
b) Disposal Cost of 20,000 gallons of contents and rinsates	26,000
c) Disposal Cost of 20 drums of contaminated liquids from vaults @ $100/drum	2,000
d) Disposal of contaminated scraps, plumbing	5,000
e) Crane rental - 8 hours @ $100/hr	800
f) Steam cleaner rental 2 days @ $100/day	200
g) Laboratory analyses of sludges and residuals	2,000
h) Plant labor 96 hours @ $10/hr	960
i) Supervision 50 hours @ $30/hr	1,500
Sub Total.....	$39,460
B. Other Containers	
a) Disposal cost of 100 drums @ $100/drum	$10,000
b) Plant labor 16 hours at $10/hr	160
c) Lab analyses of various drums	5,000
Sub Total.....	$15,160

TABLE I-1 (CONTINUED)

C. General	
a. Safety clothing and equipment @ $100/worker	$ 500
b. Certification	
1) Signetics supervisor 24 hours @ $30/hr	720
2) New Mexico Professional Engineer 60 hours @ $60/hr	6,000
c. 1) Solid wastes left from clean-up 10 drums @ $100/drum	1,000
Sub Total.....	$ 8,220
D. Total of Subtotals	
a. Tanks	$39,460
b. Other Containers	15,160
c. General	8,220
	$62,840
E. Peripheral	
a. 15% Administrative	$ 9,426
b. 15% Contingencies	9,426
Total Closure Cost (1984 Dollars).....	$81,692

I.5 **Financial Assurance Mechanism for Closure** (HWMR 206.C.3.d.):

I.5.a **Financial Test and Corporate Guarantee for Closure** (HWMR 206.C.3.d.(5)):

Per the document in Exhibit I-2, Signetics has elected to utilize the Financial Test as a mechanism for assuring closure funds. This document will be updated within 90 days after the close of each succeeding fiscal year.

I.6 **Post-Closure Cost Estimate** (HWMR 206.C.3.e):

Since all wastes will be disposed of offsite, there will be no post-closure activities or costs.

I.7 **Financial Assurance Mechanism for Post-Closure** (HWMR 206.C.3.f):

Since all wastes will be disposed of offsite, there will be no post-closure activities or costs.

I.8 **Liability Insurance** (HWMR 206.C.3.h):

I.8.a **Sudden Insurance** (HWMR 206.C.3.h.(1)):

Signetics has obtained liability insurance for sudden and accidental occurrences in the amount of $4 million per occurrence with an annual aggregate of $8 million exclusive of legal defense costs. A copy of the signed certificate of liability insurance has been sent to the Director by certified mail. The certificate is worded as specified in HWMR 206.D.3.j.(10) (see Exhibit I-3).

I.8.b **Nonsudden Insurance** (HWMR 206.C.3.h.(2)):

Signetics is a storage facility, therefore, no liability insurance is required for a nonsudden accidental occurrence.

I.8.c **Financial Test** (HWMR 206.C.3.h.(6)):

Signetics has an insurance policy for sudden and accidental occurrences, therefore, the financial test is not necessary.

I.8.d **Variance Procedures** (HWMR 206.C.3.h.(3)):

Signetics will not request the Director for a reduction of liability amounts.

I.8.e **Adjustment Procedures** (HWMR 206.C.3.h.(4)):

If the Director increases the amounts of liability coverage or elects to improve nonsudden liability coverage requirements, Signetics will immediately seek an adjustment to the insurance policy discussed above.

Exhibit I-1 Anticipated Closure Schedule

Activity	- Day - 360	330	300	270	240	210	180	150	120	90	60	30	0
1) Determine Closure Schedule. Give 180 Day Notice to Director Prior to Commencement of Closure Activities.	*												
2) After Approval From Director, Begin Closure Plan.							*						
3) Decontamination of Hazardous Waste Drain Pipes							* * *						
4) Disposal of Tank Inventory								* *					
5) Dispose of Drum Inventory								* *					
6) Decontamination of Tanks									* * *				
7) Removal of Tanks									* * *				
8) Laboratory Analyses								* * * *	* * *	* * *	*		
9) Decontamination of Containment Vaults									* *	* *			
10) Decontamination of Drum Storage									* * *	*			
11) Dispose of Drums Resulting From Clean Up											* * *	*	
12) Certification by an Independent PE												* *	
13) Notification to EPA and Completion Closure													*

EXHIBIT I-2

Financial Assurance

for Closure

21 March 1984

Signetics
a subsidiary of U.S. Philips Corporation

Signetics Corporation
P.O. Box 409
811 E. Arques Avenue
Sunnyvale, California 94086
Telephone 408/739-7700

Mr. Steven Asher, Director
New Mexico Environmental Improvement Division
P.O. Box 968
Sante Fe, NM 87504

Dear Sir:

I am the chief financial officer of Signetics Corporation, 811 East Arques Avenue, Sunnyvale, California 94086. This letter is in support of this firm's use of the financial test to demonstrate financial assurance, as specified in the New Mexico Hazardous Waste Management Regulations, Part II, 206.C.3. and 206.D.3.

1. This firm is the owner or operator of the following facilities for which financial assurance for closure or post-closure care is demonstrated through the financial test specified in the New Mexico Hazardous Waste Management Regulations, Part II, 206.C.3 and 206.D.3. The current closure and/or post-closure cost estimates covered by the test are shown for each facility:

CLOSURE/POST-CLOSURE COST ESTIMATES

Location	Closure Cost	Post Closure Cost	Facility Total
1. 811 E. Arques Avenue Sunnyvale, CA	$ 655,000.	$ 218,000.	$ 873,000.
2. 730 Evelyn Sunnyvale, CA	66,000.	27,000.	93,000.
3. 440 Wolfe Road Sunnyvale, CA	55,000.	27,000.	82,000.

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Signetics Corporation
811 East Arques Avenue
Sunnyvale, California 94086

4.	3600 Peterson Way Santa Clara, CA	66,000.	27,000.	93,000.
5.	4130 South Market Court Sacramento, CA	22,000.	10,000.	32,000.
6.	9201 Pan American Freeway, NE, Albuquerque, NM	270,000.	54,000.	324,000.
	Grand Totals	$1,134,000.	$363,000.	$1,497,000.

2. This firm guarantees, through the corporate guarantee specified in the New Mexico Hazardous Waste Management Regulations, Part II, 206.C.3 or 206.D.3., the closure or post-closure care of the following facilities owned or operated by subsidiaries of this firm. The current cost estimates for the closure or post-closure care so guaranteed are shown for each facility: NONE.

3. This firm is the owner or operator of the following hazardous waste management facilities for which financial assurance for closure or, if a disposal facility, post-closure care, is not demonstrated either to The New Mexico Environmental Improvement Division through the financial test or any other financial assurance mechanism specified in The New Mexico Hazardous Waste Management Regulations, Part II, 206.C.3. and 206.D.3. The current closure and/or post-closure cost estimates not covered by such financial assurance are shown for each facility: NONE.

This firm is not required to file a Form 10K with the Securities and Exchange Commission (SEC) for the latest fiscal year.

The fiscal year of this firm ended January 1, 1984. The figures for the following items marked with an asterisk are derived from this firm's independently audited, year-end financial statements for the latest completed fiscal year, ended January 1, 1984.

Alternative I

1. Sum of current closure and post-closure cost estimates (total of all cost estimates shown in the four paragraphs above) $1.497 M

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Signetics Corporation
811 East Arques Avenue
Sunnyvale California 94086

I hereby certify that the wording of this letter is identical to the wording specified in The New Mexico Hazardous Waste Management Regulations, PartII, 206.D.3.j.(6), as such regulations were constituted on the date shown immediately below.

R S Cramer

for Gary N. Clark
Vice President - Finance

Date: 5/4/84

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EXHIBIT I-3

HAZARDOUS WASTE FACILITY CERTIFICATE
of
LIABILITY INSURANCE

NEW MEXICO

Y. H. PARK
6/5/84
acceptable

Financial Assurance for
Sudden and Accidental
Occurrences

X Travelers Indemnity Company
__ Travelers Indemnity Company of America
__ The Phoenix Insurance Company
__ Travelers Indemnity Company of Rhode Island
__ Travelers Indemnity Company of Illinois
__ Charter Oak Fire Insurance Company

One Tower Square
Hartford, Connecticut 06115

hereby certifies that it has issued liability insurance covering bodily injury and property damage to

Name SIGNETICS CORPORATION

Mailing Address 811 EAST ARQUES AVENUE

SUNNYVALE CA 94086

in connection with the insured's obligation to demonstrate financial responsibility under the New Mexico Hazardous Waste Regulations, Part II, 206.C.3.h. or 206.D.3.h. The coverag applies at

E.P.A. I.D. NUMBER	NAME	ADDRESS
1. NMD 000709782	SIGNETICS CORPORATION	9201 PAN AMERICAN FREEWAY N E ALBUQUERQUE NM
2.		

for:

__ sudden accidental occurrences
__ non-sudden accidental occurrences
X sudden and non-sudden accidental occurrences

The limits of liability are $ 4,000,000 each occurrence

$ 8,000,000 annual aggregate

exclusive of legal defense costs. The coverage is provided under

Policy Number TLEH-187T877-0-83

Issued on 10-03-83

The effective date of said policy is 07-01-83

RECEIVED

MAY 28 1984

GROUND WATER/HAZARDOUS WASTE
BUREAU

REPLACING CERTIFICATE ISSUED 11-09-83 ON REVISED CERTIFICATE.

MYJ-140
05-24-84

(CONTINUED ON REVERSE)

(2) The Insurer further certifies the following with respect to the insurance described ~~on Page 1.~~ in Paragraph (1) above:

(a) Bankruptcy or insolvency of the insured shall not relieve the Insurer of its obligations under the policy.

(b) The Insurer is liable for the payment of amounts within any deductible applicable to the policy, with a right of reimbursement by the insured for any such payment made by the Insurer. This provision does not apply with respect to that amount of any deductible for which coverage is demonstrated as specified in the New Mexico Hazardous Waste Regulations, Part II, 206.C.3.h.(6) or 206.D.3.h.(6).

(c) Whenever requested by the Director of the New Mexico Environmental Improvement Division (EID), the Insurer agrees to furnish to the Director a signed duplicate original of the policy and all endorsements.

(d) Cancellation of the insurance, whether by the Insurer or the insured, will be effective only upon written notice and only after the expiration of sixty (60) days after a copy of such written notice is received by the EID Director.

(e) Any other termination of the insurance will be effective only upon written notice any only after the expiration of thirty (30) days after a copy of such written notice is received by the EID Director.

I hereby certify that the wording of this instrument is identical to the wording specified in the New Mexico Hazard Waste Regulations, Part II, 206.B.3.j.(10), as such regulations were constituted on the date first above written, and that the Insurer is licensed to transact the business of insurance, or eligible to provide insurance as an excess or surplus lines insurer, in one or more states.

John R. Kenney, Secretary (DP)

John R. Kenney
Secretary, Authorized Representative of the Travelers Insurance Companies
One Tower Square, Hartford, Connecticut 06115

SECTION J

OTHER FEDERAL LAWS

Information will be provided in accordance with the requirements of HWMR 501 at the request of the New Mexico Environmental Improvement Division. At this time, however, we believe this facility is in compliance with the following Federal laws: Wild and Scenic Rivers Act, National Historic Preservation Act of 1966, Endangered Species Act, Coastal Zone Management Act, and the Fish and Wildlife Coordination Act.

SECTION J

OTHER FEDERAL LAWS

Information will be provided in accordance with the requirements of HWMR 501. at the request of the New Mexico Environmental Improvement Division. At this time, however, we believe this facility is in compliance with the following Federal laws; Wild and Scenic Rivers Act, National Historic Preservation Act of 1966, Endangered Species Act, Coastal Zone Management Act, and the Fish and Wildlife Coordination Act.

CERTIFICATION

HWMR 302.B.4.

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Date: 1/31/85 Signature: John R. McGerigle

John McGerigle
Plant Manager,
Signetics-Albuquerque

* John R. McGerigle was delegated signature authority by Paul W. Driscoll, Signetics Director, Corporate Facilities, on July 12, 1984, in accordance with HWMR 302.B.1.a.(2).

signetics
a subsidiary of U.S. Philips Corporation

Signetics Corporation
PO Box 9052
811 East Arques Avenue
Sunnyvale, California 94086
Telephone 408/739-7700

July 12, 1984

State of New Mexico
Crown Building
725 St. Michaels Drive - M/S 0968
P.O. Box 968
Santa Fe, New Mexico 87504

Re: Delegation of Authorized Representative

Dear Sir/Madam:

Pursuant to 40 CFR section 122.6(b), please be advised that I have delegated Mr. John McGerigle as our representative duly authorized to sign reports required by permits, and other information requested by the Director.

The individual named in the above paragraph has overall responsibility for the operation of the facilities whose ID numbers appear below:

NMD 000709782 9201 Pam American Frwy., Albuquerque, NM 87113

This delegation is effective immediately and shall continue until revoked in writing.

Yours very truly,

Paul W. Driscoll

Paul W. Driscoll
Director, Corporate Facilities

/r

cc: John McGerigle