RCRA PART B PERMIT APPLICATION

AKZO CHEMICALS INC.
McCook Research Laboratory
8401 W. 47th Street
McCook, Illinois 60525

February 15, 1990

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(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 I L D 0 0 0 8 0 5 7 0 5 D

LABEL ITEMS

- I. 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
A. Is this facility a **publicly owned treatment works** which results in a **discharge** to **waters of the U.S.**? (FORM 2A)		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	
E. Does or will this facility treat, store, or dispose of **hazardous wastes**? (FORM 3)	X		
G. Does 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	
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	

SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED
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	
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	
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	
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	
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 AKZO CHEMICALS INC. RESEARCH LABORATORY

IV. FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)*: 2 J. RICHMOND, CHEM RESEARCH MGR

B. PHONE *(area code & no.)*: 708 442 7100

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX: 3 8401 W. 47th STREET

B. CITY OR TOWN: McCOOK

C. STATE: IL

D. ZIP CODE: 60525

FEB 20 1990

IEPA-DLPC

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER: 8401 W. 47th STREET

B. COUNTY NAME: COOK

C. CITY OR TOWN: McCOOK

D. STATE: IL

E. ZIP CODE: 60525

F. COUNTY CODE *(if known)*:

CONTINUED FROM THE FRONT

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

A. FIRST	B. SECOND
2869 (specify) INDUSTRIAL ORGANIC CHEMICALS	(specify)
C. THIRD	**D. FOURTH**
(specify)	(specify)

VIII. OPERATOR INFORMATION

A. NAME: AKZO CHEMICALS INC.

B. Is the name listed in Item VIII-A also the owner? ☒ 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)*

D. PHONE *(area code & no.)*: A 312 906 7500

E. STREET OR P.O. BOX: 300 S. RIVERSIDE PLAZA

F. CITY OR TOWN: B CHICAGO

G. STATE: IL

H. ZIP CODE: 60606

IX. INDIAN LAND
Is the facility located on Indian lands? ☐ YES ☒ 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 0 3 1 1 7 4 A A L (specify) PLEASE SEE ATTACHMENT 1
C. RCRA *(Hazardous Wastes)*: 9	**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)*

Akzo Chemicals Inc. McCook Research Laboratory is specifically engaged in research on new products, process improvements and applied research in the chemistry of fatty acids, esters, nitrogen derivatives, paper chemicals and other specialty organic chemicals.

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
s Richmond, Chem. Research Mgr.	Emma M. Richmond	2-15-90

COMMENTS FOR OFFICIAL USE ONLY

(fill—in areas are spaced for elite type, i.e., 12 characters/inch).

Form Approved OMB No. 158-S80004

FORM 3 RCRA

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: F I L D 0 0 0 8 0 5 7 0 5

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS

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)*

☐ 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

C 8 — YR. | MO. | DAY — FOR EXISTING FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*

☐ 2. NEW FACILITY *(Complete item below.)*

YR. | MO. | DAY — 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)*

☒ 1. FACILITY HAS INTERIM STATUS

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

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.

C — DUP — 1

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S 0 2	600	G		5				
X-2	T 0 3	20	E		6				
1	S 0 1	11,000	G		7				
2					8				
3					9				
4									

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
POUNDS	P
TONS	T

METRIC UNIT OF MEASURE	CODE
KILOGRAMS	K
METRIC TONS	M

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*

EPA Form 3510-3 (6-80)

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): W I L D 0 0 0 8 0 5 7 0 5 — T/A 1

FOR OFFICIAL USE ONLY: W DUP — T/A 2 DUP

IV. 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	F002	1500	P	S01	SPENT HALOGENATED SOLVENTS
2	F003	5000	P	S01	SPENT NONHALOGENATED SOLVENTS
3	F005	5000	P	S01	SPENT NONHALOGENATED SOLVENTS
4	D001	5000	P	S01	IGNITABLE WASTE
5	D002	2000	P	S01	CORROSIVE WASTE
6	D003	100	P	S01	REACTIVE WASTE
7	D004	50	P	S01	E-P TOXIC ARSENIC WASTE
8	D005	50	P	S01	E-P TOXIC BARIUM WASTE
9	D006	50	P	S01	E-P TOXIC CADMIUM WASTE
10	D007	50	P	S01	E-P TOXIC CHROMIUM WASTE
11	D008	50	P	S01	E-P TOXIC LEAD WASTE
12	D009	50	P	S01	E-P TOXIC MERCURY WASTE
13	D010	50	P	S01	E-P TOXIC SELENIUM WASTE
14	D011	50	P	S01	E-P TOXIC SILVER WASTE
15	U002	0*	P	S01	ACETONE
16	U009	0*	P	S01	ACRYLONITRILE
17	U031	0*	P	S01	N-BUTYL ALCOHOL
18	U044	0*	P	S01	CHLOROFORM
19	U080	0*	P	S01	(DICHLOROMETHANE) METHYLENE CHLORIDE
20	U103	0*	P	S01	DIMETHYL SULFATE
21	U122	0*	P	S01	FORMALDEHYDE
22	U154	0 *	P	S01	METHANOL
23	U159	0 *	P	S01	METHYL ETHYL KETONE
24	U210	0 *	P	S01	TETRACHLOROETHYLENE
25	U220	0 *	P	S01	TOLUENE
26	U239	0 *	P	S01	XYLENE

* POSSIBLE SPILLS

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 I L D 0 0 0 8 0 5 7 0 5 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)*
4 1 4 8 0 1 6	0 8 7 5 0 0 0 0

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 and 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
JAMES RICHMOND CHEMICAL RESEARCH MANAGER	James M. Richmond	2-15-90

X. OPERATOR CERTIFICATION

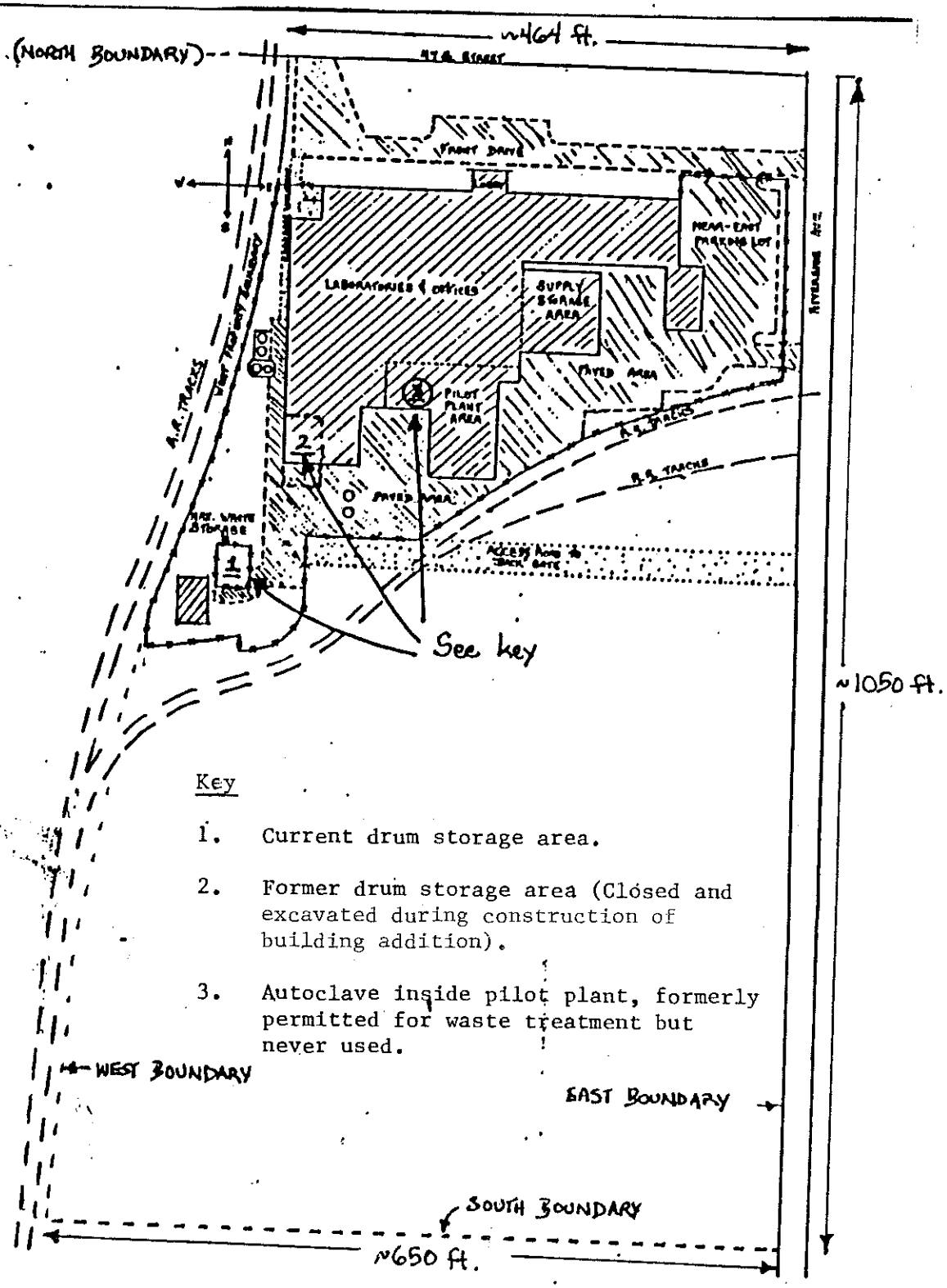
I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, 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

Continued from page 4.

V. FACILITY DRAWING *(see page 4)*

Form Approved OMB No. 158-S80004



Key

1. Current drum storage area.
2. Former drum storage area (Closed and excavated during construction of building addition).
3. Autoclave inside pilot plant, formerly permitted for waste treatment but never used.

FACILITY DRAWING
Scale = approx. 140 feet per inch
(Revised 2/1/90)

AKZO CHEMICALS INC.

McCook Research Laboratory

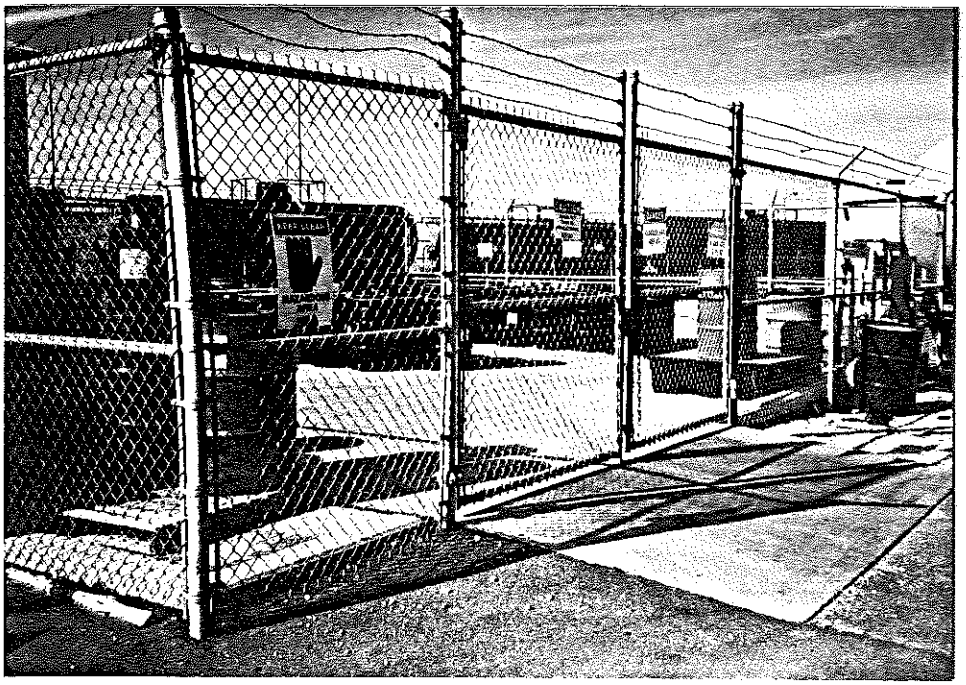
List of Existing Air Operating Permits

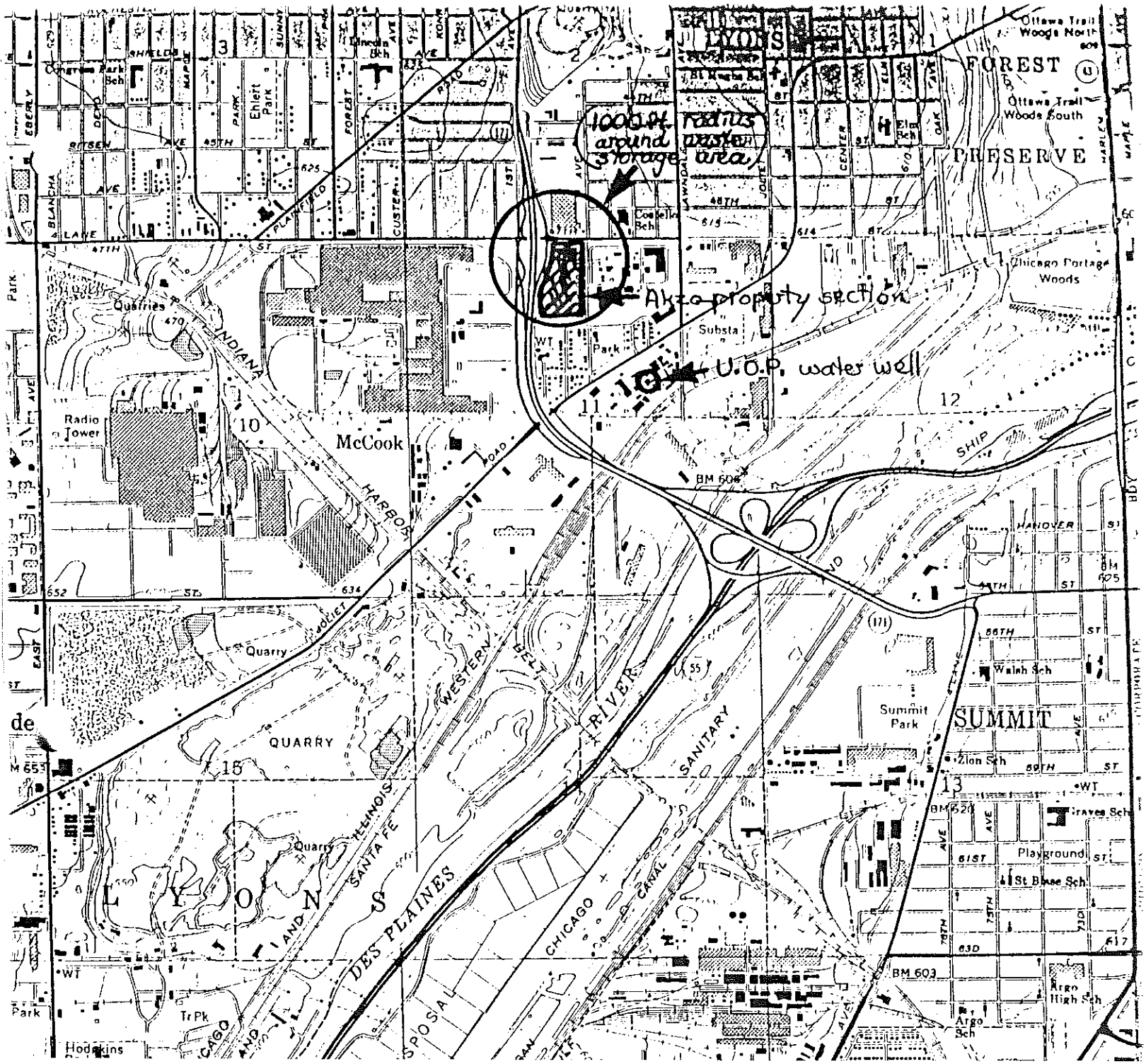
Operation Of:	ID Number	Application Number	Agency
Pilot Plant Expansion	031174AAL*	09110013	IEPA

VI. PHOTOGRAPHS OF HAZARDOUS WASTE STORAGE AREA

Photo Date = 1/26/90

Photo Date = 1/26/90




1000 ft. radius around waste storage area
Akzo property section
U.O.P. water well
LYONS
FOREST
PRESERVE
Ottawa Trail Woods North
Ottawa Trail Woods South
Chicago Portage Woods
Quarries
Radio Tower
McCook
INDIANA
HARBOR
SHIP
Quarry
QUARRY
WESTERN
BELT
RIVER
SANITARY
CHICAGO
CANAL
DES PLAINES
ILLINOIS
SANTA FE
LYONS
Summit Park
SUMMIT
Playground
St Blase Sch
Argo High Sch
Argo Sch
Walsh Sch
Zion Sch
Graves Sch
Hodgkins
Ehlert Park
Lincoln Sch
Coatello Sch
Substa
Park
BM 606
BM 603
BM 620
10
11
12
13
15

A-10 (2/15/90)

APPENDIX A1

-Original Part A Permit Application
-Proof of Receipt by EPA
-Modification Submitted in 1987
-Statements Regarding Cause for Revision in 1988

Please print or type with ELITE type (12 characters/inch) in the unshaded areas only. GSA No. 0246-EPA-01

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

NOTIFICATION OF HAZARDOUS WASTE ACTIVITY

INSTALLATION'S EPA I.D. NO.

I. NAME OF INSTALLATION

II. INSTALLATION MAILING ADDRESS

III. LOCATION OF INSTALLATION

PLEASE PLACE LABEL IN THIS SPACE

INSTRUCTIONS: If you received a preprinted label, affix it in the space at left. If any of the information on the label is incorrect, draw a line through it and supply the correct information in the appropriate section below. If the label is complete and correct, leave Items I, II, and III below blank. If you did not receive a preprinted label, complete all items. "Installation" means a single site where hazardous waste is generated, treated, stored and/or disposed of, or a transporter's principal place of business. Please refer to the INSTRUCTIONS FOR FILING NOTIFICATION before completing this form. The information requested herein is required by law *(Section 3010 of the Resource Conservation and Recovery Act).*

DETACH

FOR OFFICIAL USE ONLY

COMMENTS: C

INSTALLATION'S EPA I.D. NUMBER: F 1 (T/A, C)

APPROVED:

DATE RECEIVED (yr., mo., & day):

I. NAME OF INSTALLATION

ARMAK RESEARCH LABORATORY

II. INSTALLATION MAILING ADDRESS

STREET OR P.O. BOX: 3 8401 W. 47th STREET

CITY OR TOWN: 4 McCOOK — ST.: IL — ZIP CODE: 60525

III. LOCATION OF INSTALLATION

STREET OR ROUTE NUMBER: 5 8401 W. 47th STREET

CITY OR TOWN: 6 McCOOK — ST.: IL — ZIP CODE: 60525

IV. INSTALLATION CONTACT

NAME AND TITLE (last, first, & job title): 2 D. FRANK VICE PRES DIR OF RES

PHONE NO. (area code & no.): 312-442-7100

V. OWNERSHIP

A. NAME OF INSTALLATION'S LEGAL OWNER: 8 ARMAK COMPANY

B. TYPE OF OWNERSHIP (enter the appropriate letter into box)

F = FEDERAL
M = NON-FEDERAL

M

VI. TYPE OF HAZARDOUS WASTE ACTIVITY (enter "X" in the appropriate box(es))

[X] A. GENERATION
[ ] B. TRANSPORTATION (complete item VII)
[X] C. TREAT/STORE/DISPOSE
[ ] D. UNDERGROUND INJECTION

VII. MODE OF TRANSPORTATION (transporters only – enter "X" in the appropriate box(es))

[ ] A. AIR [ ] B. RAIL [ ] C. HIGHWAY [ ] D. WATER [ ] E. OTHER (specify):

VIII. FIRST OR SUBSEQUENT NOTIFICATION

Mark "X" in the appropriate box to indicate whether this is your installation's first notification of hazardous waste activity or a subsequent notification. If this is not your first notification, enter your Installation's EPA I.D. Number in the space provided below.

[X] A. FIRST NOTIFICATION
[ ] B. SUBSEQUENT NOTIFICATION (complete item C)

C. INSTALLATION'S EPA I.D. NO.

IX. DESCRIPTION OF HAZARDOUS WASTES

Please go to the reverse of this form and provide the requested information.

EPA Form 8700-12 (6 80)

CONTINUE ON REVERSE

I.D. – FOR OFFICIAL USE ONLY

W

IX. DESCRIPTION OF HAZARDOUS WASTES *(continued from front)*

A. HAZARDOUS WASTES FROM NON–SPECIFIC SOURCES. Enter the four–digit number from 40 CFR Part 261.31 for each listed hazardous waste from non–specific sources your installation handles. Use additional sheets if necessary.

1	2	3	4	5	6
F005	F004	F002			
7	**8**	**9**	**10**	**11**	**12**

B. HAZARDOUS WASTES FROM SPECIFIC SOURCES. Enter the four–digit number from 40 CFR Part 261.32 for each listed hazardous waste from specific industrial sources your installation handles. Use additional sheets if necessary.

13	14	15	16	17	18
19	**20**	**21**	**22**	**23**	**24**
25	**26**	**27**	**28**	**29**	**30**

C. COMMERCIAL CHEMICAL PRODUCT HAZARDOUS WASTES. Enter the four–digit number from 40 CFR Part 261.33 for each chemical substance your installation handles which may be a hazardous waste. Use additional sheets if necessary.

31	32	33	34	35	36
P005	P022	P095	U002	U122	U210
37	**38**	**39**	**40**	**41**	**42**
U223					
43	**44**	**45**	**46**	**47**	**48**

D. LISTED INFECTIOUS WASTES. Enter the four–digit number from 40 CFR Part 261.34 for each listed hazardous waste from hospitals, veterinary hospitals, medical and research laboratories your installation handles. Use additional sheets if necessary.

49	50	51	52	53	54

E. CHARACTERISTICS OF NON–LISTED HAZARDOUS WASTES. Mark "X" in the boxes corresponding to the characteristics of non–listed hazardous wastes your installation handles. *(See 40 CFR Parts 261.21 – 261.24.)*

- [X] 1. IGNITABLE (D001)
- [ ] 2. CORROSIVE (D002)
- [ ] 3. REACTIVE (D003)
- [X] 4. TOXIC (D000)

X. 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.

SIGNATURE	NAME & OFFICIAL TITLE *(type or print)*	DATE SIGNED
	D. Frank, Vice Pres., Dir. of Res.	

EPA Form 8700-12 (6-80) REVERSE

(fill-in areas are spaced for elite type, i.e., 12 characters/inch).

Form Approved OMB No. 158-R0173

FORM 1 GENERAL

U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER: F ILD000805705

LABEL ITEMS

I. EPA I.D. NUMBER

ACILITY NAME

V. FACILITY MAILING ADDRESS

VI. FACILITY LOCATION

PLEASE PLACE LABEL IN THIS SPACE

GENERAL INSTRUCTIONS

If a preprinted label has been provided, aff It in the designated space. Review the inform ation carefully; if any of it is incorrect, cro through it and enter the correct data in t appropriate fill-in area below. Also, if any the preprinted data is absent *(the area to t left of the label space lists the Informatic that should appear)*, please provide it in t proper fill-in area(s) below. If the label complete and correct, you need not comple Items I, III, V, and VI *(except VI-B whi must be completed regardless)*. Complete Items II no label has been provided. Refer the instructions for detailed item descri tions and for the legal authorizations und 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
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)		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	
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)	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	
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	

SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED
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	
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	
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	
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	
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 ARMAK RESEARCH LABORATORY

IV. FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)*	B. PHONE *(area code & no.)*
2 D. FRANK VICE PRES. DIR OF RES	312 442 7100

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX

3 8401 W. 47th STREET

B. CITY OR TOWN	C. STATE	D. ZIP CODE
4 McCOOK	IL	60525

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

5 8401 W. 47th STREET

B. COUNTY NAME

COOK

C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE *(if known)*
6 McCOOK	IL	60525	

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

A. FIRST	B. SECOND
7391 (specify) Research & Development Laboratories	C 7 (specify)
C. THIRD	**D. FOURTH**
(specify)	C 7 (specify)

III. OPERATOR INFORMATION

A. NAME: ARMAK COMPANY

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.)*: C A 312 786 0400

E. STREET OR P.O. BOX: 00 S. WACKER DRIVE

F. CITY OR TOWN: CHICAGO

G. STATE: IL

H. ZIP CODE: 60606

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

EXISTING ENVIRONMENTAL PERMITS

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

X. 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.

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

Armak Research facility specifically is engaged in research on new products, process improvements, and applied research in the chemistry of fatty acids, esters, and the nitrogen derivatives thereof.

XII. 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
...nk, VP & Dir. of Research	J. Frank	Nov 14, 1980

XIII. FOR OFFICIAL USE 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

F I L D 0 0 0 8 0 5 7 0 5

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS

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

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

C	YR.	MO.	DAY
8	6 1	0 1	0 1

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

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

YR.	MO.	DAY

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

[ ] 1. FACILITY HAS INTERIM STATUS

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

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.

C DUP T/A C 1

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S 0 2	600	G		5				
X-2	T 0 3	20	E		6				
1	S 0 1	11,000	G		7				
	0 2	5,000 *	G		8				
3	T 0 1	300	G		9				
4					10				

*only if contents cannot be used as fuel for energy production.

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 ility 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 a ıt 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-	0 0 2	400	P	T 0 3 D 8 0	
X-	0 0 1	100	P	T 0 3 D 8 0	
X-4	D 0 0 2				*included with above*

CONTINUE ON PAGE 3

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 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)*
41 48 016	87 50 000

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 and 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
D. Frank, Vice Pres./Director of Research	D. Frank	Nov. 14, 1980

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

CONTINUE ON PAGE 5

Continued from page 2.
NOTE: Photocopy this page before completing if you have more than 25 wastes to list.

Form Approved OMB No. 158-S80004

EPA I.D. NUMBER (enter from page 1)	FOR OFFICIAL USE ONLY
W I L D 0 0 0 8 0 5 7 0 5 1	W DUP 2 DUP

IV. 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	F002	1,200	P	S01				Spent halogenated solvents
2	F005	600	P	S01				Spent non-halogenated solvents
3	D001	3,200	P	S01				"Ignitable" waste
4	D009	100	P	S01				EP-Toxic mercury
5	U002	0*	P	S01				Acetone
6	U009	0*	P	S01				Acrylonitrile
7	U044	0*	P	S01				Chloroform
8	U045	0*	P	S01				Chloromethane
9	U115	0*	P	S01				Ethylene oxide
10	U122	0*	P	S01				Formaldehyde
11	U154	0*	P	S01				Methanol
	U210	0*	P	S01				Tetrachloroethene
13	U223	0	P	S01	T01			TDI
14	F003	0**	P	S02				Spent non-halogenated solvents
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

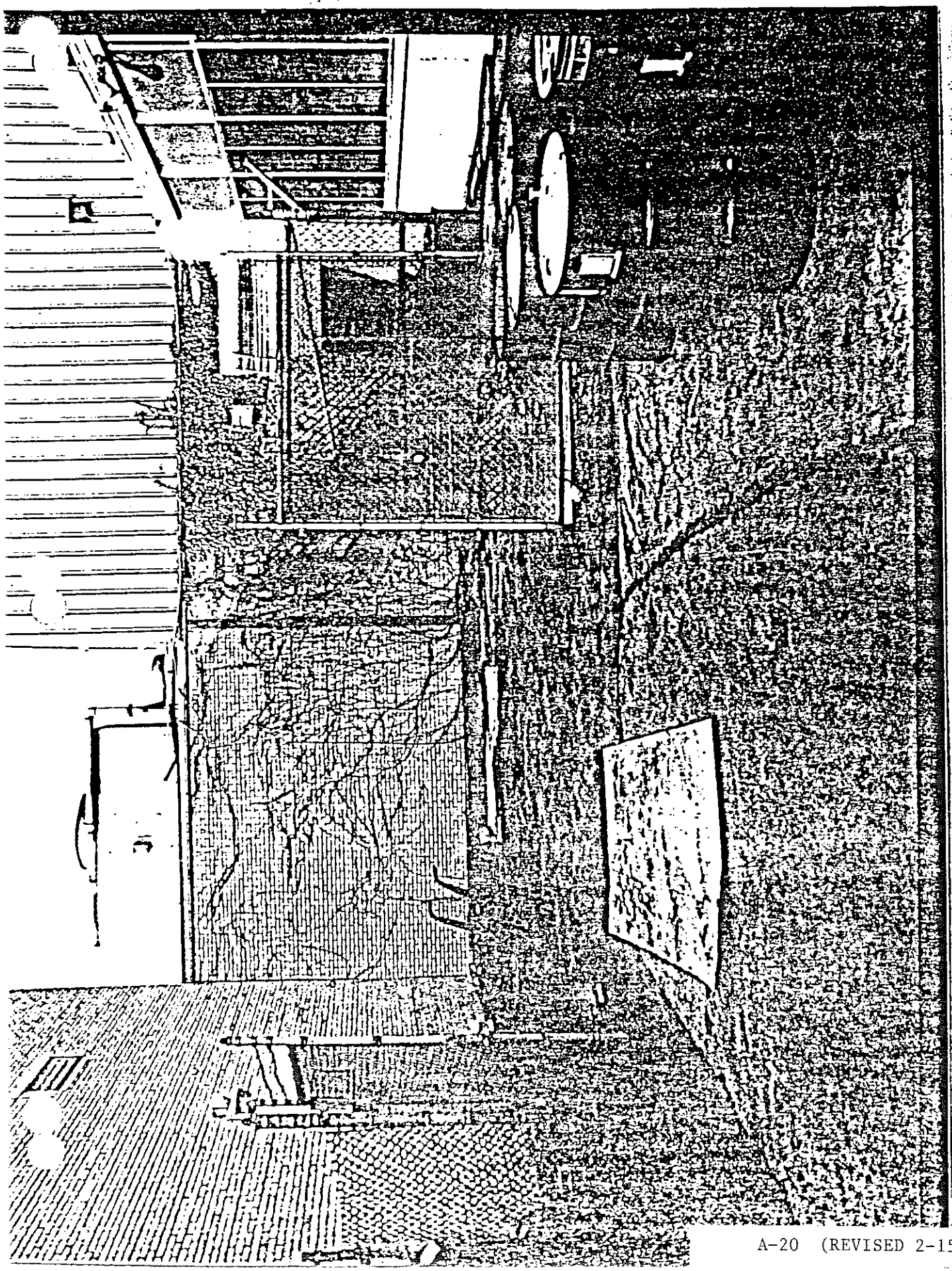
EPA Form 3510-3 (3-80)

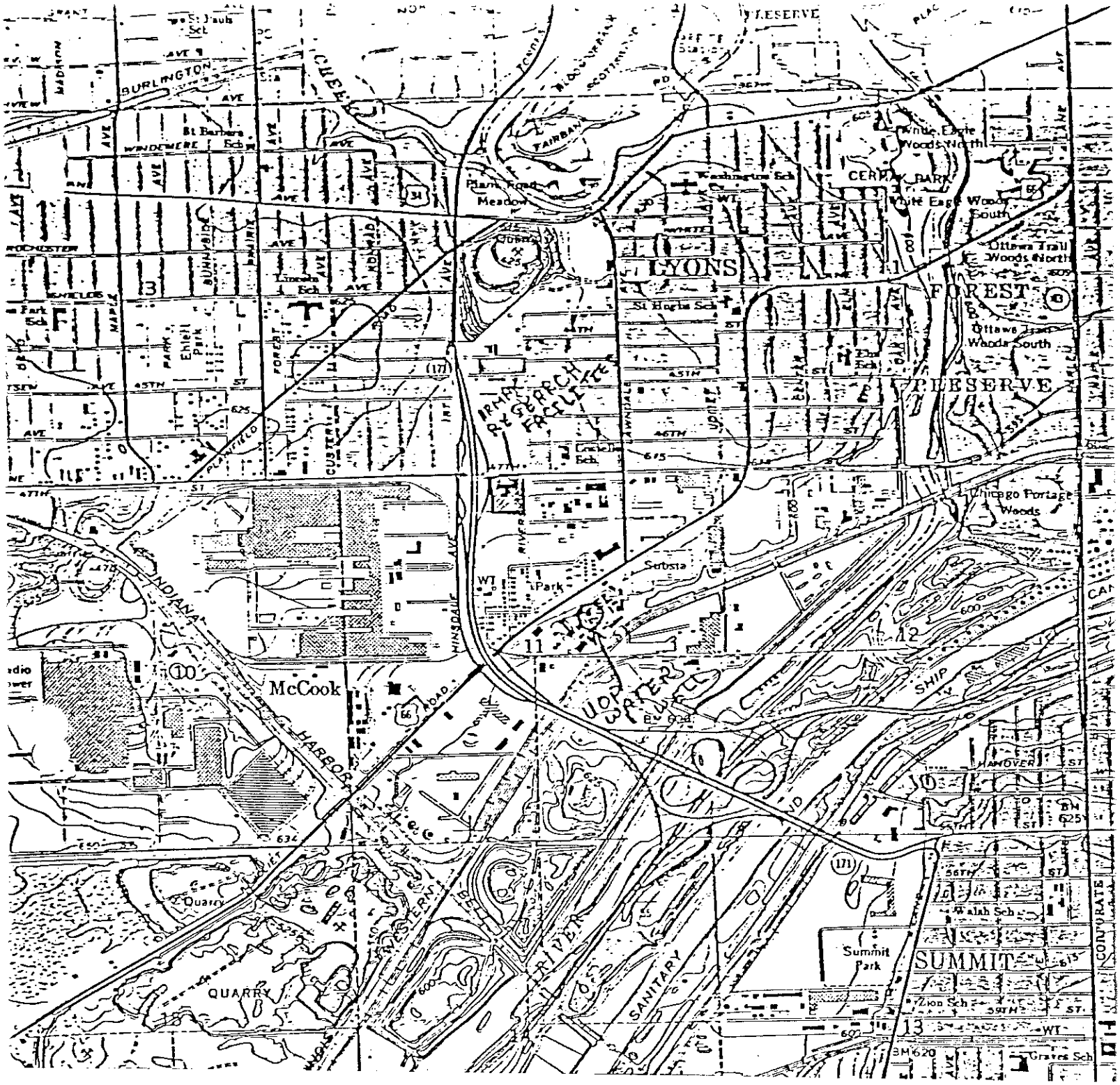
A-19 (REVISED 2-15-90)

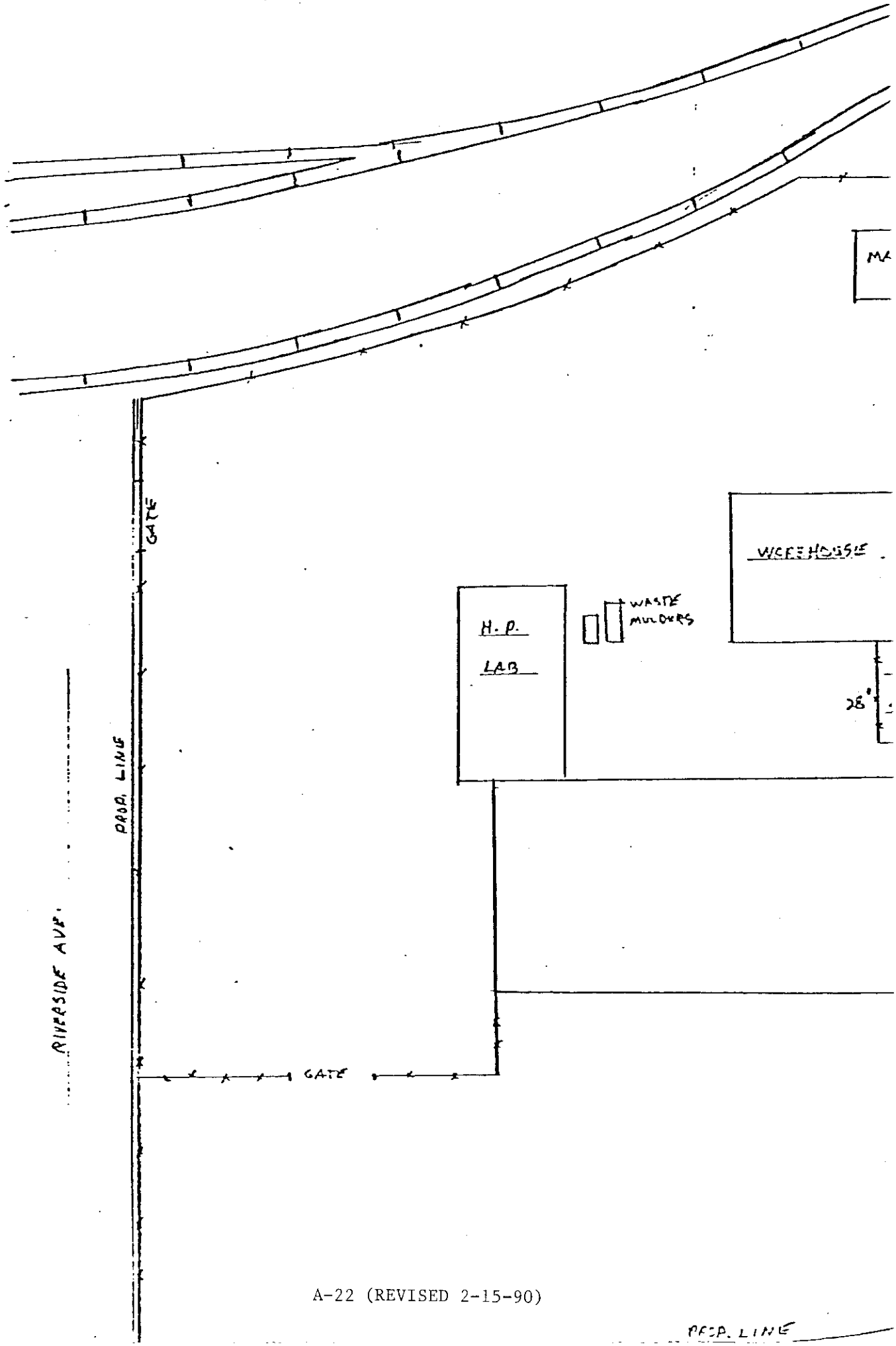
VERSE

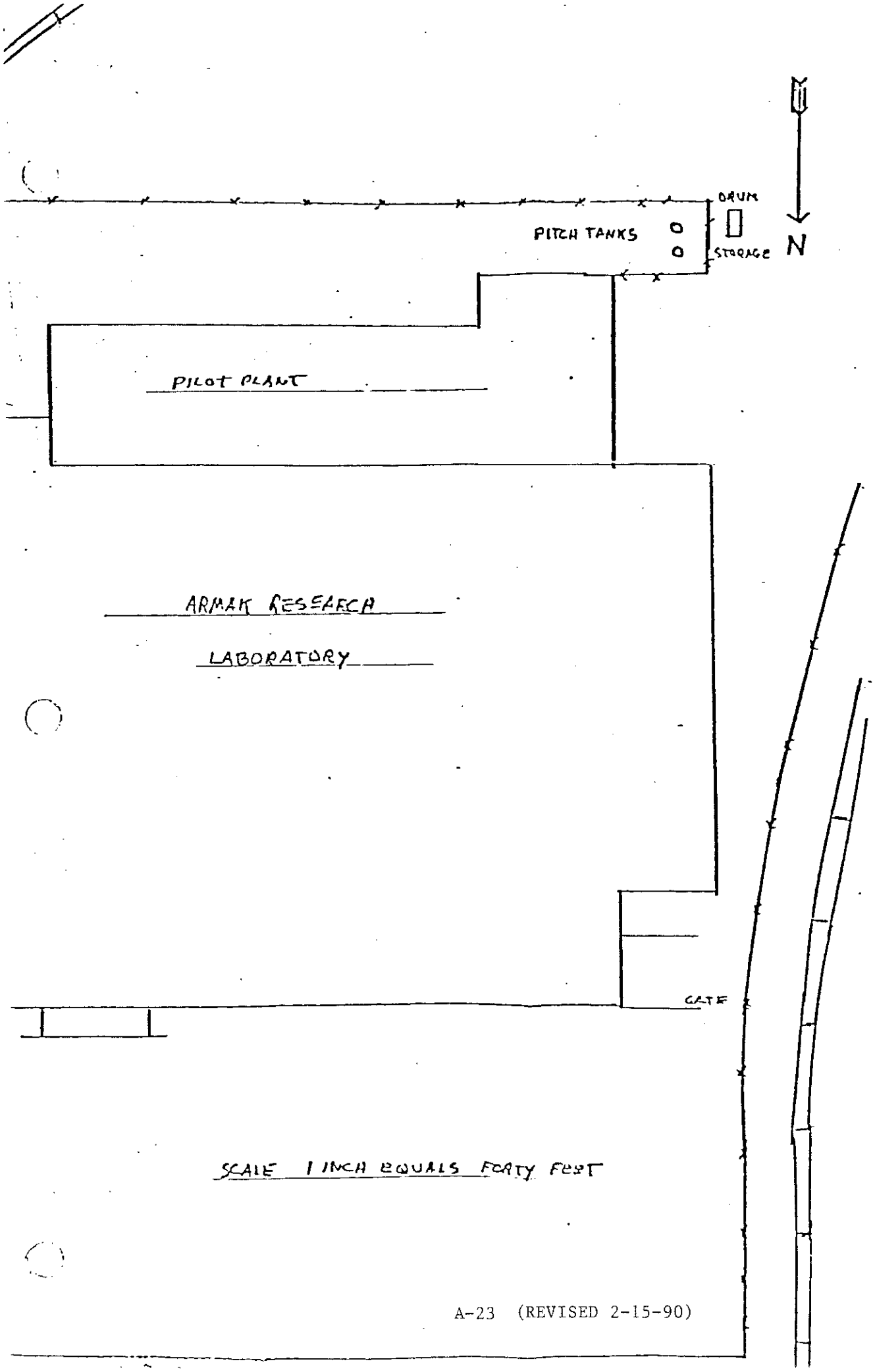
ossible spills.
only if material cannot be used as fuel for energy production.

(...ied pages)




PRESERVE
BURLINGTON
St Barbara Sch
WINDEMERE
Plain Road Meadow
Washington Sch
White Eagle Woods North
CERMAK PARK
White Eagle Woods South
Ottawa Trail Woods North
LYONS
FOREST
St Hughs Sch
Ottawa Trail Woods South
PRESERVE
Lincoln Sch
Ehlert Park
ARMAY RESEARCH FACILITIES
Costello Sch
Chicago Portage Woods
Substa
Park
INDIANA
HARBOR
McCook
HINSDALE AVE
UOP WATER WELL
SHIP
HANOVER
Quarry
QUARRY
WESTERN
RIVER
SANITARY
Walsh Sch
Summit Park
SUMMIT
Zion Sch
Graves Sch
CORPORATE


GATE
PROP. LINE
RIVERSIDE AVE.
H. P.
LAB
WASTE
MULDERS
WAREHOUSE
28'
GATE
PROP. LINE


DRUM
PITCH TANKS
STORAGE
N
PILOT PLANT
ARMAK RESEARCH
LABORATORY
GATE
SCALE 1 INCH EQUALS FORTY FEET

ECRA

EPA

ACKNOWLEDGEMENT OF NOTIFICATION OF HAZARDOUS WASTE ACTIVITY

This is to acknowledge that you have filed a Notification of Hazardous Waste Activity for the installation located at the address shown in the box below to comply with Section 3010 of the Resource Conservation and Recovery Act *(RCRA)*. Your EPA Identification Number for that installation appears in the box below. The EPA Identification Number must be included on all shipping manifests for transporting hazardous wastes; on all Annual Reports that generators of hazardous waste, and owners and operators of hazardous waste treatment, storage and disposal facilities must file with EPA; on all applications for a Federal Hazardous Waste Permit; and other hazardous waste management reports and documents required under Subtitle C of RCRA.

EPA I.D. NUMBER → ILD000805705 REACKNOWLEDGEMENT

ARMAK RESEARCH LABORATORY
6401 W 47TH ST
MCCOOK IL 60525

INSTALLATION ADDRESS →

6401 W 47TH ST
MCCOOK IL 60525

EPA Form 8700-12A (4-80)

Akzo Chemie America

Research

8401 W. 47th Street
McCook, Illinois 60525
312/442-7100
Twx 910 259 1770
Answer back: Armak Res Mcck

April 3, 1987

Mr. Larry Eastep
Mgr. of Permit Section
Illinois Environmental Protection Agency
Land Pollution Division
2200 Churchill Road
Springfield, IL 62706

Dear Mr. Eastep:

Enclosed is the revised Part A permit application for Akzo Chemie America (ILD 000805705, 0311740009). This revision was necessitated by the need to relocate the existing RCRA Hazardous Waste Drum Storage Area to a new location approximately 100 feet southwest of the original. This new storage area will be constructed in accordance with 40 CFR 264.175-176 and Title 35: 724.275 - 276.

The total capacity will remain as in the original Part A permit. The description of hazardous wastes has been updated to reflect current and anticipated requirements.

I can be reached at (312) 442-7100 if there are any questions.

Sincerely,

Charles E. Plank
Environmental Engineer

CEP/sla

PS Form 3811, July 1983 447-845

DOMESTIC RETURN RECEIPT

SENDER: Complete items 1, 2, 3 and 4.

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for service(s) requested.

1. ☒ Show to whom, date and address of delivery.
2. ☐ Restricted Delivery.

3. Article Addressed to:

Mr. Larry Eastep
IL. E.P.A.
2200 Churchill Road
Springfield, IL 62706

4. Type of Service:

☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail

Article Number

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Addressee
X

6. Signature — Agent
X Ellen Hellyer

7. Date of Delivery

8. Addressee's Address *(ONLY if requested and fee paid)*

RECEIVED
APR 8 1987
IEPA-DLPC

(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: I L D 0 0 0 8 0 5 7 0 5 — D

LABEL ITEMS

I. 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
A. Is this facility a **publicly owned treatment works** which results in a **discharge to waters of the U.S.**? (FORM 2A)		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	
E. Does or will this facility treat, store, or dispose of **hazardous wastes**? (FORM 3)	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	
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	

SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED
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	
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	
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	
H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Fresch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		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

SKIP: A K Z O C H E M I E A M E R I C A R E S E A R C H L A B O R A T O R Y

V. FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)*: D. FRANK, VICE PRES. DIR. OF RES.

B. PHONE *(area code & no.)*: 3 1 2 — 4 4 2 — 7 1 0 0

VI. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX: 8 4 0 1 W. 4 7 t h S T R E E T

B. CITY OR TOWN: M C C O O K,

C. STATE: I L

D. ZIP CODE: 6 0 5 2 5

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER: 8 4 0 1 W. 4 7 t h S T R E E T

B. COUNTY NAME: C O O K

C. CITY OR TOWN: M C C O O K

D. STATE: I L

E. ZIP CODE: 6 0 5 2 5

F. COUNTY CODE *(if known)*:

CONTINUED FROM THE FRONT

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

A. FIRST	B. SECOND
C 7391 (specify) RESEARCH & DEVELOPMENT LABORATORY	C 7 (specify)
C. THIRD	**D. FOURTH**
(specify)	C 7 (specify)

VIII. OPERATOR INFORMATION

A. NAME: AKZO CHEMIE AMERICA

B. Is the name listed in Item VIII-A also the owner? ☒ 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.): C A 312 906 7500

E. STREET OR P.O. BOX: 300 S. RIVERSIDE DRIVE

F. CITY OR TOWN: CHICAGO

G. STATE: IL

H. ZIP CODE: 60606

IX. INDIAN LAND: Is the facility located on Indian lands? ☐ YES ☒ NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water): IL

B. UIC (Underground Injection of Fluids): IL

C. RCRA (Hazardous Wastes): IL

D. PSD (Air Emissions from Proposed Sources): C 9 T P

E. OTHER (specify): C 9 T

(specify) Please see the attached form

E. OTHER (specify): C 9 T

(specify) Please see the attached form.

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. 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)

Akzo Chemie America Research is specifically engaged in research on new products, process improvements, and applied research in the chemistry of fatty acids, esters, nitrogen derivatives, organic peroxides, paper chemicals and other specialty organic chemicals.

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. OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
Frank, V.P. & Director of Research	J Frank	4-3-87

COMMENTS FOR OFFICIAL USE ONLY

Form 3510-1 (10-80) REVERSE

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

U.S. ENVIRONMENTAL PROTECTION AGENCY

HAZARDOUS WASTE PERMIT APPLICATION

Consolidated Permits Program

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

RCRA

I. EPA I.D. NUMBER: F L L D 0 0 0 8 0 5 7 0 5

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS

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 o 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' EPA I.D. Number in Item I above.

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

☐ 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

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

☐ 2. NEW FACILITY *(Complete item below.)*

FOR NEW FACILITI PROVIDE THE DAT *(yr., mo., & day)* OPE TION BEGAN OR IS EXPECTED TO BEG

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

☒ 1. FACILITY HAS INTERIM STATUS

☐ 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, the 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
GALLONS	G
LITERS	L
CUBIC YARDS	Y
CUBIC METERS	C
GALLONS PER DAY	U

UNIT OF MEASURE	UNIT OF MEASURE CODE
LITERS PER DAY	V
TONS PER HOUR	D
METRIC TONS PER HOUR	W
GALLONS PER HOUR	E
LITERS PER HOUR	H

UNIT OF MEASURE	UNIT OF MEASURE CODE
ACRE-FEET	A
HECTARE-METER	F
ACRES	B
HECTARES	Q

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.

C DUP T/A C I

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. PROCESS DESIGN CAPACITY 1. AMOUNT	B. 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S 0 2	600	G		5				
X-2	T 0 3	20	E		6				
			G		7				
2					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	K054	900	P	T03 D80	
2	D002	400	P	T03 D80	
X-3	D001	100	P	T03 D80	
X-4	D002				*Included with above*

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)*: W I L D 0 0 0 8 0 5 7 0 5 — F/A C: I

FOR OFFICIAL USE ONLY: W DUP — F/A C: 2 DUP

IV. 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	F 0 0 2	5000	P	S 0 1	Spent chlorinated solvents and still bottoms from their recove
2	F 0 0 5	600	P	S 0 1	Spent non-halogenated solvents
3	D 0 0 1	1200	P	S 0 1	Ignitable waste
4	D 0 0 2	600	P	S 0 1	Corrosive waste
5	D 0 0 3	0*	P	S 0 1 T 0 1	Reactive waste
6	D 0 0 9	100	P	S 0 1	EP-Toxic mercury
7	U 0 0 2	0**	P	S 0 1	Acetone
8	U 0 0 9	0**	P	S 0 1	Acrylonitrile
9	U 0 4 4	0**	P	S 0 1	Chloroform
10	U 0 8 0	0**	P	S 0 1	Methylene Chloride
11	U 1 1 5	0**	P	S 0 1	Ethylene Oxide
12	U 1 2 2	0**	P	S 0 1	Formaldehyde
13	U 1 5 4	0**	P	S 0 1	Methanol
14	U 2 1 0	0**	P	S 0 1	Tetrachloroethylene
15	F 0 0 3	0***	P	S 0 2	Spent nonchlorinated solvents
16	U 2 3 9	200	P	S 0 1	Xylene
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

* - only if material is not treated as part of a closed loop process

** - possible spills

*** - only if material cannot be used as fuel for energy production

Continued from the front.

V. 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)*

E	L	L	D	0	0	0	8	0	5	7	0	5	6

VI. 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)*.

VII. 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)*.

FACILITY GEOGRAPHIC LOCATION

LATITUDE *(degrees, minutes, & seconds)*	LONGITUDE *(degrees, minutes, & seconds)*
41 48 016	87 50 000

VIII. FACILITY OWNER

☒ 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 and 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
D. Frank, Vice President/Director of Research	D Frank	4-3-87

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.

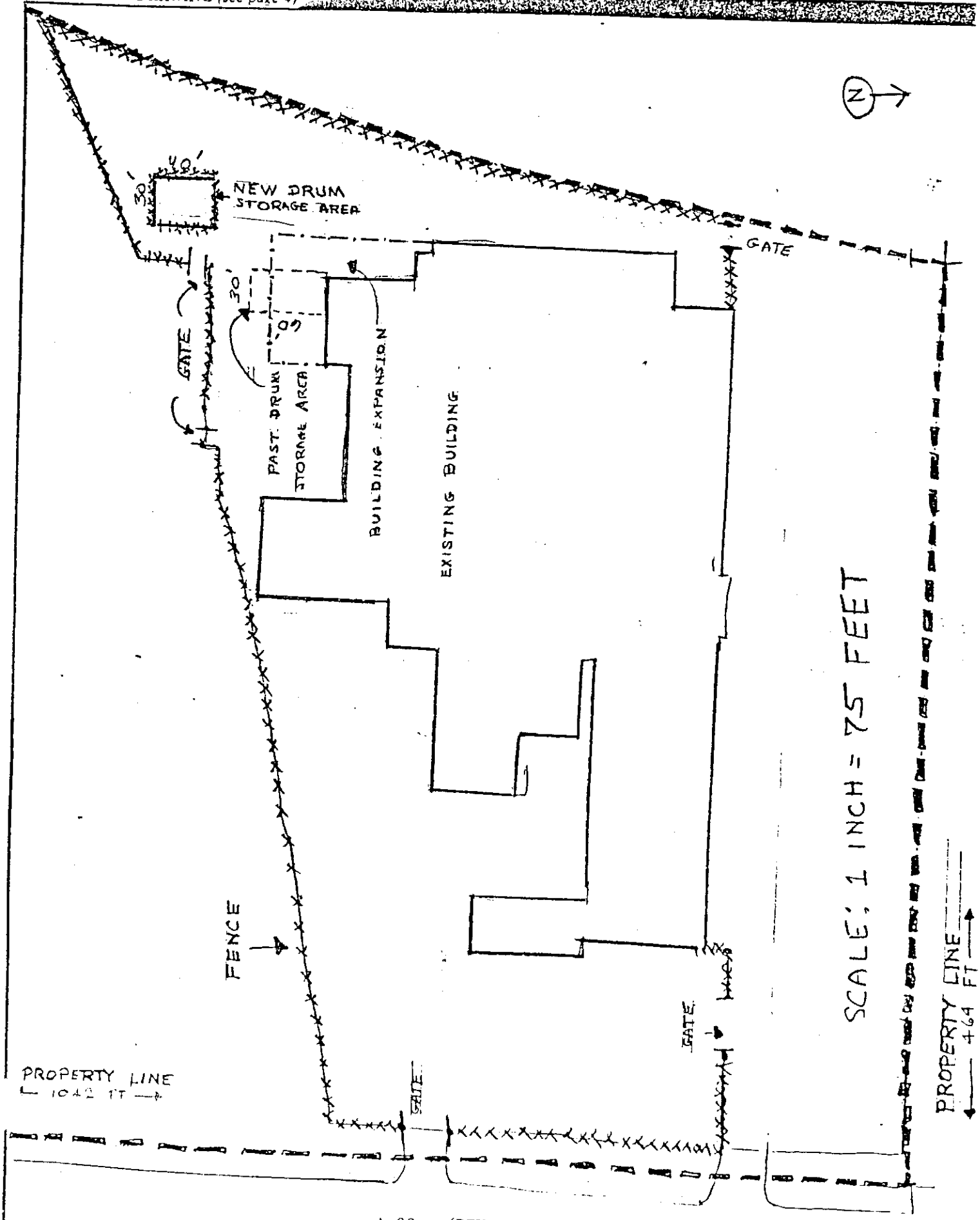
A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED

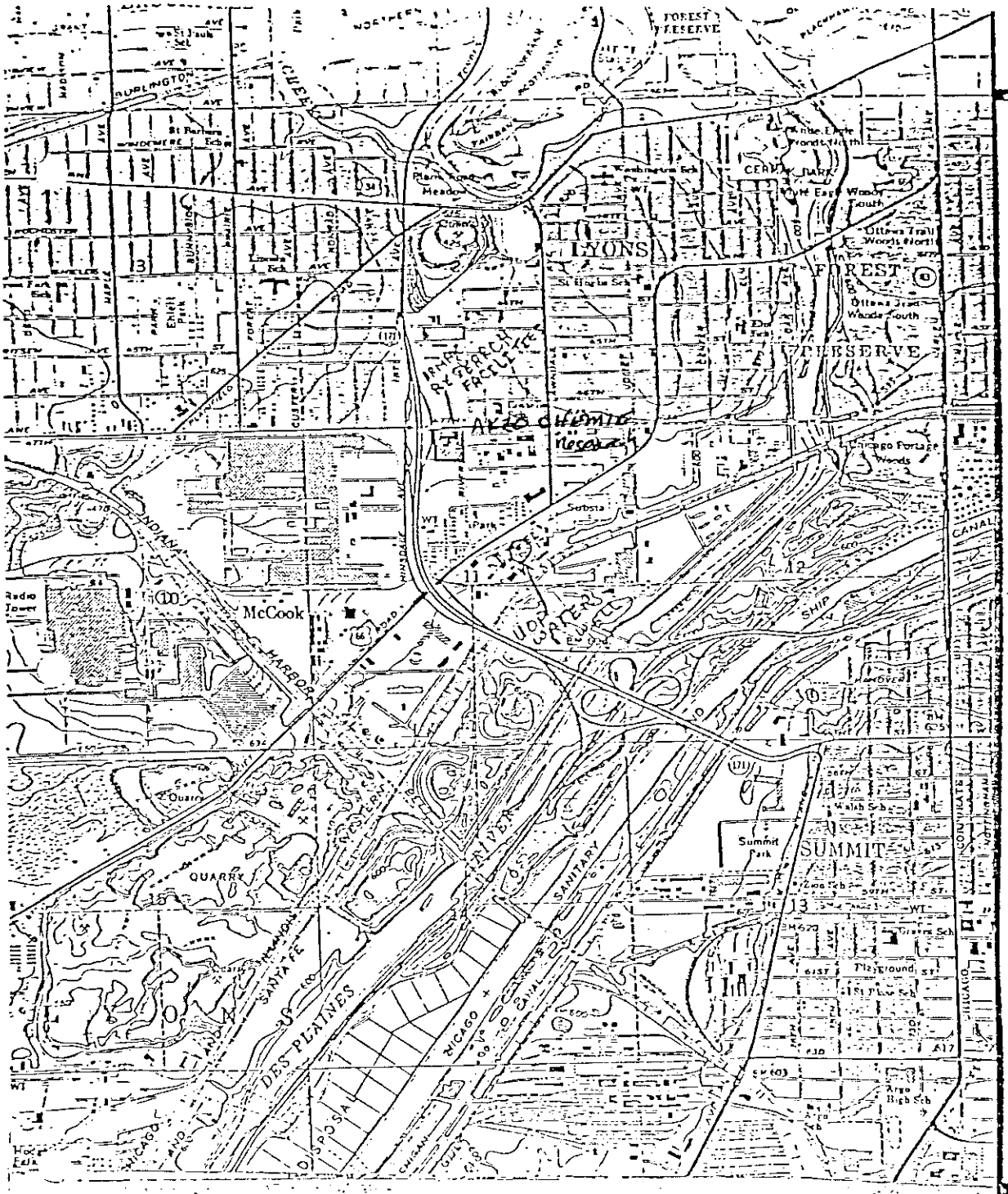
CONTINUE ON PAGE 5

Continued from page 4.

V. FACILITY DRAWING *(see page 4)*

Form Approved OMB No. 158-S80004





BERWYN QUADRANGLE
ILLINOIS--COOK CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

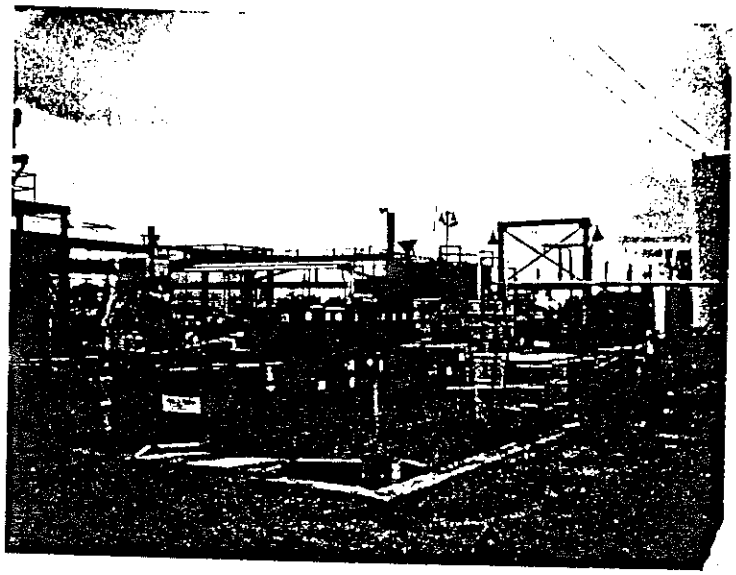
SCALE 1:24 000

CONTOUR INTERVAL 5 FEET
DATUM IS MEAN SEA LEVEL

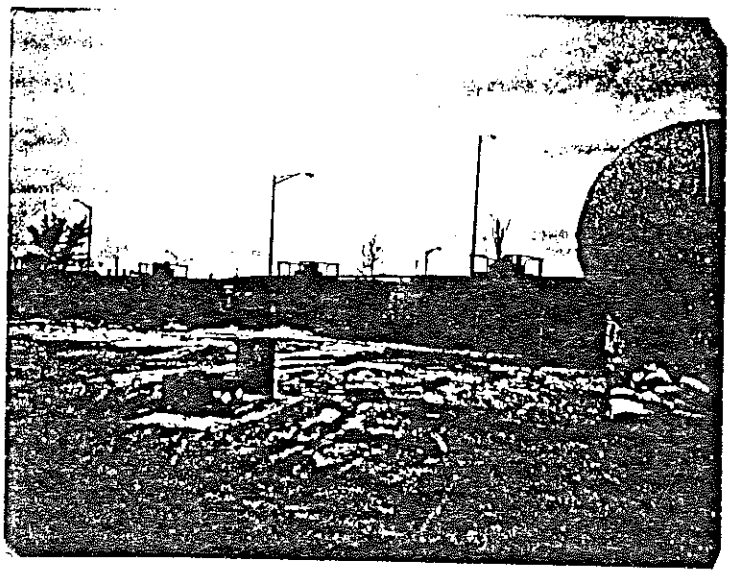
AKZO CHEMIE AMERICA
RESEARCH LABORATORY

List of Existing Air Operating Permits

Operation Of:	ID #	Application #	Agency
Hofmann Pilot Plant	031174ABM	80010033	IEPA
Pilot Plant Expansion	031174AAL	79110013	IEPA



EXISTING DRUM STORAGE
AREA VIEW TOWARDS
SOUTHEAST



SITE FOR NEW
DRUM STORAGE AREA
VIEW TOWARD WEST FENCE

REVISIONS TO MOST RECENT PART A

The newly-completed Part A included in this permit application is modified in the following ways:

1.) The storage in tanks of spent nonhalogenated solvents (F003 waste) is not required. The tanks referred to in the previous Part A were never used for storage of hazardous waste.

2.) The treatment of reactive waste (D003 waste) in tanks was part of a project that has been terminated, and this item is no longer required.

3.) The list of wastes is expanded, to be more thorough in anticipating types of waste that may be generated by the McCook research facility.

SECTION B

FACILITY DESCRIPTION

B-1: GENERAL DESCRIPTION (703.183(a))

The Akzo Chemicals Inc. McCook Research facility consists of a research laboratory and pilot plant. This facility conducts research and development for various product groups within the Akzo corporation, including fatty acids, esters, nitrogen derivatives, paper chemicals and other specialty organic chemicals. Activities include product and process development.

The wide variety of products that are researched, via bench-scale or pilot plant experiments, creates a need to prepare for possible generation of hazardous waste. Most of the work conducted on a daily basis will not generate more than a few gallons of waste weekly, due to the limited volumes of chemicals used in bench-scale reactions. The research facility may, however, need to store drum quantities of wastes such as spent solvents if a project requires multiple runs on a pilot plant scale. Therefore, a storage area is maintained for drums of hazardous waste.

The container storage area is located outdoors, in the southwest section of the research facility site. The storage area, which is constructed in accordance with RCRA regulations, consists of a diked concrete base, surrounded by a seven-foot high chain-link fence topped with barbed wire. The concrete base contains a sump area and sump pump, to allow collection of rainwater or spills. The sump pump piping is designed to allow diversion of collected liquid to either a container (if liquid is hazardous) such as a drum or tank wagon, or the metropolitan sanitary sewer, depending on the nature of the liquid collected. The diked area including the sump is designed to retain 10% of the total volume of waste stored.

The street address and mailing address for the Akzo McCook Research facility is:

Akzo Chemicals Inc.
8401 W. 47th Street
McCook, IL 60525

The contact and party responsible for hazardous waste management activities is:

Dr. James Richmond
Chemical Research Manager
Phone: (708) 442-7100

B-2: TOPOGRAPHIC MAP (703.183(s), 703.185(d), 724.195, 724.197)

B-2a: GENERAL MAP REQUIREMENTS (703.183(s))

Multiple maps and drawings are submitted to meet the following requirements for this permit application:

Requirement	Corresponding Figure Number
Site elevation measurements, property boundaries	B1
Change in west boundary	B2
Elevation contours, surface waters	B3
Prevailing wind direction	B4
Locations of: buildings, structures, access control	B5 (site plan)
Locations of: buildings structures access control sewers fire control flood, runoff control load, unload areas hazardous waste storage area solid waste management units	B6 (sketch based on traced site plan)
100-year floodplain area	B7
Surrounding land uses, injection/ withdrawal wells	B8

Figure B1 includes the original plat of survey for the property on which the McCook Research facility is located. The plat was for two sections of Akzo (formerly Armak) property: the section on which the McCook Research facility is located, and a section on the east side of Riverside Avenue - on which the McCook Plant (a separate facility) is located. The scale of this plat is one inch per 50 feet, and the date is 1948. The plat demonstrates that there is less than a 5-foot change in elevation across the property.

Since 1948, there was a change in the west boundary of the research facility property, due to an expansion of First Avenue and subsequent relocation of adjacent railroad tracks. Figure B2

illustrates the change in the west property line. Appendix BI contains the current legal description of the property.

Figure B3 is a United States Geological Survey map of the Berwyn Quadrangle, containing the McCook Research facility site. This map shows elevation contours and surface waters in the map area. The location of the facility site has been sketched in. The scale is one inch per 2000 feet and the map date is 1980.

Figure B4 contains a wind rose for the Chicago metropolitan area, based on an annual average of prevailing winds. The wind rose was obtained from the National Climatic Data Service in 1988.

Figure B5 is a copy of the most recent site plan for the McCook Research facility. This site plan does not show the south border of the property, at approximately 1050 feet south of 47th Street. A revised site plan is being drawn at the time of this permit application, to include all property boundaries, buildings, stuctures, etc. The scale of the site plan in Figure B5 is one inch per 30 feet and the date is 1987.

Figure B6 is a sketch based on a reduced tracing of Figure B5. The facility perimeter fence, sewer manholes, fire hydrants, water cannons, hazardous waste storage area and solid waste management units are drawn in. The loading area, access control fence and flood/runoff control dike for the hazardous waste storage area are also indicated. (No unloading areas for hazardous waste are designated because waste is not accepted from other sites.) This sketch was revised in 1990 for this application, and the scale is approximately one inch per 75 feet.

Figure B7 is a Federal Insurance Administration map, to demonstrate that the McCook Research facility is not located in a 100-year floodplain area. The scale is one inch per 1000 feet and the map date is 1976.

Figure B8 shows surrounding land uses and locations of injection or withdrawal wells within 1000 feet around the research facility. This map is an enlarged section of the USGS map of Figure B3. The surrounding land uses have been sketched in and are current to the date of submission of this application. The location of the withdrawal well was obtained from the Illinois State Water Survey and is current to the date of submission of this application.

B-2b: ADDITIONAL MAP REQUIREMENTS FOR LAND DISPOSAL FACILITIES (703.184, 703.185(c) and (d)(1), 724.195, 724.197)

The facility for which this permit application is submitted does not contain any surface impoundments or disposal facilities.

B-3a: SEISMIC STANDARD (724.118)

The facility is not located in any of the political jurisdictions listed in 40 CFR Part 264 Appendix VI, and is therefore not subject to seismic considerations.

B-3b: FLOODPLAIN STANDARD (703.184(c), 724.118(b))

Figure B7 is a Federal Insurance Administration map which demonstrates that the facility is not within the 100-year floodplain. Based on location of the facility, Sections B-3b(1) through B-3b(3) do not apply.

B-3c: OTHER LOCATION REQUIREMENTS (Section 21(l) of the Illinois Environmental Protection Act)

The facility does not contain any disposal facilities, and no new disposal facilities are planned.

B-4: TRAFFIC INFORMATION (703.183(j))

Traffic within the research facility site consists of supply vendor deliveries via truck and occasional transport of materials between onsite locations via forklift. Supply deliveries are made via two entrances illustrated in Figure B9. These gates, Gate 2 and Gate 3, will accommodate a semi-trailer.

Signs are posted on the perimeter fence of the research site to guide any incoming trucks to the storeroom delivery door via Gate 2. Refer to Figure B9. Unloading of supplies normally takes place at this door. Occasionally, it is more convenient to bring vehicles such as construction vehicles into the site via Gate 3. On such occasions, the vehicle is guided to Gate 3 by a member of the storeroom staff. Delivery and construction traffic volume averages two semi-trailers or lighter vehicles per day through Gate 2, and two semi-trailers or lighter vehicles per week through Gate 3.

Hazardous waste and special waste transport vehicles are guided to Gate 3 by a RCRA-trained Akzo employee after the driver has arrived at the storeroom door. These vehicles will back up to Gate 3 via the access road shown in Figure B9. Waste transport traffic volume averages one semi-trailer per month through Gate 3.

Figure B9 also illustrates the paved access areas and pilot plant yard areas within the site. The paved areas used for access by large vehicles are of adequate width and strength for use by vehicles of sizes up to semi-trailer, including emergency response vehicles, and are kept in good condition at all times.

The paved areas in the east section of the site consist of six inches of compacted gravel topped with four inches of asphalt. The access area in the west section of the site (including access to hazardous waste storage area) consists of six inches of compacted gravel topped with two inches of asphalt and two inches of highway-grade asphalt. A section of the south pilot plant yard (surrounding storage tanks) has six inches of reinforced concrete base instead of asphalt, as indicated in Figure B9. The access road leading from Riverside Avenue to the back gate consists of six inches of compacted gravel topped with four inches of asphalt.

The existing pavement thicknesses have been compared to standard design references for pavement load bearing capacity. Copies of the applicable tables from the Asphalt Institute handbook are in Appendix B1. Traffic for both access areas (through Gate 2 to delivery door and over access road to Gate 3) is in the "light" category, based on 5or less trucks per day over 6000 pounds weight. The truck types assumed are up to semi-trailers, with a maximum axle load of 16000 pounds. These assumptions result in a required overall thickness of the flexible pavement of 7.5 inches, including asphalt, compacted stone and sub-base.

The recommended minimum for the top surface layer is 2.0 inches for "plant mix" bituminous pavement under light traffic. This is exceeded by our four and six-inch applications of asphalt. The recommended minimum for the base course is 4.0 inches. This is exceeded by our six inches of compacted stone. To meet the overall thickness recommendation, this leaves the 1.5 inches of sub-base (7.5 inches minus 2.0 surface and 4.0 base course). This is exceeded by at least six inches of clay base.

There is normally only one forklift being used to transport materials around the site at any given time. This traffic does not have a set pattern and involves mostly short-distance transport, therefore no traffic control signs, signals or procedures are used.

Traffic within the hazardous waste storage area is limited to occasional use of a forklift/drumlift to transport drums of hazardous waste. Only one forklift is allowed in the area at a time. This traffic averages one hour of forklift use per month for addition of drums or removal of drums. The concrete base of the hazardous waste storage area is of sufficient strength to support this forklift traffic. The base consists of six inches of compacted gravel topped with six inches of reinforced 3000-p.s.i. concrete.

FIGURE B1 (attached)

PLAT OF SURVEY SHOWING PROPERTY ELEVATIONS

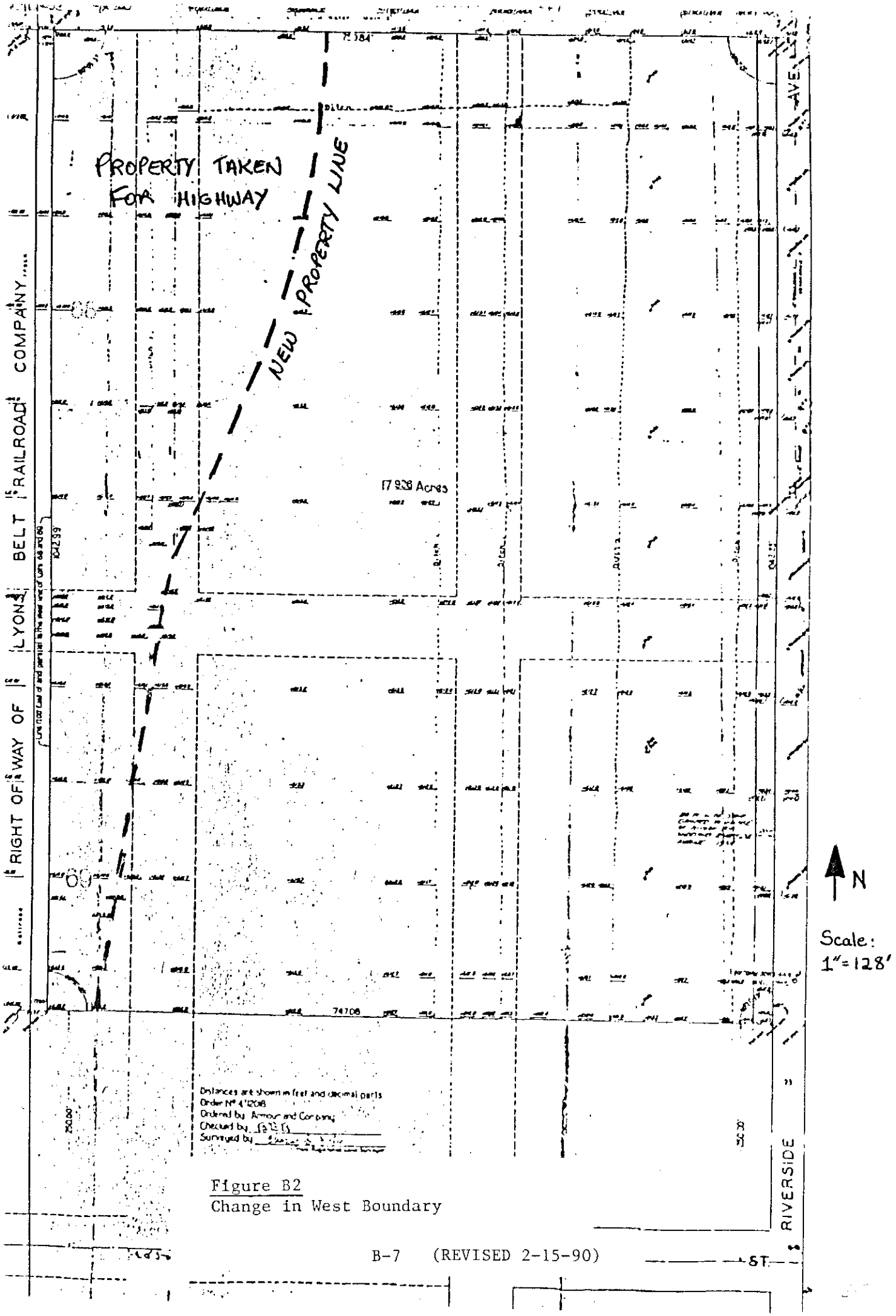
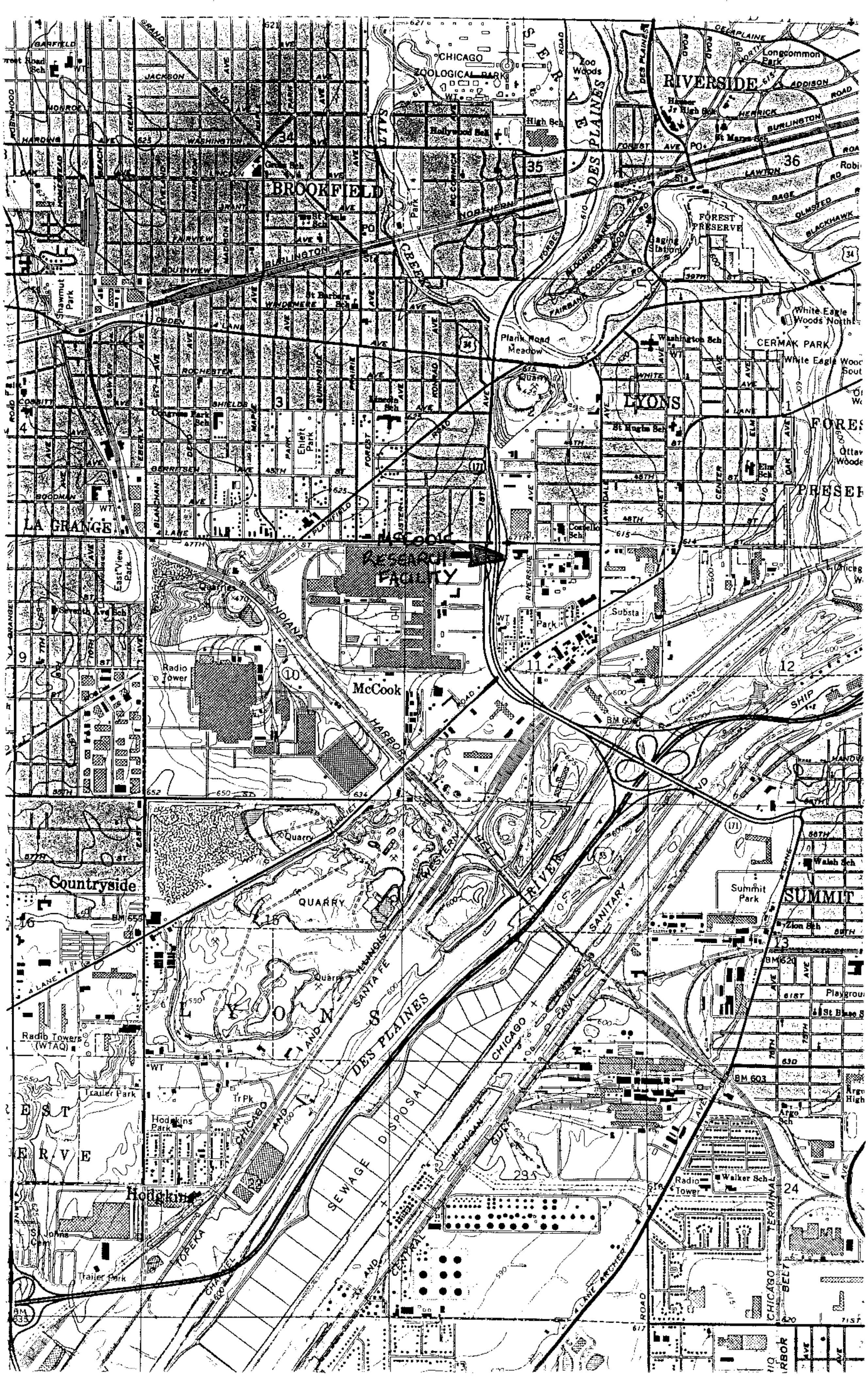


Figure B2
Change in West Boundary

FIGURE B3 (attached)

USGS MAP



McCOOK RESEARCH FACILITY
BROOKFIELD
RIVERSIDE
LYONS
LA GRANGE
McCook
Countryside
Hodgkins
SUMMIT
CHICAGO ZOOLOGICAL PARK
Zoo Woods
FOREST PRESERVE
CERMAK PARK
White Eagle Woods North
Plank Road Meadow
Shawmut Park
Ehlert Park
East View Park
Summit Park
Hodgkins Park
Radio Tower
Radio Towers (WTAQ)
Trailer Park
QUARRY
Quarries
SEWAGE DISPOSAL
DES PLAINES
RIVER
SANITARY
CHICAGO
SANTA FE
Substa
Walker Sch
Washington Sch
St Hugh Sch
Costello Sch
Congress Park Sch
Seventh Ave Sch
Zion Sch
Walsh Sch
Argo Sch
Hollywood Sch
High Sch

Figure B4

Wind Rose For
Chicago Metropolitan Area

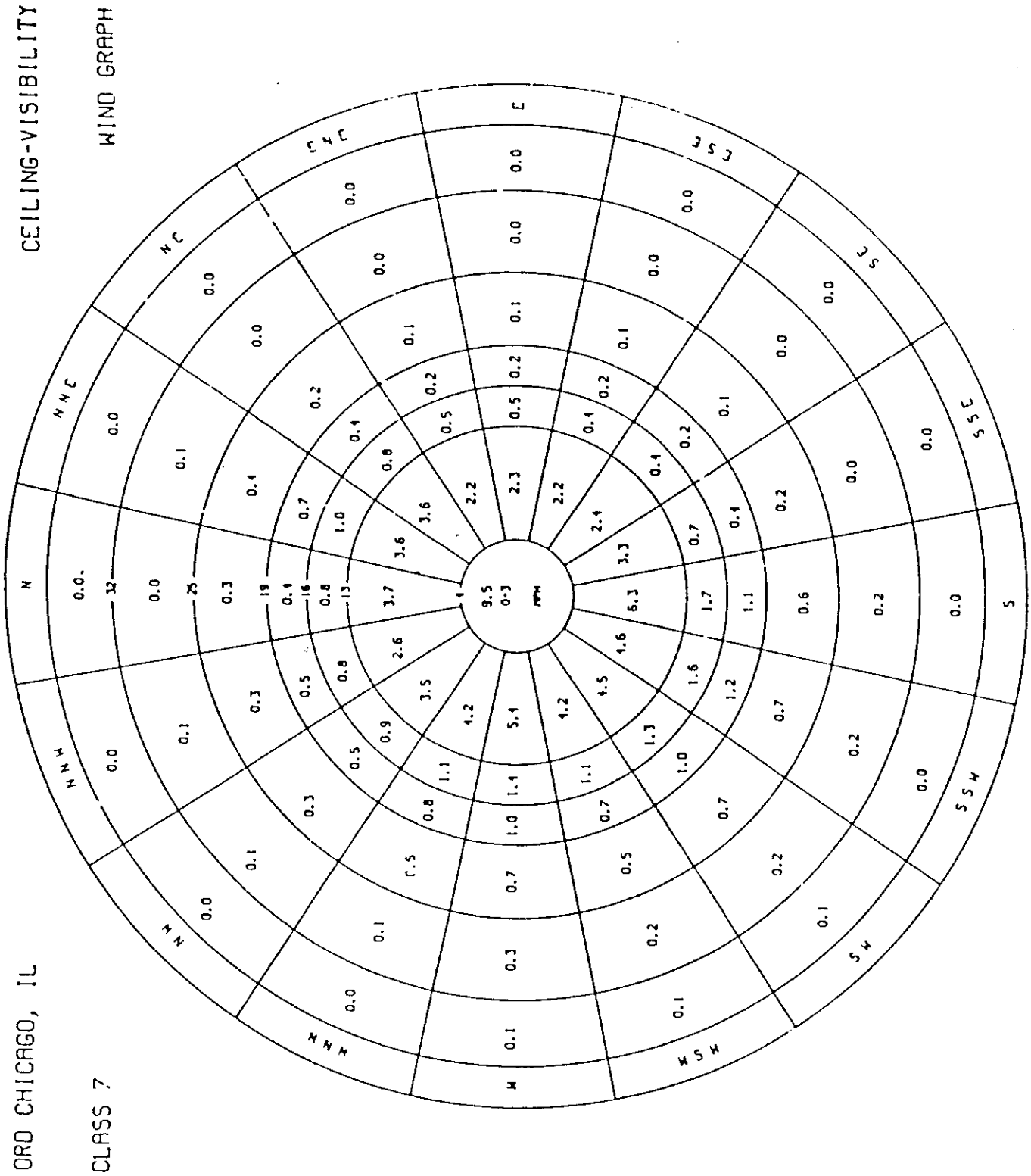


FIGURE B5 (attached)

SITE PLAN

Figure B6

Reduced Site Plan

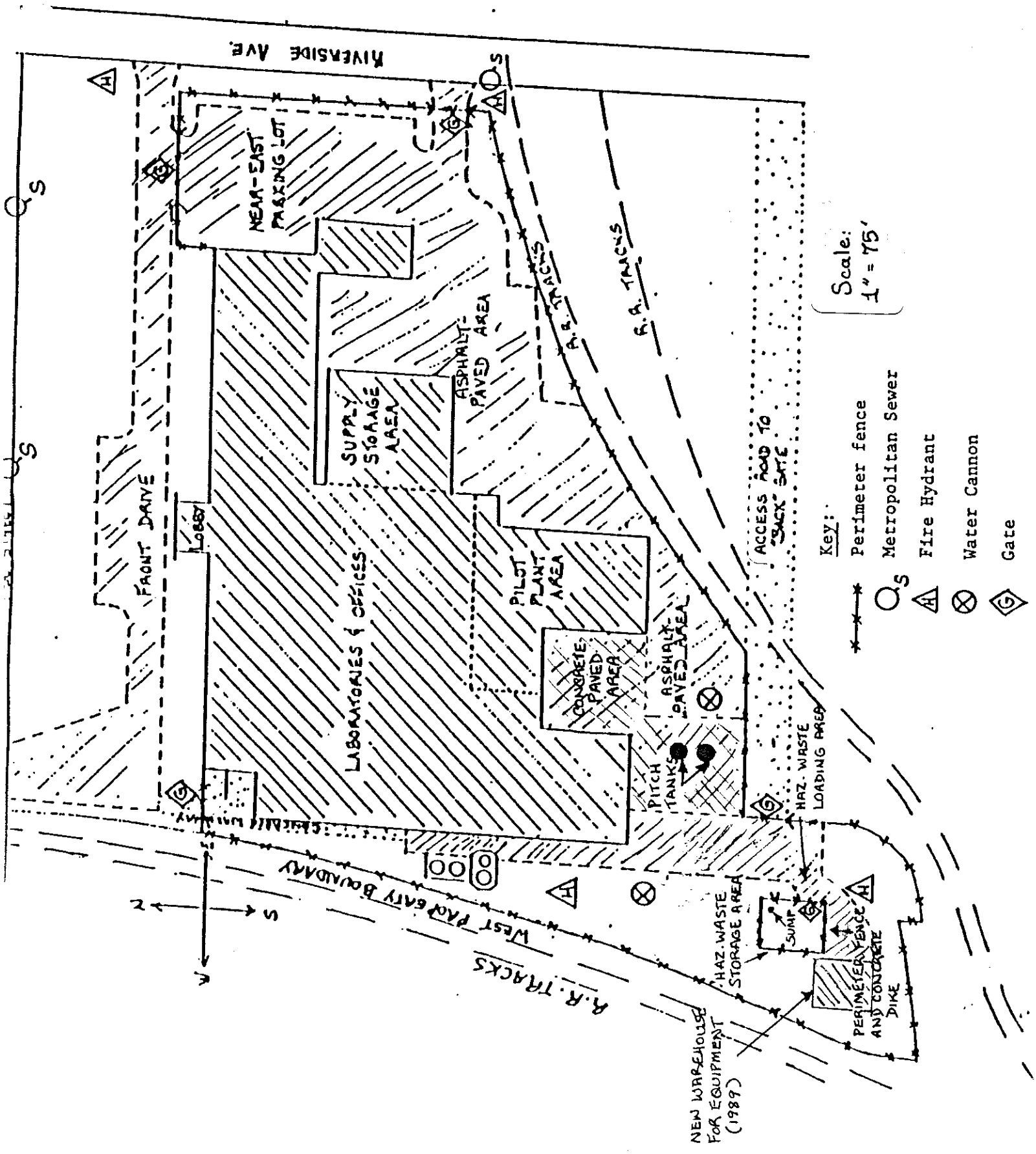
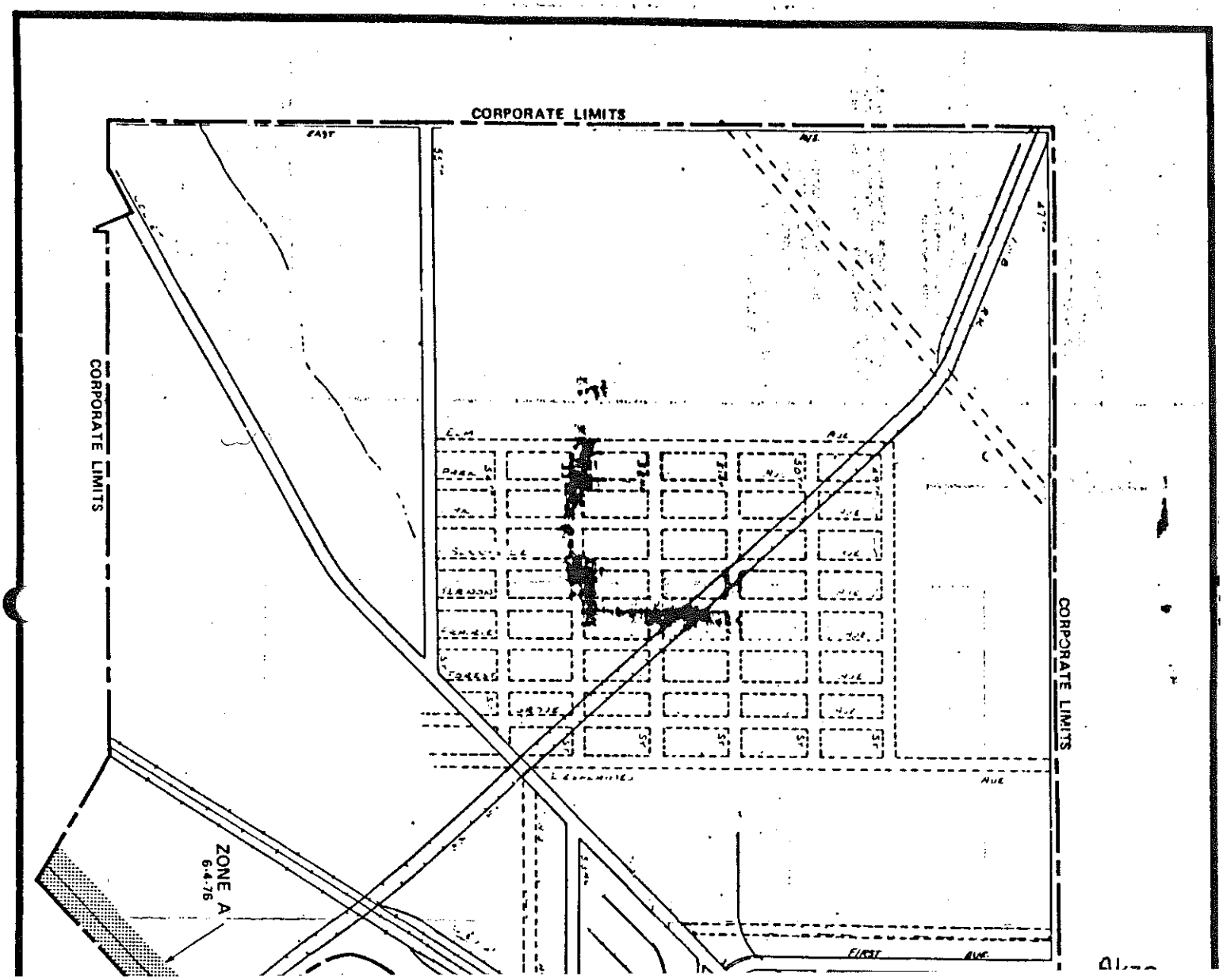


Figure B7

Flood Plain Map



Scale:
1" = 1250'

N

Figure B8

Surrounding Land Uses
(Enlarged USGS Map)

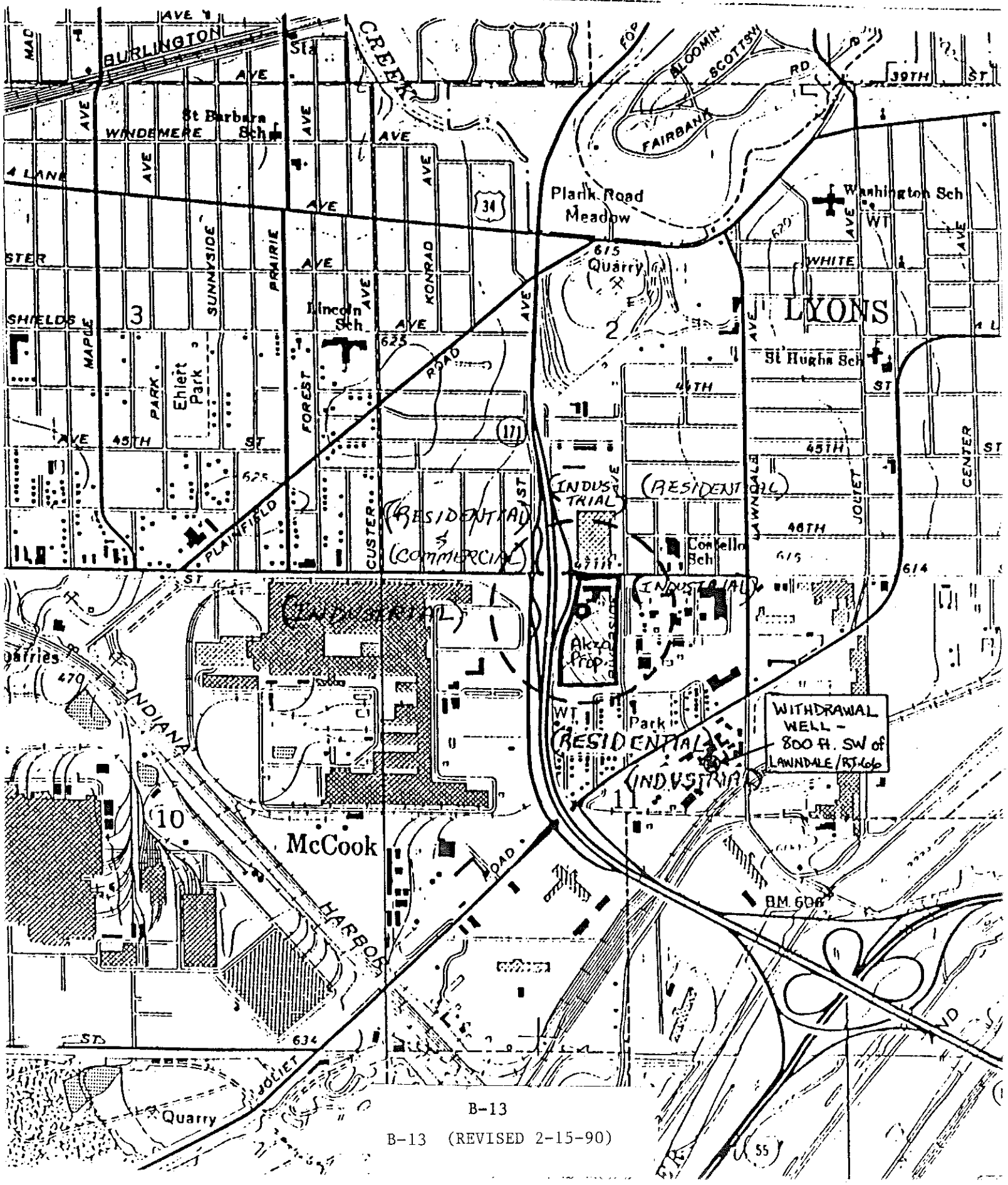
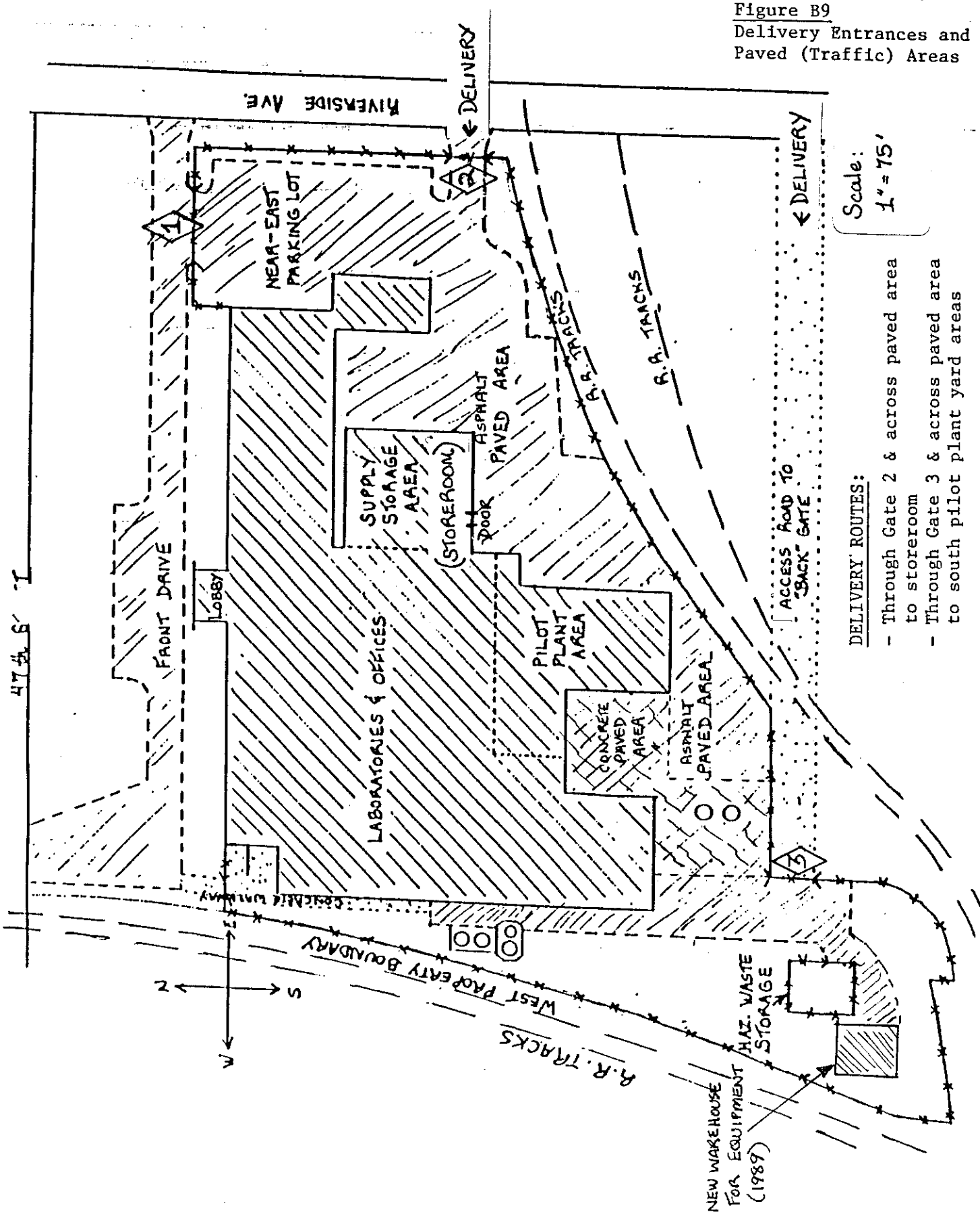


Figure B9
Delivery Entrances and
Paved (Traffic) Areas



C1 8

Also

Parcel 2:
That part of the North West quarter of Section 11, Township 38 North, Range 12 East of the Third Principal Meridian, described as follows:

Beginning at a point in the West line of Riverside Avenue, said point being 250 feet North of the Center line of 49th Street as shown on the plat of Phillips Subdivision of that part of the North West quarter of said Section lying North of Joliet Road; thence North along the West line of Riverside Avenue to the South line of 47th Street as shown on said plat of said Subdivision; thence West along the said South line of 47th Street to a point, said point being 17 feet East of the North West corner of Lot 68 of said Subdivision, thence South along a line East of, parallel to and 17 feet normally distant from the West line of Lots 68 and 69 of said Subdivision and said Lot lines extended to a point in said Lot 69, said point being 250 feet North of the center line of 49th Street, as shown in said Subdivision; thence East along a line which is North of, parallel to and 250 feet normally distant from the center line of 49th Street, as shown in said Subdivision, to the point of beginning, all in Cook County, Illinois, (excepting the following described tracts from Parcel 2):

Commencing at the North West corner of said Lot 68 in Phillips Subdivision in the North West quarter of Section 11, aforesaid, said point lying on the South line of 47th Street; thence Easterly along said South line of 47th Street, a distance of 17 feet to the point of beginning; thence Easterly along said South line a distance of 730.84 feet to a point on the West line of Riverside Avenue; thence South Westerly along a straight line, a distance of 456.09 feet to a point, distant 15 feet South (measured at right angles) of said South line of 47th Street; thence South along a

line, perpendicular to said South line, a distance of 21.91 feet to a point of curvature; thence South Westerly along the arc of a curve, concave toward the North West, having a radius of 613.88 feet and a central angle of 14 degrees, 05 minutes, 50 seconds, a distance of 151.04 feet to a point of tangency; thence South Westerly, a distance of 108.38 feet to a point of curvature; thence South Westerly along the arc of a curve, concave to the North West having a radius of 613.88 feet and a central angle of 7 degrees, 00 minutes, 10 seconds, a distance of 76.65 feet to a point of tangency; thence South Westerly a distance of 191.20 feet to a point of curvature; thence South Westerly along the arc of a curve, concave to the South East, having a radius of 944.44 feet and a central angle of 12 degrees, 30 minutes, 00 seconds, a distance of 206.04 feet to a point of tangency; thence South Westerly, a distance of 305.26 feet to a point on a line 250.00 feet North of and parallel to the center line of 49th Street; thence Westerly along a line a distance of 39.64 feet to a point on a line 17.00 feet East of and parallel to the West line of Lots 68 and 69; thence Northerly along the aforesaid parallel line of the point of beginning, except that part thereof falling within the following described land, to wit:

Beginning at a point on a line, said line being distant 12.67 feet North of the center line of vacated 49th Street, said point being distant 17 feet East of the extended West line of Lot 69, in Phillips Subdivision in the North West quarter of Section 11 aforesaid; thence North along a line, parallel with said West line of Lot 69, a distance of 253.10 feet to a point; thence North Easterly along a straight line, forming an angle of 8 degrees, 45 minutes, 00 seconds, to the right of the last described course extended, a distance of 297.40 feet to a point of curvature; thence North Easterly along a curved line, concave to the South East and having a radius of 978.87 feet and a central angle of 12 degrees, 30 minutes, a distance of 213.7 feet to a point of tangency; thence North Easterly along a straight line a distance of 297.40 feet to a point of curvature; thence North Easterly along a curved line, concave to the North West and having a radius of 593.81 feet and a central angle of 21 degrees, 15 minutes, a distance of 220.00 feet to a point of tangency; thence Northerly along a straight line a distance of 40.9 feet to a point, distant 33 feet South of said North line of said Section 11; thence Easterly, parallel with said North line of Section 11 a distance of 25 feet to a point; thence South along a straight line, perpendicular to the last described course, a distance of 40.9 feet to a point of curvature; thence South Westerly along a curved line, concave to the North West and having a radius of 618.81 feet and a central angle of 14 degrees, 05 minutes, 50 seconds, a distance of 152.10 feet to a point of tangency; thence South Westerly along a straight line a distance of 108.40 feet to a point of curvature;

thence South Westerly along a curved line, concave to the North West and having a radius of 618.81 feet and a central angle of 7 degrees, 09 minutes, 10 seconds, a distance of 77.20 feet to a point of tangency; thence South Westerly along a straight line a distance of 189.0 feet to a point of curvature; thence South Westerly along a curved line, concave to the South East and having a radius of 940.37 feet and a central angle of 12 degrees, 30 minutes, a distance of 205.10 feet to a point of tangency; thence South Westerly along a straight line a distance of 547.70 feet to the point of beginning, in Cook County, Illinois.

Permanent Tax Nos. 18-11-200-008; 18-11-107-002; 18-11-106-002; 19-11-105-005; 11-11-999-999

ROADS - DESIGN OF FLEXIBLE PAVEMENT

PROCEDURE:

1. ON THE BASIS OF DATA FROM TRAFFIC STUDY, DETERMINE TRAFFIC CLASSIFICATION FOR DESIGN FROM TABLE A.
2. DETERMINE MAXIMUM SINGLE AXLE LOAD ANTICIPATED DURING LIFE OF PAVEMENT.
   a. FOR BUS STOP AREAS, THE PAVEMENT SHOULD BE DESIGNED FOR THE "HEAVY" TRAFFIC CLASSIFICATION WHERE THE NORMAL PAVEMENT DESIGN IS FOR "LIGHT" OR "MEDIUM" TRAFFIC AND FOR "VERY HEAVY" TRAFFIC WHERE THE NORMAL PAVEMENT DESIGN IS FOR "HEAVY" OR "VERY HEAVY" TRAFFIC.
   b. FOR PARKING LOTS, THE FLEXIBLE PAVEMENT SHOULD BE DESIGNED FOR "HEAVY" TRAFFIC EXCEPT THAT WHEN ONLY PASSENGER CARS AND LIGHT TRUCKS OF 6,000 LB. AXLE LOAD OR LESS ARE EXPECTED TO USE THE PARKING FACILITY, THE MINIMUM REQUIRED THICKNESS OF BASE AND PAVEMENT MAY BE REDUCED TO 6".
3. MINIMUM BASE COURSE IS EQUAL TO 4" WITH A CBR OF 80 PLUS.

TABLE A

CLASSIFICATION OF TRAFFIC

TRAFFIC CLASSIFICATION	TRAFFIC DENSITY MAXIMUM, PER LANE, PER DAY	
	DAILY VOLUME PASSENGER CARS & LIGHT TRUCKS UNDER 6000 #	DAILY VOLUME COMMERCIAL TR. AND BUSES OVER 6000 #
LIGHT	25	5
MEDIUM	500	25
HEAVY	UNLIMITED	250
VERY HEAVY	UNLIMITED	UNLIMITE

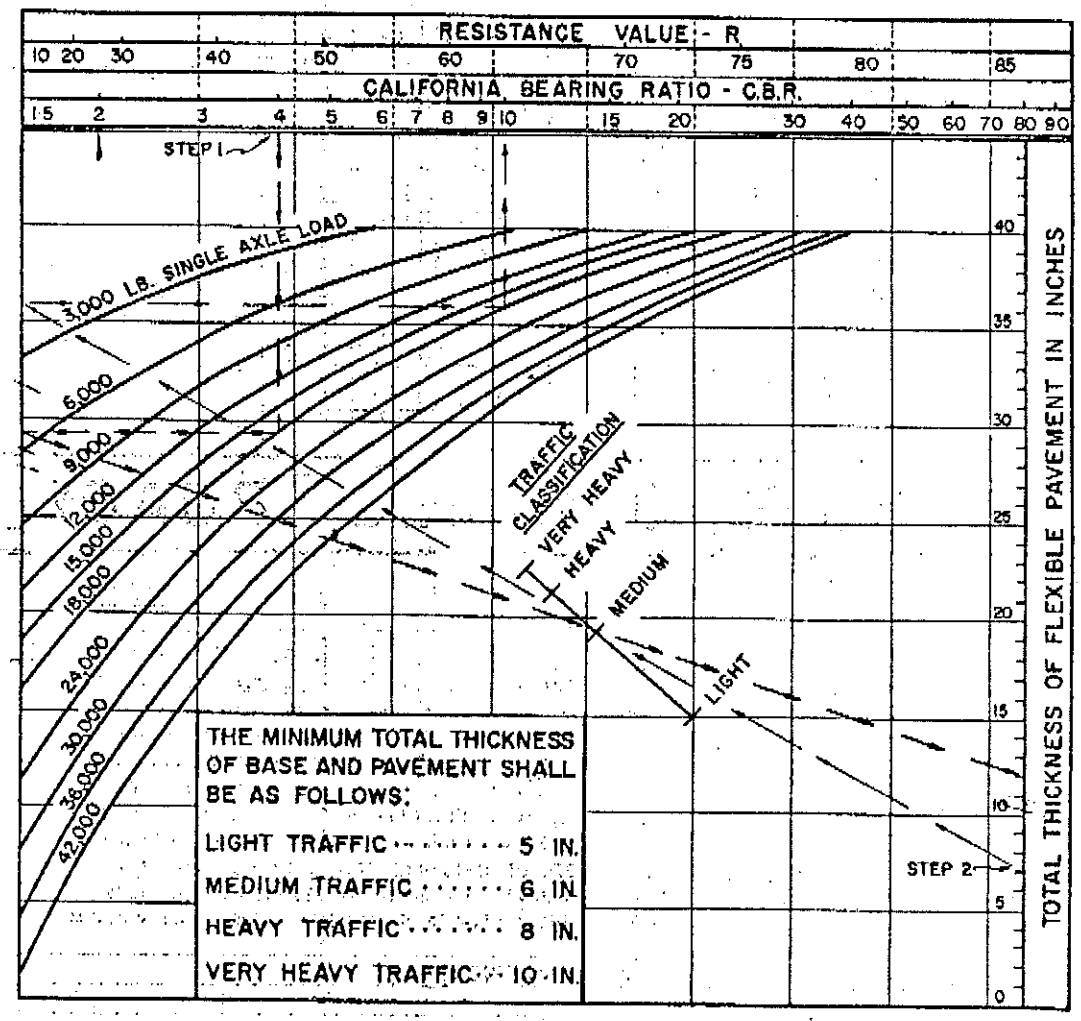


FIG.B DESIGN OF TOTAL PAVEMENT AND BASE THICKNESS

DESIGN OF PAVEMENT

PROBLEM:

GIVEN:

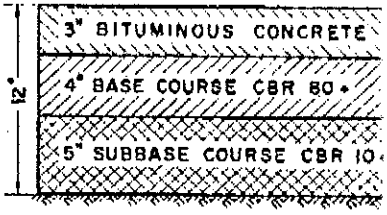
PLANT MIX
TRAFFIC CLASSIFICATION = MEDIUM
MAXIMUM SINGLE AXLE LOAD = 18,000
SUBGRADE CBR = 4

FIND:

REQUIRED PAVEMENT THICKNESS
SUBBASE COURSE CBR

SOLUTION:

STEP 1 — ENTER CHART (FIG.B) AT CBR READ DOWN TO INTERSECT SINGLE A LOAD CURVE = 18,000 LBS; PROJECT HORIZONTLY TO LEFT EDGE OF CHAR THEN FROM INTERSECTION OF EDGE CHART THRU PIVOT POINT FOR MEDI TRAFFIC DRAW LINE TO GET TOTAL PAVEMENT THICKNESS OF 12 INCHES.
STEP 2 — FROM TABLE C BELOW FOR PLANT MIX
BITUMINOUS SURFACE = 3 IN.
MINIMUM BASE COURSE = 4 IN. (See note 3
TOTAL = 7 IN.
ENTER CHART (FIG. B) WITH 7 IN. THICKNESS (AT RIGHT) AND DRAW LINE THRU PIVOT POINT FOR MEDIUM TRAF TO LEFT EDGE; PROJECT TO THE RI TO SINGLE AXLE LOAD CURVE = 18 00 READ UP TO CBR = 10. THIS IS THE M CBR FOR THE REMAINING SUBBASE OF 5 IN.



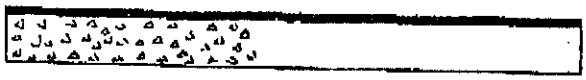
TABLE—C

BITUMINOUS PAVEMENT TYPE			SELECTION OF BITUMINOUS PAVEMENT TYPES FOR DIFFERENT DENSITIES OF TRAFFIC AS INFLUENCED BY SERVICE LIFE, QUALITY, AND COST FACTORS								BITUMINOUS PAVEMENT SURFACE SUGGESTED THICKNESSES			
			LIGHT TRAFFIC		MEDIUM TRAFFIC		HEAVY TRAFFIC		VERY HEAVY TRAFFIC		PAVEMENT SURFACE THICKNESS IN INCHE			
			QUALITY CHOICE	COST CHOICE	QUALITY CHOICE	COST CHOICE	QUALITY CHOICE	COST CHOICE	QUALITY CHOICE	COST CHOICE	LIGHT TRAFFIC	MEDIUM TRAFFIC	HEAVY TRAFFIC	VERY HEA TRAFFIC
EXPECTED SERVICE	SHORT LIFE	SINGLE SURFACE TREATMENT	6th	1st	6th	1st	—	—	—	—	1—	1—	—	—
	MEDIUM LIFE	DOUBLE SURFACE TREATMENT	5th	2nd	5th	2nd	—	—	—	—	1	1	—	—
		ROAD MIX	4th	3rd	4th	3rd	4th	1st	—	—	2	3	3	—
	LONG LIFE	PLANT MIX	3rd	4th	3rd	4th	3rd	2nd	—	—	2	3	3	—
		MACADAM *	2nd	5th	2nd	5th	2nd	3rd	—	—	2	2-½	2-½	—
		ASPHALTIC CONCRETE	1st	6th	1st	6th	1st	4th	1st	1st	2	3	3	4

* COST CHOICE FOR CONDITIONS AN

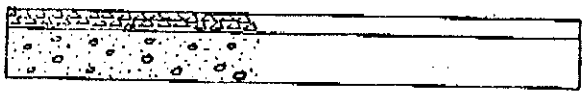
Adapted from Asphalt Institute - Handbook, and Thickness Design Flexible Pavements for Streets and Highways.

ROADS - TYPICAL SECTIONS FLEXIBLE PAVEMENT



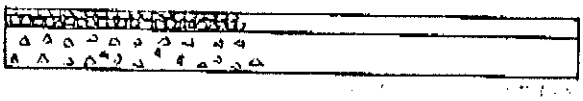
BITUMINOUS SURFACE TREATMENT, 1-2 COATS, 3/8" TO 3/4"
6" - 8" LIMEROCK, GRAVEL, CRUSHED STONE OR SOIL CEMENT STABILIZATION. (BASE PRIMED)

LOW TYPE - SURFACE TREATMENT



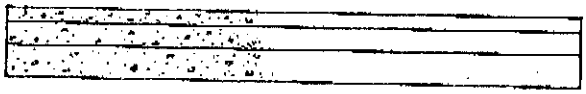
2" - 3" AGGREGATE MIXED IN PLACE SURFACE COURSE
6" OR MORE GRAVEL BASE

INTERMEDIATE TYPE - ROAD MIX



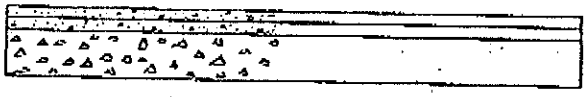
2½" TO 3" STONE SURFACE COURSE PENETRATED WITH BITUME
4" TO 6" CRUSHED STONE BASE. (VOIDS FILLED WITH SAND OR SCREENINGS.)

INTERMEDIATE TYPE - PENETRATION



2" BITUMINOUS CONCRETE SURFACE
3" BITUMINOUS CONCRETE BASE OR PENETRATION MACADAM BASE
SUB-BASE AS REQUIRED

HIGH TYPE - BITUMINOUS CONCRETE

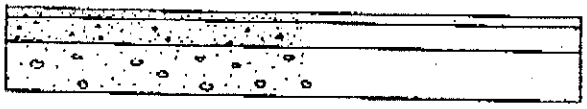


1½" BITUMINOUS CONCRETE SURFACE
1½" BITUMINOUS CONCRETE BINDER
6" TO 9" CRUSHED STONE BASE (VOIDS FILLED WITH SAND OR SCREENINGS)

HIGH TYPE - BITUMINOUS CONCRETE

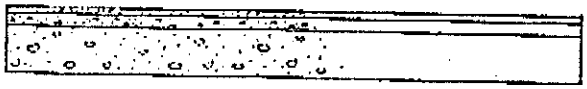
1½" SHEET ASPHALT SURFACE
1½" BITUMINOUS BINDER COURSE
6" TO 9" PORTLAND CEMENT CONCRETE BASE

HIGH TYPE - SHEET ASPHALT



1½" SHEET ASPHALT SURFACE
3½" BITUMINOUS CONCRETE BINDER
0" TO 8" SUB-BASE AS REQUIRED

HIGH TYPE - SHEET ASPHALT



1" SHEET ASPHALT OR BITUMINOUS CONCRETE SURFACE
1½" BITUMINOUS CONCRETE BINDER
SAND OR BITUMINOUS LEVELING COURSE
EXISTING PAVEMENT FOR BASE

HIGH TYPE - RESURFACE

FIG. A TYPICAL SECTIONS - BITUMINOUS ROADS.

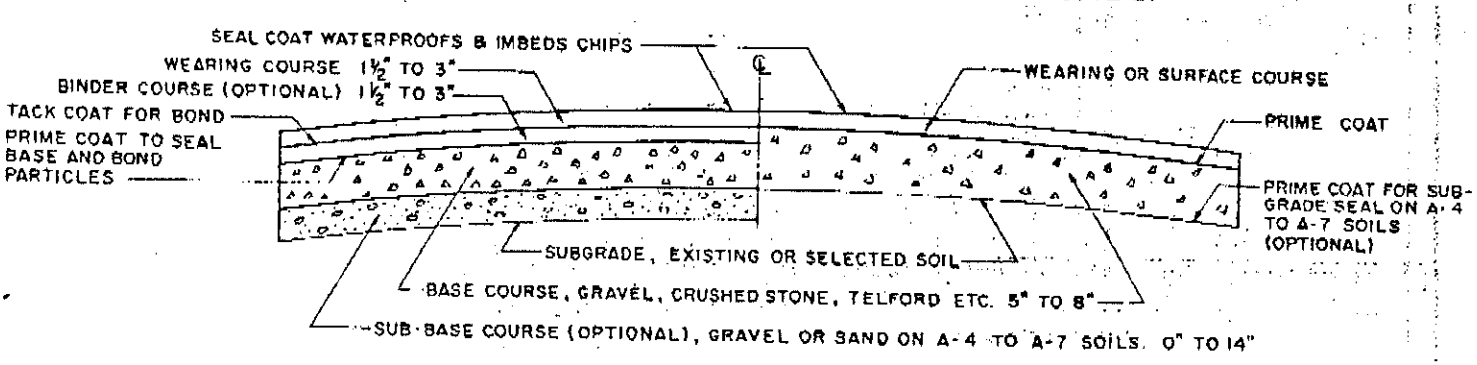


FIG. B ILLUSTRATION OF ELEMENTS OF BITUMINOUS ROADS

ROADS-FLEXIBLE PAVEMENTS RECOMMENDED THICKNESSES

TABLE A RECOMMENDED THICKNESSES FOR STREETS AND HIGHWAYS

Subgrade Classification		Fine-Grained Soils, Plastic						Fine-Grained Soils, Slight to Non-plastic						Gravelly or Sandy Soils, Well Drained					
Wheel Load, lb.		6000		9000		12,000		6000		9000		12,000		6000		9000		12,000	
Traffic Classification	Bituminous Surface, Inches	B	S	B	S	B	S	B	S	B	S	B	S	B	S	B	S	B	S
Light	2	4	–	5	–	4	4	4	–	4	–	4	–	*	–	*	–	*	–
Medium	3	4	4	4	4	4	7	4	–	4	–	5	–	4	–	4	–	4	–
Heavy	3	5	4	5	5	5	9	5	–	6	–	7	–	5	–	5	–	5	–
Very heavy	4	6	4	6	4	6	8	6	–	6	–	7	–	6	–	6	–	6	–

TABLE B RECOMMENDED THICKNESSES FOR PARKING LOTS

Subgrade Classification	Bituminous Pavement, Thickness, inches					
	Passenger Cars			Heavy Trucks		
	Bituminous Surface	Base Course†	Subbase Course	Bituminous Surface	Base Course†	Subbase Course
Gravelly or sandy soils, well drained	1 to 3	4	–	3	5	–
Fine-grained soils, slight to non-plastic	2 to 3	4	–	3	5	5
Fine-grained soils, plastic	2 to 3	4	4	3	5	11

B = base course (inches)
S = subbase course (inches)
Bituminous surface (inches) includes wearing and binder courses.
* Stabilization of subgrade recommended.
† Base Course shall consist of material classified as "Excellent Base", see page 10-02.

AKZO

CALCULATION SHEET

Chemical Division

CENTRAL ENGINEERING DEPARTMENT	DOBBS FERRY, N.Y.	A. R. NO.
Title	Subject	
Signature	Date	Sheet 2 of 2

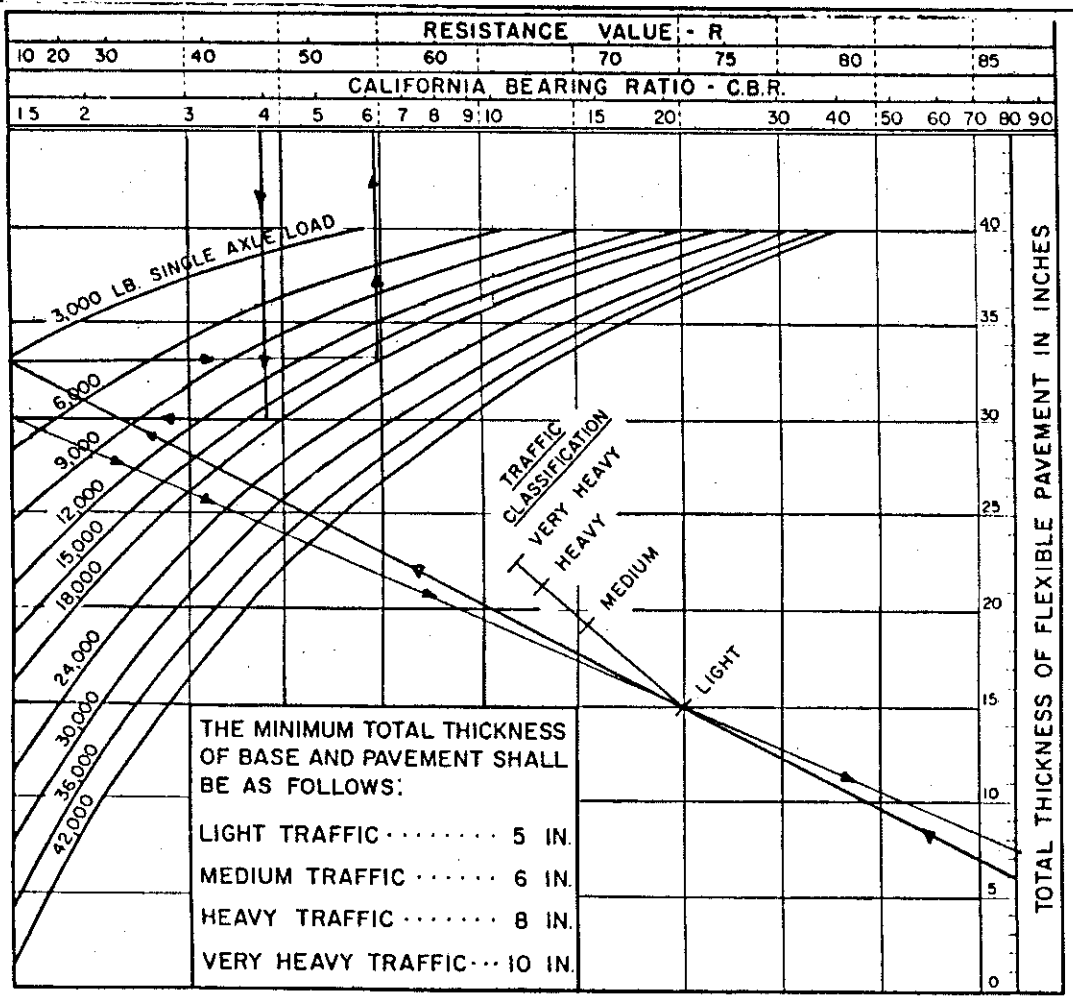


FIG.B DESIGN OF TOTAL PAVEMENT AND BASE THICKNESS

TABLE–C

BITUMINOUS PAVEMENT TYPE			SELECTION OF BITUMINOUS PAVEMENT TYPES FOR DIFFERENT DENSITIES OF TRAFFIC AS INFLUENCED BY SERVICE LIFE, QUALITY, AND COST FACTORS								BITUMINOUS PAVEMENT SURFACE SUGGESTED THICKNESSES			
			LIGHT TRAFFIC		MEDIUM TRAFFIC		HEAVY TRAFFIC		VERY HEAVY TRAFFIC		PAVEMENT SURFACE THICKNESS IN INCHES			
			QUALITY CHOICE	COST CHOICE	QUALITY CHOICE	COST CHOICE	QUALITY CHOICE	COST CHOICE	QUALITY CHOICE	COST CHOICE	LIGHT TRAFFIC	MEDIUM TRAFFIC	HEAVY TRAFFIC	VERY HEAVY TRAFFIC
EXPECTED SERVICE	SHORT LIFE	SINGLE SURFACE TREATMENT	6th	1st	6th	1st	–	–	–	–	1–	1–	–	–
	MEDIUM LIFE	DOUBLE SURFACE TREATMENT	5th	2nd	5th	2nd	–	–	–	–	1	1	–	–
		ROAD MIX	4th	3rd	4th	3rd	4th	1st	–	–	2	3	3	–
	LONG LIFE	[redacted]	3rd	4th	3rd	4th	3rd	2nd	–	–	2	3	3	–
		MACADAM *	2nd	5th	2nd	5th	2nd	3rd	–	–	2	2-½	2-½	–
		ASPHALTIC CONCRETE	1st	6th	1st	6th	1st	4th	1st	1st	2	3	3	4

* COST CHOICE FOR THIS TYPE OF PAVEMENT IS VARIABLE, DEPENDING UPON LOCAL CONDITIONS AND THE AVAILABILITY OF CRUSHED AGGREGATES.

Adapted from Asphalt Institute - Handbook, and Thickness Design Flexible Pavements for Streets and Highways

CLASSIFICATION OF TRAFFIC

TRAFFIC CLASSIFICATION	TRAFFIC DENSITY MAXIMUM, PER LANE, PER DAY	
	DAILY VOLUME PASSENGER CARS & LIGHT TRUCKS UNDER 6000 #	DAILY VOLUME COMMERCIAL TRUCKS AND BUSES OVER 6000 #
LIGHT	25	[redacted]
MEDIUM	500	25
HEAVY	UNLIMITED	250
VERY HEAVY	UNLIMITED	UNLIMITED

B-21 (Revised 2-15-90)

SECTION C

WASTE CHARACTERISTICS

C-1: CHEMICAL AND PHYSICAL ANALYSES (703.183(b), 724.113(a))

Hazardous wastes that are accumulated at this facility have been generated by routine laboratory work or by pilot plant experiments. Wastes from the laboratory that are designated as hazardous are typically spent solvents or excess reagents (lab packs). Wastes from the pilot plant that are designated as hazardous are typically spent solvents, off-spec products or by-products. Material safety data sheets for materials from which wastes are typically generated are presented in Appendix CII.

Figure C1 summarizes the eight basic categories of hazardous wastes that are normally generated at this facility. Although the hazardous waste classifications (D001, F002, F003, etc.) of these eight categories will remain the same, the number of chemicals under each category may change from year to year, depending on materials used in ongoing research projects. Descriptions of each basic category are as follows:

Category 1 waste consists of spent solvents that are generated by routine laboratory procedures such as analytical chemistry work and equipment cleaning. The waste is classified as ignitable due to the low flash point (less than 140 F) of the mixture. The waste is also classified as hazardous waste numbers F003 and/or F005 because the waste is composed of one or more of the following spent solvents:

F003	F005
Acetone	Isobutanol
n-Butanol	Methyl ethyl ketone
Ethyl ether	2-Nitropropane
Ethyl acetate	Pyridine
Methanol	Toluene
Methyl isobutyl ketone	
Xylene	

Chemical composition, flash point and pH of a sample of Category 1 waste are shown in Appendix C1.

This waste may also contain water, small amounts of nonhazardous fatty nitrogen-derivatives, or small amounts of other spent ignitable solvents such as isopropanol or hydrocarbons (pentane, hexane, or octane).

Category 2 waste consists of small volumes of spent halogenated solvents from routine laboratory procedures. This waste is classified as F002 because it will contain one or more of the following spent solvents:

F002

Chlorobenzene	Trichloroethylene
Methylene chloride	1,1,1-Trichloroethane
Tetrachloroethylene	1,1,2-Trichloroethane

Chemical composition, flash point and pH of a sample of Category 2 waste are shown in Appendix C1.

This waste stream may also contain water, small amounts of nonhazardous fatty nitrogen-derivatives or small amounts of other spent chlorinated solvents such as chloroform or carbon tetrachloride.

Category 3 waste consists of small volumes of "characteristic" wastes from laboratory experiments. These include products or by-products that have characteristics of ignitability, corrosivity, reactivity or EP-toxicity. There is no steady stream of this waste, due to the changing nature of research projects. However, past examples of waste in this category include:

- Reaction by-product containing small amounts of 2,4-dichlorophenoxyacetic acid; (D016)

- Reaction by-product containing sodium cyanide and gold cyanide; (D003)

Quantities generated in this waste category are normally lab-pack quantities (less than five gallons per year).

Category 4 waste is a mixture of plastic resin, spent methylene chloride and spent ethyl acetate. This stream is generated by equipment cleaning procedures in the polyurethane development lab. Typical volume generated is two drums (110 gallons) per year. This waste is classified as F002 because it contains spent methylene chloride, as F003 because it contains spent ethyl acetate, and as D001 due to a flash point below 140 F.

Chemical composition, flash point and pH of a sample of Category 4 waste are shown in Appendix C1.

Category 5 waste is generated by pilot plant runs and consists of spent solvents, or still bottoms from recovery of solvents, that are in the F002, F003 or F005 waste lists per 35 IAC Part 721. There is no steady stream of this waste, due to the changing nature of research projects. However, past examples of waste in this category include:

- Still bottoms from recovery of 1,1,2-trichloro-1,2,2-trifluoroethane; (F002)

- Spent solvent mixture including acetone and xylene; (F003)

This waste will be classified as one or more of the EPA Waste Numbers D001, F002, F003 and F005.

Category 6 is reserved for miscellaneous off-spec products or by-products from pilot plant runs which are designated as hazardous waste due to characteristics of ignitability, corrosivity, reactivity or EP-toxicity. It is anticipated that D001 waste consisting of spent flammable solvent such as isopropanol is likely to be generated in small volumes by future pilot plant runs.

Category 7 waste consists of excess laboratory reagents that are disposed as lab-packs. This waste is not stored in the hazardous waste storage area. A disposal vendor is hired to collect these items, segregate and containerize them for shipping, and transport them to the proper disposal site(s). The applicable EPA Waste Numbers and hazard characteristics for these excess reagents are too numerous to list in Figure C1. However, shipping documents from the most recent shipment of this type are presented in Appendix CIII as a sample of typical items.

Category 8 is reserved for possible spill residues corresponding to commonly used reagents that are listed "U-wastes" per 35 IAC Part 721.

In addition to these eight categories of hazardous waste, the wastewater collected in the sump of the hazardous waste storage area (described in Section D of this application) will be included in this Waste Sampling and Analysis Plan for the Akzo McCook Research Facility. Routine and special analyses of the sump wastewater are necessary to ensure its proper handling and disposal.

C-1a: CONTAINERIZED WASTE (703.201(b)(1))

All hazardous wastes will be stored only in the designated storage area. The storage area includes a diked concrete base. Refer to Section D-1a(3).

C-1b: WASTES IN TANK SYSTEMS (724.291(b)(2), 724.292(a)(2))

No hazardous wastes will be stored in tanks in this facility.

C-1c: WASTES IN PILES (724.350(c)(1) and(4))

No hazardous waste pile activity is conducted in this facility.

C-1d: LANDFILLED WASTES (724.414(c))

No hazardous waste landfill activity is conducted in this facility.

C-1e: WASTES INCINERATED AND WASTES USED IN PERFORMANCE TESTS (703.223(b)(1))

No hazardous waste incinerator activity is conducted in this facility.

C-1f: WASTES TO BE LAND TREATED (703.206(b)(4), 724.371(a)(1) and (2), 724.376, Part 721-Appendix H)

No wastes will be land treated in this facility.

C-2: WASTE ANALYSIS PLAN (703.183(c), 724.113(b) and (c))

The waste analysis plan for the Akzo McCook Research facility has been prepared in accordance with IAC Section 724.113 (b). The nature of operations at the research facility does not create a regular stream of hazardous wastes. Therefore, the plan is designed for the types of hazardous wastes that could be generated. The plan includes procedures for sampling various types of wastes, and examples of tests to be applied to wastes that could be generated.

Samples will be analyzed in accordance with guidelines published in 35 IAC Part 721 and SW-846. Simple tests such as pH measurement and flash point determination may be performed in-house. Other tests such as gas chromatograph/mass spectrometer analysis will be performed by submission of samples to outside certified laboratories, whose analytical methods and quality control procedures comply with RCRA guidelines and SW-846.

C-2a: PARAMETERS AND RATIONALE (724.113(b)(1))

Hazardous wastes will be analyzed in all cases except those where the waste is known to have same composition as a commercial product, e.g. waste comprised of spilled commercial product or excess reagent in uncontaminated form. Most hazardous waste to be stored in the hazardous waste storage facility will have been generated on-site, and knowledge of the waste origin will ensure adequate selection of tests for characterization.

All hazardous wastes to be stored in the hazardous waste storage area will be subjected to the minimum visual inspection/check to confirm identity. This visual inspection consists of drawing a sample from the waste container to confirm the expected color, solid content, number of phases, etc.

Figure C2 outlines the minimum battery of tests to be performed on wastes in each of the eight in-house waste categories (previously described in Figure C1). These tests are performed to provide characterization that is adequate for the waste to be handled and stored safely, and to be disposed legally.

All waste in Waste Categories 1 through 6 will be tested for flash point and pH to assure proper waste segregation, labelling and container compatibility for storage. Any waste found to be ignitable or corrosive by these tests is segregated accordingly within the storage area. Corrosive wastes may also need to be stored in special containers to prevent container corrosion during storage.

The minimum battery of tests to be performed on liquids collected in the sump for the hazardous waste drum storage area will depend on the contaminant suspected to be present. If a leak or spill is

suspected or known to have occurred in the storage area, analyses will include the appropriate chemical analyses for the hazardous constituents of the leaked/spilled material. If the leaked/spilled material was a "characteristic" waste, tests for the appropriate caharacteristic(s) will be performed on the sump liquids, in addition to chemical analyses. If the sump liquids are suspected to be contaminated because of an unexplained odor or visual aspect of the liquids, the minimum testing will include pH, flash point and chemical analyses for presence of all wastes that have been stored in the storage area since the last removal of sump liquids.

Waste in Categories 1 through 6 will also be analyzed for chemical composition by the appropriate methods for the chemical components. This analysis is performed to confirm identification of hazardous components, thereby assuring proper storage and disposal. This analysis will also determine what the Reportable Quantity is if waste components include any substances listed in 40 CFR Part 302 Table 302.4 (CERCLA Hazardous Substances) or 40 CFR Part 355 Appendices A and B (SARA Extremely Hazardous Substances).

Wastes in Categories 1 and 2 do not contain EP-toxic constituents under current conditions, as shown in the representative analyses in Appendix CI. However, this analysis will be added to the minimum battery of tests if the nature of ongoing research changes and creates EP-toxic solvent waste.

Standard analyses for wastes in Categories 3 and 6 (other than flash point, pH and GC/mass spec) cannot be determined exactly because these are one-time generations. EP-toxicity or corrosivity tests will be performed whenever applicable.

Wastes in Categories 4 and 5 will be tested only for the standard items (flash point, pH and GC/mass spec) because these categories are for wastes whose hazardous characteristics originate from presence of "F-list" spent solvents.

The "commercial product" wastes/residues of Waste Categories 7 and 8 will not normally be analyzed because the composition and hazard characteristics will be known. Any reagent/commercial chemical product purchased for onsite use is required to be accompanied by a material safety data sheet. This data sheet is kept on file and will serve as one source of hazard characteristic information. In some cases, quantitative analysis of a spill residue may be required to determine proper handling or disposal. The quantitative analysis by gas chromatograph, mass spectrometer or other suitable means will be performed in accordance with the appropriate method in SW-846 for the given contaminant, by a qualified outside lab.

C-2b: TEST METHODS (724.113(b)(2))

Hazardous wastes to be stored on site will be spent solvents, reaction by-products or discarded products, excess reagents or spill wastes that have been generated on site. Therefore, these wastes should be of composition consistent with professional knowledge of their origins.

Using this knowledge, tests will be selected to quantify the chemical composition and hazardous (physical) characteristics of the waste. Test methods are listed below for all anticipated tests for wastes that are likely to be generated.

1.) pH measurement - performed in-house or by qualified outside lab, using an electronic meter in accordance with Method 9040 of SW-846.

2.) flash point determination - performed in-house or by qualified outside lab, using the Pensky-Marten Closed Cup Apparatus in accordance with Method 1010 of SW-846.

3.) chemical analysis by GC/mass spec - performed by an outside qualified lab, using appropriate methods from SW-846. Chemical components which can be expected to be analyzed on a routine basis for Waste Categories 1 through 6 include:

Component	Appropriate Method(s) in SW-846
F002	
Chlorobenzene	8240
Methylene Chloride	8240
Tetrachloroethylene	8010/8240
1,1,1-Trichloroethane	8010/8240
1,1,2-Trichloroethane	8010/8240
Trichloroethylene	8010/8240
1,1,2-Trichloro-1,2,2-trifluoroethane	8010/8240
Other Spent Halogenated Solvents	
Carbon Tetrachloride	8010/8240
Chloroform	8010/8240
F003	
Acetone	8240
n-Butanol	8240
Ethyl Ether	8010/8240
Ethyl Acetate	8240
Methanol	8010/8240
Methyl Isobutyl Ketone	8015/8240
Xylene	8020/8240

F005

Isobutanol	8240
Methyl Ethyl Ketone	8015/8240
2-Nitropropane	8030/8240
Pyridine	8090/8250
Toluene	8020/8240

Other Ignitables

Ethanol	8015/8240
Hexane	8240
Isopropanol	8240
Octane	8240
Pentane	8240

Other GC/mass spec analyses will be added to this list if required by waste generated in new research projects.

4.) Total and Amenable Cyanide - Performed by outside qualified lab using Method 9010 or 9012 of SW-846.

5.) EP-toxicity test - Performed by outside qualified lab using Method 1310 of SW-846 in conjunction with the analysis method(s) for the constituent(s) of interest:

EP-Toxic Constituent	Applicable Method(s) in SW-846
Arsenic	7060/7061
Barium	7080
Cadmium	7130/7131
Chromium	7190/7191
Lead	7420/7421
Mercury	7470
Selenium	7740/7741
Silver	7760
2,4-D	8150/8250

If the waste is known to contain a high concentration of the EP-toxic constituent, an analysis will be done using the appropriate sample digestion/dissolution method in conjunction with the constituent analysis from the list above:

Sample Type	Digestion/Dissolution Method in SW-846
Aqueous	3010/3020
Oil, Grease or Wax	3040
Sediment, Sludge or Soil	3050

6.) Corrosivity to steel test - performed by outside qualified lab, in accordance with Method 1110 of SW-846.

C-2c: SAMPLING METHODS (724.113(b)(3), 40 CFR Part 261 Appendix 1)

The general criteria to be considered in developing a sampling method for any hazardous waste will be as follows:

- type/form of the waste
- types of analyses required
- selection of sampling points (to obtain representative samples)
- sampling equipment required (Refer to Figure C3)
- number, volume and type of samples (i.e., composite, grab, etc.)

Waste accumulation and storage procedures for the research facility require that most hazardous wastes be stored in 55-gallon drums. Therefore, the sampling technique used most often will be for sampling of liquid wastes in drums, as described below. Drums of hazardous waste will be sampled at the point of accumulation, before being taken to the hazardous waste storage area.

Liquids collected in the hazardous waste storage area sump will be sampled from the sump for initial visual inspection. Whenever the sump liquids are suspected or known to be contaminated and must be transferred to a container to allow decontamination to begin, the liquids will be transferred to the appropriate accumulation container(s) and the liquids (and any resulting washwater) will then be sampled from the container(s) for further analyses. Sump liquids sampled from the sump or from drums will be withdrawn using a glasss coliwasa. Larger containers will be sampled with a stainless steel bomb sampler.

Sampling equipment for other types of wastes are listed in Figure C3.

Figure C4 outlines sampling parameters for the in-house waste categories described in Figures C1 and C2. In addition to these samples, an 8-ounce (or larger) composite sample of each stream is submitted to the disposal site for approval.

The sampling methods of Figure C4, and any methods designed for new wastes, are based on the guidelines of 40 CFR Appendix I.

Sampling of Liquid Wastes

1.) Selection of Containers

The most important factors to be considered in selecting containers for samples of hazardous wastes are:

- compatibility
- resistance to breakage
- volume (size of sample)

Sample containers must not melt, rupture, or leak as a result of chemical reactions with waste constituents. They must also have adequate wall thicknesses to withstand handling during sample collection and transportation to the laboratory. A wide mouth is necessary to facilitate transfer of samples from sampler to container. Because glass is inert to most chemicals (except strong alkalis and hydrofluoric acid), it is the material of choice for hazardous waste sample containers. Caps will be the Teflon-lined type.

2.) Withdrawal of Samples from Drums

Drums containing liquid hazardous wastes (e.g., spent solvents) may be under pressure when their bungs are tight. These drums must be sampled with extreme caution. Any pressure must be released before a sample is taken.

To release built-up pressure in tighthead drums, slowly loosen the bung with a bung wrench. When the pressure is relieved, removed the bung entirely. Samples are to be collected through the bung using a Coliwasa sampler.

3.) Withdrawal of Samples From Larger Containers (e.g. tank car)

For a larger accumulation container, stainless steel bomb-type sampler will be lowered to the midpoint of the liquid depth, opened to allow entrance of liquid, then closed and withdrawn. If the waste is non-uniform, three separate samples will be taken at the bottom, middle and top levels of the liquid depth to allow representative analyses.

4.) Transfer of Sample to Sample Container; Special Notes for Organic Samples

When transferring organic liquid samples to containers, care must be taken to prevent entrainment of air bubbles. The liquid must be released slowly from the sampling device into the container to prevent bubbling, and must fill the container completely (no headspace.) If air bubbles are formed in the container during filling, sampling must be started over.

Compositing organic samples is not allowed whenever combining the samples may cause entrainment of air or volatilization of chemical components (thereby altering original composition of samples.) The only exception to this is during generation of the composite samples required by waste treatment/disposal vendors for approval of waste streams.

5.) Sample Container Closures/Labeling

All containers used for hazardous waste samples must have tight-fitting screw-type lids that are Teflon-lined. When each container is filled, the lid should be tightened and the sealed container checked for leaks. (There must not be any leaks.)

Sample containers should additionally be sealed around the jar lid, to preserve sample integrity from time of collection to opening at the laboratory. Gummed paper seals showing:

- collector's name
- date and time of sampling
- sample number (must match label)

may be used. The seal must be applied in such a manner that it is necessarily broken when the container is opened. (Figure C5 shows an example of a "sample seal".)

Each sample must be clearly labeled. Gummed paper labels or tags may be used. They should be of adequate size to contain the following information:

- name of collector
- date and time of sampling
- place of collection (e.g., Drum Storage Area)
- generic name of sample (e.g., spent halogenated solvents)

An example of a container label is shown in Figure C6.

6.) Sampling Precautions and Protective Gear

Appropriate safety precautions must be taken when sampling any hazardous waste. In all cases, adequate background information on each waste must be provided, so that appropriate precautions can be readily determined and adequate protection can be chosen and used.

Minimum protective clothing for persons collecting samples of hazardous wastes include:

- hardhat
- Neoprene gloves
- goggles
- rubber boots

In the presence of hazardous vapors, respiratory protection is mandatory. If necessary, self-contained breathing apparatus, a hose mask with a blower, or a gas mask should be used. If the vapor or gas is not immediately dangerous to life, an air-line respirator, a hose mask (without a blower), or a chemical cartridge respirator may be adequate. A list of appropriate respiratory protection devices is given in Figure C7.

Persons collecting hazardous waste samples should know the limitations of their protective equipment and use additional clothing and devices as necessary.

7.) Sample Handling and Shipping

Immediately after a sample is transferred into the appropriate sample container, the container must be capped tightly to prevent the loss of volatile components, and to exclude air (preventing oxidation).

Until the sample is tested in-house or shipped for outside analyses, appropriate sample preservation protocol must be followed. Refer to guidelines outlined in Figure C10.

Extreme care should be used in preparing the sample container for shipment to an outside laboratory. Each sample must be packed so as to avoid leakage and/or breakage. A cardboard box that provides at least ten centimeters (~four inches) of tight packing around the sample container must be used. Packing generally is vermiculite, polyurethane chips, etc. The box should be sealed with reinforced tape.

Each sample must be accompanied by an analysis request sheet. An example of the request sheet is shown in Figure C8. A copy of the request should be retained in the files. Complete addresses of both sender and receiving laboratory must appear on each package.

Hazardous samples cannot be sent by regular mail. If shipped via UPS (United Parcel Service) or common carrier, request a copy of the bill of lading and retain it in the files as part of RCRA documentation.

8.) Record of Sampling and Analysis

All pertinent information regarding sample collection, analysis, etc., will be maintained in a permanent record book (a bound volume with consecutively numbered pages). Entries will include:

a.) Purpose of sampling (i.e., monitoring under RCRA)

b.) Facility name, address, etc.

c.) A list of wastes monitored, showing:

- generic name
- process by which generated
- composition of waste (components and concentration)
- method of collection
- number and volume of samples to be taken
- description of sampling points

- analyses to be made

- who will run analyses

Periodic entries in this log book will cover each sample of each waste, and must include:

- waste name

- date and time of collection

- name of person collecting sample(s)

- number and volume of samples taken

- volume of representative sample

- sample identification number

- any in-house tests performed on the sample

- tests to be run by outside laboratory

- name of laboratory running tests

- any deviations from the standard (basic) information provided in the major entries above, and reasons for deviations. (e.g., change in sampling method and why, change in collection site and why, etc.)

Analytical results will be recorded in the log book as well, and all reports will be retained in a permenent RCRA file.

9.) Custody of Waste Samples

To establish documentation that traces sample possession from the time of collection, a "chain-of-custody" record must be filled out and must accompany every sample. The record must contain the following minimum information:

- sample number

- signature of person collecting sample

- date and time of collection

- place and address of collection

- waste type

- places for signatures of persons involved in chain of custody

- inclusive dates of possession

A copy of the custody record should be retained in the files. Figure C9 is an example of a custody record form.

C-2d: FREQUENCY OF ANALYSIS (724.113(b)(4))

Because the research facility does not generate a regular hazardous waste stream, each new stream must be analyzed separately. If an extended research project generates enough drums of a hazardous waste for multiple shipments, the waste stream will undergo an initial set of analyses, and will be re-analyzed whenever there is a possibility that composition may have changed - due to process changes or other factors.

C-2e: ADDITIONAL REQUIREMENTS FOR WASTES GENERATED OFF-SITE (724.113(c))

The hazardous waste area will not be used for wastes from other generators.

C-2f: ADDITIONAL REQUIREMENTS FOR IGNITABLE, REACTIVE OR INCOMPATIBLE WASTES (724.113(b)(6), 724.117)

As described in Section C-2b, analyses will be chosen to ensure adequate charaterization, and to ensure safe handling, segregation and storage, of hazardous wastes. All waste analyses will include flash point determination. Any waste suspected of being reactive or incompatible will be segregated and tested to identify reactive or incompatible components.

C-3: QUALITY ASSURANCE (702.145)

The following summarizing organizational and procedural guidelines will be used to ensure reliability of waste analysis data obtained in-house or from outside certified laboratories:

1.) Delegation of Sampling and Analysis Responsibilities

Sampling of hazardous wastes will be carried out by the Environmental Engineer or trained persons being directly supervised by the Environmental Engineer. Analytical tests performed in-house will be completed by trained professional chemists in the analytical laboratory. The analytical laboratory section head is responsible for verifying that proper test methods are used, and that a program of data quality control is followed for tests.

For analyses performed by outside laboratories, samples will be submitted only to laboratories that provide proof of compliance

with methods of 40 CFR Part 261 and SW-846. Also, proof will be required that the lab adheres to a quality assurance program in compliance with the standards of SW-846. The appropriate analytical method from SW-846 will be specified in the analysis request.

Samples submitted to the outside lab(s) for our own quality assurance program will include:

- field blanks/background samples to test for target contaminants in "clean" sampling equipment, water or solvents used for washing equipment, etc.

- samples of raw materials, for standardization of chromatographs, when necessary to characterize possible interference in readings.

- "spiked" samples to test the accuracy of results, not less than once per year

It should be understood that the number and type of these samples will be highly dependent on the types of wastes sampled each year. For example, if a spill cleanup occurs, there may be many background samples for water and/or soil and "clean" sampling equipment. However, under normal operations, there will only be samples of rinsate for pre-washing coliwasa samplers and sample jars.

Appendix CIV contains a generalized quality control manual from the outside lab used most often for hazardous waste testing. This does not include specific detection limits for our anlytical service needs because our waste compositions will vary. The detection limits possible will be dependent on concentration of each chemical constituent, and on whether potential interference exists due to waste composition. Detection limits will recorded as part of the analytical results.

2.) Calibration/Standardization of Test Equipment

All in-house analytical instrumentation used for waste testing will be calibrated frequently, to ensure accurate results for the types of wastes to be analyzed.

Information regarding the calibration of equipment for electronic pH measurement and flash point determination is presented in Appendix CIV. The pH meter requires daily calibration, due to frequency of use for all research samples. The flash point apparatus is subjected to the formal calibration twice per year.

3.) Data Reporting and Review

All results of in-house tests will be reported with corresponding percent accuracy, and similar reporting will be requested from any outside laboratories used. All in-house results are subject to

review by the supervisor of the person performing the test, before data is considered complete and acceptable.

4.) Data Records and Chain-of-Custody

These procedures have been described in Section C-2c Sampling Methods.

C-3(a)(3): WASTE CHARACTERISTICS: FIRST THIRD WASTES WITH TREATMENT STANDARDS (728.133 (a) through (e), 728.107(a), 728.141 through 728.143)

Any wastes generated that are listed in IAC Section 728.133, which do not meet the treatment standards of IAC Sections 728.141 through 728.143, will not be disposed via land disposal without being treated to meet the standards first. Any lab packs containing wastes so listed, that do not meet the treatment standards, will either be disposed in a unit that has been granted a no-migration exemption or treated to meet the standard.

C-3(a)(5): WASTE CHARACTERISTICS: SOFT HAMMER WASTES (728.133(f), 40 CFR 268.34(h))

Any wastes generated that are listed in 40 CFR 268.10 or 268.11 will not be shipped for disposal in a landfill or surface

impoundment unless a valid demonstration and certification have been submitted, pursuant to IAC Section 728.108, and unless the landfill meets the technological requirements of 40 CFR 268.5(h)(2).

C-3(b)(2): NOTIFICATION AND CERTIFICATION FOR WASTES TO BE FURTHER MANAGED (728.107 (b)(6))

For any restricted wastes generated at this facility that will be further managed at a different treatment, storage or disposal facility, Akzo Chemicals inc. will submit a notice and certification before the first shipment of the waste, in accordance with the requirements of IAC Section 728.107(a).

C-3(b)(3): NOTIFICATION AND CERTIFICATION FOR SOFT HAMMER WASTES NOT SUBJECT TO CALIFORNIA LIST PROHIBITIONS (728.107(b)(7))

Akzo Chemicals Inc. will submit a notice to all subsequent treatment, storage or disposal facilities describing the applicable prohibitions in IAC Section 728.133(f) for any soft hammer waste not subject to California list prohibitions. \the notice will be submitted with each shipment of the waste, and will include information listed in IAC Section 728.107(b)(7)(A) through (D).

C-3(c): ADDITIONAL REQUIREMENTS PERTAINING TO STORAGE OF RESTRICTED WASTES (728.150)

All hazardous wastes restricted from land disposal that are stored in this facility will be stored in appropriate containers (per Section D of this permit application), and will be stored solely for the purpose of accumulating sufficient quantities of waste to facilitate proper treatment, recovery or disposal at a qualified permitted facility. At this time, no waste streams are anticipated to require storage beyond one year.

C-3(c)(1): RESTRICTED WASTES STORED IN CONTAINERS 728.150(a)(2)(A)

All hazardous wastes, including wastes restricted from land disposal that are stored in this facility, will be stored in containers that are properly labeled per Section D of this permit application. This labelling includes identification of contents and accumulation start date for each container.

Figure C1: WASTE STREAMS GENERATED ON-SITE

In-House Category No.	Description	EPA Waste Number(s)	Hazard Characteristics
1	Spent Flammable Solvents; Lab	D001, F003, F005	Ignitable, Toxic
2	Spent Halogenated Solvents; Lab	F002	Toxic
3	Miscellaneous "Characteristic" Wastes; Lab	D001..D011, D016	Ignitable, Corrosive, Reactive, Toxic
4	Plastic Resin/Solvent Mixture	D001, F002	Ignitable, Toxic
5	"F"-Wastes; Pilot Plant	D001, F002, F003, F005	Ignitable, Toxic
6	Miscellaneous "Characteristic" Wastes; Pilot Plant	D001..D011	Ignitable, Corrosive, Reactive, Toxic
7	Excess Reagents (lab-pack) Wastes	*	*
8	Spill Wastes	**	Ignitable, Corrosive, Reactive, Toxic

* - Waste number and hazard varies. This waste is not normally stored. It is removed from accumulation point, packed and disposed by lab-pack vendor.

** - Waste number cannot be predicted. However, the RCRA Part A permit application for the hazardous waste storage area has been written to include the following possible spill wastes, corresponding to commonly used reagents: U002, U009, U031, U044, U069, U080, U102, U103, U107, U115, U122, U154, U159, U210, U220, U239.

Figure C2: TESTS PERFORMED FOR EACH WASTE CATEGORY

In-House Category No.	Description	Tests
1	Spent Flammable Solvents; Lab	- flash point - pH - GC/mass spec for composition
2	Spent Halogenated Solvents; Lab	- flash point - pH - GC/mass spec for composition
3	Misc. "Characteristic" Wastes; Lab	- flash point - pH - GC/mass spec for composition - EP-toxicity (if applicable) - corrosivity to steel (if applicable)
4	Plastic Resin/Solvent Mixture	- flash point - pH - GC/mass spec for composition
5	"F"-Wastes; Pilot Plant	- flash point - pH - GC/mass spec for composition
6	Misc. "Characteristic" Wastes; Pilot Plant	- flash point - pH - GC/mass spec for composition - EP-toxicity (if applicable) - corrosivity to steel (if applicable)
7	Excess Reagents (lab-pack) Wastes	- None
8	Spill Wastes	- None, unless exact composition needed to determine disposal method

Figure C3

Sampling Equipment for Various Types of Wastes

Waste Type	Sampler	Limitations
Liquids, sludges, and slurries in drums, vacuum trucks, barrels, and similar containers	Coliwasa Sampler	Not for containers 1.5 m(5 ft) deep.
	a) Plastic	Not for wastes containing ketones, nitrobenzene, dimethylformamide, mesityl oxide, or tetrahydrofuran[3,4].
	b) Glass	Not for wastes containing hydrofluoric acid and concentrated alkali solutions.
Liquids and sludges in ponds, pits, or lagoons	Pond Sampler	Cannot be used to collect samples beyond 3.5 m(11.5 ft). Dip and retrieve sampler slowly to avoid bending the tubular aluminum handle.
Powdered or granular solids in bags, drums, barrels, and similar containers	a) Grain sampler	Limited application for sampling moist and sticky solids with a diameter 0.6 cm(¼ in.).
	b) Sampling trier	May incur difficulty in retaining core sample of very dry granular materials during sampling.
Dry wastes in shallow containers	Trowel or scoop sampler	Not applicable to sampling deeper than 8 cm(3 in.). Difficult to obtain reproducible mass of samples.
Waste piles	Waste pile sampler	Not applicable to sampling solid wastes with dimensions greater than half the diameter of the sampling tube.
Soil deeper than 8 cm(3 in.).	a) Soil auger	Does not collect undisturbed core sample.
	b) Viehmeyer sampler	Difficult to use on stony, rocky, or very wet soil.
Wastes in storage tanks	Weighted bottle sampler	May be difficult to use on very viscous liquids.

Figure C4: WASTE SAMPLING METHODS

Waste Category, Description	Apparatus	Sample Type, Minimum Frequency
1. Spent Flammable Solvents; Lab; (liquid)	Coliwasa (glass)	- 8 oz. sample per drum, for flash point and pH - 8 oz. composite of all drums generated in 3-month interval, for composition
2. Spent Halogenated Solvents; Lab; (liquid)	Coliwasa (glass)	(Same as Category 1 above)
3. Misc. "Characteristic" Wastes; Lab; (liquid or solid)	*	- 8 oz. sample per drum, for flash point and pH - 8 oz. composite of all drums generated per stream or 3-month interval, for composition, EP-toxicity or corrosivity
4. Plastic Resin/Solvent Mixture (semi-solid)	Coliwasa & Dipper **	- 8 oz. sample per drum for flash point and pH - 8 oz. composite of all drums generated in 6-month interval, for composition
5. "F"-Wastes; Pilot Plant; (liquid or solid)	*	(Same as Category 3 above)
6. Misc. "Characteristic" Wastes; Pilot Plant; (liquid or solid)	*	(Same as Category 3 above)

* - Apparatus will depend on type of waste (liquid or solid), and will be selected in accordance with 40 CFR Appendix I.

** - Two sampling apparatus are needed because drums have two layers, solid and semi-solid.

Figure C5

Example of Sample Seal

Collected by _____ Collector's Sample No. _____
signature

Date Collected _____ Time Collected _____

Place Collected _____

_____

_____

Figure C6

Example of Sample Label

Collected by _____ Collector's Sample No. _____
signature

Place of Collection _____

_____

Date Sampled _____ Time Sampled _____

Field Information _____

_____

_____

Figure C7

RESPIRATORY PROTECTIVE DEVICES RECOMMENDED

FOR VARIOUS HAZARDS

Type of hazard	Recommended respiratory device
Oxygen deficiency	Self-contained breathing apparatus, hose mask with blower
Gaseous contaminant immediately dangerous to life	Self-contained breathing apparatus, hose mask with blower, gas mask
Gaseous contaminant not immediately dangerous to life	Air-line respirator, hose mask without blower, chemical-cartridge respirator
Particulate contaminant	Dust, mist, or fume respirator, air-line respirator, abrasive-blasting respirator
Combination of gaseous and particulate contaminants immediately dangerous to life	Self-contained breathing apparatus, hose mask with blower, gas mask with special filter
Combination of gaseous and particulate contaminants not immediately dangerous to life	Air-line respirator, hose mask without blower, chemical-cartridge respirator with special filter

Figure C8
Example of
Sample Analysis Request

PRIORITY ____
(explain) _____
_____
_____

HAZARDOUS MATERIALS SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector _____ Date Sampled _____ Time _____ hours

Location of Sampling _____
name of company, disposal site, etc.

Address _____
number street city state zip

Telephone (___) _____ Company Contact _____

HML NO. (Lab only)	COLLECTOR'S SAMPLE NO.	TYPE OF SAMPLE*	FIELD INFORMATION**

Analysis Requested _____
_____
_____

Special Handling and/or Storage _____
_____

PART II: LABORATORY SECTION

Received by _____ Title _____ Date _____
Sample Allocation: __HML __LBL __LABL __SRL Date _____
Analysis Required _____
_____

*Indicate whether sample is sludge, soil, etc.; **Use back of page for additional information.

Figure C9
Example of
Chain-of-Custody Record

Collector's Sample No._____

CHAIN OF CUSTODY RECORD
Hazardous Materials

Location of Sampling: __Producer __Hauler __Disposal Site

__ Other:_____

Company's Name_____Telephone( )_____

Address_____
number street city state zip

Collector's Name_____Telephone( )_____
signature

Date Sampled_____Time Sampled_____hours

Type of Process Producing Waste_____

Waste Type Code _____Other_____

Field Information_____

_____

_____

Sample Allocation:

1. _____
name of organization

2. _____
name of organization

3. _____
name of organization

Chain of Possession

1. _____ _____ _____
signature title inclusive dates

2. _____ _____ _____
signature title inclusive dates

3. _____ _____ _____
signature title inclusive dates

FIGURE C10

SAMPLE PRESERVATION AND MAXIMUM HOLDING TIME

(Copied from EPA SW-846)

Parameter	Container	Preservative	Holding Time
Volatile Organics			
Concentrated Waste Samples	8-oz. widemouth glass with Teflon liner	None	14 days
Liquid Samples			
No Residual Chlorine Present	2 40-mL vials with Teflon lined septum caps	4 drops conc. HCl, Cool, 4°C	14 days
Residual Chlorine Present	2 40-mL vials with Teflon lined septum caps	Collect sample in a 4 oz. soil VOA container which has been pre-preserved with 4 drops of 10% sodium thiosulfate. Gently mix sample and transfer to a 40-mL VOA vial that has been pre-preserved with 4 drops conc. HCl, Cool to 4°C	14 days
Acrolein and Acrylonitrile	2 40-mL vials with Teflon lined septum caps	Adjust to pH 4-5, Cool, 4°C	14 days
Soil/Sediments and Sludges	4-oz (120-mL) widemouth glass with Teflon liner	Cool, 4°C	14 days

APPENDIX CI

Contents

1. Flash Point and pH for Waste Category 1.

2. Flash Point and pH for Waste Category 2.

3. Flash Point and pH for Waste Category 4.

4. Chemical Analysis of Three Waste Categories.

AKZO CHEMICALS
Research Center - McCook

Analytical Laboratory Report

Reference number: R89- 841

Name: M. A. JOHNSON
Sample name: WASTE SOLVENT MIXTURE

Project number: 70-0001'

Notebook number: 1234

Requested analyses	Sample number(s) E89017
flash point pmcc	75 F
pH	5.0

Analyst: MW
Reviewed by: MW

Date submitted: 06/08/89
Date completed: 06/08/89

AKZO CHEMICALS
Research Center - McCook

Analytical Laboratory Report

Reference number: P89- 62

Name: MADELYN ASHUM-JOHNSON
Sample name: WASTE CHLORINATED SOLVENTS

Project number: 70-00017

Notebook number: 9999

Requested analyses	Sample number(s) E89019
flash point (PMCC)	137 F
pH (as is)	2.77
chloroform (%)	19
methylene chloride (%)	13
chlorobenzene (%)	2
tetrachloroethylene (%)	15

GC/HPLC analysis:

Analyst: CIOTA, GREAVES
Reviewed by: CNW

Date submitted: 06/19/89
Date completed: 06/22/89

AKZO CHEMICALS
Research Center - McCook

Analytical Laboratory Report

Reference number: R89- 926

Name: MADELYN ASHUM-JOHNSON
Sample name: PLASTIC RESIN/SOLVENT MIXTURE

Project number: 70-00017

Notebook number: 9999

Requested analyses	Sample number(s) E89027a
flash point (pmcc)	85 F
pH (as is)	5.03

Analyst: GREAVES
Reviewed by: JG

Date submitted: 06/21/89
Date completed: 06/22/89

Enviro-Test/Perry Laboratories, Inc.
Chicago Dairy & Food Laboratories

319 OGDEN AVENUE DOWNERS GROVE, IL 60515-3142 (312) 963-4672

IEPA 100186 **CERTIFIED LABORATORY REPORT** IDPH 17134

Akzo Chemicals, Inc.
Madelyn Ashum-Johnson
8401 West 47th Street
McCook, IL 60525

July 19, 1989
Received: 06-29-89
Completed:07-18-89
P.O. #:11-4343R

Lab No.	Sample Identification		
H5033	E89017/Spent Lab Solvents (Flammable)	06-07-89	10:00
H5034	E89019/Spent Chlorinated Solvents (2 layers)	06-19-89	13:30
H5035	E89027a/Plastic Resin Cleanout(Flammable)	06-21-89	10:45

Test Parameter	H5033	H5034	H5035
Acetone	5.5%		
Isopropanol	26.3%	3.6%	
Methanol	1.2%		
Methyl Ethyl Ketone	0.7%		
Chlorobenzene		5.2%	
Chloroform		18.2%	
Methylene Chloride		8.5%	1.9%
Tetrachloroethylene		13.6%	
Ethyl Acetate			2.9%

All results are total and in ppm unless otherwise noted.
Approved for the examination of water, dairy, chemical, microbiological and container testing by the ILDPH, ILEPA and USPHS.

I certify that I am familiar with the information contained in this report and that to the best of my knowledge and belief such information is true, complete, and accurate.

Robert J. Jakubiec, PhD
Laboratory Director

APPENDIX CII

TYPICAL MATERIALS FROM WHICH
HAZARDOUS COMPONENTS OF WASTES ARE GENERATED:

(Material Safety Data Sheets in This Appendix)

Acetone
n-Butanol
Carbon Tetrachloride
Chlorobenzene
Chloroform
Ethanol
Ethyl Acetate
Ethyl Ether
Hexane
Isobutanol
Isopropanol
Methanol
Xylene
Methylene Chloride
Methyl Ethyl Ketone
Methyl Isobutyl Ketone
2-Nitropropane
Octane
Pentane
Pyridine
Tetrachloroethylene
Toluene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethylene

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

M A T E R I A L S A F E T Y D A T A S H E E T

24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151

CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

EFFECTIVE: 10/11/85 ISSUED: 01/23/86

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: ACETONE
FORMULA: (CH3)2CO
FORMULA WT: 58.08
CAS NO.: 00067-64-1
NIOSH/RTECS NO.: AL3150000
COMMON SYNONYMS: DIMETHYL KETONE; METHYL KETONE; 2-PROPANONE
PRODUCT CODES: 9010,9006,9002,9254,9009,9001,9004,5356,A134,9007,9005,9008

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH - 1
FLAMMABILITY - 3 (FLAMMABLE)
REACTIVITY - 2
CONTACT - 1

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

PRECAUTIONARY LABEL STATEMENTS

DANGER
EXTREMELY FLAMMABLE
HARMFUL IF SWALLOWED OR INHALED
CAUSES IRRITATION

KEEP AWAY FROM HEAT, SPARKS, FLAME. AVOID CONTACT WITH EYES, SKIN, CLOTHING. AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE WATER SPRAY, ALCOHOL FOAM, DRY CHEMICAL, OR CARBON DIOXIDE. FLUSH SPILL AREA WITH WATER SPRAY.

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
ACETONE	90-100	67-64-1

SECTION III - PHYSICAL DATA

BOILING POINT: 56 C (133 F)
MELTING POINT: -95 C (-139 F)
SPECIFIC GRAVITY: 0.79 (H2O=1)
VAPOR PRESSURE(MM HG): 181
VAPOR DENSITY(AIR=1): 2
EVAPORATION RATE: 5.6 (BUTYL ACETATE=1)

CONTINUED ON PAGE: 2

SECTION III - PHYSICAL DATA (CONTINUED)

SOLUBILITY(H2O): COMPLETE (IN ALL PROPORTIONS) % VOLATILES BY VOLUME: 100

APPEARANCE & ODOR: CLEAR, COLORLESS LIQUID WITH FRAGRANT SWEET ODOR.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: -18 C (0 F) NFPA 704M RATING: 1-3-0

FLAMMABLE LIMITS: UPPER - 13 % LOWER - 2 %

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

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

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

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 1780 MG/M3 (750 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 2375 MG/M3 (1000 PPM)

TOXICITY: LD50 (ORAL-RAT)(MG/KG) - 9750
LD50 (IPR-MOUSE)(G/KG) - 1297

EFFECTS OF OVEREXPOSURE
CONTACT WITH SKIN HAS A DEFATTING EFFECT, CAUSING DRYING AND IRRITATION. OVEREXPOSURE TO VAPORS MAY CAUSE IRRITATION OF MUCOUS MEMBRANES, DRYNESS OF MOUTH AND THROAT, HEADACHE, NAUSEA AND DIZZINESS.

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. FLUSH SKIN WITH WATER.

CONTINUED ON PAGE: 3

SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, SOURCES OF IGNITION

INCOMPATIBLES: SULFURIC ACID, NITRIC ACID, STRONG OXIDIZING AGENTS

SECTION VII - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SUITABLE PROTECTIVE CLOTHING. SHUT OFF IGNITION SOURCES; NO FLARES, SMOKING, OR FLAMES IN AREA. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH AREA WITH WATER.

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

DISPOSAL PROCEDURE

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

EPA HAZARDOUS WASTE NUMBER: U002 (TOXIC WASTE)

SECTION VIII - PROTECTIVE EQUIPMENT

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

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 5000 PPM, A GAS MASK WITH ORGANIC VAPOR CANNISTER IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS WITH FULL FACE SHIELD IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GLASSES WITH SIDESHIELDS, POLYVINYL ACETATE GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: RED

SPECIAL PRECAUTIONS

BOND AND GROUND CONTAINERS WHEN TRANSFERRING LIQUID. KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA.

CONTINUED ON PAGE: 4

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	ACETONE
HAZARD CLASS	FLAMMABLE LIQUID
UN/NA	UN1090
LABELS	FLAMMABLE LIQUID

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	ACETONE
HAZARD CLASS	3.1
UN/NA	UN1090
LABELS	FLAMMABLE LIQUID

(TM) AND (R) DESIGNATE TRADEMARKS.
N/A = NOT APPLICABLE OR NOT AVAILABLE

THE INFORMATION PUBLISHED IN THIS MATERIAL SAFETY DATA SHEET HAS BEEN COMPILED FROM OUR EXPERIENCE AND DATA PRESENTED IN VARIOUS TECHNICAL PUBLICATIONS. IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE SUITABILITY OF THIS INFORMATION FOR THE ADOPTION OF NECESSARY SAFETY PRECAUTIONS. WE RESERVE THE RIGHT TO REVISE MATERIAL SAFETY DATA SHEETS PERIODICALLY AS NEW INFORMATION BECOMES AVAILABLE.

-- LAST PAGE --

72-62-7820-01

MATERIAL SAFETY DATA SHEET

Ashland Chemical Company
DIVISION OF ASHLAND OIL, INC.
P. O. BOX 2219, COLUMBUS, OHIO 43216 • (614) 889-3333
24-HOUR EMERGENCY TELEPHONE (606) 324-1133

Ashland

THIS MSDS COMPLIES WITH 29 CFR 1910.1200 (THE HAZARD COMMUNICATION STANDARD)

PRODUCT NAME: BUTANOL NORMAL
CAS NUMBER: 71 36 3

AKZO-CHEMIE AMERICA 8201
300 WACKER DRIVE
CHICAGO IL 60606

ATTN: PLANT MGR./SAFETY DIR.

05 50 021 0256730-
DATA SHEET NO: 0004296-005
LATEST REVISION DATE: 01/87-87029
PRODUCT: 3680000
INVOICE: 714201
INVOICE DATE: 05/08/87
TO: AKZO-CHEMIE AMERICA
8201 W 47TH STREET
MCCOOK IL 60525

SECTION I-PRODUCT IDENTIFICATION

GENERAL OR GENERIC ID: ALCOHOL

DOT HAZARD CLASSIFICATION: FLAMMABLE LIQUID (173.115)

SECTION II-COMPONENTS

IF PRESENT, IARC, NTP AND OSHA CARCINOGENS ARE IDENTIFIED IN THIS SECTION
SEE DEFINITION PAGE FOR CLARIFICATION

INGREDIENT	% (BY WT)		NOTE
NORMAL BUTANOL CAS #: 71-36-3	100	PEL: 100 PPM - CEILING TLV: 50 PPM - CEILING	(1)

(1): SKIN ABSORPTION MAY POTENTIALLY CONTRIBUTE TO THE OVERALL EXPOSURE TO THIS MATERIAL. APPROPRIATE MEASURES SHOULD BE TAKEN TO PREVENT ABSORPTION SO THAT THE TLV IS NOT INVALIDATED.

SECTION III-PHYSICAL DATA

PROPERTY	REFINEMENT	MEASUREMENT
BOILING POINT	FOR PRODUCT	243.00 DEG F (117.22 DEG C) @ 760.00 MMHG
VAPOR PRESSURE	FOR PRODUCT	4.40 MMHG @ 68.00 DEG F (20.00 DEG C)
SPECIFIC VAPOR DENSITY	AIR = 1	2.6
SPECIFIC GRAVITY		.807 - .810 @ 77.00 DEG F (25.00 DEG C)
PERCENT VOLATILES		100.00%
EVAPORATION RATE	(N-BUTYL ACETATE = 1)	.46

SECTION IV-FIRE AND EXPLOSION INFORMATION

FLASH POINT(TCC) 85.0 - 99.0 DEG F
(29.4 - 37.2 DEG C)

EXPLOSIVE LIMIT (PRODUCT) LOWER - 1.4% UPPER - 11.2%

EXTINGUISHING MEDIA: ALCOHOL FOAM OR WATER FOG OR CARBON DIOXIDE OR DRY CHEMICAL

HAZARDOUS DECOMPOSITION PRODUCTS: MAY FORM TOXIC MATERIALS:, CARBON DIOXIDE AND CARBON MONOXIDE, VARIOUS HYDROCARBONS, ETC.

FIREFIGHTING PROCEDURES: WEAR SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE WHEN FIGHTING FIRES.

SPECIAL FIRE & EXPLOSION HAZARDS: VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL ALONG THE GROUND OR MAY BE MOVED BY VENTILATION AND IGNITED BY PILOT LIGHTS, OTHER FLAMES, SPARKS, HEATERS, SMOKING, ELECTRIC MOTORS, STATIC DISCHARGE, OR OTHER IGNITION SOURCES AT LOCATIONS DISTANT FROM MATERIAL HANDLING POINT.

NEVER USE WELDING OR CUTTING TORCH ON OR NEAR DRUM (EVEN EMPTY) BECAUSE PRODUCT (EVEN JUST RESIDUE) CAN IGNITE EXPLOSIVELY.

NFPA CODES: HEALTH- 1 FLAMMABILITY- 3 REACTIVITY- 0

SECTION V-HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LEVEL 100 PPM - CEILING

THRESHOLD LIMIT VALUE 50 PPM - CEILING

(SKIN)

EFFECTS OF ACUTE OVEREXPOSURE: FOR PRODUCT

EYES - CAN CAUSE SEVERE IRRITATION, REDNESS, TEARING, BLURRED VISION.

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CONTINUED ON PAGE: 2

SECTION V-HEALTH HAZARD DATA (CONTINUED)

SKIN - PROLONGED OR REPEATED CONTACT CAN CAUSE MODERATE IRRITATION, DEFATTING, DERMATITIS.
BREATHING - EXCESSIVE INHALATION OF VAPORS CAN CAUSE NASAL AND RESPIRATORY IRRITATION, DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE, POSSIBLE UNCONSCIOUSNESS, AND EVEN ASPHYXIATION.
SWALLOWING - CAN CAUSE GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING, AND DIARRHEA.

FIRST AID:

IF ON SKIN: THOROUGHLY WASH EXPOSED AREA WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHING. LAUNDER CONTAMINATED CLOTHING BEFORE RE-USE.

IF IN EYES: FLUSH WITH LARGE AMOUNTS OF WATER, LIFTING UPPER AND LOWER LIDS OCCASIONALLY, GET MEDICAL ATTENTION.

IF SWALLOWED: IMMEDIATELY DRINK TWO GLASSES OF WATER AND INDUCE VOMITING BY EITHER GIVING IPECAC SYRUP OR BY PLACING FINGER AT BACK OF THROAT. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. GET MEDICAL ATTENTION IMMEDIATELY.

IF BREATHED: IF AFFECTED, REMOVE INDIVIDUAL TO FRESH AIR. IF BREATHING IS DIFFICULT, ADMINISTER OXYGEN. IF BREATHING HAS STOPPED GIVE ARTIFICIAL RESPIRATION. KEEP PERSON WARM, QUIET AND GET MEDICAL ATTENTION.

PRIMARY ROUTE(S) OF ENTRY:

INHALATION

SKIN ABSORPTION
SKIN CONTACT

EFFECTS OF CHRONIC OVEREXPOSURE: FOR PRODUCT

OVEREXPOSURE TO THIS MATERIAL (OR ITS COMPONENTS) HAS APPARENTLY BEEN FOUND TO CAUSE THE FOLLOWING EFFECTS IN LABORATORY ANIMALS:, ANEMIA, LIVER ABNORMALITIES, KIDNEY DAMAGE, EYE DAMAGE, LUNG DAMAGE

OVEREXPOSURE TO THIS MATERIAL (OR ITS COMPONENTS) HAS BEEN SUGGESTED AS A CAUSE OF THE FOLLOWING EFFECTS IN HUMANS:, EYE DAMAGE

SECTION VI-REACTIVITY DATA

HAZARDOUS POLYMERIZATION: CANNOT OCCUR

STABILITY: STABLE

INCOMPATIBILITY: AVOID CONTACT WITH:, STRONG OXIDIZING AGENTS.

SECTION VII-SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

SMALL SPILL: ABSORB LIQUID ON PAPER, VERMICULITE, FLOOR ABSORBENT, OR OTHER ABSORBENT MATERIAL AND TRANSFER TO HOOD.

LARGE SPILL: ELIMINATE ALL IGNITION SOURCES (FLARES, FLAMES INCLUDING PILOT LIGHTS, ELECTRICAL SPARKS). PERSONS NOT WEARING PROTECTIVE EQUIPMENT SHOULD BE EXCLUDED FROM AREA OF SPILL UNTIL CLEAN-UP HAS BEEN COMPLETED. STOP SPILL AT SOURCE, DIKE AREA OF SPILL TO PREVENT SPREADING, PUMP LIQUID TO SALVAGE TANK. REMAINING LIQUID MAY BE TAKEN UP ON SAND, CLAY, EARTH, FLOOR ABSORBENT, OR OTHER ABSORBENT MATERIAL AND SHOVELED INTO CONTAINERS.

WASTE DISPOSAL METHOD:

SMALL SPILL: DISPOSE OF IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.

LARGE SPILL: DISPOSE OF IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.

SECTION VIII-PROTECTIVE EQUIPMENT TO BE USED

RESPIRATORY PROTECTION: IF TLV OF THE PRODUCT OR ANY COMPONENT IS EXCEEDED, A NIOSH/MSHA JOINTLY APPROVED AIR SUPPLIED RESPIRATOR IS ADVISED IN ABSENCE OF PROPER ENVIRONMENTAL CONTROL. OSHA REGULATIONS ALSO PERMIT OTHER NIOSH/MSHA RESPIRATORS UNDER SPECIFIED CONDITIONS. (SEE YOUR SAFETY EQUIPMENT SUPPLIER). ENGINEERING OR ADMINISTRATIVE CONTROLS SHOULD BE IMPLEMENTED TO REDUCE EXPOSURE.

VENTILATION: PROVIDE SUFFICIENT MECHANICAL (GENERAL AND/OR LOCAL EXHAUST) VENTILATION TO MAINTAIN EXPOSURE BELOW TLV(S).

PROTECTIVE GLOVES: WEAR RESISTANT GLOVES SUCH AS:, NITRILE RUBBER

EYE PROTECTION: CHEMICAL SPLASH GOGGLES IN COMPLIANCE WITH OSHA REGULATIONS ARE ADVISED; HOWEVER, OSHA REGULATIONS ALSO PERMIT OTHER TYPE SAFETY GLASSES. (CONSULT YOUR SAFETY EQUIPMENT SUPPLIER)

OTHER PROTECTIVE EQUIPMENT: TO PREVENT REPEATED OR PROLONGED SKIN CONTACT, WEAR IMPERVIOUS CLOTHING AND BOOTS.

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SECTION IX-SPECIAL PRECAUTIONS OR OTHER COMMENTS

CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTIED. SINCE EMPTIED CONTAINERS RETAIN PRODUCT RESIDUES (VAPOR, LIQUID, AND/OR SOLID), ALL HAZARD PRECAUTIONS GIVEN IN THE DATA SHEET MUST BE OBSERVED.

THE INFORMATION ACCUMULATED HEREIN IS BELIEVED TO BE ACCURATE BUT IS NOT WARRANTED TO BE WHETHER ORIGINATING WITH THE COMPANY OR NOT. RECIPIENTS ARE ADVISED TO CONFIRM IN ADVANCE OF NEED THAT THE INFORMATION IS CURRENT, APPLICABLE, AND SUITABLE TO THEIR CIRCUMSTANCES.

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SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: CARBON TETRACHLORIDE
FORMULA: CCL4
FORMULA WT: 153.82
CAS NO.: 00056-23-5
NIOSH/RTECS NO.: FG4900000
COMMON SYNONYMS: CARBON TET; TETRACHLOROMETHANE; METHANETETRACHLORIDE; PERCHLOROMETHANE
PRODUCT CODES: 1513,1512,1511,1514,1516,1510

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	3	(CANCER CAUSING)
FLAMMABILITY	-	0	
REACTIVITY	-	1	
CONTACT	-	3	(LIFE)

LABORATORY PROTECTIVE EQUIPMENT

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

PRECAUTIONARY LABEL STATEMENTS

POISON DANGER
EXCEPTIONAL CONTACT HAZARD - READ MATERIAL SAFETY DATA SHEET
MAY BE FATAL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN
NOT FOR HOUSEHOLD USE

NOTE: REPORTED AS CAUSING CANCER IN LABORATORY ANIMALS. EXERCISE DUE CARE.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING.

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
CARBON TETRACHLORIDE	90-100	56-23-5

SECTION III - PHYSICAL DATA

BOILING POINT: 77 C (171 F)
VAPOR PRESSURE(MM HG): 91

MELTING POINT: -23 C (-9 F)
VAPOR DENSITY(AIR=1): 5.3

SPECIFIC GRAVITY: 1.59 (H2O=1)
EVAPORATION RATE: 0.33 (BUTYL ACETATE=1)

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SECTION III - PHYSICAL DATA (CONTINUED)

SOLUBILITY(H2O): NEGLIGIBLE (LESS THAN 0.1 %) % VOLATILES BY VOLUME: 100

APPEARANCE & ODOR: CLEAR, COLORLESS, HEAVY LIQUID WITH CHARACTERISTIC ODOR.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: N/A NFPA 704M RATING: 3-0-0

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

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

TOXIC GASES PRODUCED
HYDROGEN CHLORIDE, PHOSGENE

SECTION V - HEALTH HAZARD DATA

THIS SUBSTANCE IS LISTED AS ONE WHICH MAY BE REASONABLY ANTICIPATED TO BE A CARCINOGEN BY THE NATIONAL TOXICITY PROGRAM (NTP).

THRESHOLD LIMIT VALUE (TLV/TWA): 30 MG/M3 (5 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 125 MG/M3 (20 PPM)

TOXICITY:
LD50 (ORAL-RAT)(MG/KG) - 2800
LD50 (ORAL-MOUSE)(G/KG) - 12.8
LD50 (IPR-RAT)(MG/KG) - 1500

EFFECTS OF OVEREXPOSURE
INHALATION OF VAPORS MAY CAUSE SEVERE IRRITATION OF THE RESPIRATORY SYSTEM
SKIN ABSORPTION MAY BE HARMFUL OR FATAL.
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE KIDNEY AND/OR LIVER DAMAGE.
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE CENTRAL NERVOUS SYSTEM DEPRESSION.

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FO AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
WASH CLOTHING BEFORE RE-USE.

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SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, SOURCES OF IGNITION

INCOMPATIBLES: ALKALI METALS, SODIUM METAL, POTASSIUM METAL, CHEMICALLY ACTIVE METALS

DECOMPOSITION PRODUCTS: HYDROGEN CHLORIDE, CHLORINE

SECTION VII - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH SPILL AREA WITH WATER.

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

SPOSAL PROCEDURE

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

EPA HAZARDOUS WASTE NUMBER: U211 (TOXIC WASTE)

SECTION VIII - PROTECTIVE EQUIPMENT

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

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS ABOVE 5 PPM, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

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

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: BLUE

SPECIAL PRECAUTIONS

KEEP CONTAINER TIGHTLY CLOSED. STORE IN SECURE POISON AREA.

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SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	CARBON TETRACHLORIDE (AIR AND WATER ONLY)
HAZARD CLASS	ORM-A
UN/NA	UN1846
LABELS	NONE
REPORTABLE QUANTITY	5000 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	CARBON TETRACHLORIDE
HAZARD CLASS	6.1
UN/NA	UN1846
LABELS	POISON

(TM) AND (R) DESIGNATE TRADEMARKS.
N/A = NOT APPLICABLE OR NOT AVAILABLE

INFORMATION PUBLISHED IN THIS MATERIAL SAFETY DATA SHEET HAS BEEN COMPILED FROM OUR EXPERIENCE AND DATA PRESENTED IN VARIOUS TECHNICAL PUBLICATIONS. IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE SUITABILITY OF THIS INFORMATION FOR THE ADOPTION OF NECESSARY SAFETY PRECAUTIONS. WE RESERVE THE RIGHT TO REVISE MATERIAL SAFETY DATA SHEETS PERIODICALLY AS NEW INFORMATION BECOMES AVAILABLE.

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SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: CHLOROBENZENE
FORMULA: C6H5CL
FORMULA WT: 112.56
CAS NO.: 00108-90-7
NIOSH/RTECS NO.: C20175000
COMMON SYNONYMS: MONOCHLOROBENZENE; BENZENE CHLORIDE; CHLOROBENZOL
PRODUCT CODES: 9179

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH - 2
FLAMMABILITY - 3 (FLAMMABLE)
REACTIVITY - 1
CONTACT - 2

LABORATORY PROTECTIVE EQUIPMENT

GLES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

PRECAUTIONARY LABEL STATEMENTS

WARNING
FLAMMABLE
HARMFUL IF SWALLOWED
CAUSES IRRITATION

KEEP AWAY FROM HEAT, SPARKS, FLAME. AVOID CONTACT WITH EYES, SKIN, CLOTHING. AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE WATER SPRAY, ALCOHOL FOAM, DRY CHEMICAL, OR CARBON DIOXIDE. FLUSH SPILL AREA WITH WATER SPRAY.

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
CHLOROBENZENE	90-100	108-90-7

SECTION III - PHYSICAL DATA

BOILING POINT: 132 C (270 F)
VAPOR PRESSURE(MM HG): 8.8

MELTING POINT: -45 C (-49 F)
VAPOR DENSITY(AIR=1): 3.9

SPECIFIC GRAVITY: 1.11 (H2O=1)
EVAPORATION RATE: 1.07 (BUTYL ACETATE=1)

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C-46 (2/15/90)

SECTION III - PHYSICAL DATA (CONTINUED)

SOLUBILITY(H2O): SLIGHT (0.1 TO 1 %) % VOLATILES BY VOLUME: N/A

APPEARANCE & ODOR: COLORLESS, VERY REFRACTIVE LIQUID WITH SWEET, ALMOND ODOR.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 29 C (84 F) NFPA 704M RATING: 2-3-0

FLAMMABLE LIMITS: UPPER - 9.6 % LOWER - 1.3 %

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

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

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

TOXIC GASES PRODUCED
HYDROGEN CHLORIDE, PHOSGENE

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 350 MG/M3 (75 PPM)

TOXICITY: LD50 (ORAL-RAT)(MG/KG) - 2910

EFFECTS OF OVEREXPOSURE
INHALATION OF VAPORS MAY CAUSE SEVERE IRRITATION OF THE RESPIRATORY SYSTEM
LIQUID MAY CAUSE DERMATITIS.
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE CENTRAL NERVOUS SYSTEM DEPRESSION.

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, IF CONSCIOUS, GIVE LARGE AMOUNTS OF WATER. INDUCE VOMITING.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. FLUSH SKIN WITH WATER.

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SECTION IX - STORAGE AND HANDLING PRECAUTIONS (CONTINUED)

STORAGE AREA.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	CHLOROBENZENE
HAZARD CLASS	FLAMMABLE LIQUID
UN/NA	UN1134
LABELS	FLAMMABLE LIQUID
REPORTABLE QUANTITY	100 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	CHLOROBENZENE
HAZARD CLASS	3.3
UN/NA	UN1134
LABELS	FLAMMABLE LIQUID

(A) AND (R) DESIGNATE TRADEMARKS.
N/A = NOT APPLICABLE OR NOT AVAILABLE

THE INFORMATION PUBLISHED IN THIS MATERIAL SAFETY DATA SHEET HAS BEEN COMPILED FROM OUR EXPERIENCE AND DATA PRESENTED IN VARIOUS TECHNICAL PUBLICATIONS. IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE SUITABILITY OF THIS INFORMATION FOR THE ADOPTION OF NECESSARY SAFETY PRECAUTIONS. WE RESERVE THE RIGHT TO REVISE MATERIAL SAFETY DATA SHEETS PERIODICALLY AS NEW INFORMATION BECOMES AVAILABLE.

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SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, SOURCES OF IGNITION

INCOMPATIBLES: STRONG OXIDIZING AGENTS

DECOMPOSITION PRODUCTS: HYDROGEN CHLORIDE

SECTION VII - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

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

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

SPOSAL PROCEDURE

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

EPA HAZARDOUS WASTE NUMBER: U037 (TOXIC WASTE)

SECTION VIII - PROTECTIVE EQUIPMENT

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

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 1000 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS RECOMMENDED.

EYE/SKIN PROTECTION: SAFETY GOGGLES, UNIFORM, APRON, RUBBER GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: RED

ECIAL PRECAUTIONS

BOND AND GROUND CONTAINERS WHEN TRANSFERRING LIQUID. KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID

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EFFECTIVE: 10/11/85 ISSUED: 01/23/86

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: CHLOROFORM
FORMULA: CHCL3
FORMULA WT: 119.38
CAS NO.: 00067-66-3
NIOSH/RTECS NO.: FS9100000
COMMON SYNONYMS: TRICHLOROMETHANE; METHYL TRICHLORIDE
PRODUCT CODES: 9175,9182,E910,9183,9174,9181,9257,9186,9180

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	- 3	(CANCER CAUSING)
FLAMMABILITY	- 0	
REACTIVITY	- 1	
CONTACT	- 2	

LABORATORY PROTECTIVE EQUIPMENT

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

PRECAUTIONARY LABEL STATEMENTS

POISON DANGER
HARMFUL IF SWALLOWED OR INHALED
CAUSES IRRITATION

NOTE: REPORTED AS CAUSING CANCER IN LABORATORY ANIMALS. EXERCISE DUE CARE.
AVOID CONTACT WITH EYES, SKIN, CLOTHING.
AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING.

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
CHLOROFORM	90-100	67-66-3

SECTION III - PHYSICAL DATA

BOILING POINT:	61 C (142 F)	VAPOR PRESSURE(MM HG):	160
MELTING POINT:	-64 C (-83 F)	VAPOR DENSITY(AIR=1):	4.1
SPECIFIC GRAVITY: (H2O=1)	1.47	EVAPORATION RATE: (BUTYL ACETATE=1)	11.5
SOLUBILITY(H2O):	SLIGHT (0.1 TO 1 %)	% VOLATILES BY VOLUME:	100

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C-50 2/15/90

SECTION III - PHYSICAL DATA (CONTINUED)

APPEARANCE & ODOR: CLEAR, COLORLESS LIQUID WITH PLEASANT, SWEET ODOR.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: N/A NFPA 704M RATING: 2-0-0

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

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

TOXIC GASES PRODUCED
HYDROGEN CHLORIDE, CHLORINE, PHOSGENE

SECTION V - HEALTH HAZARD DATA

THIS SUBSTANCE IS LISTED AS ONE WHICH MAY BE REASONABLY ANTICIPATED TO BE A CARCINOGEN BY THE NATIONAL TOXICITY PROGRAM (NTP).

THRESHOLD LIMIT VALUE (TLV/TWA): 50 MG/M3 (10 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 225 MG/M3 (50 PPM)

TOXICITY:	LD50 (ORAL-RAT)(MG/KG)	- 1194
	LD50 (ORAL-MOUSE)(MG/KG)	- 80
	LC50 (INHAL-MOUSE) (G/M3)	- 28

EFFECTS OF OVEREXPOSURE
CONTACT WITH SKIN HAS A DEFATTING EFFECT, CAUSING DRYING AND IRRITATION.
OVEREXPOSURE TO VAPORS MAY CAUSE IRRITATION OF MUCOUS MEMBRANES, DRYNESS OF MOUTH AND THROAT, HEADACHE, NAUSEA AND DIZZINESS.
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE KIDNEY AND/OR LIVER DAMAGE.

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. FLUSH SKIN WITH WATER.

SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONTINUED ON PAGE: 3

SECTION VI - REACTIVITY DATA (CONTINUED)

CONDITIONS TO AVOID: HEAT, LIGHT

INCOMPATIBLES: STRONG BASES, CHEMICALLY ACTIVE METALS

DECOMPOSITION PRODUCTS: OXIDES OF CHLORINE, CHLORINE, HYDROGEN CHLORIDE

SECTION VII - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH SPILL AREA WITH WATER.

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

DISPOSAL PROCEDURE

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

EPA HAZARDOUS WASTE NUMBER: U044 (TOXIC WASTE)

SECTION VIII - PROTECTIVE EQUIPMENT

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

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS ABOVE 10 PPM, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

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

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: BLUE

SPECIAL PRECAUTIONS

KEEP CONTAINER TIGHTLY CLOSED. STORE IN SECURE POISON AREA.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

CONTINUED ON PAGE: 4

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION (CONTINUED)

PROPER SHIPPING NAME	CHLOROFORM (AIR AND WATER ONLY)
HAZARD CLASS	ORM-A
UN/NA	UN1888
LABELS	NONE
REPORTABLE QUANTITY	5000 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	CHLOROFORM
HAZARD CLASS	6.1
UN/NA	UN1888
LABELS	POISON

(TM) AND (R) DESIGNATE TRADEMARKS.
N/A = NOT APPLICABLE OR NOT AVAILABLE

THE INFORMATION PUBLISHED IN THIS MATERIAL SAFETY DATA SHEET HAS BEEN COMPILED FROM OUR EXPERIENCE AND DATA PRESENTED IN VARIOUS TECHNICAL PUBLICATIONS. IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE SUITABILITY OF THIS INFORMATION FOR THE ADOPTION OF NECESSARY SAFETY PRECAUTIONS. WE RESERVE THE RIGHT TO REVISE MATERIAL SAFETY DATA SHEETS PERIODICALLY AS NEW INFORMATION BECOMES AVAILABLE.

-- LAST PAGE --

Material Safety Data Sheet

2,4-D ISOOCTYL ESTER

SECTION I — IDENTIFICATION OF PRODUCT

MANUFACTURER'S NAME	Platte Chemical Co., Inc.
EMERGENCY TELEPHONE NO.	(303) 356-4400 or CHEMTREC (800) 424-9300
ADDRESS	150 So. Main Street Fremont, Nebraska 68025
TRADE NAME AND SYNONYMS	CLEAN CROP 2,4-D ISOOCTYL ESTER
CHEMICAL NAME AND SYNONYMS	2,4-D Low Vol; 2,4-D LV; Isooctyl Ester of 2,4-Dichlorophenoxyacetic Acid
CHEMICAL FAMILY	Phenoxy herbicide

SECTION II — HAZARDOUS INGREDIENTS OF MIXTURES

COMPONENT	%	THRESHOLD LIMIT VALUE (Units)
Isooctyl ester of 2,4-dichlorophenoxyacetic acid		None established
Inert Ingredients		—

SECTION III — PHYSICAL DATA

APPEARANCE AND ODOR	Amber liquid with an alcohol-like odor		
BOILING POINT (DEGREES FAHRENHEIT)	2,4-D isooctyl ester: 170°-180°C @ 0.5 mmHg	SPECIFIC GRAVITY (WATER = 1)	Approx. 1.15
DENSITY	approx. 9.6 lbs./lbs. gal.		
VAPOR PRESSURE (MM. OF MERCURY)	Not available	PERCENT VOLATILE (BY VOLUME)	Not available
VAPOR DENSITY (AIR = 1)	Not available	EVAPORATION RATE (BUTYL ACETATE = 1)	Lower than Butyl Acetate
SOLUBILITY IN WATER	Virtually Insoluble	Note:	This product is intended for formulating use only.

SECTION IV — FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (SPECIFY METHOD/DEGREES FAHRENHEIT)	> 240°F TCC	FLAMMABLE LIMITS (PERCENT BY VOLUME)	LOWER — Not Established — UPPER

FIRE EXTINGUISHING MEDIA
Dry Chemical, Foam, CO_2, Water Spray or Fog

SPECIAL FIRE FIGHTING PROCEDURES
Wear self-contained breathing apparatus and full protective clothing. Smoke and fumes from fire may contain hazardous components.

UNUSUAL FIRE AND EXPLOSION HAZARDS
If water is used to fight fire, dike area to contain run-off and prevent contamination of water supplies.

SECTION V — REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID: Excessive heat.
	STABLE	X	

INCOMPATABILITY (Materials to avoid)
Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS:
Not known; however, some chlorine-containing compounds and other hazardous products may be formed in fire situation.

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID: None known.
	WILL NOT OCCUR	X	

READ THE BACK.

CLEAN CROP is a Registered T.M. of United Agri Products, Inc

1804

C-54 (2/15/90)

MSDS: 2,4-D ISOOCTYL ESTER

SECTION VI — HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE
Routes of Entry: Ingestion, inhalation, eyes and skin contact. Product is considered moderately toxic; primary route of exposure is from dermal contact. May be harmful if swallowed or inhaled. Irritation of eyes, nasal passages, throat and skin may become severe, especially prolonged or repeated exposure, and may lead to allergic skin reacations. Overexposure may result in nausea, vomiting, tenseness, muscular weakness, diarrhea, and lead to abdominal cramps, convulsions and possibly death.

EMERGENCY AND FIRST AID PROCEDURES
Ingestion—Drink 1 or 2 glasses of water and induce vomiting. Call a physician immediately. Never induce vomiting or give anything by mouth to an unconscious person.
Eyes—Flush with running water for at least 15 minutes and get medical attention.
Skin—Wash thoroughly with soap and water. Remove all contaminated clothing and wash before reuse.
Inhalation—Remove to fresh air. If irritation persists, get medical attention.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:
None known.

POTENTIAL CARCINOGEN STATUS:
Not known. None of the components in this product is listed by IARC, NTP or OSHA as a carcinogen.
IARC CANCER REVIEW: ANIMAL INADEQUATE EVIDENCE; IMEMDT 15,111,77; IARC Monogr Eval Carcinog Risk Chem Man.

SECTION VII — SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Contain spill, absorb liquids by covering with clay or other absorbant material; vacuum, scoop or sweep up wastes and place in container for disposal.

WASTE DISPOSAL METHOD
Material which cannot be used at the site should be disposed of in an approved waste disposal facility, following all applicable Federal, State and Local regulations. Triple rinse containers and offer for recycling or reconditioning, or puncture and dispose of in an approved sanitary landfill. Do not contaminate water supplies by disposal of wastes or containers.

SECTION VIII — SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)
Not normally required. If vapors may exceed acceptable levels, wear MSHA/NIOSH-approved respirator or mask for protection against pesticide dusts, mists and vapors.

VENTILATION		
	LOCAL EXHAUST: Use in manufacturing plants, and for work in confined areas.	SPECIAL: Direct exhaust ventilation through appropriate filter or scrubber before release.
	MECHANICAL (General): Use if ventilation is not adequate.	OTHER: Work in well ventilated area.

PROTECTIVE GLOVES	EYE PROTECTION
Rubber or impervious.	Chemical goggles or shielded safety glasses.

OTHER PROTECTIVE EQUIPMENT
Wear clothing consistent with good practices for handling and applying pesticides. Wear protective clothing, including long pants, long-sleeved shirt, hat and rubber boots during mixing and loading operations. Wash clothing before reuse.

SECTION IX — SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Store in a cool, dry place, away from children, food and feed products, seed and fertilizer. Do not contaminate other stored products or the storage area by handling or storage of this product. Immediately clean up any spills which occur during handling and storage.

OTHER PRECAUTIONS
Do not contaminate water supplies by handling or storage of product, cleaning of equipment or disposal of wastes. Keep work and storage areas clean. Toxic to fish and other aquatic organisms. Read and follow precautionary measures on product label.

SECTION X — DOT INFORMATION AND DATE

DOT CLASSIFICATION	DOT LABEL	DATE OF ISSUE	SUPERSEDES
RQ HAZARDOUS SUBSTANCE, LIQUID, N.O.S., ORM-E. NA 9188 (2,4-D ESTER)	None Required	12/30/87	New

All information contained in this Material Safety Data Sheet is furnished free of charge and is intended for your evaluation. In our opinion the information is, as of the date this Material Safety Data Sheet, reliable, however, it is your responsibility to determine the suitability of the information for your use. You are advised not to construe the information as absolutely complete since additional information may be necessary or desirable when particular, exceptional or variable conditions or circumstances exist or because of applicable laws or government regulations. Therefore, you should use this information only as a supplement to other information gathered by you, and you must make independent determinations of the suitability and completeness of the information from all sources to assure both proper use of the material described herein and the safety and health of employees. Accordingly, no guarantee expressed or implied is made by Platte as to the results to be obtained based upon your use of the information nor does Platte assume any liability arising out of your use of the information.

C-55 (2/15/90)

chemists helping chemists in research & industry
aldrich chemical co.
P.O. Box 355, Milwaukee, Wisconsin 53201 USA

Telephone: (414) 273-3850
TWX: (910) 262-3052 Aldrichem MI
Telex: 26 843 Aldrich MI
FAX: (414) 273-4979

ATTN: SAFETY DIRECTOR
AKZO CHEMIE AMERICA
300 S RIVERSIDE PLAZA
CHICAGO IL 60606

DATE: 10/16/87
CUST # 105252 P.O. # 109936R

MATERIAL SAFETY DATA SHEET

IDENTIFICATION

PRODUCT # 27764-9 NAME: ETHYL ALCOHOL, ANHYDROUS, DENATURED, GOLD LABEL

CAS # 64-17-5

TOXICITY HAZARDS

RTECS # KQ6300000
ETHYL ALCOHOL

IRRITATION DATA

SKN-RBT 400 MG OPEN MLD	UCDS** 7/22/70
SKN-RBT 500 MG/24H SEV	28ZPAK -,34,72
EYE-RBT 79 MG	AJOPAA 29,1363,46
EYE-RBT 100 MG/24H MOD	28ZPAK -,34,72
EYE-RBT 100 MG/4S RINSE MOD	FCTOD7 20,573,82

TOXICITY DATA

ORL-CHD LDLO:2000 MG/KG	ATXKA8 17,183,58
ORL-HMN LDLO:1400 MG/KG	NPIRI* 1,44,74
SCU-INF LDLO:19440 MG/KG	AJCPAI 5,466,35
ORL-RAT LD50:7060 MG/KG	TXAPA9 16,718,70
IHL-RAT LC50:20000 PPM/10H	NPIRI* 1,44,74
IPR-RAT LD50:3750 MG/KG	EVHPAZ 61,321,85
IVN-RAT LD50:1440 MG/KG	TXAPA9 18,60,71
ORL-MUS LD50:7500 MG/KG	BCTKAG 6,399,73
IHL-MUS LC50:39 GM/M3/4H	GTPZAB 26(8),53,82
IPR-MUS LD50:933 MG/KG	SCCUR* -,5,61
IVN-MUS LD50:1973 MG/KG	HBTXAC 1,128,55
ORL-RBT LD50:6300 MG/KG	HBTXAC 1,130,55
IPR-RBT LD50:963 MG/KG	EVHPAZ 61,321,85
IVN-RBT LD50:2374 MG/KG	EVHPAZ 61,321,85
ORL-GPG LD50:5560 MG/KG	JIHTAB 23,259,41
IPR-GPG LD50:3414 MG/KG	EVHPAZ 61,321,85
IPR-HAM LD50:5068 MG/KG	EVHPAZ 61,321,85
IPR-MAM LD50:4300 MG/KG	TXAPA9 13,358,68

REVIEWS, STANDARDS, AND REGULATIONS

ACGIH TLV-TWA 1000 PPM 85INA8 5,242,86
MSHA STANDARD-AIR:TWA 1000 PPM (1900 MG/M3) DTLVS* 3,103,71
OSHA STANDARD-AIR:TWA 1000 PPM FEREAC 39,23540,74
EPA GENETOX PROGRAM 1986, POSITIVE: RODENT DOMINANT LETHAL; PLANT GENE MUTATION
EPA GENETOX PROGRAM 1986, POSITIVE: PLANT CHROMOSOME
EPA GENETOX PROGRAM 1986, NEGATIVE: ASPERGILLUS-FORWARD MUTATION; SHE-CLONAL ASSAY
EPA GENETOX PROGRAM 1986, NEGATIVE: CELL TRANSFORM.-RLV F344 RAT EMBRYO
EPA GENETOX PROGRAM 1986, NEGATIVE: IN VITRO CYTOGENETICS-NONHUMAN; MAMMALIAN MICRONUCLEUS
EPA GENETOX PROGRAM 1986, NEGATIVE: N CRASSA-ANEUPLOIDY; HISTIDINE REVERSION-AMES TEST
EPA GENETOX PROGRAM 1986, NEGATIVE: IN VITRO SCE-HUMAN LYMPHOCYTES; IN VITRO SCE-HUMAN
EPA GENETOX PROGRAM 1986, NEGATIVE: IN VITRO SCE-NONHUMAN; SPERM MORPHOLOGY-MOUSE
EPA GENETOX PROGRAM 1986, NEGATIVE/LIMITED: CARCINOGENICITY-MOUSE/RAT
EPA TSCA CHEMICAL INVENTORY, 1986

Belgium
Aldrich Chemie N.V. S.A.
Ed. Lambermontlaan 140, b. 6
B-1030 Brussels
Telephone (02) 2428750
Telex 62302 A chem B
FAX (02) 242 82 15

France
Aldrich Chimie S.a.r.l.
27, Fosse des Treize
F 67000 Strasbourg
Telephone (08) 327010
Telex 890076 Aldrich F
FAX (88) 75 12 83

Japan
Aldrich Japan
Kyodo Bldg. Shinkanda
10 Kanda Mikurachio
Chiyoda Ku, Tokyo
Telephone (03) 256 0155
FAX (03) 256 0157

United Kingdom
Aldrich Chemical Co. Ltd.
The Old Brickyard, New Road
Gillingham, Dorset SP8 4JL
Telephone (07476) 2211
Telex 417738 Aldrich G
FAX (07476) 3779

West Germany
Aldrich Chemie GmbH & Co. KG
D 7924 Steinheim
Telephone (07329) 87 0
Telex 714838 Aldrich D
FAX (07329) 87 39

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chemists helping chemists in research & industry
aldrich chemical co.
P.O. Box 355, Milwaukee, Wisconsin 53201 USA

Telephone: (414) 273-3850
TWX: (910) 262-3052 Aldrichem MI
Telex: 26 843 Aldrich MI
FAX: (414) 273-4979

MATERIAL SAFETY DATA SHEET

CATALOG # 27764-9 NAME: ETHYL ALCOHOL, ANHYDROUS, DENATURED, GOLD LABEL

EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, DECEMBER 1986
NIOSH ANALYTICAL METHODS: SEE ALCOHOLS I, 1400; IN BLOOD, SEE 2-BUTANONE, ETHANOL 8002
MEETS CRITERIA FOR PROPOSED OSHA MEDICAL RECORDS RULE FEREAC 47,30420, 82

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

HEALTH HAZARD DATA

ACUTE EFFECTS
MAY BE FATAL IF INHALED, SWALLOWED, OR ABSORBED THROUGH SKIN.
VAPOR OR MIST IS IRRITATING TO THE EYES, MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT.
CAUSES SKIN IRRITATION.
EXPOSURE CAN CAUSE:
DAMAGE TO THE EYES
NAUSEA, DIZZINESS AND HEADACHE
CAN CAUSE CNS DEPRESSION.

CHRONIC EFFECTS
DAMAGE TO THE LIVER
DAMAGE TO THE HEART
DAMAGE TO THE KIDNEYS

FIRST AID
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
ASSURE ADEQUATE FLUSHING OF THE EYES BY SEPARATING THE EYELIDS WITH FINGERS.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
CALL A PHYSICIAN.
WASH CONTAMINATED CLOTHING BEFORE REUSE.

ADDITIONAL INFORMATION
MATERIAL IS DENATURED WITH 5% METHYL ALCOHOL AND 5% 2-PROPANOL.
WARNING: METHYL ALCOHOL MAY BE FATAL OR CAUSE BLINDNESS IF SWALLOWED.

PHYSICAL DATA

MELTING POINT: -130 C
BOILING POINT: 78 C
SPECIFIC GRAVITY: 0.789
VAPOR DENSITY: 1.59
VAPOR PRESSURE: 44.6 MM @ 20 C

FIRE AND EXPLOSION HAZARD DATA

AUTO IGNITION TEMP.: 683 F
LOWER EXPLOSION LEVEL: 3.3%63C
UPPER EXPLOSION LEVEL: 24.5%
FLASH POINT: 56 F

EXTINGUISHING MEDIA
CARBON DIOXIDE, DRY CHEMICAL POWDER, ALCOHOL OR POLYMER FOAM.

SPECIAL FIRE FIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.
USE WATER SPRAY TO COOL FIRE-EXPOSED CONTAINERS.
WARNING!
FLAMMABLE LIQUID.

Belgium Aldrich Chemie N.V. S.A. Bd. Lambermontlaan 140 b 6 B 1030 Brussels Telephone (32) 2422750 Telex 62302 Alchem B FAX (32)242 82 16

France Aldrich Chimie S.a.r.l. 27 Fosse des Treize F 67000 Strasbourg Telephone (88) 327010 Telex 890076 Aldrich F FAX (88) 75 12 83

Japan Aldrich Japan Kyodo Bldg. Shinkanda 10 Kanda Mikuracho Chiyoda Ku Tokyo Telephone (03) 256 0155 FAX (03) 256 0157

United Kingdom Aldrich Chemical Co. Ltd. The Old Brickyard New Road Gillingham Dorset SP8 4JL Telephone (07476) 2211 Telex 417238 Aldrich G FAX (07476) 3779

West Germany Aldrich Chemie GmbH & Co. KG D 7924 Steinheim Telephone (07329) 67 0 Telex 714436 Aldri D FAX (07329) 87 39

C-57 (2/15/90)

chemists helping chemists in research & industry
aldrich chemical co.
P.O. Box 355, Milwaukee, Wisconsin 53201 USA

Telephone: (414) 273-3850
TWX: (910) 262-3052 Aldrichem MI
Telex: 26 843 Aldrich MI
FAX: (414) 273-4979

CATALOG # 27764-9 NAME: ETHYL ALCOHOL, ANHYDROUS, DENATURED, GOLD LABEL

UNUSUAL FIRE AND EXPLOSION HAZARDS
VAPOR MAY TRAVEL CONSIDERABLE DISTANCE TO SOURCE OF IGNITION AND FLASH BACK.

REACTIVITY DATA

INCOMPATIBILITIES
OXIDIZING AGENTS
PEROXIDES
ACIDS
ACID CHLORIDES
ACID ANHYDRIDES
ALKALI METALS
AMMONIA
MOISTURE

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS
TOXIC FUMES OF:
CARBON MONOXIDE, CARBON DIOXIDE

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED
SHUT OFF ALL SOURCES OF IGNITION.
EVACUATE AREA.
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.
ABSORB ON SAND OR VERMICULITE AND PLACE IN CLOSED CONTAINERS FOR DISPOSAL.
WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

WASTE DISPOSAL METHOD
BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER BUT EXERT EXTRA CARE IN IGNITING AS THIS MATERIAL IS HIGHLY FLAMMABLE.

OBSERVE ALL FEDERAL, STATE & LOCAL LAWS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.
USE ONLY IN A CHEMICAL FUME HOOD.
SAFETY SHOWER AND EYE BATH.
DO NOT BREATHE VAPOR.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
AVOID PROLONGED OR REPEATED EXPOSURE.
WASH THOROUGHLY AFTER HANDLING.
POISON.
IRRITANT.
KEEP TIGHTLY CLOSED.
KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAME.
HYGROSCOPIC.
STORE IN A COOL DRY PLACE.

ADDITIONAL PRECAUTIONS AND COMMENTS

ADDITIONAL INFORMATION
FOR ADDITIONAL INFORMATION SEND FOR MSDS ON: 10,982-7 2-PROPANOL AND 15,490-0 METHYL ALCOHOL.

Belgium
Aldrich Chemie N.V./S.A.
Bd. Lambermontlaan 140 b 6
B-1030 Brussels
Telephone (02) 2428750
Telex 62302 Aldrichem B
FAX (02) 242 82 16

France
Aldrich Chimie S.a.r.l.
27 Fusée des Treize
F-67000 Strasbourg
Telephone (88) 327010
Telex 890076 Aldrich F
FAX (88) 75 12 63

Japan
Aldrich Japan
Kyodo Bldg. Shinkanda
10 Kanda Mikuracho
Chiyoda-Ku, Tokyo
Telephone (03) 255 0155
Telex 4417733 Aldrich G
FAX (03) 256-0157

United Kingdom
Aldrich Chemical Co. Ltd.
The Old Brickyard, New Road
Gillingham, Dorset SP8 4JL
Telephone (0747) 2211
Telex 417733 Aldrich G
FAX (0747) 3779

West Germany
Aldrich Chemie GmbH & Co. KG
D-7924 Steinheim
Telephone (07329) 8700
Telex 7144034 Aldri D
FAX (07329) 87 99

C-58 (2/15/90)

chemists helping chemists in research & industry
aldrich chemical co.
P.O. Box 355, Milwaukee, Wisconsin 53201 USA

Telephone: (414) 273-3850
TWX: (910) 262-3052 Aldrichem MI
Telex: 26 843 Aldrich MI
FAX: (414) 273-4979

MATERIAL SAFETY DATA SHEET

CATALOG # 27764-9 NAME: ETHYL ALCOHOL, ANHYDROUS, DENATURED, GOLD LABEL

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

Belgium
Aldrich Chemie N.V.-S.A.
Bd. Lambermontlaan 140, b. 6
B-1030 Brussels
Telephone (02) 2428750
Telex 62502 A chem B
FAX (02)242 82 16

France
Aldrich Chimie S.a.r.l.
27, Fosse des Treize
F-67000 Strasbourg
Telephone (88) 327010
Telex 890076 Aldrich F
FAX (88) 75 12 83

Japan
Aldrich Japan
Kyodo Bldg. Shinkanda
10 Kanda Mikuracho
Chiyoda-Ku, Tokyo
Telephone (03) 258 0155
FAX (03) 258 0157

United Kingdom
Aldrich Chemical Co., Ltd.
The Old Brickyard, New Road
Gillingham, Dorset SP8 4JL
Telephone (07476) 2211
Telex 417238 Aldrich G
FAX (07476) 3779

West Germany
Aldrich Chemie GmbH & Co. KG
D-7924 Steinheim
Telephone (07329) 87-0
Telex 714638 Aldr D
FAX (07329) 87 39

C-59 (2/15/90)

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

M A T E R I A L S A F E T Y D A T A S H E E T

24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151

CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: ETHYL ACETATE
FORMULA: CH3COOC2H5
FORMULA WT: 88.11
CAS NO.: 00141-78-6
NIOSH/RTECS NO.: AH5425000
COMMON SYNONYMS: ACETIC ACID ETHYL ESTER; ETHYL ETHANOATE; ETHYL ACETIC ESTE
PRODUCT CODES: 9279,9280,9284,9260,9281,9282

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH - 2
FLAMMABILITY - 3 (FLAMMABLE)
REACTIVITY - 0
CONTACT - 2

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

PRECAUTIONARY LABEL STATEMENTS

WARNING
FLAMMABLE
HARMFUL IF SWALLOWED OR INHALED
CAUSES IRRITATION

KEEP AWAY FROM HEAT, SPARKS, FLAME. AVOID CONTACT WITH EYES, SKIN, CLOTHING. AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE WATER SPRAY, ALCOHOL FOAM, DRY CHEMICAL, OR CARBON DIOXIDE. FLUSH SPILL AREA WITH WATER SPRAY.

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
ETHYL ACETATE	90-100	141-78-6

SECTION III - PHYSICAL DATA

BOILING POINT: 77 C (171 F)
VAPOR PRESSURE(MM HG): 76

MELTING POINT: -84 C (-119 F)
VAPOR DENSITY(AIR=1): 3.0

ECIFIC GRAVITY: 0.90 (H2O=1)
EVAPORATION RATE: 6 (BUTYL ACETATE=1)

CONTINUED ON PAGE: 2

SECTION III - PHYSICAL DATA (CONTINUED)

SOLUBILITY(H2O): MODERATE (1 TO 10 %) % VOLATILES BY VOLUME: 100

APPEARANCE & ODOR: CLEAR, COLORLESS LIQUID WITH PLEASANT FRUITY ODOR.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: -4 C (24 F) NFPA 704M RATING: 1-3-0

FLAMMABLE LIMITS: UPPER - 11 % LOWER - 2.2 %

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

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

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

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 400 MG/M3 (1400 PPM)

TOXICITY: LD50 (ORAL-RAT)(G/KG) - 11
LC50 (INHL-RAT-8H) (PPM) - 1600

EFFECTS OF OVEREXPOSURE
LIQUID MAY CAUSE DERMATITIS.
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE KIDNEY AND/OR LIVER DAMAGE.

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. FLUSH SKIN WITH WATER.

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SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, SOURCES OF IGNITION, FLAME

INCOMPATIBLES: STRONG OXIDIZING AGENTS, STRONG ACIDS, STRONG BASES

SECTION VII - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

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

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

DISPOSAL PROCEDURE

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

EPA HAZARDOUS WASTE NUMBER: U112 (TOXIC WASTE)

SECTION VIII - PROTECTIVE EQUIPMENT

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

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 1000 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS RECOMMENDED.

EYE/SKIN PROTECTION: SAFETY GOGGLES, UNIFORM, APRON, NEOPRENE GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: RED

SPECIAL PRECAUTIONS

BOND AND GROUND CONTAINERS WHEN TRANSFERRING LIQUID. KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA.

CONTINUED ON PAGE: 4

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	ETHYL ACETATE
HAZARD CLASS	FLAMMABLE LIQUID
UN/NA	UN1173
LABELS	FLAMMABLE LIQUID

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	ETHYL ACETATE
HAZARD CLASS	3.2
UN/NA	UN1173
LABELS	FLAMMABLE LIQUID

(TM) AND (R) DESIGNATE TRADEMARKS.
N/A = NOT APPLICABLE OR NOT AVAILABLE

THE INFORMATION PUBLISHED IN THIS MATERIAL SAFETY DATA SHEET HAS BEEN COMPILED
OM OUR EXPERIENCE AND DATA PRESENTED IN VARIOUS TECHNICAL PUBLICATIONS. IT IS
E USER'S RESPONSIBILITY TO DETERMINE THE SUITABILITY OF THIS INFORMATION FOR
THE ADOPTION OF NECESSARY SAFETY PRECAUTIONS. WE RESERVE THE RIGHT TO REVISE
MATERIAL SAFETY DATA SHEETS PERIODICALLY AS NEW INFORMATION BECOMES AVAILABLE.

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J. T. BAKER CHEMICAL CO. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: ETHER, ANHYDROUS
FORMULA: $(C_2H_5)_2O$
FORMULA WT: 74.12
CAS NO.: 60-29-7
NIOSH/RTECS NO.: KI5775000
COMMON SYNONYMS: DIETHYL ETHER; ETHYL ETHER; 1,1'-OXYBISETHANE
PRODUCT CODES: 9242,9245,9244,9197,9248,9247,9259,9237

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH - 2
FLAMMABILITY - 4 (FLAMMABLE)
REACTIVITY - 1
CONTACT - 1

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

PRECAUTIONARY LABEL STATEMENTS

DANGER
EXTREMELY FLAMMABLE - HIGHLY VOLATILE
TENDS TO FORM EXPLOSIVE PEROXIDES - ESPECIALLY WHEN ANHYDROUS
HARMFUL IF INHALED - CAUSES IRRITATION

KEEP AWAY FROM HEAT, SPARKS, FLAME.
AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. IN CASE OF FIRE, USE WATER SPRAY, ALCOHOL FOAM, DRY CHEMICAL, OR CARBON DIOXIDE. FLUSH SPILL AREA WITH WATER SPRAY.

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
ETHER, ANHYDROUS	90-100	60-29-7
ETHYL ALCOHOL	0-2.5	64-17-5

SECTION III - PHYSICAL DATA

BOILING POINT: 35 C (95 F)
MELTING POINT: -116 C (-177 F)
SPECIFIC GRAVITY: 0.71 (H2O=1)
VAPOR PRESSURE(MM HG): 442
VAPOR DENSITY(AIR=1): 2.6
EVAPORATION RATE: 37.5 (BUTYL ACETATE=1)

CONTINUED ON PAGE: 2

SECTION III - PHYSICAL DATA (CONTINUED)

SOLUBILITY(H2O): MODERATE (1 TO 10 %) % VOLATILES BY VOLUME: 100

APPEARANCE & ODOR: COLORLESS LIQUID WITH CHARACTERISTIC SWEET ODOR.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: -45 C (-49 F) NFPA 704M RATING: 2-4-1

FLAMMABLE LIMITS: UPPER - 48 % LOWER - 1.9 %

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

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

UNUSUAL FIRE & EXPLOSION HAZARDS
VAPORS MAY FLOW ALONG SURFACES TO DISTANT IGNITION SOURCES AND FLASH BACK.
CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE.
MAY FORM EXPLOSIVE PEROXIDES, ESPECIALLY WHEN HEATED.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 1200 MG/M3 (400 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 1500 MG/M3 (500 PPM)

TOXICITY:

LD50 (ORAL-RAT)(MG/KG)	-	1700
LC50 (INHAL-RABBIT)(PPM)	-	1060
LD50 (SKIN-RABBIT)(MG/KG)	-	360

EFFECTS OF OVEREXPOSURE
INHALATION OF VAPORS MAY CAUSE NAUSEA, VOMITING, LIGHTHEADEDNESS OR HEADACHE.
VAPORS MAY BE IRRITATING TO SKIN, EYES, NOSE AND THROAT.

EMERGENCY AND FIRST AID PROCEDURES
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. FLUSH SKIN WITH WATER.

CONTINUED ON PAGE: 3

SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: FLAME, HEAT, SOURCES OF IGNITION, LIGHT, AIR

INCOMPATIBLES: STRONG BASES, STRONG OXIDIZING AGENTS, ALUMINUM, COMBUSTIBLE MATERIALS

DECOMPOSITION PRODUCTS: EXPLOSIVE PEROXIDES

SECTION VII - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

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

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

OSAL PROCEDURE

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

EPA HAZARDOUS WASTE NUMBER: U117 (TOXIC WASTE)

SECTION VIII - PROTECTIVE EQUIPMENT

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

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 1000 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS RECOMMENDED.

EYE/SKIN PROTECTION: SAFETY GLASSES WITH SIDESHIELDS, PROPER GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: RED

IAL PRECAUTIONS

BOND AND GROUND CONTAINERS WHEN TRANSFERRING LIQUID. KEEP CONTAINER

CONTINUED ON PAGE: 4

SECTION IX - STORAGE AND HANDLING PRECAUTIONS (CONTINUED)

TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA.
USE CAUTION WHEN OPENING CAP. IMPORTANT - DO NOT USE AFTER EXPIRATION DATE.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	ETHYL ETHER
HAZARD CLASS	FLAMMABLE LIQUID
UN/NA	UN1155
LABELS	FLAMMABLE LIQUID

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	DIETHYL ETHER
HAZARD CLASS	3.1
UN/NA	UN1155
LABELS	FLAMMABLE LIQUID

(TM) AND (R) DESIGNATE TRADEMARKS.
N/A = NOT APPLICABLE OR NOT AVAILABLE

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J. T. BAKER CHEMICAL CO. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: HEXANES
FORMULA: C6H14
FORMULA WT: 86.18
CAS NO.: 00110-54-3
NIOSH/RTECS NO.: MN9275000
COMMON SYNONYMS: NORMAL HEXANE; HEXYL HYDRIDE
PRODUCT CODES: 9262,9310,9304,9306,N169,9309,N168,9303,9308

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH - 1
FLAMMABILITY - 3 (FLAMMABLE)
REACTIVITY - 0
CONTACT - 1

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

PRECAUTIONARY LABEL STATEMENTS

DANGER
EXTREMELY FLAMMABLE
CAUSES IRRITATION

KEEP AWAY FROM HEAT, SPARKS, FLAME.
AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. IN CASE OF FIRE, USE WATER SPRAY, ALCOHOL FOAM, DRY CHEMICAL, OR CARBON DIOXIDE. FLUSH SPILL AREA WITH WATER SPRAY.

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
HEXANES	90-100	110-54-3

SECTION III - PHYSICAL DATA

BOILING POINT: 69 C (156 F)
VAPOR PRESSURE(MM HG): 124

MELTING POINT: -95 C (-139 F)
VAPOR DENSITY(AIR=1): 3.0

SPECIFIC GRAVITY: 0.66 (H2O=1)
EVAPORATION RATE: 9 (BUTYL ACETATE=1)

SOLUBILITY(H2O): NEGLIGIBLE (LESS THAN 0.1 %)
% VOLATILES BY VOLUME: 100

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SECTION III - PHYSICAL DATA (CONTINUED)

APPEARANCE & ODOR: COLORLESS LIQUID WITH MILD ODOR.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: -22 C (-7 F) NFPA 704M RATING: 1-3-0

FLAMMABLE LIMITS: UPPER - 7.5 % LOWER - 1.1 %

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

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

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

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 180 MG/M3 (50 PPM)

TOXICITY: LD50 (ORAL-RAT)(G/KG) - 28.7

EFFECTS OF OVEREXPOSURE
OVEREXPOSURE TO VAPORS MAY CAUSE IRRITATION OF MUCOUS MEMBRANES, DRYNESS OF MOUTH AND THROAT, HEADACHE, NAUSEA AND DIZZINESS.

EMERGENCY AND FIRST AID PROCEDURES
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FO AT LEAST 15 MINUTES.

SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, SOURCES OF IGNITION, FLAME

COMPATIBLES: STRONG OXIDIZING AGENTS, CHLORINE, FLUORINE, MAGNESIUM PERCHLORATE

CONTINUED ON PAGE: 3

SECTION VII - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SUITABLE PROTECTIVE CLOTHING. SHUT OFF IGNITION SOURCES; NO FLARES, SMOKING, OR FLAMES IN AREA. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH AREA WITH WATER.

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

DISPOSAL PROCEDURE

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

EPA HAZARDOUS WASTE NUMBER: D001 (IGNITABLE WASTE)

SECTION VIII - PROTECTIVE EQUIPMENT

VENTILATION:	USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.
RESPIRATORY PROTECTION:	RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 1000 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS RECOMMENDED.
EYE/SKIN PROTECTION:	SAFETY GLASSES WITH SIDESHIELDS, NEOPRENE GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: RED

SPECIAL PRECAUTIONS

BOND AND GROUND CONTAINERS WHEN TRANSFERRING LIQUID. KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	HEXANE
HAZARD CLASS	FLAMMABLE LIQUID
UN/NA	UN1208
LABELS	FLAMMABLE LIQUID

CONTINUED ON PAGE: 4

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION (CONTINUED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	HEXANE, AND ITS ISOMERS
HAZARD CLASS	3.1
UN/NA	UN1208
LABELS	FLAMMABLE LIQUID

(TM) AND (R) DESIGNATE TRADEMARKS.
N/A = NOT APPLICABLE OR NOT AVAILABLE

THE INFORMATION PUBLISHED IN THIS MATERIAL SAFETY DATA SHEET HAS BEEN COMPILED FROM OUR EXPERIENCE AND DATA PRESENTED IN VARIOUS TECHNICAL PUBLICATIONS. IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE SUITABILITY OF THIS INFORMATION FOR THE ADOPTION OF NECESSARY SAFETY PRECAUTIONS. WE RESERVE THE RIGHT TO REVISE MATERIAL SAFETY DATA SHEETS PERIODICALLY AS NEW INFORMATION BECOMES AVAILABLE.

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72-62-7820-01

MATERIAL SAFETY DATA SHEET

Ashland Chemical Company
DIVISION OF ASHLAND OIL, INC.
P. O. BOX 2219, COLUMBUS, OHIO 43216 • (614) 889-3333
24-HOUR EMERGENCY TELEPHONE (606) 324-1133

THIS MSDS COMPLIES WITH 29 CFR 1910.1200 (THE HAZARD COMMUNICATION STANDARD)

PRODUCT NAME: ISOBUTANOL
CAS NUMBER: 78 83 1

ASHLAND CHEMICAL COMPANY
6428 JOLIET ROAD
COUNTRYSIDE, IL 60525

05 +61 -
DATA SHEET NO: 0004298-003
LATEST REVISION DATE: 09/06-86/
PRODUCT: 3495000
INVOICE: ACCLOC
INVOICE DATE: 09/10/86
TO:

**** INTERCOMPANY MAIL ****

SECTION I-PRODUCT IDENTIFICATION

GENERAL OR GENERIC ID: ALCOHOL

DOT HAZARD CLASSIFICATION: FLAMMABLE LIQUID (173.115) AND CORROSIVE (173.240)

SECTION II-COMPONENTS

INGREDIENT	% (BY WT)	PEL	TLV
ISOBUTANOL CAS #: 78-83-1	100	100	50 PPM

SECTION III-PHYSICAL DATA

PROPERTY	REFINEMENT	MEASUREMENT
BOILING POINT	FOR PRODUCT	226.00 DEG (107.77 DEG @ 760.00 MM
VAPOR PRESSURE	FOR PRODUCT	8.80 MM @ 68.00 DEG (20.00 DEG
SPECIFIC VAPOR DENSITY	AIR = 1	2.6
SPECIFIC GRAVITY		.802 - .804 @ 68.00 DEG (20.00 DEG
PERCENT VOLATILES		100.00%
EVAPORATION RATE	(N-BUTYL ACETATE = 1)	.82

SECTION IV-FIRE AND EXPLOSION INFORMATION

FLASH POINT(TCC) 85.0 DEG F
(29.4 DEG C)

EXPLOSIVE LIMIT (PRODUCT) LOWER - 1.7%

EXTINGUISHING MEDIA: ALCOHOL FOAM OR CARBON DIOXIDE OR DRY CHEMICAL

HAZARDOUS DECOMPOSITION PRODUCTS: MAY FORM TOXIC MATERIALS:, CARBON DIOXIDE AND CARBON MONOXIDE, VARIOUS HYDROCARBONS, ETC.

FIREFIGHTING PROCEDURES: WEAR SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE WHEN FIGHTING FIRES.

SPECIAL FIRE & EXPLOSION HAZARDS: VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL ALONG THE GROUND OR MAY BE MOVED BY VENTILATION AND IGNITED BY PILOT LIGHTS, OTHER FLAMES, SPARKS, HEATERS, SMOKING, ELECTRIC MOTORS, STATIC DISCHARGE, OR OTHER IGNITION SOURCES AT LOCATIONS DISTANT FROM MATERIAL HANDLING POINT.

NEVER USE WELDING OR CUTTING TORCH ON OR NEAR DRUM (EVEN EMPTY) BECAUSE PRODUCT (EVEN JUST RESIDUE) CAN IGNITE EXPLOSIVELY.
ALL FIVE GALLON PAILS AND LARGER METAL CONTAINERS SHOULD BE GROUNDED AND BONDED WHEN MATERIAL IS TRANSFERRED.

SECTION V-HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LEVEL 100 PPM

THRESHOLD LIMIT VALUE 50 PPM

EFFECTS OF ACUTE OVEREXPOSURE: FOR PRODUCT

EYES - CAN CAUSE SEVERE IRRITATION, POSSIBLE PERMANENT INJURY.
SKIN - CAN CAUSE IRRITATION. BURNS CAN RESULT FROM PROLONGED CONTACT
BREATHING - EXCESSIVE INHALATION OF VAPORS CAN CAUSE NASAL AND RESPIRATORY IRRITATION, DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE, POSSIBLE UNCONSCIOUSNESS, AND EVEN ASPHYXIATION.
SWALLOWING - CAN CAUSE GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING, AND DI

FIRST AID:

IF ON SKIN: THOROUGHLY WASH EXPOSED AREA WITH SOAP AND WATER. REMOVE CONTA

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SECTION V-HEALTH HAZARD DATA (CONTINUED)

CLOTHING. LAUNDER CONTAMINATED CLOTHING BEFORE RE-USE.

IF IN EYES: FLUSH WITH LARGE AMOUNTS OF WATER, LIFTING UPPER AND LOWER LIDS OCCASIONALLY, GET MEDICAL ATTENTION.

IF SWALLOWED: IMMEDIATELY DRINK TWO GLASSES OF WATER AND INDUCE VOMITING BY EITHER GIVING IPECAC SYRUP OR BY PLACING FINGER AT BACK OF THROAT. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. GET MEDICAL ATTENTION IMMEDIATELY.

IF BREATHED: IF AFFECTED, REMOVE INDIVIDUAL TO FRESH AIR. IF BREATHING IS DIFFICULT, ADMINISTER OXYGEN. IF BREATHING HAS STOPPED GIVE ARTIFICIAL RESPIRATION. KEEP PERSON WARM, QUIET AND GET MEDICAL ATTENTION.

PRIMARY ROUTE(S) OF ENTRY:

INHALATION

SKIN CONTACT

EFFECTS OF CHRONIC OVEREXPOSURE: FOR PRODUCT

OVEREXPOSURE TO THIS MATERIAL (OR ITS COMPONENTS) HAS APPARENTLY BEEN FOUND TO CAUSE THE FOLLOWING EFFECTS IN LABORATORY ANIMALS:, LIVER ABNORMALITIES

SECTION VI-REACTIVITY DATA

HAZARDOUS POLYMERIZATION: CANNOT OCCUR

STABILITY: STABLE

INCOMPATIBILITY: AVOID CONTACT WITH:, STRONG OXIDIZING AGENTS.

SECTION VII-SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

SMALL SPILL: ELIMINATE ALL SOURCES OF IGNITION SUCH AS FLARES, FLAMES (INCLUDING PILOT LIGHTS), AND ELECTRICAL SPARKS.
ABSORB LIQUID ON PAPER, VERMICULITE, FLOOR ABSORBENT, OR OTHER ABSORBENT MATERIAL AND TRANSFER TO HOOD.

LARGE SPILL: ELIMINATE ALL IGNITION SOURCES (FLARES, FLAMES INCLUDING PILOT LIGHTS, ELECTRICAL SPARKS). PERSONS NOT WEARING PROTECTIVE EQUIPMENT SHOULD BE EXCLUDED FROM AREA OF SPILL UNTIL CLEAN-UP HAS BEEN COMPLETED. STOP SPILL AT SOURCE, DIKE AREA OF SPILL TO PREVENT SPREADING, PUMP LIQUID TO SALVAGE TANK. REMAINING LIQUID MAY BE TAKEN UP ON SAND, CLAY, EARTH, FLOOR ABSORBENT, OR OTHER ABSORBENT MATERIAL AND SHOVELED INTO CONTAINERS.

WASTE DISPOSAL METHOD:

SMALL SPILL: ALLOW VOLATILE PORTION TO EVAPORATE IN HOOD. ALLOW SUFFICIENT TIME FOR VAPORS TO COMPLETELY CLEAR HOOD DUCT WORK. DISPOSE OF REMAINING MATERIAL IN ACCORDANCE WITH APPLICABLE REGULATIONS.

LARGE SPILL: DESTROY BY LIQUID INCINERATION.
CONTAMINATED ABSORBENT MAY BE DEPOSITED IN A LANDFILL IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

SECTION VIII-PROTECTIVE EQUIPMENT TO BE USED

RESPIRATORY PROTECTION: IF TLV OF THE PRODUCT OR ANY COMPONENT IS EXCEEDED, A NIOSH/MSHA JOINTLY APPROVED AIR SUPPLIED RESPIRATOR IS ADVISED IN ABSENCE OF PROPER ENVIRONMENTAL CONTROL. OSHA REGULATIONS ALSO PERMIT OTHER NIOSH/MSHA RESPIRATORS UNDER SPECIFIED CONDITIONS. (SEE YOUR SAFETY EQUIPMENT SUPPLIER). ENGINEERING OR ADMINISTRATIVE CONTROLS SHOULD BE IMPLEMENTED TO REDUCE EXPOSURE.

VENTILATION: PROVIDE SUFFICIENT MECHANICAL (GENERAL AND/OR LOCAL EXHAUST) VENTILATION TO MAINTAIN EXPOSURE BELOW TLV(S).

PROTECTIVE GLOVES: WEAR RESISTANT GLOVES SUCH AS:, NITRILE RUBBER

EYE PROTECTION: CHEMICAL SPLASH GOGGLES IN COMPLIANCE WITH OSHA REGULATIONS ARE ADVISED; HOWEVER, OSHA REGULATIONS ALSO PERMIT OTHER TYPE SAFETY GLASSES. (CONSULT YOUR SAFETY EQUIPMENT SUPPLIER)

OTHER PROTECTIVE EQUIPMENT: TO PREVENT REPEATED OR PROLONGED SKIN CONTACT, WEAR IMPERVIOUS CLOTHING AND BOOTS.

SECTION IX-SPECIAL PRECAUTIONS OR OTHER COMMENTS

CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTIED. SINCE EMPTIED CONTAINERS RETAIN PRODUCT RESIDUES (VAPOR, LIQUID, AND/OR SOLID), ALL HAZARD PRECAUTIONS GIVEN IN THE DATA SHEET MUST BE OBSERVED.

THE INFORMATION ACCUMULATED HEREIN IS BELIEVED TO BE ACCURATE BUT IS NOT WARRANTED TO BE WHETHER ORIGINATING WITH THE COMPANY OR NOT. RECIPIENTS ARE ADVISED TO CONFIRM IN ADVANCE OF NEED THAT THE INFORMATION IS CURRENT, APPLICABLE, AND SUITABLE TO THEIR CIRCUMSTANCES.

72-62-7820-01

MATERIAL SAFETY DATA SHEET

Ashland Chemical Company
DIVISION OF ASHLAND OIL, INC.
P. O. BOX 2219, COLUMBUS, OHIO 43216 • (614) 889-3333
24-HOUR EMERGENCY TELEPHONE (606) 324-1133

Ashland

THIS MSDS COMPLIES WITH 29 CFR 1910.1200 (THE HAZARD COMMUNICATION STANDARD)

****

PRODUCT NAME: ISOPROPANOL 99%
CAS NUMBER: 67 63 0

RECEIVED
APR 23 1986
G. F. ROTTER

AKZO-CHEMIE AMERICA
300 S. WACKER
CHICAGO IL 60606

ATTN: PLANT MGR./SAFETY DIR.

05 50 021 0256730-001
DATA SHEET NO: 0001444-004
LATEST REVISION DATE: 03/86-86063
PRODUCT: 7280000
INVOICE: 947478
INVOICE DATE: 04/04/86
TO: AKZO-CHEMIE AMERICA
8401 W. 47TH ST.
MCCOOK IL 60525

SECTION I-PRODUCT IDENTIFICATION

GENERAL OR GENERIC ID: ALCOHOL

DOT HAZARD CLASSIFICATION: FLAMMABLE LIQUID (173.115)

SECTION II-COMPONENTS

INGREDIENT	% (BY WT)	PEL	TLV	NOTE
ISOPROPANOL	>95	400	400 PPM	

SECTION III-PHYSICAL DATA

PROPERTY	REFINEMENT	MEASUREMENT
BOILING POINT	FOR PRODUCT	180.00 DEG F (82.22 DEG C) @ 760.00 MMHG
VAPOR PRESSURE	FOR PRODUCT	33.00 MMHG @ 68.00 DEG F (20.00 DEG C)
SPECIFIC VAPOR DENSITY	AIR = 1	2.0
SPECIFIC GRAVITY		.783 - .784 @ 77.00 DEG F (25.00 DEG C)
PERCENT VOLATILES		100.00%
EVAPORATION RATE	(ETHYL ETHER = 1)	7.70

SECTION IV-FIRE AND EXPLOSION INFORMATION

FLASH POINT(TCC) 53.00 DEG F
(11.66 DEG C)

EXPLOSIVE LIMIT (PRODUCT) LOWER - 2.0%

EXTINGUISHING MEDIA: ALCOHOL FOAM OR CARBON DIOXIDE OR DRY CHEMICAL

HAZARDOUS DECOMPOSITION PRODUCTS: MAY FORM TOXIC MATERIALS:, CARBON DIOXIDE AND CARBON MONOXIDE, ETC.

FIREFIGHTING PROCEDURES: WEAR SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE WHEN FIGHTING FIRES.

SPECIAL FIRE & EXPLOSION HAZARDS: NEVER USE WELDING OR CUTTING TORCH ON OR NEAR DRUM (EVEN EMPTY) BECAUSE PRODUCT (EVEN JUST RESIDUE) CAN IGNITE EXPLOSIVELY.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL ALONG THE GROUND OR MAY BE MOVED BY VENTILATION AND IGNITED BY PILOT LIGHTS, OTHER FLAMES, SPARKS, HEATERS, SMOKING, ELECTRIC MOTORS, STATIC DISCHARGE, OR OTHER IGNITION SOURCES AT LOCATIONS DISTANT FROM MATERIAL HANDLING POINT.
ALL FIVE GALLON PAILS AND LARGER METAL CONTAINERS SHOULD BE GROUNDED AND/OR BONDED WHEN MATERIAL IS TRANSFERRED.

NFPA CODES: HEALTH- 1 FLAMMABILITY- 3 REACTIVITY- 0

SECTION V-HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LEVEL 400 PPM

THRESHOLD LIMIT VALUE 400 PPM

EFFECTS OF ACUTE OVEREXPOSURE: FOR PRODUCT

EYES - CAN CAUSE SEVERE IRRITATION, REDNESS, TEARING, BLURRED VISION.
SKIN - PROLONGED OR REPEATED CONTACT CAN CAUSE MODERATE IRRITATION, DEFATTING, DERMATITIS.
BREATHING - EXCESSIVE INHALATION OF VAPORS CAN CAUSE NASAL AND RESPIRATORY IRRITATION, DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE, POSSIBLE UNCONSCIOUSNESS, AND EVEN ASPHYXIATION.
SWALLOWING - CAN CAUSE GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING, AND DIARRHEA.

FIRST AID:

C-74 (Revised 2/15/92)

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CONTINUED ON PAGE: 2

SECTION V-HEALTH HAZARD DATA (CONTINUED)

IF ON SKIN: THOROUGHLY WASH EXPOSED AREA WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHING. LAUNDER CONTAMINATED CLOTHING BEFORE RE-USE.

IF IN EYES: FLUSH WITH LARGE AMOUNTS OF WATER, LIFTING UPPER AND LOWER LIDS OCCASIONALLY, GET MEDICAL ATTENTION.

IF SWALLOWED: IMMEDIATELY DRINK TWO GLASSES OF WATER AND INDUCE VOMITING BY EITHER GIVING IPECAC SYRUP OR BY PLACING FINGER AT BACK OF THROAT. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. GET MEDICAL ATTENTION IMMEDIATELY.

IF BREATHED: IF AFFECTED, REMOVE INDIVIDUAL TO FRESH AIR. IF BREATHING IS DIFFICULT, ADMINISTER OXYGEN. IF BREATHING HAS STOPPED GIVE ARTIFICIAL RESPIRATION. KEEP PERSON WARM, QUIET AND GET MEDICAL ATTENTION.

PRIMARY ROUTE(S) OF ENTRY:

INHALATION

SKIN CONTACT

EFFECTS OF CHRONIC OVEREXPOSURE: FOR PRODUCT

OVEREXPOSURE TO THIS MATERIAL (OR ITS COMPONENTS) HAS APPARENTLY BEEN FOUND TO CAUSE THE FOLLOWING EFFECTS IN LABORATORY ANIMALS:, LIVER ABNORMALITIES, KIDNEY DAMAGE, BRAIN DAMAGE

OVEREXPOSURE TO THIS MATERIAL (OR ITS COMPONENTS) HAS BEEN SUGGESTED AS A CAUSE OF THE FOLLOWING EFFECTS IN HUMANS:, KIDNEY DAMAGE

SECTION VI-REACTIVITY DATA

HAZARDOUS POLYMERIZATION: CANNOT OCCUR

STABILITY: STABLE

INCOMPATIBILITY: AVOID CONTACT WITH:, STRONG OXIDIZING AGENTS.

SECTION VII-SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

SMALL SPILL: ELIMINATE ALL SOURCES OF IGNITION SUCH AS FLARES, FLAMES (INCLUDING PILOT LIGHTS), AND ELECTRICAL SPARKS.
ABSORB LIQUID ON PAPER, VERMICULITE, FLOOR ABSORBENT, OR OTHER ABSORBENT MATERIAL AND TRANSFER TO HOOD.

LARGE SPILL: ELIMINATE ALL IGNITION SOURCES (FLARES, FLAMES INCLUDING PILOT LIGHTS, ELECTRICAL SPARKS). PERSONS NOT WEARING PROTECTIVE EQUIPMENT SHOULD BE EXCLUDED FROM AREA OF SPILL UNTIL CLEAN-UP HAS BEEN COMPLETED. STOP SPILL AT SOURCE, DIKE AREA OF SPILL TO PREVENT SPREADING, PUMP LIQUID TO SALVAGE TANK. REMAINING LIQUID MAY BE TAKEN UP ON SAND, CLAY, EARTH, FLOOR ABSORBENT, OR OTHER ABSORBENT MATERIAL AND SHOVELED INTO CONTAINERS.
PREVENT RUN-OFF TO SEWERS, STREAMS OR OTHER BODIES OF WATER. IF RUN-OFF OCCURS, NOTIFY PROPER AUTHORITIES AS REQUIRED, THAT A SPILL HAS OCCURED.

WASTE DISPOSAL METHOD:

SMALL SPILL: DISPOSE OF IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.

LARGE SPILL: DISPOSE OF IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS. CONTAMINATED ABSORBENT MAY BE DEPOSITED IN A LANDFILL IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

SECTION VIII-PROTECTIVE EQUIPMENT TO BE USED

RESPIRATORY PROTECTION: IF TLV OF THE PRODUCT OR ANY COMPONENT IS EXCEEDED, A NIOSH/MSHA JOINTLY APPROVED AIR SUPPLIED RESPIRATOR IS ADVISED IN ABSENCE OF PROPER ENVIRONMENTAL CONTROL. OSHA REGULATIONS ALSO PERMIT OTHER NIOSH/MSHA RESPIRATORS UNDER SPECIFIED CONDITIONS. (SEE YOUR SAFETY EQUIPMENT SUPPLIER). ENGINEERING OR ADMINISTRATIVE CONTROLS SHOULD BE IMPLEMENTED TO REDUCE EXPOSURE.

VENTILATION: PROVIDE SUFFICIENT MECHANICAL (GENERAL AND/OR LOCAL EXHAUST) VENTILATION TO MAINTAIN EXPOSURE BELOW TLV(S).

PROTECTIVE GLOVES: WEAR RESISTANT GLOVES SUCH AS:, NATURAL RUBBER, NEOPRENE

EYE PROTECTION: CHEMICAL SPLASH GOGGLES IN COMPLIANCE WITH OSHA REGULATIONS ARE ADVISED; HOWEVER, OSHA REGULATIONS ALSO PERMIT OTHER TYPE SAFETY GLASSES. (CONSULT YOUR SAFETY EQUIPMENT SUPPLIER)

OTHER PROTECTIVE EQUIPMENT: TO PREVENT REPEATED OR PROLONGED SKIN CONTACT, WEAR IMPERVIOUS CLOTHING AND BOOTS.

SECTION IX-SPECIAL PRECAUTIONS OR OTHER COMMENTS

CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTIED. SINCE EMPTIED CONTAINERS RETAIN PRODUCT RESIDUES (VAPOR, LIQUID, AND/OR SOLID), ALL HAZARD PRECAUTIONS GIVEN IN THE DATA SHEET MUST BE OBSERVED.

C-75 (Revised 2/15/90)

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SECTION IX-SPECIAL PRECAUTIONS OR OTHER COMMENTS (CONTINUED)

THE INFORMATION ACCUMULATED HEREIN IS BELIEVED TO BE ACCURATE BUT IS NOT WARRANTED TO BE WHETHER ORIGINATING WITH THE COMPANY OR NOT. RECIPIENTS ARE ADVISED TO CONFIRM IN ADVANCE OF NEED THAT THE INFORMATION IS CURRENT, APPLICABLE, AND SUITABLE TO THEIR CIRCUMSTANCES.

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MATERIAL SAFETY DATA SHEET

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P. O. BOX 2219, COLUMBUS, OHIO 43216 • (614) 889-3333
24-HOUR EMERGENCY TELEPHONE (606) 324-1133

Ashland

000590

METHANOL

THIS MSDS COMPLIES WITH 29 CFR 1910.1200 (THE HAZARD COMMUNICATION STANDARD)

****

Product Name: METHANOL
CAS NUMBER: 67-56-1

Data Sheet No: 0001447-005
Prepared: 03/04/86
Supersedes: 04/02/85

AKZO-CHEMIE AMERICA 8401
300 S. RIVERSIDE PLAZA
CHICAGO IL 60606

ATTN: PLANT MGR./SAFETY DIR.

05 50 021 0256730-001

PRODUCT: 7350000
INVOICE: 669727
INVOICE DATE: 08/03/88
TO: AKZO-CHEMIE AMERICA
8401 W. 47TH ST.
MCCOOK IL 60525

RECEIVED
AUG 16 1988
G. F. ROTTER

SECTION I - PRODUCT IDENTIFICATION

General or Generic ID: ALCOHOL

DOT Hazard Classification: FLAMMABLE LIQUID (173.115)

SECTION II - COMPONENTS

IF PRESENT, IARC, NTP AND OSHA CARCINOGENS ARE IDENTIFIED IN THIS SECTION
SEE DEFINITION PAGE FOR CLARIFICATION

INGREDIENT	% (by WT)	PEL	TLV	Note
METHYL ALCOHOL CAS #: 67-56-1	100	200 PPM - SKIN	200 PPM - SKIN	(1)

Notes:

(1) SKIN ABSORPTION MAY POTENTIALLY CONTRIBUTE TO THE OVERALL EXPOSURE TO THIS MATERIAL. APPROPRIATE MEASURES SHOULD BE TAKEN TO PREVENT ABSORPTION SO THAT THE TLV IS NOT INVALIDATED.

ACGIH - SHORT TERM EXPOSURE LIMIT (STEL) FOR METHYL ALCOHOL IS 250 PPM. NIOSH RECOMMENDS A LIMIT OF 200 PPM, 8-HOUR TWA; 800 PPM 15 MINUTE CEILING.

SECTION III - PHYSICAL DATA

Boiling Point	for PRODUCT	147.00 Deg F (63.88 Deg C) @ 760.00 mm Hg
Vapor Pressure	for PRODUCT	97.68 mm Hg @ 68.00 Deg F (20.00 Deg C)
Specific Vapor Density	AIR = 1	1.1
Specific Gravity		.793 @ 68.00 Deg F (20.00 Deg C)
Percent Volatiles		100.00%
Evaporation Rate	(N-BUTYL ACETATE = 1)	5.91

SECTION IV - FIRE AND EXPLOSION INFORMATION

FLASH POINT(TCC) 54.0 Deg F (12.2 Deg C)

EXPLOSIVE LIMIT (PRODUCT) LOWER - 6.0%

EXTINGUISHING MEDIA: WATER FOG OR CARBON DIOXIDE OR DRY CHEMICAL

HAZARDOUS DECOMPOSITION PRODUCTS: MAY FORM TOXIC MATERIALS:, CARBON DIOXIDE AND CARBON MONOXIDE, VARIOUS HYDROCARBONS, ETC.

FIREFIGHTING PROCEDURES: WEAR SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN THE POSITVE PRESSURE DEMAND MODE WHEN FIGHTING FIRES.

SPECIAL FIRE & EXPLOSION HAZARDS: VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL ALONG THE GROUND OR MAY BE MOVED BY VENTILATION AND IGNITED BY PILOT LIGHTS, OTHER FLAMES, SPARKS, HEATERS, SMOKING, ELECTRIC MOTORS, STATIC DISCHARGE, OR OTHER IGNITION SOURCES AT LOCATIONS DISTANT FROM MATERIAL HANDLING POINT.

NEVER USE WELDING OR CUTTING TORCH ON OR NEAR DRUM (EVEN EMPTY) BECAUSE PRODUCT (EVEN JUST RESIDUE) CAN IGNITE EXPLOSIVELY.

ALL FIVE GALLON PAILS AND LARGER METAL CONTAINERS INCLUDING TANK CARS AND TANK TRUCKS SHOULD BE GROUNDED AND/OR BONDED WHEN MATERIAL IS TRANSFERRED.

NFPA CODES: HEALTH- 1 FLAMMABILITY- 3 REACTIVITY- 0

SECTION V - HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LEVEL 200 PPM - SKIN

THRESHOLD LIMIT VALUE 200 PPM - SKIN

SEE SECTION II

C-77 (Revised 2/15/90)

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CONTINUED ON PAGE: 2

SECTION V HEALTH HAZARD DATA (Continued)

EFFECTS OF ACUTE OVEREXPOSURE: FOR PRODUCT

EYES - CAN CAUSE SEVERE IRRITATION, REDNESS, TEARING, BLURRED VISION.
SKIN - PROLONGED OR REPEATED CONTACT CAN CAUSE MODERATE IRRITATION, DEFATTING, DERMATITIS.
BREATHING - EXCESSIVE INHALATION OF VAPORS CAN CAUSE NASAL AND RESPIRATORY IRRITATION, CENTRAL NERVOUS SYSTEM EFFECTS INCLUDING DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE AND POSSIBLE UNCONSCIOUSNESS, AND EVEN DEATH.
SWALLOWING - CAN CAUSE GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING, DIARRHEA, BLINDNESS AND DEATH.

FIRST AID:

IF ON SKIN: THOROUGHLY WASH EXPOSED AREA WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHING. LAUNDER CONTAMINATED CLOTHING BEFORE RE-USE.

REMOVE CONTAMINATED SHOES PROMPTLY. DISCARD SHOES SATURATED WITH THIS PRODUCT.

IF IN EYES: FLUSH WITH LARGE AMOUNTS OF WATER, LIFTING UPPER AND LOWER LIDS OCCASIONALLY, GET MEDICAL ATTENTION.

IF SWALLOWED: IMMEDIATELY DRINK TWO GLASSES OF WATER AND INDUCE VOMITING BY EITHER GIVING IPECAC SYRUP OR BY PLACING FINGER AT BACK OF THROAT. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. GET MEDICAL ATTENTION IMMEDIATELY.

IF BREATHED: IF AFFECTED, REMOVE INDIVIDUAL TO FRESH AIR. IF BREATHING IS DIFFICULT, ADMINISTER OXYGEN. IF BREATHING HAS STOPPED GIVE ARTIFICIAL RESPIRATION. KEEP PERSON WARM, QUIET AND GET MEDICAL ATTENTION.

PRIMARY ROUTE(S) OF ENTRY:

INHALATION, SKIN ABSORPTION, SKIN CONTACT

EFFECTS OF CHRONIC OVEREXPOSURE: FOR PRODUCT

OVEREXPOSURE TO THIS MATERIAL (OR ITS COMPONENTS) HAS APPARENTLY BEEN FOUND TO CAUSE THE FOLLOWING EFFECTS IN LABORATORY ANIMALS:, LIVER ABNORMALITIES, KIDNEY DAMAGE, EYE DAMAGE, LUNG DAMAGE, SPLEEN DAMAGE, BRAIN DAMAGE, NERVOUS SYSTEM DAMAGE

OVEREXPOSURE TO THIS MATERIAL (OR ITS COMPONENTS) HAS BEEN SUGGESTED AS A CAUSE OF THE FOLLOWING EFFECTS IN HUMANS:, EYE DAMAGE

SECTION VI REACTIVITY DATA

HAZARDOUS POLYMERIZATION: CANNOT OCCUR

STABILITY: STABLE

INCOMPATIBILITY: AVOID CONTACT WITH:, STRONG OXIDIZING AGENTS.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

SMALL SPILL: ELIMINATE ALL SOURCES OF IGNITION SUCH AS FLARES, FLAMES (INCLUDING PILOT LIGHTS), AND ELECTRICAL SPARKS.

ABSORB LIQUID ON PAPER, VERMICULITE, FLOOR ABSORBENT, OR OTHER ABSORBENT MATERIAL AND TRANSFER TO HOOD.

LARGE SPILL: ELIMINATE ALL IGNITION SOURCES (FLARES, FLAMES INCLUDING PILOT LIGHTS, ELECTRICAL SPARKS). PERSONS NOT WEARING PROTECTIVE EQUIPMENT SHOULD BE EXCLUDED FROM AREA OF SPILL UNTIL CLEAN-UP HAS BEEN COMPLETED. STOP SPILL AT SOURCE, DIKE AREA OF SPILL TO PREVENT SPREADING, PUMP LIQUID TO SALVAGE TANK. REMAINING LIQUID MAY BE TAKEN UP ON SAND, CLAY, EARTH, FLOOR ABSORBENT, OR OTHER ABSORBENT MATERIAL AND SHOVELED INTO CONTAINERS.

PREVENT RUN-OFF TO SEWERS, STREAMS OR OTHER BODIES OF WATER. IF RUN-OFF OCCURS, NOTIFY PROPER AUTHORITIES AS REQUIRED, THAT A SPILL HAS OCCURED.

WASTE DISPOSAL METHOD:

SMALL SPILL: ALLOW VOLATILE PORTION TO EVAPORATE IN HOOD. ALLOW SUFFICIENT TIME FOR VAPORS TO COMPLETELY CLEAR HOOD DUCT WORK. DISPOSE OF REMAINING MATERIAL IN ACCORDANCE WITH APPLICABLE REGULATIONS.

LARGE SPILL: DESTROY BY LIQUID INCINERATION.

CONTAMINATED ABSORBENT MAY BE DEPOSITED IN A LANDFILL IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

SECTION VIII PROTECTIVE EQUIPMENT TO BE USED

RESPIRATORY PROTECTION: IF WORKPLACE EXPOSURE LIMIT(S) OF PRODUCT OR ANY COMPONENT IS EXCEEDED (SEE SECTION II), A NIOSH/MSHA APPROVED AIR SUPPLIED RESPIRATOR IS ADVISED IN ABSENCE OF PROPER ENVIRONMENTAL CONTROL. OSHA REGULATIONS ALSO PERMIT OTHER NIOSH/MSHA RESPIRATORS (NEGATIVE PRESSURE TYPE) UNDER SPECIFIED CONDITIONS (SEE YOUR SAFETY EQUIPMENT SUPPLIER). ENGINEERING OR ADMINISTRATIVE CONTROLS SHOULD BE IMPLEMENTED TO REDUCE EXPOSURE.

VENTILATION: PROVIDE SUFFICIENT MECHANICAL (GENERAL AND/OR LOCAL EXHAUST) VENTILATION TO MAINTAIN EXPOSURE BELOW TLV(S).

PROTECTIVE GLOVES: WEAR RESISTANT GLOVES SUCH AS:, NEOPRENE

EYE PROTECTION: CHEMICAL SPLASH GOGGLES IN COMPLIANCE WITH OSHA REGULATIONS ARE ADVISED; HOWEVER, OSHA REGULATIONS ALSO PERMIT OTHER TYPE SAFETY GLASSES. (CONSULT YOUR SAFETY EQUIPMENT SUPPLIER)

OTHER PROTECTIVE EQUIPMENT: TO PREVENT REPEATED OR PROLONGED SKIN CONTACT, WEAR IMPERVIOUS CLOTHING AND BOOTS.

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SECTION IX SPECIAL PRECAUTIONS OR OTHER COMMENTS

CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTIED.SINCE EMPTIED CONTAINERS RETAIN PRODUCT RESIDUES (VAPOR, LIQUID, AND/OR SOLID), ALL HAZARD PRECAUTIONS GIVEN IN THE DATA SHEET MUST BE OBSERVED.

CONTAINS METHANOL.

CANNOT BE MADE NON-POISONOUS.

ALUMINUM MAY FORM AN OXIDE SCALE ON PROLONGED EXPOSURE TO METHANOL.

THE INFORMATION ACCUMULATED HEREIN IS BELIEVED TO BE ACCURATE BUT IS NOT WARRANTED TO BE WHETHER ORIGINATING WITH THE COMPANY OR NOT. RECIPIENTS ARE ADVISED TO CONFIRM IN ADVANCE OF NEED THAT THE INFORMATION IS CURRENT, APPLICABLE, AND SUITABLE TO THEIR CIRCUMSTANCES.

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

M A T E R I A L S A F E T Y D A T A S H E E T

24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151

CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

EFFECTIVE: 10/14/85 ISSUED: 01/23/86

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: METHYLENE CHLORIDE
FORMULA: CH2CL2
FORMULA WT: 84.93
CAS NO.: 00075-09-2
NIOSH/RTECS NO.: PA8050000
COMMON SYNONYMS: DICHLOROMETHANE; METHYLENE DICHLORIDE; METHANE DICHLORIDE
PRODUCT CODES: 9324,Q480,9330,5531,9315,9329,9264,9341

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH - 3 (CANCER CAUSING)
FLAMMABILITY - 1
REACTIVITY - 1
CONTACT - 2

LABORATORY PROTECTIVE EQUIPMENT

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

PRECAUTIONARY LABEL STATEMENTS

POISON DANGER
HARMFUL IF INHALED - CAUSES IRRITATION
NOTE: REPORTED AS CAUSING CANCER IN LABORATORY ANIMALS. EXERCISE DUE CARE.
AVOID CONTACT WITH EYES, SKIN, CLOTHING.
KEEP IN TIGHTLY CLOSED CONTAINER. WASH THOROUGHLY AFTER HANDLING.

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
METHYLENE CHLORIDE	90-100	75-09-2

SECTION III - PHYSICAL DATA

BOILING POINT: 40 C (104 F)
VAPOR PRESSURE(MM HG): 350

MELTING POINT: -95 C (-139 F)
VAPOR DENSITY(AIR=1): 2.9

SPECIFIC GRAVITY: 1.32 (H2O=1)
EVAPORATION RATE: 27.5 (BUTYL ACETATE=1)

SOLUBILITY(H2O): MODERATE (1 TO 10 %)
% VOLATILES BY VOLUME: 100

APPEARANCE & ODOR: COLORLESS,VOLATILE LIQUID WITH PENETRATING,ETHER-LIKE ODOR.

CONTINUED ON PAGE: 2

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: N/A NFPA 704M RATING: 2-1-0

FLAMMABLE LIMITS: UPPER - 19 % LOWER - 12 %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

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

TOXIC GASES PRODUCED
HYDROGEN CHLORIDE, PHOSGENE

SECTION V - HEALTH HAZARD DATA

SOME EXPERIMENTS WITH TEST ANIMALS INDICATED THAT THIS SUBSTANCE MAY BE ANTICIPATED TO BE A CARCINOGEN.

THRESHOLD LIMIT VALUE (TLV/TWA): 350 MG/M3 (100 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 1740 MG/M3 (500 PPM)

TOXICITY:

LD50 (ORAL-RAT)(MG/KG)	-	2524
LD50 (IPR-MOUSE)(MG/KG)	-	1500
LC50 (INHAL-RAT-1)(G/M3)	-	88

EFFECTS OF OVEREXPOSURE
INHALATION OF VAPORS MAY CAUSE NAUSEA, VOMITING, LIGHTHEADEDNESS OR HEADACHE.
LIQUID MAY BE IRRITATING TO SKIN, EYES, AND MUCOUS MEMBRANES.

EMERGENCY AND FIRST AID PROCEDURES
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. FLUSH SKIN WITH WATER.

SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT

DECOMPOSITION PRODUCTS: HYDROGEN CHLORIDE

CONTINUED ON PAGE: 3

SECTION VII - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE

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

EPA HAZARDOUS WASTE NUMBER: U080 (TOXIC WASTE)

SECTION VIII - PROTECTIVE EQUIPMENT

VENTILATION:	USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.
RESPIRATORY PROTECTION:	RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS ABOVE 100 PPM, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.
EYE/SKIN PROTECTION:	SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, POLYVINYL ALCOHOL GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: BLUE

SPECIAL PRECAUTIONS

KEEP CONTAINER TIGHTLY CLOSED. STORE IN SECURE POISON AREA.
KEEP CONTAINERS OUT OF SUN AND AWAY FROM HEAT.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	DICHLOROMETHANE (AIR ONLY)
HAZARD CLASS	ORM-A
UN/NA	UN1593
LABELS	NONE

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	DICHLOROMETHANE
HAZARD CLASS	6.1

CONTINUED ON PAGE: 4

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION (CONTINUED)

UN/NA	UN1593
LABELS	HARMFUL - STOW AWAY FROM FOOD STUFFS

(TM) AND (R) DESIGNATE TRADEMARKS.
N/A = NOT APPLICABLE OR NOT AVAILABLE

THE INFORMATION PUBLISHED IN THIS MATERIAL SAFETY DATA SHEET HAS BEEN COMPILED FROM OUR EXPERIENCE AND DATA PRESENTED IN VARIOUS TECHNICAL PUBLICATIONS. IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE SUITABILITY OF THIS INFORMATION FOR THE ADOPTION OF NECESSARY SAFETY PRECAUTIONS. WE RESERVE THE RIGHT TO REVISE MATERIAL SAFETY DATA SHEETS PERIODICALLY AS NEW INFORMATION BECOMES AVAILABLE.

-- LAST PAGE --

SECTION V-HEALTH HAZARD DATA (CONTINUED)

IF ON SKIN: THOROUGHLY WASH EXPOSED AREA WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHING. LAUNDER CONTAMINATED CLOTHING BEFORE RE-USE.

IF IN EYES: FLUSH WITH LARGE AMOUNTS OF WATER, LIFTING UPPER AND LOWER LIDS OCCASIONALLY, GET MEDICAL ATTENTION.

IF SWALLOWED: DO NOT INDUCE VOMITING, KEEP PERSON WARM, QUIET, AND GET MEDICAL ATTENTION. ASPIRATION OF MATERIAL INTO THE LUNGS DUE TO VOMITING CAN CAUSE CHEMICAL PNEUMONITIS WHICH CAN BE FATAL.

IF BREATHED: IF AFFECTED, REMOVE INDIVIDUAL TO FRESH AIR. IF BREATHING IS DIFFICULT, ADMINISTER OXYGEN. IF BREATHING HAS STOPPED GIVE ARTIFICIAL RESPIRATION. KEEP PERSON WARM, QUIET AND GET MEDICAL ATTENTION.

PRIMARY ROUTE(S) OF ENTRY:

INHALATION

SKIN CONTACT

SECTION VI-REACTIVITY DATA

HAZARDOUS POLYMERIZATION: CANNOT OCCUR

STABILITY: STABLE

INCOMPATIBILITY: AVOID CONTACT WITH:, STRONG OXIDIZING AGENTS.

SECTION VII-SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

SMALL SPILL: ABSORB LIQUID ON PAPER, VERMICULITE, FLOOR ABSORBENT, OR OTHER ABSORBENT MATERIAL AND TRANSFER TO HOOD.

LARGE SPILL: ELIMINATE ALL IGNITION SOURCES (FLARES, FLAMES INCLUDING PILOT LIGHTS, ELECTRICAL SPARKS). PERSONS NOT WEARING PROTECTIVE EQUIPMENT SHOULD BE EXCLUDED FROM AREA OF SPILL UNTIL CLEAN-UP HAS BEEN COMPLETED. STOP SPILL AT SOURCE, DIKE AREA OF SPILL TO PREVENT SPREADING, PUMP LIQUID TO SALVAGE TANK. REMAINING LIQUID MAY BE TAKEN UP ON SAND, CLAY, EARTH, FLOOR ABSORBENT, OR OTHER ABSORBENT MATERIAL AND SHOVELED INTO CONTAINERS.

WASTE DISPOSAL METHOD:

SMALL SPILL: ALLOW VOLATILE PORTION TO EVAPORATE IN HOOD. ALLOW SUFFICIENT TIME FOR VAPORS TO COMPLETELY CLEAR HOOD DUCT WORK. DISPOSE OF REMAINING MATERIAL IN ACCORDANCE WITH APPLICABLE REGULATIONS.

LARGE SPILL: DESTROY BY LIQUID INCINERATION.
CONTAMINATED ABSORBENT MAY BE DEPOSITED IN A LANDFILL IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

SECTION VIII-PROTECTIVE EQUIPMENT TO BE USED

RESPIRATORY PROTECTION: IF TLV OF THE PRODUCT OR ANY COMPONENT IS EXCEEDED, A NIOSH/MSHA JOINTLY APPROVED AIR SUPPLIED RESPIRATOR IS ADVISED IN ABSENCE OF PROPER ENVIRONMENTAL CONTROL. OSHA REGULATIONS ALSO PERMIT OTHER NIOSH/MSHA RESPIRATORS UNDER SPECIFIED CONDITIONS. (SEE YOUR SAFETY EQUIPMENT SUPPLIER). ENGINEERING OR ADMINISTRATIVE CONTROLS SHOULD BE IMPLEMENTED TO REDUCE EXPOSURE.

VENTILATION: PROVIDE SUFFICIENT MECHANICAL (GENERAL AND/OR LOCAL EXHAUST) VENTILATION TO MAINTAIN EXPOSURE BELOW TLV(S).

PROTECTIVE GLOVES: WEAR RESISTANT GLOVES SUCH AS:, NATURAL RUBBER, NEOPRENE

EYE PROTECTION: CHEMICAL SPLASH GOGGLES IN COMPLIANCE WITH OSHA REGULATIONS ARE ADVISED; HOWEVER, OSHA REGULATIONS ALSO PERMIT OTHER TYPE SAFETY GLASSES. (CONSULT YOUR SAFETY EQUIPMENT SUPPLIER)

OTHER PROTECTIVE EQUIPMENT: TO PREVENT REPEATED OR PROLONGED SKIN CONTACT, WEAR IMPERVIOUS CLOTHING AND BOOTS.

SECTION IX-SPECIAL PRECAUTIONS OR OTHER COMMENTS

CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTIED. SINCE EMPTIED CONTAINERS RETAIN PRODUCT RESIDUES (VAPOR, LIQUID, AND/OR SOLID), ALL HAZARD PRECAUTIONS GIVEN IN THE DATA SHEET MUST BE OBSERVED.

MINOR EMBRYOTOXIC/FETOTOXIC EFFECTS HAVE BEEN OBSERVED IN LABORATORY RATS EXPOSED TO MEK BY INHALATION AT LEVELS GREATER THAN 1000 PPM (5 TIMES THE OSHA-PEL/TWA) FOR MOST OF THE GESTATION PERIOD.

OVEREXPOSURE TO MATERIAL HAS APPARENTLY BEEN FOUND TO CAUSE THE FOLLOWING EFFECTS IN LABORATORY ANIMALS:, LIVER ABNORMALITIES, KIDNEY DAMAGE, LUNG DAMAGE, BRAIN DAMAGE

THE INFORMATION ACCUMULATED HEREIN IS BELIEVED TO BE ACCURATE BUT IS NOT WARRANTED TO BE WHETHER ORIGINATING WITH THE COMPANY OR NOT. RECIPIENTS ARE ADVISED TO CONFIRM IN ADVANCE OF NEED THAT THE INFORMATION IS CURRENT, APPLICABLE, AND SUITABLE TO THEIR CIRCUMSTANCES.

72-62-7820-01

MATERIAL SAFETY DATA SHEET

Ashland Chemical Company
DIVISION OF ASHLAND OIL, INC.
P. O. BOX 2219, COLUMBUS, OHIO 43216 • (614) 889-3333
24-HOUR EMERGENCY TELEPHONE (606) 324-1133

ROBERTA ZORN

Ashland.

THIS MSDS COMPLIES WITH 29 CFR 1910.1200 (THE HAZARD COMMUNICATION STANDARD)

PRODUCT NAME: METHYL ETHYL KETONE
CAS NUMBER: 78 93 3

AKZO-CHEMIE AMERICA
300 WACKER DRIVE
CHICAGO IL 60606

ATTN: PLANT MGR./SAFETY DIR.

05 50 021 0256730-
DATA SHEET NO: 0000017-003
LATEST REVISION DATE: 01/86-86010
PRODUCT: 3540000
INVOICE: 305776
INVOICE DATE: 04/19/85
TO: AKZO-CHEMIE AMERICA
8201 WEST 47 ST.
MCCOOK IL 60525

SECTION I-PRODUCT IDENTIFICATION

GENERAL OR GENERIC ID: KETONE

DOT HAZARD CLASSIFICATION: FLAMMABLE LIQUID (173.115)

SECTION II-COMPONENTS

INGREDIENT	% (BY WT)	PEL	TLV	NOTE
METHYL ETHYL KETONE	>95	200	200 PPM	

SECTION III-PHYSICAL DATA

PROPERTY	REFINEMENT	MEASUREMENT
BOILING POINT	FOR PRODUCT	175.00 DEG F (79.44 DEG C) @ 760.00 MMHG
VAPOR PRESSURE	FOR PRODUCT	70.00 MMHG @ 68.00 DEG F (20.00 DEG C)
SPECIFIC VAPOR DENSITY	AIR = 1	2.5
SPECIFIC GRAVITY		.805 - .807 @ 68.00 DEG F (20.00 DEG C)
PERCENT VOLATILES		100.00%
EVAPORATION RATE	(N-BUTYL ACETATE = 1)	5.70

SECTION IV-FIRE AND EXPLOSION INFORMATION

FLASH POINT(TCC) 23.00 DEG F
(-5.00 DEG C)

EXPLOSIVE LIMIT (PRODUCT) LOWER - 2.0%

EXTINGUISHING MEDIA: ALCOHOL FOAM OR CARBON DIOXIDE OR DRY CHEMICAL

HAZARDOUS DECOMPOSITION PRODUCTS: MAY FORM TOXIC MATERIALS:, CARBON DIOXIDE AND CARBON MONOXIDE, VARIOUS HYDROCARBONS, ETC.

FIREFIGHTING PROCEDURES: WEAR SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE WHEN FIGHTING FIRES.

SPECIAL FIRE & EXPLOSION HAZARDS: VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL ALONG THE GROUND OR MAY BE MOVED BY VENTILATION AND IGNITED BY PILOT LIGHTS, OTHER FLAMES, SPARKS, HEATERS, SMOKING, ELECTRIC MOTORS, STATIC DISCHARGE, OR OTHER IGNITION SOURCES AT LOCATIONS DISTANT FROM MATERIAL HANDLING POINT.

NEVER USE WELDING OR CUTTING TORCH ON OR NEAR DRUM (EVEN EMPTY) BECAUSE PRODUCT (EVEN JUST RESIDUE) CAN IGNITE EXPLOSIVELY.
ALL FIVE GALLON PAILS AND LARGER METAL CONTAINERS SHOULD BE GROUNDED AND/OR BONDED WHEN MATERIAL IS TRANSFERRED.

NFPA CODES: HEALTH- 1 FLAMMABILITY- 3 REACTIVITY- 0

SECTION V-HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LEVEL 200 PPM

THRESHOLD LIMIT VALUE 200 PPM

EFFECTS OF ACUTE OVEREXPOSURE: FOR PRODUCT

EYES - CAN CAUSE SEVERE IRRITATION, REDNESS, TEARING, BLURRED VISION.
SKIN - PROLONGED OR REPEATED CONTACT CAN CAUSE MODERATE IRRITATION, DEFATTING, DERMATITIS.
BREATHING - EXCESSIVE INHALATION OF VAPORS CAN CAUSE NASAL AND RESPIRATORY IRRITATION, DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE, POSSIBLE UNCONSCIOUSNESS, AND EVEN ASPHYXIATION.
SWALLOWING - CAN CAUSE GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING, AND DIARRHEA.

FIRST AID:

C-89 (Revised 3/15/90)

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72-62-7820-01

MATERIAL SAFETY DATA SHEET

Ashland Chemical Company
DIVISION OF ASHLAND OIL, INC.
P. O. BOX 2219, COLUMBUS, OHIO 43216 • (614) 889-3333
24-HOUR EMERGENCY TELEPHONE (606) 324-1133

THIS MSDS COMPLIES WITH 29 CFR 1910.1200 (THE HAZARD COMMUNICATION STANDARD)

PRODUCT NAME: METHYL ISOBUTYL KETONE
CAS NUMBER: 108 10 1

AKZO-CHEMIE AMERICA 8201
300 WACKER DRIVE
CHICAGO IL 60606

ATTN: PLANT MGR./SAFETY DIR.

05 50 021 0256730-
DATA SHEET NO: 0000984-004
LATEST REVISION DATE: 03/86-86063
PRODUCT: 3620000
INVOICE: 714201
INVOICE DATE: 05/08/87
TO: AKZO-CHEMIE AMERICA
8201 W 47TH STREET
MCCOOK IL 60525

SECTION I-PRODUCT IDENTIFICATION

GENERAL OR GENERIC ID: KETONE

DOT HAZARD CLASSIFICATION: FLAMMABLE LIQUID (173.115)

SECTION II-COMPONENTS

IF PRESENT, IARC, NTP AND OSHA CARCINOGENS ARE IDENTIFIED IN THIS SECTION
SEE DEFINITION PAGE FOR CLARIFICATION

INGREDIENT	% (BY WT)	NOTE
4- METHYL-2-PENTANONE CAS #: 108-10-1 PEL: 100 PPM	>95 TLV: 50 PPM	(1)

(1): ACGIH - SHORT TERM EXPOSURE LIMIT (STEL) FOR METHYL ISOBUTYL KETONE IS 75 PPM. NIOSH RECOMMENDS A LIMIT OF 50 PPM, 8-HOUR TWA.

SECTION III-PHYSICAL DATA

PROPERTY	REFINEMENT	MEASUREMENT
BOILING POINT	FOR PRODUCT	237.20 - 242.60 DEG F (114.00 - 117.00 DEG C) @ 760.00 MMHG
VAPOR PRESSURE	FOR PRODUCT	16.00 MMHG @ 68.00 DEG F (20.00 DEG C)
SPECIFIC VAPOR DENSITY	AIR = 1	3.5
SPECIFIC GRAVITY		.800 - .803 @ 68.00 DEG F (20.00 DEG C)
PERCENT VOLATILES		100.00%
EVAPORATION RATE	(N-BUTYL ACETATE = 1)	1.64

SECTION IV-FIRE AND EXPLOSION INFORMATION

FLASH POINT(TCC) 60.0 DEG F
(15.6 DEG C)

EXPLOSIVE LIMIT (PRODUCT) LOWER - 1.4%

EXTINGUISHING MEDIA: ALCOHOL FOAM OR WATER FOG OR CARBON DIOXIDE OR DRY CHEMICAL

HAZARDOUS DECOMPOSITION PRODUCTS: MAY FORM TOXIC MATERIALS:, CARBON DIOXIDE AND CARBON MONOXIDE, VARIOUS HYDROCARBONS, ETC.

FIREFIGHTING PROCEDURES: WEAR SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE WHEN FIGHTING FIRES.

SPECIAL FIRE & EXPLOSION HAZARDS: VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL ALONG THE GROUND OR MAY BE MOVED BY VENTILATION AND IGNITED BY PILOT LIGHTS, OTHER FLAMES, SPARKS, HEATERS, SMOKING, ELECTRIC MOTORS, STATIC DISCHARGE, OR OTHER IGNITION SOURCES AT LOCATIONS DISTANT FROM MATERIAL HANDLING POINT.

NEVER USE WELDING OR CUTTING TORCH ON OR NEAR DRUM (EVEN EMPTY) BECAUSE PRODUCT (EVEN JUST RESIDUE) CAN IGNITE EXPLOSIVELY.
ALL FIVE GALLON PAILS AND LARGER METAL CONTAINERS INCLUDING TANK CARS AND TANK TRUCKS SHOULD BE GROUNDED AND/OR BONDED WHEN MATERIAL IS TRANSFERRED.

NFPA CODES: HEALTH- 2 FLAMMABILITY- 3 REACTIVITY- 0

SECTION V-HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LEVEL 100 PPM

THRESHOLD LIMIT VALUE 50 PPM

EFFECTS OF ACUTE OVEREXPOSURE: FOR PRODUCT

EYES - CAN CAUSE SEVERE IRRITATION, REDNESS, TEARING, BLURRED VISION.
SKIN - PROLONGED OR REPEATED CONTACT CAN CAUSE MODERATE IRRITATION, DEFATTING, DERMATITIS.

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CONTINUED ON PAGE: 2

SECTION V-HEALTH HAZARD DATA (CONTINUED)

BREATHING - EXCESSIVE INHALATION OF VAPORS CAN CAUSE NASAL AND RESPIRATORY IRRITATION, DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE, POSSIBLE UNCONSCIOUSNESS, AND EVEN ASPHYXIATION.
SWALLOWING - CAN CAUSE GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING, AND DIARRHEA.

FIRST AID:

IF ON SKIN: THOROUGHLY WASH EXPOSED AREA WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHING. LAUNDER CONTAMINATED CLOTHING BEFORE RE-USE.

IF IN EYES: FLUSH WITH LARGE AMOUNTS OF WATER, LIFTING UPPER AND LOWER LIDS OCCASIONALLY, GET MEDICAL ATTENTION.

IF SWALLOWED: DO NOT INDUCE VOMITING, KEEP PERSON WARM, QUIET, AND GET MEDICAL ATTENTION. ASPIRATION OF MATERIAL INTO THE LUNGS DUE TO VOMITING CAN CAUSE CHEMICAL PNEUMONITIS WHICH CAN BE FATAL.

IF BREATHED: IF AFFECTED, REMOVE INDIVIDUAL TO FRESH AIR. IF BREATHING IS DIFFICULT, ADMINISTER OXYGEN. IF BREATHING HAS STOPPED GIVE ARTIFICIAL RESPIRATION. KEEP PERSON WARM, QUIET AND GET MEDICAL ATTENTION.

PRIMARY ROUTE(S) OF ENTRY:

INHALATION

SKIN CONTACT

EFFECTS OF CHRONIC OVEREXPOSURE: FOR PRODUCT

OVEREXPOSURE TO THIS MATERIAL (OR ITS COMPONENTS) HAS APPARENTLY BEEN FOUND TO CAUSE THE FOLLOWING EFFECTS IN LABORATORY ANIMALS:, LIVER ABNORMALITIES, LUNG DAMAGE, BRAIN DAMAGE

SECTION VI-REACTIVITY DATA

HAZARDOUS POLYMERIZATION: CANNOT OCCUR

STABILITY: STABLE

INCOMPATIBILITY: AVOID CONTACT WITH:, STRONG OXIDIZING AGENTS.

SECTION VII-SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

SMALL SPILL: ABSORB LIQUID ON PAPER, VERMICULITE, FLOOR ABSORBENT, OR OTHER ABSORBENT MATERIAL AND TRANSFER TO HOOD.
ELIMINATE ALL SOURCES OF IGNITION SUCH AS FLARES, FLAMES (INCLUDING PILOT LIGHTS), AND ELECTRICAL SPARKS.

LARGE SPILL: ELIMINATE ALL IGNITION SOURCES (FLARES, FLAMES INCLUDING PILOT LIGHTS, ELECTRICAL SPARKS). PERSONS NOT WEARING PROTECTIVE EQUIPMENT SHOULD BE EXCLUDED FROM AREA OF SPILL UNTIL CLEAN-UP HAS BEEN COMPLETED. STOP SPILL AT SOURCE, DIKE AREA OF SPILL TO PREVENT SPREADING, PUMP LIQUID TO SALVAGE TANK. REMAINING LIQUID MAY BE TAKEN UP ON SAND, CLAY, EARTH, FLOOR ABSORBENT, OR OTHER ABSORBENT MATERIAL AND SHOVELED INTO CONTAINERS.
PREVENT RUN-OFF TO SEWERS, STREAMS OR OTHER BODIES OF WATER. IF RUN-OFF OCCURS, NOTIFY PROPER AUTHORITIES AS REQUIRED, THAT A SPILL HAS OCCURED.

WASTE DISPOSAL METHOD:

SMALL SPILL: ALLOW VOLATILE PORTION TO EVAPORATE IN HOOD. ALLOW SUFFICIENT TIME FOR VAPORS TO COMPLETELY CLEAR HOOD DUCT WORK. DISPOSE OF REMAINING MATERIAL IN ACCORDANCE WITH APPLICABLE REGULATIONS.

LARGE SPILL: DESTROY BY LIQUID INCINERATION.
CONTAMINATED ABSORBENT MAY BE DEPOSITED IN A LANDFILL IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

SECTION VIII-PROTECTIVE EQUIPMENT TO BE USED

RESPIRATORY PROTECTION: IF TLV OF THE PRODUCT OR ANY COMPONENT IS EXCEEDED, A NIOSH/MSHA JOINTLY APPROVED AIR SUPPLIED RESPIRATOR IS ADVISED IN ABSENCE OF PROPER ENVIRONMENTAL CONTROL. OSHA REGULATIONS ALSO PERMIT OTHER NIOSH/MSHA RESPIRATORS UNDER SPECIFIED CONDITIONS. (SEE YOUR SAFETY EQUIPMENT SUPPLIER). ENGINEERING OR ADMINISTRATIVE CONTROLS SHOULD BE IMPLEMENTED TO REDUCE EXPOSURE.

VENTILATION: PROVIDE SUFFICIENT MECHANICAL (GENERAL AND/OR LOCAL EXHAUST) VENTILATION TO MAINTAIN EXPOSURE BELOW TLV(S).

PROTECTIVE GLOVES: WEAR RESISTANT GLOVES SUCH AS:, NEOPRENE

EYE PROTECTION: CHEMICAL SPLASH GOGGLES IN COMPLIANCE WITH OSHA REGULATIONS ARE ADVISED; HOWEVER, OSHA REGULATIONS ALSO PERMIT OTHER TYPE SAFETY GLASSES. (CONSULT YOUR SAFETY EQUIPMENT SUPPLIER)

OTHER PROTECTIVE EQUIPMENT: TO PREVENT REPEATED OR PROLONGED SKIN CONTACT, WEAR IMPERVIOUS CLOTHING AND BOOTS.

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P. O. BOX 2219, COLUMBUS, OHIO 43216 • (614) 889-3333
24-HOUR EMERGENCY TELEPHONE (606) 324-1133

SECTION IX-SPECIAL PRECAUTIONS OR OTHER COMMENTS

CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTIED.SINCE EMPTIED CONTAINERS RETAIN PRODUCT RESIDUES (VAPOR, LIQUID, AND/OR SOLID), ALL HAZARD PRECAUTIONS GIVEN IN THE DATA SHEET MUST BE OBSERVED.

THE INFORMATION ACCUMULATED HEREIN IS BELIEVED TO BE ACCURATE BUT IS NOT WARRANTED TO BE WHETHER ORIGINATING WITH THE COMPANY OR NOT. RECIPIENTS ARE ADVISED TO CONFIRM IN ADVANCE OF NEED THAT THE INFORMATION IS CURRENT, APPLICABLE, AND SUITABLE TO THEIR CIRCUMSTANCES.

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chemists helping chemists in research & industry
aldrich chemical co.
P.O. Box 355, Milwaukee, Wisconsin 53201 USA

Telephone: (414) 273-3850
TWX: (910) 262-3052 Aldrich M
Telex: 26 843 Aldrich M
FAX: (414) 273-4979

RECEIVED
OCT 7 1988
G. F. ROTTER

ATTN: SAFETY DIRECTOR
AKZO CHEMIE AMERICA
300 SOUTH RIVERSIDE PLAZA
22ND FLOOR
CHICAGO IL 60606

DATE: 10/04/88
CUST # 105252 P.O. # 112487R

M A T E R I A L S A F E T Y D A T A S H E E T

PAGE:

IDENTIFICATION

PRODUCT # 13026-5 NAME: 2-NITROPROPANE, 95%
CAS # 79-46-9
MF: C3H7NO2

SYNONYMS
DIMETHYLNITROMETHANE * ISONITROPROPANE * NIPAR S-20 * NIPAR S-20 SOLVENT * NIPAR S-30 SOLVENT * NITROISOPROPANE * BETA-NITROPROPANE * 2-NITROPROPANE * 2-NITROPROPANE (ACGIH,DOT) * 2-NP * RCRA WASTE NUMBER U171 * UN 2608 (DOT) *

TOXICITY HAZARDS

RTECS # TZ5250000
PROPANE, 2-NITRO-

TOXICITY DATA

ORL-RAT LD50:720 MG/KG	34ZIAG -,430,69
IHL-RAT LC50:400 PPM/6H	JEPTDQ 2(2),233,78
IHL-MUS LC50:10 GM/M3/2H	85GMAT -,94,82
IPR-MUS LD50:75 MG/KG	NTIS** AD691-490

REVIEWS, STANDARDS, AND REGULATIONS
ACGIH TLV-SUSPECTED CARCINOGEN 85INA8 5,441,86
ACGIH TLV-TWA 10 PPM 85INA8 5,441,86
MSHA STANDARD-AIR:TWA 25 PPM (90 MG/M3) DTLVS* 3,188,71
OSHA STANDARD-AIR:TWA 25 PPM FEREAC 39,23540,74
EPA GENETOX PROGRAM 1986, POSITIVE: CARCINOGENICITY-MOUSE/RAT
EPA GENETOX PROGRAM 1986, INCONCLUSIVE: MAMMALIAN MICRONUCLEUS
EPA TSCA CHEMICAL INVENTORY, 1986
EPA TSCA SECTION 8(E) STATUS REPORT 8EHQ-0578-0170
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, MARCH 1988
NIOSH CURRENT INTELLIGENCE BULLETIN 17, 1977
NIOSH ANALYTICAL METHODS: SEE 2-NITROPROPANE, 2528
NTP FOURTH ANNUAL REPORT ON CARCINOGENS, 1984
MEETS CRITERIA FOR PROPOSED OSHA MEDICAL RECORDS RULE FEREAC 47,30420, 82

TARGET ORGAN DATA
BEHAVIORAL (ANOREXIA, HUMAN)
GASTROINTESTINAL (HYPERMOTILITY, DIARRHEA)
GASTROINTESTINAL (NAUSEA OR VOMITING)
LIVER (TUMORS)
TUMORIGENIC (CARCINOGENIC BY RTECS CRITERIA)
TUMORIGENIC (EQUIVOCAL TUMORIGENIC AGENT BY RTECS CRITERIA)

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

HEALTH HAZARD DATA

ACUTE EFFECTS
HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.
VAPOR OR MIST IS IRRITATING TO THE EYES, MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT.
CAUSES SKIN IRRITATION.
SYMPTOMS OF EXPOSURE MAY INCLUDE BURNING SENSATION, COUGHING, WHEEZING, LARYNGITIS, SHORTNESS OF BREATH, HEADACHE, NAUSEA AND

Belgium
Aldrich Chemie N.V./S.A.
Bd. Lambermontlaan 140 b 6
B-1030 Brussels
Telephone (32) 2428750
Telex 62302 Alchem B
FAX (02) 242 82 16

France
Aldrich-Chimie S.a.r.l.
27, Fossé des Treize
F 67000 Strasbourg
Telephone (88) 327010
Telex 890076 Aldrich F
FAX (88) 75 12 83

Japan
Aldrich Japan
Kyodo Bldg. Shinkanda
10 Kanda-Mikuriacho
Chiyoda-Ku, Tokyo
Telephone (03) 258-0155
FAX (03) 258-0157

United Kingdom
Aldrich Chemical Co., Ltd.
The Old Brickyard, New Road
Gillingham, Dorset SP8 4JL
Telephone (07476) 7211
Telex 417236 Aldrich G
FAX [illegible]

West Germany
Aldrich-Chemie GmbH & Co. KG
D-7924 Steinheim
Telephone (07329) 87-0
Telex 714838 Aldri D
FAX (07329) 87-39

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chemists helping chemists in research & industry
aldrich chemical co.
P.O. Box 355, Milwaukee, Wisconsin 53201 USA

Telephone: (414) 273-3850
TWX: (910) 262-3052 Aldrichem MI
Telex: 26 843 Aldrich MI
FAX: (414) 273-4979

VOMITING.

CHRONIC EFFECTS

CARCINOGEN.
DAMAGE TO THE LIVER
TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

FIRST AID

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
CALL A PHYSICIAN.
WASH CONTAMINATED CLOTHING BEFORE REUSE.

ADDITIONAL INFORMATION

WARNING: OVEREXPOSURE MAY CAUSE SERIOUS LIVER DISORDERS.

PHYSICAL DATA

MELTING POINT: -93 C
BOILING POINT: 120 C
SPECIFIC GRAVITY: 0.992
VAPOR DENSITY: 3
VAPOR PRESSURE: 13.0 MM @ 20 C

FIRE AND EXPLOSION HAZARD DATA

LOWER EXPLOSION LEVEL: 2.6%
FLASH POINT: 99 F

EXTINGUISHING MEDIA

WATER SPRAY.
CARBON DIOXIDE, DRY CHEMICAL POWDER, ALCOHOL OR POLYMER FOAM.

SPECIAL FIRE FIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.
FLAMMABLE LIQUID.

UNUSUAL FIRE AND EXPLOSION HAZARDS

EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

REACTIVITY DATA

INCOMPATIBILITIES

STRONG OXIDIZING AGENTS
STRONG BASES
LEAD
COPPER
AND THEIR ALLOYS.

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

THERMAL DECOMPOSITION MAY PRODUCE CARBON MONOXIDE, CARBON DIOXIDE, AND NITROGEN OXIDES.

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

EVACUATE AREA.
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.
ABSORB ON SAND OR VERMICULITE AND PLACE IN CLOSED CONTAINERS FOR DISPOSAL.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

Belgium
Aldrich Chemie N.V./S.A.
Bd. Lambermontlaan 140, b. 6
B-1030 Brussels
Telephone (02) 2428750
Telex 62302 Alchem B
FAX (02) 242 82 16

France
Aldrich-Chimie S.a.r.l.
27, Fosse des Tranze
F-67000 Strasbourg
Telephone (88) 327010
Telex 890076 Aldrich F
FAX (88) 75 12 83

Japan
Aldrich Japan
Kyodo Bldg. Shinkanda
10 Kanda-Mikurocho
Chiyoda-Ku, Tokyo
Telephone (03) 258-0155
FAX (03) 258-0157

United Kingdom
Aldrich Chemical Co., Ltd.
The Old Brickyard, New Road
Gillingham, Dorset SP8 4JL
Telephone (07476) 2211
Telex 417238 Aldrich G
FAX (07476) [illegible]

West Germany
Aldrich-Chemie GmbH & Co. KG
D-7924 Steinheim
Telephone (07329) 87-0
Telex 714638 Aldri D
FAX (07329) 87-39

chemists helping chemists in research & industry
aldrich chemical co.
P.O. Box 355, Milwaukee, Wisconsin 53201 USA

Telephone: (414) 273-3850
TWX: (910) 262-3052 Aldrichem Mi
Telex: 26 843 Aldrich MI
FAX: (414) 273-4979

MATERIAL SAFETY DATA SHEET

PAGE:

CATALOG # 13026-5 NAME: 2-NITROPROPANE, 95%

WASTE DISPOSAL METHOD

BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER BUT EXERT EXTRA CARE IN IGNITING AS THIS MATERIAL IS HIGHLY FLAMMABLE.

OBSERVE ALL FEDERAL, STATE & LOCAL LAWS.

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

CHEMICAL SAFETY GOGGLES.
RUBBER GLOVES.
NIOSH/MSHA-APPROVED RESPIRATOR.
SAFETY SHOWER AND EYE BATH.
USE ONLY IN A CHEMICAL FUME HOOD.
DO NOT BREATHE VAPOR.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
AVOID PROLONGED OR REPEATED EXPOSURE.
WASH THOROUGHLY AFTER HANDLING.
IRRITANT.
CARCINOGEN.
HARMFUL VAPOR.
KEEP TIGHTLY CLOSED.
KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAME.
STORE IN A COOL DRY PLACE.

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

NOT APPLICABLE

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

Belgium
Aldrich Chemie N.V./S.A.
Bd. Lambermontlaan 140, b. 6
B-1030 Brussels
Telephone (02) 2428750
Telex 62302 Alchem B
FAX (02) 242 82 16

France
Aldrich-Chimie S.a.r.l.
27, Fosse des Treize
F-67000 Strasbourg
Telephone (88) 327010
Telex 890076 Aldrich F
FAX (88) 75 12 83

Japan
Aldrich Japan
Kyodo Bldg. Shinkanda
10 Kanda-Mikuracho
Chiyoda-Ku, Tokyo
Telephone (03) 258-0155
FAX (03) 258-0157

United Kingdom
Aldrich Chemical Co. Ltd.
The Old Brickyard, New Road
Gillingham, Dorset SP8 4JL
Telephone (07476) 2211
Telex 417238 Aldrich G
FAX (07476)

West Germany
Aldrich-Chemie GmbH & Co. KG
D-7924 Steinheim
Telephone (07329) 87-0
Telex 714838 Aldri D
FAX (07329) 87-99

C-91 (Revised 2/15/90)

J. T. Baker Chemical Co.

222 Red School Lane Phillipsburg, N.J. 08865
24-Hour Emergency Telephone -- (201) 859-2151

Chemtrec # (800) 424-9300
National Response Center # (800) 424-8802

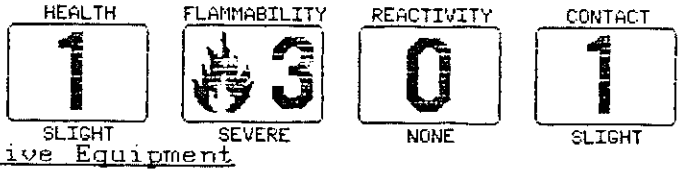
MATERIAL SAFETY DATA SHEET

SECTION I - PRODUCT IDENTIFICATION

Product Name: Octane
Formula: $CH_3(CH_2)_6CH_3$
Formula Wt: 114.23
CAS No.: 00111-65-9
NIOSH/RTECS No.: RG8400000
Common Synonyms: Normal Octane
Product Codes: S687,S686

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA™ System



Laboratory Protective Equipment

Precautionary Label Statements

WARNING!
FLAMMABLE
HARMFUL IF SWALLOWED
CAUSES IRRITATION

Keep away from heat, sparks, flame. Avoid contact with eyes, skin, clothing. Avoid breathing vapor. Keep in tightly closed container. Use with adequate ventilation. Wash thoroughly after handling. In case of fire, use water spray, alcohol foam, dry chemical, or carbon dioxide. Flush spill area with water spray.

SECTION II - HAZARDOUS COMPONENTS

Component	%	CAS No.
Octane	90-100	111-65-9

SECTION III - PHYSICAL DATA

Boiling Point: 126°C (259°F) Vapor Pressure(mmHg): 11

Continued on Page: 2

SECTION III - PHYSICAL DATA (Continued)

Melting Point: -57°C (-71°F) Vapor Density(air=1): 3.86

Specific Gravity: 0.70 (H_2O=1) Evaporation Rate: N/A (Butyl Acetate=1)

Solubility(H_2O): Negligible (less than 0.1 %) % Volatiles by Volume: 100

Appearance & Odor: Colorless liquid with a gasoline-like odor.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: 13°C (56°F) NFPA 704M Rating: 0-3-0

Flammable Limits: Upper - 6.5 % Lower - 1.0 %

Fire Extinguishing Media

Use alcohol foam, dry chemical or carbon dioxide.
(Water may be ineffective.)

Special Fire-Fighting Procedures

Firefighters should wear proper protective equipment and self-contained (positive pressure if available) breathing apparatus with full facepiece. Move exposed containers from fire area if it can be done without risk. Use water to keep fire-exposed containers cool.

Unusual Fire & Explosion Hazards

Vapors may flow along surfaces to distant ignition sources and flash back. Closed containers exposed to heat may explode. Contact with strong oxidizers may cause fire.

SECTION V - HEALTH HAZARD DATA

Threshold Limit Value (TLV/TWA): 1450 mg/m^3 (300 ppm)

Short-Term Exposure Limit (STEL): 1800 mg/m^3 (375 ppm)

Effects of Overexposure

Vapors may be irritating to skin, eyes, and mucous membranes.
Liquid may cause dermatitis.
Inhalation of vapors may cause narcosis.
Chronic effects of overexposure may include central nervous system depression.

Emergency and First Aid Procedures

If swallowed, if conscious, immediately induce vomiting.

Continued on Page: 3

SECTION V - HEALTH HAZARD DATA (Continued)

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Flush skin with water.

SECTION VI - REACTIVITY DATA

Stability: Stable Hazardous Polymerization: Will not occur

Conditions to Avoid: heat, flame, other sources of ignition

Incompatibles: strong oxidizing agents, chlorine, fluorine

SECTION VII - SPILL AND DISPOSAL PROCEDURES

Steps to be taken in the event of a spill or discharge

Wear suitable protective clothing. Shut off ignition sources; no flares, smoking, or flames in area. Stop leak if you can do so without risk. Use water spray to reduce vapors. Take up with sand or other non-combustible absorbent material and place into container for later disposal. Flush area with water.

J. T. Baker Solusorb[R] solvent adsorbent is recommended for spills of this product.

Disposal Procedure

Dispose in accordance with all applicable federal, state, and local environmental regulations.

EPA Hazardous Waste Number: D001 (Ignitable Waste)

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

Ventilation: Use general or local exhaust ventilation to meet TLV requirements.

Respiratory Protection: Respiratory protection required if airborne concentration exceeds TLV. At concentrations up to 1000 ppm, a chemical cartridge respirator with organic vapor cartridge is recommended. Above this level, a self-contained breathing apparatus is recommended.

Eye/Skin Protection: Safety goggles, uniform, apron, proper gloves are recommended.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA[TM] Storage Color Code: Red

Continued on Page: 4

SECTION IX - STORAGE AND HANDLING PRECAUTIONS (Continued)

Special Precautions

Bond and ground containers when transferring liquid. Keep container tightly closed. Store in a cool, dry, well-ventilated, flammable liquid storage area.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

Proper Shipping Name	Octane
Hazard Class	Flammable liquid
UN/NA	UN1262
Labels	FLAMMABLE LIQUID

INTERNATIONAL (I.M.O.)

Proper Shipping Name	Octane and its isomers
Hazard Class	3.2
UN/NA	UN1262
bels	FLAMMABLE LIQUID

N/A = Not Applicable or Not Available

The information published in this Material Safety Data Sheet has been compiled from our experience and data presented in various technical publications. It is the user's responsibility to determine the suitability of this information for the adoption of necessary safety precautions. We reserve the right to revise Material Safety Data Sheets periodically as new information becomes available.

-- LAST PAGE --

chemists helping chemists in research & industry
aldrich chemical co.
P.O. Box 355, Milwaukee, Wisconsin 53201 USA

Telephone: (414) 273-3850
TWX: (910) 262-3052 Aldrichem MI
Telex: 26 843 Aldrich MI
FAX: (414) 273-4979

ATTN: SAFETY DIRECTOR
AKZO CHEMICALS INC
8401 WEST 47TH STREET
MCCOOK IL 60525

DATE: 11/30/88
CUST # 105252 P.O. # 112890R

MATERIAL SAFETY DATA SHEET

PAGE:

IDENTIFICATION

PRODUCT # 27041-5 NAME: PENTANE, 99+%, HPLC GRADE
CAS # 109-66-0
MF: C5H12

SYNONYMS
AMYL HYDRIDE (DOT) * PENTAN (POLISH) * PENTANE (ACGIH,DOT) * PENTANEN (DUTCH) * PENTANI (ITALIAN) * UN 1265 (DOT) *

TOXICITY HAZARDS

RTECS # RZ9450000
PENTANE

TOXICITY DATA
IVN-MUS LD50:446 MG/KG JPMSAE 67,566,78

REVIEWS, STANDARDS, AND REGULATIONS
ACGIH TLV-TWA 600 PPM; STEL 750 PPM 85INA8 5,463,86
MSHA STANDARD-AIR:TWA 500 PPM (1475 MG/M3) DTLVS* 3,200,71
OSHA STANDARD-AIR:TWA 1000 PPM FEREAC 39,23540,74
NIOSH REL TO ALKANES-AIR:TWA 350 MG/M3 MMWR** 34(1S),6S,85
EPA TSCA CHEMICAL INVENTORY, 1986
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, JUNE 1988
NIOSH ANALYTICAL METHODS: SEE HYDROCARBONS, BP 36-126 C, 1500

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

HEALTH HAZARD DATA

ACUTE EFFECTS
HARMFUL IF INHALED OR SWALLOWED.
VAPOR OR MIST IS IRRITATING TO THE EYES, MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT.
CAUSES SKIN IRRITATION.

EXPOSURE CAN CAUSE:
DAMAGE TO THE LUNGS

FIRST AID
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
CALL A PHYSICIAN.
WASH CONTAMINATED CLOTHING BEFORE REUSE.

PHYSICAL DATA

MELTING POINT: -130 C
BOILING POINT: 35 C TO 36 C
SPECIFIC GRAVITY: 0.626
VAPOR DENSITY: 2.48
VAPOR PRESSURE: 426.0 MM @ 20 C
776.0 MM @ 37.8 C

Belgium
Aldrich Chemie N.V./S.A.
Bd. Lambermontlaan 140 b 6
B 1030 Brussels
Telephone (02) 2428750
Telex 62302 Alchem B
FAX (02) 242 82 16

France
Aldrich-Chimie S.a.r.l.
27, Fosse des Treize
F 67000 Strasbourg
Telephone (68) 327010
Telex 890076 Aldrich F
FAX (88) 75 12 63

Japan
Aldrich Japan
Kyodo Bldg. Shinkanda
10 Kanda Mikuracho
Chiyoda Ku, Tokyo
Telephone (03) 258-0155
FAX (03) 258 0157

United Kingdom
Aldrich Chemical Co., Ltd.
The Old Brickyard, New Road
Gillingham, Dorset SP8 4JL
Telephone (07476) 2211
Telex 417238 Aldrich G
FAX (07476) 3779

West Germany
Aldrich-Chemie GmbH & Co. KG
D-7924 Steinheim
Telephone (07329) 87 0
Telex 714838 Aldri D
FAX (07329) 87 33

chemists helping chemists in research & industry
aldrich chemical co.
P.O. Box 355, Milwaukee, Wisconsin 53201 USA

Telephone: (414) 273-3850
TWX: (910) 262-3052 Aldrichem MI
Telex: 26 843 Aldrich MI
FAX: (414) 273-4979

MATERIAL SAFETY DATA SHEET

CATALOG # 27041-5 NAME: PENTANE, 99+%, HPLC GRADE

FIRE AND EXPLOSION HAZARD DATA

AUTO IGNITION TEMP.: 500 F
LOWER EXPLOSION LEVEL: 1.4%
UPPER EXPLOSION LEVEL: 8.3%
FLASH POINT: -57 F

EXTINGUISHING MEDIA
CARBON DIOXIDE, DRY CHEMICAL POWDER, ALCOHOL OR POLYMER FOAM.
DO NOT USE WATER.

SPECIAL FIRE FIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.
USE WATER SPRAY TO COOL FIRE-EXPOSED CONTAINERS.

UNUSUAL FIRE AND EXPLOSION HAZARDS
EXTREMELY FLAMMABLE.
VAPOR MAY TRAVEL CONSIDERABLE DISTANCE TO SOURCE OF IGNITION AND FLASH BACK.
CONTAINER EXPLOSION MAY OCCUR UNDER FIRE CONDITIONS.

REACTIVITY DATA

INCOMPATIBILITIES
OXIDIZING AGENTS

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS
TOXIC FUMES OF:
CARBON MONOXIDE, CARBON DIOXIDE

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED
EVACUATE AREA.
SHUT OFF ALL SOURCES OF IGNITION.
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.
COVER WITH AN ACTIVATED CARBON ADSORBENT, TAKE UP AND PLACE IN CLOSED CONTAINERS. TRANSPORT OUTDOORS.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

WASTE DISPOSAL METHOD
BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER BUT EXERT EXTRA CARE IN IGNITING AS THIS MATERIAL IS HIGHLY FLAMMABLE.

OBSERVE ALL FEDERAL, STATE & LOCAL LAWS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

CHEMICAL SAFETY GOGGLES.
SAFETY SHOWER AND EYE BATH.
MECHANICAL EXHAUST REQUIRED.
RUBBER GLOVES.
NIOSH/MSHA-APPROVED RESPIRATOR.
DO NOT BREATHE VAPOR.
AVOID CONTACT WITH EYES, SKIN AND CLOTHING.
WASH THOROUGHLY AFTER HANDLING.
IRRITANT.
KEEP TIGHTLY CLOSED.
KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAME.
OPEN CAREFULLY.
MAY DEVELOP PRESSURE.
HANDLE AND STORE UNDER NITROGEN.
REFRIGERATE.

Belgium
Aldrich Chemie N.V. S.A.
Bd. Lambermontlaan 140, b. 6
B-1030 Brussels
Telephone (02) 2428750
Telex 62302 A chem B
FAX (02) 242 82 16

France
Aldrich-Chimie S.a.r.l.
27, Fosse des Treize
F-67000 Strasbourg
Telephone (88) 327010
Telex 890076 Aldrich F
FAX (88) 75 12 83

Japan
Aldrich Japan
Kyodo Bldg. Shinkanda
10 Kanda-Mikuracho
Chiyoda-Ku, Tokyo
Telephone (03) 258 0155
FAX (03) 258-0157

United Kingdom
Aldrich Chemical Co. Ltd.
The Old Brickyard, New Road
Gillingham, Dorset SP8 4JL
Telephone (07476) 2211
Telex 417238 Aldrich G
FAX (07476) 3779

West Germany
Aldrich-Chemie GmbH & Co. KG
D-7924 Steinheim
Telephone (07329) 87-0
Telex 714838 A dri D
FAX (07329) 87 39

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chemists helping chemists in research & industry
aldrich chemical co.
P.O. Box 355, Milwaukee, Wisconsin 53201 USA

Telephone: (414) 273-3850
TWX: (910) 262-3052 Aldrichem MI
Telex: 26 843 Aldrich MI
FAX: (414) 273-4979

MATERIAL SAFETY DATA SHEET

PAGE:

CATALOG # 27041-5 NAME: PENTANE, 99+%, HPLC GRADE

ADDITIONAL PRECAUTIONS AND COMMENTS

NOT APPLICABLE

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Aldrich-Chemie N.V./S.A.
Bd. Lambermontlaan 140 b 6
B-1030 Brussels
Telephone (02) 2428750
Telex 62302 Alchem B
FAX (02) 242 82 16

France
Aldrich-Chimie S.a.r.l.
27, Fosse des Treize
F-67000 Strasbourg
Telephone (88) 327010
Telex 890076 Aldrich F
FAX (88) 75 12 83

Japan
Aldrich Japan
Kyodo Bldg. Shinkanda
10 Kanda-Mikuracho
Chiyoda-Ku, Tokyo
Telephone (03) 258-0155
FAX (03) 258-0157

United Kingdom
Aldrich Chemical Co. Ltd.
The Old Brickyard, New Road
Gillingham, Dorset SP8 4JL
Telephone (07476) 2211
Telex 417238 Aldrich G
FAX (07476) 3

West Germany
Aldrich-Chemie GmbH & Co. KG
D-7924 Steinheim
Telephone (07329) 87-0
Telex 714838 Aldri D
FAX (07329) 87-39

C-98 (2-15-90)

MATERIAL SAFETY DATA SHEET

EASTMAN KODAK COMPANY
343 STATE STREET
ROCHESTER, NEW YORK 14650

FOR EMERGENCY HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION, CALL 716-722-5151
FOR ALL OTHER PURPOSES, CALL 800-225-5352, IN NEW YORK STATE CALL 716-458-4014

DATE OF REVISION: 08/02/88 KODAK ACCESSION NUMBER: 900214

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SECTION I. IDENTIFICATION

- PRODUCT NAME: PYRIDINE
- FORMULA: C5 H5 N
- CAT NO(S): 103 2580; 103 2606; 103 2614; 103 2630; 103 2689; 103 2705; 116 7022; 116 7048; 136 1831; 136 1849; 136 1856; 136 1864; 136 1872; 159 5081; 179 6994; 186 4859; 111 6011; 115 4061; 115 4681; 136 5303; 136 5311; 136 5329; 146 8313; 146 8453; 186 4578; 186 4610
- CHEM. NO(S): 00214; 13002; 13098
- KODAK'S INTERNAL HAZARD RATING CODES: R: 2 S: 3 F: 3 C: 0

==========

SECTION II. PRODUCT AND COMPONENT HAZARD DATA

COMPONENT(S):	PERCENT	ACGIH TLV(R)	CAS REG. NO.
PYRIDINE	CA. 100	5 PPM	110-86-1

==========

SECTION III. PHYSICAL DATA

- APPEARANCE AND ODOR: COLORLESS LIQUID; DISAGREEABLE ODOR
- BOILING POINT: 115 C (239 F)
- VAPOR PRESSURE: 16 MMHG AT 20 C (68 F)
- EVAPORATION RATE (N-BUTYL ACETATE = 1): NOT AVAILABLE
- VOLATILE FRACTION BY WEIGHT: CA. 100 %
- SPECIFIC GRAVITY (WATER = 1): 0.98
- SOLUBILITY IN WATER (BY WEIGHT): COMPLETE

==========

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

- FLASH POINT: 8 C (47 F) TAG CLOSED CUP
- EXTINGUISHING MEDIA: WATER SPRAY; DRY CHEMICAL; CARBON DIOXIDE; "ALCOHOL" FOAM
- SPECIAL FIRE FIGHTING PROCEDURES: WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING. WATER MAY BE INEFFECTIVE IN FIGHTING FIRE. USE WATER SPRAY TO KEEP FIRE-EXPOSED CONTAINERS COOL.
- UNUSUAL FIRE AND EXPLOSION HAZARDS: FIRE OR EXCESSIVE HEAT MAY PRODUCE HAZARDOUS DECOMPOSITION PRODUCTS. VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL ALONG THE GROUND OR BE MOVED BY VENTILATION TO AN IGNITION SOURCE AND FLASH BACK.

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C-99 (2/15/90)

SECTION V. REACTIVITY DATA

- STABILITY: STABLE
- INCOMPATIBILITY: STRONG OXIDIZERS, ACIDS, DINITROGEN TETROXIDE, MALEIC ANHYDRIDE, BETA PROPIOLACTONE, SILVER PERCHLORATE, NITROMETHANE
- HAZARDOUS DECOMPOSITION PRODUCTS: COMBUSTION WILL PRODUCE CARBON DIOXIDE AND PROBABLY CARBON MONOXIDE. OXIDES OF NITROGEN MAY ALSO BE PRESENT.
- HAZARDOUS POLYMERIZATION: WILL NOT OCCUR.

SECTION VI. TOXICITY AND HEALTH HAZARD DATA

A. EXPOSURE LIMITS: 5 PPM AS AN 8-HR. TWA, ACGIH 1986-7. THE OSHA PEL IS 5 PPM.

B. EXPOSURE EFFECTS:
INHALATION: TRANSIENT SYMPTOMS OF OVEREXPOSURE INCLUDE NAUSEA, DIZZINESS, HEADACHE, INSOMNIA AND NERVOUSNESS. THE CHARACTERISTIC ODOR IS DETECTABLE AT 1 PPM AND BECOMES OBJECTIONABLE TO UNACCUSTOMED INDIVIDUALS AS CONCENTRATIONS APPROACH 10 PPM. REPEATED AND PROLONGED EXPOSURE MAY PRODUCE LIVER, KIDNEY AND BONE MARROW INJURY.
SKIN: CAUSES BURNS. HARMFUL IF ABSORBED THROUGH THE SKIN.
EYE: CAUSES BURNS.
INGESTION: EXPECTED TO BE A LOW INGESTION HAZARD.

C. FIRST AID:
INHALATION: REMOVE TO FRESH AIR. TREAT SYMPTOMATICALLY. IF SYMPTOMS ARE PRESENT GET MEDICAL ATTENTION.
SKIN: IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION IF SYMPTOMS ARE PRESENT AFTER WASHING.
EYE: IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES AND GET MEDICAL ATTENTION.
INGESTION: DRINK A GLASS OF WATER. SEEK MEDICAL ATTENTION.

SECTION VII. VENTILATION AND PERSONAL PROTECTION

A. VENTILATION:
GOOD GENERAL ROOM VENTILATION SHOULD BE USED. LOCAL EXHAUST MAY BE NEEDED.

B. RESPIRATORY PROTECTION:
A NIOSH APPROVED ORGANIC VAPOR RESPIRATOR SHOULD BE WORN, IF NEEDED.

C. SKIN AND EYE PROTECTION:
PROTECTIVE GLOVES AND CLOTHING SHOULD BE WORN. SAFETY GLASSES, GOGGLES, OR A FACE SHIELD SHOULD BE WORN.

==========

SECTION VIII. SPECIAL STORAGE AND HANDLING PRECAUTIONS

KEEP FROM CONTACT WITH OXIDIZING MATERIALS. KEEP CONTAINER TIGHTLY CLOSED AND AWAY FROM ACIDS, DINITROGEN TETROXIDE, MALEIC ANHYDRIDE, PERCHROMATES, BETA PROPIOLACTONE, SILVER PERCHLORATE, OR NITROMETHANE.
CLASSIFIED AS A FLAMMABLE LIQUID. KEEP AWAY FROM HEAT, SPARKS AND FLAME.
USE WITH ADEQUATE VENTILATION. KEEP CONTAINER CLOSED.
COMPLY WITH ALL FEDERAL, STATE AND LOCAL CODES PERTAINING TO THE STORAGE, HANDLING, DISPENSING AND DISPOSAL OF FLAMMABLE LIQUIDS.

==========

SECTION IX. SPILL, LEAK, AND DISPOSAL PROCEDURES

REMOVE ALL SOURCES OF IGNITION. ABSORB MATERIAL IN VERMICULITE OR OTHER SUITABLE ABSORBENT AND PLACE IN IMPERVIOUS CONTAINER. DISPOSE BY INCINERATION OR CONTRACT WITH LICENSED CHEMICAL WASTE DISPOSAL AGENCY. DISCHARGE, TREATMENT, OR DISPOSAL MAY BE SUBJECT TO FEDERAL, STATE OR LOCAL LAWS.

==========

FOR TRANSPORTATION INFORMATION REGARDING THIS PRODUCT, PLEASE PHONE THE EASTMAN KODAK DISTRIBUTION CENTER NEAREST YOU: ROCHESTER, NY (716) 254-1300; OAK BROOK, IL (312) 654-5300; CHAMBLEE, GA (404) 455-0123; DALLAS, TX (214) 241-1611; WHITTIER, CA (213) 945-1255; HONOLULU, HI (808) 833-1661.

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==========

R-0308.700C 87-8273 @900214*

chemists helping chemists in research & industry

aldrich chemical co.

P.O. Box 355, Milwaukee, Wisconsin 53201 USA • (414) 273-3850

ATTN: SAFETY DIRECTOR
AKZO CHEMIE AMERICA
300 S RIVERSIDE PLAZA
CHICAGO IL 60606

DATE: 06/23/87
CUST # 1C5252 P.O. # 108984R

MATERIAL SAFETY DATA SHEET

IDENTIFICATION

PRODUCT # T750-0 NAME: **TETRACHLOROETHYLENE, 99%**
CAS # 127-18-4

TOXICITY HAZARDS

RTECS # KX3850000
ETHYLENE, TETRACHLORO-

IRRITATION DATA

SKN-RBT 810 MG/24H SEV	EJTXAZ 9,171,76
EYE-RBT 162 MG MLD	EJTXAZ 9,171,76

TOXICITY DATA

IHL-MAN LDLO:2857 MG/KG	MLDCAS 5,152,72
ORL-RAT LD50:3005 MG/KG	FAATDF 7,119,86
ORL-MUS LD50:8100 MG/KG	NTIS** PB257-185
IHL-MUS LC50:5200 PPM/4H	APTOA6 9,303,53
IPR-MUS LD50:4700 MG/KG	NTIS** PB257-185
SCU-MUS LD50:65 GM/KG	JPETAB 123,224,58
IPR-DOG LD50:2100 MG/KG	TXAPA9 10,119,67

REVIEWS, STANDARDS, AND REGULATIONS

CARCINOGENIC REVIEW:ANIMAL SUSPECTED IMEMDT 20,491,79
ACGIH TLV-TWA 50 PPM; STEL 200 PPM 85INA8 5,464,86
MSHA STANDARD-AIR:TWA 100 PPM (670 MG/M3) DTLVS* 3,201,71
OSHA STANDARD-AIR:TWA 100 PPM;CL 200;PK 300/5M/3H FEREAC 39,23540,74
NIOSH REL TO TETRACHLOROETHYLENE-AIR:MINIMIZE WORKPLACE EXPOSURE MMWR* * 34(1S),27S,85
EPA GENETOX PROGRAM 1986, POSITIVE: CELL TRANSFORM.-RLV F344 RAT EMBRYO
EPA GENETOX PROGRAM 1986, POSITIVE: S CEREVISIAE GENE CONVERSION; S CEREVISIAE-HOMOZYGOSIS
EPA GENETOX PROGRAM 1986, POSITIVE: S CEREVISIAE-REVERSION
EPA GENETOX PROGRAM 1986, POSITIVE/LIMITED: CARCINOGENICITY-MOUSE/RAT
EPA GENETOX PROGRAM 1986, NEGATIVE: CELL TRANSFORM.-SA7/SHE
EPA TSCA CHEMICAL INVENTORY, 1986
EPA TSCA SECTION 8(E) STATUS REPORT 8EHQ-0979-0310;8EHQ-0680-0345; 8EHQ-0578-0146
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, DECEMBER 1986
NIOSH CURRENT INTELLIGENCE BULLETIN 20, 1978
NCI CARCINOGENESIS BIOASSAY (GAVAGE);RESULTS POSITIVE:MOUSE NCITR* NCI-CG-TR-13,77
NTP CARCINOGENESIS STUDIES (INHALATION);CLEAR EVIDENCE:MOUSE,RAT NTPTR* NTP-TR-311,86
NCI CARCINOGENESIS BIOASSAY (GAVAGE);RESULTS NEGATIVE:RAT NCITR* NCI-CG-TR-13,77
NTP CARCINOGENESIS STUDIES;TEST COMPLETED (CAMERA COPY IN PROGRESS), SEPTEMBER 1986
MEETS CRITERIA FOR PROPOSED OSHA MEDICAL RECORDS RULE FEREAC 47,30420, 82

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

HEALTH HAZARD DATA

ACUTE EFFECTS

HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.
VAPOR OR MIST IS IRRITATING TO THE EYES, MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT.
CAUSES SKIN IRRITATION.

USA
Aldrich Chemical Co., Inc.
940 West Saint Paul Avenue
Milwaukee, Wisconsin 53233
Telephone (414) 273-3850
TWX (910) 262-3052 Aldrichem MI
Telex 26 643 Aldrich MI
FAX (414) 273-4379

Belgium
Aldrich Chemie N.V./S.A.
6 Rue Caporal Claes
B 1030 Brussels
Telephone (02) 2428750
Telex 62302 Alchem B

France
Aldrich-Chimie S.a.r.l.
27, Fosse des Tailleurs
F-67000 Strasbourg
Telephone (88) 327010
Telex 890076 Aldrich F
FA

Japan
Aldrich Japan
Kyodo Bldg. Shinkanda
10 Kanda M.A.Jracho
Chiyoda Ku, Tokyo
Telephone (03) 258-0155

United Kingdom
Aldrich Chemical Co., Ltd.
The Old Brickyard, New Road
Gillingham, Dorset SP8 4JL
Telephone (0747h) 2211
Telex 417238 Aldrich G

West Germany
Aldrich Chemie GmbH & Co. KG
D 7924 Steinheim
Telephone (07329) 87-0
Telex 714538 Aldri D
FAX (07329) 87-39

C-102 (2/15/90)

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CATALOG # T750-0 NAME: TETRACHLOROETHYLENE, 99%

EXPOSURE CAN CAUSE:
NAUSEA, DIZZINESS AND HEADACHE
NARCOTIC EFFECT.
CHRONIC EFFECTS
DAMAGE TO THE LIVER
DAMAGE TO THE KIDNEYS
CARCINOGEN.
FIRST AID
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
CALL A PHYSICIAN.

PHYSICAL DATA

MELTING POINT: -22 C
BOILING POINT: 121 C
SPECIFIC GRAVITY: 1.623
VAPOR PRESSURE: 13.0 MM @ 20 C

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: NONE
EXTINGUISHING MEDIA
NONCOMBUSTIBLE.
USE EXTINGUISHING MEDIA APPROPRIATE TO SURROUNDING FIRE CONDITIONS.
SPECIAL FIRE FIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.
UNUSUAL FIRE AND EXPLOSION HAZARDS
EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

REACTIVITY DATA

INCOMPATIBILITIES
STRONG BASES
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS
TOXIC FUMES OF:
PHOSGENE GAS
HYDROGEN CHLORIDE GAS
CARBON MONOXIDE, CARBON DIOXIDE

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED
EVACUATE AREA.
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.
ABSORB ON SAND OR VERMICULITE AND PLACE IN CLOSED CONTAINERS FOR DISPOSAL.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.
WASTE DISPOSAL METHOD
DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.

OBSERVE ALL FEDERAL, STATE & LOCAL LAWS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.
SAFETY SHOWER AND EYE BATH.
USE ONLY IN A CHEMICAL FUME HOOD.
DO NOT BREATHE VAPOR.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
WASH THOROUGHLY AFTER HANDLING.

USA
Aldrich Chemical Co., Inc.
940 West Saint Paul Avenue
Milwaukee, Wisconsin 53233
Telephone: (414) 273-3850
TWX: (910) 262 3052 Aldrichem MI
Telex: 26 843 Aldrich MI
FAX: (414) 273-4979

Belgium
Aldrich Chemie N.V./S.A.
6 Rue Caporal Claes
B 1030 Brussels
Telephone (02) 2428750
Telex: 62302 Atchem B

France
Aldrich Chimie S.a.r.l.
27, Fosse des Treize
F-67000 Strasbourg
Telephone (88) 327010
Telex 890076 Aldrich F
FAX

Japan
Aldrich Japan
Kyodo Bldg. Shinkanda
10 Kanda Mikuracho
Chiyoda Ku, Tokyo
Telephone (03) 258 0155

United Kingdom
Aldrich Chemical Co., Ltd.
The Old Brickyard, New Road
Gillingham, Dorset SP8 4JL
Telephone (07476) 2211

West Germany
Aldrich-Chemie GmbH & Co. KG
D-7924 Steinheim
Telephone (07329) 87-0
Telex 714838 Aldri D
FAX (07329) 87 39

C-103 (2/15/90

M A T E R I A L S A F E T Y D A T A S H E E T PAGE: 3

CATALOG # T750-0 NAME: TETRACHLOROETHYLENE, 99%

CARCINOGEN.
IRRITANT.
HARMFUL LIQUID AND FUMES.
KEEP TIGHTLY CLOSED.
STORE IN A COOL DRY PLACE.

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

EXPOSURE TO AND/OR CONSUMPTION OF ALCOHOL
MAY INCREASE TOXIC EFFECTS.

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

USA
Aldrich Chemical Co., Inc.
940 West Saint Paul Avenue
Milwaukee, Wisconsin 53233
Telephone (414) 273-3850
TWX. (910) 262-3052 Aldrichem MI
Telex: 26 843 Aldrich MI
FAX. (414) 273-4979

Belgium
Aldrich Chemie N.V./S.A.
6 Rue Caporal Claes
B-1030 Brussels
Telephone (02) 2428750
Telex. 62302 Alchem B

France
Aldrich-Chimie S.a.r.l.
27, Fosse des Treize
F-67000 Strasbourg
Telephone (88) 327010
Telex 890076 Aldrich F
FAX

Japan
Aldrich Japan
Kyodo Bldg. Shinkanda
10 Kanda Misuracho
Chiyoda Ku Tokyo
Telephone (03) 258-0155

United Kingdom
Aldrich Chemical Co., Ltd.
The Old Brickyard, New Road
Gillingham, Dorset SP8 4JL
Telephone (07476) 2211
Telex 417238 Aldrich G

West Germany
Aldrich Chemie GmbH & Co. KG
D-7924 Steinheim
Telephone (07329) 87-0
Telex. 714838 Aldri D
FAX. (07329) 87-39

C-104 (2/15/90)

72-62-7820-01

MATERIAL SAFETY DATA SHEET

Ashland Chemical Company
DIVISION OF ASHLAND OIL, INC.
P. O. BOX 2219, COLUMBUS, OHIO 43216 • (614) 889-3333

24-HOUR EMERGENCY TELEPHONE (606) 324-1133

Ashland

009699

TOLUENE

THIS MSDS COMPLIES WITH 29 CFR 1910.1200 (THE HAZARD COMMUNICATION STANDARD)

****

Product Name: TOLUENE
CAS NUMBER: 108-88-3

Data Sheet No: 0000565-005
Prepared: 12/22/88
Supersedes: 03/04/86

AKZO-CHEMIE AMERICA 8401
300 S. RIVERSIDE PLAZA
CHICAGO IL 60606

ATTN: PLANT MGR./SAFETY DIR.

05 50 856 0256730-001

PRODUCT: 2185000
INVOICE: 294437
INVOICE DATE: 02/22/88
TO: AKZO-CHEMIE AMERICA
8401 W. 47TH ST.
MCCOOK IL 60525

SECTION I - PRODUCT IDENTIFICATION

General or Generic ID: AROMATIC HYDROCARBON

DOT Hazard Classification: FLAMMABLE LIQUID (173.115)

SECTION II - COMPONENTS

IF PRESENT, IARC, NTP AND OSHA CARCINOGENS AND CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SARA TITLE III SECTION 313 ARE IDENTIFIED IN THIS SECTION. SEE DEFINITION PAGE FOR CLARIFICATION

INGREDIENT	% (by WT)	PEL	TLV	Note
TOLUENE CAS #: 108-88-3	100	200 PPM	100 PPM	(1)

Notes:

(1) ACGIH - SHORT TERM EXPOSURE LIMIT (STEL) FOR TOLUENE IS 150 PPM. THE OSHA ACCEPTABLE CEILING CONCENTRATION IS 300 PPM. THE ACCEPTABLE MAXIMUM PEAK ABOVE THE ACCEPTANCE CEILING CONCENTRATION FOR AN 8-HOUR SHIFT IS 500 PPM FOR A MAXIMUM DURATION OF 10 MINUTES. NIOSH RECOMMENDS A LIMIT OF 100 PPM, 8-HOUR TWA; 200 PPM 10 MINUTE CEILING.

THIS CHEMICAL IS SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF SARA TITLE III.

SECTION III - PHYSICAL DATA

Boiling Point	for PRODUCT	232.00 Deg F (111.11 Deg C) @ 760.00 mm Hg
Vapor Pressure	for PRODUCT	22.00 mm Hg @ 68.00 Deg F (20.00 Deg C)
Specific Vapor Density	AIR = 1	3.2
Specific Gravity		.871 @ 60.00 Deg F (15.55 Deg C)
Percent Volatiles		100.00%
Evaporation Rate	(N-BUTYL ACETATE = 1)	2.00

SECTION IV - FIRE AND EXPLOSION INFORMATION

FLASH POINT(TCC) 45.0 Deg F (7.2 Deg C)

EXPLOSIVE LIMIT (PRODUCT) LOWER - 1.2% UPPER - 7.0%

EXTINGUISHING MEDIA: REGULAR FOAM OR CARBON DIOXIDE OR DRY CHEMICAL

HAZARDOUS DECOMPOSITION PRODUCTS: MAY FORM TOXIC MATERIALS:, CARBON DIOXIDE AND CARBON MONOXIDE, VARIOUS HYDROCARBONS, ETC.

FIREFIGHTING PROCEDURES: WEAR SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN THE POSITIVE PRESSURE DEMAND MODE WHEN FIGHTING FIRES.

SPECIAL FIRE & EXPLOSION HAZARDS: VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL ALONG THE GROUND OR MAY BE MOVED BY VENTILATION AND IGNITED BY PILOT LIGHTS, OTHER FLAMES, SPARKS, HEATERS, SMOKING, ELECTRIC MOTORS, STATIC DISCHARGE, OR OTHER IGNITION SOURCES AT LOCATIONS DISTANT FROM MATERIAL HANDLING POINT.

NEVER USE WELDING OR CUTTING TORCH ON OR NEAR DRUM (EVEN EMPTY) BECAUSE PRODUCT (EVEN JUST RESIDUE) CAN IGNITE EXPLOSIVELY.

ALL FIVE GALLON PAILS AND LARGER METAL CONTAINERS INCLUDING TANK CARS AND TANK TRUCKS SHOULD BE GROUNDED AND/OR BONDED WHEN MATERIAL IS TRANSFERRED.

NFPA CODES: HEALTH- 2 FLAMMABILITY- 3 REACTIVITY- 0

SECTION V - HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LEVEL	200	PPM
THRESHOLD LIMIT VALUE	100	PPM

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CONTINUED ON PAGE: 2

C-105 (2/15/90)

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SECTION V: HEALTH HAZARD DATA (Continued)

EFFECTS OF ACUTE OVEREXPOSURE: FOR PRODUCT

EYES - CAN CAUSE SEVERE IRRITATION, REDNESS, TEARING, BLURRED VISION.
SKIN - PROLONGED OR REPEATED CONTACT CAN CAUSE MODERATE IRRITATION, DEFATTING, DERMATITIS.
BREATHING - EXCESSIVE INHALATION OF VAPORS CAN CAUSE NASAL AND RESPIRATORY IRRITATION, CENTRAL NERVOUS SYSTEM EFFECTS INCLUDING DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE AND POSSIBLE UNCONSCIOUSNESS, AND EVEN DEATH.
SWALLOWING - CAN CAUSE GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING, AND DIARRHEA. ASPIRATION OF MATERIAL INTO THE LUNGS CAN CAUSE CHEMICAL PNEUMONITIS WHICH CAN BE FATAL.

FIRST AID:

IF ON SKIN: THOROUGHLY WASH EXPOSED AREA WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHING. LAUNDER CONTAMINATED CLOTHING BEFORE RE-USE.

IF IN EYES: FLUSH WITH LARGE AMOUNTS OF WATER, LIFTING UPPER AND LOWER LIDS OCCASIONALLY, GET MEDICAL ATTENTION.

IF SWALLOWED: DO NOT INDUCE VOMITING, KEEP PERSON WARM, QUIET, AND GET MEDICAL ATTENTION. ASPIRATION OF MATERIAL INTO THE LUNGS DUE TO VOMITING CAN CAUSE CHEMICAL PNEUMONITIS WHICH CAN BE FATAL.

IF BREATHED: IF AFFECTED, REMOVE INDIVIDUAL TO FRESH AIR. IF BREATHING IS DIFFICULT, ADMINISTER OXYGEN. IF BREATHING HAS STOPPED GIVE ARTIFICIAL RESPIRATION. KEEP PERSON WARM, QUIET AND GET MEDICAL ATTENTION.

PRIMARY ROUTE(S) OF ENTRY:

INHALATION, SKIN CONTACT

EFFECTS OF CHRONIC OVEREXPOSURE: FOR PRODUCT

OVEREXPOSURE TO THIS MATERIAL (OR ITS COMPONENTS) HAS APPARENTLY BEEN FOUND TO CAUSE THE FOLLOWING EFFECTS IN LABORATORY ANIMALS:, LIVER ABNORMALITIES, KIDNEY DAMAGE, LUNG DAMAGE, SPLEEN DAMAGE

OVEREXPOSURE TO THIS MATERIAL (OR ITS COMPONENTS) HAS BEEN SUGGESTED AS A CAUSE OF THE FOLLOWING EFFECTS IN HUMANS:, LIVER ABNORMALITIES

SECTION VI: REACTIVITY DATA

HAZARDOUS POLYMERIZATION: CANNOT OCCUR

STABILITY: STABLE

INCOMPATIBILITY: AVOID CONTACT WITH:, STRONG OXIDIZING AGENTS.

SECTION VII: SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

SMALL SPILL: ABSORB LIQUID ON PAPER, VERMICULITE, FLOOR ABSORBENT, OR OTHER ABSORBENT MATERIAL AND TRANSFER TO HOOD.

LARGE SPILL: ELIMINATE ALL IGNITION SOURCES (FLARES, FLAMES INCLUDING PILOT LIGHTS, ELECTRICAL SPARKS). PERSONS NOT WEARING PROTECTIVE EQUIPMENT SHOULD BE EXCLUDED FROM AREA OF SPILL UNTIL CLEAN-UP HAS BEEN COMPLETED. STOP SPILL AT SOURCE, DIKE AREA OF SPILL TO PREVENT SPREADING, PUMP LIQUID TO SALVAGE TANK. REMAINING LIQUID MAY BE TAKEN UP ON SAND, CLAY, EARTH, FLOOR ABSORBENT, OR OTHER ABSORBENT MATERIAL AND SHOVELED INTO CONTAINERS.

WASTE DISPOSAL METHOD:

SMALL SPILL: ALLOW VOLATILE PORTION TO EVAPORATE IN HOOD. ALLOW SUFFICIENT TIME FOR VAPORS TO COMPLETELY CLEAR HOOD DUCT WORK. DISPOSE OF REMAINING MATERIAL IN ACCORDANCE WITH APPLICABLE REGULATIONS.

LARGE SPILL: DESTROY BY LIQUID INCINERATION.

CONTAMINATED ABSORBENT MAY BE DEPOSITED IN A LANDFILL IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

SECTION VIII: PROTECTIVE EQUIPMENT TO BE USED

RESPIRATORY PROTECTION: IF WORKPLACE EXPOSURE LIMIT(S) OF PRODUCT OR ANY COMPONENT IS EXCEEDED (SEE SECTION II), A NIOSH/MSHA APPROVED AIR SUPPLIED RESPIRATOR IS ADVISED IN ABSENCE OF PROPER ENVIRONMENTAL CONTROL. OSHA REGULATIONS ALSO PERMIT OTHER NIOSH/MSHA RESPIRATORS (NEGATIVE PRESSURE TYPE) UNDER SPECIFIED CONDITIONS (SEE YOUR SAFETY EQUIPMENT SUPPLIER). ENGINEERING OR ADMINISTRATIVE CONTROLS SHOULD BE IMPLEMENTED TO REDUCE EXPOSURE.

VENTILATION: PROVIDE SUFFICIENT MECHANICAL (GENERAL AND/OR LOCAL EXHAUST) VENTILATION TO MAINTAIN EXPOSURE BELOW TLV(S).

PROTECTIVE GLOVES: WEAR RESISTANT GLOVES SUCH AS:, NITRILE RUBBER

EYE PROTECTION: CHEMICAL SPLASH GOGGLES IN COMPLIANCE WITH OSHA REGULATIONS ARE ADVISED; HOWEVER, OSHA REGULATIONS ALSO PERMIT OTHER TYPE SAFETY GLASSES. (CONSULT YOUR SAFETY EQUIPMENT SUPPLIER)

OTHER PROTECTIVE EQUIPMENT: TO PREVENT REPEATED OR PROLONGED SKIN CONTACT, WEAR IMPERVIOUS CLOTHING AND BOOTS.

SECTION IX: SPECIAL PRECAUTIONS OR OTHER COMMENTS

CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTIED.SINCE EMPTIED CONTAINERS RETAIN PRODUCT RESIDUES (VAPOR, LIQUID, AND/OR SOLID), ALL HAZARD PRECAUTIONS GIVEN IN THE DATA SHEET MUST BE OBSERVED.

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C-106 (2/15/90)

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SCD NO. = 00325
ACC NO. = 900325
MI# = K-0349.800
CAS REG. NO. = 108-88-3
PHONE NO.: (716) 722-5151

MATERIAL SAFETY DATA SHEET

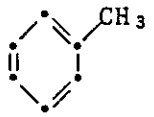
EASTMAN KODAK COMPANY
343 State Street
Rochester, New York 14650

For Emergency Health, Safety, and Environmental Information, call (716) 722-5151
For all other purposes, call the Marketing and Distribution Center in your area.

Date of Preparation: 9/26/83 Approved by U.S. Department of Labor

SECTION I. IDENTIFICATION

- Product Name: Toluene
- Size(s): 5 kg, 5 gal, 4 L, 4 x 4 L, 1 pint, 12 x 1 pint, 1 gal, 4 x 1 gal, bulk
- Synonym(s): Methylbenzene; Methylbenzol; Phenylmethane; Toluol
- Formula: C_7H_8



- Kodak Laboratory Chemicals Catalog Number(s): 325, 13016, 13037, 13053
- Kodak Accession Number: 900325

SECTION II. PRODUCT AND COMPONENT HAZARD DATA

A. COMPONENT(S):

COMPONENT(S):	Percent	TLV*	Kodak Accession No.	CAS Reg. No.
Toluene	> 99	100 ppm skin	900325	108-88-3

B. PRECAUTIONARY LABEL STATEMENT(S):

WARNING!
FLAMMABLE
CAUSES IRRITATION
HARMFUL IF ABSORBED THROUGH SKIN
HARMFUL IF INHALED
Keep away from heat, sparks, and flame.
Keep container closed.
Use with adequate ventilation.
Avoid contact with eyes, skin, and clothing.
Avoid breathing vapor.
First Aid: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. In case of eye contact, get medical attention.

SECTION III. PHYSICAL DATA

- Appearance and Odor: Colorless liquid; benzene-like odor
- Melting Point: -95 °C (-139 °F)
- Boiling Point: 109-111 °C (228-231 °F) @ 760 mmHg
- Vapor Pressure: 10 mmHg @ 6.4 °C; 40 mmHg @ 31.8 °C
- Evaporation Rate (ether = 1): 4.5
- Vapor Density (Air = 1): 3.19
- Volatile Fraction by Weight: ∿ 100 %
- Specific Gravity (H_2O = 1): 0.863
- Solubility in Water: Negligible
- Heat of Decomposition: -0.52 kcal/g (*)
  * Calculated by ASTM Program CHETAH.

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

- Flash Point: 5 °C (41 °F) Tag closed cup
- Flash Point: 10 °C (50 °F) Tag open cup
- Autoignition Temperature: 568 °C (1055 °F)
- Cool Flame: > 427 °C (> 800 °F)
- Flammable Limits in Air (% by volume in air): Lower 1.22 at 26 °C (78 °F) Upper 6.7 at 67 °C (152 °F)
- Extinguishing Media: Dry chemical; CO_2; Water spray
- Special Fire Fighting Procedures:
  USE WATER WITH CAUTION. Since this material is lighter than water and insoluble in water, the fire could easily be spread by the use of water in an area where the water would not be contained.
- Unusual Fire and Explosion Hazards: None known

SECTION V. REACTIVITY DATA

- Stability: Stable
- Incompatibility:
  Strong oxidizers
- Hazardous Decomposition Products:
  As with any other organic material, combustion will produce carbon dioxide and probably carbon monoxide.
- Hazardous Polymerization: Will not occur.

SECTION VI. TOXICITY AND HEALTH HAZARD DATA

A. EXPOSURE LIMITS: Threshold Limit Value (TLV): 100 ppm-TWA, "Skin Notation," ACGIH, 1982.

B. EXPOSURE EFFECTS:

Inhalation: May cause upper respiratory tract irritation. High vapor concentrations may cause narcosis.

Eyes: Vapor may cause irritation.

Skin: Repeated contact may cause irritation.

C. FIRST AID:

Inhalation: Remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Get medical attention if symptoms persist.

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes and get medical attention.

Skin: Flush skin with plenty of water.

D. TOXICITY DATA

Test	Species	Result	Classification[2]
Acute Oral LD_{50}	Rat	7 g/kg[1]	Practically non-toxic
Inhalation LC_{50}	Rat	8000 ppm - 4 hr[4]	Slightly toxic

Skin Absorption: Absorbed through the skin at rate of 14-23 $mg/cm^2/hr$.[3]; LD_{50} (Rabbit) - 14 g/kg[4]
Repeated Skin Application: Rabbit - slight to moderate irritation[4]
Skin Sensitization: Not a sensitizer[4].
Eye Irritation: Rabbit - slight

Chronic feeding studies in rats at doses of 118, 354, 590 mg/kg showed no significant effects. Respiratory tract irritation has been reported in humans at 200 ppm; nausea, impaired balance, vision disturbances, dizziness have been reported at higher concentrations ($\sim$ 800 ppm).[4]

Single exposures of humans for 8 hours daily to vapor concentration of 50 to 800 ppm did not cause changes in the white blood count. At concentrations above 200 ppm, incoordination was noted with increasing degree dependent upon the vapor concentrations.[14] Rats exposed for 6 hours to calculated vapor concentrations of 4,000 ppm showed incoordination but survived and gained weight during the 14-day observation period.[5]

SECTION VII. PERSONAL PROTECTION AND CONTROLS

A. RESPIRATORY PROTECTION:

An appropriate NIOSH-approved respirator for organic vapor should be worn if needed.

B. VENTILATION:

Local Exhaust: If needed to control vapor below the TLV.

Mechanical (General): Recommend at least ten air changes per hour for good general room ventilation.

C. SKIN AND EYE PROTECTION:

Protective gloves should be worn.
Wear goggles or face shield.

SECTION VIII. SPECIAL STORAGE AND HANDLING PRECAUTIONS

Keep from contact with oxidizing materials.
Material is classified as a flammable liquid. Keep away from heat, sparks, and flame. Keep container closed. Use with adequate ventilation.
Comply with all federal, state, and local codes pertaining to the storage, handling, dispensing and disposal of flammable liquids.

SECTION IX. SPILL, LEAK, AND DISPOSAL PROCEDURES

Avoid inhalation and skin contact.
For large spills use a NIOSH-approved self-contained breathing apparatus.
Remove all sources of ignition.
Absorb material in vermiculite or other suitable absorbent and place in impervious container.
Dispose in an approved incinerator or contract with licensed chemical waste disposal service.
Discharge, treatment, or disposal may be subject to federal, state, or local laws.

SECTION X. ENVIRONMENTAL EFFECTS DATA

A. SUMMARY:

This chemical has been tested for environmental effects. Some published data are available for this chemical, and these data have been used to provide the following estimate of environmental impact:

This chemical has a high biological oxygen demand, and it is expected to cause significant oxygen depletion in aquatic systems. It has a moderate potential to affect aquatic organisms. It is expected to have a low potential to affect secondary waste treatment microorganisms. It is readily biodegradable, but if not biodegraded, it is moderately likely to bioconcentrate. The direct instantaneous discharge to a receiving body of water of an amount of this chemical which will rapidly produce, by dilution, a final concentration of 0.2 mg/L or less is not expected to cause an adverse environmental effect. After dilution with a large amount of water, followed by secondary waste treatment, this chemical is not expected to have any adverse environmental impact.

B. OXYGEN DEMAND DATA:

COD: 1.41 g/g; 1.88 g/g[6]; 2.52 g/g[7]
BOD_5: 0.86 g/g; 1.23 g/g[6]; 2.15 g/g[7]

C. ACUTE AQUATIC EFFECTS:

96-hour LC_{50}; Fathead minnow: 58 mg/L[6]; 44 mg/L[9]
24-hour LC_{50}; Water flea: 470 mg/L[10]; 310 mg/L[11]
24-hour LC_{50}; Goldfish: 58 mg/L[6][8]
24- to 96-hour LC_5; Goldfish: 57.7 mg/L[6]
24- to 96-hour LC_{50}; Guppy: 63-59 mg/L[6]
24- to 96-hour LC_{50}; Bluegill: 24 mg/L[6][9]
48-hour LC_{50}; Golden orfe (minnow): 70 mg/L; 422 mg/L[12][a]

[a]Results of the same test carried out at two different laboratories.

D. BIOCONCENTRATION POTENTIAL:

Octanol/Water Partition Coefficient: Log P = 2.11-2.94;
P = 130-870[13]

SECTION XI. TRANSPORTATION

- Proper Shipping Name or Description: TOLUENE
- DOT Hazard Classification: FLAMMABLE LIQUID
- UN or DOT Number: UN 1294

SECTION XII. REFERENCES

1. Arch. Ind. Health 14:387-398, 1956.

2. Hodge, H.C., and Sterner, J.H., American Industrial Hygiene Association Quarterly. 10:93, 1949.

3. Chemical Industry Institute of Toxicology Report No. 8562-08810, p.2.

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5. Toxicity results are from unpublished data, Health, Safety, and Human Factors Laboratory, Eastman Kodak Company, Rochester, New York.

6. Verschueren, K., Handbook of Environmental Data on Organic Chemicals, Van Nostrand Reinhold Company, New York, N.Y., 1977.

7. Bridie, A.L., Wolff, C.J.M., and Winter, M., "BOD and COD of Some Petrochemicals," Water Res., 13, 623-6(1979).

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10. Bringmann, V., and Kuehn, R., "Results of the Damaging Effect of Water Pollutants on Daphnia magna," Z. Wasser Abwasser Forch., 10(5), 161-6 (1977) (in German).

11. LeBlanc, A., "Acute Toxicity of Priority Pollutants to Water Flea (Daphnia magna)," Bull. Environ. Contam. Toxicol., 24, 684-91(1980).

12. Juhnke, I., and Luedemann, D., "Results of the Study of 200 Chemical Compounds on Acute Fish Toxicity Using the Golden Orfe Test," Z. Wasser Abwasser Forsch., 11(5), 161-41(1978) (in German).

13. Pomona College, Medicinal Chemistry Project, "Chemical Parameter Data Base," Leo A. J., and Hansch, C., Eds., Seaver Chemistry Laboratory, Claremont, California, January 3, 1983.

14. Von Oettingen W.F., Neal, P.A., Donahue D.D., JAMA 118:579 (1942).

The information contained herein is furnished without warranty of any kind. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of the suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers.

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aldrich chemical co.

P.O. Box 355, Milwaukee, Wisconsin 53201 USA

Telephone: (414) 273-3850
TWX: (910) 262-3052 Aldrichem MI
Telex: 26 843 Aldrich MI
FAX: (414) 273-4979

ATTN: SAFETY DIRECTOR
AKZO CHEMICALS INC
8401 WEST 47TH STREET
MCCOOK IL 60525

DATE: 06/07/89
CUST # 105252 P.O. # 114173R

MATERIAL SAFETY DATA SHEET

PAGE:

IDENTIFICATION

PRODUCT # T5470-4 NAME: 1,1,1-TRICHLOROETHANE, 97%
CAS # 71-55-6
MF: C2H3CL3

SYNONYMS

AEROTHENE TT * CHLOROETENE * CHLOROETHENE * CHLOROETHENE NU * CHLOROFORM, METHYL- * CHLOROTHANE NU * CHLOROTHENE * CHLOROTHENE(INHIBITED) * CHLOROTHENE NU * CHLOROTHENE VG * CHLORTEN * INHIBISOL * METHYLCHLOROFORM * METHYL CHLOROFORM (ACGIH,DOT,OSHA) * METHYLTRICHLOROMETHANE * NCI-C04626 * RCRA WASTE NUMBER U226 * SOLVENT 111 * STROBANE * ALPHA-T * 1,1,1-TCE * 1,1,1-TRICHLOORETHAAN (DUTCH) * 1,1,1-TRICHLORAETHAN (GERMAN) * TRICHLORO-1,1,1-ETHANE (FRENCH) * ALPHA-TRICHLOROETHANE * 1,1,1-TRICHLOROETHANE * 1,1,1-TRICHLOROETHANE (DOT,OSHA) * 1,1,1-TRICLOROETANO (ITALIAN) * TRI-ETHANE * UN 2831 (DOT) *

TOXICITY HAZARDS

RTECS # KJ2975000
ETHANE, 1,1,1-TRICHLORO-

IRRITATION DATA

EYE-MAN 450 PPM/8H	BJIMAG 28,286,71
SKN-RBT 5 GM/12D-I MLD	AIHAAP 19,353,58
SKN-RBT 20 MG/24H MOD	85JCAE -,94,86
EYE-RBT 100 MG MLD	AIHAAP 19,353,58
EYE-RBT 2 MG/24H SEV	85JCAE -,94,86

TOXICITY DATA

IHL-MAN LCLO:27 GM/M3/10M	JOCMA7 8,358,66
ORL-RAT LD50:10300 MG/KG	NTIS** PB257-185
IHL-RAT LC50:18000 PPM/4H	28ZPAK -,28,72
IPR-RAT LD50:3593 MG/KG	ENVRAL 40,411,86
ORL-MUS LD50:11240 MG/KG	NTIS** PB257-185
IHL-MUS LC50:3911 PPM/2H	SAIGBL 13,226,71
IPR-MUS LD50:3636 MG/KG	SAIGBL 13,290,71
SCU-MUS LD50:16 GM/KG	JPETAB 123,224,58
ORL-DOG LD50:750 MG/KG	FMCHA2 -,C242,83
IPR-DOG LD50:3100 MG/KG	TXAPA9 10,119,67
IHL-CAT LC50:24400 MG/M3	GISAAA 35(8),127,70
ORL-RBT LD50:5660 MG/KG	AIHAAP 19,353,58
ORL-GPG LD50:9470 MG/KG	AIHAAP 19,353,58

REVIEWS, STANDARDS, AND REGULATIONS

ACGIH TLV-TWA 350 PPM; STEL 450 PPM 85INAB 5,382,86
IARC CANCER REVIEW:ANIMAL INADEQUATE EVIDENCE IMEMOT 20,515,79
IARC CANCER REVIEW:GROUP 3 IMSUDL 7,56,87
MSHA STANDARD-AIR:TWA 350 PPM (1900 MG/M3) OTLVS* 3,161,71
OSHAPEL:8H TWA 350 PPM (1900 MG/M3) FEREAC 54,2923,89
OSHAPEL FINAL:8H TWA 350 PPM (1900 MG/M3);STEL 450 PPM (2450 MG/M3) FEREAC 54,2923,89
NIOSH REL TO 1,1,1-TRICHLOROETHANE-AIR:CL 350 PPM/15M MMWR** 37(S-7),27,88
EPA GENETOX PROGRAM 1988, POSITIVE: CELL TRANSFORM.-RLV F344 RAT EMBRYO
EPA GENETOX PROGRAM 1988, NEGATIVE: SPERM MORPHOLOGY-MOUSE
EPA GENETOX PROGRAM 1988, INCONCLUSIVE: CARCINOGENICITY-MOUSE/RAT; MAMMALIAN MICRONUCLEUS

Belgium
Aldrich Chemie N.V./S.A.
Bd. Lambermontlaan 140 b 6
B-1030 Brussels
Telephone (02) 2428750
Telex 62302 A chem B
FAX (02) 242 82 16

France
Aldrich-Chimie S.a.r.l.
27, Fosse des Treize
F-67000 Strasbourg
Telephone (88) 327010
Telex 890076 Aldrich F
FAX (88) 75 12 83

Japan
Aldrich Japan
Kyodo Bldg. Shirkanda
10 Kanda-Mikuracho
Chiyoda-Ku, Tokyo
Telephone (03) 258-0155
FAX (03) 258-0157

United Kingdom
Aldrich Chemical Co., Ltd.
The Old Brickyard, New Road
Gillingham, Dorset SP8 4JL
Telephone (07476) 2211
Telex 417238 Aldrich G
FAX (if

West Germany
Aldrich-Chemie GmbH & Co. KG
D-7924 Steinheim
Telephone (07329) 87-0
Telex 714838 Aldri D
FAX (07329) 87-39

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chemists helping chemists in research & industry
aldrich chemical co.
P.O. Box 355, Milwaukee, Wisconsin 53201 USA

Telephone: (414) 273-3850
TWX: (910) 262-3052 Aldrichem MI
Telex: 26 843 Aldrich MI
FAX: (414) 273-4979

MATERIAL SAFETY DATA SHEET

PAGE:

CATALOG # T5470-4 NAME: 1,1,1-TRICHLOROETHANE, 97%

EPA TSCA CHEMICAL INVENTORY, 1986
EPA TSCA 8(A) PRELIMINARY ASSESSMENT INFORMATION, FINAL RULE FEREAC 47,26992,82
EPA TSCA SECTION 8(E) STATUS REPORT 8EHQ-0283-0471 S;8EHQ-0980-0365; 8EHQ-0982-0457
EPA TSCA SECTION 8(E) STATUS REPORT 8EHQ-0979-0310
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, JANUARY 1989
NIOSH CURRENT INTELLIGENCE BULLETIN 27, 1978
NIOSH ANALYTICAL METHODS: SEE HYDROCARBONS, HALOGENATED, 1003
NCI CARCINOGENESIS BIOASSAY (GAVAGE);INADEQUATE STUDIES:MOUSE,RAT NCITR* NCI-TR-3,77
NTP CARCINOGENESIS STUDIES;SELECTED, FEBRUARY 1989
OSHA ANALYTICAL METHOD #14
MEETS CRITERIA FOR PROPOSED OSHA MEDICAL RECORDS RULE FEREAC 47,30420, 82

TARGET ORGAN DATA
SENSE ORGANS AND SPECIAL SENSES (CONJUNCTIVA IRRITATION)
BEHAVIORAL (HALLUCINATIONS, DISTORTED PERCEPTIONS)
BEHAVIORAL (CHANGE IN MOTOR ACTIVITY)
BEHAVIORAL (IRRITABILITY)
BEHAVIORAL (CHANGE IN PSYCHOPHYSIOLOGICAL TESTS)
GASTROINTESTINAL (HYPERMOTILITY, DIARRHEA)
GASTROINTESTINAL (NAUSEA OR VOMITING)
GASTROINTESTINAL (OTHER CHANGES)
SPECIFIC DEVELOPMENTAL ABNORMALITIES (CARDIOVASCULAR SYSTEM)

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

HEALTH HAZARD DATA

ACUTE EFFECTS
MAY BE HARMFUL BY INHALATION, INGESTION, OR SKIN ABSORPTION.
VAPOR OR MIST IS IRRITATING TO THE EYES, MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT.
CAUSES SKIN IRRITATION.
EXPOSURE TO AND/OR CONSUMPTION OF ALCOHOL MAY INCREASE TOXIC EFFECTS.
PROLONGED EXPOSURE CAN CAUSE:
NARCOTIC EFFECT
DERMATITIS

CHRONIC EFFECTS
DAMAGE TO THE LIVER
DAMAGE TO THE KIDNEYS

FIRST AID
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES.
IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS AMOUNTS OF WATER.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
CALL A PHYSICIAN.
WASH CONTAMINATED CLOTHING BEFORE REUSE.

PHYSICAL DATA

MELTING POINT: -50 C
BOILING POINT: 74 C TO 76 C
SPECIFIC GRAVITY: 1.338
VAPOR DENSITY: 4.6
VAPOR PRESSURE: 100.0 MM @ 20 C
APPEARANCE: COLORLESS LIQUID

Belgium
Aldrich Chemie N.V./S.A.
Bd. Lambermontlaan 140 b 6
B-1030 Brussels
Telephone (02) 2428750
Telex 62302 Alchem B
FAX (02) 242 82 16

France
Aldrich-Chimie S.a.r.l.
27, Fosse des Treize
F-67000 Strasbourg
Telephone (88) 327010
Telex 890076 Aldrich F
FAX (88) 75 12 83

Japan
Aldrich Japan
Kyodo Bldg. Shinkanda
10 Kanda-Mikuracho
Chiyoda-Ku, Tokyo
Telephone (03) 258-0155
FAX (03) 258-0157

United Kingdom
Aldrich Chemical Co., Ltd.
The Old Brickyard, New Road
Gillingham, Dorset SP8 4JL
Telephone (07476) 2211
Telex 417238 Aldrich G
FAX (07476) 3779

West Germany
Aldrich-Chemie GmbH & Co. KG
D-7924 Steinheim
Telephone (07329) 87-0
Telex 714838 Aldri D
FAX (07329) 87-39

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chemists helping chemists in research & industry
aldrich chemical co.
P.O. Box 355, Milwaukee, Wisconsin 53201 USA

Telephone: (414) 273-3850
TWX: (910) 262-3052 Aldrichem MI
Telex: 26 843 Aldrich MI
FAX: (414) 273-4979

MATERIAL SAFETY DATA SHEET

PAGE:

CATALOG # T5470-4 NAME: 1,1,1-TRICHLOROETHANE, 97%

FIRE AND EXPLOSION HAZARD DATA

AUTO IGNITION TEMP.: 998 F
LOWER EXPLOSION LEVEL: 7.5% @ 25 C
UPPER EXPLOSION LEVEL: 15% @ 25 C
FLASH POINT: NONE

EXTINGUISHING MEDIA
WATER SPRAY.
CARBON DIOXIDE, DRY CHEMICAL POWDER, ALCOHOL OR POLYMER FOAM.

SPECIAL FIRE FIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSION HAZARDS
EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

REACTIVITY DATA

INCOMPATIBILITIES
STRONG OXIDIZING AGENTS
ALUMINUM
AND ITS ALLOYS.
MAGNESIUM
ZINC
STRONG BASES

REACTS VIOLENTLY WITH:
POTASSIUM
SODIUM

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS
TOXIC FUMES OF:
CARBON MONOXIDE, CARBON DIOXIDE
HYDROGEN CHLORIDE GAS
PHOSGENE GAS

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.
COVER WITH DRY LIME OR SODA ASH, PICK UP, KEEP IN A CLOSED CONTAINER AND HOLD FOR WASTE DISPOSAL.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

WASTE DISPOSAL METHOD
DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.

OBSERVE ALL FEDERAL, STATE & LOCAL LAWS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

CHEMICAL SAFETY GOGGLES.
RUBBER GLOVES.
NIOSH/MSHA-APPROVED RESPIRATOR.
SAFETY SHOWER AND EYE BATH.
MECHANICAL EXHAUST REQUIRED.
DO NOT BREATHE VAPOR.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
WASH THOROUGHLY AFTER HANDLING.
IRRITANT.
HARMFUL VAPOR.
KEEP TIGHTLY CLOSED.
HYGROSCOPIC.
HANDLE AND STORE UNDER NITROGEN.

Belgium
Aldrich-Chemie N.V./S.A.
Bd. Lambermontlaan 140 b. 6
B-1030 Brussels
Telephone (02) 2428750
Telex 62302 Alchem B
FAX (02) 242 82 16

France
Aldrich-Chimie S.a.r.l.
27, Fosse des Treize
F-67000 Strasbourg
Telephone (88) 327010
Telex 890076 Aldrich F
FAX (88) 75 12 83

Japan
Aldrich Japan
Kyodo Bldg. Shinkanda
10 Kanda-Mikuracho
Chiyoda-Ku, Tokyo
Telephone (03) 258-0155
FAX (03) 258-0157

United Kingdom
Aldrich Chemical Co., Ltd.
The Old Brickyard, New Road
Gillingham, Dorset SP8 4JL
Telephone (07476) 2211
Telex 417238 Aldrich G
FAX (

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Aldrich-Chemie GmbH & Co. KG
D-7924 Steinheim
Telephone (07329) 87-0
Telex 714838 Aldri D
FAX (07329) 87-39

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aldrich chemical co.
P.O. Box 355, Milwaukee, Wisconsin 53201 USA

Telephone: (414) 273-3850
TWX: (910) 262-3052 Aldrichem MI
Telex: 26 843 Aldrich MI
FAX: (414) 273-4979

MATERIAL SAFETY DATA SHEET

CATALOG # T5470-4 NAME: 1,1,1-TRICHLOROETHANE, 97%

STORE IN A COOL DRY PLACE.

ADDITIONAL PRECAUTIONS AND COMMENTS

ADDITIONAL INFORMATION
INHIBITED WITH 3% 1,4-DIOXANE. WARNING: 1,4-DIOXANE IS A CANCER-SUSPECT AGENT. 1,1,1-TRICHLOROETHANE HAS BEEN REPORTED TO REACT VIOLENTLY WITH ACETONE, NITRITES, AND OXYGEN.

REGULATORY INFORMATION

3.0% 1,4-DIOXANE 123-91-1
THIS PRODUCT IS SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS.

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

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Aldrich-Chemie N.V./S.A.
Bd. Lambermontlaan 140 b 6
B-1030 Brussels
Telephone (02) 2428750
Telex 62302 Alchem B
FAX (02) 242 82 16

France
Aldrich-Chimie S.a.r.l.
27, Fosse des Treize
F-67000 Strasbourg
Telephone (88) 327010
Telex 890076 Aldrich F
FAX (88) 75 12 83

Japan
Aldrich Japan
Kyodo Bldg. Shinkanda
10 Kanda-Mikurocho
Chiyoda-Ku, Tokyo
Telephone (03) 258-0155
FAX (03) 258 0157

United Kingdom
Aldrich Chemical Co., Ltd.
The Old Brickyard, New Road
Gillingham, Dorset SP8 4JL
Telephone (07476) 2211
Telex 417238 Aldrich G
FAX 10

West Germany
Aldrich-Chemie GmbH & Co. KG
D-7924 Steinheim
Telephone (07329) 87-0
Telex 714838 Aldri D
FAX (07329) 87 39

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aldrich chemical co.
P.O. Box 355, Milwaukee, Wisconsin 53201 USA

Telephone: (414) 273-3850
TWX: (910) 262-3052 Aldrichem MI
Telex: 26 843 Aldrich MI
FAX: (414) 273-4979

ATTN: SAFETY DIRECTOR
AKZO CHEMIE AMERICA
300 SOUTH RIVERSIDE PLAZA
22ND FLOOR
CHICAGO IL 60606

DATE: 07/27/88
CUST # 105252 P.O. # 111993R

MATERIAL SAFETY DATA SHEET

IDENTIFICATION

PRODUCT # T5475-5 NAME: 1,1,2-TRICHLOROETHANE, 98%
CAS # 79-00-5
MF: C2H3CL3

SYNONYMS
ETHANE TRICHLORIDE * NCI-C04579 * RCRA WASTE NUMBER U227 * RCRA WASTE NUMBER U359 * BETA-T * BETA-TRICHLOROETHANE * 1,1,2-TRICHLORETHANE * 1,1,2-TRICHLOROETHANE * 1,2,2-TRICHLOROETHANE * 1,1,2-TRICHLOROETHANE (ACGIH) * TROJCHLOROETAN(1,1,2) (POLISH) * VINYL TRICHLORIDE *

TOXICITY HAZARDS

RTECS # KJ3150000
ETHANE, 1,1,2-TRICHLORO-

IRRITATION DATA

SKN-RBT 500 MG OPEN MLD	UCDS** 6/28/72
SKN-RBT 810 MG/24H SEV	EJTXAZ 9,171,76
SKN-RBT 500 MG/24H MLD	85JCAE -,95,86
EYE-RBT 162 MG MLD	EJTXAZ 9,171,76
EYE-RBT 500 MG/24H MLD	85JCAE -,95,86
SKN-GPG 1440 MG/15M	APTOA6 41,298,77

TOXICITY DATA

ORL-RAT LD50:836 MG/KG	AIHAAP 30,470,69
IPR-RAT LD50:265 MG/KG	ENVRAL 40,411,86
ORL-MUS LD50:378 MG/KG	DCTODJ 8,333,85
IPR-MUS LD50:494 MG/KG	TXAPA9 9,139,66
SCU-MUS LD50:227 MG/KG	JPETAB 123,224,58
IPR-DOG LD50:450 MG/KG	TXAPA9 10,119,67
SKN-RBT LD50:5377 MG/KG	AIHAAP 30,470,69

REVIEWS, STANDARDS, AND REGULATIONS
ACGIH TLV-TWA 10 PPM (SKIN) 85INA8 5,594,86
MSHA STANDARD-AIR:TWA 10 PPM (45 MG/M3) (SKIN) DTLVS* 3,263,71
OSHA STANDARD-AIR:TWA 10 PPM (SKIN) FEREAC 39,23540,74
EPA TSCA CHEMICAL INVENTORY, 1986
EPA TSCA SECTION 8(E) STATUS REPORT 8EHQ-0979-0310
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, MARCH 1988
NIOSH CURRENT INTELLIGENCE BULLETIN 27, 1978
NIOSH ANALYTICAL METHODS: SEE HYDROCARBONS, HALOGENATED, 1003
NCI CARCINOGENESIS BIOASSAY (GAVAGE);CLEAR EVIDENCE:MOUSE NCITR* NCI-TR-74,78
NCI CARCINOGENESIS BIOASSAY (GAVAGE);NO EVIDENCE:RAT NCITR* NCI-TR-74,78
MEETS CRITERIA FOR PROPOSED OSHA MEDICAL RECORDS RULE FEREAC 47,30420,82

TARGET ORGAN DATA
BEHAVIORAL (SLEEP)
BEHAVIORAL (SOMNOLENCE)
LUNGS, THORAX OR RESPIRATION (OTHER CHANGES)
GASTROINTESTINAL (ULCERATION OR BLEEDING FROM STOMACH)
LIVER (HEPATITIS: HEPATOCELLULAR NECROSIS, ZONAL)
LIVER (LIVER FUNCTION TESTS IMPAIRED)
PATERNAL EFFECTS (TESTES, EPIDIDYMIS, SPERM DUCT)

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

Belgium Aldrich-Chimie N.V./S.A. Bd. Lambermontlaan 140 b 6 B-1030 Brussels Telephone (02) 2428750 Telex 62302 Alchem B FAX (02) 242 82 16

France Aldrich-Chimie S.a.r.l. 27, Fosse des Treize F-67000 Strasbourg Telephone (88) 327010 Telex 890076 Aldrich F FAX (88) 75 12 83

Japan Aldrich Japan Kyodo Bldg. Shinkanda 10 Kanda-Mikuracho Chiyoda-Ku, Tokyo Telephone (03) 258-0155 FAX (03) 258-0157

United Kingdom Aldrich Chemical Co., Ltd The Old Brickyard, New Road Gillingham, Dorset SP8 4JL Telephone (07476) 2211 Telex 417238 Aldrich G FAX (07476)

West Germany Aldrich-Chemie GmbH & Co. KG D-7924 Steinheim Telephone (07329) 87-0 Telex 714838 Aldri D FAX (07329) 87-39

C-118 (2/19/90)

chemists helping chemists in research & industry
aldrich chemical co.
P.O. Box 355, Milwaukee, Wisconsin 53201 USA

Telephone: (414) 273-3850
TWX: (910) 262-3052 Aldrichem MI
Telex: 26 843 Aldrich MI
FAX: (414) 273-4979

MATERIAL SAFETY DATA SHEET

PAGE:

CATALOG # T5475-5 NAME: 1,1,2-TRICHLOROETHANE, 98%

HEALTH HAZARD DATA

ACUTE EFFECTS
HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.
VAPOR OR MIST IS IRRITATING TO THE EYES, MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT.
CAUSES SKIN IRRITATION.
EXPOSURE TO AND/OR CONSUMPTION OF ALCOHOL MAY INCREASE TOXIC EFFECTS.
PROLONGED EXPOSURE CAN CAUSE:
NARCOTIC EFFECT
DERMATITIS

CHRONIC EFFECTS
DAMAGE TO THE LIVER
DAMAGE TO THE KIDNEYS
CARCINOGEN.
DAMAGE TO THE EYES

FIRST AID
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
ASSURE ADEQUATE FLUSHING OF THE EYES BY SEPARATING THE EYELIDS WITH FINGERS.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
CALL A PHYSICIAN.
DISCARD CONTAMINATED CLOTHING AND SHOES.

PHYSICAL DATA

MELTING POINT: -37 C
BOILING POINT: 110 C TO 115 C
SPECIFIC GRAVITY: 1.435
VAPOR DENSITY: 4.55
VAPOR PRESSURE: 18.8 MM @ 20 C
40.0 MM @ 35.2 C

FIRE AND EXPLOSION HAZARD DATA

LOWER EXPLOSION LEVEL: 8.4%
UPPER EXPLOSION LEVEL: 13.3%
FLASH POINT: NONE

EXTINGUISHING MEDIA
CARBON DIOXIDE, DRY CHEMICAL POWDER, ALCOHOL OR POLYMER FOAM.

SPECIAL FIRE FIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSION HAZARDS
EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

REACTIVITY DATA

INCOMPATIBILITIES
STRONG BASES
STRONG OXIDIZING AGENTS

REACTS VIOLENTLY WITH:
SODIUM
POTASSIUM
MAGNESIUM
ALUMINUM
HEAT-SENSITIVE.

Belgium
Aldrich Chemie N.V./S.A.
84 Lambermontlaan 140, b 6
B-1030 Brussels
Telephone (02) 2428750
Telex 62302 Alchem B
FAX (02) 242 82 16

France
Aldrich-Chimie S.a.r.l.
27, Fossé des Treize
F-67000 Strasbourg
Telephone (88) 327010
Telex 890076 Aldrich F
FAX (88) 75 12 83

Japan
Aldrich Japan
Kyodo Bldg. Shinkanda
10 Kanda-Mikuracho
Chiyoda-Ku, Tokyo
Telephone (03) 258-0155
FAX (03) 258-0157

United Kingdom
Aldrich Chemical Co., Ltd.
The Old Brickyard, New Road
Gillingham, Dorset SP8 4JL
Telephone (07476) 2211
Telex 417238 Aldrich G
FAX (07476) [illegible]

West Germany
Aldrich-Chemie GmbH & Co. KG
D-7924 Steinheim
Telephone (07329) 87-0
Telex 714838 Aldri D
FAX (07329) 87-39

C-119 (2/19/90)

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Telephone: (414) 273-3850
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MATERIAL SAFETY DATA SHEET

PAGE:

CATALOG # T5475-5 NAME: 1,1,2-TRICHLOROETHANE, 98%

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS
TOXIC FUMES OF:
CARBON MONOXIDE, CARBON DIOXIDE
HYDROGEN CHLORIDE GAS
PHOSGENE GAS

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED
EVACUATE AREA.
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.
ABSORB ON SAND OR VERMICULITE AND PLACE IN CLOSED CONTAINERS FOR DISPOSAL.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

WASTE DISPOSAL METHOD
THE MATERIAL SHOULD BE IGNITED IN THE PRESENCE OF SODIUM CARBONATE AND SLAKED LIME (CALCIUM HYDROXIDE). THE SUBSTANCE SHOULD BE MIXED WITH VERMICULITE AND THEN WITH THE DRY CAUSTICS, WRAPPED IN PAPER AND BURNED IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.

OBSERVE ALL FEDERAL, STATE & LOCAL LAWS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.
FACESHIELD (8-INCH MINIMUM).
USE ONLY IN A CHEMICAL FUME HOOD.
SAFETY SHOWER AND EYE BATH.
DO NOT BREATHE VAPOR.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
AVOID PROLONGED OR REPEATED EXPOSURE.
WASH THOROUGHLY AFTER HANDLING.
TOXIC.
IRRITANT.
CARCINOGEN.
HARMFUL LIQUID AND FUMES.
KEEP TIGHTLY CLOSED.
STORE IN A COOL DRY PLACE.

ADDITIONAL PRECAUTIONS AND COMMENTS

NOT APPLICABLE

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

Belgium
Aldrich Chemie N.V./S.A.
Bd. Lambermontlaan 140, b. 6
B-1030 Brussels
Telephone (02) 2428750
Telex 62302 Alchem B
FAX (02) 242 82 16

France
Aldrich-Chimie S.a.r.l.
27, Fossé des Treize
F-67000 Strasbourg
Telephone (88) 327010
Telex 890076 Aldrich F
FAX (88) 75 12 83

Japan
Aldrich Japan
Kyodo Bldg. Shinkanda
10 Kanda-Mikuracho
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Aldrich Chemical Co., Ltd.
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Gillingham, Dorset SP8 4JL
Telephone (07476) 2211
Telex 417238 Aldrich G
FAX (07476) 3779

West Germany
Aldrich-Chemie GmbH & Co. KG
D-7924 Steinheim
Telephone (07329) 87-0
Telex 714838 A dr D
FAX (07329) 87-39

C-120 (2/15/90)

MATERIAL SAFETY DATA SHEET

EASTMAN KODAK COMPANY
343 STATE STREET
ROCHESTER, NEW YORK 14650

FOR EMERGENCY HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION, CALL 716-722-5151
FOR ALL OTHER PURPOSES, CALL 800-225-5352, IN NEW YORK STATE CALL 716-458-4014

DATE OF PREPARATION: 09/15/86 KODAK ACCESSION NUMBER: 901300

SECTION I. IDENTIFICATION

- PRODUCT NAME: TRICHLOROETHYLENE
- SYNONYM(S): TRICHLOROETHENE
- FORMULA: C2 H CL3
- CAT NO(S): 112 6689; 112 6697; 112 6705; 112 6713; 113 8809; 114 5671; 115 7205; 116 7618; 116 7691; 125 0166; 136 3480; 136 3498; 136 3506; 136 3514; 136 3522; 186 3430
- CHEM. NO(S): 01300; 13038
- KODAK'S INTERNAL HAZARD RATING CODES: R: 2 S: 2 F: 3 C: O-Z

SECTION II. PRODUCT AND COMPONENT HAZARD DATA

COMPONENT(S):	PERCENT	ACGIH TLV(R)	CAS REG. NO.
TRICHLOROETHYLENE	CA. 100	50 PPM	79-01-6

SECTION III. PHYSICAL DATA

- APPEARANCE AND ODOR: COLORLESS LIQUID; CHLOROFORM-LIKE ODOR
- BOILING POINT: 87 C (189 F)
- VAPOR PRESSURE: 61 MMHG AT 20 C (68 F)
- EVAPORATION RATE (N-BUTYL ACETATE = 1): NOT AVAILABLE
- VOLATILE FRACTION BY WEIGHT: CA. 100 %
- SPECIFIC GRAVITY (WATER = 1): 1.47
- SOLUBILITY IN WATER (BY WEIGHT): NEGLIGIBLE

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

- FLASH POINT: NONE, SEE BELOW.
- EXTINGUISHING MEDIA: WATER SPRAY; DRY CHEMICAL; CARBON DIOXIDE; FOAM
- SPECIAL FIRE FIGHTING PROCEDURES: WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING. WATER MAY BE INEFFECTIVE IN FIGHTING FIRE. USE WATER SPRAY TO KEEP FIRE-EXPOSED CONTAINERS COOL. FIGHT FIRE FROM A PROTECTED LOCATION.
- UNUSUAL FIRE AND EXPLOSION HAZARDS: FIRE OR EXCESSIVE HEAT MAY PRODUCE HAZARDOUS DECOMPOSITION PRODUCTS. NO FLASH POINT IN STANDARD APPARATUS DUE TO FLAME QUENCHING, HOWEVER, VAPORS ARE FLAMMABLE ABOVE 31 C (88 F) IN VESSELS OF ADEQUATE SIZE. VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL ALONG THE GROUND OR BE MOVED BY VENTILATION TO AN IGNITION SOURCE AND FLASH BACK. CAN SPONTANEOUSLY DECOMPOSE IN THE PRESENCE OF ALUMINUM OR ALUMINUM CHLORIDE.

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SECTION V. REACTIVITY DATA

- STABILITY: STABLE
- INCOMPATIBILITY: STRONG OXIDIZERS, STRONG BASES, ACIDS, STRONG REDUCING AGENTS, METALS, ALUMINUM
- HAZARDOUS DECOMPOSITION PRODUCTS: COMBUSTION WILL PRODUCE CARBON DIOXIDE AND PROBABLY CARBON MONOXIDE. HYDROGEN CHLORIDE GAS MAY ALSO BE PRESENT.
- HAZARDOUS POLYMERIZATION: MAY OCCUR UPON HEATING AND IS CATALYZED BY ALUMINUM CHLORIDE.

SECTION VI. TOXICITY AND HEALTH HAZARD DATA

A. EXPOSURE LIMITS: TLV 50 PPM, ACGIH 1985-86; OSHA PEL 100 PPM.

B. EXPOSURE EFFECTS: OVEREXPOSURE MAY CAUSE CNS DEPRESSION. THIS IS PARTICULARLY TRUE FOLLOWING ACUTE EXPOSURE. VISUAL DISTURBANCES, MENTAL CONFUSION, FATIGUE, AND SOMETIMES NAUSEA AND VOMITING ARE OBSERVED. LIVER AND KIDNEY INJURY HAVE ALSO BEEN OBSERVED.
INHALATION: HARMFUL IF INHALED.
SKIN: HARMFUL IF ABSORBED THROUGH SKIN. CAUSES IRRITATION.
EYE: CAUSES IRRITATION.
CARCINOGENICITY STATUS: THIS CHEMICAL HAS BEEN IDENTIFIED AS A CARCINOGEN OR POTENTIAL CARCINOGEN FOR HAZARD COMMUNICATION PURPOSES BY: INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC) MONOGRAPHS

C. FIRST AID:
INHALATION: REMOVE TO FRESH AIR. TREAT SYMPTOMATICALLY. IF SYMPTOMS ARE PRESENT GET MEDICAL ATTENTION PROMPTLY.
SKIN: IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION IF SYMPTOMS ARE PRESENT AFTER WASHING.
EYE: IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES AND GET MEDICAL ATTENTION.

SECTION VII. VENTILATION AND PERSONAL PROTECTION

A. VENTILATION:
GOOD GENERAL ROOM VENTILATION SHOULD BE USED. LOCAL EXHAUST MAY BE NEEDED.

B. RESPIRATORY PROTECTION:
A NIOSH-APPROVED ORGANIC VAPOR RESPIRATOR SHOULD BE WORN, IF NEEDED.

C. SKIN AND EYE PROTECTION:
PROTECTIVE GLOVES AND CLOTHING SHOULD BE WORN. SAFETY GLASSES OR GOGGLES SHOULD BE WORN.

SECTION VIII. SPECIAL STORAGE AND HANDLING PRECAUTIONS

KEEP CONTAINER TIGHTLY CLOSED AND AWAY FROM ACIDS, BASES, REDUCING AGENTS OR METALS.
KEEP FROM CONTACT WITH OXIDIZING MATERIALS.
KEEP AWAY FROM HEAT, SPARKS, AND FLAME. USE WITH ADEQUATE VENTILATION.
STORE IN A COOL PLACE. DO NOT STORE IN ALUMINUM CONTAINERS.
SINCE EMPTY CONTAINER RETAINS PRODUCT RESIDUE, FOLLOW LABEL WARNINGS EVEN AFTER CONTAINER IS EMPTY.

SECTION IX. SPILL, LEAK, AND DISPOSAL PROCEDURES

REMOVE ALL SOURCES OF IGNITION. ABSORB MATERIAL IN VERMICULITE OR OTHER SUITABLE ABSORBENT AND PLACE IN IMPERVIOUS CONTAINER. DISPOSE BY INCINERATION OR CONTRACT WITH LICENSED CHEMICAL WASTE DISPOSAL AGENCY. DISCHARGE, TREATMENT, OR DISPOSAL MAY BE SUBJECT TO FEDERAL, STATE OR LOCAL LAWS.

FOR TRANSPORTATION INFORMATION REGARDING THIS PRODUCT, PLEASE PHONE THE EASTMAN KODAK DISTRIBUTION CENTER NEAREST YOU: ROCHESTER, NY (716) 254-1300; OAK BROOK, IL (312) 654-5300; CHAMBLEE, GA (404) 455-0123; DALLAS, TX (214) 241-1611; WHITTIER, CA (213) 945-1255; HONOLULU, HI (808) 833-1661.

THE INFORMATION CONTAINED HEREIN IS FURNISHED WITHOUT WARRANTY OF ANY KIND. USERS SHOULD CONSIDER THESE DATA ONLY AS A SUPPLEMENT TO OTHER INFORMATION GATHERED BY THEM AND MUST MAKE INDEPENDENT DETERMINATIONS OF THE SUITABILITY AND COMPLETENESS OF INFORMATION FROM ALL SOURCES TO ASSURE PROPER USE AND DISPOSAL OF THESE MATERIALS AND THE SAFETY AND HEALTH OF EMPLOYEES AND CUSTOMERS.

C-123 (2/15/90)

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

M A T E R I A L S A F E T Y D A T A S H E E T

24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151

CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (300) 424-8802

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: XYLENES
FORMULA: C6H4(CH3)2
FORMULA WT: 106.17
CAS NO.: 01330-20-7
COMMON SYNONYMS: DIMETHYLBENZENE; XYLOL
PRODUCT CODES: 9489,9499,5377,9491,9493,9490,X516,9492,9516

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH - 2
FLAMMABILITY - 3 (FLAMMABLE)
REACTIVITY - 0
CONTACT - 1

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

PRECAUTIONARY LABEL STATEMENTS

WARNING
FLAMMABLE
HARMFUL IF SWALLOWED OR INHALED
CAUSES IRRITATION

KEEP AWAY FROM HEAT, SPARKS, FLAME. AVOID CONTACT WITH EYES, SKIN, CLOTHING. AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE WATER SPRAY, ALCOHOL FOAM, DRY CHEMICAL, OR CARBON DIOXIDE. FLUSH SPILL AREA WITH WATER SPRAY.

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
XYLENES	90-100	1330-20-7

SECTION III - PHYSICAL DATA

BOILING POINT: 137 C (279 F)
VAPOR PRESSURE(MM HG): 5.1

MELTING POINT: N/A
VAPOR DENSITY(AIR=1): 3.6

SPECIFIC GRAVITY: 0.86 (H2O=1)
EVAPORATION RATE: 9.5 (BUTYL ACETATE=1)

SOLUBILITY(H2O): NEGLIGIBLE (LESS THAN 0.1 %)
% VOLATILES BY VOLUME: 100

CONTINUED ON PAGE: 2

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SECTION III - PHYSICAL DATA (CONTINUED)

APPEARANCE & ODOR: COLORLESS LIQUID WITH SWEET PLEASANT ODOR.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 27 C (81 F) NFPA 704M RATING: 2-3-0

FLAMMABLE LIMITS: UPPER - 7.0 % LOWER - 1.1 %

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

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

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

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 435 MG/M3 (100 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 655 MG/M3 (150 PPM)

TOXICITY:

LD50 (ORAL-RAT)(MG/KG)	-	4300
LCLO (INHAL-RAT-4H) (PPM)	-	5000
LD50 (SCU-RAT)(MG/KG)	-	1700

EFFECTS OF OVEREXPOSURE
CONTACT WITH SKIN HAS A DEFATTING EFFECT, CAUSING DRYING AND IRRITATION.
INHALATION OF VAPORS MAY CAUSE NAUSEA, VOMITING, LIGHTHEADEDNESS OR HEADACHE.
INHALATION OF EXCESSIVE AMOUNTS OF VAPORS MAY CAUSE DEPRESSION, DIZZINESS, CONFUSION OR COLLAPSE.
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE KIDNEY AND/OR LIVER DAMAGE.

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, DO NOT INDUCE VOMITING. IF CONSCIOUS, CAUTIOUSLY GIVE WARM WATER, THEN MINERAL OIL FOLLOWED BY HOT COFFEE OR STRONG TEA.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL

CONTINUED ON PAGE: 3

SECTION V - HEALTH HAZARD DATA (CONTINUED)

RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FO AT LEAST 15 MINUTES.

SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, SOURCES OF IGNITION, FLAME

INCOMPATIBLES: STRONG OXIDIZING AGENTS

SECTION VII - SPILL AND DISPOSAL PROCEDURES

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

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

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

EPA HAZARDOUS WASTE NUMBER: U239 (TOXIC WASTE)

SECTION VIII - PROTECTIVE EQUIPMENT

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

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 1000 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS RECOMMENDED.

EYE/SKIN PROTECTION: SAFETY GLASSES WITH SIDESHIELDS, RUBBER GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

F-T-DATA(TM) STORAGE COLOR CODE: RED

CONTINUED ON PAGE: 4

SECTION IX - STORAGE AND HANDLING PRECAUTIONS (CONTINUED)

SPECIAL PRECAUTIONS

BOND AND GROUND CONTAINERS WHEN TRANSFERRING LIQUID. KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	XYLENE
HAZARD CLASS	FLAMMABLE LIQUID
UN/NA	UN1307
LABELS	FLAMMABLE LIQUID
REPORTABLE QUANTITY	1000 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	XYLENES
HAZARD CLASS	3.3
UN/NA	UN1307
LABELS	FLAMMABLE LIQUID

(TM) AND (R) DESIGNATE TRADEMARKS.
N/A = NOT APPLICABLE OR NOT AVAILABLE

THE INFORMATION PUBLISHED IN THIS MATERIAL SAFETY DATA SHEET HAS BEEN COMPILED FROM OUR EXPERIENCE AND DATA PRESENTED IN VARIOUS TECHNICAL PUBLICATIONS. IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE SUITABILITY OF THIS INFORMATION FOR THE ADOPTION OF NECESSARY SAFETY PRECAUTIONS. WE RESERVE THE RIGHT TO REVISE MATERIAL SAFETY DATA SHEETS PERIODICALLY AS NEW INFORMATION BECOMES AVAILABLE.

-- LAST PAGE --

APPENDIX CIII

Shipping Papers from Lab Pack Removal

C-128 (12/15/90)

APPENDIX C III
Example of Lab Pack Wastes
Page 1 of 5

STATE OF LOUISIANA
DEPARTMENT OF ENVIRONMENTAL QUALITY
HAZARDOUS WASTE DIVISION
P.O. BOX 44307
BATON ROUGE, LOUISIANA 70804

ase print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: ILD000805705 — Manifest Document No.: 89101
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
AKZO CHEMICAL, INC.
8401 WEST 47th ST. McCOOK, IL 60525

A. State Manifest Document Number: LA 1119248

4. Generator's Phone ( ) 312-442-7100

B. State Generator's ID: 0311740009

5. Transporter 1 Company Name: ROLLINS ChemPAK, INC
6. US EPA ID Number: DED982565941
C. State Transporter's ID: 2451
D. Transporter's Phone: 302-479-2920

7. Transporter 2 Company Name: DAHLEN TRANSPORT INC.
8. US EPA ID Number: MND022969026
E. State Transporter's ID: 0386
F. Transporter's Phone: 612-459-3344

9. Designated Facility Name and Site Address
ROLLINS ENVIRONMENTAL SERVICES (LA) INC.
13351 SCENIC HWY.
BATON ROUGE, LA 70807
10. US EPA ID Number: LAD010395127
G. State Facility's ID:
H. Facility's Phone: (504)778-1234

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. WASTE FLAMMABLE LIQUID, N.O.S., UN1993	006	DF	00068	P	D001
b. WASTE OXIDIZER, N.O.S., UN1479	001	DM	00002	P	D001
c. WASTE OXIDIZER, N.O.S., UN1479	008	DF	00021	P	D001
d. WASTE NITRIC ACID, FUMING, OXIDIZER, UN 2032	001	DF	00001	P	D001

J. Additional Descriptions for Materials Listed Above
a. ~~ORGANIC LIQUIDS, LABPACK~~ SH
b. ORGANIC / INORGANIC SOLIDS, LABPACK
c. INORGANIC SOLIDS AND LIQUIDS, LAB PACK
d. IN ISA BOX

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
If undeliverable return to generator. If spilled in LA contact the LA dept. of public safety at (504) 925-6595. In case of transportation emergency contact CHEMTREC at 1-800-424-9300. Caution - Handle with care, use gloves and eye protection.
BR- 33145

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Printed/Typed Name: LINCOLN D. METCALFE — Signature: Lincoln D. Metcalfe — Month Day Year: 3 14 89

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: SCOTT HOFFERT — Signature: Scott Hoffert — Month Day Year: 3 14 89

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: LARRY SOUBA — Signature: Larry Souba — Month Day Year: 03 21 89

19. Discrepancy Indication Space

C-129 (Revised 2/19/90)

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: GENE JARREAU — Signature: [signature] — Month Day Year: 03 23 89

EPA Form 8700-22 k(Rev. 9/88) Previous edition is obsolete.

STATE OF LOUISIANA
DEPARTMENT OF ENVIRONMENTAL QUALITY
HAZARDOUS WASTE DIVISION
P.O. BOX 44307
BATON ROUGE, LOUISIANA 70804

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. I L D 0 0 0 8 0 5 7 0 5 Manifest Document No. 8 9 1 1 0 7

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
AKZO CHEMICAL, INC.
8401 WEST 47th ST. McCOOK, IL 60525

4. Generator's Phone ( ) 312-442-7100

A. State Manifest Document Number LA 1119249
B. State Generator's ID 0311740009

5. Transporter 1 Company Name ROLLINS ChemPAK, INC
6. US EPA ID Number D E D 9 8 2 5 6 5 9 4 7
C. State Transporter's ID 2451
D. Transporter's Phone 302-479-2920

7. Transporter 2 Company Name DAHLEN TRANSPORT, INC.
8. US EPA ID Number M N D 0 2 2 9 6 9 0 2 6
E. State Transporter's ID 0586
F. Transporter's Phone 612-459-3344

9. Designated Facility Name and Site Address
ROLLINS ENVIRONMENTAL SERVICES (LA) INC.
13351 SCENIC HWY.
BATON ROUGE, LA 70807
10. US EPA ID Number L A D 0 1 0 3 9 5 1 2 7
G. State Facility's ID
H. Facility's Phone (504)778-1234

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
GENERATOR a. WASTE FLAMMABLE SOLID, N.O.S. UN1325	001	DF	00007	P	D001
b. WASTE WATER REACTIVE SOLID, N.O.S., FLAMMABLE SOLID, UN 2813 DANGEROUS WHEN WET	002	DF	00007	P	D001
c. WASTE CORROSIVE LIQUID, N.O.S., UN1760	002	DM	00030	P	D002
d. WASTE CORROSIVE LIQUID, N.O.S. UN1760	004	DF	00047	P	D002

J. Additional Descriptions for Materials Listed Above
ALL ARE LABPACKS
a. ORGANIC SOLIDS
b. ORGANIC/INORGANIC SOLIDS D003
c. INORGANIC LIQUID D002
d. INORGANIC/ORGANIC LIQUIDS, U188

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
If undeliverable return to generator. If spilled in LA contact the LA dept. of public safety at (504) 925-6595. In case of transportation emergency contact CHEMTREC at 1-800-424-9300. Caution - Handle with care, use gloves and eye protection.
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Printed/Typed Name: LINCOLN D. METCALFE
Signature: Lincoln D. Metcalfe
Month, Day, Year: 1 3 1 4 8 9

TRANSPORTER
17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: SCOTT HOFFERT
Signature: Scott Hoffert
Month Day Year: 1 3 1 4 8 9

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: LARRY SOUBA
Signature: Larry Souba
Month Day Year: 0 3 2 1 8 9

19. Discrepancy Indication Space

C-130 (Revised 2/19/90)

FACILITY
20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: GENE JARREAU
Signature: Gene Jarreau
Month Day Year: 0 3 2 3 8 9

EPA Form 8700-22 k(Rev. 9/88) Previous edition is obsolete.

STATE OF LOUISIANA
DEPARTMENT OF ENVIRONMENTAL QUALITY
HAZARDOUS WASTE DIVISION
P.O. BOX 44307
BATON ROUGE, LOUISIANA 70804

APPENDIX C III
Example of Lab Pack Wastes
Page 3 of 5

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. ILD000805706 Manifest Document No. 89101
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
AKZO CHEMICAL, INC.
8401 WEST 47th ST. McCOOK, IL 60525
312-442-7100

A. State Manifest Document Number LA 1119250
B. State Generator's ID 0311740009

4. Generator's Phone ( )

5. Transporter 1 Company Name: ROLLINS ChemPAK, INC
6. US EPA ID Number: DED982565947
C. State Transporter's ID 2451
D. Transporter's Phone 302-479-2920

7. Transporter 2 Company Name: DAHLEN TRANSPORT INC
8. US EPA ID Number: MMD022969026
E. State Transporter's ID 0386
F. Transporter's Phone 612-459-3344

9. Designated Facility Name and Site Address
ROLLINS ENVIRONMENTAL SERVICES (LA) INC.
13351 SCENIC HWY.
BATON ROUGE, LA 70807
10. US EPA ID Number: LAD010395127
G. State Facility's ID
H. Facility's Phone (504)778-1234

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	L. Waste No.
a. WASTE POISON B, LIQUID, N.O.S. UN2810	001	DF	00030	P	P024
b. WASTE POISON B, SOLID, N.O.S., UN2811	001	DF	00030	P	P024
c. WASTE CORROSIVE SOLID, N.O.S. UN1759	001	DF	00020	P	D002
d. WASTE ORM-A, N.O.S., NA 1693	001	DF	00001	P	U147

J. Additional Descriptions for Materials Listed Above
a. ORGANIC LIQUIDS, U223 ALL ARE LABPACKS
b. ORGANIC SOLIDS
c. ORGANIC SOLIDS
d. ORGANIC SOLIDS

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
If undeliverable return to generator. If spilled in LA contact the LA dept. of public safety at (504) 925-6595. In case of transportation emergency contact CHEMTREC at 1-800-424-9300. Caution - Handle with care, use gloves and eye protection.
BR-33145

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Printed/Typed Name: LINCOLN D. METCALFE
Signature: Lincoln D Metcalfe
Month Day Year: 3 14 89

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: SCOTT HOFFERT
Signature: Scott Hoffert
Month Day Year: 3 14 89

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: LARRY Souba
Signature: Larry Souba
Month Day Year: 03 21 89

19. Discrepancy Indication Space
C-131 (Revised 2/15/90)

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: GENE JARREAU
Signature: Gene Jarreau
Month Day Year: 03 23 89

GENERATOR
TRANSPORTER
FACILITY

EPA Form 8700-22 k(Rev. 9/88) Previous edition is obsolete.
DEQ FORM HW-3 (R 9/88)

STATE OF LOUISIANA
DEPARTMENT OF ENVIRONMENTAL QUALITY
HAZARDOUS WASTE DIVISION
P.O. BOX 44307
BATON ROUGE, LOUISIANA 70804

APPENDIX C III
Example of Lab Pack Wastes
Page 4 of 5

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. ILD000805705 Manifest Document No. 89101
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
AKZO CHEMICAL, INC.
8401 WEST 47th ST. McCOOK, IL 60525

4. Generator's Phone ( ) 312-442-7100

A. State Manifest Document Number: LA 1115151
B. State Generator's ID: 0311740009

5. Transporter 1 Company Name: ROLLINS ChemPAK, INC
6. US EPA ID Number: DED982565947
C. State Transporter's ID: 2451
D. Transporter's Phone: 302-479-2920

7. Transporter 2 Company Name: DAHLEN TRANSPORT, INC
8. US EPA ID Number: MND022969026
E. State Transporter's ID: 0386
F. Transporter's Phone: 612-459-3344

9. Designated Facility Name and Mailing Address: ROLLINS ENVIRONMENTAL SERVICES (LA) INC.
13351 SCENIC HWY.
BATON ROUGE, LA 70807
10. US EPA ID Number: LAD010395127
G. State Facility's ID:
H. Facility's Phone: (504)778-1234

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. WASTE ORM-C, N.O.S.	001	DN	00002	P	NONE
b. WASTE ORM-C, N.O.S.	001	DF	00001	P	NONE
c. HAZARDOUS WASTE, SOLID, N.O.S., ORM-E, NA9189	001	DN	00005	P	SH D009
d. HAZARDOUS WASTE, SOLID, N.O.S., ORM-E, NA 9189	001	DF	00003	P	U081

J. Additional Descriptions for Materials Listed Above
a. ASBESTOS WASTE — ALL ARE LAB PACKS
b. SULFUR WASTE
c. SH [redacted] / INORGANIC SOLIDS SH SH SH
d. ORGANIC / INORGANIC SOLIDS D005, D007, D008

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
If undeliverable return to generator. If spilled in LA contact the LA dept. of public safety at (504) 925-6595. In case of transportation emergency contact CHEMTREC at 1-800-424-9300. Caution - Handle with care, use gloves and eye protection.
BR- 33145

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Printed/Typed Name: LINCOLN D. METCALFE — Signature: Lincoln D. Metcalfe — Month Day Year: 3 14 89

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: SCOTT HOFFERT — Signature: Scott Hoffert — Month Day Year: 3 14 89

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: LARRY SOUBA — Signature: Larry Souba — Month Day Year: 0 3 21 89

19. Discrepancy Indication Space

C-132 (Revised 2/15/90)

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: GENE JARREAU — Signature: [signature] — Month Day Year: 0 3 23 89

GENERATOR / TRANSPORTER / FACILITY

EPA Form 8700-22 k(Rev. 9/88) Previous edition is obsolete. DEQ FORM HW-3 (R 9/88)

APPENDIX C III
Example of Lab Pack Wastes
Page 5 of 5

STATE OF LOUISIANA
DEPARTMENT OF ENVIRONMENTAL QUALITY
HAZARDOUS WASTE DIVISION
P.O. BOX 44307
BATON ROUGE, LOUISIANA 70804

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. LD000805705 — Manifest Document No. 89101
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address: AKZO CHEMICAL, INC, 8401 W. 47TH ST, MCCOOK, IL 60525
4. Generator's Phone ( ) 312-442-7100
A. State Manifest Document Number: LA 1118606
B. State Generator's ID: 0311740009

5. Transporter 1 Company Name: ROLLINS ChemPAK, INC
6. US EPA ID Number: DED982565947
C. State Transporter's ID: 2451
D. Transporter's Phone: 302-479-2920

7. Transporter 2 Company Name: DAHLEN TRANSPORT, INC
8. US EPA ID Number: MND022969026
E. State Transporter's ID: 0386
F. Transporter's Phone: 612-459-3344

9. Designated Facility Name and Site Address: ROLLINS ENVIRONMENTAL SERVICES (LA) INC, 13351 SCENIC HWY, BATON ROUGE, LA 70807
10. US EPA ID Number: LAD010395127
G. State Facility's ID:
H. Facility's Phone: (504) 778-1234

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. WASTE COMBUSTIBLE LIQUID, N.O.S. NA 1993	002	DF	00066 SH	P	D001
b. NON HAZARDOUS, NON RCRA WASTE	004 SH	DF	00161 SH	P	NONE
c.					
d.					

J. Additional Descriptions for Materials Listed Above: a. ORGANIC SOLVENT ALLARE LABPACKS; b. NON RCRA REGULATED WASTE
K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
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Printed/Typed Name: LINCOLN D. METCALFE — Signature: Lincoln D. Metcalfe — Month Day Year: 3 14 89

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: SCOTT HOFFERT — Signature: Scott Hoffert — Month Day Year: 3 14 89

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: LARRY SOUBA — Signature: Larry Souba — Month Day Year: 03 21 89

19. Discrepancy Indication Space
C-133 (Revised 2/15/90)

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Printed/Typed Name: GENE JARREAU — Signature: Gene Jarreau — Month Day Year: 03 23 89

GENERATOR — TRANSPORTER — FACILITY

EPA Form 8700-22 k(Rev. 9/88) Previous edition is obsolete.
TSD FACILITY MAIL TO GENERATOR
DEQ FORM HW-3 (R 9/88)

APPENDIX CIV

Contents

1. Calibration Procedures for Flash Point and pH.

2. QC Manual from TEI Analytical Inc.

A.O.C.S. Official Method Tn 2a-86

Replaces Tn 2a-64
Revised 1987

Flash Point of Fatty Quaternary Ammonium Chloride, Closed Cup Method

(Modified Closed Cup Method, A.S.T.M. Designation D 93-80)

Definition: This method determines the temperature at which the sample will flash when a test flame is applied under the conditions specified for the test.

Scope: Applicable to fatty quaternary ammonium chlorides and their solutions that are liquids at temperatures 20 F below their expected flash points.

A. Apparatus

1. Pensky-Martens closed cup flash tester, A.S.T.M. Designation D 93-52. Either hand or motor stirring is allowable, but the latter is preferred. The specified low-range A.S.T.M. P.M. and high-range A.S.T.M. P.M. centigrade and fahrenheit thermometers are replaced by a single centigrade or fahrenheit thermometer as described below.
2. Thermometers, A.O.C.S. Specification H 10-55, Closed Cup Flash Point Thermometers.

B. Calibration of Tester

1. Make a determination in triplicate on the flash point of standard p-xylene and standard isopropanol. (See Notes, D1 and D2). Average these values for each material. If the difference between and values for the two materials are less than 15 F (8.4 C) or more than 27 F (15.0 C), repeat the determinations on fresh standards. Calculate a correction factor as follows:

$$X = 92 - A$$
$$Y = 71 - B$$
$$\text{Correction} = \frac{X + Y}{2}$$

where: A = Observed flash point of p-xylene
B = Observed flash point of isopropanol.

Apply this correction to all determinations.

C. Procedure

1. Melt the sample, if it is not already liquid, in a water bath and mix thoroughly. Do not heat the sample excessively (See Notes D, 3 and 4.).
2. Fill the cup with the quaternary sample (See Notes D, 1.) so that the top of the meniscus is exactly at the filling line; place the lid on the cup and properly engage the locating devices. Insert the thermometer and suspend so that the bottom of the bulb is exactly 1 3/4 in. (4.445 cm) below the level of the rim of the cup, which corresponds to the level of the lower surface of the portion of the lid inside the rim.
3. Light the test flame and adjust so that it is the size of a bead 5/32 in. (3.97 mm) in diameter.

C-135 (9/15/95)

SECTION FIVE INSTRUMENT OPERATION

This section includes: Paragraph 5.1, an introduction to the use of your instrument; Paragraph 5.2, an explanation of Ready and its importance in operation of the instrument; and Paragraphs 5.3, which lists options in pH measurement. All are illustrated with drawings that show the control keys and the symbols that appear in Display. Paragraph 5.3.3 also provides a decision path, which is a guide to the selection of pH measurement options that are appropriate to your application. Then Paragraph 5.4 describes Auto Read and Paragraph 5.5 explains restandardization and calibration.

For the most part, the first five paragraphs concern pH measurements. The instrument is also used for millivolt measurements; this topic is discussed in Paragraph 5.6.

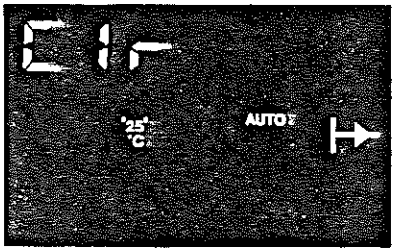
5.1 pH MEASUREMENTS: A SIMPLE AND COMMON PROCEDURE

The following standardization procedure is the easiest method for operating the instrument in the pH Mode. All the necessary accessories, except the beakers, are supplied with the meter. They are:

- pH 4 and pH 10 buffers
- pH electrode or electrodes and Keeper Cable

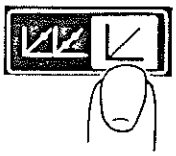
As an introduction to the instrument, follow the steps outlined below.

Clear the instrument.

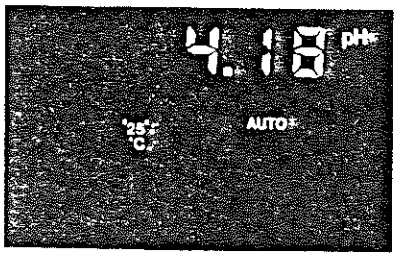


Ensure that the READY Symbol is in Display, indicating that the instrument is in Ready. This is done automatically when the instrument is cleared, but you should become accustomed to looking for the READY Symbol.

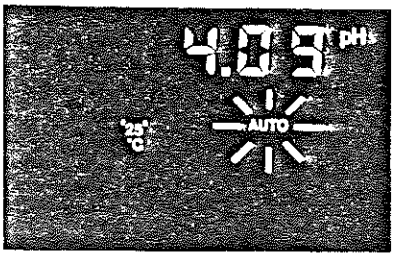
Rinse the electrode(s) with distilled water or pH 4 buffer and immerse in pH 4 buffer. (This symbol does not appear on the instrument. It indicates rinsing or some other manipulation of standards or samples.)



Depress the STANDARD Key. The instrument recognizes this entry as the first standard. Display will look much like this. *The reading, which changes as the electrode stabilizes, varies depending upon analytical conditions and upon the electrode used.*

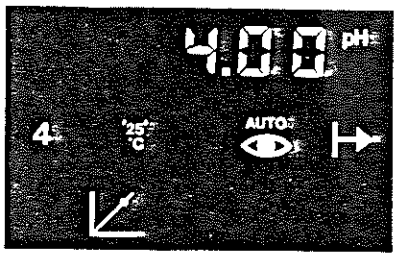


Shortly, the AUTO Symbol will begin flashing, indicating that the electrode is approaching stabilization.



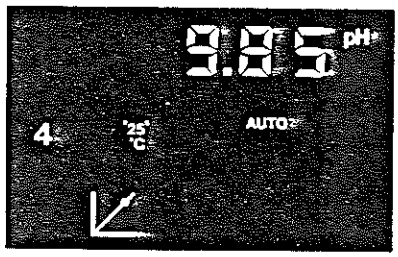
C-136 (2/15/92)

When input from the electrode(s) is stable, Auto Read will lock, the instrument will automatically standardize on 4.00, and the one-point standardization symbol will appear along with the pH 4 buffer symbol.

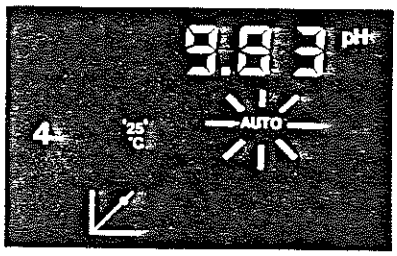


Now rinse the electrode(s) with distilled water or pH 10 buffer, blot, and immerse in pH 10 buffer.

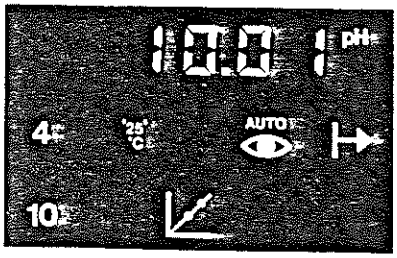
Depress the STANDARD Key again. The instrument recognizes this entry as the second standard. Display will look much like this. *Once again, the value shown may be different. And once again, it will change as the electrode(s) stabilize.*



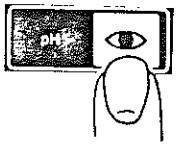
The AUTO Symbol will again flash after a short time. *This flashing indicates that the Auto Read Function of the instrument has detected that the electrodes are nearing stabilization.*



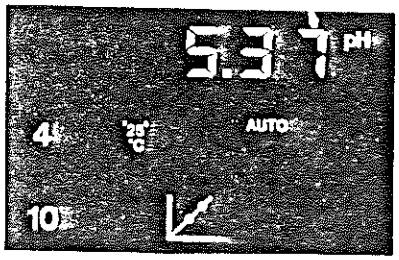
When input from the electrode(s) is stable, Auto Read will lock, the instrument will standardize on 10.01 pH, and the two-point standardization symbol will appear along with both the pH 4 and pH 10 symbol.



The instrument is now ready to make a pH measurement. Select a handy solution as the sample, rinse the electrode(s) with distilled water or the selected sample, blot, and immerse in the sample.



Depress the pH READ Key, as shown—not the pH Symbol. The pH Symbol is not a key; its only purpose is to identify the pH Function. Display will again activate. As the electrode approaches stability, the AUTO Symbol will flash, then Auto Read locks.



C-137 (2/15/90)

T E I A N A L Y T I C A L I N C .

QUALITY CONTROL MANUAL

JANUARY, 1989

Gayle E. Marks, Ph.D.
President

Susan Krejci
Vice President

C-138 (2/15/90)

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INTRODUCTION

The role of the analytical laboratory is to provide data to be used in decision making. These data are generated as a result of the examination of samples drawn from the population about which the decisions are to be made. To be valuable, the data must accurately describe the sample, which, in turn must be representative of the population.

Because of the importance of laboratory analysis, a program to assure the reliability of data is essential. Although all conscientious analysts practice informal quality control, various factors may lead to uneven application of such efforts. The discipline afforded by an established, routine control program is therefore indispensable in assuring the validity of the final results.

An analytical quality control program should have as its aim the consideration, evaluation and control of variables which could affect the analytical result. In this manual an attempt is made to define such a program, but to become effective, the program requires the committment of all the people in the laboratory.

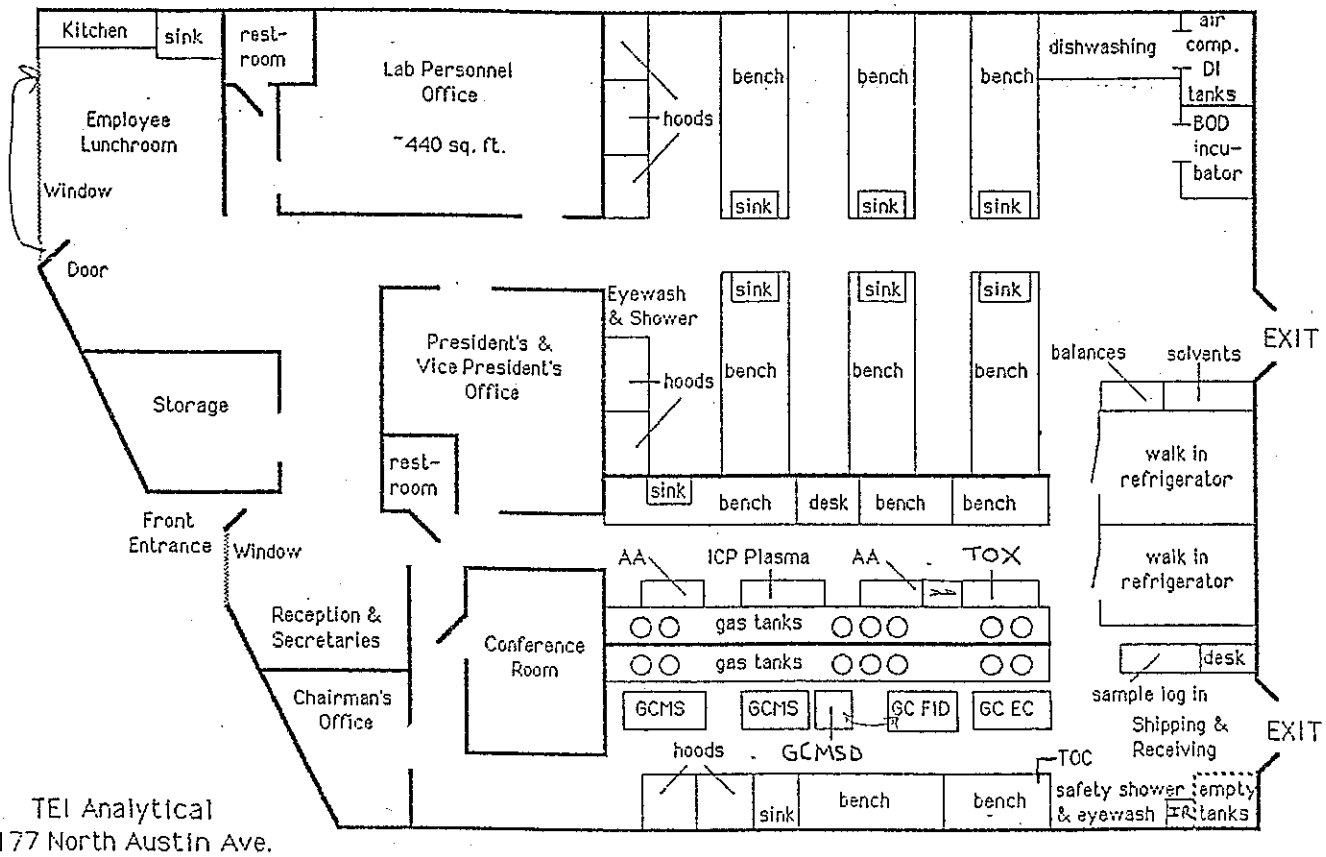
This manual is intended both as a description of a quality control program and as instruction for its implementation. All procedures, whether descriptive or instructive, should be followed to the letter. When a situation arises where strict adherence to procedure is impossible or impractical, careful documentation should be made of the circumstances and of the modifications adopted. No modifications should be employed until approved by the president or vice-president of the laboratory.

Throughout, it must be borne in mind that TEI Analytical, Inc. is a commercial laboratory in a competitive field and that the costs of a quality control program must be passed along to the customer. To maintain the best competitive position, the quality control program must be efficient as well as effective. The ultimate program will be that minimum program which uncompromisingly assures the reliability of the laboratory data. To this end, quality control practices of questionable utility will be avoided, and the body of the quality control data will be analyzed with the aim of finding an optimum between excessive rigor and uncertain control.

C-140 (2/15/70)

FACILITIES

TEI Analytical, Inc. is located at 7177 N. Austin in Niles, Illinois. The laboratory and offices occupy approximately 7000 square feet of floor space organized as shown in this floor plan.



TEI Analytical
7177 North Austin Ave.
Niles Illinois
60648

647-1345

C-140 (3/15/90)

SAMPLE RECEIPT, STORAGE AND HANDLING

Purpose: To explain and provide guidance to all personnel in the proper procedures for sample login, storage and handling.

Procedures:

A. Sample Receipt

1. Samples are delivered to the laboratory by delivery services, by clients and occassionally by staff. Upon receipt, the time of receipt is recorded and any chain of custody paperwork is completed.

2. Samples are inspected to determine their suitability for the tests requested. If problems exist regarding sample size, condition, preservative or age, the client is contacted and informed of the problem. If the client requests that the tests be performed on the samples as received, a note regarding the condition of the samples is entered during sample login. That note will appear on all copies of the report regarding the sample in question.

3. Samples are then logged into the computer data base with all of the following information being entered:

a. Client name, address and contact person.

b. Date and time of sample receipt.

c. Sample identification as supplied by client.

d. Date that tests must be completed.

e. Client purchase order number, if available.

f. Special notes regarding condition of sample.

g. Special instructions to analysts.

h. Sample storage location.

i. Tests requested.

j. The computer assigns a unique laboratory sample number to the sample. This number is affixed to the sample and is used for identification during the testing.

k. A label is printed which includes the laboratory sample number, the client name, the client's sample identification, the tests to be performed, the date of receipt and the date tests are to be completed. This label is affixed to an acknowledgement form which is sent to the client. If analyses are to be performed on a rush basis, the acknowledgement is not sent because the results will be reported before the acknowledgement would be received.

l. A work order is printed which contains the information from sample login. Any paperwork which was received with the sample is attached to this workorder. The workorder is then filed according to sample number.

k. All samples are then recorded in a permanent ledger. The following information is recorded in the ledger:

1. Laboratory sample number.

2. Date received.

3. Client name.

4. Sample storage location.

5. Brief reference to client sample identification and tests to be performed.

B. SAMPLE STORAGE

Samples are stored in one of the walk-in refrigerators on the shelf assigned during sample login.

C. SAMPLE HANDLING

Samples are kept refrigerated until time of analysis. At this time they are removed from the refrigerator and allowed to come to room temperature, the amount of sample required by the test is removed and the remaining sample or its empty container is returned to the assigned storage shelf.

METHODS OF ANALYSIS

PURPOSE: To provide necessary reference to all personnel for the proper methods to be used for sample analysis.

PROCEDURES: The procedure to be used for analysis depends upon the use of the data. The procedures in use are taken from the USEPA, ASTM, ANSI, NIOSH and from methods supplied by the client. Questions regarding analytical procedures should be directed to the laboratory director or the laboratory supervisor. Reference to the procedure being used should be noted along with the raw data in the laboratory notebook. Any deviations from the referenced procedure should be noted and approved by the laboratory director or laboratory supervisor.

QUALITY CONTROL

PURPOSE: To provide the necessary reference to all personnel in the use of quality control procedures. The procedures presented here are in addition to any specific quality control requirements of the method of analysis.

PROCEDURES:

A. Administrative

1. Methods manuals are kept current and available to all laboratory personnel.

2. Instrument manuals are available.

3. Instrumentation is adequate for the tests being performed.

4. Adequate backup instrumentation and spare part are available.

5. Adequate consumables are available.

6. Instrumentation is maintained and calibrated in accordance with the manufacturers guidelines and the method requirements.

7. Laboratory facilities are maintained in a clean and safe manner.

8. Volumetric ware is calibrated on a regular basis.

9. The temperature of each refrigerator, oven and incubator is checked every day.

10. The deionized water supply (minimum ASTM Type II) is checked daily.

11. The performance of each balance is checked daily.

12. Incoming supplies are checked against the purchase order.

B. Documentation

1. Instrument preventive maintenance is documented in a separate log book for each instrument. Instrument problems and service are also recorded in this book.

2. Instrument calibrations are recorded in the analysts labbook.

3. Daily safety check of the laboratory are recorded on the Daily QC Checklist (Figure 2).

4. Each analyst is issued a set of pipetors. The monthly calibration check of these pipetors is recorded in the analysts labbook.

5. The calibration of other volumetric ware is checked upon receipt. The results are recorded in a logbook of volumetric ware.

6. The daily temperature checks are recorded on the Daily QC Checklist.

7. The deionized water check is recorded on the Daily QC Checklist.

8. The daily performance check on each balance and the semiannual calibration is recorded on the Daily QC Checklist.

9. Analyst training and demonstration of proficiency are documented in the personnel file.

C. Samples

1. Samples are logged into the computer data base.

2. Samples are inspected regarding their suitability for the testing requested. Improper samples are noted,

and the client informed by the laboratory director or laboratory supervisor.

3. Samples are assigned a storage location and are stored accordingly.

D. Analysis

1. Instruments will be warmed-up and calibrated as required by the manufacturer and the method in use. At least a 5 point calibration curve will be constructed.

2. Statistical control of the measurement system will be verified and documented. The quality control limits are specified in each protocol. If the value is outside these limits, standards will be rerun and the quality control check sample will be reanalysed. If the values are still outside of the limits, the laboratory director or supervisor will be notified. All actions taken to correct the problem should be recorded in the instrument logbook.

3. No samples may be analysed until the system is in control.

4. Every group of 10 or less samples will be accompanied by a blank, a spiked sample, a duplicate spiked sample and a control sample as a minimum. The determined value of the control sample must be within the acceptable limits of the protocol. If not, all samples following the last acceptable control sample will be reanalyzed once the system is back in control. Spike recovery must be between 75% and 125%, and duplicate spike values must agree within 10%.

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

M A T E R I A L S A F E T Y D A T A S H E E T

24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151

CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: ETHYL ACETATE
FORMULA: CH3COOC2H5
FORMULA WT: 88.11
CAS NO.: 00141-78-6
NIOSH/RTECS NO.: AH5425000
COMMON SYNONYMS: ACETIC ACID ETHYL ESTER; ETHYL ETHANOATE; ETHYL ACETIC EST
PRODUCT CODES: 9279,9280,9284,9260,9281,9282

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH - 2
FLAMMABILITY - 3 (FLAMMABLE)
REACTIVITY - 0
CONTACT - 2

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

PRECAUTIONARY LABEL STATEMENTS

WARNING
FLAMMABLE
HARMFUL IF SWALLOWED OR INHALED
CAUSES IRRITATION

KEEP AWAY FROM HEAT, SPARKS, FLAME. AVOID CONTACT WITH EYES, SKIN, CLOTHING. AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE WATER SPRAY, ALCOHOL FOAM, DRY CHEMICAL, OR CARBON DIOXIDE. FLUSH SPILL AREA WITH WATER SPRAY.

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
ETHYL ACETATE	90-100	141-78-

SECTION III - PHYSICAL DATA

BOILING POINT: 77 C (171 F)
VAPOR PRESSURE(MM HG): 76

MELTING POINT: -84 C (-119 F)
VAPOR DENSITY(AIR=1): 3.0

ECIFIC GRAVITY: 0.90 (H2O=1)
EVAPORATION RATE: 6 (BUTYL ACETATE=1)

CONTINUED ON PAGE: 2

6. The daily temperature checks are recorded on the Daily QC Checklist.

7. The deionized water check is recorded on the Daily QC Checklist.

8. The daily performance check on each balance and the semiannual calibration is recorded on the Daily QC Checklist.

9. Analyst training and demonstration of proficiency are documented in the personnel file.

C. Samples

1. Samples are logged into the computer data base.

2. Samples are inspected regarding their suitability for the testing requested. Improper samples are noted,

and the client informed by the laboratory director or laboratory supervisor.

3. Samples are assigned a storage location and are stored accordingly.

D. Analysis

1. Instruments will be warmed-up and calibrated as required by the manufacturer and the method in use. At least a 5 point calibration curve will be constructed.

2. Statistical control of the measurement system will be verified and documented. The quality control limits are specified in each protocol. If the value is outside these limits, standards will be rerun and the quality control check sample will be reanalysed. If the values are still outside of the limits, the laboratory director or supervisor will be notified. All actions taken to correct the problem should be recorded in the instrument logbook.

3. No samples may be analysed until the system is in control.

4. Every group of 10 or less samples will be accompanied by a blank, a spiked sample, a duplicate spiked sample and a control sample as a minimum. The determined value of the control sample must be within the acceptable limits of the protocol. If not, all samples following the last acceptable control sample will be reanalyzed once the system is back in control. Spike recovery must be between 75% and 125%, and duplicate spike values must agree within 10%.

5. As a minimum, the calibration standards and quality control sample will be rerun at the end of the analyses. If they are outside of acceptable limits, the problem must be identified and corrected and the analyses repeated.

E. Calculations. Calculations may be performed by the analyst, the laboratory director, or the laboratory supervisor. The method of calculation must be shown. For each set of 10 or less, at least one sample is recalculated by either the laboratory director or supervisor. If an error is found, all samples in the set will be recalculated. Also, the individual who performed the initial calculation will be advised of the error and the necessary correction.

DATA REDUCTION, VALIDATION AND REPORTING

PURPOSE: To instruct all personnel in the procedures used for data reduction, validation and reporting.

PROCEDURES:

A. Data Reduction and review. Data reduction and review is performed by the analyst, the laboratory director or the laboratory supervisor. The data is reviewed to verify the following:

1. Sample readings are within the range of the calibration readings.

2. The quality control samples are within acceptable limits.

3. The blank does not indicate a contamination problem.

4. The spike and duplicate spike values are within acceptable limits.

B. Validation. Data is validated by the laboratory director or the laboratory supervisor. The data is reviewed for completeness, accuracy and precision. The calculations are checked at this time and the number of significant figures reported is also checked. The validated data is then entered into the computer data base.

C. Reporting.

1. Reports are generated from the computer data base by either the laboratory director or supervisor. If a special report format is required, the report is retyped by a secretary. The report is checked and signed by the laboratory director. The laboratory supervisor may sign in the director's absence.

2. The report contains as a minimum the following information:

a. Client name, address and contact.

b. Report date, report number, and total number of pages.

c. Date and time of sample receipt.

d. Statement regarding any unusual sample condition or deviation from standard methods.

e. Test method and results.

f. Date test was performed.

g. Statement limiting reproduction of the report.

h. Signature of the laboratory director or supervisor.

3. General quality assurance data is mailed with the report. Specific quality assurance data is provided upon request.

4. A copy of the report is retained for a period of 5 years. It is filed alphabetically according to client.

DISPOSAL

PURPOSE: To inform all personnel of the procedures for proper disposal of wastes and samples.

PROCEDURES:

A. Aqueous solutions and samples meeting the requirements of 40CFR261.3(A)(IV)(E) are poured into the sink and rinsed down with large amounts of water. Sample bottles are then rinsed with water at least 3 times, then disposed of in the trash dumpster.

B. Solid lab wastes and samples may be discarded in the trash dumpster unless:

1. They are classified as hazardous wastes.

2. They are reactive.

C. Laboratory wastes which may not be discarded in the trash dumpster are disposed of in lab packs by a licensed hazardous waste disposal firm.

D. Samples which may not be discarded in the trash dumpster are returned to the client.

LABORATORY SAFETY

The laboratory safety program is described in a separate safety manual.

PERSONNEL

PURPOSE: To provide information concerning the duties and required qualifications of the laboratory personnel.

LABORATORY DIRECTOR AND QUALITY ASSURANCE OFFICER:

A. The laboratory quality assurance officer is the laboratory director.

B. The director and quality assurance officer must have the following qualification:

1. A degree in chemistry.

2. A minimum of 10 years experience in analytical chemistry, and a minimum of 5 years experience in supervising analysts.

3. A formal training in quality assurance.

C. Responsibilities include the following:

1. Overall safety and quality of the laboratory.

2. Fiscal management of the laboratory.

3. Preparation of quality control samples.

4. Review of data to ensure quality control acceptance criteria are met.

5. Final approval of all reports.

LABORATORY SUPERVISOR

A. Qualifications. The laboratory supervisor should have a degree in chemistry and a minimum of 5 years experience in analytical chemistry.

B. Responsibilities.

1. General supervision of the operations of the laboratory.

2. Selection and review of analysts and support staff.

3. Supervision and training of analysts and support staff.

4. Maintenance of adequate consumable inventories.

5. Responsibilities of the director in the director's absence.

LABORATORY SAFETY OFFICER

A. Qualifications. The laboratory safety officer should have a minimun of a high school education. Completion of formal training in laboratory is also required.

B. Responsibilities.

1. To administer the safety program of the laboratory as presented in the safety manual.

2. To report to the laboratory director any safety problems needing the director's or the supervisor's attention.

ANALYSTS

A. Qualifications. Analysts should have a minimum of a high school education. They must demonstrate their proficiency with a given test before they are allowed to perform that test on samples.

B. Responsibilities.

1. To perform tests in accordance with the protocols

2. To conform to all quality and safety practices required.

ESSENTIAL QUALITY CONTROL PRACTICES

PURPOSE: To provide necessary reference for the quality control practices which are performed as a minimum.

PROCEDURES:

A. Balances.

1. A services contract is in effect which provides for semiannual service and calibration of each balance.

2. Two sets of class S weights are available. These weights are recalibrated by an outside source every 5 years. The calibration is staggered so that there is always at least one set available in the laboratory.

3. A performance check of each balance is made and documented each day that the laboratory is in operation.

B. Electrodes and meters. Meters and electrodes are calibrated with each use. The calibration is checked at the end of each use.

C. Temperature Measurement. A set of thermometers certified by the National Bureau of Standards is available for periodic calibration of the thermometers used in refrigerators, ovens, water baths and incubators.

D. Color standards are available for wavelength verification of spectrophotometers.

E. Chemicals are dated when received and replaced as needed.

F. Analytical Laboratory Practices.

1. Participate in proficiency testing programs on a quarterly basis.

2. Use only approved methods of analysis.

3. Have written protocols for each method.

4. Use control samples, spike and spike duplicate samples.

5. Ensure that personnel are properly trained in the procedures of the laboratory and have demonstrated proficiency in performing those procedures.

SECTION D

PROCESS INFORMATION

D-1: CONTAINERS

D-1a: CONTAINERS WITH FREE LIQUIDS

D-1a(1): DESCRIPTION OF CONTAINERS (724.271, 724.272)

Hazardous wastes will be stored in 55-gallon steel or plastic drums, and occasionally in 75-gallon steel or plastic overpack drums or smaller (5-30 gallon) containers. Materials of construction for these containers will be chosen on the basis of compatibility with waste to be stored. All drums will be new or reconditioned (with D.O.T. certification). All drums to be utilized for waste storage will be inspected for integrity as safe storage containers.

Drum types utilized (e.g., tighthead, salvage, etc.) will meet D.O.T. specifications as outlined in 49 CFR Part 173 for the material to be stored. Material of construction will be chosen on the basis of chemical compatibility. For example, many corrosive wastes cannot be stored in steel drums, and would be instead placed in compatible plastic drums. Similarly, many solvents are capable of degrading plastics, and must be stored in steel drums.

Any container of hazardous waste to be stored in the hazardous waste storage area will be labeled using a yellow and red printed adhesive label. Figure D7 is a photocopy of the exact type of label used. This label will be placed on the side of the container, in the upper third of the side. The label will be filled out by the Environmental Engineer, and will contain the following information:

Pre-printed messages:

"Hazardous Waste"
"Federal law prohibits improper disposal"
"If found, contact the nearest police, or public safety authority, or the U.S. Environmental Protection Agency"
"Handle with care"
"Contains hazardous or toxic waste"

Information to be filled in:

- Proper D.O.T. shipping name for waste
- E.P.A. waste number
- UN or NA number
- Generator name, address and E.P.A ID number
- Accumulation start date
- Manifest number (completed at time of shipment)

In addition, a unique identifying number is assigned to each hazardous waste container to be stored, in accordance with an in-house numbering system. This container number is used to reference a container for purposes of inventorying or inspecting containers. The container number will be written in the upper right-hand corner of the printed drum label. (See Figure D7)

Additional labels indicating D.O.T. categories such as corrosive, flammable, oxidizer, etc. will be affixed to any waste storage containers where such categories apply to the container contents. These labels will be placed near the hazardous waste label and on the lid of the container.

The maximum capacity of the hazardous waste storage area specified in this application is 200 55-gallon drums, or 11,000 gallons. The actual number of each type of container, in terms of volumes and materials of construction, will depend on the types of waste generated.

D-1a(2): CONTAINER MANAGEMENT PRACTICES (724.273)

All drums of waste stored in the hazardous waste storage area, or being used as satellite accumulation containers, are kept closed except during addition, sampling or removal of waste. Drums are transported via forklift, using the drumlift attachment. All persons who operate forklifts within the facility are trained to operate their vehicles safely, and have received training in safe handling of waste as part of the RCRA training program described in Section H of this application. Moving equipment such as forklifts will be used in the waste storage area only with direct supervision, to provide guidance and avoid damage to containers.

The maximum stacking height for storage of drums of hazardous waste is two drums high, with pallets or wood slats used to separate layers of drums. As mentioned in Section D-1a(1), the storage area holds a maximum of 200 55-gallon drums. The normal separation or storage arrangement of drums will follow the scheme depicted in Figure D1. Separate sections of the storage area will be used for each type of waste, and the aisle space between these sections will be wide enough to accommodate a forklift (minimum five feet wide).

D-1a(3): SECONDARY CONTAINMENT SYSTEM DESIGN AND OPERATION (703.201(a)(1), 724.275(a) and (d))

Figures D2 and D3 are drawings of the concrete base and dike that provide secondary containment for the hazardous waste storage area. Container arrangement is depicted in Figure D1.

D-1a(3)(a): REQUIREMENT FOR THE BASE OR LINER TO CONTAIN LIQUIDS (724.275(a)(1))

As shown in Figures D2 and D3, the storage area base is a continuous concrete slab. The base is free of cracks and gaps, so that any liquids collected within the dike will be retained for removal.

At the time of this application, it is proposed that an epoxy-type chemically resistant coating be applied to the surface of the concrete base, dike and sump interior, to provide protection against migration of chemicals through the concrete. A bid has been obtained from a local supplier for this job. The coating can be applied as soon as weather permits, based on requirements for 60 F ambient temperature during application.

Information regarding the chemical resistance of this coating is provided in Appendix D1. An additional quotation of chemical resistance to methylene chloride spills was requested because this is considered the one low point of resistance for all coatings investigated. If necessary, the drums containing small amounts of methylene chloride (usually 2-4 per year from Waste Categories 2 and 4 combined) will be placed on secondary-containment or "spill" pallets as added protection.

The open joints at the edges of the floor slab in this base have been packed with a flexible fiberglass material and then sealed with an epoxy sealant of appropriate chemical resistance. The one expansion joint in the base is also sealed with epoxy. Upon applying the new epoxy coating to the entire base, these joints would be repacked and sealed with a material that bonds to the new epoxy.

The concrete base and dike are of sufficient structural strength to be used for storage of drums of waste (3000 psi compressive strength concrete). The concrete slab is six inches thick, with welded-wire (6 in. x 6 in. spacing, 4/4 wire) reinforcement.

D-1a(3)(b): CONTAINMENT SYSTEM DRAINAGE (703.201(a)(2), 724.275(b)(2))

The surface of the concrete base for the waste storage area is sloped toward a sump area, located at the northeast corner of the base (within the dike). This is shown in Figure D4. The sloping will allow liquids to collect in the sump area, and to be removed in a timely manner after occurance of a leak, spill or precipitation.

D-1a(3)(c): CONTAINMENT SYSTEM CAPACITY (703.201(a)(3), 724.275(b)(3))

The retention capacity of the diked base is calculated to be 2180 gallons, based on a minimum 3.0-inch curb. Figure D5 shows a section of the design drawing illustrating the calculation. This retention volume is 19.8% of the designed capacity of 11,000 gallons. If the drum arrangement in Figure D1 is assumed, 100 drums would be resting on the surface to displace retention volume. At a curb height of 3.0 inches, these drums would displace 588 gallons of retention volume, leaving 1592 gallons available. Therefore the minimum volume available would be 1592 gallons or 14.5% of the maximum capacity.

D-1a(3)(d): CONTROL OF RUN-ON (703.201(a)(4), 724.275(b)(4))

As shown in Figure D3, the base is diked to prevent run-on. The 24-hour, 25-year storm event for this location is 4.5 inches. Over the surface of the base (40.4 ft. by 28.75 ft.), 4.5 inches of water corresponds to 3260 gallons. The total capacity of the dike, assuming 100 drums are resting on the base, is 1592 gallons.

To accommodate both the 10% minimum spill retention and the 4.5 inches of precipitation, capacity of 4360 gallons is required. This will require a minimum dike height of 5.5 inches, again assuming 100 drums are displacing part of the dike capacity.

It is proposed at the time of this application that the dike height be increased to six inches before the new epoxy coating is applied to the entire base.

D-1a(4): REMOVAL OF LIQUIDS FROM CONTAINMENT SYSTEM (703.201(a)(5), 724.275(b)(5))

Figure D6 is a diagram of the sump pump piping for the hazardous waste storage area. The pump outflow can be diverted either to a pipeline leading to the research facility outflow to the metropolitan sewer (if nonhazardous), or to a connection for transfer to a suitable container such as a tank wagon (if hazardous).

The motor and switch for this pump are explosion-proof, to prevent any ignition hazard during transfer of potentially ignitable liquids. The tank wagon to be used for this purpose will be an Akzo tank wagon borrowed from the Akzo McCook Plant located at 8401 W. 47th Street. If for some reason there was not a tank wagon available from the plant, one could be obtained on short notice from our emergency response contractor, Heritage Remediation/Engineering Inc. The tank wagon would be filled via a hose connected to the sump pump outflow.

Normally, the liquids in the sump will be removed after rainfall or snow. The area must first be inspected for evidence of any drum leakage, to ensure that the sump liquids consist of precipitation only. If evidence of a leak is found, sampling and cleanup must begin immediately.

If a spill or leak of waste occurs within the concrete dike, the liquids will be collected in the sump area and sampled. This sample will be analyzed in accordance with Section C-2 Waste Analysis Plan. Any hazardous waste or spill residues collected in this manner will be contained and disposed legally. A cleanup of the area within the dike will follow immediately, to ensure decontamination of the containment system and to prevent hazards to personnel, remaining storage containers and the environment.

D-1b: CONTAINERS WITHOUT FREE LIQUIDS

Containers of hazardous waste will be stored in the area described in Section D-1a, regardless of whether free liquids are present in the waste.

D-2: TANK SYSTEMS

No hazardous wastes will be stored in tanks in this facility.

D-3: WASTE PILES

No hazardous waste pile activity is conducted in this facility.

D-4: SURFACE IMPOUNDMENTS

No hazardous waste surface impoundment activity is conducted in this facility.

D-5: INCINERATORS

No waste incinerator activity is conducted in this facility.

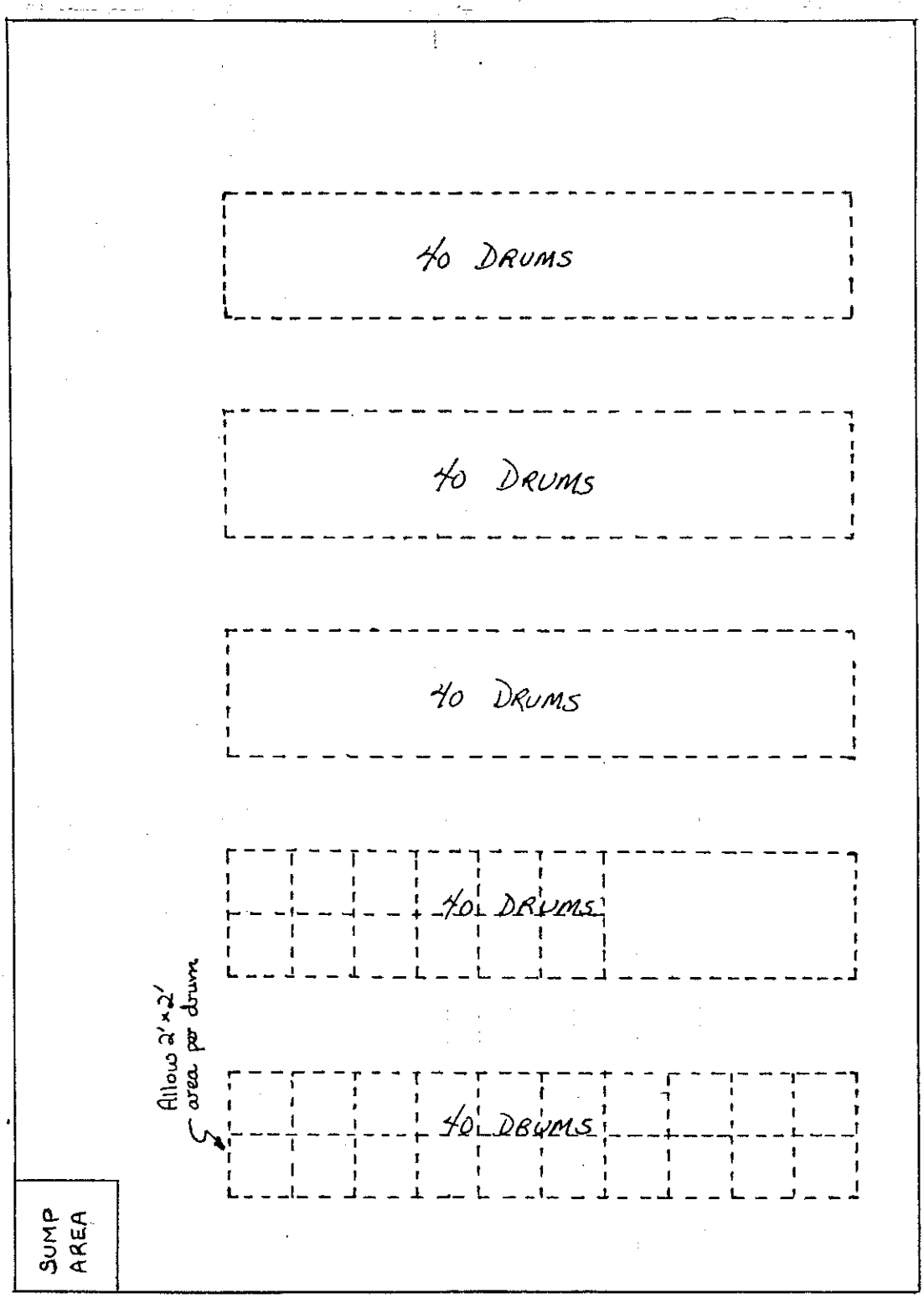
D-6: LANDFILLS

No hazardous waste landfill activity is conducted in this facility.

D-7: LAND TREATMENT

No wastes will be land-treated in this facility.

Figure D1
Drum Arrangement



SCALE = 1 inch per 5.33 ft.

STORAGE CAPACITY = 200 55-gal. drums (Stacked two high)

FIGURE D2 (attached)

HAZARDOUS WASTE DRUM STORAGE AREA DESIGN

Figure D3
Top View of Concrete Base

(Photocopy of part of Figure D2)

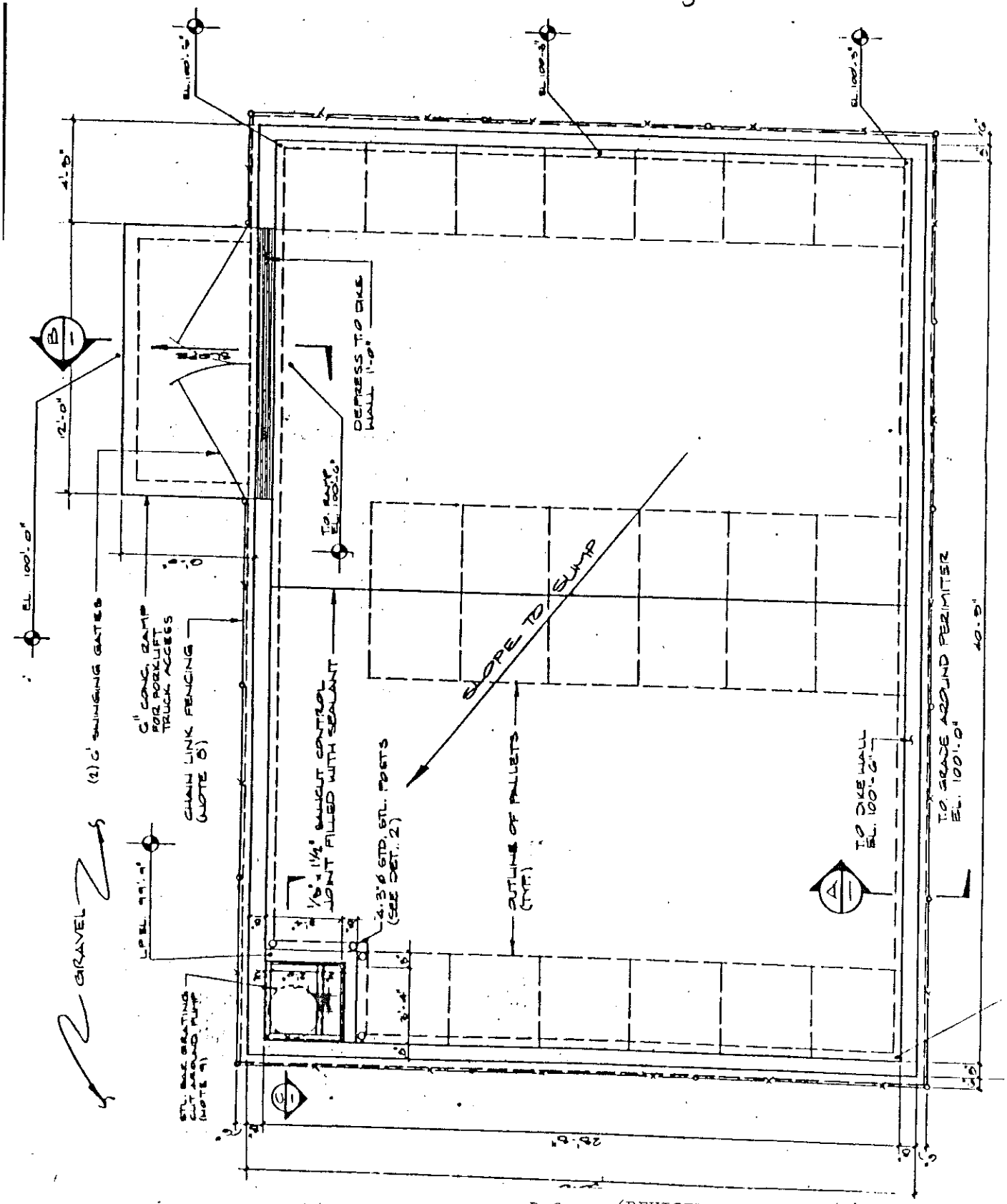


Figure D4
Detail of Sump Area

(Photocopy of part of Figure D2)

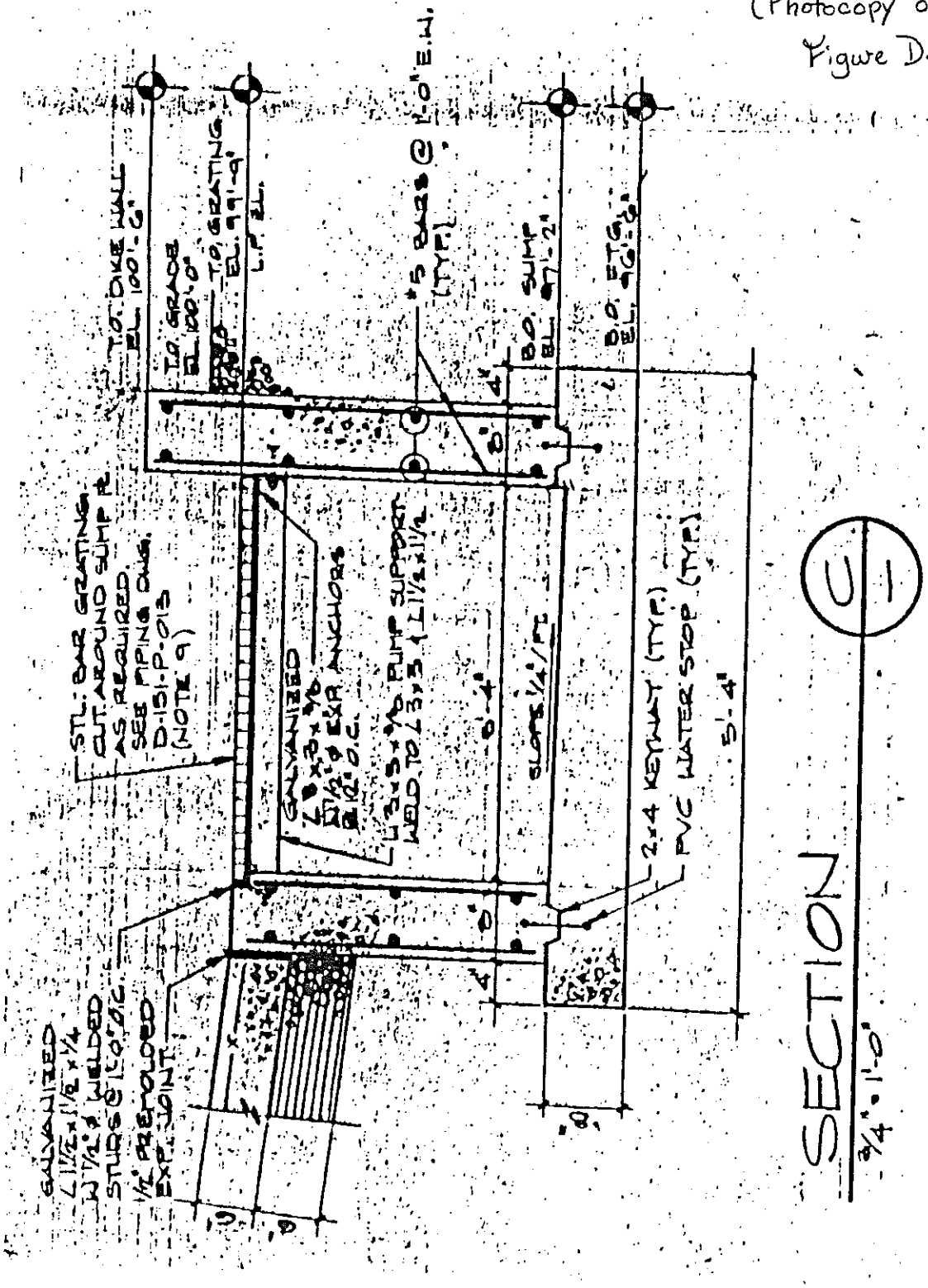


Figure D5
Retention Capacity Calculation

(Photocopy of part of Figure D2)

GENERAL NOTES:

1. ALL CONCRETE SHALL HAVE A DESIGN COMPRESSIVE STRENGTH OF 3000 P.S.I. DEVELOPED IN 28 DAYS.

2. DESIGN, DETAILING AND PLACEMENT OF REINFORCING, AND CONSTRUCTION SHALL CONFORM TO THE LATEST BUILDING CODE, THE REINFORCED CONCRETE CODE ACI 318-83 AND THE ACI DETAILING MANUAL.

3. REINFORCING STEEL SHALL BE DEFORMED, ROLLED FROM NEW BILLET STEEL, AND SHALL CONFORM TO ASTM A615-GRADE 60 SPECIFICATIONS, EXCEPT BARS TO BE REBENT IN FIELD WHICH SHALL BE GRADE 40.

4. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185 SPECIFICATIONS. LAPS SHALL BE 6" MINIMUM.

5. HORIZONTAL WALL REINFORCING SHALL LAP 20 DIAMETERS. CORNER HORIZONTAL BARS SHALL BE USED WHERE NOT NOTED ON DRAWINGS, AND SHALL BE OF THE SAME SIZE AND SPACINGS AS HORIZONTAL WALL REINFORCING.

6. THE BOTTOM OF ALL FOUNDATIONS SHALL REST ON UNDISTURBED SOIL WITH AN ALLOWABLE BEARING PRESSURE OF ____ PSF.

7. ALL CONCRETE SLABS SHALL HAVE A BROOM FINISH UNLESS OTHERWISE NOTED.

8. CHAIN LINK FABRIC FENCING SHALL HAVE A UNIFORM DIAMOND MESH WOVEN OF NO. 9 GAGE STEEL WIRE HOT-DIPPED GALVANIZED AFTER WEAVING. LINE POSTS SHALL BE 2 3/8" O.D. CORNER, ANGLE, PULL, AND GATE POSTS SHALL BE 3" O.D. TOP RAILS AND BRACES SHALL BE 1 5/8" O.D. EXTENSION ARMS SHALL BE MALLEABLE IRON FOR END AND CORNER POSTS AND PRESSED STEEL FOR INTERMEDIATE POSTS WITH THREE LINES OF 4 POINT PATTERN DOUBLE STRAND NO. 12 1/2 GAGE GALVANIZED WIRE WITH ALUMINUM BARBS @ 5" O.C. GATE FRAMES SHALL HAVE STILES AND RAILS OF 2" O.D. STANDARD STEEL PIPE WITH 1 5/8" O.D. BRACING AND STANDARD HARDWARE.

9. GALVANIZED SERRATED STEEL BAR GRATING SHALL BE GW-125 AS MANUFACTURED BY MCNICHOLS CO., OR EQUAL. BEARING BARS SHALL BE 1 1/4" X 3/16" @ 1 3/16" O.C. CROSS BARS SHALL BE @ 4" O.C.

10. RETENTION CAPACITY CALCULATION:

HARZARDOUS DRUM STORAGE CAPACITY = 200

TOTAL VOLUME OF DRUMS 200 X 55 GAL./DRUM = 11,000 GAL.

STORAGE AREA-28'-8" X 40'-8" = 1166 S.F.

RETENTION VOLUME (3" MIN. CURB) = 0.25' X 1166 S.F. X 7.48 GAL./CU.FT. = 2180 GAL.

PERCENT RETENTION = 2180 GAL./11,000 GAL. = 19.8%

Figure D6

Sump Pump Piping for Waste Storage Area

(Photocopy of part of Figure D9)

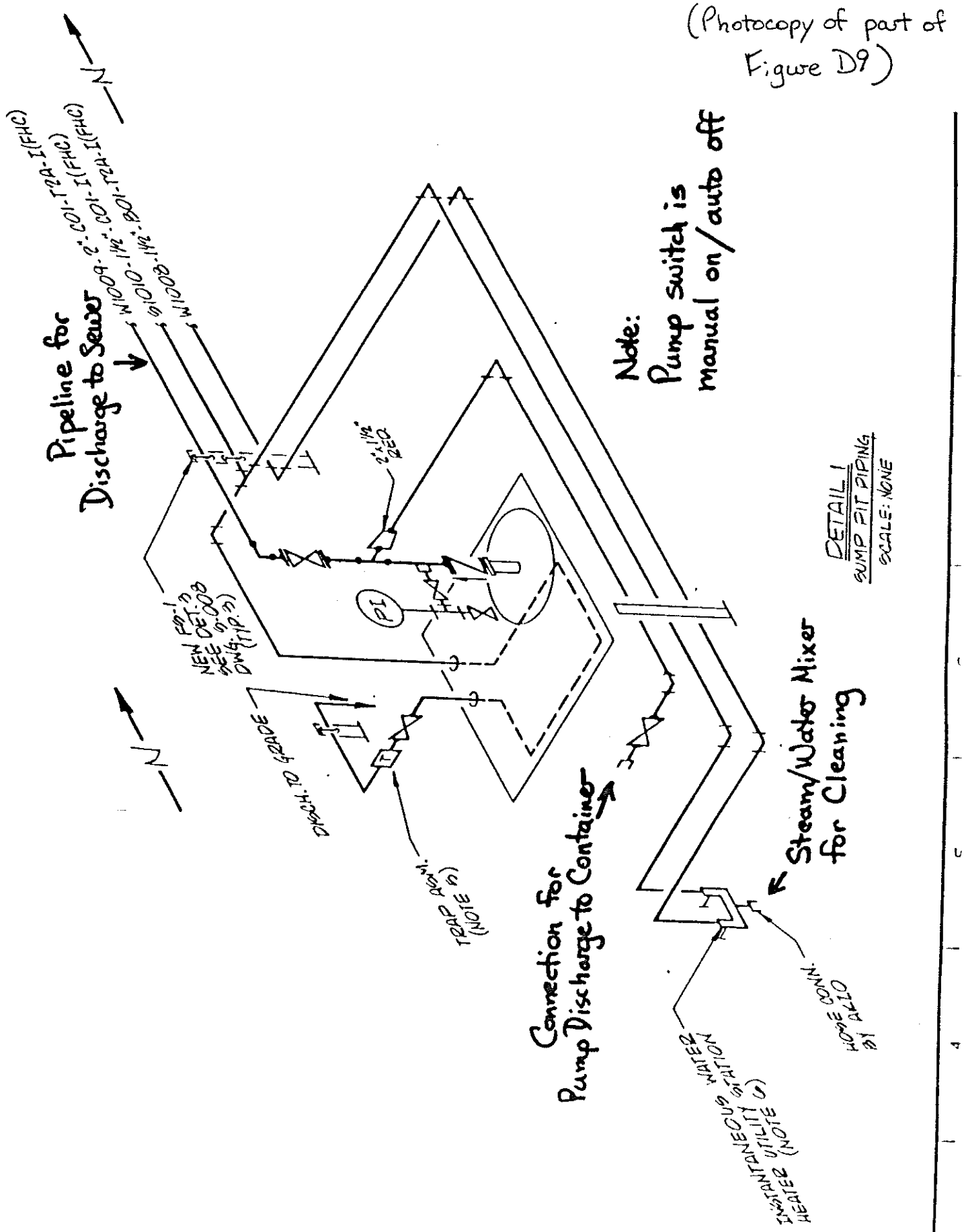


Figure D7
Required Label for
Hazardous Waste Containers

(In-House) Container ID Number Here

HAZARDOUS WASTE

FEDERAL LAW PROHIBITS IMPROPER DISPOSAL

IF FOUND, CONTACT THE NEAREST POLICE, OR
PUBLIC SAFETY AUTHORITY, OR THE
U.S. ENVIRONMENTAL PROTECTION AGENCY

PROPER D.O.T.
SHIPPING NAME_____ UN OR NA#_____

GENERATOR INFORMATION:

NAME_____

ADDRESS_____

CITY_____ STATE_____ ZIP_____

EPA
ID NO._____

EPA
WASTE NO._____

ACCUMULATION
START DATE_____

MANIFEST
DOCUMENT NO._____

HANDLE WITH CARE!

CONTAINS HAZARDOUS OR TOXIC WASTES

STYLE WM-6

Printed by LABELMASTER, Div. of AMERICAN LABELMARK CO., INC., CHICAGO, IL 60646

Figure D8
D.O.T. Category Labels
(Examples)

FIGURE D9

FULL-SIZE DRAWING OF CONSTRUCTION DETAILS

FOR HAZARDOUS WASTE STORAGE AREA

APPENDIX DI

Chemical-Resistant Coating

ONCE YOU PUT IT ON, PRACTICALLY NOTHING CAN TAKE IT OFF.

Overkote flooring material has undergone rigorous laboratory testing to prove its ability to withstand continuous exposure to deteriorating agents that can cause other floor coverings to fail.

The chemical resistance chart on the following page is based on continuous immersion to assure unlimited service life. For questionable chemicals not listed, contact C.P.S. Inc. or your local representative.

0 – OVERKOTE
0+ – OVERKOTE Plus

CPS CORROSION CHART*

CHEMICAL	O	O+
Acetic Acid (0-30%)	R	R
Acetic Acid (30-50%)	NR	R
Acetic Acid (Glacial)	NR	NR
Acetone (0-5%)	R	R
Acetone (10%)	NR	R
Adipic Acid Solution	R	R
Alcohol, Isopropyl (10%)	R	R
Alcohol, Methyl (100%)	R	R
Alcohol, Ethyl (10%)	R	R
Allyl Chloride	R	R
Aluminum Bromate	R	R
Aluminum Bromide	R	R
Aluminum Chloride	R	R
Aluminum Fluoride (25%)	R	R
Aluminum Hydroxide	R	R
Aluminum Iodide	R	R
Aluminum Nitrate	R	R
Aluminum Sodium [illegible]oride	R	R
[illegible]num Sulfate	R	R
[illegible]ns	R	R
Ammonia - Wet	R	R
Ammonium Benzoate	R	R
Ammonium Chloride	R	R
Ammonium Chlorostanate	R	R
Ammonium Fluoride (25%)	R	R
Ammonium Hydroxide (0-30%)	R	R
Ammonium Iodate	R	R
Ammonium Iodide	R	R
Ammonium Nitrate	R	R
Ammonium Oxalate	R	R
Ammonium Phosphate	R	R
Ammonium Silicate	R	R
Ammonium Sulfate	R	R
Ammonium Sulfide	R	R
Ammonium Trichloride	R	R
Barium Bromide	R	R
Barium Carbonate	R	R
Barium Chlorate	R	R
Barium Chloride	R	R
Barium Citrate	R	R
Barium Dichromate	R	R
Barium Hydroxide (0-10%)	R	R
Barium Iodate	R	R
Barium Iodide	R	R
Barium Nitrate	R	R
Barium Nitrite	R	R
Barium Oxalate	R	R
Barium Sulfate	R	R
Barium Sulfide	R	R
Barium Sulfite	R	R
Beer	R	R
Benzene	R	R
[illegible]nzene (5% ub [illegible]osene)	R	R
[illegible]ene Sulfonic Acid	R	R
Benzoic Acid	R	R
Berylium Chloride	R	R
Beverages-Carbonated	R	R
Bizmuth Oxychloride	R	R
Black Liquor	R	R
Bleach Liquor	R	R
Blood	R	R
Borax	R	R
Boric Acid	R	R
Bromic Acid	R	R
Bromine Water	R	R
Butadiene	R	R
Butyl Cellosolve	R	R
Butyric Acid	R	R
Cadmium Bromate	R	R
Cadmium Bromide	R	R
Calcium Bisulfite	R	R
Calcium Bromate	R	R
Calcium Bromide	R	R
Calcium Carbonate	R	R
Calcium Chlorate	R	R
Calcium Chloride	R	R
Calcium Citrate	R	R
Calcium Hydroxide (0-50%)	R	R
Calcium Hypochlorite (0-20%)	R	R
Calcium Iodide	R	R
Calcium Nitrate	R	R
Calcium Nitrite	R	R
Calcium Oxychloride	R	R
Calcium Phosphate	R	R
Calcium Sulfate	R	R
Calcium Thiosulfate	R	R
Carbon Dioxide	R	R
Carbon Disulfide	R	R
Carbon Tetrachloride	R	R
Carbonic Acid	R	R
Castor Oil	R	R
Cerous Bromate	R	R
Cerous Sulfate	R	R
Cesium Iodate	R	R
Cesium Tribromide	R	R
Chlorine, Dry Gas	R	R
Chlorine Water - All	R	R
Chlorine, Wet Gas	R	R
Chloroactic Acid (0-25%)	R	R
Chlorobenzene	R	R
Chloroform	R	R
Chlorostannic Acid	R	R
Chromic Acid (0-25%)	R	R
Chromic Acid (35%)	NR	R
Chromic Sulfate	R	R
Chromus Chloride	R	R
Chromus Iodide	R	R
Citric Acid	R	R
Cobaltic Chloride	R	R
Cobaltous Bromide	R	R
Cobaltous Chloride	R	R
Cobaltous Fluoride	R	R
Copper Chloride	R	R
Copper Fluoride	R	R
Copper Nitrate	R	R
Copper Sulfate	R	R
Crude Oil - Sour	R	R
Crude Oil - Sweet	R	R
Cupric Bromate	R	R
Cupric Bromide	R	R
Cupric Sulfate	R	R
Cuprous Sulfite	R	R
Cuprous Thiocyanate	R	R
Cyclohexane	R	R
Deionized Water	R	R
Detergents, All	R	R
Diacetone Alcohol	R	R
Dichloro Benzene, Ortho	R	R
Diesel Fuel	R	R
Diethyl Sulfate	R	R
Diethylene Glycol	R	R
Dimethyl Formamide	NR	NR
Dysprosium Bromate	R	R
Erbium Chloride	R	R
Erbium Nitrate	R	R
Ethyl Actate	R	R
Ethyl Bromide	NR	NR
Ethyl Cellosolve	R	R
Ethylene Glycol	R	R
Fat	R	R
Fatty Acids	R	R
Ferric Bromide	R	R
Ferric Chloride	R	R
Ferric Formate	R	R
Ferric Nitrate	R	R
Ferric Oxalate	R	R
Ferric Sulfate	R	R
Ferric Sulfide	R	R
Ferric Thiocyanate	R	R
Ferrous Chloride	R	R
Ferrous Chloroplatinate	R	R
Ferrous Ferricyanide	R	R
Ferrous Fluoride	R	R
Ferrous Formate	R	R
Ferrous Iodide	R	R
Ferrous Perchlorate	R	R
Ferrous Potassium Oxylate	R	R
Ferrous Sulfate	R	R
Ferrous Thiocyanate	R	R
Ferrous Thiosulfate	R	R
Fluosilicic Acid (10%)	R	R
Formaldehyde (0-40%)	R	R
Formic Acid (25%)	R	R
Freon	R	R
Gadolinium Bromide	R	R
Gadolinium Chloride	R	R
Gadolinium Nitrate	R	R
Gadolinium Sulfate	R	R
Gallium Bromide	R	R
Gallium Sulfate	R	R
Gallium Trichloride	R	R
Gasoline Refined, All	R	R
Glucose	R	R
Glycerine	R	R
Glycol, Ethylene	R	R
Glycol, Propylene	R	R
Hydrazine, 35% Catalyzed	R	R
Hydraulic Fluid	R	R
Hydrobromic Acid (0-50%)	R	R
Hydrochloric Acid (0-37%)	R	R
Hydrofluoric Acid (0-25%)	R	R
Hydrogen Peroxide (10%)	R	R
Hydrogen Sulfide, Aqueous	R	R
Hypochlorous Acid (10%)	R	R
Iridium Chloride	R	R
Jet Fuel	R	R
Kerosene	R	R
Lactic Acid	R	R
Lard	R	R
Lauric Acid	R	R
Lead Acetate	R	R
Lead Persulfate	R	R
Levulinic Acid (25%)	R	R
Lithium Acetate	R	R
Lithium Nitrate	R	R
Lithium Sulfide	R	R
Lix 84 (Henkel)	R	R
Magnesium Acetate	R	R
Magnesium Bromide	R	R
Magnesium Carbonate	R	R
Magnesium Chloride	R	R
Magnesium Hydroxide	R	R
Magnesium Nitrate	R	R
Magnesium Perchlorate	R	R
Magnesium Sulfate	R	R
Magnesium Thiosulfate	R	R
Maleic Acid (100%)	R	R
Manganese Chloride	R	R
Manganese Iodide	R	R
Manganese Lactate	R	R
Manganese Sulfate	R	R
Mercurous Nitrate	R	R
Mercury	R	R
Methyl Isobutyl Carbitol	R	R
Methyl Isobutyl Ketone	R	R
Methyl Methacrylate	R	R
Methylene Chloride	NR	NR
Mineral Oils	R	R
Molasses	R	R
Molybdenum Oxybromide	R	R
Molybdenum Tetra Bromide	R	R
Molybdenum Oxychloride	R	R
Naphthalene	R	R
Naphthas	R	R
Nickel Bromide	R	R
Nickel Chloride	R	R
Nickel Formate	R	R
Nickel Nitrate	R	R
Nickel Potassium Cyanide	R	R
Nitric Acid (0-20%)	R	R
Nitric Acid (30%)	NR	R
Nitric Acid (40%)	NR	R
Nitrobenzene	NR	R
Oakite Cleaning Solutions	R	R
Oleic Acid	R	R
Oxalic Acid	R	R
Palladium Chloride	R	R
Perchlorethylene	R	R
Phenol (90%)	NR	R
Phosphoric Acid (0-85%)	R	R
Phosphorous Thioamide	R	R
Phosphotingstic Acid	R	R
Pickling Acids, Sulfuric & HCl	R	R
Picric Acid	R	R
Plating Solutions	R	R
Platinic Acid	R	R
Platinum Chloride	R	R
Platinum Sulfate	R	R
Potassium Aluminum Silicate	R	R
Potassium Arsenate	R	R
Potassium Arsenite Acid	R	R
Potassium Aurate	R	R
Potassium Bicarbonate	R	R
Potassium Borate	R	R
Potassium Bromide	R	R
Potassium Carbonate	R	R
Potassium Chloride	R	R
Potassium Cyanate	R	R
Potassium Cyanide	R	R
Potassium Dichromate	R	R
Potassium Fluoride	R	R
Potassum Hydrosulfide	R	R
Potassium Hydroxide	R	R
Potassium Hypochlorite	R	R
Potassium Hypophosphite	R	R
Potassium Iodide	R	R
Potassium Nitrate	R	R
Potassium Phosphate, Hydrogen	R	R
Potassium Phosphate, Pyro	R	R
Potassium Phosphite	R	R
Potassium Silicate	R	R
Potassium Sulfate	R	R
Potassium Sulfide	R	R
Potassium Sulfite	R	R
Potassium Thiocarbonate	R	R
Potassium Thiocyanate	R	R
Pulp Mill Liquors	R	R
Radium Bromide	R	R
Radium Chloride	R	R
Rhodium Chloride	R	R
Rhodium Sulfate	R	R
Rhodium Sulfite	R	R
Rubidium Carbonate	R	R
Rubidium Sulfide	R	R
Samarium Chloride	R	R
Scandium Nitrate	R	R
Selenic Acid	R	R
Silicic Acid	R	R
Silicon Fluoride	R	R
Silver Nitrate	R	R
Silver Perchlorate	R	R
Silver Permanganate	R	R
Silver Thiosulfate	R	R
Soaps	R	R
Sodium Acetate	R	R
Sodium Benzoate	R	R
Sodium Bicarbonate	R	R
Sodium Bisulfate	R	R
Sodium Bromide	R	R
Sodium Carbonate	R	R
Sodium Chloride	R	R
Sodium Cyanide	R	R
Sodium Dichromate	R	R
Sodium Ferrocyanide	R	R
Sodium Fluoride	R	R
Sodium Hydroxide (0-59%)	R	R
Sodium Hypochlorite (0-6%)	R	R
Sodium Hypochlorite (6-15%)	R	R
Sodium Methoxide (40%)	R	R
Sodium Nitrate	R	R
Sodium Phosphate	R	R
Sodium Silicate	R	R
Sodium Sulphate	R	R
Sodium Sulphite	R	R
Sodium Tetraborate	R	R
Sodium Thiosulfate	R	R
Stannic Chloride	R	R
Stearic Acid	R	R
Strontium Chlorate	R	R
Strontium Iodate	R	R
Strontium Nitrite	R	R
Strontium Sulfide	R	R
Strontium Thiocyanate	R	R
Sugars	R	R
Sulfamic Acid (25%)	R	R
Sulfite Liquors	R	R
Sulfuric Acid (0-75%)	R	R
Sulfuric Acid (0-100%)	NR	R
Sulfurous Acid (7%)	R	R
Tannic Acid	R	R
Tantalum Fluoride	R	R
Tartaric Acid	R	R
Tellurium Bromide	R	R
Tetra Hydro Furane	NR	NR
Tetraethyl Lead	R	R
Thallium Bromide	R	R
Thallium Chloride	R	R
Thorium Bromide	R	R
Titanium Chloride	R	R
Titanium Fluoride	R	R
Titanium Nitrate	R	R
Titanium Sulfide	R	R
Toluene	R	R
Trichloroethylene	NR	R
Tricresyl Phosphate	R	R
Trisodium Phosphate	R	R
Tung Oil	R	R
Tungsten Oxytetrabromide	R	R
Turpentine	R	R
Uranium Bromide	R	R
Uranium Chloride	R	R
Uranyl Bromide	R	R
Urine	R	R
Vanadium Chloride	R	R
Vanadium Fluoride	R	R
Vanadyl Bromide	R	R
Vegetable Oils, All	R	R
Vinegar	R	R
Vinyl Acetate	R	R
Water, Distilled	R	R
Water, Deionized	R	R
Water, Salt	R	R
Wine	R	R
Xylene	R	R
Zinc Chloride	R	R
Zinc Sulfate	R	R
Zinc Fluosilicate	R	R
Zinc Formate	R	R
Zinc Permanganate	R	R
Zirconium Nitrate	R	R

*The Corrosion Chart is based on continuous immersion for unlimited service life.

CPS illini
CONCRETE PROTECTION SYSTEMS
620 SOUTH BROADWAY
COAL CITY, IL 60416
312-704-8888 • 815-634-2434

December 6, 1989

Madelyn Johnson
Akzo Chemical
8401 W 47th St
McCook, Il 60525

Dear Madelyn:

Thank you for the opportunity to offer the enclosed pricing for the area we discussed. The pricing includes repairing all expansion joints using Overflex and Fiberglass, lining the sump pit and coating the entire area with Overkote Plus.

I contacted Eugene Jacobs (President of C.P.S.) and he informed me that methylene chloride will not harm our material if spilled outside because of it's high rate of evaporation.

If you have further questions, please do not hesitate to contact me.

Sincerely,
Dan
Dan Donigan

DD:jd

Proposal

WREN CONSTRUCTION COMPANY
530 East Minooka Road
MORRIS, ILLINOIS 60450
(815) 237-2000 (815) 942-1605

PROPOSAL SUBMITTED TO: AKZO Chemical		PHONE: 708-442-7100	DATE: 12/6/89
STREET: 8401 W 47th St		JOB NAME:	
CITY, STATE AND ZIP CODE: McCook, Il		JOB LOCATION:	
ARCHITECT: Madelyn Johnson	DATE OF PLANS:		JOB PHONE:

We hereby submit specifications and estimates for:

This pricing is for the following concrete preparation and coating:

1. Sandblast or Shotblast floor, curbs and sump pit.
2. Repair expansion joints with overflex and fiberglass.
3. Coat entire area, including curbs and sump pit with Overkote Plus.

Material:	$8,982.00
Tax on Material:	538.92
Misc Matl, Equip, Labor:	5,481.00
Grand Total Installed:	$15,001.92

We Propose hereby to furnish material and labor — complete in accordance with above specifications, for the sum of:

Fifteen Thousand One and 92/100xxxxxxxxxxxxxxxxxxx dollars ($ 15,001.92).

Payment to be made as follows:

UPON RECEIPT

All material is guaranteed to be as specified. All work to be completed in a workmanlike manner according to standard practices. Any alteration or deviation from above specifications involving extra costs will be executed only upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon strikes, accidents or delays beyond our control. Owner to carry fire, tornado and other necessary insurance. Our workers are fully covered by Workmen's Compensation Insurance.

Authorized Signature: Dan Doyle

Note: This proposal may be withdrawn by us if not accepted within 30 (thirty) days.

Acceptance of Proposal — The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

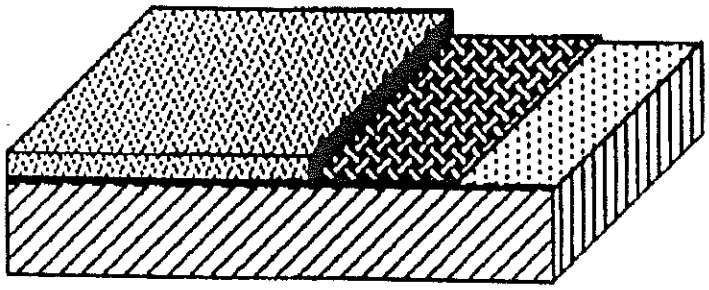
Signature _____

Date of Acceptance: _____

Signature _____

CONCRETE PROTECTION SYSTEMS, INC.

OVERFLEX LAMINATE SYSTEMS



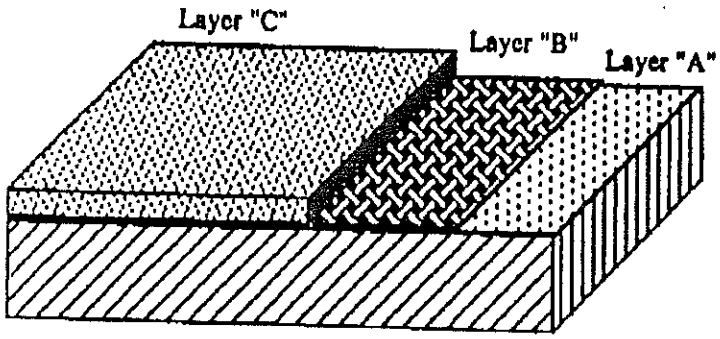
P. O. Box 9545 - Tulsa, OK 74157

10/12/89

OVERFLEX LAMINATE CONSTRUCTION

The OVERFLEX Laminate Flooring System was developed to minimise the possibility of cracks in concrete, propagating through the monolythic flooring allowing chemicals to penetrate into the substrate; and also to prevent the chemicals from attacking the concrete below the flooring material, disbonding it from the concrete.

OVERKOTE Flooring will not crack or debond from concrete when subjected to external impact



loads or from thermal shock conditions, however when there is movement in existing concrete cracks or when cracks in the concrete are formed after the flooring has been applied, depending on the extent of the movement, the concrete cracks may extend through the flooring material.

Construction

Layer "A" is a 16 mil layer of the semiflexible resin OVERFLEX. This resin has a very low viscosity which permeates the concrete and bonds to it tenaciously.

Layer "B" is 18 ounce fiberglass woven roving which is rolled into the liquid OVERFLEX Resin and becomes completely saturated with the resin.

Layer "C" is the corrosion resistant rigid flooring; OVERKOTE, OVERKOTE Plus, or OVER-KRETE: the selection is based on the corrosion resistance required. The thickness of Layer "C" is 1/8 inch minimum.

The above composit construction bridges the cracks in concrete and, within limits, prevents the cracks from projecting through the protective flooring.

A brief explanation of the construction is as follows:

The fibers in fiberglass have extremely high tensile strength, 29,000 psi and very high tensile modulus, 3,000,000 psi and when applied in a form that allows loading in the tensile direction, these high physical properties can be utilized. In the OVERFLEX Laminate System the fiberglass is used in the form of woven roving which is esentially flat woven strands. As applied, the strands of fiberglass bridge the cracks in the concrete, and since the resin in the composit construction is bonded to the fiberglass, the strands of glass hold the laminate together preventing the laminate from being torn apart. The principal is not too different from the use of steel reinforcing bars in reinforced concrete. The primary difference is that while steel reinforcing bars are straight, the glass fibers have a slight bend in them due to the fact that they are woven; this allows a small amount of initial stretch in the laminate. Even though this stretch is quite small it can be enough to crack a rigid resin; therefore a semiflexible resin, OVERFLEX, is incorporated in the glass laminate

The thickness of Layer "C" over the fiberglass of.

Layer "B" is of primary importance since fiberglass and the binders used to coat the fiberglass are very subject to attack by chemicals. If the corrosive chemicals on the flooring permeate to the fiberglass or reach the fiberglass due to mechanical abuse which dent, chip, or gouge the surface; the chemicals will attack the glass and wick along the glass fiber length causing the flooring material to delaminate.

The minimum thickness of 1/8" for Layer "C" allows for both permeation and physical abuse factors providing a permanent flooring for heavy duty industrial applications.

APPLICATION PROCEDURE

Concrete Preparation:

Concrete must be sound and clean. On new concrete sandblasting, shot blasting, or acid etching is required to remove the laitance and to provide an suitable texture for bonding. On existing concrete, old coatings, oils, waxes, and other contaminants must be removed. Holes and cavities must be filled. Unevenness must be smoothed out. This can be accomplished by filling with OVERDRIVE resin and suitable sand or sand and P gravel depending on the thickness to be filled.

For application over existing cracks the OVERFLEX Laminate system should be applied at a minimum width of 1/8 inches.

Layer "A":

OVERFLEX resin system is applied with a soft rubber squeegee and short nap roller at the rate of one gallon per 100 square feet; this will produce a thickness of approximately 16 mils. This layer is allowed time to set up sufficiently to allow walking on: at temperatures of 65 to 85°F this will require 4 to 8 hours.

Layer "B":

Within 8 hours after Layer "A" has set up, Layer "B" should be applied. Layer "B" consists of a second coating of OVERFLEX resin applied the same as Layer A, at a rate of one gallon per 100 square feet. While still wet, a layer of 18 ounce woven roving is rolled on. For total slab coverage, the woven roving should be butted as close as possible without overlapping. The woven roving should be flattened and impregnated by the use of a serrated roller, the type commonly used in laying up fiberglass construction. The woven roving should be thoroughly saturated, if it is not, add additional OVERFLEX should be added..

When this has been completed and while the OVERFLEX is still wet, immediately broadcast silica sand onto the surface until saturated. Allow time to set up before proceeding to the next step.

Note: The grade of silica sand should be the same type as specified in CPS Flooring kits.

Layer "C":

Within 24 hours after Layer B has been applied, apply Layer C, This is the corrosion resistant layer which can be OVERKOTE, OVERKOTE Plus, or OVERKRETE. This is applied in accordance with the standard application procedure for CPS flooring; by troweling, screed rake, or CPS spraying. The thickness of this layer should be 3/16 inch producing a total laminate thickness of 1/4 inch.

Vertical Applications:

The OVERFLEX Laminate System can also be used on vertical surfaces by substituting OVERFLEX V and using OVERKOTE V, OVERKOTE Plus V, or OVERKRETE V as the corrosion resistant layer. The V modification will hold on vertical surfaces without running off. In this case the corrosion resistant layer can be 1/8 inch thick making the total thickness 3/16 inches.

Concrete Protection Systems, Inc.
P.O. Box 9545
Tulsa, OK 74107
(918) 446-6399

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PHYSICAL PROPERTIES

OVERKOTE and OVERKOTE Plus	
Property	
Compressive Strength ASTM C-579	12,000 psi
Tensile Strength ASTM C-307	2,000 psi
Flexural Strength ASTM C-348	4,200 psi
Modulus of Elasticity ASTM C-580	3,000,000 psi
Hardness-Shore D	85
Impact Resistance Mil D-3134F	6 FT/Lbs with no failure
Taber Abrasion ASTM 1044 CS17 Wheels with 2,000 Grams.	Loss/1000 Cycles=25 Mg
Shear Bond Str to Concrete:	300 psi with failure of concrete
Tensile Str to Concrete after 7 days immersion in water. ACI Bulletin 59-43	335 psi with failure of concrete
Water Absorption ASTM D-570-63	0.10% Maximum
Linear Shrinkage C-531	0.01% Max
Linear Coefficient of Expansion ASTM C-531	2.0×10^{-5} In/In/°F
Flammability ASTM D-635-63	Self Extinguishing
Fungus and Bacteria Resistance Mil-F-52505 Sec. 4.4.2.11 specified in TT-P-34	Will not support growth

Packaging:
For Packaging, Coverage, and Component Breakdown, refer to individual Product Bulletins.

D-22 (2/15/90)

SECTION E

GROUNDWATER MONITORING

Under RCRA regulations (40 CFR Part 265.90), groundwater monitoring is required for surface impoundments, landfills and land-treatment facilities. The facility which is the subject of this permit application is a hazardous waste storage facility, and is therefore not subject to groundwater monitoring requirements

SECTION F

PROCEDURES TO PREVENT HAZARDS

F-1: SECURITY (703.183(d), 724.114)

F-1a: SECURITY PROCEDURES AND EQUIPMENT (703.183(d),724.114)

F-1A(1): 24-HOUR SURVEILLANCE SYSTEM (703.183(a))

The security at the Akzo McCook Research facility is maintained by barriers and entry control equipment, as described in Sections F-1a(2)(a) and (b).

F-1a(2): BARRIERS AND MEANS TO CONTROL ENTRY (724.114(b))

F-1a(2)(a): BARRIER (724.114(b)(2)(A))

The Akzo McCook Research facility is surrounded by a fence on all sides except along the length of the front of the laboratory building. Refer to Figure F1 for the location of the fence and gates. The perimeter fence is a seven-foot high chain link fence topped by three strands of barbed wire.

The hazardous waste storage area is within this perimeter and is surrounded on all sides by a separate fence. Refer to Figure F1. This fence is also seven feet high and topped by three strands of barbed wire, and has one gate for access.

F-1a(2)(b): MEANS TO CONTROL ENTRY (724.114(b)(2)(B))

During day shifts (6 a.m. - 6 p.m.) the research facility areas outside the laboratory building and outside the hazardous waste storage area are accessible via Gates 1, 2 and 3 in Figure F1. The gate to the hazardous waste storage area is locked at all times. Visitors may enter the front lobby, or may make deliveries to the storeroom door (locked). Access beyond the lobby, or into any part of the main building, is controlled by mechanical and electronic locks.

Employees are issued key cards for access to the main building. Visitors must sign in at the lobby and be escorted by an Akzo employee to enter the building past the lobby. Persons making deliveries to the storeroom will ring a doorbell and be escorted past the locked door by storeroom personnel.

During late shifts (6 p.m. - 6 a.m.), access is controlled by locking all perimeter gates and front lobby doors. A guard service does inspections of the perimeter security and facility occupancy at random times during weekend shifts.

F-1a(3): WARNING SIGNS (724.114(c))

Signs are posted on all four sides of the hazardous waste storage area to include the messages:

- "Danger - Hazardous Waste Storage Area"
- "Unauthorized Personnel Keep Out" or "Authorized Personnel Only"
- "No Matches, Smoking, or Open Lights"

Signs are also posted to require that the areas along the east and south sides of the storage area be kept clear, to keep the gate area and access road clear. All signs are legible from a distance of 25 feet, and are inspected for legibility as part of the regular inspections described in Section F-2.

F-2: INSPECTION SCHEDULE (703.183(e), 724.115)

F-2a: GENERAL INSPECTION REQUIREMENTS
(703.183(e), 724.115(a) and (b), 724.133)

Akzo Chemicals Inc. employees conduct weekly inspections (as required under 40 CFR Part 265.15 and 265.174) of the hazardous waste storage area for condition of containers, barrier and sump pump equipment, for evidence of leaks or spills, and for structural condition of the storage area itself. Results of each inspection are recorded on a log sheet, which is kept onsite at all times, in the Environmental Engineer's office.

F-2a(1): TYPES OF PROBLEMS (724.115(b)(3))

Figure F2 is the schedule for inspecting all items associated with safe operation of the hazardous waste storage area. This schedule includes problems to be looked for during the inspections. During each storage area inspection, the results are recorded on the log sheet shown in Figures F3 and F4. A drum inventory is attached to each inspection sheet to show drum tallies.

If any inspected items are found to be deficient, the deficiency and corrective action are logged. The description of the corrective action must include method, item/container worked on, and start and end time of corrective work. All inspection log sheets must be signed (name, title, signature) and dated by the inspector.

The paved area outside the hazardous waste storage area, across which waste drums are transported (approx. 60 feet distance) to be loaded onto a truck, will be inspected before and after the

loading operation on the shipment day. The normal duration of this loading operation is 0.5-1.5 hours, and it occurs approximately once per every two months. Appendix F1 contains a copy of the log sheet to be used for this inspection.

Figure F5 is the schedule of safety and security equipment inspections for the research site in general. These inspections are accomplished by more than one inspector. Appendix F1 contains copies of the corresponding log sheets. In addition, all fire extinguishers, safety showers, eyewashes and hallway-mounted respirators are required to have tags showing inspection dates.

F-2b: SPECIFIC PROCESS INSPECTION REQUIREMENTS

F-2b(1): CONTAINER INSPECTION (724.274)

The weekly inspections of the hazardous waste storage area include checking for the following problems for each storage container (drum):

- damage due to handling
- corrosion or other deterioration
- any evidence of leaks
- required label missing, deteriorated, illegible or not filled out correctly
- inadequate aisle space between containers

The weekly inspection will also include checking for the following problems in the storage area:

- cracking or erosion of dike or floor
- suspicious floor stain, liquid or odor present to indicate possible leaking drum
- corrosion or damage to fence or gate
- lock inoperative, damaged or missing
- warning signs missing or deteriorated
- sump pump or piping damaged or leaking
- water line frozen or leaking

Results of the inspection are recorded on the inspection log sheet as described in Section F-2a(1) above. An inventory of

containers is also taken during the inspection and is attached to the log sheet.

F-3: WAIVER OR DOCUMENTATION OF PREPAREDNESS AND PREVENTION REQUIREMENTS

F-3a: EQUIPMENT REQUIREMENTS (703.183, 724.132)

The Akzo Chemicals Inc. McCook Research facility is equipped with special equipment for the purpose of emergency preparedness, including preparedness for emergencies associated with handling and storing hazardous wastes. Locations of specific emergency equipment are given in the Contingency Plan.

F-3a(1): INTERNAL COMMUNICATIONS (724.132(a))

The research facility is equipped with an internal telephone system, with telephones in every office, laboratory, conference room, and the pilot plant control room. An internal paging system is tied into this telephone system. Paging speakers are located in every laboratory, hallway and pilot plant room, as well as various outdoor locations and selected administrative offices. The paging system is activated by dialing 61 or 60 from any phone. Dialing 61 will broadcast the caller's voice over all speakers except those in offices. Dialing 60 will broadcast over all speakers in the research facility site.

The research facility is also equipped with an integrated fire alarm system, with speakers in all hallways and pilot plant rooms, and at outdoor locations in pilot plant yards. Alarm activation boxes/levers are located in all hallways, laboratories and pilot plant rooms. The fire alarm system is equipped with battery power backup in case of power failure.

The hazardous waste storage area has an outdoor telephone located approximately 10 feet from the southwest corner of its perimeter, mounted on the outside of the new equipment warehouse. At the time of this permit application, a fire alarm pull box is planned for installation beside the phone. In case of power failure, the alarm will be on backup power.

F-3a(2): EXTERNAL COMMUNICATIONS (264.32(b))

The fire alarm system is tied into a direct signal to the ADT* office, so that ADT will notify the local fire department of an alarm. This is provided in case an alarm is activated when the facility is unoccupied.

The local police department can be reached using the facility's telephone system. In case of power outage, four telephone extentions will remain in operation, to act as emergency phones.

The emergency phone extentions are in the lobby, pilot plant control room, research director's office and research department head's office.

F-3a(3): EMERGENCY EQUIPMENT (724.132(c))

Firefighting equipment available within the McCook Research facility, in general, includes portable fire extinguishers of various types, a sprinkler system, fire hoses and water cannons. Refer to Figures G8a and G8b (in Section G of permit application) for locations of this equipment. Firefighting equipment for the hazardous waste storage area (located outdoors in pilot plant yard area) includes portable fire extinguishers kept nearby and municipal fire hydrants.

Spill control equipment for the hazardous waste storage area is available from a central supply kept in the pilot plant. This includes hand shovels, granular-type absorbents and absorbent "pigs". A smaller supply of spill response materials is kept beside the storage area gate for quick response to small spills. If a spill is too large for Akzo personnel to contain and clean up, vacuum truck services and emergency spill cleanup services are available on a 24-hour basis from our emergency response contractor listed in the Contingency Plan.

Wsate generated by spill cleanup operations can be contained in drums, hired bulk-waste transport vehicles, or hired vacuum trucks. All spill waste, including contaminated soil, gravel and water, will be transported and disposed of as quickly as permit and manifest requirements are met. Decontamination of any equipment will be carried out in a manner that ensures containment of any contaminated water generated by the cleanup. This water will be disposed of as waste, in accordance with applicable regulations.

F-3a(4): WATER FOR FIRE CONTROL (264.32(d))

The firewater for the entire McCook Research facility, including the hazardous waste storage area within its perimeter, is provided via the McCook Plant firewater pumps, and is withdrawn from the municipal firewater supply of the Village of McCook. The pumps provide up to 1500 gallons per minute at 105 psi to supply our firewater systems (sprinklers, hydrants, cannons). Refer to Figure F6 for locations of hydrants in immediate vicinity of the research facility.

* - American District Telegraph

F-3b: AISLE SPACE REQUIREMENTS (264.35)

Paved access roads are provided within the research facility perimeter, to allow unobstructed access to all areas of the laboratory building, pilot plant and yard areas, and the hazardous waste storage area. Refer to Figure F7. Wide gates are provided at strategic locations, to allow emergency vehicles to access various parts of the site as directly as possible.

Emergency vehicles can access the hazardous waste storage area directly via the road leading to the site's back gate. The storage area itself is not large enough to accommodate large trucks. However, the area has a large entry gate and two sides of the perimeter fence are kept clear for sufficient access.

Within the hazardous waste storage area, adequate aisle space is maintained between rows of drums and between the drums and dike. Refer to Figure D1. Minimum aisle space, assuming the maximum 200 drums, will be three feet for aisles between double rows and two feet inside the dike wall.

F-4: PREVENTATIVE PROCEDURES, STRUCTURES AND EQUIPMENT (703.183(h))

F-4a: UNLOADING OPERATIONS (703.183(h)(1))

Since wastes are generated on-site by Akzo Chemicals Inc., no elaborate unloading facilities have been constructed. Drums of hazardous waste are brought into the storage area via forklift/drumlift vehicles. Paved access routes are available from any other part of the research facility to the storage area. A shallow-slope concrete ramp leads up to the storage area entrance, because the dike around the storage area causes it to be above elevation of surrounding pavement.

The hazardous waste storage area is located close to a large gate in the research facility's perimeter fence. (NOTE: This part of perimeter fence is more than 50 feet within property boundary.) This allows waste transport vehicles to back up to the paved area surrounding the storage area, minimizing distance for drum transfers.

F-4b: RUN-OFF (703.183(h)(2))

No designated waste-handling area is needed because containers of hazardous waste are transferred to the storage area as soon as they are full. If a container begins to leak during transfer, the container will be on a paved surface, and the spill will be immediately contained using absorbents. A large supply of absorbents is available in the pilot plant.

F-4c: WATER SUPPLIES (703.183(h)(3))

In the event that a spill occurs in this facility, dry adsorbent materials will be used to contain and clean up the spill as thoroughly as possible. Any subsequent washing of the spill area will not commence until devices (booms, dikes, etc.) are in place to prevent contaminated washwater from leaving the immediate area of washing. Contaminated water will be collected via pump and/or vacuum equipment for containerization and disposal.

As described in Section D-1a(4), contaminated liquids generated by any cleanup in the hazardous waste storage area will be contained by the dike, collected in the sump and pumped to an appropriate container.

No water wells are located within 1000 feet of the hazardous waste storage area or site in general. Wastewater from this facility is discharged only to the metropolitan sanitary sewer.

F-4d: EQUIPMENT AND POWER FAILURE (703.183(h)(4))

The only equipment within the hazardous waste storage area that is subject to mechanical failure or power failure is the sump pump. If the sump pump fails, a replacement pump will be borrowed from another part of the research facility or rented from a local vendor. Only air-operated diaphragm pumps are used as temporary pumps for this purpose.

As mentioned earlier, power outages will not completely disable external communications because emergency phone extensions are available. The fire alarm system and emergency lights will not be disabled by a power failure because they are equipped with battery power backups.

F-4e: PERSONNEL PROTECTION EQUIPMENT (703.183(h)(5))

All personnel who handle waste within the research facility are required to wear hard hats, steel-toed shoes and safety glasses as standard equipment. Other protective gear, including chemical-resistant clothing and gloves, boots, face shields, dust masks, cartridge respirators, air masks and self-contained breathing apparatus are kept available and must be used when needed. All personnel are trained to avoid undue exposure to hazardous wastes or chemicals.

Refer to Figure F9 for an outline of appropriate protective equipment for hazardous waste operations.

F-5a: PRECAUTIONS TO PREVENT IGNITION OR REACTION OF IGNITABLE OR REACTIVE WASTES (703.183(i), 724.117(a))

The hazardous waste storage area is outdoors, and signs are posted on all four sides of its perimeter fence to indicate that no smoking, matches or open lights are allowed in the vicinity. No cutting, welding or use of equipment that may expose ignitable or reactive waste to ignition sources will be allowed in the storage area, unless all ignitable and reactive wastes have been removed.

Waste at accumulation points is protected by facility policy against smoking in any area except offices, halls, lounges or lunchrooms. Also, the research facility upholds a policy that hot-work permits must be obtained before any cutting or welding is begun in any part of the facility.

F-5b: GENERAL PRECAUTIONS FOR HANDLING IGNITABLE OR REACTIVE WASTE AND MIXING OF INCOMPATIBLE WASTE (703.183(i), 724.117(b))

Because hazardous wastes are stored only in the hazardous waste storage area in closed drums, the only danger other than ignition/reaction hazards covered in Section F-5a would be a possibility that incompatible wastes may be combined during addition of waste to satellite accumulation containers.

The wide variety of reagents handled on a small scale in the research laboratory has prompted adoption of the waste segregation procedures outlined in Section H of this permit application. All laboratory and pilot plant employees are instructed to categorize their waste into the following segregation categories, seeking help from their supervisor and/or the Environmental Engineer when needed:

1. Nonhazardous waste, liquid, organic base mixtures
2. Nonhazardous waste, liquid, organic acid mixtures
3. Hazardous waste, ignitable solvent/org. base mixtures
4. Hazardous waste, ignitable solvent/org. acid mixtures
5. Hazardous waste, mixture of halogenated solvents
6. Nonhazardous solid waste
7. Other wastes that are, or may be, hazardous

Accumulation containers are designated for each of the first five categories above. Other wastes are assigned to containers on a case-by-case basis to ensure proper segregation. As an added precaution, the liquid laboratory wastes in the first five categories above are accumulated in safety cans with flash arrestors.

Reactive wastes are not normally generated in the research facility. If a small container of excess reagent becomes a reactive waste, it will be disposed of as a lab pack item, and will not be added to other accumulation containers. If a larger

quantity of reactive waste is generated, proper storage conditions will be determined. If required conditions preclude outdoor storage, safe (satellite) accumulation conditions and containers will be provided. Disposal will be arranged as quickly as permits, manifests and disposal contracts are complete.

F-5c: MANAGEMENT OF IGNITABLE OR REACTIVE WASTES IN CONTAINERS (703.201(c), 724.276)

Figure F8 indicates the location of the hazardous waste storage area. The nearest property line is the west border. The south third of the storage area will be used for storage of ignitable waste. The small amount of reactive waste (100 lbs.) included in Part A of this permit application will be stored on its own spill tray pallet along the east side of the storage area. The spill tray pallet is an HDPE tray with a well of capacity of 85 gallons. The separation scheme for these waste types is included in Figure F10.

The northwest corner of the storage area is closest to the property line, which is 50 feet away at that point. Therefore, the ignitable and reactive wastes will always be more than 50 feet from any property line.

F-5d: MANAGEMENT OF INCOMPATIBLE WASTES IN CONTAINERS (703.201(d), 724.277)

In addition to the precautions regarding segregation of waste as described in Section F-5b, containers such as drums will not be re-used for accumulation or storage of wastes.

As described in Section F-5c, reactive waste will be stored only on its own containment tray. Any liquid accumulated in this tray would be removed via portable air-operated pump for proper disposal. Any other potentially incompatible wastes, such as a strong acid, strong base, oxidizer or poison cannot be stored in the hazardous waste storage area at the same time as their incompatible waste types, unless the incompatible quantity is small enough to store on its own spill tray (i.e. one drum).

F-5e: MANAGEMENT OF IGNITABLE OR REACTIVE WASTES IN TANKS (703.202(f), 724.298)

No hazardous wastes are stored in tanks in this facility.

F-5f: MANAGEMENT OF INCOMPATIBLE WASTES IN TANK SYSTEMS (703.202(f), 724.299)

No hazardous wastes are stored in tanks in this facility.

F-5g: MANAGEMENT OF IGNITABLE OR REACTIVE WASTES PLACED IN WASTE PILES (703.204(f))

No waste pile activities are conducted in this facility.

F-5h: MANAGEMENT OF INCOMPATIBLE WASTES PLACED IN WASTE PILES (703.204(g))

No waste pile activities are conducted in this facility.

F-5i: MANAGEMENT OF IGNITABLE OR REACTIVE WASTES PLACED IN SURFACE IMPOUNDMENTS (703.203(g). 724.329)

No surface impoundment activities are conducted in this facility.

F-5j: MANAGEMENT OF INCOMPATIBLE WASTES PLACED IN SURFACE IMPOUNDMENTS (703.203(h), 724.329)

No surface impoundment activities are conducted in this facility.

F-5k: MANAGEMENT OF IGNITABLE OR REACTIVE WASTES PLACED IN LANDFILLS (703.207(f), 724.412)

No landfill activities are conducted in this facility.

F-5l: MANAGEMENT OF INCOMPATIBLE WASTES PLACED IN LANDFILLS (703.207(g), 724.413)

No landfill activities are conducted in this facility.

F-5m: MANAGEMENT OF IGNITABLE OR REACTIVE WASTES PLACED IN LAND TREATMENT UNITS (703.206(g), 724.381)

No land treatment activities are conducted in this facility.

F-5n: MANAGEMENT OF INCOMPATIBLE WASTES PLACED IN LAND TREATMENT UNITS (703.206(h), 724.381)

No land treatment activities are conducted in this facility.

Figure F1

Outer Perimeter Fence
and Entrances &
(Inner) Storage Area Perimet
Fence

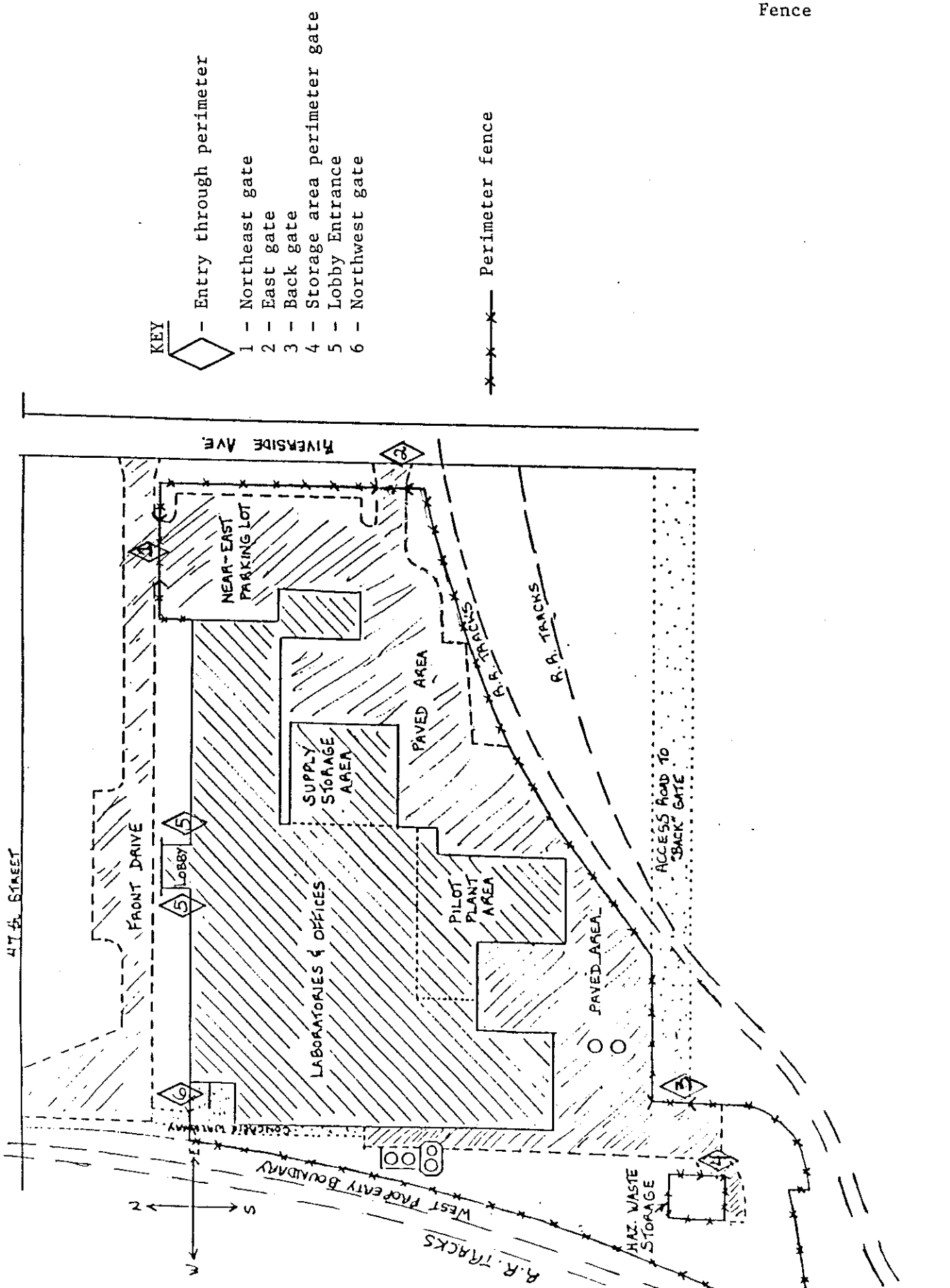


FIGURE F2

SCHEDULE OF INSPECTION ITEMS FOR HAZARDOUS WASTE STORAGE AREA

Item	Types of Problems	Inspection Frequency
Storage Containers (Drums)	corrosion, leaks, inadequate labels, inadequate aisle space, missing or extra container	Weekly
Concrete Pad	cracks, deterioration, stains	Weekly
Dike	cracks, deterioration	Weekly
Fence	corrosion, damage	Weekly
Gate & Lock	corrosion, damage, not locked	Weekly
Warning Signs	deterioration, missing	Weekly
Sump Pump	inoperative, damage, leak in piping	Weekly
Water Source (for cleanup)	inoperative, frozen	Weekly
Fire Extinguisher	loss of pressure, missing	Weekly
Spill Adsorbents	inventory low, damage	Weekly
Access Road	obstructions, damage	Weekly
Loading Route	pavement erosion, potholes,evidence of leaks or spills of waste	Daily (when in use)

Figure F3

HAZARDOUS WASTE STORAGE CHECKLIST

Complete both pages and attach inventory list

Date: _____

Time: _____

Inspector: (Name) _____

Title: _____

Signature: _____

Inspected Item	Check For	Status OK	Status NOT	Problem
Containers	Corrosion, leak inadequate label, no aisle space, missing or extra container			
Concrete Base	Cracks, stains deterioration			
Dike	Cracks, erosion			
Fence	Corrosion, damage			
Gate & Lock	Corrosion, damage not locked			
Warning Signs	Deterioration, missing sign			
Sump Pump	Inoperative, frozen			
Fire Extinguisher	Low pressure, missing			
Spill Adsorbents	Inventory low, damage			
Access Road	Obstructions, damage			

If any problems were found during inspection, provide details of corrective action on next page of this form.

Figure F4

DESCRIPTION OF CORRECTIVE ACTION

Item or Container To Be Repaired	Corrective Action	Start and End Dates Times of Work

FIGURE F5

SCHEDULE OF GENERAL SITE SAFETY EQUIPMENT INSPECTIONS

Item	Types of Problems	Inspection Frequency
Fire Alarm System	inoperative	Quarterly
Paging System	inoperative	(used daily)
Sprinkler System	inoperative, leak	Quarterly
Fire Extinguishers	pressure low	Quarterly
Fire Hydrants, Water Cannons	inoperative, damage	Quarterly
Emergency Lights	inoperative, battery failure	Quarterly
Self-Contained Breathing Apparatus	pressure low, damage	Quarterly
Type N Gas Masks	cartridge expired, damage	Quarterly
Safety Showers, Eye Washes	low pressure, leak, needs flushing	Quarterly
Spill Adsorbents	inventory low, missing	Quarterly
Protective Equipment (respirators, gloves, coveralls, face shields, etc.)	inventory low, missing	Quarterly
First Aid Supplies	inventory low, missing, expired items	Quarterly
Perimeter Fence	corrosion, damage	Quarterly
Electronic Door Locks	inoperative	(used daily)

Figure F6

Locations of Fire Hydrai
and Water Cannons

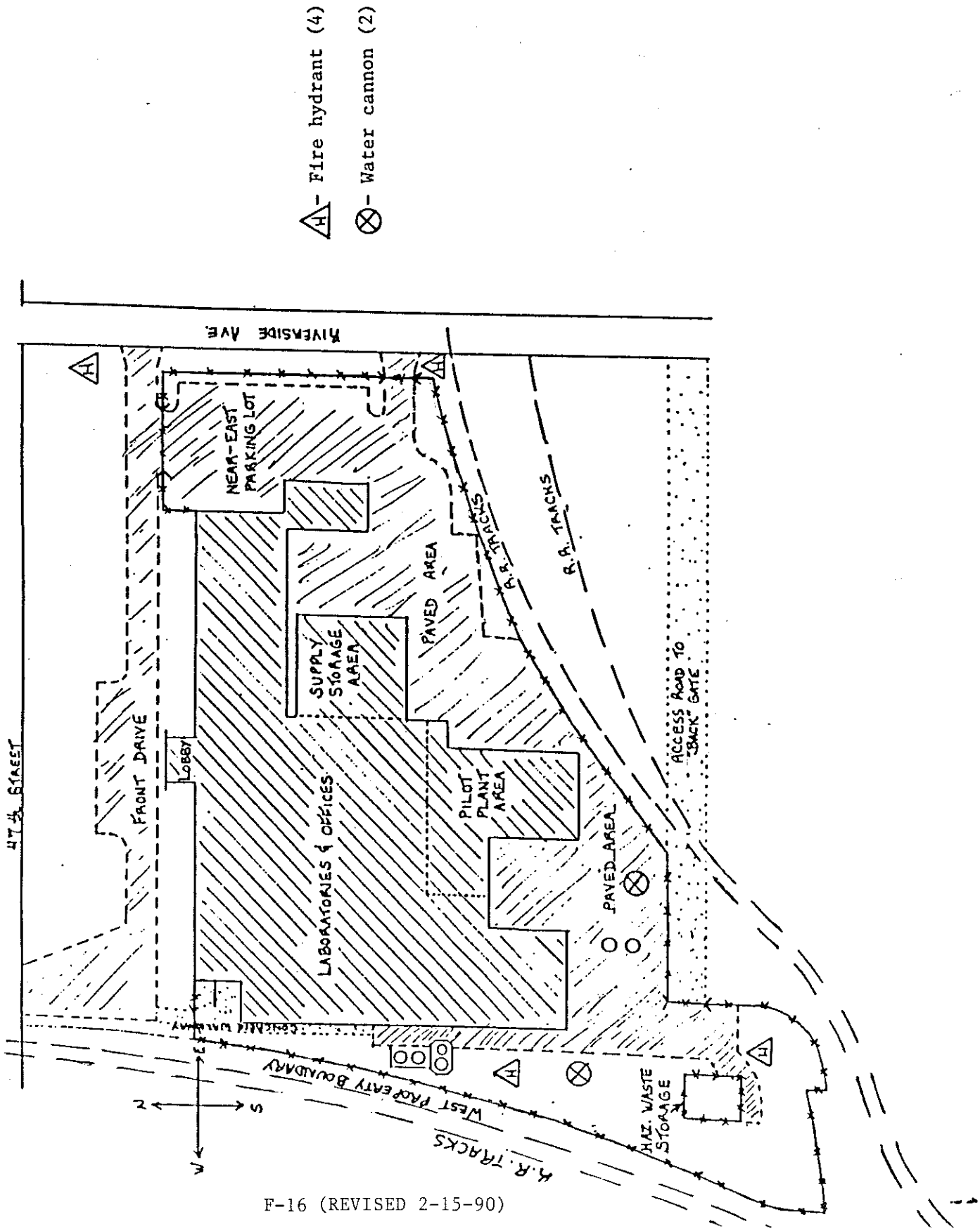


Figure F7

Access to Hazardous Wast Storage Area and Site in General

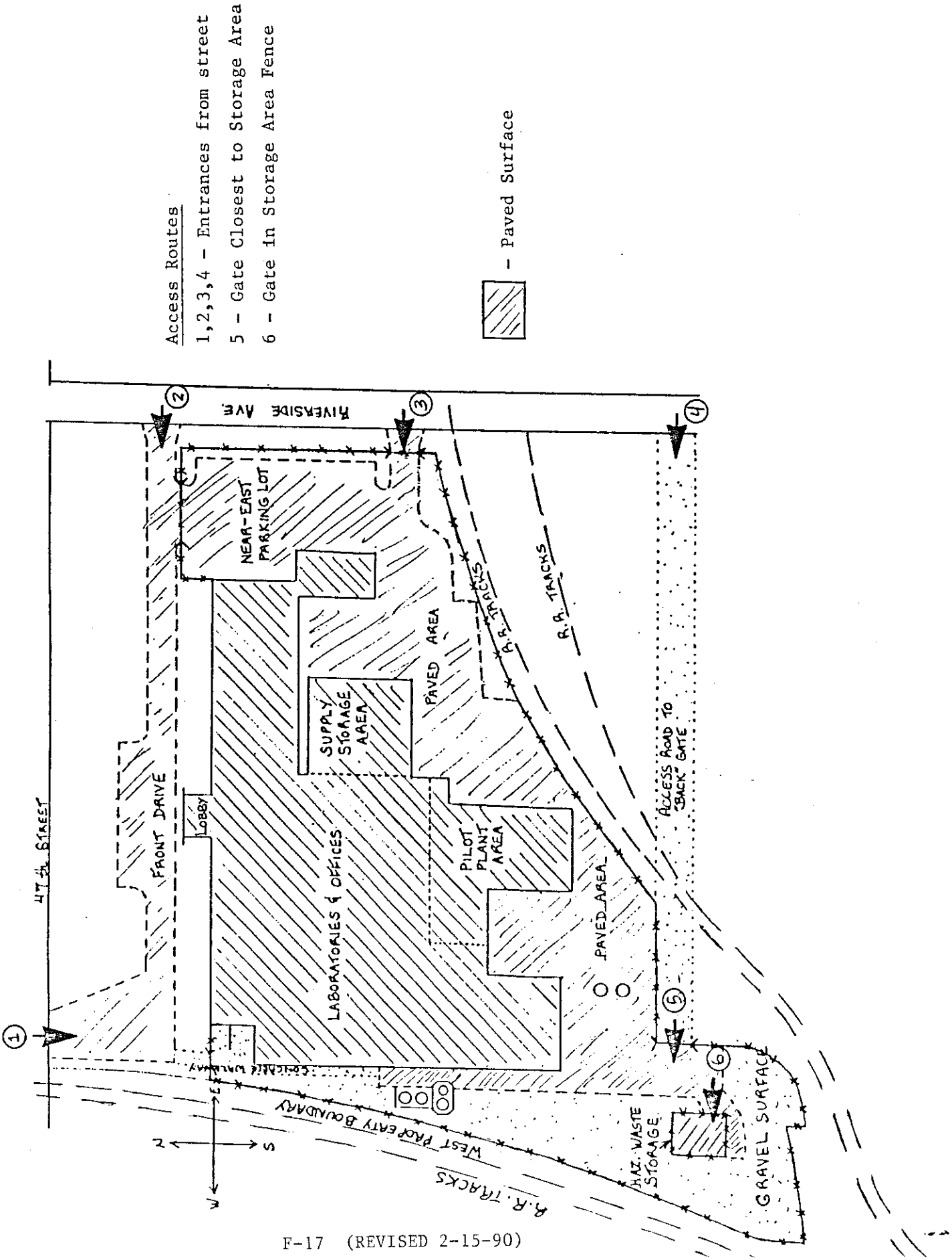
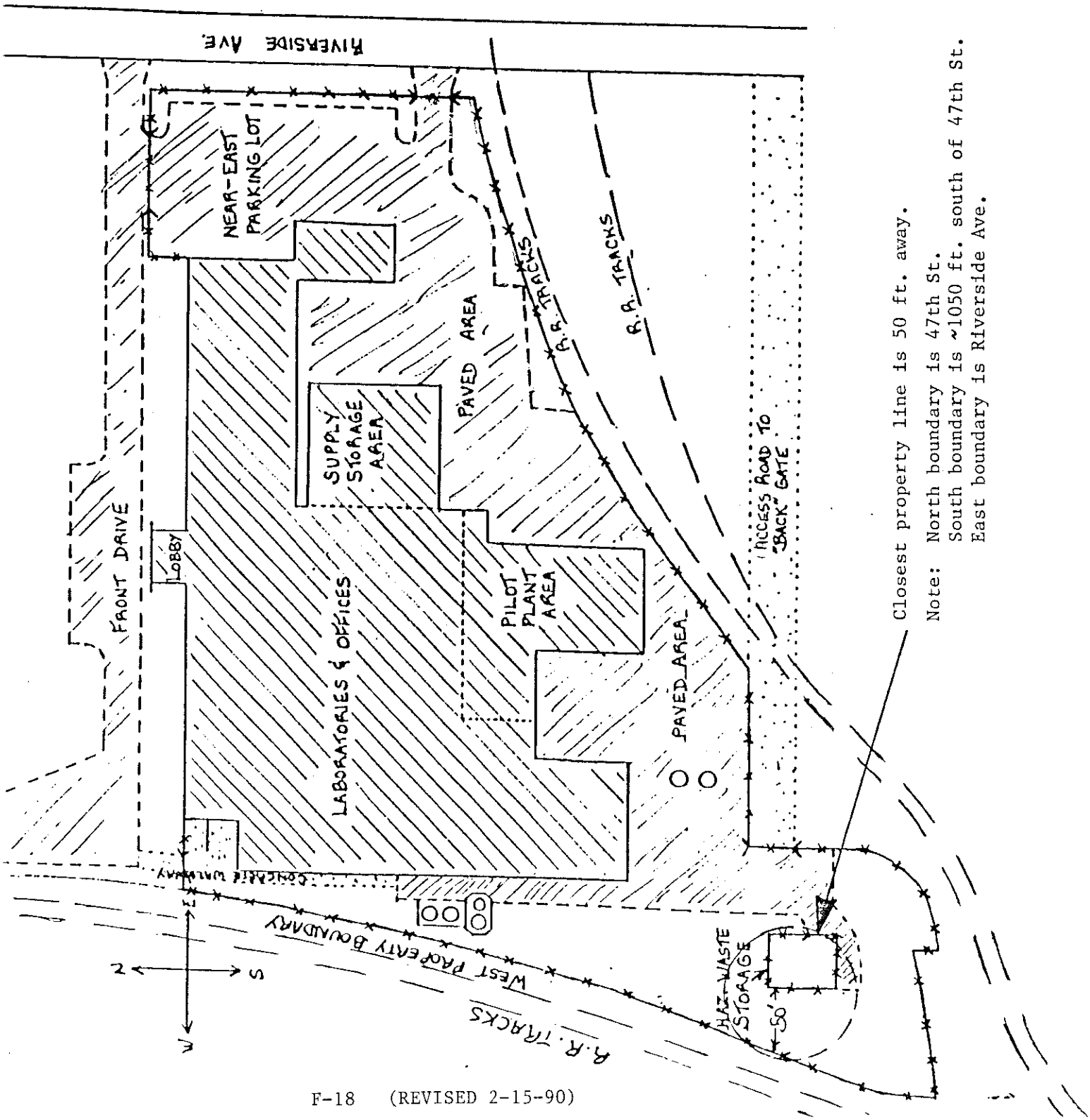


Figure F8

Relative Location of
Hazardous Waste Stora



Closest property line is 50 ft. away.

Note: North boundary is 47th St.
South boundary is ~1050 ft. south of 47th St.
East boundary is Riverside Ave.

FIGURE F 9

Personnel Protective Equipment for Hazardous Waste-Related Tasks

TASK	Basic Equipment: Hardhat, Safety Glasses, Safety Shoes, Chem Resist Gloves	Respirator: Cartridge	Respirator: Air Supplied	Clothing: Chem Resist Apron	Clothing: Saranex Coverall	Clothing: Chemrel Coverall
1. Routine inspection of storage area and on-site transport routes	(X)	Carry	---	---	---	---
2. Move Drum Into Storage	(X)	Carry	---	---	---	---
3. Add Waste to Accumulation Drum	(X)	*	*	*	*	*
4. Sample Waste	(X)	*	*	*	*	*
5. Load Drums onto Transport vehicle	(X)	Carry	---	---	---	---
6. Assess or Contain Uncharacterized Spill or Release	(X)	---	(X)	---	---	(X)
7. Contain or Clean-up Characterized Spill or Release	(X)	*	*	---	*	*

* Notes: Appropriate type respirator and coverall for some tasks is highly dependent on chemical composition of waste and quantity released to air during task. Half-mask cartridge respirator and apron are only for small-quantity tasks with wastes of lower toxicity.

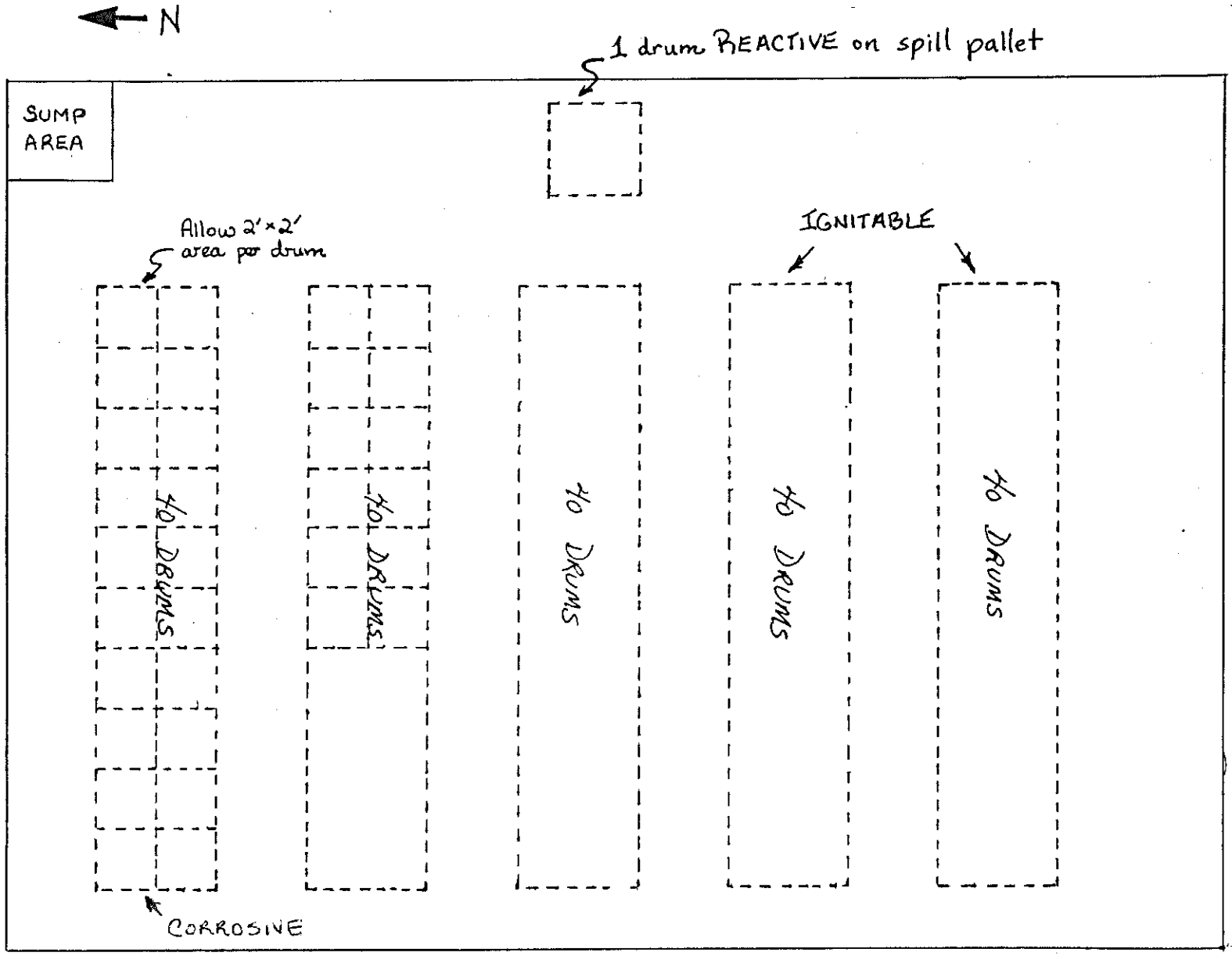


Figure F10 - Segregation Scheme

APPENDIX F1

Inspection Log Sheets

HAZARDOUS WASTE SHIPMENT

DRUM LOADING ROUTE INSPECTION

Inspector Name _____ Shipment Date _____

Signature _____ Loading Start Time _____

Title _____ End Time _____

Manifest No. _____

Total No. Drums _____

Check For:	Problems:	Status: Before Loading OK/Not	Status: After Loading OK/Not
Pavement Erosion			
Potholes			
Evidence of Spill or Leak			

Weather Conditions:

Other Comments: (Record any unusual incidents that occurred during loading, such as leaking drum)

Quarterly Inspection - Fire Response Equipment

Date: _____

Inspector Name: _____

Signature: _____

Inspected Item	Check for	Status OK/Not	Problem
Fire Alarm System	inoperative		
Fire Hydrant #1 (NE driveway)	Inoperative, damaged, obstructed access		
Fire Hydrant #2 (SE driveway)			
Fire Hydrant #3 (RCRA pad area)			
Fire Hydrant #4 (W of paper wing)			
Water Cannon #1 (W of paper wing)	inoperative damaged, obstructed access		
Water Canon #2 (S of pilot plant)			

Complete form and distribute:
Original: Building Supervisor, Copies: Safety Manager, Environmental Engineer

Quarterly Inspection - Spill Response Equipment

Date: _____

Inspector Name: _____

Signature: _____

Location	Item	Inventory	Restock? Y/N
Pilot Plant Spill Cage			
	Chemrel coveralls		
	Saranex coveralls		
	Sol-Vex gloves		
	Neoprene gloves		
	Plastic shovels		
	Plastic squeegees		
	Broom		
	Barricade Tape		
	Spill Sign		
	Battery Lanterns		
	Hazorb		
	Granular Carbon		
	Clay Adsorbents		
	Bicarbonate		
	Neutrasorb		
	Neutracit		
	Citric Acid		
	pH Paper		
	Pigs		
	Pillows		
	Disposal Bags		
	Duct Tape		
RCRA Storage			
	Pigs		
	Pillows		
	Saranex Coveralls		
	Neoprene Gloves		
	Clay Adsorbents		
	Scoop		
	Disposal Bags		
Storeroom Loft			
	Saranex Coveralls		

Complete form and distribute:
Original: Environmental Engineer, Copies: Safety Manager, Spill Team Chairman

Quarterly Inspection - Misc. Protective Equipment

Date: _____

Inspector Name: _____

Signature: _____

Item	Inventory	Restock? Y/N
North Respirators		
MSA Respirators		
Respirator detergent		
OVA cartridge - North		
OVA cartridge - MSA		
Ammonia cartridge - North		
Ammonia cartridge - MSA		
Particulates cartridge - North		
Particulates cartridge - MSA		
Neoprene gloves		
Sol-Vex gloves		
Rubber apron		
Saranex lab coat		
Face shields		
Ear muffs		

Quarterly Inspection - Emergency Response Respirators

Date: _____

Inspector Name: _____

Signature: _____

Inspected Item	Check for	Status OK/Not	Problem
SCBA's:	Pressure low, low-supply alarm inoperative, mask assembly damaged or dirty.		
#1 - Pilot Plant Entrance			
#2 - Pilot Plant Entrance			
#3 - Outside high Pressure Lab			
Type N Gas Masks:	Cartridge expired, mask assembly damaged or dirty, spare cartridge missing		
#1 - Pilot Plant Entrance			
#2 - Outside High Pressure Lab			
#3 - Outside Room 13			
#4 - P.P. Room 44 Spill Supplies			
#5 - P.P. Room 44 Spill Supplies			

Complete form and distribute:
Original: Building Supervisor, Copies: Safety Manager, Environmental Engineer

QUARTERLY INSPECTION - SAFETY EQUIPMENT

Dates _____ - _____
Inspector Name: _____
Signature: _____

Complete all pages and distribute copies:
Original - Bldg. Supervisor, Copies - Safety Mgr., Env. Engr.

Inspection Points/Problems to Note: Fire Extinguishers - weight low, pressure gauge low, wall bracket loose, obstructed access
Safety Shower - inoperative, obstructed access
Eyewash - dirty, uneven flow, obstructed access
Sprinklers - obstructed, system pressure low
Emergency Lights - obstructed, battery failure

√ = okay
P = problem
- = none installed

Room No.	Fire Extinguishers CO2	Fire Extinguishers Dry	Fire Extinguishers Halon	Safety Shower	Sprinklers	Emer. Lights	Problem(s) Noted (Describe)
1	(5)	---	---				
2	(2)	(2)	---				
3	(2)	(1)	---				
4	(1)	(1)	---				
5	(1)	---	---				
8	(1)	(1)	---				
9	(2)	(2)	---				
10	(2)	(3)	---				
11	(1)	(1)	---				
12a	(1)	---	---				
13	(2)	(1)	---				
21	---	(1)	(1)				
25	---	(1)	(1)				

QUARTERLY INSPECTION - SAFETY EQUIPMENT

Room No.	Fire Extinguishers CO2	Fire Extinguishers Dry	Fire Extinguishers Halon	Safety Shower	Sprinklers	Emer. Lights	Problem(s) Noted (Describe)
29	(1)	(1)	(1)				
30	(2)	(2)	(1)				
37	(1)	---	(1)				
PP 44	---	(2)	---				
PP 47	(2)	(3)	---				
48	(1)	(1)	---				
49	(1)	---	---				
50	(1)	---	---				
50a	(1)	---	---				
66	(1)	(1)	---				
68	(1)	(1)	---				
69	(1)	(1)	---				
70	(1)	---	---				
102	(2)	(2)	---				
104	---	(1)	(1)				
106	(1)	---	---				
108	(1)	(1)	---				
110	(1)	---	(1)				
112	(3)	(2)	---				
115	---	(1)	---				

QUARTERLY INSPECTION - SAFETY EQUIPMENT

Room No.	Fire Extinguishers CO2	Fire Extinguishers Dry	Fire Extinguishers Halon	Safety Shower	Sprinklers	Emer. Lights	Problem(s) Noted (Describe)
117	(2)	(2)	---				
121	(2)	(2)	---				
127	(2)	---	---				
128	(1)	---	---				
129	(2)	(2)	---				
131	(1)	---	---				
135	(1)	---	(1)				
136	(1)	---	---				
137	(1)	---	---				
142	---	(1)	---				
143	(1)	---	---				
143a	---	(1)	---				
201	(1)	---	---				
205	(4)	(2)	---				
302	(3)	---	---				
H-60*	(1)	(1)	---				
H-65*	---	(1)	---				
H-70*	---	(1)	---				
H-201*	---	(1)	---				
H-203*	(2)	---	---				

QUARTERLY INSPECTION - SAFETY EQUIPMENT

Room No.	Fire Extinguishers CO2	Fire Extinguishers Dry	Fire Extinguishers Halon	Safety Shower	Sprinklers	Emer. Lights	Problem(s) Noted (Describe)
Mezzanine	(1)	(3)	---				

* Indicates hallway outside room number

SECTION G

CONTINGENCY PLAN

The information contained in this section is submitted in accordance with the requirements for a Contingency Plan, as contained in 35 IAC Sections 703.183(g), 724.150 through 724.156, and 724.152(b).

G-1: GENERAL INFORMATION

This contingency plan is for the Akzo Chemicals Inc. Research facility located at 8401 West 47th Street, McCook, Illinois 60525. The facility consists of a research laboratory and pilot plant, employing approximately 110-120 persons. The purpose of this facility is to conduct research and development, and provide technical support for the various business groups within the Akzo corporation.

In general, the research laboratory handles small volumes of chemicals, usually less than one gallon in quantity, under carefully controlled conditions. The pilot plant handles larger quantities of chemicals, also under carefully controlled conditions. The employees are highly trained professionals, usually Ph.D. chemists, other degreed chemists or chemical engineers. The laboratory is equipped with proper safety and environmental equipment, to protect the employees and the surrounding community from chemical hazards.

The laboratory and pilot plant carry out a thorough safety and environmental plan, which includes regular inspections, fire drills, air monitoring, safety and waste handling training, first aid training, CPR training, etc.

A site plan of the facility is shown in Figure G1.

G-2: EMERGENCY COORDINATORS (724.152(d), 724.155)

If an emergency situation develops in the facility, the person discovering the emergency will first take appropriate immediate action:

Type of Emergency	Appropriate Immediate Action
Small Fire Without Injury (confined to small area such as hood)	Use nearest fire extinguisher to attempt to put out fire. If this fails, pull nearest fire alarm.
Small Explosion Without Injury (confined to small area such as hood)	Inform everyone in immediate vicinity of nature of explosion. Isolate area where debris may be present. Contact Spill Team if needed.
Large Fire or Explosion	Pull nearest fire alarm.
Small Spill (1 gal. or less)	Notify everyone in immediate vicinity of nature of spill. Contain spill if safe to do so. Contact Spill Team if needed.
Large Spill or Any Spill That Creates Immediate Exposure Hazard	Evacuate immediate area. Use paging system to announce nature and location of spill.
Release of Hazardous Chemical to Air	Evacuate immediate area. Use paging system to announce nature and origin of release.
Medical Emergency	Use paging system to announce need for first aid person.

After taking appropriate immediate action, the person who discovered the emergency must contact the Primary Emergency Coordinator. If the Primary Emergency Coordinator is not available, the Alternate Emergency Coordinators should be called (in the order listed) until one is reached.

The Emergency Coordinator will immediately determine necessary actions to protect human health, inside the facility and in the the surrounding community, and and to minimize risk to the environment.

Primary Emergency Coordinator:

Moneeb Zakaria, Environmental and Regulatory Affairs Mgr - McCook
1023 Longmeadow Lane
Western Springs, IL 60558
Office Phone: (708)442-7100 ext.284
Home Phone: (708)246-8259

Alternate Emergency Coordinators:

Madelyn Ashum-Johnson, Environmental Engineer
376 Oak Street
DesPlaines, IL 60016
Office Phone: (708)442-7100 ext.366
Home Phone: (708)390-0896

Ram Shetty, Research Coordinator
1111 Buttonwood Drive
Westmont, IL 60559
Office Phone: (708)442-7100 ext.260
Home Phone: (708)964-2388

Spence Line, Building Supervisor
2221 Wharf Drive
Woodridge, IL 60517
Office Phone: (708)442-7100 ext.205
Home Phone: (708)985-9130

The Primary Emergency Coordinator, and the other Emergency Coordinators in his absence, have complete authority to commit all resources of the company in the event of an emergency.

G-3: IMPLEMENTATION OF THE CONTINGENCY PLAN (724.152(a), 724.156(d))

The provisions of this Contingency Plan must be carried out immediately whenever there is a fire, explosion, or release of hazardous waste or hazardous waste constituents which could threaten human health or the environment. The Emergency Coordinator must make the decision to implement the Contingency Plan. The purpose of this section is to provide appropriate decision-making criteria to the Emergency Coordinator.

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 off-site 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 result in the release of hazardous chemicals.

   g. An explosion has occurred.

2. Spill or Chemical 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 can be contained onsite, but the potential exists for groundwater contamination.

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

G-4: EMERGENCY RESPONSE PROCEDURES

G-4a: NOTIFICATION (724.156(a))

If an emergency situation develops in the facility, the person discovering the emergency will first take appropriate immediate action:

Type of Emergency	Appropriate Immediate Action
Small Fire Without Injury (confined to small area such as hood)	Use nearest fire extinguisher to attempt to put out fire. If this fails, pull nearest fire alarm.
Small Explosion Without Injury (confined to small area such as hood)	Inform everyone in immediate vicinity of nature of explosion. Isolate area where debris may be present. Contact Spill Team if needed.
Large Fire or Explosion	Pull nearest fire alarm.
Small Spill (1 gal. or less)	Notify everyone in immediate vicinity of nature of spill. Contain spill if safe to do so. Contact Spill Team if needed.
Large Spill or Any Spill That Creates Immediate Exposure Hazard	Evacuate immediate area. Use paging system to announce nature and location of spill.
Release of Hazardous Chemical to Air	Evacuate immediate area. Use paging system to announce nature and origin of release.
Medical Emergency	Use paging system to announce need for first aid person.

After taking appropriate immediate action, the person who discovered the emergency must contact the Primary Emergency Coordinator. If the Primary Emergency Coordinator is not available, the Alternate Emergency Coordinators should be called (in the order listed) until one is reached.

Primary Emergency Coordinator:

Moneeb Zakaria, Environmental and Regulatory Affairs Mgr.- McCook
1023 Longmeadow Lane
Western Springs, IL 60558
Office Phone: (708)442-7100 ext.284
Home Phone: (708)246-8259

Alternate Emergency Coordinators:

Madelyn Ashum-Johnson, Environmental Engineer
376 Oak Street
DesPlaines, IL 60016
Office Phone: (708)442-7100 ext.366
Home Phone: (708)390-0896

Ram Shetty, Research Coordinator
1111 Buttonwood Drive
Westmont, IL 60559
Office Phone: (708)442-7100 ext.260
Home Phone: (708)964-2388

Spence Line, Building Supervisor
2221 Wharf Drive
Woodridge, IL 60517
Office Phone: (708)442-7100 ext.205
Home Phone: (708)985-9130

The Emergency Coordinator will then assume responsibility for supervising response actions and implementation of the Contingency Plan. Efforts to reach the Primary Emergency Coordinator will continue unless impractical.

In case of fire, explosion, natural disaster or chemical spill involving flammable materials, the Emergency Coordinator will immediately call the McCook Fire Department and Police Department:

McCook Fire Department	447-1235
McCook Police Department	447-1231

The caller will notify these departments if an ambulance is needed.

If an emergency requires implementation of the contingency plan, the Research Director and administration manager must also be notified immediately:

Dr. James Richmond
Chemical Research Manager
Office Phone: (708) 442-7100 ext. 315
Home Phone: (815) 436-5379

Dr. Tim Davis
Research Administration Manager
Office Phone: (708) 442-7100 ext. 263
Home Phone: (708) 325-7223

Additional notification required for special types of incidents is included in Section G-4c Assessment.

G-4b: Identification of Hazardous Materials (724.156(b))

The Emergency Coordinator will immediately identify the nature, exact source, amount and areal extent of the release or emergency. To determine which hazardous materials are involved in the

incident, the Emergency Coordinator will use information from persons reporting the incident and from labels on containers in the incident area. Unidentified spills will be sampled for analysis. Explosive gas detectors will be used if appropriate.

If hazardous chemicals may be involved in, or threatened by, the emergency situation, the Emergency Coordinator must put in a call to the Environmental Engineer for technical assistance. Also, the Emergency Coordinator will decide whom should be notified of the following persons:

Chairman, Special Hazards Committee	Dr. Fred Gadberry Office Phone: (708)442-7100 ext. 266
Section Head, Product and Process Research	Dr. Ken Visek Office Phone: (708)442-7100 ext. 293

Appendix GIV contains a list of hazardous chemicals that are typically stored on-site. Also listed are the amounts typically stored and the Reportable Quantity for each chemical. Reportable Quantity values are explained in Section G-4c Assessment.

G-4c: ASSESSMENT (724.156(c) and (d))

The Emergency Coordinator will assess possible hazards to human health and the environment, both inside and outside the facility boundaries.

Hazard assessment guidelines for fire, explosion, spill and release incidents are presented in Figures G2 and G3. Detailed information related to assessment and notification, such as detailed initial assessment procedures, phone numbers and required content for reports, is contained in Appendices GI, GII and GIII.

Evacuation

If evacuation of the facility is advisable, the Emergency Coordinator will use the paging system (dial 60) to instruct everyone to evacuate. The evacuation announcement will be of the following general form:

> "Attention. We have a (chemical release, potential release, spill, etc.) in (the pilot plant, Area 1, etc.). Please evacuate the building by the nearest safe exit."
>
> ** Repeat announcement three times **

The facility Evacuation Plan is outlined in section G-7 of this Contingency Plan.

Whenever the facility is evacuated, the McCook Police Department must be notified immediately and given the cause for the evacuation.

If evacuation of the local area surrounding the facility is advisable, the following must be notified:

McCook Police Department	447-1231
Lyons Police Department	447-1225
Illinois Emergency Services and Disaster Agency	(217) 782-7860
McCook Plant Guardhouse	77-203

Release Assessment and Notification

If the emergency is a spill or release, the Emergency Coordinator must determine whether notification of any local, state or federal agencies is required. The procedure for determining this is outlined in Figure G4.

If a Reportable Quantity of a (CERCLA) Hazardous Substance* has been released, the following must be notified, whether or not the release migrates beyond facility boundaries:

National Response Center	(800) 424-8802
Illinois Emergency Services and Disaster Agency	(217) 782-7860

Notification of the National Response Center must include certain information regarding the incident. Refer to Appendix GII.

If a Reportable Quantity of a (CERCLA) Hazardous Substance or a (SARA) Extremely Hazardous Substancee** has been released and has migrated beyond facility boundaries, the following must be notified:

Cook County Emergency Services and Disaster Agency	865-4766 or 865-4755
McCook Fire Department	447-1235

Note that for (CERCLA) Hazardous Substances this is additional notification. The NRC and IESDA must still be called.

Notification of the CCESDA and local fire department must include certain information regarding the incident, and entails written followup reports. Refer to Appendix GII.

* - (CERCLA) Hazardous Substances and their Reportable Quantities are listed in Table 302.4 of 40 CFR Part 302.
**- (SARA) Extremely Hazardous Substances and their Reportable Quantities are listed in Appendices A & B of 40 CFR Part 355.

If a spill may enter the sanitary sewer system, either directly or indirectly, the following must be notified:

Metropolitan Sanitary District	751-5600
Illinois EPA - Division of Water Pollution Control	345-9780

The following corporate personnel will be contacted to assist in assessing hazards to human health and/or the environment, and to assist in determining necessary response and control actions to be taken:

Charles Donahue, Corporate Director of Regulatory Affairs
Office Phone: (312) 906-7645
Home Phone: (312) 642-4709

George Rotter, Corporate Director of Safety and Health
Office Phone: (312) 906-7662
Home Phone: (708) 352-0940

Mariam Tehrani, Corporate Manager of Environmental Affairs
Office Phone: (312) 906-7616
Home Phone: (708) 898-4456

Mary Thompson, Corporate Industrial Hygiene Manager
Office Phone: (312) 906-7759
Home Phone: (708) 682-0259

Helpful Outside Contacts

If additional outside help is needed in assessment of hazards or determination of response procedures, the following contacts may be useful:

CHEMTREC
(Hotline for information on proper handling of chemicals in emergencies such as spills, fires, etc)
Phone: (800) 424-9300

LaGrange Immediate Family Care Clinic
(Open 8:00 AM to 8:00 PM, 365 days a year)
Phone: (708) 354-3000

LaGrange Memorial Hospital
(For hours outside clinic hours)
Phone: (708) 352-1200

Hinsdale Hospital
Poison Control Center
Phone: (708) 887-2600

Intra-Company and Followup Reporting

In the event of any chemical release incident, the Corporate Manager of Environmental Affairs must be notified as soon as possible. This is done to assure that proper notification and procedures were followed, and to pre-screen possible "substantial risk" incidents on behalf of the Central TSCA Committee. The summary of guidelines for contacting the Corporate Manager of Environmental Affairs is as follows:

Situation	Action
Emergency Coordinator is sure that incident is reportable, either through CWA, RCRA, Superfund, TSCA or SARA requirements.	Contact National Response Center and then Corporate Manager of Environmental Affairs as soon as it is practical.
Emergency Coordinator is unsure that incident is reportable.	Contact Corporate Manager of Environmental Affairs. Contact National Response Center if so advised.
Emergency Coordinator has decided that incident is definitely not reportable.	Contact Corporate Manager of Environmental Affairs within 48 hours, for proper review and logging.

In addition to the notification procedures described above, the Emergency Coordinator must maintain a log/record of the incident, and must complete all necessary followup reports to appropriate company personnel and local, state and federal agencies. Required content for the log is outlined in Appendix GII. Followup reporting requirements are outlined in Appendix GIII.

Followup reporting includes completion of an intra-company report on the Unusual Incident Report form, for any injury, fire, explosion, spill or release incident. A sample of this form and its distribution list are explained in Appendix GIII. The report must be completed within 48 hours of the incident.

G-4d: CONTROL PROCEDURES (724.152(a))

Control procedures are outlined in this section for the three major categories of emergency situations:

1. Fire and/or Explosion
2. Spill or Release
3. Flood

1. Fire and/or Explosion

Unless a fire or explosion is so small (confined to one type of flammable material or one vessel, in a small area such as a hood) that it is readily extinguished and does not present an immediate exposure hazard to personnel, all of the following actions must be taken to minimize risk to human health and the environment. Priorities are listed in order.

a. Take necessary action to assist and protect any injured or trapped persons.

b. Pull nearest fire alarm. This will automatically notify McCook Fire Department.
Call for ambulance if needed.

c. If it is within the capabilities of facility personnel to help contain or extingush the fire, persons nearest to affected area (including fire marshals reporting to alarm) will use fire extinguishers to attempt to extinguish fire until fire department personnel arrive.

d. Complete emergency shutdown procedures.

e. Contact Emergency Coordinator* if none has responded to alarm. Emergency Coordinator will assess the emergency situation in accordance with Sections G-4b and G-4c of this Contingency Plan.

* - Note for emergency response during night shifts - If a fire or explosion occurs during an off-shift (4 p.m.-8 a.m.) where a limited number of personnel are available, there will be a change in the notification procedure. At the point when the Emergency Coordinator is contacted, it may be necessary to use an interim Emergency Coordinator until the person contacted arrives at the facility, as follows:

In the rare case that no Emergency Coordinator can be readily contacted, or if the only Emergency Coordinator that can be contacted feels that supervisory staff is needed before he/she can get to the site, contact the Akzo McCook Plant* guardhouse and ask for the senior shift supervisor. The senior shift supervisor may act as an interim Emergency Coordinator until one arrives.

f. Clear the emergency area of all persons not actively involved in fighting the fire. Everyone who has evacuated the building must report to the Headcount Station. (Refer to Evacuation Plan outlined in Section G-7 of this Contingency Plan.)
Fire marshals will also evacuate if instructed to do so by local fire department or by Emergency Coordinator.

g. Inform everyone involved in firefighting effort of any hazardous materials in emergency area. Indicate whether the materials are flammable, toxic, etc.

h. If an explosion has occurred and no fires or toxic fumes are present, isolate affected area and check for damage to equipment and to containers of hazardous materials. Inform everyone involved in investigation of any hazardous material that may have been spilled as a result of the explosion, i.e. if debris may be contaminated.

i. Prevent unauthorized persons from entering the facility.

The laboratory, pilot plant and container storage area can be accessed by emergency vehicles via the routes illustrated in Figure G5. These access routes are kept clear at all times.

Types and locations of firefighting equipment that are available within the facility are indicated in Figures G8a and G8b. Refer to section G-5 of this Contingency Plan for more detail regarding emergency equipment.

During power failures, the following extensions will serve as emergency phones:

Extension	Location
249	Lobby
259	Pilot Plant Control Room
343	Dr. D. Frank (office)
376	Dr. J. Richmond (office)

* - Akzo McCook Plant is adjacent facility to the research facility, at 8201 W. 47th Street.

If the fire alarm has sounded, all personnel who evacuate the facility will remain outside until the Emergency Coordinator gives the "ALL CLEAR" signal.

After the facility has been made safe for re-entry and an "ALL CLEAR" has been given, operations may resume in areas not affected by the emergency. Operations will not resume in any areas where debris remains and/or emergency equipment has not been restored to readiness. Employees must obtain clearance from the Emergency Coordinator to resume work in these affected areas, after cleanup/restoration of equipment is complete.

2. Spill or Release

The following procedures will be used for response to a chemical spill or release, in order to minimize risk to human health and the environment. Priorities are listed in order.

a. Take necessary action to assist and protect any injured persons.

b. If the emergency is a small spill (one gallon or less) that does not release toxic fumes, use the lab spill kit for immediate containment. Contact the Spill Team if needed*. Refer to Figure G6 for Spill Team members.

   If the emergency is a short-lived release (such as release from autoclave or lab reaction vessel) of non-toxic fumes, evacuate immediate area and notify Emergency Coordinator*.

   If the emergency is a large spill or hazardous release, evacuate immediate area. Use paging system (dial 60) to announce nature and location of incident, requesting Emergency Coordinator* to come to caller location.

   * - Note for emergency response during night shifts - In the event that a spill or release occurs during an off-shift (4 p.m. to 8 a.m.), where a limited number of personnel are available, the following changes in procedure will take effect:

     1.) No Spill Team will be available for small spills. Pilot Plant personnel will all be given spill control training to cover small spills.

2.) In case of a large spill or release, evacuate area and use paging system (dial 60) to announce nature and location of incident. Contact an Emergency Coordinator using the information in Section G-2 of this Contingency Plan.

In the rare case that no Emergency Coordinator can be readily contacted, or if the only Emergency Coordinator contacted believes that supervisory staff is needed on the scene before he/she can get to the facility, contact the Akzo McCook Plant* guardhouse and ask for the senior shift supervisor. The senior shift supervisor may act as an interim Emergency Coordinator until one arrives.

3.) If additional manpower is needed to help with immediate emergency response such as spill containment, the Emergency Coordinator may contact the McCook Plant senior shift supervisor.

c. The Emergency Coordinator will assess the situation in accordance with Sections G-4b and G-4c of this Contingency Plan, and will implement any necessary evacuation and notification procedures.
The Evacuation Plan is outlined in Section G-7 of this Contingency Plan.

d. Complete emergency shutdown procedures if safe to do so.

e. If it is necessary to re-enter the hazardous area (to prevent further releases or other secondary hazards), this will only be done if the following conditions are met:

1.) Re-entry will not endanger a person's life if proper protective equipment is used, i.e. there is no imminent danger of a secondary fire or explosion.

2.) Persons re-entering have received clearance from the Emergency Coordinator.

3.) No person enters the hazardous area alone.

4.) The spill or release has been characterized, via knowledge by persons in area or via air sampling.

* - Akzo McCook Plant is adjacent facility to the research facility, at 8201 W. 47th Street.

5.) The re-entry team has a clear understanding of their purpose, and a time limit has been set for this task.

6.) A second team is standing by to aid the re-entry team, wearing necessary gear.

f. If it is within the capabilities of facility personnel to safely contain a larger spill, personnel who normally work in the spill area will use available equipment to do so. Types and locations of spill control equipment available in the facility are outlined in Figures G9 and G10.

The following general guidelines are provide in regard to spill containment and cleanup:

1.) Isolate the spill area with signs and barricade tape.

2.) Characterize the spilled substance and double-check compatibility of protective equipment before beginning containment.

3.) Characterize any secondary hazards, such as:

- Ignition of spilled material
- Reaction of spilled material with other materials in vicinity
- Secondary spills due to damaged containers

Remove ignition sources and incompatible materials. Take necessary action to prevent secondary spills.

4.) If the spill is spreading toward the municipal sewer, either directly or via a floor drain, give priority to diking the spill to prevent entry to the sewer.

If the spill has occurred in the hazardous waste container storage area (Refer to map in Figure G5), prevent spill from entering sewer via sump pump. The pump outlet piping is designed to allow diversion of outlet water to a suitable disposal container.

5.) If the spill is caused by a leaking container, try to prevent further leakage by repairing the leak or by transferring contents to another container.

6.) Always place contaminated materials from cleanup in an approved container such as a salvage drum. This includes contaminated coveralls, gloves, etc., as well as spent absorbents.

7.) No personnel other than the spill cleanup crew will enter spill area until Emergency Coordinator gives clearance to remove barricades.

g. If the spill is too large or too hazardous to be handled by facility personnel, a qualified emergency response contractor will be called in to clean up spill. An agreement has been signed with this contractor, to guarantee response to spill emergencies by a team with the necessary equipment available on a 24-hour basis:

Emergency Response Contractor

Heritage Remediation/Engineering, Inc.
(708) 969-9172

If bulk removal of contaminated material is needed on a less urgent basis, the following contacts may be helpful:

Additional Spill Cleanup and Vacuum Truck Services

Browning Ferris Ind. Chem. Services, Inc.
Phone : (708) 482-4570

Chemical Waste Management Inc.
Phone : (708) 572-8800

Extra Equipment (pumps, tank wagon, etc.)

McCook Plant
Contact Names : K. Rollins (Env. Engr.) ext. 77-269
T. Chefalo (Safety) ext. 77-222

NOTE: Always contact the McCook Research Environmental Engineer to arrange disposal of spill waste, including contaminated soil or gravel in case of a large spill.

3. Floods

The facility is not located within the 100-year flood plain. Therefore, requirements for preparations and control procedures in relation to floods are not applicable. A map of the flood-prone areas in the vicinity of this facility is presented in Figure G7.

G-4e: PREVENTION OF RECURRENCE OR SPREADING OF FIRES, EXPLOSIONS, OR RELEASES (724.156(e))

During the emergency, the Emergency Coordinator will take all necessary actions to prevent secondary hazards such as fire, explosion, or chemical release. This will include prevention of a recurrance or spreading of the existing emergency. Preventative actions include:

a. Shut down all processes/equipment that are either in the emergency area or in any area threatened by the emergency.
   This will include shutdown of the entire facility if necessary.

b. Contain and remove all spill waste in a manner which prevents secondary hazards such as fire, explosion, or chemical release.

c. Monitor for leaks, pressure buildup, gas generation, or ruptures in all equipment located in an emergency shutdown area.

G-4f: STORAGE AND TREATMENT OF RELEASED MATERIAL (724.156(g))

Immediately after an emergency, the Emergency Coordinator will consult with the Environmental Engineer, to provide for proper storage and removal of recovered waste and contaminated material (including contaminated soil or surface water) resulting from the emergency control/cleanup.

G-4g: INCOMPATIBLE WASTES (724.156(h)(1))

The Emergency Coordinator will consult with the Environmental Engineer to ensure that waste(s) generated by emergency control/cleanup are kept segregated, to prevent mixing of incompatible wastes in both the emergency area and the hazardous waste container storage area. No contaminated material will be disposed in the nonhazardous waste containers, such as the rubbish or special waste containers.

If a spill occurs in the hazardous waste storage area, an alternate accumulation area will be used to prevent incompatible waste from being stored in the affected area during cleanup. The area designated for this purpose is indicated in Figure G19. As described in Section B-4, this section of the yard area is paved with six inches of reinforced concrete. A roof was added over the area in 1989.

In the event that a major cleanup is underway, shipment would be scheduled immediateley for as many waste drums as possible, and generation of wastes that are incompatible with the remaining waste would be prevented by re-scheduling the research work if necessary. The alternate accumulation area would then be prepared for use by first placing a plastic liner over the concrete surface.

The area is also bordered on the west side by a trench, which leads to a wastewater sewer. The trench has a rectangular cross-section, 15 inches wide by 20 inches deep. A 40-foot section of the trench, which would receive runoff from the alternate accumulation area, would be isolated by closing sluice gates during any storage of waste in the area.

The isolated 40-foot section of trench will provide 83.2 cubic feet or 622 gallons of retention capacity. The maximum total volume of waste to be stored in this alternate storage area is 100 55-gallon drums or 5500 gallons. Therefore. the retention capacity of the trench section is equal to 11.3% of the maximum waste volume.

G-4h: POST-EMERGENCY EQUIPMENT MAINTENANCE (724.156(h)(2))

Immediately after an emergency, the Emergency Coordinator will ensure that all emergency equipment listed in Section G-5 of this Contingency plan is restored to readiness or replaced with new equipment. This will include such actions as:

- Recharging fire extinguishers and air supply tanks
- Decontaminating respirators, reusable spill cleanup equipment, etc.
- Restocking protective equipment, first aid supplies, spill control equipment and waste disposal containers
- Restoring security equipment such as fences, locks, etc.

Before operations can be resumed in any area affected by the emergency, an inspection of safety equipment will be made in accordance with Section F-2 of this Contingency Plan.

G-4i: CONTAINER SPILLS AND LEAKAGE (724.152,724.271)

Refer to Section G-4d for emergency response procedures for container spills and leakage.

G-4j(1): TANK SPILLS AND LEAKAGE (724.294(c)(1))

Refer to Section G-4d for emergency response procedures for tank spills and leakage. No tanks are designated for waste storage in this facility.

Section G-4j(2) does not apply to this facility and has not been included.

G-4k: WASTE PILE SPILLS AND LEAKAGE (724.352,724.353)

No waste pile activities are conducted in this facility. Therefore, the following sections do not apply to this facility and have not been included:

G-4k(1)(a through c)
G-4k(2)(a through c)

G-4l: SURFACE IMPOUNDMENT SPILLS AND LEAKAGE (724.322, 724.327)

No surface impoundment activities are conducted in this facility. Therefore, the following sections do not apply to this facility and have not been included:

G-4l(1)(a through e)
G-4l(2)
G-4l(3)(a and b)
G-4l(4)(a through c)

G-4m: INCINERATOR SPILLS AND LEAKAGE (724.152)

No incinerator activities are conducted in this facility. Therefore, this section does not apply to this facility.

G-4n: LANDFILL LEAKAGE (724.152, 724.402)

No landfill activities are conducted in this facility. Therefore, the following sections do not apply to this facility and will not be included:

G-4n(1)
G-4n(2)
G-4n(3)

G-5: EMERGENCY EQUIPMENT

Types and locations of emergency equipment within the facility are presented in Figures G8a, G8b, G9 and G10. This section contains descriptions of available equipment for three major categories of emergencies, plus personal protective equipment:

1. Fire emergency
2. Spill emergency
3. First aid/medical emergency
4. Personal protective equipment

1. Fire Emergency Equipment

The laboratory and pilot plant are protected by a sprinkler system and integrated alarm system. The facility is broken down into ten areas for the alarm system. Refer to Figure G11 for locations corresponding to the alarm areas. Refer to Figure G8b for locations of fire alarm pull boxes.

In the event that the alarm system is activated, via an alarm box or sprinkler activation, an audible alarm will sound throughout the facility. The audble alarm will be a number of short rings corresponding to the area number for the location where alarm activation originated, repeated three times.

All rooms except the pilot plant control room are included in the sprinkler system. Figure G11 shows locations of the shutoff valves for the fire protection water supplies.

When the fire alarm system is activated, a signal is automatically sent to ADT*, and the local fire department is notified. Unless a call is placed to ADT to warn that an alarm was falsely triggered, a fire truck will arrive.

Other available fire response/control equipment includes:

Fire extinguishers (dry chemical and CO_2)
Water cannons
Fire hose
Fire blanket

Locations of this equipment are indicated in Figures G8a and G8b. Training in the use of fire extinguishers is included in annual RCRA training.

Appendix GVI contains more detailed information on use of the fire response materials.

* - ADT= American District Telegraph

2. Spill Emergency Equipment

Each laboratory is equipped with a small spill cleanup kit, to allow immediate containment of the size spill that might occur during bench-scale reactions. Larger cleanup kits incuding absorbents (loose granular, pigs, pillows), brooms, sponges, protective clothing, barricades, etc., are kept in three locations. Refer to Figure G9. The pilot plant supply contains the largest quantities of absorbents. Salvage containers are available in various sizes from the storeroom and pilot plant.

Appendix GVI contains more detailed information regarding use of spill control materials.

Containment and cleanup of small spills is covered in annual RCRA training for all employees. In addition, a team of ten or more volunteers is given more in-depth training to maintain a Spill Team. The Spill team is available for cleanup of spills of one gallon or less, whenever cleanup requires more than one person or requires an experienced cleanup crew. The current list of Spill Team members is presented in Figure G6.

3. First Aid/Medical Emergency Equipment

Locations of various types of first aid equipment are illustrated in Figure G9. Small first aid kits are mounted at various locations in hallways, for immediate access to sterile bandages in case of injury. The central first aid supply is located in the storeroom and includes:

Assorted bandages
Burn, antibiotic ointments
Eyewash solutions
Assorted non-prescription medications for minor illness symptoms

A team of volunteers comprises the First Aid Team, and is given annual training by a certified instructor. The current members of the First Aid Team are listed in Figure G15. Training in CPR is also offered to employees annually.

Other types of medical emergency equipment available within the facility include:

Stretcher
Inhalator
Resuscitator
CPR unit
Air splints

A team of volunteers is trained to bring specified emergency equipment to every fire alarm, to assist any injured persons. The assigned equipment includes resuscitation equipment, masks for working in a hazardous environment, a stretcher and a

fire blanket. Refer to the Emergency Equipment Team list in Figure G15.

4. Personal Protective Equipment

All laboratory rooms and pilot plant areas within the facility are designated as eye-protection areas, with the exception of offices, conference rooms, lounges or break areas, the library

and hallways. The pilot plant rooms and pilot plant yards are designated as head and eye protection areas. Every employee is provided with safety glasses, hardhat, safety shoes and appropriate uniforms (lab coats and/or coveralls) for basic protective equipment. Pilot plant employees are also provided with cartridge respirators and face shields.

Other protective equipment maintained as stock items include:

Gloves (various chemical-resistant types)
Goggles, face shields
Coveralls (Tyvek,Saranex,Chemrel)
Cartridge respirators, various cartridges
Hearing protection equipment

Two types of gas masks are kept in hallway locations for emergency use: Type N escape mask and self-contained breathing apparatus. Locations are indicated in Figure G9.

G-6: COORDINATION AGREEMENT REQUIREMENTS (724.137, 724.152(c))

Several outside agencies/groups are given copies of this Contingency Plan, and all subsequent revisions, because they have agreed to provide services in the event of an emergency at this site. Copies of the distribution letters are in Appendix GV.

The McCook Fire Department and Police Department will come onsite in the event that our fire alarm is activated or they are called directly. In the event that a major spill/release of hazardous material occurs, Heritage Remediation/Engineering (private contractor), the Cook County Local Emergency Planning Committee, and the Illinois Emergency Services and Disaster Agency will provide response/remediation services as necessary. A specific agreement has been signed between this site and Heritage, stating that Heritage will respond to spill/release emergencies on a 24-hour basis. This agreement is copied in Appendix GVII.

In the event that several agencies/groups respond to the same incident, authority will be prioritized as follows:

IESDA
CCESDA
McCook Fire, Police
Heritage

Representatives of the emergency response agencies/groups mentioned above will be offered annual tours of this site for the purpose of familiarization. Attendance will be documented, and the tour will include pointing out locations of the hazardous waste storage area and alternate accumulation area (for temporary relocation of drums in emergency), fire control and spill control equipment, and all entrances to site.

Two local medical facilities, LaGrange Immediate Family Care and LaGrange Memorial Hospital, have agreed to treat injured persons in the event of an accident/emergency. These medical facilities are given safety data sheets for the materials listed in Appendix III, in addition to the Contingency Plan, and are notified that safety data sheets are available from this site for any material used onsite.

All agencies that are given copies of the Contingency Plan are asked to submit any suggestions they may have for improvements. Similarly, response agency/group representatives who take the annual tour are asked to submit suggestions based on their observations.

G-7 EVACUATION PLAN (724.152(f))

This section outlines procedures for a facility evacuation. In the event of a fire, explosion, or chemical release - or imminent danger that such emergencies may occur, the Emergency Coordinator will decide if a facility evacuation is necessary. There will be a difference in evacuation procedures for day and night shifts, due to the limited number of people working night shift in the facility.

Summaries of the evacuation responsibilities for various personnel are presented in Figures G12, G13 and G14.

1. Day Shift Evacuation

a. Signal to Evacuate

The signal to begin evacuation will either be the fire alarm or an announcement over the paging system.

The locations corresponding to each of the alarm area numbers are illustrated in Figure G11. When a fire alarm box is activated, the audible alarm will be a pattern of rings corresponding to the area where the alarm originates. This will ensure that all personnel are aware of the unsafe area to avoid during exit.

If the evacuation is initiated by an announcement over the paging system (dial 60 on any phone), the announcement will be of the following form:

> "Attention. We have a (chemical release, large spill, etc.) in the (pilot plant, GC lab, etc.). Please evacuate the building by the nearest safe exit."

The announcement will be repeated a minimum of three times to begin the evacuation.

NOTE: The description of the emergency area is critical to prevent use of unsafe exits. Therefore, the description should include a familiar name, and should not rely on room numbers or unfamiliar descriptions. Examples of bad descriptions: Room 117, near tank T-32, etc.

b. Evacuation for Fire Alarm

Upon initiation of an evacuation by fire alarm, all personnel except Emergency Coordinators, fire marshals and fire monitors will leave the building immediately by safe exits. Fire marshals and monitors are listed in Figure G15, as well as safety equipment assigned to specific fire marshals.

Fire marshals will report to the alarm area and await instruction from the head fire marshal. Fire monitors will do a quick inspection of their area to ensure that everyone evacuates, and will then leave the building.

c. Evacuation for Emergency Announcement

If evacuation is initiated by an announcement over the paging system, all personnel except the Emergency Coordinators and personnel assisting in emergency control procedures will leave the building.

d. Headcount Stations

All personnel (Akzo employees, contractors and visitors) who evacuate the building will congregate at a headcount station. Refer to Figure G16 for locations of the primary station and the two alternate stations. If the primary station is inappropriate, due to weather conditions or incident location, the headcount monitor will go to an alternate atation (both are in easy visual range of primary) and guide evacuees there.

No persons shall remain near exit doors, or in any other areas where access to building by professional emergency crews (fire department, ambulance, etc.) could be blocked.

Supervisors of each lab group will be responsible for ensuring that their staff heeds the announcement. Contract foremen are likewise responsible for their personnel. Visitors are the responsibility of persons they are visiting.

e. Headcount Procedure

1.) Unless the nature of the emergency renders the primary headcount station unsafe, all persons will congregate there and report to their supervisor.

2.) Each supervisor (or assigned alternate) will in turn notify the Headcount Monitor of which employees in their group are present, absent for the day, or unaccounted for.

3.) The Headcount Monitor will have a checklist for compiling names of persons unaccounted for. The Emergency Coordinator will simultaneously compile the names of persons remaining in the facility to assist with emergency response procedures.

4.) The Headcount Monitor will relay his/her list of "missing" persons to the Emergency Coordinator by one of the following methods:

- If the lobby remains safe, the Emergency Coordinator will designate person(s) to wait in the lobby for the headcount report. The Headcount Monitor will re-enter the lobby to turn in this report. The designated person(s) will be prepared* to hand-carry this information to the Emergency Coordinator or relay it over the paging system.

- If the lobby is unsafe to return to, the Headcount Monitor will remain at the headcount station and wait until a person designated by the Emergency Coordinator arrives. This designated person will be prepared* to hand-carry this information to the Emergency Coordinator.

  * - In order to safely return to the Emergency Coordinator's location, this person must be aware of the exact nature of the emergency, and be wearing any necessary protective gear.

5.) The Emergency Coordinator will be responsible for following through on the list of missing persons. This will not involve endangering lives of other personnel by allowing them to re-enter any hazardous areas. The list will be relayed to professional emergency crews such as fire department personnel if necessary.

f. <u>All-Clear Signal</u>

The all-clear signal will include an announcement over the paging system and a verbal notification to the headcount station(s). The announcement will be of the form:

"All clear. It is safe to re-enter the building."

This will be repeated at least three times. An all-clear will not be given until all areas which should not be entered, due to continuing cleanup or restoration of safety equipment, are thoroughly barricaded.

g. <u>Drills</u>

Drills are held to practice the evacuation procedures at least twice per year.

2. Night Shift Evacuation

a. Signal to Evacuate

Signals to evacuate during night shifts will be exactly the same as for day shift. It is important that the entire building be notified of need for evacuation, even if it appears that no one is working night shift other than pilot plant personnel.

b. Evacuation for Fire Alarm

Upon initiation of an evacuation by fire alarm, all personnel who are not in area of fire will evacuate to the near-east parking lot. Refer to Figure G16. These personnel will gather information on any "missing" persons, and will wait for instructions from the Emergency Coordinator or an all-clear announcement.

The persons working in the alarm area will go to a safe area to call an Emergency Coordinator, and will direct the fire department to the emergency area.

Pilot Plant personnel will assist in control/extinguishment of a small fire using available extinguishers, if safe to do so.

Names of persons not accounted for will be provided to the Emergency Coordinator and/or fire department.

c. Evacuation for Emergency Announcement

This evacuation procedure will be the same as for night shift fire alarm, except for directing fire department to emergency area. The Emergency Coordinator (or person designated by same) will call the local police department to explain reason for evacuation.

d. Headcount

Evacuees who have gathered in the parking lot will wait for the Emergency Coordinator (or person designated by same) to record their names before leaving the facility. The Emergency Coordinator will be responsible for following through on accounting for any "missing" persons.

e. All-Clear Signal

The all-clear signal for night shift evacuation will be the same as for day shift.

f. Drills

If a significant number of persons (>5) become involved in an extended pilot plant project (longer than 2 weeks), a drill will be held to train these people in proper evacuation procedure. Otherwise, lab and pilot plant supervisors will explain the evacuation and emergency control procedures via verbal review of this plan at start-up of short-term projects.

G-8: REQUIRED REPORTS (724.156(j))

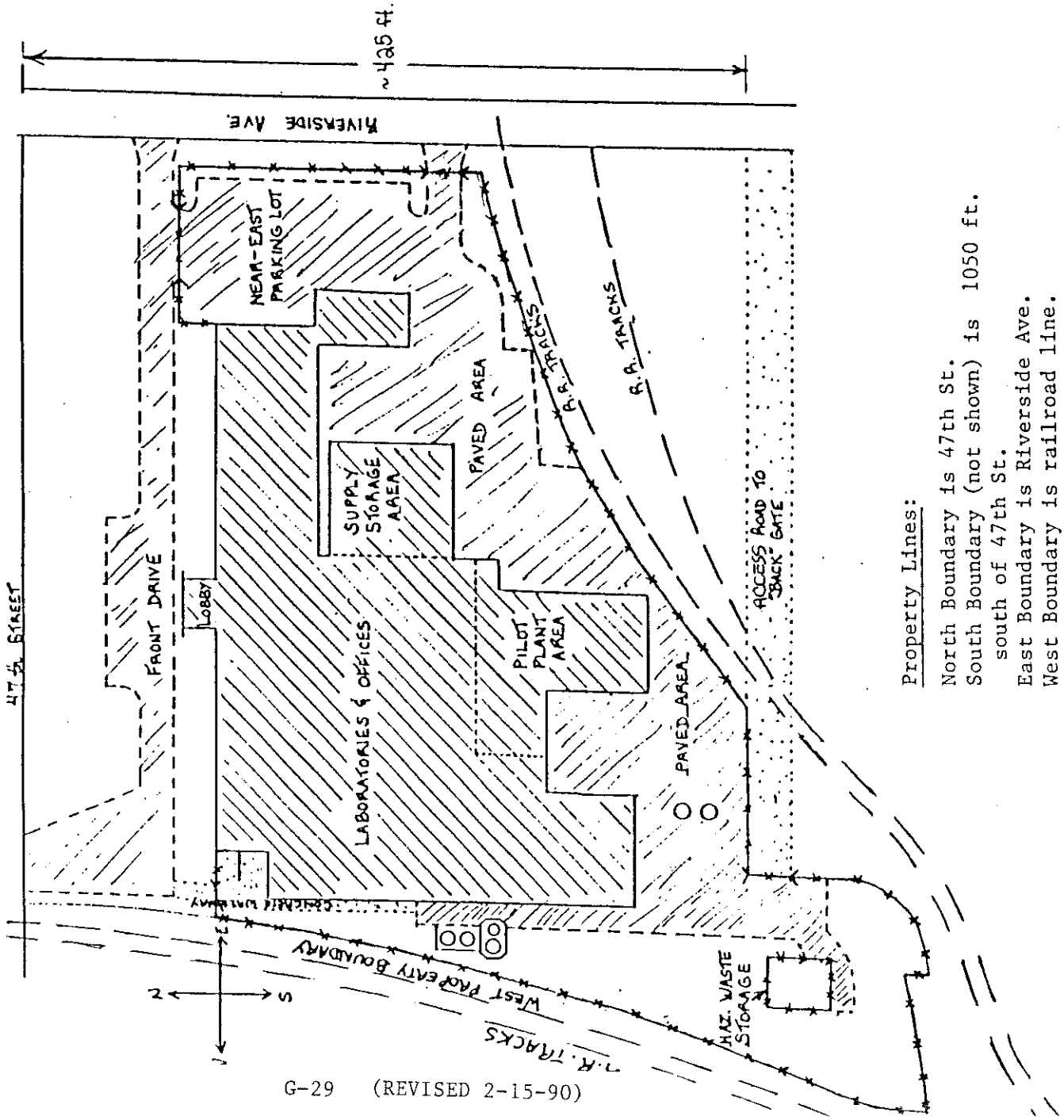
The Emergency Coordinator is required to keep a log of every emergency incident. Details of the required content for this log are given in Appendix GII.

Followup reporting requirements, including cleanup notification to IEPA-DLPC and IESDA, and submission of a written report to the USEPA Regional Administrator and IEPA-DLPC within 15 days after occurrence of the emergency, are described in Appendix GII.

Figure G1

Akzo Chemicals Inc.
McCook Research Facility
Site

(Note: Boundaries of propert are given in Section B-2a)



Property Lines:

North Boundary is 47th St.
South Boundary (not shown) is 1050 ft. south of 47th St.
East Boundary is Riverside Ave.
West Boundary is railroad line.

Figure G2
FIRE/EXPLOSION HAZARD
ASSESSMENT
(Phone list in Appendix G1)

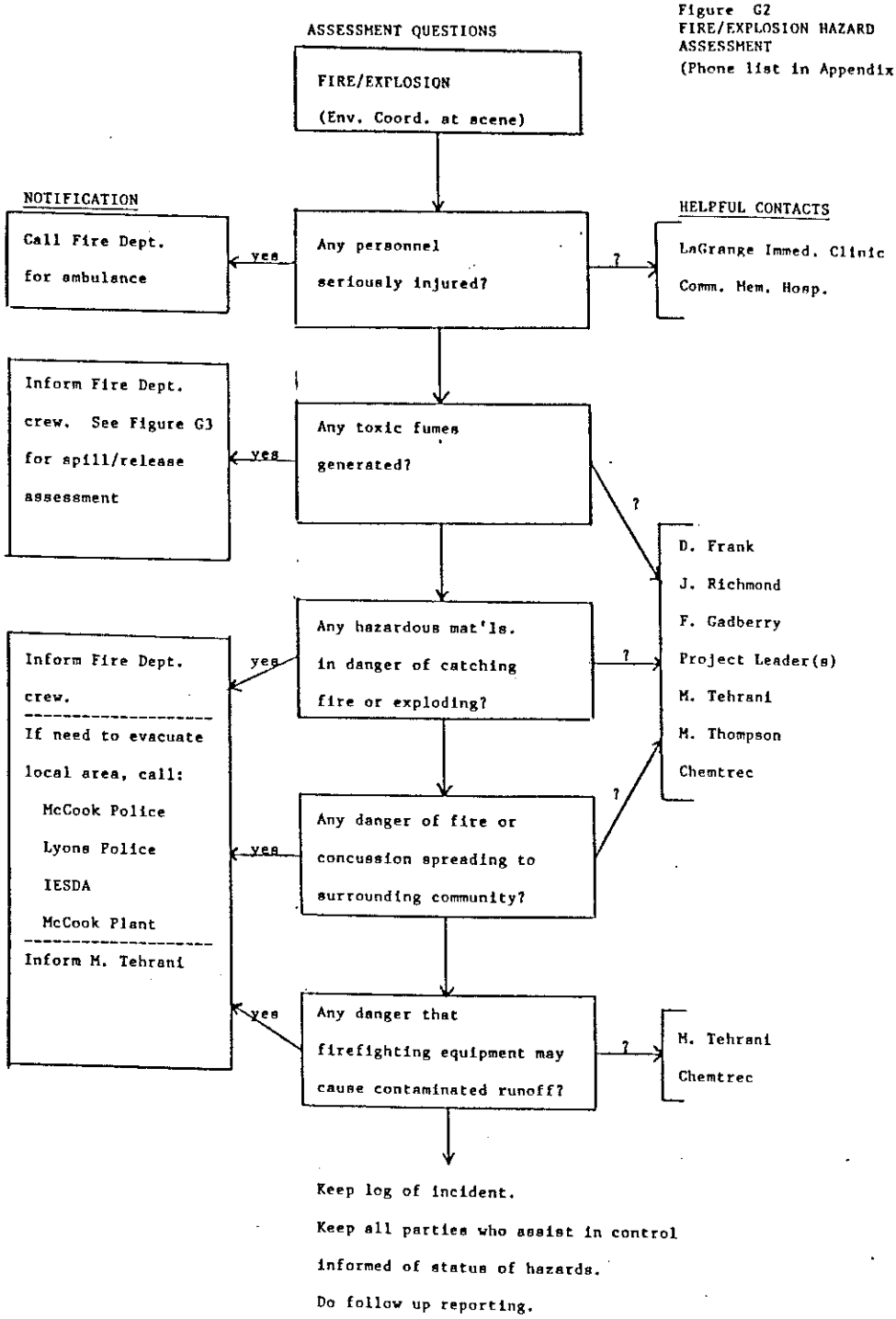


Figure G2

FIRE/EXPLOSION
HAZARD ASSESSMENT

Figure G3
SPILL/RELEASE HAZARD
ASSESSMENT
(Phone list in Appendix GI)

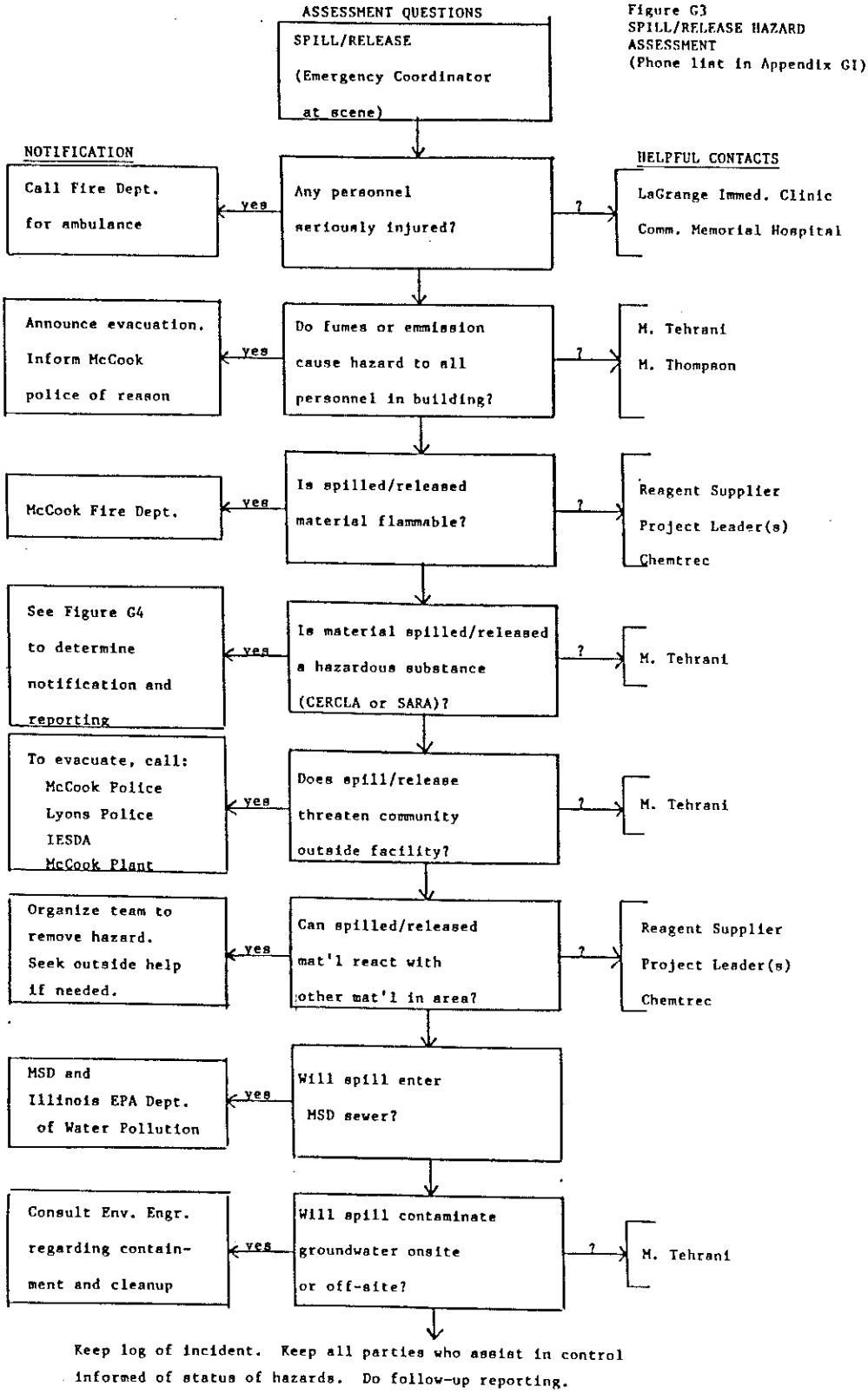
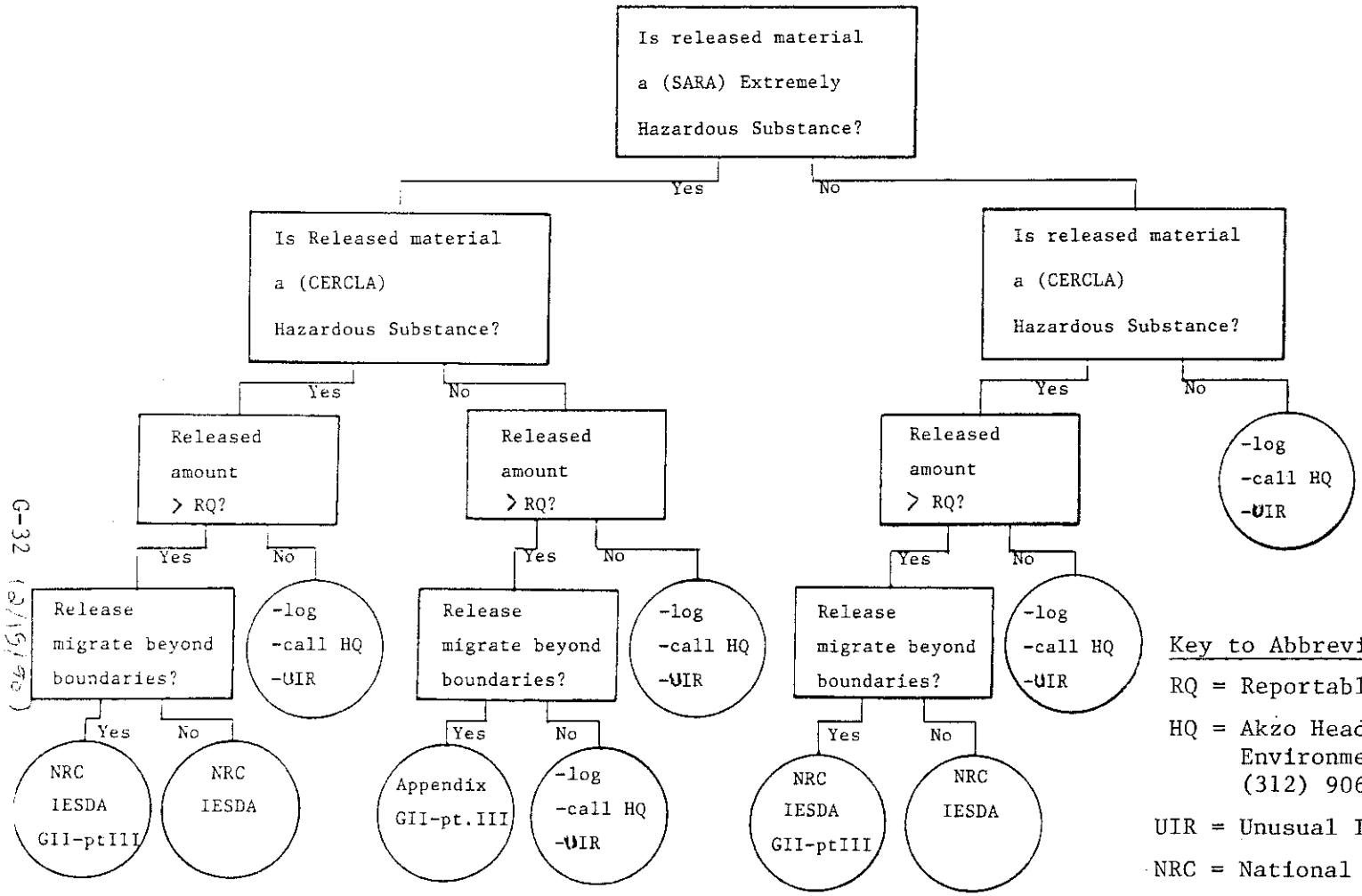


Figure G3

SPILL/EMISSION
HAZARD ASSESSMENT

Figure G4

GUIDE FOR DETERMINING NOTIFICATION REQUIREMENTS FOR RELEASE



Key to Abbreviations

RQ = Reportable Quantity

HQ = Akzo Headquarters Environmental Engineering (312) 906-7616

UIR = Unusual Incident Report

NRC = National Response Center

IESDA = Illinois Emergency Services and Disaster Agency

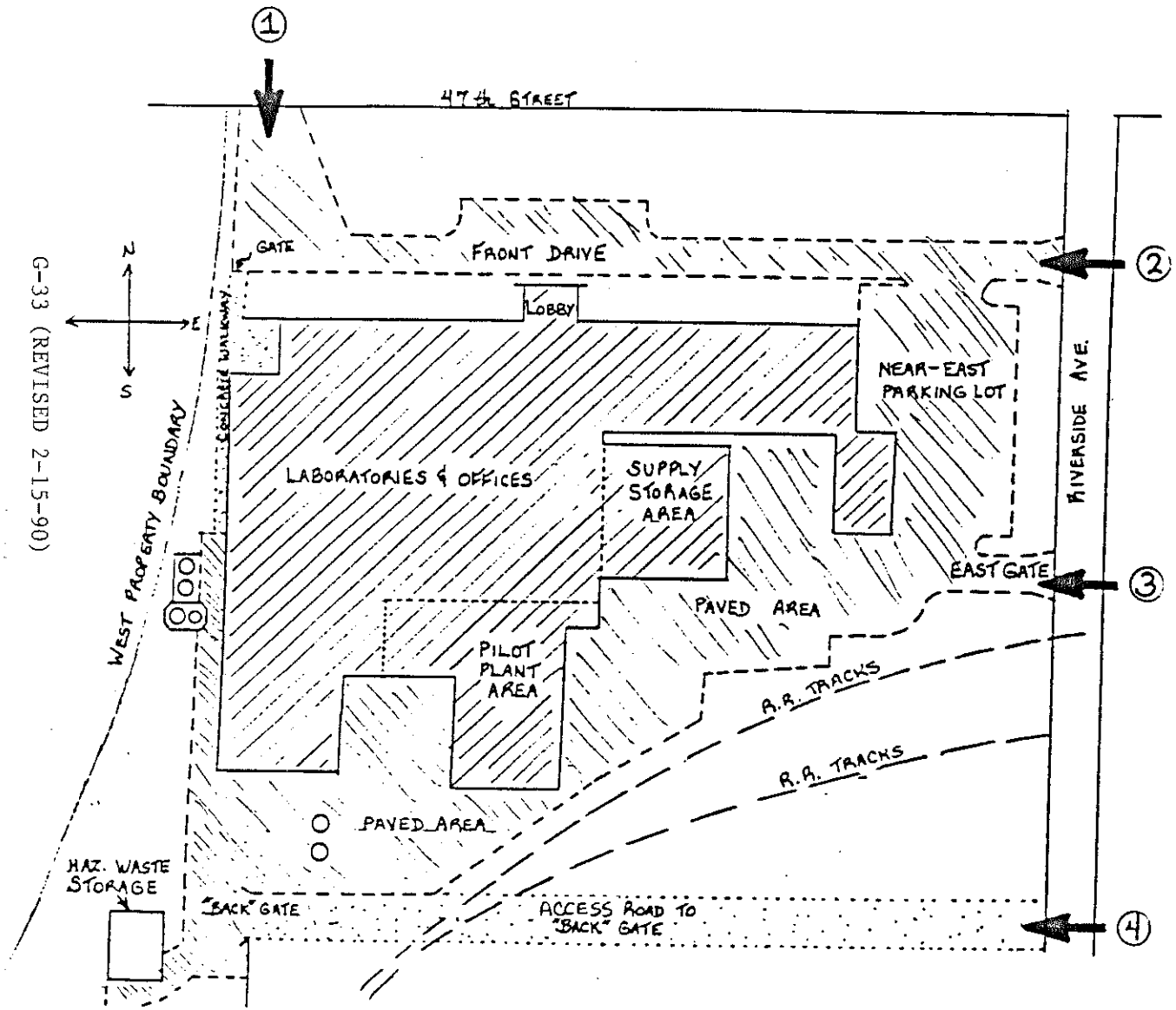
GII-pt III = Part III of Appendix GII; Special reporting for RQ that migrates off-site

Notes:

1.) If released substance is a mixture, do assessment for each component and its released quantity.

2.) (SARA) Extremely Haz. Substances and their RQ's are listed in Table 302.4 of 40 CFR Part 302.

3.) (CERCLA) Haz. Substances and their RQ's are listed in Appendices A & B of 40 CFR Part 355.



Access Routes

1. Northwest driveway to access north & west sides of building
2. Northeast driveway to access north & east sides of building
3. East gate to access supply storage, pilot plant, south side of building
4. "Back" gate to access southwest sections and hazardous waste container storage area

Figure G5
EMERGENCY VEHICLE ACCESS

FIGURE G6

SPILL TEAM MEMBERS

Name	Extension
Fred Gadberry, Chairman	266
Madelyn Ashum-Johnson	366
Bob Case	280
Gene Damaso	326
Ralph Franklin	291
Lori Sternisha	327
Mark Huang	269
Jim Love	360
Chris Maramba	235
Ashu Sharma	285

Figure G7

Flood Plain Map

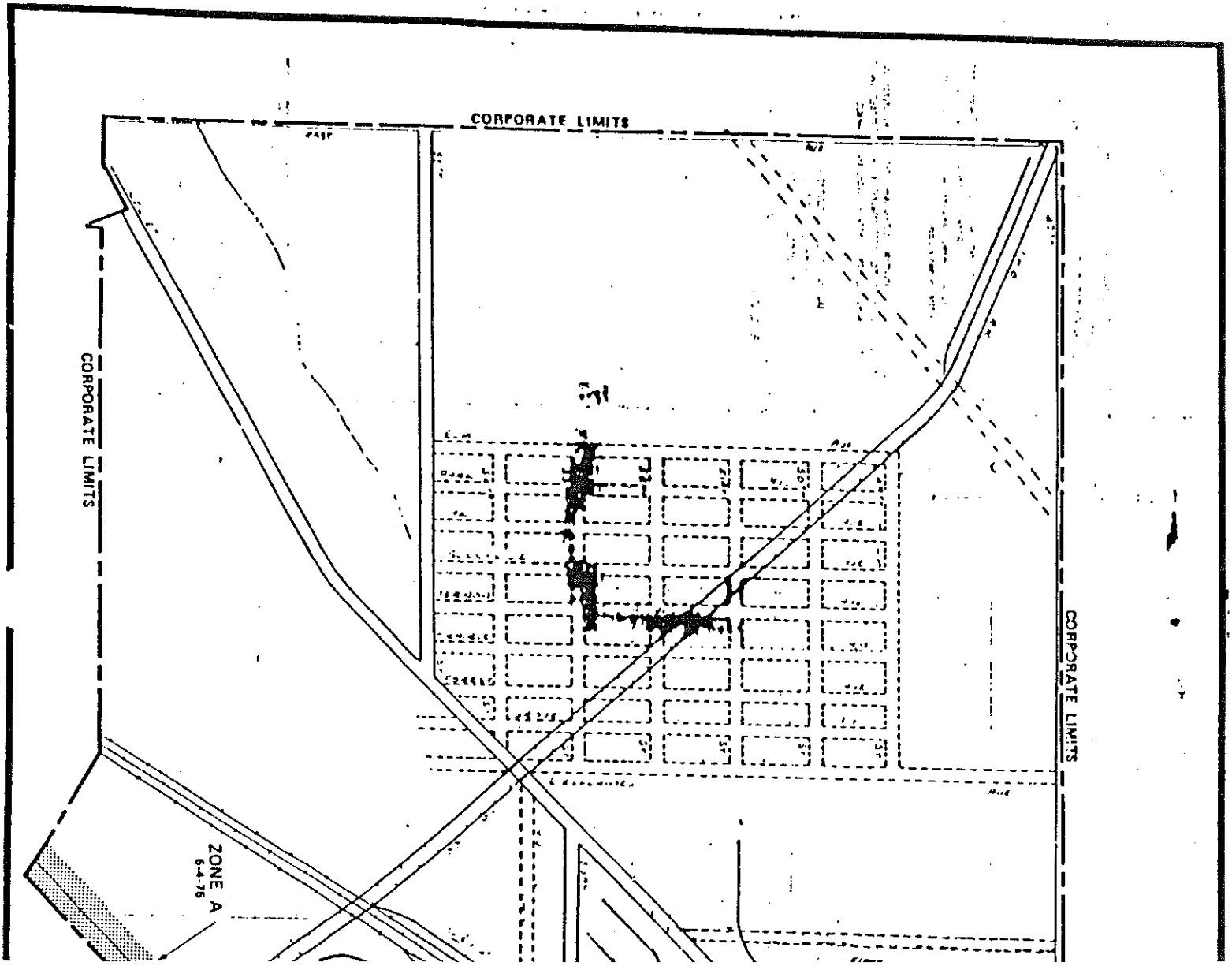


Figure G8a

Locations of Fire Hydran
and Water Cannons

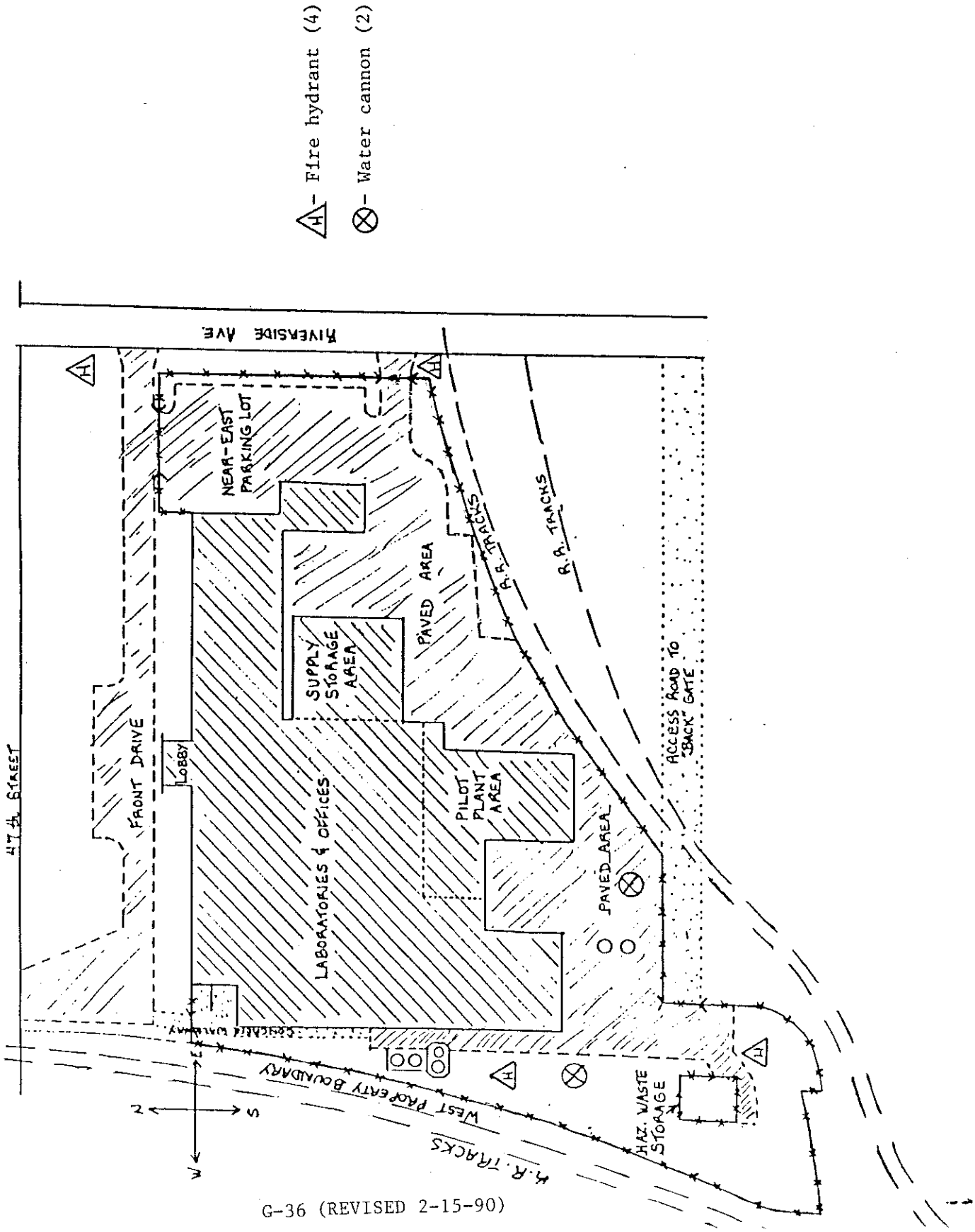


Figure G8b

FIREFIGHTING, ALARM
EQUIPMENT INSIDE BUILDING

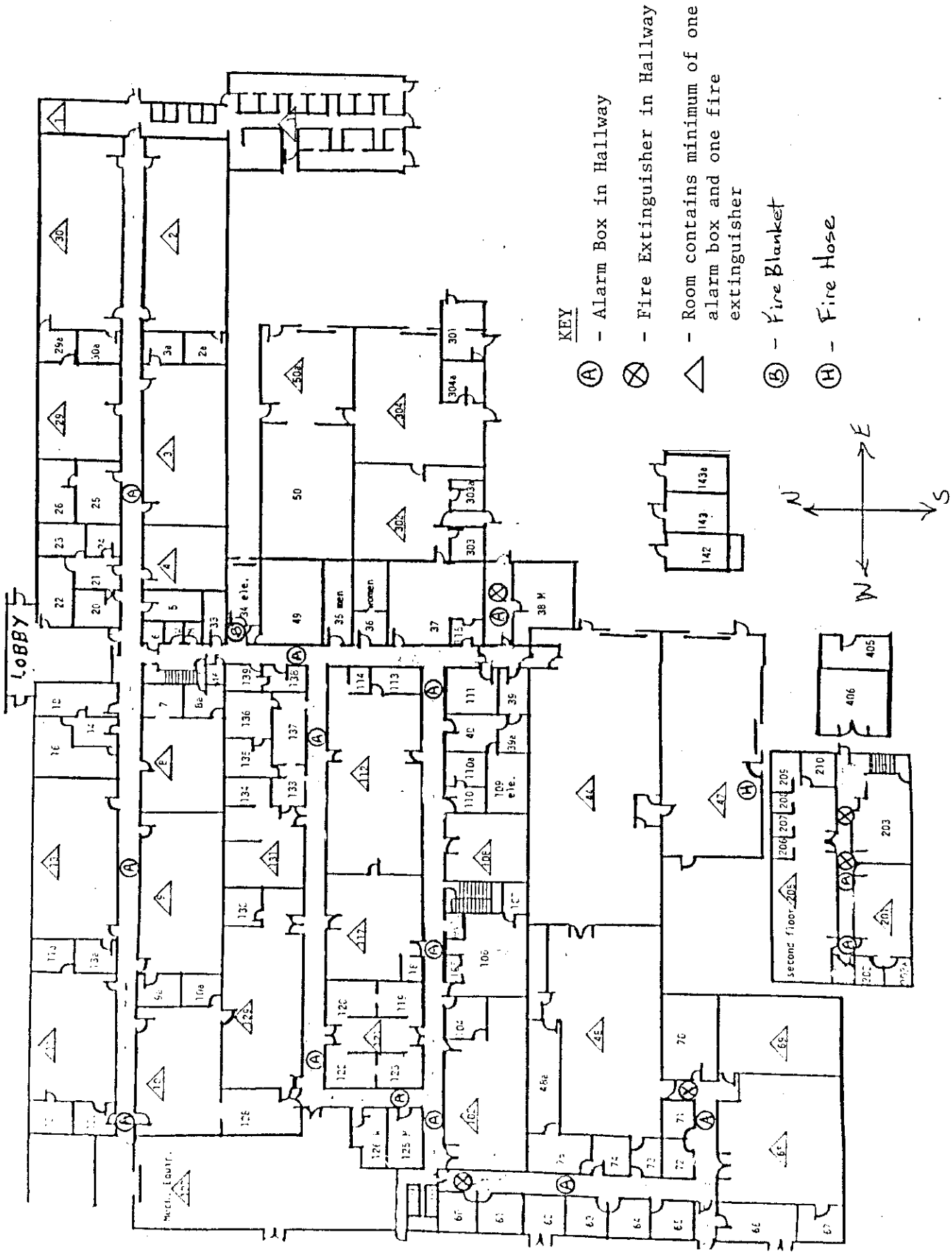
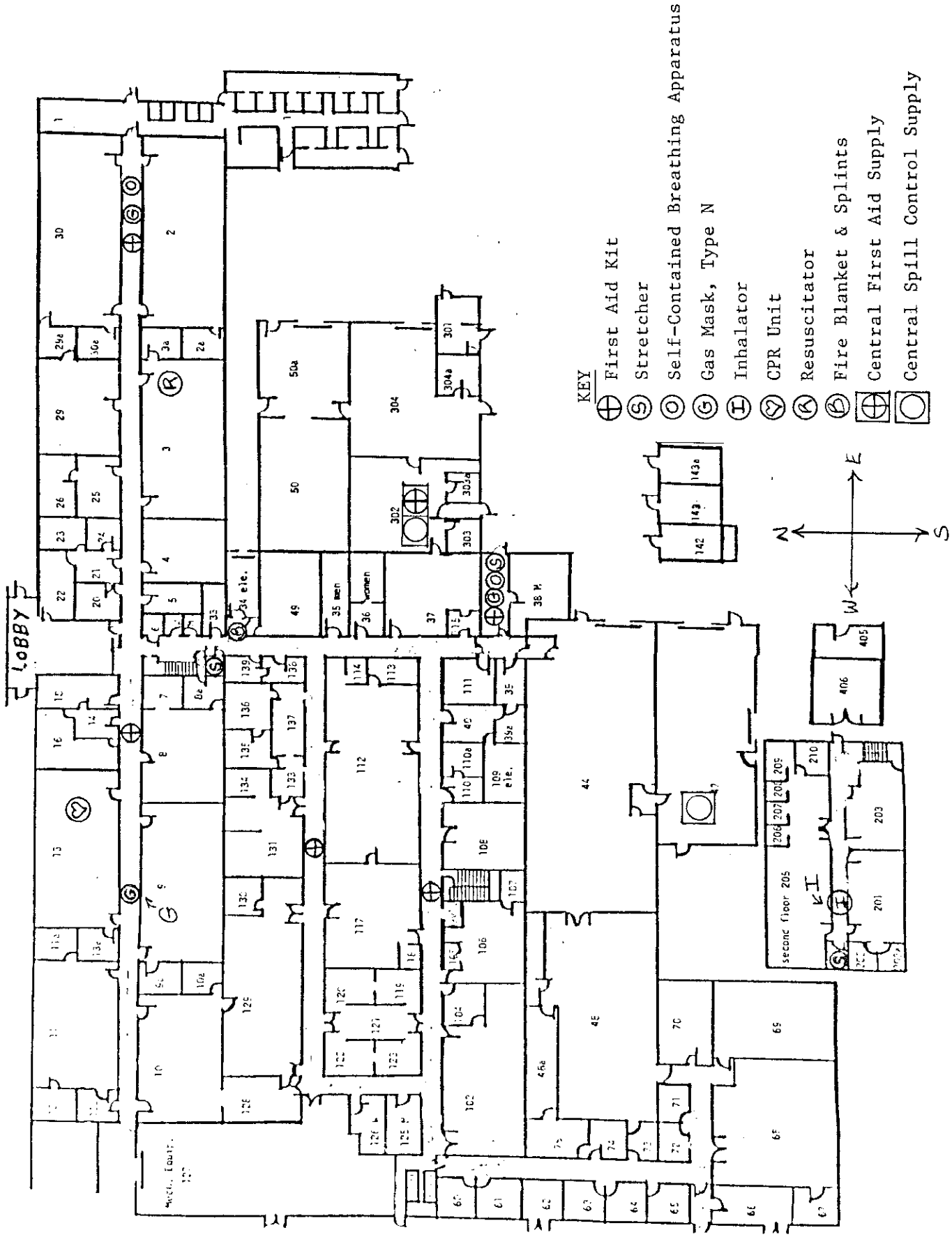


Figure G9

FIRST AID AND SPILL CONTROL EQUIPMENT



 (2/15/90)

FIGURE G10

EMERGENCY EQUIPMENT INVENTORY
(refer also to Figures G8a, G8b, G9)

Equipment	Location(s)
Fire Emergency:	
Fire alarm box	- various hallway locations - every lab & chemical storage area - pilot plant rooms
Fire extinguisher (various types)	(same as above)
Fire hose	- near south exit of pilot plant
Water cannon	- south yard outside pilot plant - southwest yard outside Area 1
Fire blanket	- exit corridor south of copy room - Room 2
Spill Emergency:	
Small spill cleanup kit	- every lab
Larger cleanup kit and central supply of various absorbents (loose, pigs, pillows)	- storeroom - pilot plant - Room 2 (F. Gadberry's lab)
Safety shower and eyewash	- every lab & chemical storage area - pilot plant rooms
First Aid/Medical Emergency:	
Small first aid kit (large bandages,etc.)	- various hallway locations - inside each lab entrance
Central supply of bandages, ointments, non-prescription medication, etc.	- storeroom
Stretcher	- in stairwell across hall from copy room - in exit corridor near entrance to pilot plant - in stairwell at west end of second floor

FIGURE G10 (cont'd.)

EMERGENCY EQUIPMENT INVENTORY

Equipment	Location(s)
First Aid/Medical Emergency (cont'd.)	
Air Splints	- in exit corridor south of copy room
CPR unit	- Room 13 (W. Wagner)
Resuscitator	- Room 3 (F. Gadberry) - Room 120 (F. Mozayeni)
Inhalator	- in second floor hallway outside Room 201
Protective Equipment:	
Self-contained breathing apparatus	- near east exit by high-pressure lab - in exit corridor by entrance to pilot plant
Gas mask, Type N	- various hallway locations
Protective gloves, goggles, coveralls, hardhats, dust masks, cartridge respirators, ear plugs, etc.	- storeroom - pilot plant
Power Failure	
Emergency Lights (battery-powered)	- every lab, stairwell and exit

Figure G11

FIRE ALARM AREAS
AND WATER SHUTOFFS

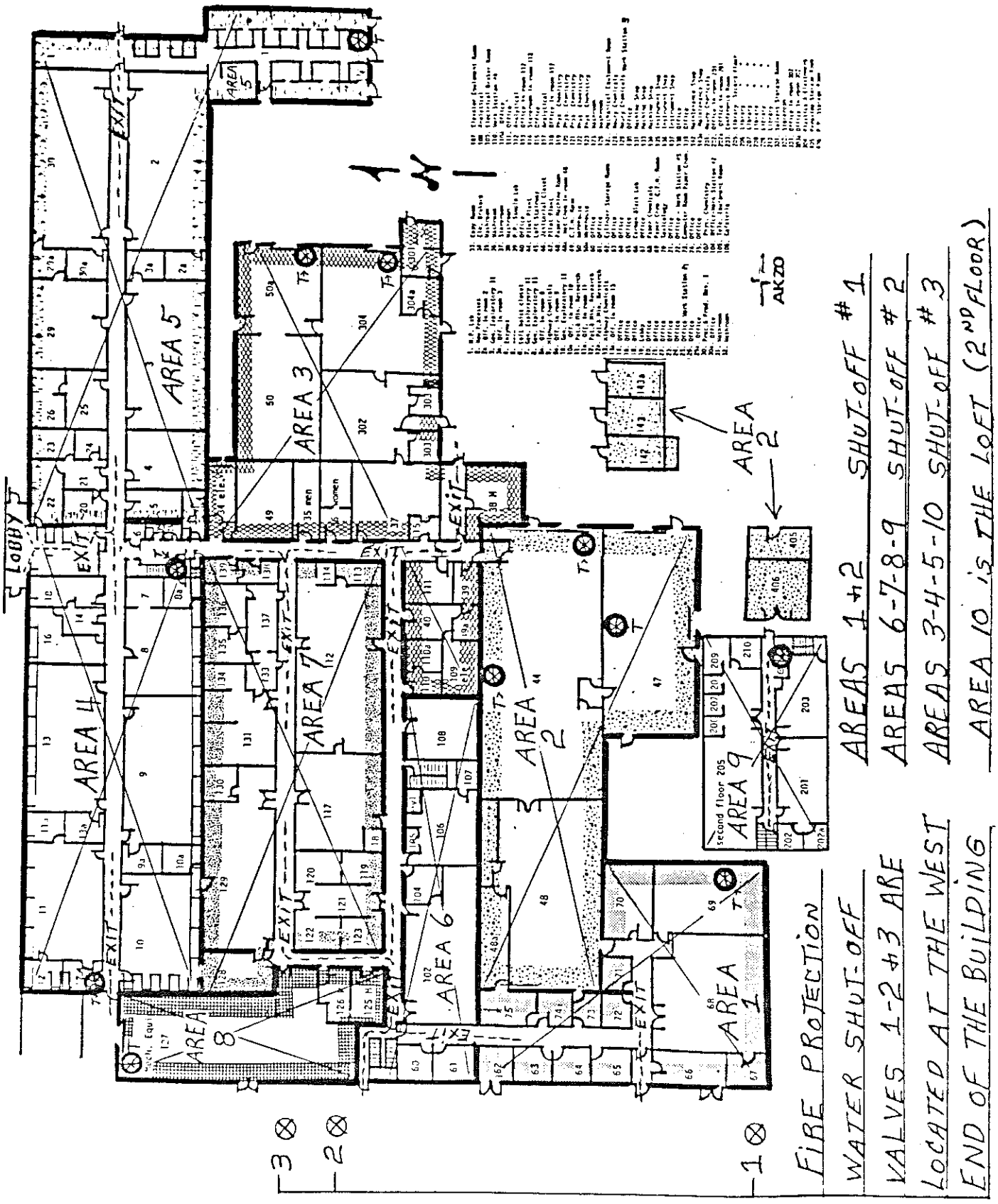


FIGURE G12

DAY SHIFT FIRE EVACUATION RESPONSIBILITIES

Emergency Coordinators	1. Report to alarm area to supervise response. 2. Direct fire department crew to emergency area. 3. Make list of personnel who remain in building to assist.
Fire Marshals	1. Report to alarm area. 2. Follow instructions of head fire marshal.
Fire Monitors	1. Check your area to ensure that everyone evacuates. 2. Evacuate by safe exit.
Headcount Monitor	1. Evacuate to headcount station 2. Compile list of unaccounted for persons and give to Emergency Coordinator.
Supervisors, Contract Foremen and Persons with Visitors	1. Evacuate by safe exit. 2. Find your staff members at headcount station and report any missing people to head-count monitor. 3. Keep your staff away from exits until all-clear.
All Other Personnel Not Assisting in Emergency Control	1. Evacuate by safe exit. 2. Report to your supervisor at headcount station and wait for all-clear.

ALL EVACUEES WILL REMAIN AT HEADCOUNT STATION UNTIL AN ALL-CLEAR IS SOUNDED.

FIGURE G13

DAY SHIFT RESPONSIBILITIES IN ANNOUNCED EVACUATION

Emergency Coordinators	1. Report to emergency area and supervise response. 2. Make list of personnel who remain in building to assist.
Headcount Monitor	1. Evacuate to headcount station. 2. Compile list of unaccounted for persons and give to Emergency Coordinator.
Supervisors, Contract Foremen and Persons With Visitors	1. Evacuate by safe exit. 2. Find your staff members at head-count station and report any missing people to headcount monitor. 3. Keep your staff away from exits until all-clear.
All Other Personnel Not Assisting in Emergency Control	1. Evacuate by safe exit. 2. Report to your supervisor at headcount station and wait for all-clear.

ALL EVACUEES WILL REMAIN AT HEADCOUNT STATION UNTIL AN ALL-CLEAR IS SOUNDED.

FIGURE G14

NIGHT SHIFT RESPONSIBILITIES FOR FIRE OR ANNOUNCED EVACUATION

Person(s) Activating Alarm or Announcing Evacuation	1. Go to safe area and call Emergency Coordinator. 2. If fire - direct fire dept. crew to emergency area. 3. Keep evacuees informed of status of hazard.
Emergency Coordinator	1. Report to emergency area and supervise response. 2. Compile list of unaccounted for persons. 3. If non-fire, call police to explain evacuation.
Other Personnel Working in Emergency Area	1. Assist in control procedures if so instructed and safe to do so. 2. Evacuate to near-east parking lot if so instructed.
All Other Personnel	1. Evacuate to near-east parking lot and wait for instructions from Emergency Coordinator. 2. Gather list of missing persons.

ALL EVACUEES WILL REMAIN OUTSIDE BUILDING UNTIL ALL-CLEAR IS SOUNDED.

FIGURE G15

EMERGENCY TEAMS/COMMITTEES

Fire Marshals

Name
S. Line, Head Marshal
M. Ashum
D. Brandt, Alternate Head Marshal
G. Damaso
S. Gadberry
W. Largent
T. McDevitt
M. Shilakis
D. Slaboszewski
J. Duran

Fire Area Monitors

Name	Assigned Area Number
B. Tan	1
J. Ray, L. Hartrick	2
K. Heffley	3
H. Nemeth, T. Newman	4
D. Pauling, A. Kacmarek	5
C. N. Wang	6
F. Mozayeni, J. Greaves	7
D. Stein	8
R. Petry	9
H. Nemeth	10

Emergency Equipment Team *

Name	Assigned Equipment
W. Wagner	CPR Unit
B. Maisonneuve	Gas Mask
E. Carr	Stretcher & Blanket
F. Gadberry	Resuscitator
E. Sodha (B. Magruder)	Self-Contained Breathing Apparatus

Headcount Monitors

Name
T. Davis (primary)
G. Szajer (alternate)

* - Team members will bring assigned equipment to all day-shift fire alarms.

FIGURE G15 (cont'd.)

First Aid Team (as of 9-20-88)

Name

A. Alekna
M. Ashum-Johnson
J. Borchert
C. Brady
H. Cho
L. Culbertson
G. Damaso
J. Duran
R. Franklin
F. Gadberry
J. Greaves
E. Hartrick
C. Maramba
H. Mattson
F. Mosayeni
O. Perez
A. Sharma
L. Sternisha
C. Stetenfeld
M. Stowell
M. Vondrasek
C. Vucsko
W. Wagner
W. Wang
L. Yodual

Figure G16

HEADCOUNT STATIONS

KEY

Headcount Station:

1. Primary; 47th & Riverside
2. Alternate; West driveway area
3. Night Shift; Near-East parking lot

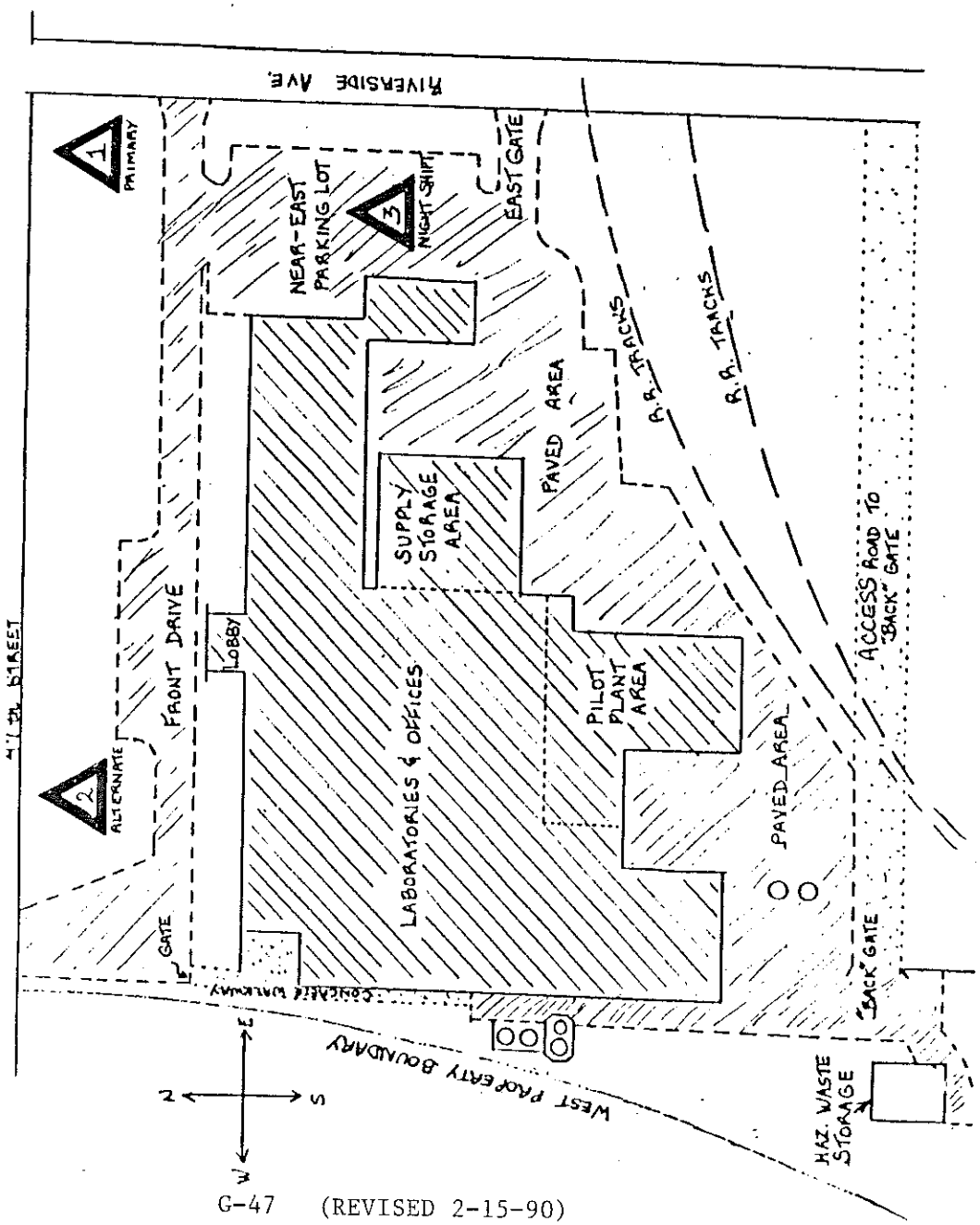


Figure G17

SAMPLE FORM FOR CALL REPORT

** CONFIDENTIAL **

AKZO CHEMICALS INC.
RESEARCH LABORATORY

TELEPHONE LOG REPORT

DATE: _____

TIME: _____

SUBJECT: _____

_____

CONTACT PERSON: _____

TITLE: _____

AFFILIATION: _____

LOCATION: _____

TELEPHONE: _____

SUMMARY OF DISCUSSION:

AKZO CHEMICALS INC (ACI)
UNUSUAL INCIDENT REPORT (UIR)

REPORT NO. 8-
REPORT DATE
ACI SITE McCook - Research

INCIDENT DATE _____ TIME _____ DEPT. _____ THIS REPORT BY _____

RESULT(S) - INJURY/ILLNESS ☐ DECOMPOSITION ☐ EXPLOSION ☐ FIRE ☐ DELUGE ☐
POWER FAILURE ☐ EQUIPMENT DAMAGE ☐ ODOR COMPLAINT ☐ THEFT ☐
CHEMICAL RELEASE/SPILL ☐ MISPUMPING (NO RELEASE) ☐ OTHER ☐
COMPLETE OTHER SIDE ← → ESTIMATED VALUE OF LOSS $ _____

CAUSE(S) - PERSONAL ERROR ☐ WRONG PROCEDURE ☐ SAFETY OR PLANT RULE VIOLATION ☐
UNSAFE POSITION ☐ WRONG EQUIPMENT/TOOL ☐ NATURE ☐
POOR HOUSEKEEPING ☐ EQUIPMENT FAILURE ☐ UNSAFE CONDITIONS ☐ OTHER ☐

DESCRIBE INCIDENT AND EXPLAIN CAUSES (WHO, WHAT, WHEN, WHERE, HOW) _____

WHAT ACTIONS WERE TAKEN IN RESPONSE TO INCIDENT? _____

EQUIPMENT RESTORED TO READINESS? EMERGENCY SAFETY CONTROL DEVICES

WHAT COULD BE DONE TO PREVENT RECURRENCE? OTHER COMMENTS? _____

DISTRIBUTION:

SECTION HEAD _____

M. Ashum S. Line J. Richmond
C. Donohue L. Metcalfe M. Schroeter
D. Frank J. Reavley M. Tehrani
F. Gadberry G. Rotter M. Zakaria

Person(s) involved in incident _____

Person reporting the incident _____

Immediate supervisor _____

Report No. 8- _____

Report of Chemical Release

ACI Site McCook-Research

Chemical Released _____ Exact Release Site _____

Quantity Released _____lbs. or _____gal. _____

Reportable Quantity _____lbs. _____

Released as: Gas- ☐ Liquid- ☐ Solid- ☐ Wind-speed _____ mph, Direction _____

Mist- ☐ Dust- ☐ _____ Weather- Clear _____, Rain _____, Snow _____

Temp. of Chem. at release- ____°F for___°C Other _____

Release - Instantaneous - ☐ -Time_____ Ambient Temp. _____°F, _____°C

Continuous- ☐ From_____ to _____ Release Reported by _____

Community Affected - No_____, Yes_____ Other Witnesses _____

Explain_____ _____

_____ _____

_____ First Supervisor on scene _____

Disposition of released chemical - On Site _____%; Off ACI Site _____%

Indicate how chemical left ACI site by following routes; show lbs. or %

Air _____ Sewer-Process _____ Waste Water

Surface Water _____ Storm _____ Treatment Output _____

Ground _____ Sanitary _____

Chemical recovered on site - _____ lbs. or _____gal.

Chemical treated on site - waste water system _____ Incinerator _____

Disposal of cleanup residues

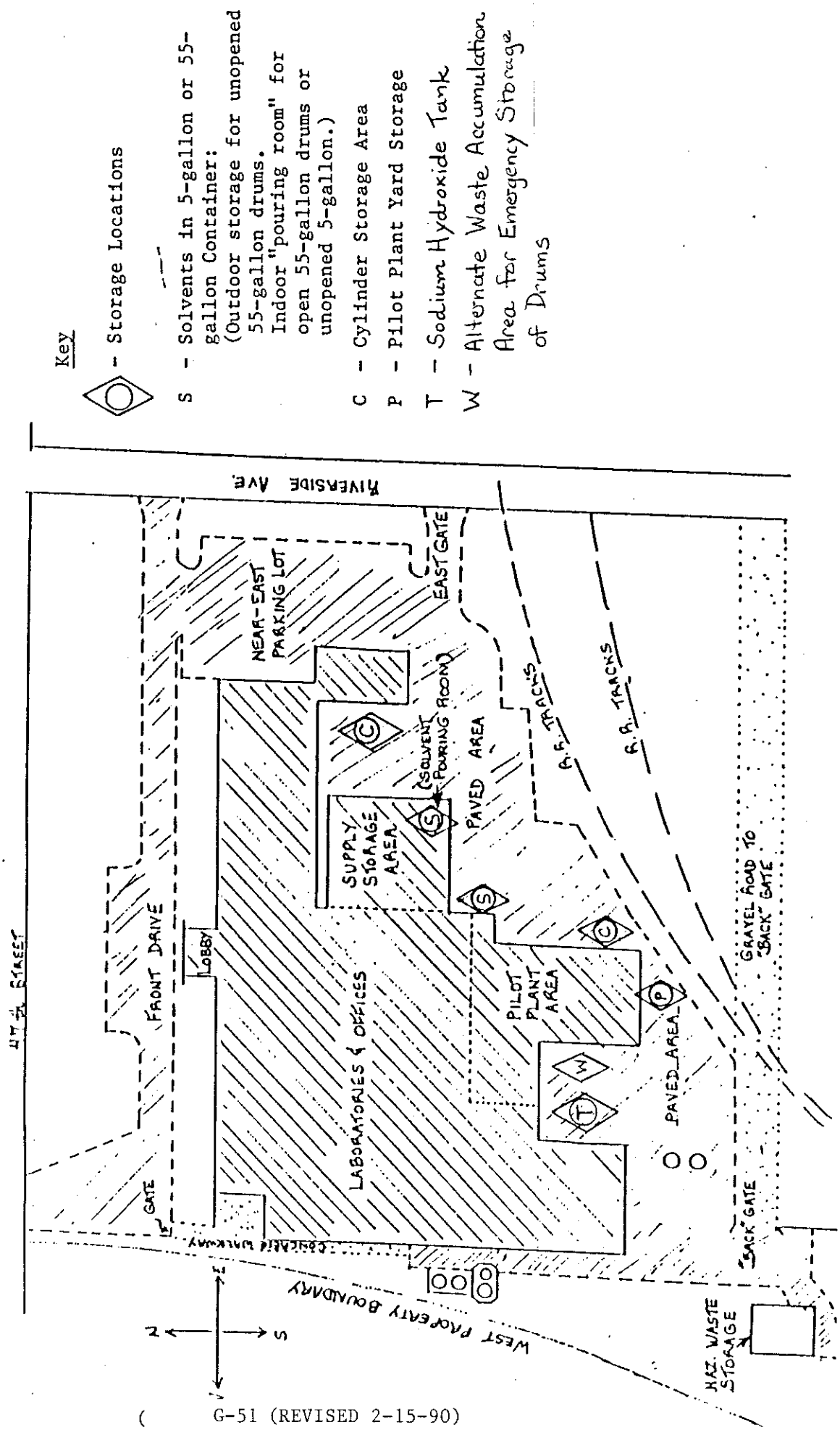
Containers No.	Type	Approx. Wt (units?)	Contents	Temporary Storage Site	Ultimate Disposal

Communications: Consult Plant Contingency Plan, notify Corp. Env. Affairs Group within 24 hrs., submit copy of form to M. Tehrani and L. Metcalfe within three working days of incident.

Agency or Organization	Individual	Phone No.	Date	Time	Summary

Figure G19

Hazardous Chemical Storage Locati



Appendix GI

DETAILED INITIAL ASSESSMENT OF HAZARD

The Emergency Coordinator will supervise the following steps in initial resonse and assessment:

Step 1: Assist Injured Personnel

Evacuate injured personnel from incident area. Obtain help from first aid team members or call for ambulance. If injured persons are trapped in large spill or release, and no imminent danger of explosion exists, trained personnel will wear full protective gear (SCBA, Chemrel coverall, gloves) to rescue. If injured personnel are trapped in large fire, only fire department personnel may enter area.

Persons requiring medical treatment will be accompanied to the hospital by their supervisor or a designated substitute. Persons assisting injured personnel will report back to the Emergency Coordinator regarding extent of injuries.

Step 2: Determine Hazardous Materials Involved

Obtain as much information as possible from persons who reported the incident or who normally work in the area regarding material directly involved/causing incident and quantity involved. If the incident is a fire or explosion, obtain list of all hazardous materials stored in the area and approximate quantities. Inform fire department personnel of material directly involved in incident (if known) and all other hazardous materials in area that could contribute to hazard, due to their potential for releasing toxic fumes or for igniting/exploding.

Persons who will have knowledge of materials used/stored in the incident area include:

- all persons who normally work in area, including direct supervisor and section head
- Safety Manager
- Environmental Engineer
- Members of Special Hazards Committee
- Building Supervisor
- Chemical Research Manager

If the incident is a spill or release and the material involved is unknown after consulting all sources of information, response

personnel must treat the material as flammable and highly toxic (unless physical appearance excludes flammability). This requires use of maximum protective gear and, if containing spill, the most inert adsorbent materials. Power should be shut down to the area immediately. An explosive gas detector should be used by response personnel entering area. If the incident is a spill, a sample of th material should be tested with pH paper and saved for chromatographic analysis.

If the spill or release of unknown material is too large for site personnel to control, site personnel will take action to contain the hazardous material and will then wait for assistance from the emergency response contractor and local emergency response agencies. Containment efforts will consist only of such actions as shutting down power, closing valves, placing dikes or booms in path of spreading spill, etc., that do not expose personnel to explosion hazards or additional releases.

Step 3: Characterize all secondary hazards

Obtain as much information as possible regarding secondary hazards:

- ignitable materials in area
- ignition sources in area
- chemical incompatibilty of materials in area
- potential for exotherm/runaway reaction during reactor shutdown
- routes by which spilled/released material could escape immediate area, such as floor drains, sewers, runoff to soil, ventilation systems

Inform all response personnel of these secondary hazards. Severe hazards will prevent entry of personnel to area. Secondary hazards that can be remedied by relocating threatened materials or by disabling equipment will determine further response actions for containment.

APPENDIX GI

PHONE LIST FOR EMERGENCY CONTACTS/NOTIFICATION

Akzo Research Emergency Coordinators

Name & Title	Extension	Home Phone
Moneeb Zakaria Alternate Emergency Coordinator & Env. and Reg. Affairs Mgr.	284	(708) 246-8259
Madelyn Ashum-Johnson Alternate Emergency Coordinator & Environmental Engineer	366	(708) 390-0896
Ram Shetty Alternate Emergency Coordinator & Research Coordinator	260	(708) 964-2388
Spence Line Alternate Emergency Coordinator & Building Supervisor	205	(708) 985-9130

Other Akzo Research Personnel

Dr. Dieter Frank Vice Pres., Research	201	(708) 420-8127
Dr. James Richmond Chemical Research Manager	315	(708) 436-5379
Dr. Fred Gadberry Chairman of Special Hazards Committee	266	

Akzo Personnel Outside Research

Name & Title	Office	Home Phone
Mariam Tehrani Corp. Mgr. of Env. Affairs	73-7616	(708) 898-4456
Mary Thompson Corp. Mgr. of Ind. Hygiene	73-7665	(708) 682-0259

Akzo Personnel Outside Research (cont'd.)

Name & Title	Office	Home Phone
Marge Waterstreet Corp. Mgr. of Communications	73-7651	(312) 472-1159
McCook Plant Guardhouse	77-203	
Tom Chefalo McCook Plant Safety Director	77-222	
Kathy Rollins McCook Plant Env. Engr.	77-269	

Local Agencies/Contacts

Name & Address	Phone
McCook Fire Department	447-1235
McCook Police Department	447-1231
Lyons Police Department	447-1225
Village of McCook Jerry Bubash, Chairman of Env. Board 50th & Glencoe Ave. McCook, IL 60525	447-9030
LaGrange Immediate Family Care Clinic	354-3000
LaGrange Memorial Hospital	352-1200
Metropolitan Sanitary District 100 E. Erie St. Chicago, IL 60611	(312)751-5600
Cook County Emergency Services and Disaster Agency	865-4766
Cook County Dept. of Env. Control Maybrook Civic Center 1500 Maybrook Drive, Room 202 Maywood, IL 60153	865-6165

APPENDIX GI (cont'd)

State, Federal Agencies/Contacts

Name & Address	Phone
Illinois Emergency Services and Disaster Agency	(217) 782-7860
Illinois EPA 1701 S. First Ave. Maywood, IL 60153	(708) 345-9780
Illinois EPA - Div. of Water Pollution Control	(708) 345-9780
National Response Center	(800) 424-8802
USEPA Regional Office (Region 5) 230 S. Dearborn Chicago, IL 60604	(312) 353-2000
CHEMTREC	(800) 424-9300

APPENDIX GII

Logging and Special Reporting of Incidents
(Phone List in Appendix GI)

I. LOGGING

The Emergency Coordinator must maintain a log of the emergency incident and circumstances surrounding the incident. The following information should be included:

A. Assessment of pre-incident site condition (condition of process equipment, weather, condition of any containment structures such as dikes, etc.)

B. Date, time and duration of incident.

C. Complete description of substances involved, including:

- proper chemical names of all components
- estimated weights or volumes involved
- physical states of all components

D. Cause of incident, if known.

E. Call Reports for all persons and agencies notified. See sample form in Figure G17.

F. Record of all control measures taken and all followup reports filed. This may include photographs to document condition of incident site before, during and after all control/cleanup operations, and after final site inspection by regulatory agencies.

NOTE: All photographs should be filed with complete record of date, time, location, photographer name and address, and names and addresses of any persons appearing in photographs.

II. REPORTING OF INCIDENT TO NATIONAL RESPONSE CENTER (AND IESDA)

When reporting an incident to the NRC, the following information must be included:

A. Name and phone number of caller.

B. Name and phone number of facility.

C. Time and type of incident.

D. Name and quantity of material(s) involved.

E. Extent of any injuries incurred.

F. Any possible hazards to human health, or the environment, outside the facility.

III. SPECIAL REPORTING FOR RELEASE OF "RQ" THAT MIGRATES BEYOND FACILITY BOUNDARY

If a Reportable Quantity of a (CERCLA) Hazardous Substance or (SARA) Extremely Hazardous Substance has been released and has migrated beyond facility boundaries via any medium, reporting requirements are as follows:

A. Notify the following:

- Cook County Emergency Services and Disaster Agency
- McCook Fire Department

Notification of these agencies will include the following information:

1. Chemical name and identity.
2. Whether the chemical is found on the list of Extremely Hazardous Substances.
3. Estimate of quantity released.
4. Time and duration of release.
5. Media into which the release occurred.
6. Any known or anticipated acute or chronic health risks associated with the release, and advice regarding medical attention.
7. Proper precautions to take as a result of the release (i.e. evacuation).
8. Name and phone number of person to be contacted for further information.

B. As soon as is practical after a release, the report is to be followed up with a written notice or notices documenting:

1. Actions taken to respond to and contain the release.

2. Any known or anticipated acute or chronic health risks associated with the release.

3. Advice regarding medical attention necessary for exposed individuals.

APPENDIX GIII

Followup Reporting by Emergency Coordinator
(Phone List in Appendix GI)

I. NOTICE OF RESUMPTION OF OPERATIONS

Before normal operations can resume in areas where processes were shut down to control an emergency, the following must be notified that emergency equipment has been restored to readiness, and that no incompatible wastes will enter areas undergoing cleanup:

EPA Regional Administrator (Region 5)
Illinois EPA- Div. Land Pollution Control
IESDA
Metropolitan Sanitary District
Village of McCook
Cook County Dept. of Environmental Control

II. NOTICE OF IMPLEMENTATION OF CONTINGENCY PLAN

Any time the contingency plan is implemented (i.e., Emergency Coordinator was called in and notification actions were initiated), a written report must be submitted to the USEPA Regional Administrator and the IEPA Division of Land Pollution Control within 15 days after the incident. The report must include:

A. Name, address and phone for facility owner or operator.

B. Name, address and phone for facility itself.

C. Date, time and type of incident.

D. Identity and amount of material(s) involved.

E. Extent of any injuries incurred.

F. An assessment of actual or potential hazards to human health or the environment, where applicable.

G. Estimated quantity and disposition of recovered materials that resulted from the incident.

III. UNUSUAL INCIDENT REPORT (INTRA-COMPANY)

An unusual incident report must be completed for any injury, fire explosion, spill, or emission incident. This report should be completed by someone from the incident area, but may be completed by the Emergency Coordinator if necessary. A sample of the form currently used for this report is shown in Figure G18. The completed report must be distributed to the following persons:

APPENDIX GIII (cont'd)

Distribution List for Unusual Incident Report

Corporate Director of Regulatory Affairs
Corporate Manager of Environmental Affairs
Corporate Director of Safety and Health
McCook Research Director
McCook Primary Emergency Coordinator
McCook Manager of Environmental and Regulatory Affairs
McCook Environmental Engineer
McCook Central Safety Committee
Supervisor(s) of Person(s) Involved in Incident

APPENDIX GIV

HAZARDOUS CHEMICALS STORED ON-SITE

Name	Maximum Amt.* Stored (lb)	RQ (lb)**	Location***
Acetone	1200	5000	Solvents
Acrylonitrile	600	100-EHS	P. P. Yard
Ammonia	900	100-EHS	Cylinders
Benzyl Chloride	400	100-EHS	Cylinders
n-Butyl Alcohol	150	5000	Solvents
Chloroform	120	5000	Solvents
Dichloromethane (Methylene Chloride)	700	1000	Solvents
Diethylamine	1500	100	Solvents
Diethyl Sulfate	600	Poison	P. P. Yard
Dimethyl Sulfate	900	1-EHS	Solvents
Ethyl Chloroacetate	500	Poison	Solvents
Ethylene Oxide	1000	1-EHS	Solvents
Isooctane (2,2,4-Trimethylpentane)	400	Flammable	Solvents
Isopropanol	3500	Flammable	Solvents
Methanol	600	5000	Solvents
Methyl Chloride	300	1	Cylinders
Methyl Ethyl Ketone	800	5000	Solvents
Mineral Spirits (Petroleum Naphtha)	800	Flammable	Solvents

* - Based on past usage and storage
** - Reportable Quantity, if listed as a (CERCLA) Hazardous Substance. If not listed, hazardous characteristic given. "EHS" indicates (SARA) Extremely Hazardous Substance
*** - Refer to Figure G19 for storage locations.

APPENDIX GIV (cont'd.)

HAZARDOUS CHEMICALS STORED ON-SITE

Name	Maximum Amt.* Stored (lb)	RQ (lb)**	Location***
Perchoroethylene (Tetrachloroethylene)	1500	1	Solvents
Sodium Hydroxide (50%)	1000	2000	Tank
Sodium Methoxide	150	Flammable	Solvents
Toluene	1000	1000	Solvents
Xylene	1200	1000	Solvents

APPENDIX GV

CONTINGENCY PLAN DISTRIBUTION LETTERS

APPENDIX GV

CONTINGENCY PLAN DISTRIBUTION LETTERS

AKZO

Chemical Division

November 4, 1988

Chief John M. Hickey
Cook County Local Emergency
Planning Committee
1401 S. Maybrook Dr.
Maywood, IL 60153

Dear Sir:

Enclosed is a copy of the RCRA Contingency Plan for Akzo Chemicals Inc. McCook Research Facility, 8401 W. 47th Street, McCook, IL 60525. If you have any questions or suggestions regarding this plan, I can be reached at 442-7100 ext. 366.

We would appreciate that the information in the Contingency Plan be kept confidential.

Sincerely,

Madelyn Ashum-Johnson

Madelyn Ashum-Johnson
Environmental Engineer

MAJ/ld

Enclosure

Akzo Chemicals Inc.
8401 West 47th Street
McCook, Illinois 60525
Tel (312) 442-7100
Fax (312) 242-2322

AKZO

Chemical Division

November 4, 1988

Police Chief
McCook Police Dept.
50th & Glencoe
McCook, IL 60525

Dear Sir:

Enclosed is a copy of the RCRA Contingency Plan for Akzo Chemicals Inc. McCook Research Facility, 8401 W. 47th Street, McCook, IL 60525. If you have any questions or suggestions regarding this plan, I can be reached at 442-7100 ext. 366.

We would appreciate that the information in the Contingency Plan be kept confidential.

Sincerely,

Madelyn Ashum-Johnson

Madelyn Ashum-Johnson
Environmental Engineer

MAJ/ld

Enclosure

Akzo Chemicals Inc.
8401 West 47th Street
McCook, Illinois 60525
Tel (312) 442-7100
Fax (312) 442-7222

AKZO

Chemical Division

November 4, 1988

Fire Chief
McCook Fire Dept.
50th & Glencoe
McCook, IL 60525

Dear Sir:

Enclosed is a copy of the RCRA Contingency Plan for Akzo Chemicals Inc. McCook Research Facility, 8401 W. 47th Street, McCook, IL 60525. If you have any questions or suggestions regarding this plan, I can be reached at 442-7100 ext. 366.

We would appreciate that the information in the Contingency Plan be kept confidential.

Sincerely,

Madelyn Ashum-Johnson

Madelyn Ashum-Johnson
Environmental Engineer

MAJ/ld

Enclosure

Akzo Chemicals Inc.
8401 West 47th Street
McCook, Illinois 60525
Tel (312) 442-7100
Fax (312) 242-2622

AKZO

Chemical Division

November 4, 1988

Oran B. Robinson
Hazardous Materials Officer
Illinois Emergency Services
and Disaster Agency
110 E Adams
Springfield, IL 62706

Dear Sir:

Enclosed is a copy of the RCRA Contingency Plan for Akzo Chemicals Inc. McCook Research Facility, 8401 W. 47th Street, McCook, IL 60525. If you have any questions or suggestions regarding this plan, I can be reached at 442-7100 ext. 366.

We would appreciate that the information in the Contingency Plan be kept confidential.

Sincerely,

Madelyn Ashum-Johnson

Madelyn Ashum-Johnson
Environmental Engineer

MAJ/ld

Enclosure

Akzo Chemicals Inc.
8401 West 47th Street
McCook, Illinois 60525
Tel (312) 442-7100
Fax (312) 242-3433

AKZO

Chemical Division

November 4, 1988

LaGrange Immediate Family Care Center
35 N. LaGrange
LaGrange, IL 60525

Attn: Manager

Dear Sir or Madam:

Enclosed is a copy of the RCRA Contingency Plan for Akzo Chemicals Inc. McCook Research Facility, 8401 W. 47th Street, McCook, IL 60525. If you have any questions or suggestions regarding this plan, I can be reached at 442-7100 ext. 366.

We would appreciate that the information in the Contingency Plan be kept confidential.

Sincerely,

Madelyn Ashum-Johnson

Madelyn Ashum-Johnson
Environmental Engineer

MAJ/ld

Enclosure

Akzo Chemicals Inc.
8401 West 47th Street
McCook, Illinois 60525
Tel (312) 442-7100
Fax (312) 242-2429

AKZO

Chemical Division

November 4, 1988

LaGrange Memorial Hospital
5101 S. Willow Springs Rd.
LaGrange, IL 60525

Attn: Chief Administrator

Dear Sir or Madam:

Enclosed is a copy of the RCRA Contingency Plan for Akzo Chemicals Inc. McCook Research Facility, 8401 W. 47th Street, McCook, IL 60525. If you have any questions or suggestions regarding this plan, I can be reached at 442-7100 ext. 366.

We would appreciate that the information in the Contingency Plan be kept confidential.

Sincerely,

Madelyn Ashum-Johnson

Madelyn Ashum-Johnson
Environmental Engineer

MAJ/ld

Enclosure

McCook Research Inc.
8401 W. 47th Street
McCook, Illinois 60525
Tel (312) 442-7100
Fax (312) 442-7111

APPENDIX GVI

USE OF FIRE OR SPILL RESPONSE EQUIPMENT

Fire Extinguisher Types and Fire Classifications

Fire Classifications:

Class **A** Fire - wood, paper, textiles, similar materials

Class **B** Fire - grease, oil, paint, solvents, etc.

Class **C** Fire - electrical equipment, area where live electricity is present

Class **D** Fire - pyrophoric metals, metal hydrides

Fire Extinguisher Types:

Dry Chemical - to be used for Class A, B or C fires

Carbon Dioxide - to be used for Class B or C fires

Halon - to be used in areas containing computerized equipmt.

"Smothering Agents" (soda ash, sodium chloride, graphite) - to be used for Class D fires

MOST LABS HAVE BEEN EQUIPPED WITH BOTH DRY CHEMICAL AND CARBON DIOXIDE EXTINGUISHERS.

A CARBON DIOXIDE EXTINGUISHER IS MOUNTED ON THE FENCE OF THE HAZARDOUS WASTE STORAGE AREA. BOTH THE DRY CHEMICAL AND CARBON DIOXIDE TYPE EXTINGUISHERS ARE APPROPRIATE FOR THIS AREA.

Water Cannons and Fire Hydrants:

These water sources are intended for use by trained firefighters only. Akzo McCook Research employees should not be involved in combatting fires large enough to require this equipment. Employees should be aware of the locations of this equipment, as described in Figure G8a of this Contingency Plan.

A photograph of a water cannon is attached, with operation features indicated.

Photograph of Water Cannon (1-26-90)

CONTROLS

1- Water On/Off Valve

2- Cannon Rotation / Direction

3- Width of Spray

Neutralizers and Sorbents Available On-Site

NEUTRALIZERS FOR ACID SPILLS:

Neutrasorb	- found in J.T.Baker lab spill kits - active ingredient: sodium carbonate - changes color to show neutralization - do not use on hydrofluoric acid
Kolorsafe for Acids	- found on spill team cart; 10 lb. boxes - active ingredient: sodium carbonate - changes color to show neutralization - do not use on hydrofluoric acid
Sodium Bicarbonate	- found in pilot plant; 55 gal. drum - do not use on hydrofluoric acid
Hydrofluoric Acid kit	- found in some J.T.Baker lab spill kits - one is stored near storeroom doorway

NEUTRALIZERS FOR CAUSTIC SPILLS:

Neutracit	- found in J.T.Baker lab spill kits - active ingredient: citric acid - changes color to show neutralization - do not use on cyanides or sulfides
Kolorsafe for Bases	- found on spill team cart; 10 lb. boxes - active ingredient: citric acid - changes color to show neutralization - do not use on cyanides or sulfides
Citric Acid	- found in spill supply cage; 50 lb. bag - do not use on cyanides or sulfides

OTHER NEUTRALIZERS:

Cyanide kit	- found in J.T.Baker lab spill kit (one near storeroom doorway)

BULK SORBENTS:

Solusorb	- found in J.T.Baker lab spill kits - consists essentially of activated carbon - can be dusty - use for solvents or noxious organics, <u>especially flammable ones</u>

Mercury-sorb	- found in J.T.Baker lab spill kits and on spill team cart (4 kg. box)
Hazorb	- found on spill team cart (5 gal. pails) and in spill supply cage (30 gal. drums) - foamed glass particles, very low density, very dusty - do not use for hydrofluoric acid, heavy metals, hydrazines or hydrazides
Activated Carbon	- found in spill supply cage (50 lb. boxes) - same particle size as Solusorb, can be dusty - use for solvents or noxious organics, especially flammable ones
Oil-Dri	- found in spill supply cage (25 lb. bags) - coarse clay particles - use for fatty products or oil-like spill
Safestep	- found in spill supply cage (25 lb. bag) - fine clay powder, dusty - use to pick up residual wetness left by other sorbent

SPILL-CONTAINMENT SORBENTS:

Haz-Mat Pigs	- found on spill team cart (6) and in spill supply cage (boxes of 12) - used to dike spill, prevent spreading - filled with polypropylene - do not use for halogenated ethers or hydrofluoric acid
Bregoil Sponges	- found in spill supply cage (boxes of 16) - filled with treated wood fiber - do not use for strong acids, strong bases, inorganic halides, heavy metals, hydrazines or hydrazides
Polysorb Pillows	- found in some labs and on spill team cart (usually boxes of 24) - filled with polypropylene - do not use on halogenated ethers
Powersorb Pillows	- found in spill supply cage (box of 16) - filled with polypropylene - do not use on halogenated ethers

APPENDIX GVII

Coordination Agreement Between Akzo Chemicals Inc.

and Heritage Remediation/Engineering, Inc.

PLANNED EMERGENCY RESPONSE SERVICE AGREEMENT (PERS)[1]

This PLANNED EMERGENCY RESPONSE SERVICE AGREEMENT is made and entered into on this 18th day of October, 1989, by and between Akzo Chemicals, Inc. ("CUSTOMER") with its principal offices at 8401 West 47th Street, McCook, Illinois 60525 and HERITAGE REMEDIATION/ENGINEERING, INC. ("HR/E"), with its principal offices at 7901 W. Morris Street, Indianapolis, IN 46231.

WHEREAS, CUSTOMER desires to secure emergency response services for certain emergencies it may encounter in its business; and

WHEREAS, HR/E is willing to provide such services.

NOW, THEREFORE, in consideration of these premises and the mutual convenants contained herein, the parties have developed the following Planned Emergency Response Service Agreement ("Agreement"):

I. Services to be Rendered

HR/E will respond to spill emergencies at the request of CUSTOMER (such request being made in accordance with Exhibit A), and will seek to stabilize and control any such spill emergency.

HR/E will provide a response team to address the specific emergency needs of CUSTOMER.

The response team will utilize equipment furnished by HR/E to respond to the spill emergency.

HR/E and CUSTOMER understand that the exact service needed in the event of a spill emergency cannot be foreseen. The exact services to be rendered will be determined pursuant to the particular circumstances of each situation.

CUSTOMER understands that while HR/E will attempt to handle every spill, HR/E does not guarantee that it will be able to handle every emergency services request. If HR/E cannot respond due to lack of equipment, personnel, or otherwise, HR/E will attempt to provide appropriate telephonic or field oversight. HR/E will upon request of the CUSTOMER refer the client to another contractor who may be better able to respond with appropriate technical personnel and/or equipment.

[1]Registered Trademark

Revised 3/22/89

G-78 (2/15/90)

At CUSTOMER'S request, HR/E will perform Emergency Response Audits and Training. In such audits and training, CUSTOMER'S environmental management team will be interviewed and response contingency plans will be analyzed to attempt to ensure prompt and efficient action for spill emergencies in compliance with State and Federal requirements. HR/E's Emergency Response Audit/Training is further described in Exhibit E.

II. Fees for HR/E Services

(1) For all emergency spill cleanup services performed by HR/E, CUSTOMER shall pay HR/E a fee pursuant to Exhibit B to this Agreement. HR/E shall determine the extent of services rendered for the purpose of computing fees.

(2) CUSTOMER may pay HR/E upon execution of this Agreement an administration fee in the amount of $ N/A . This fee guarantees the rate schedule in Exhibit B for the following twelve month period commencing at execution of the Agreement. In the absence of payment of the administration fee, the rate schedule shown in Exhibit B may be modified upon 30-day written notice to CUSTOMER by HR/E.

(3) CUSTOMER shall pay HR/E $ N/A upon initiation of any Emergency Response Audits/Training.

(4) CUSTOMER shall pay HR/E $ N/A for each hazardous material, wastestream or potential cleanup residue for which approvals for acceptance have been received at waste management facilities selected or approved by Customer.

III. Payment

All invoices for response services will be sent to CUSTOMER at the following address:

Akzo Chemicals, Inc.

8401 West 47th Street

McCook, IL 60525
(312) 442-7100
Attn: Madelyn Ashum - Johnson Enviromental Engineering

G-79 (2/15/90)

III. Payment (Cont'd.)

Payment to HR/E is due within 30 days of the date on the invoice sent to CUSTOMER. HR/E will be paid under the terms and conditions of this Agreement and payment to HR/E shall not be contingent upon nor await any insurance settlement.
All payments for services rendered should be directed to:

Heritage Remediation and Engineering, Inc.
P.O. Box 66079
Indianapolis, Indiana 46266

Balances on invoices for which payment is not received within thirty (30) days after the date of invoice will be charged a 1.5% finance charge. An additional 1.5% finance charge on any outstanding balance shall be added on the first day of each thirty day period thereafter while any portion of the invoice remains unpaid.

CUSTOMER also shall pay any taxes, tariffs or other such levies imposed by local, state or federal governments on the services or any products of the services.

IV. Governmental Notices

CUSTOMER will notify all necessary local, state and federal environmental and other agencies of any spills, unless HR/E is requested to do so in writing.

V. Effective Date

This Agreement shall take effect on the date set forth above and shall continue in effect for one (1) year or until terminated by either party in accordance with Section VI below.

VI. Termination

Either party may terminate this Agreement with or without cause by giving the other party thirty (30) days' written notice, by U.S. mail, return receipt requested. The thirty day period runs from receipt of the termination notice.

Termination hereunder shall operate to discharge all obligations which are executory by either party on and after the effective date of termination except CUSTOMER'S duty to pay for services already rendered.

VI. Termination (Cont'd.)

Termination shall be in addition to, and not in lieu of, a party's right to cancel for breach.

VII. HR/E Responsibilities

(1) HR/E shall select specific techniques for managing any cleanup. *

HR/E acknowledges that, in theevent HR/E agrees to manage a cleanup hereunder, that it may be required to handle hazardous waste or hazardous substances and that HR/E (or its subcontractors) has the knowledge, techonology, personnel and expertise to handle same.

(2) HR/E will seek to clean up spills in compliance with all valid and applicable statutes, rules and regulations of the Federal and State governments.

(3) The vehicles or vessels, material containers, and personnel to be provided by HR/E in the performance of the Agreement, to the best of HR/E's knowledge, have obtained or will obtain any permits, licenses, certificates, or approvals required to comply with valid and applicable statutes, rules and regulations of the Federal and State governments; and

(4) HR/E will employ storage facilities, recycling facilities, treatment facilities, or disposal facilities that to the best of HR/E's knowledge have permits, licenses, certificates, or approvals required by applicable statues, rules and regulations of the Federal and State governments.

(5) HR/E and its employees shall comply with CUSTOMER'S safety procedures while on CUSTOMER'S premises, provided such procedures (1) do not unreasonably hinder in HR/E's sole judgment, HR/E's conduct of its work; (2) are conspicuously and legibly posted in the working area; and (3) a copy of such procedures has been delivered to HR/E prior to the commencement of work on CUSTOMER'S premises.

(6) Emergency conditions may dictate that HR/E serve as the CUSTOMER'S Agent for purpose of coordinating transportation, permitting and disposal of waste in the physical absence of the CUSTOMER'S authorized representative. If the CUSTOMER signs this subsection, HR/E is hereby authorized to coordinate these activities as necessary.

NAME	TITLE	SIGNATURE

(7) HR/E shall not be responsible for contamination of any product which is handled by HR/E or a subcontractor of HR/E.

VIII. CUSTOMER Responsibilities

CUSTOMER warrants and represents to HR/E that:

(1) CUSTOMER has provided HR/E with a list of hazardous materials, waste products, oil and other materials at each of its sites, and a description of CUSTOMER'S business activities (Exhibit C). The descriptions of hazardous materials, waste products, oils, and other materials at site (s) and the description of CUSTOMER'S business activities are true and correct in all respects. CUSTOMER is in full compliance and will use its best efforts to remain in full compliance during the term of this Agreement, with all materials description requirements of valid and applicable statutes, ordinances orders, rules and regulations of the Federal, State and local governments.

(2) If CUSTOMER obtains knowledge or receives information during the term of this Agreement that materials handled at CUSTOMER'S facilities, or some component of such materials, present or may present a hazard or risk to persons or the environment which previously was not disclosed to HR/E, CUSTOMER shall promptly notify HR/E and disclose such information.

(3) If regulations promulgated or revised under Section 3001 of the Resource Conservation and Recovery Act of 1976 ("RCRA") identify materials present at CUSTOMER'S facilities as "hazardous waste", either by characteristics or listing, CUSTOMER, prior to the execution of this Agreement, has filed with the appropriate governmental agency the preliminary notification required by RCRA Section 3010 (a). CUSTOMER will provide HR/E with evidence thereof.

(4) If, during the term of this Agreement, any material handled at CUSTOMER'S facilities, or some component of such materials, becomes or is classified as a "hazardous waste", through new or amended laws or regulations or the handling of new materials or otherwise, CUSTOMER will promptly file with the appropriate government agency the preliminary notification required by RCRA Section 3010 (a) and provide HR/E with evidence thereof.

(5) CUSTOMER has sole title to the materials and contaminated matter which will be tendered to HR/E in the event of a spill cleanup, and is under no legal restraint -- statutory, regulatory, administrative or judicial -- which prohibits the transportation of or the transfer of possession to HR/E of such materials or contaminated matter.

(6) CUSTOMER agrees to provide HR/E, its employees and subcontractors, a safe working environment for any work in performance of this Agreement which must be undertaken on premises owned or controlled by CUSTOMER.

VIII. CUSTOMER Responsibilities (Cont'd.)

(6) This section does not apply to the actual recovery or handling of a hazardous substance involved in an emergency serviced under this Agreement, to the extent that any lack of safety arises from the hazardous substance (as opposed to CUSTOMER'S physical plant, equipment furnished to HR/E by CUSTOMER or any other action or inaction by CUSTOMER), provided that CUSTOMER has furnished HR/E with all technical advice known to it concerning hazards that may be associated with the hazardous substance, container (s) or physical location.CUSTOMER further agrees to provide all information required under 29 CFR 1910.120 (b) (1) (IV).

IX. HR/E Insurance

HR/E shall procure and maintain, at its own expense, during the term of this Agreement, at least the following insurance covering activities performed under, and contractual obligations undertaken in, this Agreement:

	COVERAGE
a. Worker Compensation	Statutory
b. Employers Liability	$1,000,000 each occurrence
c. Public Liability (bodily injury)	$5,000,000 combined single limit
d. Public Liability	Same as (c) above
e. Automobile Liability (bodily injury and property damage	$5,000,000 each occurrence (includes MC-90 endorsement)
f. Contractors Pollution Liability (TSDF's and customer's site)	$1,000,000 each occurrence $2,000,000 total losses (claims made only)

IX. HR/E Insurance (Cont'd.)

HR/E agrees to furnish to CUSTOMER, at CUSTOMER'S request, insurance certificates, showing HR/E's compliance with the above requirements.

X. Indemnification

CUSTOMER agrees to indemnify, save harmless and defend HR/E from and against any and all liabilities, claims, penalties, forfeitures, suits and the costs and expenses incident thereto (including cost of defense, settlement and reasonable attorney's fees), which HR/E may hereafter incur, become responsible for or pay out as a result of death or bodily injury to any person, destruction or damage to any property, breach of any warranty or violation of any governmental laws, regulations or orders, caused, in whole or part, by (i) CUSTOMER'S breach of any term or provision of this Agreement, or (ii) any negligent or intentional act or omission of CUSTOMER, its employees or subcontractors.

HR/E agrees to indemnify, save harmless and defend CUSTOMER from and against any and all liabilities, claims, penalties, forfeitures, suits, and the costs and expenses incident thereto (including costs of defense, settlement and reasonable attorney's fees), which CUSTOMER may hereafter incur, become responsible for or pay out as a result of death or bodily injury to any person, destruction or damage to any property, breach of any warranty, or any violation of governmental laws, regulations or orders, caused, in whole or part, by (i) HR/E's breach of any term or provision of this Agreement, or (ii) any negligent or in tentional act or omission of HR/E, its employees or subcontractors.

XI. Confidentiality

HR/E and CUSTOMER shall treat as confidential and not disclose to others during or subsequent to the term of the Agreement, except as is necessary to perform this Agreement (and then only on a confidential basis satisfactory to both parties) or as required by law, any information (including any technical information, experience or data) regarding either party's plans, programs, plant processes, products, costs, equipment, operations or customers which may come within the knowledge of the parties, their officers or their employees in the performance of this Agreement without in each instance securing the prior written consent of the other party.

HR/E shall also treat as confidential and shall not disclose to others, except as is necessary to perform this Agreement (and then only on a confidential basis satisfactory to both parties) or as required by law, information relating to the chemical composition of the materials or the quantity of materials involved in any accidental spill by CUSTOMER.

XI. Confidentiality (Cont'd.)

Nothing above, however, shall prevent either HR/E or CUSTOMER from disclosing to others or using in any manner information which either party can show:

(1) Has been published and has become part of the public domain other than by acts or omissions of HR/E or CUSTOMER;

(2) Has been furnished or made known to HR/E or CUSTOMER by third parties (other than those acting directly or indirectly for or on behalf of HR/E or CUSTOMER) as a matter of legal right without restrictions on its disclosure;

(3) Was in either party's possession prior to the disclosure thereof by CUSTOMER or HR/E to each other; or

(4) Was developed or discovered without reference to any information obtained in the course of performing services under this Agreement.

Provided, however, that neither party shall release, or cause or allow the releases of, information to the communications media, except as required by law, concerning the existence of terms of this Agreement, any material including identification of CUSTOMER or the waste, identification of the storage, recycling, treatment or disposal facility receiving the spill residues, or the general description, characteristics or constituents of the spill, without in each instance securing the consent of the other party.

The foregoing obligations shall survive the termination or expiration of this Agreement.

XII. Inspection

CUSTOMER shall have the right, during normal working hours, to inspect and obtain copies of all written licenses, permits or approvals, issued by any government entity or agency to HR/E which are applicable to the performance of the Agreement; to inspect and test, at its own expense, transportation vehicles or vessels, containers or disposal facilities provided by HR/E; and to inspect the handling, loading, transportation, recycling, treatment, storage or disposal operations employed by HR/E in the performance of the Agreement.

XIII. Independent Contractor

HR/E is and shall perform this Agreement as an independent contractor and, as such, shall have and maintain complete control over all of its employees, agents, and operations.

Neither HR/E nor anyone employed by it shall be or be deemed to be the agent (except as otherwise provided in Section VI (6), representative, employee or servant of CUSTOMER.

XIV. Excuse of Performance

The performance of this Agreement, except for the payment of money for services already rendered, may be suspended by either party in the event the work by HR/E is prevented by a cause or causes beyond the reasonable control of such party. Such causes shall include, but are not limited to, acts of God, acts of war, riot, fire, explosion, accident, flood, or sabotage; lack of adequate fuel, power, raw materials, labor or transportation facilities; governmental laws, regulations, requirements, orders or actions; breakage or failure of machinery or apparatus; national defense requirements; injunctions or restraining orders; labor trouble, strikes, lockouts or injunctions (provided that neither party shall be required to settle a labor dispute against its own best judgement).

XV. Entire Agreement

This Agreement represents the entire understanding and agreement between the parties hereto with respect to the subject matter hereof and supersedes any and all prior agreements, whether written or oral, that may exist between the parties.

No agreement purporting to modify, vary, supplement or explain any provision of this Agreement shall be effective unless in writing, signed by representatives of both parties.

In no event shall the preprinted terms or conditions found on any CUSTOMER purchase or work order be considered an amendment or modification of this Agreement, even if such documents are signed by representative of both parties.

XVI. Delegations and Assignment.

HR/E may at any time delegate the performance of the work, or any portion thereof, which is by this Agreement undertaken by HR/E with customer approval (confirmed in writing at a later time if verbal). Either party may at any time upon written notice to the other party, assign its rights under this Agreement.

XVII. Notice

Any notice to be given under this Agreement shall be in writing and delivered to the address of the respective party below:

CUSTOMER: Akzo Chemicals, Inc.

McCook Research Plant

8401 West 47th Street

McCook, IL 60525

HR/E: Heritage Remediation and Engineering, Inc.
Attn: Corporate Manager Technical Programs
8205 S. Cass Avenue-Suite 106
Darien, IL 60559
FAX: (312) 969-2035

XVIII. Governing Law

The validity, interpretation and performance of this Agreement shall be governed by and construed in accordance with the laws of Indiana, without regard to principles of conflicts of law.

XIX. Waiver

Any waiver by either party of any provision or condition of this Agreement shall not be construed or deemed to be a waiver of any other provision or condition of this Agreement, nor a waiver of a subsequent breach of the same provision or conditions, unless such waiver be so expressed in writing and signed by the party to be bound.

XX. Separability

If any section, subsection, sentence or clause of this Agreement shall be adjudged illegal, invalid or unenforceable, such illegality, invalidity or unenforceability shall not affect the legality, validity or enforceability of this Agreement as a whole or of any section, subsection, sentence or clause thereof not so adjudged.

EXHIBIT A

COMMUNICATIONS INSTRUCTION

HR/E RESPONSE CENTER
CHICAGO DIVISION

HERITAGE REMEDIATION/ENGINEERING

ADDRESS: Mailing - P.O. Box 337
Lemont, IL 60439

Physical - N.E. Canal Bank Road
Lemont, IL 60439

PHONE NUMBERS: 312/739-1150 FAX: 312/739-9491

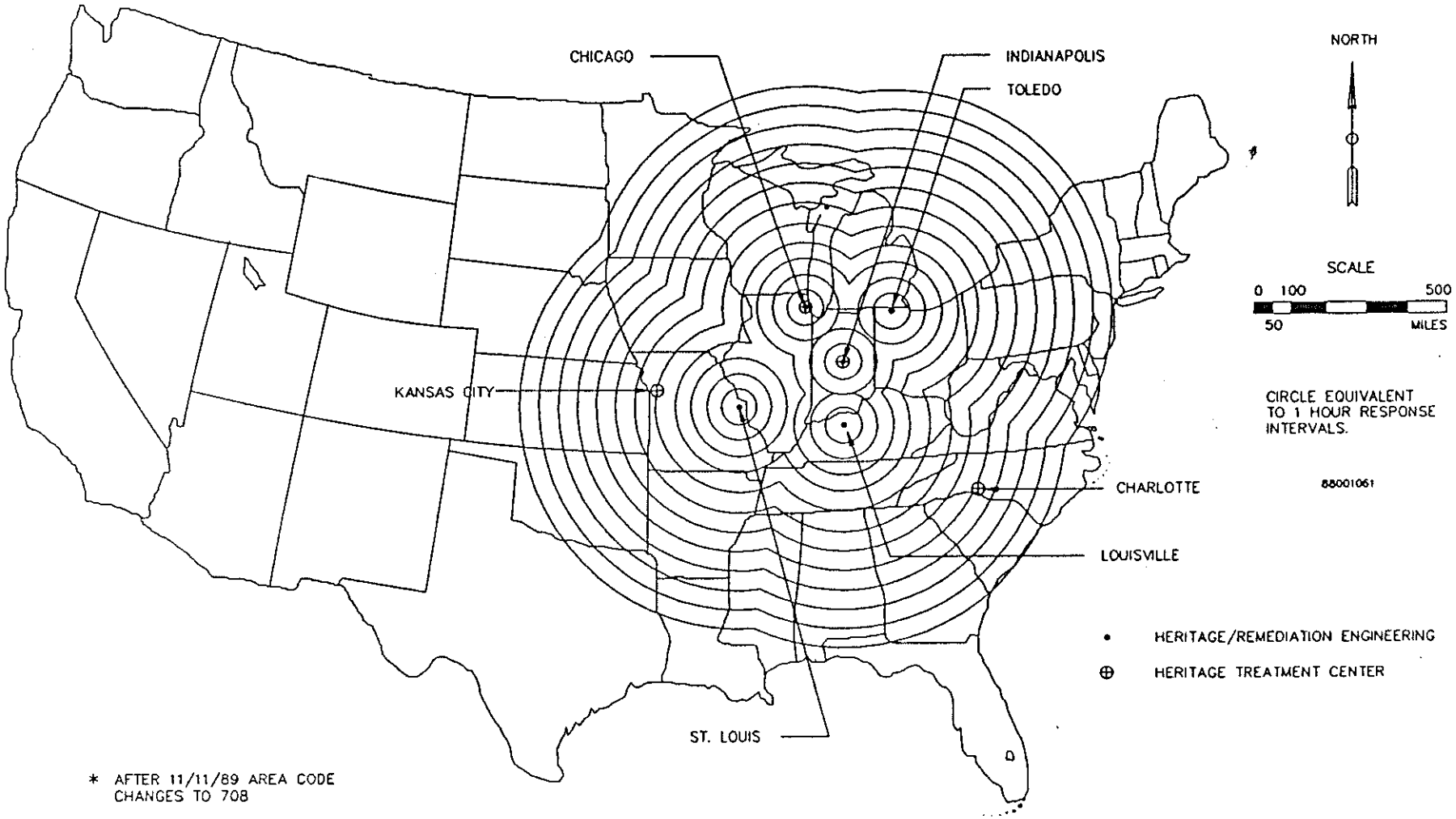
PROCEDURE: Above telephone manned by HR/E personnel or answering service, 24 hours per day, 365 days each year.

When calling for assistance, please provide the following information:

A. Name and telephone number of the reporter.
B. Name and address of the facility/company.
C. Identify your company as a PERS customer and give your PERS contract number, if known.
D. Time, type and exact location of the incident
E. Name and quantity of material (s) involved, to the extent known.
F. What actions, if any, have been taken.

HERITAGE REMEDIATION/ENGINEERING, INC.

24 HOUR EMERGENCY RESPONSE



* AFTER 11/11/89 AREA CODE CHANGES TO 708

CHICAGO DIVISION
P.O. BOX 337
LEMONT, IL 60439
(312)* 730-1150
FAX (312)* 739-9491

INDIANAPOLIS DIVISION
P.O. BOX 51020
INDIANAPOLIS, IN 46251
(317) 243-7475
FAX (317) 243-2046

LOUISVILLE DIVISION
4925 HELLER AVENUE
LOUISVILLE, KY 40218
(502) 473-0638
FAX (502) 473-0173

ST. LOUIS DIVISION
183 McDONNELL BLVD.
ST. LOUIS, MO 63042
(314) 521-3600
FAX (314) 731-3922

TOLEDO DIVISION
615 FRONT STREET
TOLEDO, OH 43605
(419) 693-4396
FAX (419) 691-1227

G-89

EXHIBIT B

Price List to be provided by HR/E.

SCHEDULE OF STANDARD FEES

EFFECTIVE FEBRUARY 1, 1989

Section 1.0 - Personnel

	Regular	Overtime	Travel Rate
Corporate Officer	125.00/hr	125.00/hr	90.00/hr
Department Manager	110.00/hr	110.00/hr	90.00/hr
Senior Project Manager/Engineer/ Geologist/Chemist/Scientist II	88.00/hr	88.00/hr	65.00/hr
Senior Project Manager/Engineer/ Geologist/Chemist/Scientist I	79.00/hr	79.00/hr	52.00/hr
Industrial Hygienist	79.00/hr	79.00/hr	52.00/hr
Project Manager/Engineer/ Geologist/Chemist/Scientist II	68.00/hr	68.00/hr	48.00/hr
Project Manager/Engineer/Geologist Chemist/Scientist I	58.00/hr	58.00/hr	40.00/hr
Safety Officer	58.00/hr	58.00/hr	40.00/hr
Environmental Specialist/Disposal Coordinator	50.00/hr	50.00/hr	31.00/hr
Superintendent	48.00/hr	64.00/hr	
Supervisor	45.00/hr	60.00/hr	
Engineering Assistant/Draftsman	45.00/hr	60.00/hr	
Equipment Operator	40.00/hr	54.00/hr	
Environmental Technician	38.00/hr	51.00/hr	
Administrative Assistant	35.00/hr	47.00/hr	
Truck Driver	35.00/hr	47.00/hr	
Recovery Technician	32.00/hr	43.00/hr	
Word Processor/Secretary	29.00/hr	29.00/hr	

Per Diem.....$75.00/man/day (minimum charge)

HERITAGE REMEDIATION/ENGINEERING, INC.
SCHEDULE OF STANDARD FEES

Section 2.0 - Equipment

2.1 Personal Protection and Safety Equipment

Level A Protection or Equivalent.....280.00/man/day
Level B Protection or Equivalent.....220.00/man/day
Level C Protection or Equivalent..... 90.00/man/day
Level D Protection or Equivalent..... 35.00/man/day
Cascade Manifold Breathing Air System..... 60.00/day
Breathing Air Hose (50 ft. section)..... 10.00/section/day
Egress Emergency Escape Air Packs..... 70.00/day
Self Contained Breathing Apparatus.....135.00/day
Portable Eye Wash..... 25.00/day
Portable Shower..... 25.00/day
Personnel Decontamination Station..... 50.00/day
Safety Harness and Tripod..... 30.00/day
Proximity Suits.....325.00/man/day
Goretex Turnout Gear.....200.00/man/day

2.2 Transport Equipment

Automobile..... 60.00/day
Crew Van..... 85.00/day
Pick-up Truck..... 65.00/day
Crew Cab Pick-up Truck..... 80.00/day
Four Wheel Drive Vehicle..... 85.00/day
Utility Truck (1 ton)..... 80.00/day
Box Van (1 ton).....110.00/day
Box Van (2 ton).....130.00/day
Box Van (6 ton).....180.00/day
Stake Bed Truck.....150.00/day
Fuel/Mechanics Truck..... 90.00/day
Semi-Tractor.....300.00/day
Flat Bed Trailer.....145.00/day
Emergency Response Trailer (20 ft.).....200.00/day
Decontamination Trailer (30 ft.).....230.00/day
Decontamination Trailer (40 ft.).....350.00/day
Low Boy/Drop Deck Trailer.....165.00/day
Box Trailer..... 60.00/day
Office Trailer..... 50.00/day
Equipment Trailer..... 30.00/day
Water Trailer..... 25.00/day
Water Trailer (w/pump)..... 37.00/day
Tanker Trailer (7,000 gal.).....300.00/day
Tanker Trailer (5,000 gal.).....200.00/day
Semi-Dump Trailer.....200.00/day
Dump Truck.....325.00/day

HERITAGE REMEDIATION/ENGINEERING, INC.
SCHEDULE OF STANDARD FEES

2.3 Vacuum Equipment

Vacuum Truck (3,000 gal.; includes 50 ft. of hose).. 50.00/hr
Vacuum Truck (3,500 gal.; includes 50 ft. of hose).. 55.00/hr
Vacuum Semi-Tanker/Tractor (5,000 gal.;includes
50 ft. of hose)..... 65.00/hr
Vacuum Unit (1,500 gal.; includes 50 ft. of hose)... 30.00/hr
Portable HEPA Vacuum units.....150.00/day
Mercury HEPA Vacuum.....175.00/day
HEPA Drum Vacuum.....195.00/day
Drum Vacuum..... 75.00/day

2.4 Waste Excavation and Handling Equipment

Front-End Crawler Loader (963 or Equivalent).....635.00/day
Front-End Crawler Loader (955 or Equivalent).....580.00/day
Rubber-Tired Loader (930 or Equivalent).....550.00/day
Crawler Dozer (Cat D-6 or Equivalent).....535.00/day
Crawler Dozer (Cat D-3 or Equivalent).....350.00/day
Trackhoe Excavator (Cat 225 or Equivalent).....675.00/day
Trackhoe Excavator (Cat 215 or Equivalent).....625.00/day
Backhoe (Case 680 or Equivalent).....340.00/day
Backhoe (Case 580 or Equivalent).....260.00/day
Bobcat.....180.00/day
Fork Truck.....225.00/day
Hydraulic Breaker/Hammer (1,000 ft.-lb.).....350.00/day

2.5 Mobile Treatment and Recovery Equipment

Recessed Plate Filter Press (44 C.F.).....900.00/day
Pumping Barge.....650.00/day
Aerator Barge.....600.00/day
Homogenizer Mixer.....175.00/day
Clarifier (High-Capacity).....325.00/day
Clarifier (Low-Capacity).....275.00/day
Compatibility Chamber.....250.00/day
Holding Tank (5,000 gal. +)..... 40.00/day
Holding Tank (less than 5,000 gal.)..... 30.00/day
Chemical Conditioning Tank..... 50.00/day
Tilted Plate Separator.....240.00/day
Mobile Activated Carbon Filter (3 cell).....300.00/day
Activated Carbon Filter (2 cell).....220.00/day
Activated Carbon Filter (1 cell).....150.00/day
Mobile Mixer Media Filter (duplex).....140.00/day
Air Scrubber/Stripper.....100.00/day
Cartridge Filter Unit..... 20.00/day
Bag Filter Unit..... 20.00/day
Flow Meter..... 20.00/day
pH Meter/Controller..... 30.00/day
ORP Meter/Controller..... 30.00/day
Flash Mixer..... 35.00/day

HERITAGE REMEDIATION/ENGINEERING, INC.
SCHEDULE OF STANDARD FEES

2.5 Mobile Treatment and Recovery Equipment (Cont'd)

Chemical Feed Pump..... 25.00/day
Oil Skimmer.....120.00/day
Rope Skimmer.....350.00/day
Portable Pool (13,000 gal.).....150.00/day

2.6 Pumping Equipment

6" Trash Pump.....220.00/day
3" and 4" trash pump.....150.00/day
4" Submersible Pump.....170.00/day
3" Submersible Pump.....120.00/day
2" Submersible Pump..... 70.00/day
3/4" Garden Hose Pump..... 15.00/day
1", 2", 3" Air Diaphragm Pump..... 75.00/day
1", 2", 3" Polypropylene Air diaphragm Pump.....125.00/day
1", 2", 3" Stainless Steel Air Diaphragm Pump.....150.00/day
1½", 2" Gas Centrifugal Pump..... 75.00/day
3", 4" Gas Centrifugal Pump.....150.00/day
Liquid Gas Transfer Pump.....Quoted Per Occurrence
2", 3" Chemical Hose with Appropriate
Fittings (1' section)..... 3.00/ft./day
3", 4" Suction Hose (20' section)..... 7.00/section/day
1½", 2" Suction Hose (20' section)..... 6.00/section/day
3" Discharge Hose (100' section)..... 25.00/section/day
1", 1½", 2" Discharge Hose (100' section)..... 20.00/section/day

2.7 Compression Equipment

Diesel Air Compressor (175 CFM).....160.00/day
Diesel Air Compressor (375 CFM).....240.00/day
Diesel Air Compressor (600 CFM).....365.00/day
Pressure Wash Unit (5,000 PSI).....170.00/day
Pressure Wash Unit (2,500 PSI).....130.00/day
Butterworth Tank Wash System..... 60.00/day
Air Blower..... 35.00/day
Hydrolaser (10,000 PSI).....600.00/day
Steamer (200,000 BTU).....140.00/day
Portable Boiler (150 HP).....300.00/day
Graco Airless Spray Wash..... 75.00/day
Pressure Hose (wash units, 50' sections)..... 30.00/section/day
Air Hose (3/4", 50' section)..... 15.00/section/day

2.8 Sampling and Analytical Equipment

Field pH Meter..... 25.00/day
Flash Point Analyzer..... 40.00/day
Photoionization Detector.....150.00/day
Organic Vapor Analyzer.....200.00/day

HERITAGE REMEDIATION/ENGINEERING, INC.
SCHEDULE OF STANDARD FEES

2.8 Sampling and Analytical Equipment (Continued...)

Draeger Air Monitoring Pump	15.00/day
Asbestos Monitoring Pump	20.00/day
Personal Air Sampling Pump	25.00/day
Air-Flow Calibrator	25.00/day
Explosimeter	60.00/day
Geiger Counter	80.00/day
Metal Detector	50.00/day
Magnetometer	75.00/day
Soil Gas Test Probe	40.00/day
Cyanide Meter	80.00/day
Carbon Monoxide Detector	80.00/day
Conductivity Meters	25.00/day
Mercury Vapor Monitor	190.00/day
Split Barrel Hand Sampler	30.00/day
Stainless Steel or Teflon Bailer	20.00/day
Hand Auger	15.00/day
Automatic Sampler (ISCO)	75.00/day
Totalizing Flow Meter (ISCO)	100.00/day
Water Level Meter	25.00/day
Oil/Water Interface Probe	30.00/day
Brainard-Kilman Sampling Pump	50.00/day
Peristaltic Sampling Pump	25.00/day
Portable Fume Hood	75.00/day
Mobile Laboratory	450.00/day
Sound Level Meter	30.00/day
Noise Dosimeter	30.00/day
Lab Pack Fingerprint Test Kit	100.00/day

2.9 Specialized Tools and Equipment

Hydraulic Drum Grappler	300.00/day
Drum Cart	20.00/day
Can Shredder	Quoted Per Occurrence
Explosion Proof Portable Radio	18.00/day
Portable Telephone	40.00/day
Microcomputer	50.00/day
Tank Tap Machine	Quoted Per Occurrence
Non-Sparking Tool Set	80.00/day
Pressurized Gas Overpack Containers	500.00/day
Tank Patch Kit	Quoted Per Occurrence
Communication Van	385.00/day
Drum Ripper	45.00/day
Drum Crusher	325.00/day

2.10 Miscellaneous Equipment

Generator (5 KW)	80.00/day
Generator (15 KW)	160.00/day
Satellite Light Set	20.00/day
Air Chisel	25.00/day

HERITAGE REMEDIATION/ENGINEERING, INC.
SCHEDULE OF STANDARD FEES

2.10 Miscellaneous Equipment (Continued)

Air Hammer	35.00/day
Transit	50.00/day
Concrete Coring Machine (Tooling Not Included)	40.00/day
Engineers Level	20.00/day
Pipe Cutter/Threader (Automatic)	30.00/day
Manual Pipe Cutter	50.00/day
Manual Pipe Threader	20.00/day
Concrete Saw (Portable)	60.00/day
Concrete Saw (Self Propelled)	165.00/day
Cutting Torch (Oxygen/Acetylene Not Included)	125.00/day
Portable Welder	60.00/day
Copy Machine	15.00/day
Facsimile Machine	20.00/day
Sandblaster	125.00/day
Jon Boat (12'; without motor)	60.00/day
Jon Boat (15'; without motor)	75.00/day
Outbound Motor (35 HP)	50.00/day
Containment Boom (4")	55.00/100'/day
Containment Boom (6")	80.00/100'/day
Partner Saw	50.00/day
Chain Saw	30.00/day
Portable Truck Scales	215.00/day
Portable Drum Scale	50.00/day
Truck Mounted Drill Rig (Mobile B-53 or equivalent)	425.00/day
Skid Mounted Drill Rig (Mobile B-24 or equivalent)	300.00/day

HERITAGE REMEDIATION/ENGINEERING, INC.
SCHEDULE OF STANDARD FEES

Section 3.0 - Expendables

Tyvek Suits	7.50/each
Tyvek Hoods	3.00/each
Chemrel Suits	40.00/each
Polycoated Tyvek Suits	10.00/each
Saranex Suits	22.00/each
Chemrel Suits (Level A)	105.00/each
Saranex Suits (NSR) (Level A)	80.00/each
Sample Gloves	0.50/pair
PVC Gloves	3.00/pair
Cloth Gloves	1.00/pair
Acid Gloves.(Milled Neoprene)	12.00/pair
Viton Gloves	80.00/pair
PVC/Latex Disposable Boots	5.50/pair
Rubber/PVC Boots	34.00/pair
Neoprene Boots	30.00/pair
Chest Waders	43.00/pair
Rain/Splash Gear	17.00/each
Duct Tape	6.00/roll
Pool Liners (13,000 gal.)	350.00/each
Coliwasa	12.00/each
Styrene Scoop	1.00/each
Visqueen	75.00/roll
Trash Bags	40.00/box
Overpack Drums	125.00/each
17 H Drums (reconditioned)	28.00/each
17 E Drums (reconditioned)	28.00/each
Sorbent Pads	80.00/bundle
Sorbent Sweeps	85.00/each
Sorbent Boom	191.00/bundle
Sorbent Roll	160.00/roll
Anti-fog	1.50/each
Glass Sampling Tubes (4')	1.50/each
Sample Jars (1 pt.)	0.75/each
Sample Jars (1 qt.)	0.75/each
Sample Jars w/teflon lid (1 qt.)	3.00/each
Sample Jars (8 oz. tall)	0.50/each
Labels (PCB or Hazardous Waste)	1.00/each
Safety Goggles	5.50/pair
Face Shields	6.50/each
Respirator Cartridges	17.50/pair
Nylon Rope (3/8")	105.00/roll
Oil Dry	6.00/bag
Vermiculite (19 lb. bag.)	8.00/bag
pH Paper	5.00/roll
Fiber Drums (30 gal.)	9.50/each
Draeger Tubes	4.00/each
Barrier tape/Hazard Tape	35.00/roll
Garden Hose	1.00/ft.

HERITAGE REMEDIATION/ENGINEERING, INC.
SCHEDULE OF STANDARD FEES

3.0 Expandables (Continued)

Heavy Duty Tank Cleaning Solution..... 10.00/gal.
Medium Duty Tank Cleaning Solution..... 9.50/gal.
Light Duty Tank Cleaning Solution..... 5.50/gal.

RATE SHEET

TERMS & CONDITIONS

- All rates are subject to change without prior written notice.
- Applicable federal, state, and local taxes and permit fees are added to the invoice. Projects requiring disposal permitting will incur a minimum additional charge of $600.00 (exclusive of analytical charges) for obtaining these permits.
- All rates are stated in United States dollars.
- All invoices are due upon receipt. Balances outstanding more than 30 days after the invoice date are subject to a monthly finance charge of 1½ percent per month from the invoice date.
- Invoices for payment shall cover a period of 14 calendar days and may be submitted on or after the day ending each period. HR/E's initial invoice may be submitted at any time after the date work is commenced. HR/E's invoice for final payment shall be submitted to the client as soon as practicable after receipt by HR/E of bills for all reimbursable costs of performing the work. HR/E reserves the right to increase or decrease the billing period on a case-by-case basis.
- Major equipment items temporarily not being used will incur a standby charge of one-half of the standard daily rate. In the event that HR/E cannot work due to factors beyond HR/E's control, both equipment and personnel will incur a charge of one-half of the standard daily rate with a full per diem charge for personnel. On scheduled non-work days, personnel will incur a full per diem charge for each day; equipment will not be charged in this case.
- HR/E per diem rates are charged for subcontractors whose expenses are paid by HR/E.
- Expendable items inventoried and warehoused by HR/E are billed according to the HR/E expendables price list. Expendable items purchased locally for specific projects are billed at the invoice price plus 20 percent.
- Mobilization and demobilization mileage will be charged on all vehicles per the following schedules: passenger vehicles = .30/mi.; utility and service vehicles = .55/mi.; over the road and transport vehicles = .85/mi.
- All items supplied by HR/E for which rates appear in the Schedule will be charged at the appropriate rate. For all equipment, materials, supplies, services and other applicable fees not described in the schedule which are obtained by HR/E from subcontractors or suppliers, the client shall reimburse HR/E for the cost to HR/E plus a handling charge of twenty (20) percent of such cost.
- All cleanup personnel and equipment will be charged portal to portal (mobilization and demobilization included). Services provided prior, during and/or subsequent to actual cleanup activities will also be charged.
- Lodging, subsistence, and other living expenses of personnel in the field are included in a Per Diem charge of $75.00/person/day.
- The Client shall reimburse HR/E for the cost of any bonds required by the Client and for the cost of all insurance in addition to standard coverage required to be carried by HR/E due to the nature of the work.
- The fees in the Schedule include the cost of HR/E's basic medical monitoring program. Any special requirements of the medical monitoring program required by the nature of the work will be considered part of the work and HR/E will be reimbursed by the Client for the cost of such special requirements which shall be separately identified in HR/E's invoices.
- Straight time hours are based on an eight hour work period. The normal work day is 7:00 am to 3:00 pm on weekdays. Other working hours must be negotiated in advance. Time taken by personnel to decontaminate and to re don protective clothing and equipment is considered part of the work period. Time over eight hours in a 24-hour period during the Monday through Friday work week and Saturdays is considered overtime. Sundays and Holidays are considered premium time and will be billed at 1.7 times the straight time rate for all personnel. Observed holidays are: New Years Eve , New Years Day, Memorial Day, Good Friday, Independence Day, Labor Day, Thanksgiving Day and the day after, Christmas Eve, and Christmas Day. (Note that cases where a holiday occurs on a weekend day, premium time rates will apply for both the holiday and the week day it is observed on).
- All daily equipment charges are based on a 12 hour/day. All equipment will be charged at the full daily rate for each day present on the job site unless otherwise agreed in writing. Rates for equipment and materials do not cover labor used in operating such equipment.
- All invoices not contested within 10 business days of receipt are considered accepted by the customer as true and accurate and payable in full.
- Travel rates are provided for certain professional personnel classifications in section 1.0, Personnel, of the fee Schedule. These rates apply for personnel in these classifications for travel occurring before 8:00 AM and after 5:00 PM on scheduled projects. For all labor classes which don't have a travel rate shown, the applicable straight time, overtime, or premium time rate will be charged for travel.
- Rates for all equipment listed do not include expendable supplies (fuel, treatment chemicals, etc.) or replacement parts. Equipment and equipment parts damaged or rendered expendable due to contamination will be billed at replacement cost plus 20%.

- All emergency call outs (i.e., less than 24-hour notice) will be subject to a 4-hour minimum response charge.

- The protective gear identified in Section 2.1, Personnel Protection and Safety Equipment, of the rate schedule refers to Levels A, B, C, and D protection or equivalent. These levels are defined below:

Level A (or equivalent)

- Fully encapsulating exposure suit (selected for resistance to chemical(s) at the site)
- Chemical resistance boots worn over safety toe boots (disposable)
- Chemical resistant outer gloves (disposable)
- Chemical resistant inner gloves (disposable)
- SCBA or SBA respiratory system
- Hard hat
- Disposable outer suit (operational)

Level B (or equivalent)

- Hooded, two-piece suit or disposable coveralls
- Chemical resistant boots worn over safety toe boots (disposable)
- Chemical resistant out gloves (disposable)
- Chemical resistant inner gloves (disposable)
- SCBA or SBA respiratory system
- Hard hat

Level C (or equivalent)

- Chemical resistant two-piece suit or disposable coveralls
- Chemical resistant boots worn over safety toe boots (disposable)
- Chemical resistant outer gloves (disposable)
- Chemical resistant inner gloves (disposable)
- APR system with full-face mask if splash potential is significant or half-face mask
- Safety glasses with goggles or face shield as necessary
- Hard hat

Level D (or equivalent)

- Standard work uniform
- Coveralls
- Gloves as necessary
- Cover boots as necessary
- Safety glasses
- Safety toe work boot
- Hard hat

HR/E safety personnel will define required levels of protection (or approve pre-specified levels) for all project activities. The daily rates specified include all equipment and supplies required for these levels of protection but will allow for a maximum of four (4) changes of disposal gear per man per day. Breathing air hose in excess of 50 ft./man will be an additional charge.

AKZO

Chemical Division

MCCOOK RESEARCH FACT SHEET

SITE MANAGER: Dieter Frank

THE SITE: Akzo's research site is located in southwest of Chicago in Lyons Township, Cook County (IL). The site occupies 17.4 acres in an area that is both residential and industrial.

HISTORY: The site was established in 1961 by Armour Chemical Company to produce nitrogen derivatives, fatty amines, esters, ketones, fatty amides, plastic additives, mining chemicals, fabric softeners, and asphalt emulsifiers. In 1970, the former Armour Industrial Chemical division was renamed "Armak" (a contraction of Armour and Akzona) at the time of its sale to Akzona. In September 1982, Akzo of the Netherlands (one of the world's leading chemical companies) bought all publicly held stock in Akzona, making Akzona a wholly-owned subsidiary of Akzo America (Akzo's U.S. holding company). In 1984, the Armak name changed to Akzo Chemie America and in 1988 to Akzo Chemicals Inc.

ACTIVITIES: The Research Laboratory is independent of the adjacent plant. The present major activities at Akzo's McCook Research facility include cationic surfactants, paper sizing chemicals, optical products, high polymers, peroxide catalysts, fine amines, carboxamides, metallization chemicals, enzymatic catalysis, and asphalt modification chemicals. The Laboratory also operates a pilot plant which is involved in small scale production and scale-up of chemical processes.

SAFETY: The site has been active in CAER (Community Awareness and Emergency Response) since 1985. In 1984, it has received a safety award for one year without a lost time injury.

ENVIRONMENTAL: There is little emission from the research laboratory. To protect the environment, scrubber systems are in use in the pilot plant which eliminate hazardous emissions.

EMPLOYMENT: Akzo's research center in McCook employs 104 people, both from the adjacent neighborhoods and the urban areas of Chicago.

June 1989/hz

Akzo Chemicals Inc.
300 South Riverside Plaza
Chicago, Illinois 60606
Tel. (312) 906 7500
Fax (312) 906 7680

Date : 11/2/89

HAZARDOUS MATERIALS STORED ON-SITE
(Quantities of 5 gallons or more)

CHEMICAL NAME	HAZARD TYPE	STORAGE LOCATION(S)*	MAX. AMOUNT STORED (lbs)
Raw Materials:			
Acetone	Flammability	Solvents	1000
Acrylonitrile	Flammability & Health	P. P. Yard	500
Ammonia	Health	Cylinders	900
Benzyl Chloride	Health	Cylinders	500
n-Butyl Alcohol	Flammability	Solvents	200
Chloroform	Health	Solvents	150
Dichloromethane (Methylene Chloride)	Health	Solvents	1000
Diethylamine	Health	Solvents	1000
Diethylene Glycol	Health	Solvents	1000
Diethylenetriamine	Health	P. P. Yard	500
Diethyl Sulfate	Health	P. P. Yard	600
Diglyme (Diethylene Glycol Dimethyl Ether)	Health	P. P. Yard	1500
Dimethyl Sulfate	Health	Solvents	1000

* - Refer to map provided in Contingency Plan, Figure G19 on page G-51

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Exhibit C - pg. 2 of 5

Date : 11/2/89

HAZARDOUS MATERIALS STORED ON-SITE
(Quantities of 5 gallons or more)

CHEMICAL NAME	HAZARD TYPE	STORAGE LOCATION(S)*	MAX. AMOUNT STORED (lbs)
Raw Materials (cont'd.):			
Ethyl Acetate	Flammability	Solvents	100
Ethyl Alcohol	Flammability	P. P. Yard & Solvents	1000
Ethylene Glycol	Flammability & Health	P. P. Yard & Solvents	2500
Ethylene Oxide	Flammability & Health	Cylinders	1000
2-Ethylhexaldehyde	Health	P. P. Yard	500
Formaldehyde Solution (in Methanol, Water)	Flammability & Health	P. P. Yard	1500
Hexane	Flammability	P. P. Yard	1000
Hexylene Glycol	Flammability	Solvents	500
Isooctane	Flammability	Solvents	500
Isooctyl Alcohol	Flammability	Solvents	1000
Isopropyl Alcohol	Flammability	P. P. Yard & Solvents	2000
Methanol	Flammability	Solvents	600

* - Refer to map provided in Contingency Plan, Figure G19 on page G-51

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Exhibit C - pg. 3 of 5

Date : 11/2/89

HAZARDOUS MATERIALS STORED ON-SITE
(Quantities of 5 gallons or more)

CHEMICAL NAME	HAZARD TYPE	STORAGE LOCATION(S)*	MAX. AMOUNT STORED (lbs)
Raw Materials (cont'd.):			
Methyl Ethyl Ketone	Flammability & Health	Solvents	500
Mineral Spirits (Petroleum Spirits)	Flammability	Solvents	1500
Propylene Glycol	Health	Solvents	500
Propylene Oxide	Flammability & Health	P. P. Yard	1000
Sodium Hydroxide, 50%	Health	Tank	1000
Tetrachloroethylene	Health	Solvents	600
Toluene	Flammability & Health	Solvents	1000
Triethyl Phosphite	Health	P. P. Yard	500
Xylene	Flammability & Health	Solvents	1000

* - Refer to map provided in Contingency Plan, Figure G19 on page G-51

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Exhibit C - pg. 4 of 5

Date : 11/2/89

HAZARDOUS MATERIALS STORED ON-SITE
(Quantities of 5 gallons or more)

CHEMICAL NAME	HAZARD TYPE	STORAGE LOCATION(S)*	MAX. AMOUNT STORED (lbs)
Accumulated Wastes: **			
Chlorinated Solvents	Health	HWSA	1500
Flammable Solvents	Flammability	HWSA	8000
Mercury Salts	Health	HWSA	20
Reactive Waste	Flammability & Health	HWSA	100

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* - Refer to map provided in Contingency Plan, Figure G19 on page G-51
** - Maximum accumulated in 90 days, not for longer-term storage

Exhibit C - pg. 5 of 5

EXHIBIT D

ACKNOWLEDGEMENT OF AGREEMENT

This document, when signed and notarized by HERITAGE REMEDIATION/ENGINEERING, INC., will serve as documentation that Akzo Chemicals, Inc., McCook Research Plant has complied with the preparedness and prevention sections for securing arrangements with a hazardous materials cleanup contractor as outlined in 40 C.F.R. 264.37 (a) (1) and (3); 40 C.F.R. 265.37 (a) (1) and (3); and 29 C.F.R. 1910.120 (3) (1) (a) (4); and the Illinois Chemical Safety Act, P.A. 84-852.

HERITAGE REMEDIATION/ENGINEERING

BY: Geoffrey A Langley

Title: Corporate Manager of Technical Programs

Signature: Geoffrey A Langley

Before me the undersigned, a Notary Public for DuPage County, State of Illinois, personally appeared Geoff A. Langley, and he being first duly sworn by me upon his oath, says that the facts alleged in theforegoing instrument are true. Signed and sealed this 6th day of October 1989.

(SEAL) Gill A. Williamson

My Commission Expires: My Commission Expires Nov. 15, 1990

EXHIBIT E

SCOPE OF ENVIRONMENTAL AUDIT/TRAINING PROGRAMS

PERSONNEL PROTECTION

1) OSHA 40 Hrs. Hazardous Waste PersonnelTraining. HR/E can provide this training at its Indianapolis Training Facility for select PERS customers. Training courses are held on a quarterly basis. *3.

CONTINGENCY PLANNING

2) Spill Prevention Training - Technical staff will inspect your plant for spill prevention and control features and/or train your crews to prevent spills. *1,4,6.

3) Spill Plan Review/Rewrite - Emergency contingency plans are now being required by cities and counties in addition to federal and state regulatory agencies. *1,4.

4) Response Drills - HR/E's response capabilities can be demonstrated and your employees preparedness tested by unannounced emergency drills. The drills will simulate predetermined accidents which you would like reviewed by your plant personnel. *1, 3,4,5.

5) Supervisor Training - Your company's plant supervision can be specially selected by your management for training by HR/E for enhanced response to crisis situations at your plant. Training at your site minimizes your cost and provides plant orientation for HR/E personnel who visit as instructors. *1, 2, 3, 4, 5, 6.

Compliance Enhancement: (Cont'd.)

*1 - Applies to training requirements under 40 CFR Part 112
- SPCC Requirement.

*2 - Applies to training requirements under 29 CFR, 1910.1200
- OSHA Hazard Communication Program.

*3 - Applies to training requirements under 29 CFR 1910.120
Hazardous waste operations and emergency response personnel standards.

*4 - Applies to training and response agreements requirements for waste generators and TSDF'S as outlined in 40 CFR Parts 262.34 (a) (4), 264.30-56; and 265.30-56.

*5 - Applies to training requirements under P.A. 83-0240
- Illinois Toxic Substance Disclosure to Employees Act.

*6 - Applies to training requirements under P.A. 84-852
- Illinois Chemical Safety Act.

XXI. Acknowledgement of Contract:

When all parties have executed this Agreement, HR/E shall provide an executed Acknowledgement of Agreement, in the form of Exhibit D, to CUSTOMER.

IN WITNESS HEREOF, the parties have caused this Agreement to be executed by their duly authorized representatives as of the day and year first above written.

CUSTOMER COMPANY NAME:

AKZO CHEMICALS, INC.

BY: Dr. Dieter Frank

TITLE: Director of Research

SIGNATURE: Dieter Frank

DATE: 10-13-1989

BY: LINCOLN D. METCALFE

TITLE: ASST DIRECTOR OF RESEARCH

SIGNATURE: Lincoln D. Metcalfe

DATE: 10/18/89

HERITAGE REMEDIATION/ENGINEERING, INC.

BY: John Spangler

TITLE: President

SIGNATURE: John Spangler

DATE: 10/25/89

SECTION H

PERSONNEL TRAINING

The information contained in this section is submitted in accordance with the requirements for a personnel training program, as contained in 35 IAC Sections 703.183(l) and 724.116.

H-1: OUTLINE OF THE TRAINING PROGRAM (724.116(a)(1))

The following subsections will describe the RCRA training program that is maintained in this facility. The objective of this program is to provide all employees who are involved in waste handling or waste management with the training needed to perform their jobs safely.

H-1a: JOB TITLES/JOB DESCRIPTIONS (724.116(d)(1),(d)(2))

Persons and Responsibilities Associated With Waste Handling

Persons who are involved in operation of the hazardous waste storage area and/or waste collection activities are listed in an organizational chart in Figure H1. This includes the following persons:

- Chemical Research Manager
- Research Administration Manager
- Environmental and Regulatory Affairs Manager
- Research Coordinator
- Building Supervisor
- Environmental Engineer
- Pilot Plant Technicians
- Contract Laborers

The Chemical Research Manager, Research Administration Manager, Research Coordinator and Building Supervisor have managerial responsibilities in relation to waste handling and compliance with environmental regulations, but are not involved with physical handling of waste.

Other laboratory employees such as chemists, engineers and lab technicians may generate small quantities of waste during experiments, but are not responsible for transferring this waste to a central accumulation container or storage area. Waste at satellite accumulation points in labs will be transferred to a central accumulation container or storage area by contract laborers.

Pilot plant technicians will transfer waste from the satellite accumulation points in the pilot plant to a central accumulation container or storage area. The Environmental Engineer will determine where the waste is to be transferred to.

Waste Collection/Storage Procedures

Figure H2 summarizes procedures to be followed for collection of waste and transfer of waste to an accumulation area or to the hazardous waste storage area.

In the laboratory building, small accumulation containers are provided in the form of five-gallon safety cans. Each container is marked with a color representing one of these waste categories:

Color	Waste Category
	Nonhazardous liquid waste mixtures:
Red	Nonignitable Organic Acid
Blue	Nonignitable Organic Base
	Hazardous liquid waste mixtures:
Yellow	Ignitable solvent with Organic Base
White	Ignitable solvent with Organic Acid
Green	Spent Solvents Containing Halogenated Solvents
--------	NOTE - Other hazardous wastes will be reported to the Environmental Engineer for designation of an accumulation container.

Containers are also available for accumulation of five gallons or less of solid* wastes, but must be assigned on a case-by-case basis to ensure compatibility of container and adequate waste segregation.

Lab employees who have waste which is difficult to categorize or possibly hazardous will notify the Environmental Engineer via the form shown in Figure H3.

In the pilot plant area, waste containers for satellite accumulation points may be of volumes up to 55 gallons.

* - "Solid" is defined here as a solid without free liquid, which will not liquefy at temperatures up to 100 F in outdoor conditions.

Nonhazardous liquid wastes will be transferred to two tanks referred to as pitch tanks. When a substantial volume of this waste is collected, the tank contents are pumped into a tank wagon and are transported to the Akzo facility in Morris, Illinois for use as auxilliary fuel. The transportation is provided by the Morris plant.

Nonhazardous solid* wastes will be collected in a dumpster referred to as the special waste gondola. When a substantial amount of this waste has collected, the gondola will be transported to an appropriate landfill by a hired transport service.

Hazardous wastes will be stored in drums in the hazardous waste storage area. Refer to Section D-1a of this application for a detailed description of the container storage area and container management practices. The only exception to this will be collection of lab-pack items. These will be removed directly from their accumulation point by a contract disposal service, without intermediate storage.

Detailed Job Descriptions

The following are job descriptions for persons directly involved in handling hazardous waste:

1.) Job Title: Environmental and Regulatory Affairs Manager
Employee Name: Moneeb Zakaria

Job Duties:

a.) Indirectly supervises (through Environmental Engineer) waste handling within facility.
b.) If needed, assists in direct supervision of waste handling and operations related to maintenance of hazardous waste storage area.
c.) Supervises Environmental Engineer in certain areas of environmental regulatory compliance, such as:
- permit application submission
- reporting to state or federal EPA
- execution of personnel training
- completing purchases related to compliance
d.) Acts as an Primary Emergency Coordinator

* - "Solid" is defined here as a solid without free liquid, which will not liquefy at temperatures up to 100 F in outdoor conditions.

Experience and Qualifications:

a.) B.S. degree in chemistry, chemical engineering, or environmental engineering.
b.) Five or more years experience in chemical research or chemical manufacturing.
c.) Experience in various areas of regulatory compliance, including:
  - FDA
  - OSHA
  - TSCA
  - DOT
  - environmental (SARA, RCRA, CWA, CAA, etc.)
d.) Supplemental training, on a continual basis, in regard to hazardous waste management.

2.) Job Title: Environmental Engineer
Employee Name: Madelyn Ashum-Johnson

Job Duties:

a.) Supervises waste handling within the facility (hazardous and nonhazardous).
b.) Obtains necessary samples of wastes and arranges for analyses.
c.) Arranges for waste disposal.
d.) Maintains all records in regard to waste storage and disposal.
e.) Organizes and executes personnel training program in regard to waste handling.
f.) Inspects, and supervises maintenance of, all equipment related to pollution control or environmental regulatory compliance.
g.) Obtains and renews required environmental permits, under direction of the corporate regulatory department.
h.) Inspects general status of facility for compliance with environmental regulations.
i.) Acts as an Alternate Emergency Coordinator.

Experience and Qualifications:

a.) B.S. degree in chemical engineering or environmental engineering.
b.) 3-5 years experience in chemical research or chemical manufacturing.
c.) Supplemental training, on a continual basis, in regard to environmental regulatory compliance.
d.) Supplemental training, on a continual basis, in regard to hazardous waste management.

3.) Job Title: Pilot Plant Technician
Employee Name: Elizabeth Hartrick
Benjamin Magruder
Joseph Ray
Esmail Sodha

Job Duties:

a.) Operates pilot plant process equipment, under direct supervision of Research Coordinator.
b.) Collects waste from pilot plant processes in proper containers, as directed by Research Coordinator or Environmental Engineer.
c.) Transfers waste from satellite accumulation point to central accumulation container or storage area, as directed by Research Coordinator or Environmental Engineer.
d.) Operates fork lift to move drums of waste between locations within facility.
e.) Notifies Emergency Coordinator of any emergency situation.
f.) Assists in cleanup of small spills in pilot plant or waste storage area.

Experience and Qualifications:

a.) 18 years of age or older.
b.) Physically fit to do manual work required for job.
c.) Able to work in a safe and clean manner.
d.) Trained in waste handling as part of the facility's RCRA training program.

4.) Job Title: Contract Laborer
Employee Name: James Dolph
Michael Howard
Kelly Kerekes
Richard Moody
Vasko Pupucovich

Job Duties:

a.) Performs janitorial tasks within the facility.
b.) Operates lift truck to move supplies or drums of chemicals (including waste) between locations within facility.
c.) Transfers containers of waste from laboratories to central accumulation containers.

Experience and Qualifications:

a.) Physically fit to do manual work required for the job.
b.) Able to work in a safe and clean manner.
c.) Trained in waste handling as part of the facility's RCRA training program.

H-1b: TRAINING CONTENT, FREQUENCY AND TECHNIQUES (724.116(c) and (d)(3))

The facility training program for waste handling is designed to include both introductory training and annual review for employees involved in waste handling. Persons participating in this training program will include:

- all Emergency Coordinators
- Environmental and Regulatory Affairs Manager
- Environmental Engineer
- Pilot Plant Technicians
- Contract Laborers

The training program is accomplished through several annual seminars, including the special waste-handling seminar and seminars provided as part of the site safety program, as follows:

- RCRA (waste handling and Contingency Plan)
- respirator use training and fit-testing
- hazard communication (understanding chemical hazards and using references, MSDS's)
- safe handling of chemicals
- spill containment and cleanup
- personnel protective equipment (gloves, clothing, etc.)

In addition, all personnel who operate a forklift as part of their job are required to pass a forklift operation and safety course.

All employees involved in handling of hazardous wastes are required to complete classroom training (in-house seminars) and on-the-job training in regard to waste handling within six months of their date of employment. Employees who have not completed their introductory training must be supervised during performance of their job duties, by a trained employee. Review of training material for waste handling is given annually.

The content of the seminar regarding safe handling of wastes within this facility is outlined in a training manual. Each training seminar will utilize the manual and the following supplementary materials:

- copies of 40 CFR Part 261.20-33
- relevent video tapes for RCRA training (such as the series distributed by Bureau of National Affairs)
- our Contingency Plan
- examples of hazardous waste drum labels, waste manifests, waste sampling equipment

The training material is updated/revised as needed to ensure compliance with the terms of the RCRA permit, and to reflect any changes in assignment of waste handling responsibilities. An outline of the contents of the training manual is shown in Figure H4. A copy of the 1989 manual is presented in Appendix HI.

During the waste handling seminar, employees are instructed on:

- hazardous nature of chemicals and chemical wastes in general
- hazardous nature of specific chemicals and wastes handled within this facility
- proper handling and storage procedures for wastes
- specific equipment and procedures utilized for waste handling within this facility
- emergency procedures and Contingency Plan

For key personnel such as the Environmental and Regulatory Affairs Manager and the Environmental Engineer, the in-house training will be supplemented through frequent corporate update seminars and corporate guidelines, as well as relevant outside technical seminars. A record of seminars attended will be continuously updated and kept onsite for inspection.

H-1c: TRAINING SUPERVISOR (724.116(a)(2))

The training program is directed by the facility Environmental and Regulatory Affairs Manager, and the facility Environmental Engineer. The training seminars will be conducted by the Environmental Engineer. Updating of training material and maintenance of training records are the responsibility of the Environmental Engineer.

Persons directing the facility training program have been trained by the corporate regulatory department, and have attended outside seminars and conferences related to hazardous waste management. (Refer to Section H-1b above) When needed, they can call upon the Environmental Regulatory Staff at Akzo Chemicals Inc.'s headquarters in Chicago, Illinois, for technical and legal assistance. The staff at headquarters includes the Corporate Manager of Environmental Affairs, and environmental engineers holding M.S. degrees in environmental engineering.

H-1d: RELEVANCE OF TRAINING TO JOB POSITION (724.116(a)(2))

The facility Environmental Engineer is responsible for coordinating and executing the procedures for teaching waste handling and management, including instruction regarding implementation of the Contingency Plan. The Environmental and Regulatory Affairs Manager, who coordinates and executes safety training for all facility employees, is responsible for integrating the hazardous waste training into the facility's overall regulatory compliance management.

The training program for waste handling is adjusted to emphasize certain topics for persons in relevant positions. Refer to Figure H5. As an example, pilot plant technicians are given more in-depth training in spill cleanup and safe operation of pilot plant equipment.

H-1e: TRAINING FOR EMERGENCY RESPONSE (724.116(a)(3))

The training program for waste personnel handling includes instruction in emergency response procedures. This section of the training program is designed to ensure that response actions will be taken to minimize risk to human health and the environment during an emergency, using :

- appropriate notification procedures and use of communication equipment within facility (including alarm system)
- proper operation of emergency equipment (including spill containment equipment)
- shutdown procedures
- evacuation procedures

This section of the training program utilizes classroom instruction, demonstration of proper use of key equipment and drills. The types of emergency situations addressed include fires, explosions, spills (including groundwater contamination incidents), releases of hazardous chemicals to air, power outages, storms and medical emergencies.

The emergency response training is given in accordance with the same schedule as other waste handling training, with the exception of evacuation drills which are scheduled at least twice per year. The existing safety training program provides that a tape recording of the alarm signal will be used to demonstrate the signal to new employees during general safety orientation, instead of waiting for a drill.

H-2: IMPLEMENTATION OF TRAINING PROGRAM
(724.116(b), (d)(4) and (e))

The directors of the waste handling training program, and all current employees who are directly involved in waste handling, have been fully trained at the time of this submittal. As stated in Section H-1b, all future employees must complete the introductory training within six months of their assignment to waste handling jobs, or within six months of their hiring date - whichever is later. New hirees with waste handling responsibilities will be supervised during all waste-handling tasks, until they complete their training.

All trained employees must participate in an annual training review, for as long as they are assigned to waste handling jobs. In addition to the topics listed in Figure H4, the annual seminars will include:

- report of hazardous wastes currently handled within the facility, including characteristics and location
- summary of requirements currently contained in RCRA permit
- review of emergency incidents that occurred in the past year, including causes, response actions taken, and any steps to be taken to prevent recurrence or to improve response in similar situation.
- summary of facility annual report to the EPA

Records of training completed by each person involved in waste handling will be kept onsite in the Environmental Engineer's office. The training record will include job title, job description, name of employee, date of assignment to waste handling duties, and signatures, dates and training descriptions for each training session completed.

Figure H1

Positions Associated With Waste Handling

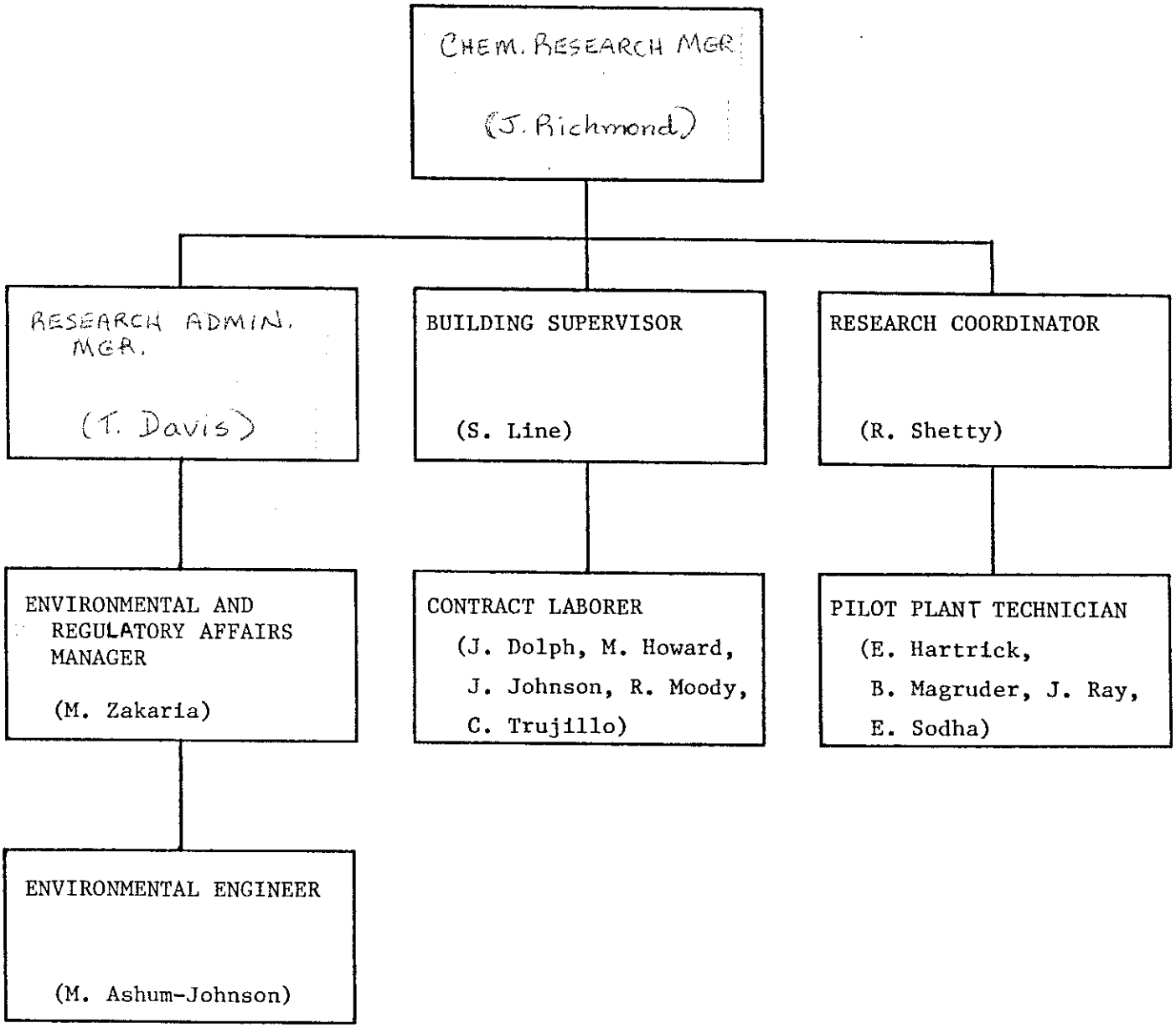

FIGURE H2

PROCEDURE FOR ACCUMULATION OF WASTE

Step 1: Identify the waste. Analyze if necessary

Step 2: Determine if waste is hazardous or nonhazardous. Consult the Environmental Engineer if you need help. A waste can be hazardous due to its origin, its characteristics, or if it is a specific waste listed as hazardous in the federal regulations.

Step 3: Determine the appropriate container for accumulation of the waste:

Waste Type	Container
Hazardous, large quantity	Properly labeled drum
Hazardous, small quantity	- Chlorinated solvents go into yellow & green safety can. - Ignitable solvents w/ organic base go into yellow safety can - Ignitable solvents w/ organic acid go into white safety can - Excess reagents are identified to Env. Engr. as lab-packs. - Others are identified to Env. Engr. for assignment of container.
Non-Hazardous, large quantity	Properly labeled drum
Non-Hazardous, small quantity	- Liquids go into appropriate color-coded safety cans: Red = nonignitable org. acid Blue = nonignitable org. base - Solids go into red flip-top (5 gallon) safety cans or properly labeled 1 gal. can. - Contact Env. Engr. for any questions about compatible container materials.

Step 4: Arrange for transfer of full (satellite) accumulation container to central accumulation container or storage area.

Hazardous waste is stored only in the hazardous waste storage facility. Nonhazardous liquid waste is added to

FIGURE H2 (cont'd.)

PROCEDURE FOR ACCUMULATION OF WASTE

Step 4: (cont'd.)

the pitch tank waste accumulation drums, which are then pumped into the pitch tanks by pilot plant technicians. Nonhazardous solids are accumulated in the special waste gondola.

The following procedures are used for transport of waste to central accumulation containers or storage area:

Container Type	Procedure
Lab-pack item	Env. Engr. will arrange for disposal service pickup.
Container filled in pilot plant	Pilot plant technician will transport.
Container filled in laboratory	Lab employee will notify contract laborer. Laborer will transport.

Figure H3
Disposal Request Form

HAZARDOUS WASTE DISPOSAL REQUEST

Date : _____

Requested by : _____

Section : _____ Extention : _____

DESCRIPTION OF WASTE

Please include composition, amount and location for each container. Also indicate if solid or liquid.

PLEASE ATTACH MSDS IF AVAILABLE

RETURN COMPLETED FORM TO MADELYN ASHUM-JOHNSON (ext. 366)

FIGURE H4

OUTLINE OF TRAINING MANUAL CONTENTS

1.0: INTRODUCTION

- 1.1 Chemical Hazards
- 1.2 The Resource Conservation and Recovery Act (RCRA)

2.0: THE STORAGE FACILITY AND HAZARDOUS WASTE HANDLING

- 2.1 Waste Accumulation Procedures Used Onsite
- 2.2 Typical Wastes Generated Onsite
- 2.3 Proper Handling and Storage of Hazardous Wastes
- 2.4 Key Terms of RCRA Permit
- 2.5 Waste Sampling and Analysis
- 2.6 Record Keeping and Reporting Requirements
- 2.7 Security
- 2.8 Inspections

3.0: EMERGENCY RESPONSE AND THE CONTINGENCY PLAN

- 3.1 Emergency Coordinators
- 3.2 Emergency Notification Procedures
- 3.3 Emergency Equipment: Location, Use, Inspection and Maintenance
- 3.4 Emergency Shutdown Procedures
- 3.5 Evacuation Procedures
- 3.6 Response to Spill (Including Groundwater Contamination Incidents)
- 3.7 Response to Fire or Explosion
- 3.8 Response to Release of Hazardous Chemical to Air
- 3.9 Response to Power Outage
- 3.10 Response to Violent Storm or Tornado

APPENDIX A: Quiz Questions Regarding Subject Matter

APPENDIX B: Lists of Applicable References In Federal Regulations

Figure H5 - AREAS OF TRAINING CONCENTRATION FOR EMPLOYEES

N = Normal level of detail covered regarding subject.
X = Extra detail covered and extra time spent on subject.

SUBJECT AREA

Employee Position	Chemical Hazards	RCRA Regs	Waste Mgt.*	Safety Precautions	Waste Handling**	Emergency Eqpt.	Emergency Response***
Primary or Alt. Emer. Coord.	N	N	N	N	N	N	X
Env. & Reg. Affairs Mgr	N	X	X	N	X	N	X
Env. Engineer	N	X	X	N	X	N	X
Pilot Plant Technician	X	N	N	N	X	N	N
Contract Laborer	X	N	N	N	X	N	N

* - Includes sampling, recordkeeping, inspecting, reporting

** - Includes site-specific accumulation procedures

*** - Includes Contingency Plan

APPENDIX HI

Training Manual

(REVISED 2-15-90)

APPENDIX HI

RCRA Training Manual

AKZO CHEMICALS INC.

McCOOK RESEARCH FACILITY

RCRA TRAINING MANUAL

Revised 12/88

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Introduction

This training manual will serve as a guideline for initial training and annual re-training of personnel who are directly involved in hazardous waste management at the Akzo Chemicals Inc., McCook Research Facility. Training seminars will be supplemented by on-the-job training for site-specific waste handling procedures.

The RCRA Contingency Plan will also be used during training seminars, to reference details of emergency response and notification procedures. A record of RCRA training seminars, including content and attendance information, is maintained by the Environmental Engineer.

I. RCRA

Resource Conservation and Recovery Act

Federal law regulating hazardous waste operations.

The Akzo McCook Research Facility is subject to the RCRA regulations as a:

1. Generator of Hazardous Waste
2. Hazardous Waste Storage Facility

We are classified as a LARGE QUANTITY GENERATOR because we can generate 1000 kg/month of hazardous waste. As a LQG, we must ship all hazardous waste off-site within 90 days of accumulation start, or else obtain a permit to be a STORAGE FACILITY.

As a generator, we were required to obtain generator ID numbers from USEPA and ILEPA:

USEPA# = ILD000805705
ILEPA# = 031174009

As a storage facility, we were required to submit a "TSDF"* permit application in two parts:

Part A - Submitted in 1980
- Short-form application
- gave us interim status as TSDF until Part B was filed

Part B - submitted in 1988
- detailed application (>300 pages)
- waiting for approval

These applications describe the T, S or D processes on site and hazardous wastes involved.

* Treatment, Storage or Disposal Facility

II. CHEMICAL HAZARDS ASSOCIATED WITH HAZARDOUS WASTES

A. Hazardous Characteristics

TOXICITY
IGNITABILITY
CORROSIVITY
REACTIVITY
COMBINATIONS OF ABOVE

Information regarding these characteristics is used to determine:

*- if waste is a hazardous waste per regulations
- handling and storage procedures (segregation, containers, etc.)
- personal protective equipment needed during handling
- need for medical monitoring of personnel

1. Toxicity - Three routes of entry into body:

   inhalation
   dermal (absorption through skin)
   oral (ingestion)

2. Ignitability - Three factors determine hazard:

   flash point
   vapor density
   ignition source

3. Corrosivity - Two types to consider:

   corrosive to steel
   corrosive to skin

* More detail on hazardous waste definition in Handout #1 in Appendix B

4. <u>Reactivity</u> - Four types to consider:

water reactive -	E.g:	alkali metals metallic hydrides sodium bisulfide
air reactive -	E.g:	Raney nickel phosphorus
oxidizers, reducing agents -	E.g:	peroxides
explosives -	E.g:	organo nitro compounds

5. Multiple-hazard chemicals are not uncommon

E.g: corrosive to steel & reactive
corrosive to skin & toxic

USE OF HAZARDOUS CHARACTERISTIC INFORMATION

Sources of information:

Lab analysis of waste
MSDS for components in waste
Reference books (E.g Dangerous Properties of Industrial Materials, Chemical dictionaries, etc.)

Handling and Storage Considerations

Choice of container (accumulation, storage)
Segregation from incompatible wastes
Labelling
Storage conditions
Special tools (spark-proof)

Selection of Personal Protective Equipment

Respirator - dust mask
chemical cartridge
air-supplied (SCBA or air-line)

Clothing - coveralls
gloves
boots

Medical Monitoring

If employee is routinely exposed to a toxin, must consider need to establish baseline data & monitor for toxin level in body.

Short-Term Exposure Effects:

dermatitis
sensitization (respiratory)
nausea, headache, dizziness

Long-Term Exposure Effects:

systemic damage
cancer
birth defects

III. HAZARDOUS WASTE HANDLING AND STORAGE AT AKZO McCOOK RESEARCH

A. Waste Accumulation/Disposal Policy (Handout #2 - Appendix B)

B. Central Accumulation, Storage Locations (Handout #3 - Appendix B)

C. Wastes Included in Permit (Handout #4 - Appendix B)

D. Key Terms of Permit

- designated T, S, D processes
- documentation procedures
- waste sampling & analysis standards
- contingency planning
- personnel training
- security and inspections
- liability coverage
- closure planning

1. T, S, D Processes

Cannot operate additional processes or close existing ones without officially revising permit & filing required notifications, etc.

2. Documentation

Inspection Records
Sampling & Analysis Records
Manifests for shipments
Training Records
Incident Reports

3. Waste Sampling & Analysis

- Representative samples of every waste stream
- Proper sampling equipment
- Sample record, chain of custody, labelling
- Minimum analyses (E.g: Composition, flash point, EP toxicity)
- Quality assurance for analyses

4. Contingency Planning

- Notification, Emergency Coordinators
- Emergency Control, Cleanup
- Evacuation
- Follow-up Reports

5. Personnel Training

- Within six months of hiring
- Annual training review

6. Security and Inspections

- Weekly inspections of storage area & contents
- Fence in good condition, gate locked
- Signs posted on all sides of area

7. Liability Coverage

- Federal government has set minimum coverage required for sudden accidental occurence
- Must show proof of coverage

8. Closure Planning

- Plan for closure of each T, S or D process, with cost estimate
- Plan to notify ILEPA & USEPA of intention to close. Get approval of closure method
- Closure completion must be verified by outside professional engineer
- Must show financial ability to cover cost of closure

IV. EMERGENCY RESPONSE AND CONTINGENCY PLAN

Emergency

Fire or Explosion
Chemical Spill or Release
Medical Emergency
Power Outage
Tornado

Response

- Appropriate Immediate Action
- Notification
- Control and Clean-up
- Follow-up Inspection & Reports

A. Fire or Explosion

1. Assist injured or trapped persons
2. Pull fire alarm. Call for ambulance
3. Remain nearby to inform and assist fire marshals if safe to do so
4. Contact Emergency Coordinator
5. Complete evacuation procedures and any additional notification
6. After fire is extinguished, check for damage that may cause secondary hazards
7. Clean-up & Inspection
8. Follow-up reports

B. CHEMICAL SPILL OR RELEASE

1. Assist injured or trapped persons
2. Small Spill (≤1 gallon)
   - Inform everyone in immediate area
   - Call Spill Team
   - Contain and clean up with lab kit if safe to do so
   - Notify Emergency Coordinator

Small Release (autoclave or small reactor)
- Evacuate immediate area
- Notify Emergency Coordinator

Large Spill or Release
- Evacuate immediate area
- Use paging system to announce nature & location of emergency, requesting Emergency Coordinator to come to location

3. Evacuate building if necessary

*4. (Large Spill or Release) Emergency Coordinator organize control and/or clean up with help of personnel from area involved, if safe to do so. Call for outside help if needed.

5. Complete any additional notification

6. Inspection

7. Follow-up reports

* See procedure regarding hazardous waste also

C. MEDICAL EMERGENCY

1. Call for ambulance if needed

2. Use paging system to announce need for first aid team at location, and to announce need for special equipment such as resuscitator.

3. Large bandages are available in hallway kits if immediate action is needed due to serious bleeding.

D. POWER OUTAGE

1. Secure reactions that may create hazard.

2. Congregate in first floor hallways and lobby in case announcement is made.

E. TORNADO

1. Congregate in first floor hallways, away from outside doors.

DETAILED PROCEDURE FOR SPILL OF HAZARDOUS WASTE IN STORAGE AREA

If a spill of hazardous waste occurs in the storage area, additional steps are needed during cleanup:

1. Use absorbents to contain and clean up spilled waste as much as possible.

2. If water is needed, there is a steam/water source available near the sump area. (Refer to drawing of storage area.)

3. The concrete base slopes to the sump area, and any liquid washed into the sump will be retained there until pump is switched on manually.

   DO NOT ACTIVATE PUMP IF SUMP CONTAINS CONTAMINATED WATER. The pump outlet piping includes valves that must be set to divert outflow away from sewer.

4. Set pump outlet valves to divert outflow to the "transfer" outlet. Connect hose to this outlet, for transfer of contaminated water to drums or tank truck.

5. Sample and analyze contaminated water.

6. Continue flushing concrete base and sump with clean water until sump is decontaminated.

7. Sample and analyze contents of sump after decontamination to verify adequate cleanup.

   Do not re-set pump outflow valves until the final analysis is complete and it is safe to allow outflow to sewer.

DETERMINATION OF WASTE CATEGORY -

HAZARDOUS OR NONHAZARDOUS

1. Is the waste listed as an "F", "K", "P" or "U" waste in 40 CFR Part 261 Subpart D?

2. Does the waste meet any of these criteria?

Characteristic	Criteria
Ignitability	- liquid with flash point <140°F (60°C)
	- nonliquid capable of igniting by friction, water absorption or spontaneous reaction at ambient conditions
	- ignitable compressed gas
	- oxidizer
Corrosivity	- aqueous w/ pH <2 or >12.5
	- liquid that corrodes steel at rate >0.25 inch per year at 130°F (55°C)
Reactivity	- normally unstable
	- reacts violently with water or forms explosive mixtures w/ water
	- generates toxic fume, gas or vapor when mixed with water
	- contains cyanide or sulfide which generates toxic fume, gas or vapor at pH 2-12.5
	- capable of detonating or exploding if exposed to strong initiating source or if heated under confinement
	- is a defined explosive
Toxicity	- fatal to humans in low doses
	- oral LD50 (rat) <50 mg/kg

Characteristic	Criteria
	- inhalation LC50 (rat) < 2 mg/l
	- dermal LD50 (rabbit) < 200 mg/kg
	(MORE CRITERIA IN REGULATIONS)
EP Toxicity	- extract per EP-toxicity test contains any of these contaminants in excess of defined limit:

Arsenic	Silver
Barium	Endrin
Cadmium	Lindane
Chromium	Methoxychlor
Lead	Toxaphene
Mercury	2,4-D
Selenium	2,4,5-TP Silvex

WASTE SEGREGATION/ACCUMULATION

Waste Type	Standard Container	Other Segregation Guidelines
1.) Nonhazardous, Liquid		
Nonignitable organic acid mixtures	Red-marked safety can	Mixture flash point >= 140 F
Nonignitable organic base mixtures	Blue-marked safety can	Mixture flash point >= 140 F
2.) Nonhazardous, Solid		
(All)	1-5 gallon bucket Do not crimp lid	Must not liquefy below 100 F outdoors.
3.) Hazardous, Liquid		
Ignitable solvent/org. acid mixtures	White-marked safety can	Mixture flash point < 140 F
Ignitable solvent/org. base mixtures	Yellow-marked safety can	Mixture flash point < 140 F
Halogenated solvents	Green-marked safety can, glass-lined or plastic	Caution: Mixture may be flammable if other solvents are present
Other hazardous liquids	(See Environmental Engineer)	
4.) Spent Catalysts	Lab: 1-gal. bucket Pilot Plant: 5-gal. bucket	Neutralize and remove all filter paper. Segregate different catalysts in separate buckets.
5.) Others	(See Environmental Engineer)	

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WASTE SEGREGATION/ACCUMULATION (cont'd.)

NOTE: The following spent solvents must be disposed as hazardous waste per environmental regulations (40 CFR Part 261.33)-

acetone
benzene
n-butyl alcohol
carbon disulfide
cresols
cresylic acid
cyclohexanone
2-ethoxyethanol
ethyl acetate
ethyl benzene
ethyl ether
iso-butyl alcohol
methanol
methyl ethyl ketone
methyl isobutyl ketone
nitropropane
2-nitropropane
pyridine
toluene
xylene

The following are examples of other solvents that should also be disposed as hazardous waste because they form ignitable mixtures:

hydrocarbons (pentane, hexane, octane, etc.)
isopropanol
mineral spirits
petroleum ether
tetrahydrofuran

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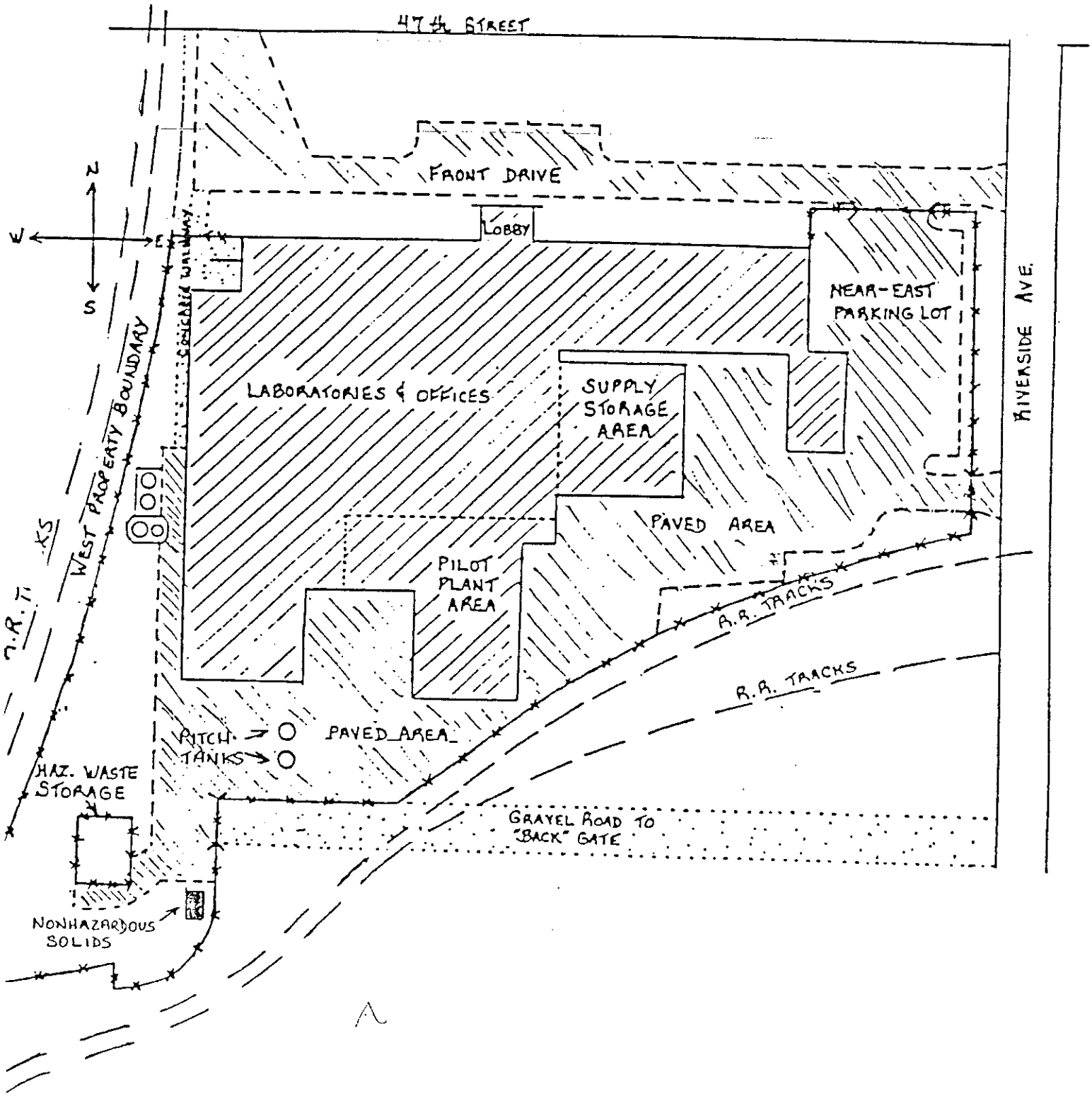
Handout #2

Handout #3
Waste Accumulation, Storage



Wastes Included in Permit for Storage in Drums

1. The following spent solvents and still bottoms from their recovery:

F002	F003	F005
tetrachloroethylene	xylene	toluene
methylene chloride	acetone	MEK
trichloroethylene	ethyl acetate	carbon disulfide
1,1,1-trichloroethane	ethyl benzene	isobutanol
1,1,2-trichloroethane	ethyl ether	pyridine
chlorobenzene	MIBK	benzene
1,1,2-trichloro-1,2,2-trifluoroethane	n-butyl alcohol	2-ethoxyethanol
orthodichlorobenzene	cyclohexanone	2-nitropropane
trichlorofluoromethane	methanol	

2. The following "characteristic" wastes:

Ignitable	E-P toxic arsenic waste
Corrosive	E-P toxic barium waste
Reactive	E-P toxic cadmium waste
	E-P toxic chromium waste
	E-P toxic lead waste
	E-P toxic mercury waste
	E-P toxic selenium waste
	E-P toxic silver waste
	E-P toxic 2,4-D waste

3. The following commercial product wastes, as spill residues, excess reagents, or off-spec products:

acetone	dimethylsulfate
acrylonitrile	di-n-octyl phthalate
n-butyl alcohol	ethylene oxide
chloroform	formaldehyde
dibutyl phthalate	methanol
dichloromethane (methylene chloride)	methyl ethyl ketone
dimethyl phthalate	tetrachloroethylene
	toluene
	xylene

SAMPLE QUIZ QUESTIONS

1. What is RCRA?

_____

2. Out facility is subject to RCRA as a _____ and a _____ _____.

3. What are the four main hazardous characteristics that can be associated with hazardous waste?

_____

_____

_____

_____

4. Name three sources of information regarding chemical components of hazardous waste.

_____

_____

_____

5. Whom do you contact if you need to dispose of waste that may be hazardous?

_____

6. Can we store hazardous waste in a tank in our facility?

_____

7. What is the source of information regarding response to emergency situations in our facility? (Fire, explosion, spill, etc.)

_____

_____

_____

8. What person(s) must be contacted to supervise response and notification procedures in emergency situations?

_____

_____

9. Where can you find spill absorbents if you have a large spill such as a leaking drum?

_____

10. If you discover a spill or release of only one pound of a chemical or waste, do you have to notify anyone?

_____

RCRA HAZARDOUS WASTES CURRENTLY GENERATED AND/OR STORED

Waste Name/Description	Chemical Components	RCRA Hazard Categories	Comments
1.) Spent Ignitable Solvents from Labs (White and Yellow color-coded cans)	Acetone * n-Butanol * Ethyl Ether * Ethyl Acetate * Isobutanol * Isopropanol Methanol * Methyl Ethyl Ketone * Methyl Isobutyl Ketone * 2-Nitropropane * Pyridine * Toluene * Xylene * Hydrocarbons (Hexane, etc.)	Ignitable, Toxic	Treatmt. Std. Waste
2.) Spent Halogenated Solvents from Lab (Green color-coded cans)	Carbon Tetrachloride Chlorobenzene * Chloroform Methylene Chloride * Tetrachloroethylene * Trichloroethane * Trichloroethylene *	Toxic, Ignitable	Treatmt. Std. Waste
3.) Plastic Resin/ Solvent Mixture	Ethyl Acetate * Methylene Chloride * Plastic Resin	Toxic, Ignitable	Treatment Std. Waste
4.) Spent Solvents from Pilot Plant	Hexane Isopropanol Ethylene glycol Diglyme	Ignitable, Toxic	

* - Listed specifically as hazardous waste per RCRA.

RCRA HAZARDOUS WASTES CURRENTLY GENERATED AND/OR STORED

Waste Name/Description	Chemical Components	RCRA Hazard Categories	Comments
5.) Equipment Cleanout Sludge w/ PCE (Tetrachloroethylene)	Tetrachloroethylene *	Toxic	Soft-Hammer
6.) Mercury Salts from Lab	Mercuric Acetate	Toxic	
7.) Cyanide Solution from Lab	Sodium Cyanide	Reactive	
8.) Excess Reagents from Pilot Plant (drum quantities)	Acrylonitrile * Formaldehyde *	Ignitable, Toxic	Soft-Hammer
9.) Excess Reagents from Lab (small containers)	Too numerous to list	All	

* - Listed specifically as hazardous waste per RCRA.

SECTION I

CLOSURE AND POST-CLOSURE REQUIREMENTS

This section, regarding closure and post-closure requirements for the Akzo Chemicals Inc. McCook Research hazardous waste storage area, is submitted in accordance with Title 35 Illinois Administrative Code Sections 703.183(m) and 724.210 through 724.220.

The storage facility specified in this closure plan is described as follows:

> The hazardous waste storage area is located 100 feet southwest of the laboratory building. This is a reinforced concrete, fenced, diked area of approximately 1200 square feet, and is sloped to a sump to contain any possible spillage or leakage from storage containers. The retention capacity of the diked area is 14% of the maximum waste capacity of the storage area. The spillage, if any occurs, can be pumped into storage drums. Warning signs (i.e "hazardous", "no smoking or fires" and "for authorized personnel only") are posted on all four sides of the area.
>
> Maximum Waste Inventory: The storage area is designed for a total maximum storage capacity of 200 drums (55 gallons each), or a total of 11,000 gallons. Hazardous waste material is stored in 55-gallon or (75-gallon) overpack drums made of polyethylene, epoxy-coated steel or polyethylene-lined steel, and occasionally in smaller (5-30 gallon) containers.

I-1: CLOSURE PLANS (703.183(m), 724.212)

The closure plan contained in this section identifies all steps that will be necessary to close the hazardous waste storage 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.

Akzo Chemicals Inc. McCook Research will maintain an on-site copy of the approved Closure Plan, and all revisions to the plan, until the certification of closure completeness has been submitted and accepted by IEPA. The owner of the Akzo Chemicals Inc. McCook Research facility will notify IEPA at least 180 days prior to the date we expect to begin final closure. For the sake of the Closure Plan, the assumed date of closure will be 2001.

Upon completion of closure, Akzo Chemicals Inc. will submit to IEPA a certification, by both the owner and a local independent registered professional engineer, that the facility has been closed in accordance with the specifications in the approved Closure Plan.

I-1a: CLOSURE PERFORMANCE STANDARD (724.211)

This Closure Plan was designed to ensure that the facility will not require further maintenance and controls after closure. The plan seeks to minimize or eliminate threats to human health and the environment, and avoid escape of hazardous waste, hazardous waste constituents, leachate, contaminated precipitation, or waste decomposition products to the ground or surface waters or to the atmosphere.

If there is any evidence of leaks or spills, samples will be taken and analyzed to determine the extent of contamination in the soil and, if nececssary, in groundwater. Any contaminated gravel and soil will be excavated, removed and disposed of at a proper disposal facility. The entire site will then be regraded subsequent to closure, to prevent erosion. The following paragraphs provide details of the efforts that will be made by Akzo to satisfy the closure performance standard.

I-1b: PARTIAL CLOSURE ACTIVITIES (724.212(b)(1) and (2))

Partial closure of the hazardous waste storage area is not feasible due to its design and intended use. The storage capacity provided by this area must be available as long as the research lab and pilot plant are operating.

I-1c: MAXIMUM WASTE INVENTORY (724.212(b)(3))

The maximum capacity of the hazardous waste storage area is 200 55-gallon drums, or 11,000 gallons of waste, therefore the maximum waste inventory will be 200 drums.

I-1d: INVENTORY REMOVAL, DISPOSAL OR DECONTAMINATION OF EQUIPMENT, STRUCTURES AND SOILS (724.212(b)(4), 724.214)

I-1d(1): CLOSURE OF CONTAINERS (724.278)

At final closure time, the following steps will be taken, to remove all hazardous wastes and any materials contaminated by hazardous wastes:

1.) A comprehensive review of historical records will be performed, including review of wastes managed, management practices, spill reports, inspection reports, repairs, etc. for the hazardous waste storage area. This information will be used to determine specific chemical contaminants from the list of priority pollutants that may be present in the storage base concrete and/or underlying soil.

2.) The integrity of the containment system (base, sump, pump and piping) will be thoroughly inspected for deterioration or cracks, to determine the potential for past leakage into underlying soil.

3.) The condition of all hazardous waste drums will be checked, to make sure they are intact and free of leaks and damage. The proper identification will be stenciled or marked on each drum. The existing hazardous waste labels, giving the waste description, generator name, address and EPA identification number, manifest number and EPA waste number, will be checked on each drum.

4.) If the exteriors of any containers are found to be contaminated, the containers will be thoroughly cleaned (using detergent, water and sorbents) before being moved from the storage area. Containers will be re-inspected after cleaning. Wastewater generated by container decontamination will be collected, containerized and disposed as hazardous waste with the other waste drums.

5.) All hazardous waste drums will be moved to a proper disposal or treatment facility, as soon as permit and manifest requirements are met.

6.) The concrete pad and sump will be cleaned using a high-pressure wash with detergent solution, followed by triple rinse. Composite samples will be taken of each rinsate (4), to be analyzed for potential contaminants determined in Step 1 above.

7.) The concrete pad will be removed. The concrete will be accumulated in dumpsters that are lined and covered with plastic membranes. A composite sample of the concrete will be analyzed for the potential contaminants determined in Step 1 above.

8.) Soil samples will be taken in accordance with the grid in Figure I1 (centers of 10 ft. x 10 ft. squares), for a minimum of 12 samples. Each will be a surface sample. These will also be analyzed for all priority pollutants determined in Step 1 above.

9.) Soil analyses will be compared to background samples of soil from other areas of the site, and to the cleanup standards obtained from IEPA-DLPC for any contaminant found. If results show contamination in excess of the cleanup standard(s), soil will be excavated at least to the extent suggested by the pattern of contamination.

NOTE: The assumed soil volume for closure cost estimate is based on three foot depth across area of storage pad, although it is unlikely that contaminants could penetrate underlying clay to this depth.

10.) The excavated area will be backfilled with clean clay and gravel.

I-1d(2): CLOSURE OF TANK SYSTEMS (724.297, 724.410)

No hazardous wastes are stored or treated in tanks in this facility.

I-1d(3): CLOSURE OF WASTE PILES (703.204(h), 724.358)

No waste pile activities are conducted in this facility.

I-1d(4): CLOSURE OF SURFACE IMPOUNDMENTS (703.203(f), 724.328)

No surface impoundment activities are conducted in this facility.

I-1d(5): CLOSURE OF INCINERATORS (724.451)

No incinerator activities are conducted in this facility.

I-1d(6): CLOSURE OF LAND TREATMENT FACILITIES (724.380, 724.212)

No land treatment activities are conducted in this facility.

I-1e: CLOSURE OF DISPOSAL UNITS (703.183(m), 703.203(f), 703.204(h), 703.207(e), 724.328(a)(2) and (c)(1)(A), 724.358(c), 724.410(a))

No hazardous wastes are disposed in this facility.

I-1f: SCHEDULE FOR CLOSURE (724.212(b)(6))

Refer to Figure I2, which is a milestone chart illustrating the closure schedule.

The Manager, Land Pollution, of the IEPA will be notified 180 days before the closing procedure for the facility will be started. At that time, the Closure Plan will be submitted to the IEPA in Springfield, Illinois. The IEPA will then approve, modify or disapprove the plan within 90 days of receipt.

All hazardous wastes will be moved out of the storage area, to a proper disposal site, within 90 days after the last batch of waste material has been generated. The last batch of hazardous waste will be generated no later than 180 days prior to the closing of the hazardous waste storage area.

The storage area will be completely closed down within 180 days after the last batch of hazardous waste has been generated. At that time, all hazardous wastes will have been disposed of properly, the storage area and all related equipment will have

been decontaminated, all residues will have been removed, and all threats to human health and the environment will have been eliminated.

When the storage area is completely closed down, Akzo Chemicals Inc. will submit a certification of closure, signed by Akzo and an independent registered professional engineer, stating that the facility has been closed in accordance with the specifications of the approved Closure Plan. This will be sent to the IEPA, 2002 Churchill Road, Springfield, IL 62706.

In terms of calendar dates, the schedule reads as follows:

The Manager, Land Pollution, of the IEPA would be notified between January 1, 2001 and June 1, 2001, which will be before the closing procedures for the storage area have been initiated. Following this notification, a closure plan would be submitted to the IEPA in Springfield, Illinois.

The last batch of hazardous waste would be generated prior to July 1, 2001, and wastes would definitely not be generated after July 1, 2001. The closing procedure will be started as soon as the Closure Plan has been approved by the IEPA. The approved Closure Plan should be back in the research facility before September 1, 2001.

I-1g: EXTENSION OF CLOSURE TIME (724.213)

Akzo Chemicals Inc. will not require an extension for closure time.

I-2: POST-CLOSURE PLAN (703.183(m), 703.203(f), 703.204(h), 703.207(e), 724.218, 724.297(b) and (c), 724.328(b) and (c)(1)(B), 724.380(c), 724.410(b))

A post-closure plan is not required because this is not a disposal facility and all wastes will be removed at closure.

I-3: NOTICE IN DEED AND CERTIFICATION (703.183(n), 724.216, 724.217(c), 724.219)

The Akzo McCook Research facility will not be used for waste disposal. Therefore, notation is not necessary in the deed to inform potential purchasers of restrictions associated with a disposal site.

I-4: CLOSURE COST ESTIMATE (703.183(o), 724.242)

The total cost for final closure of the hazardous waste storage area is estimated to be $138,600, based on the breakdown of

activities listed in Figure I3. The extreme closing condition was considered for this estimate.

This closing cost estimate will be kept onsite and will be revised whenever a change in the Closure Plan affects the costs. The estimate will be adjusted annually to reflect cost changes caused by inflation. The Department of Commerce Annual Implicit Price Deflation for Gross National Product will be used to make inflation-based adjustments.

I-5: FINANCIAL ASSURANCE MECHANISM FOR CLOSURE (703.183(o), 724.243)

I-5e: FINANCIAL TEST AND CORPORATE GUARANTEE FOR CLOSURE (724.243(f), 724.251(f), 40 CFR 264.151(h))

Appendix I-1 contains the necessary documents to meet requirements for the corporate guarantee method of financial assurance. The guarantee for Akzo Chemicals Inc. McCook Research facility is made by the parent corporation, Akzona Incorporated. This guarantee covers multiple facilities, which are identified in the documents with amount of closure funds assured for each.

I-5g: USE OF FINANCIAL MECHANISM FOR MULTIPLE FACILITIES (724.243(h))

Financial assurance documents provided in Appendix I-1 include the following:

1.) Corporate guarantee for closure care, signed by the Financial Vice President and Treasurer of Akzona Incorporated, including identification of all facilities covered and amount of funds assured

2.) Letter from Financial Vice President and Treasurer of Akzona Incorporated, including identification of all facilities covered and amount of funds assured

3.) Latest financial report for Akzona Incorporated

4.) Independent certified public accountant's report of examination of Akzona Incorporated's financial statements for fiscal 1988 (included in financial report)

5.) Special report from the independent certified public accountant as specified

I-6: POST-CLOSURE COST ESTIMATE (703.183(p), 724.244)

Post-closure care is not required.

I-7: FINANCIAL ASSURANCE MECHANISM FOR POST-CLOSURE CARE (703.183(p), 724.245)

Post-closure care is not required.

I-8: LIABILITY REQUIREMENTS (703.183(q), 724.247)

Proof of liability coverage is provided in Appendix I2.

I-8a: COVERAGE FOR SUDDEN ACCIDENTAL OCCURRENCES (724.247(a))

I-8a(1): ENDORSEMENT OR CERTIFICATION (724.247(a)(1))

The necessary certification is presented in Appendix I2, demonstrating coverage in the amount of $2 million per occurrence with annual aggregate of $2 million.

I-8b: COVERAGE FOR NONSUDDEN ACCIDENTAL OCCURRENCES (724.247(b))

Coverage is not required for a storage facility.

I-8c: REQUEST FOR VARIANCE (724.247(c))

No variance is requested.

I-9a: USE OF STATE-REQUIRED MECHANISM (40 CFR 264.151)

No applicable mechanisms exist.

I-9b: STATE ASSUMPTION OF RESPONSIBILITY (40 CFR 270.14(b)(18), 264.150)

No applicable mechanisms exist.

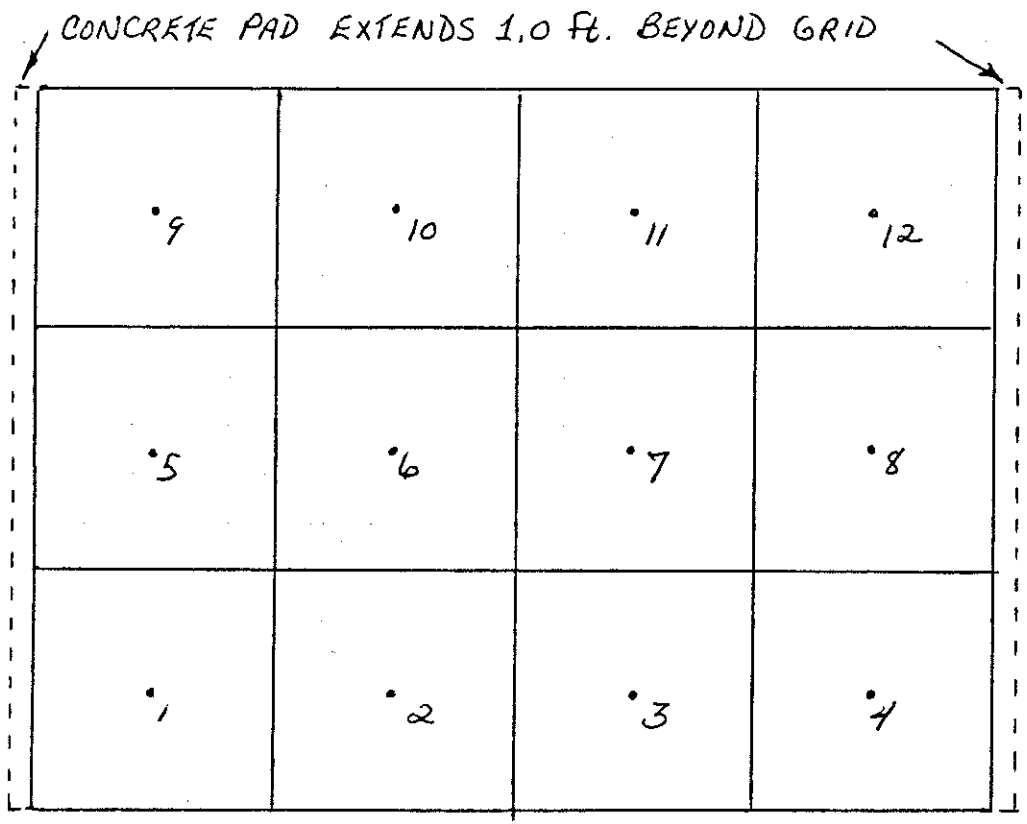


FIGURE 11 : SOIL SAMPLING GRID

FIGURE 12 - MILESTONE CHART FOR CLOSURE

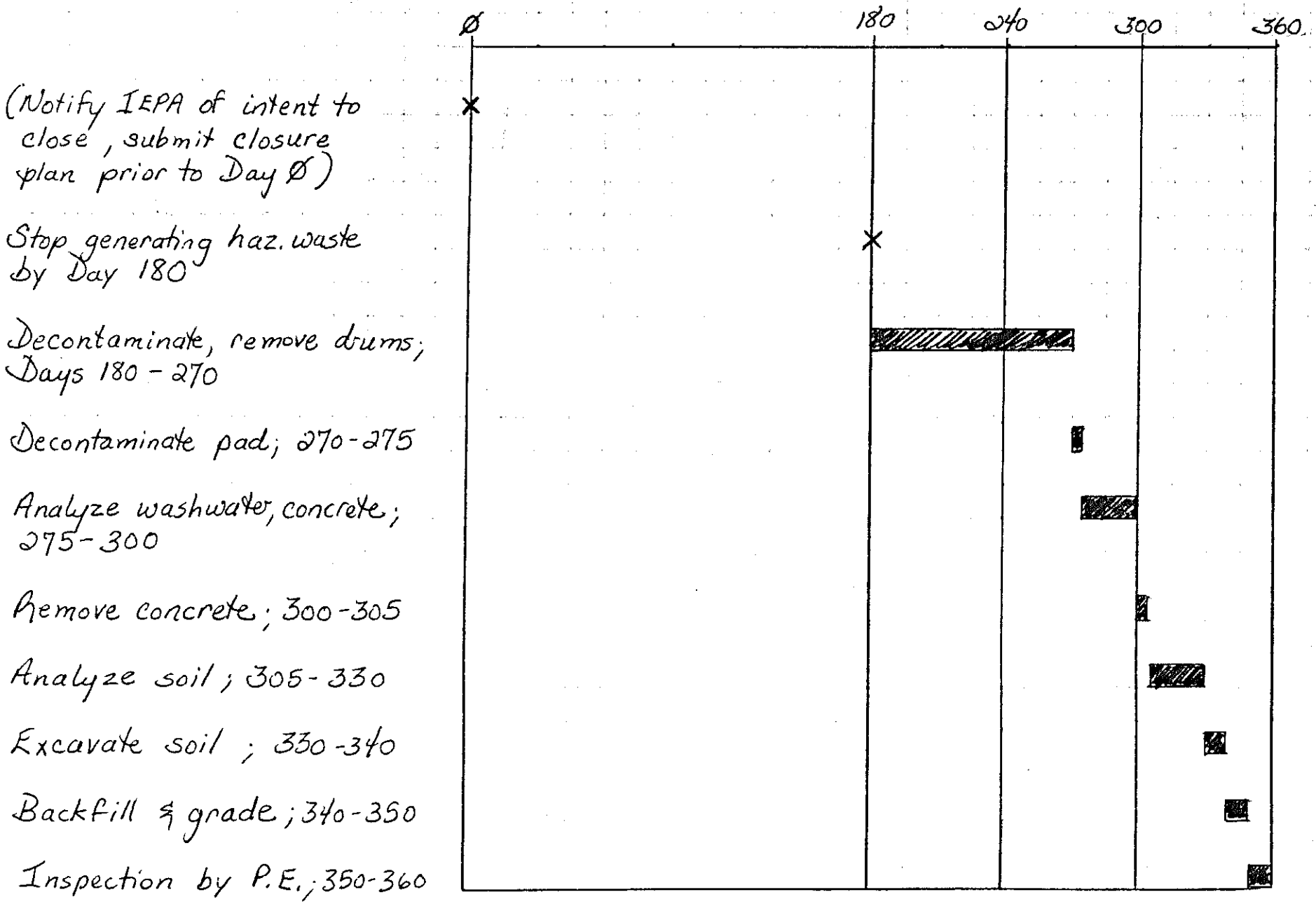


FIGURE I3

Closure Cost Estimate

		$
1.	Decontamination, Transport, Disposal of 200 drums hazardous wastes @ $350/drum	70,000
2.	Decontamination of Concrete Pad	
	2 days equipment @ $1000/day	2,000
	2 laborers, 20 hours each @ $35/hr	1,400
	1 supervisor, 20 hours @ $50/hr	1,000
3.	Sampling, Analysis of Washwater, Concrete 5 samples @ $1500 each	7,500
4.	Removal of Concrete Pad	
	3 days equipment @ $1000/day	3,000
	2 laborers, 30 hours each @ $35/hr	2,100
	1 supervisor, 30 hours @ $50/hr	1,500
5.	Soil Sampling Analysis 15 samples @ $1500 each	22,500
6.	Excavation, Disposal of Soil 130 cu yd @ $65/cu yd	8,450
7.	Backfill & Grade 130 cu yd @ $20/cu yd	2,600
8.	Inspection by Independent P.E. 16 hrs @ $60/hr	1,000
9.	Disposal of Concrete 70 cu yd @ $40/cu yd	2,800
10.	Disposal of Washwater 3000 gallons @ $4.25/gallon	12,750
	Total	$138,600

Notes: Health & Safety costs are included in labor rates.
Sampling includes labor and equipment.

APPENDIX I1

FINANCIAL ASSURANCE DOCUMENTS

AKZO

Chemical Division

March 31, 1989

Director
Illinois Environmental
Protection Agency
220 Churchill Road
P.O. Box 19276
Springfield, Illinois 62794-9276

Dear Sir:

In fulfillment of our obligation to demonstrate financial responsibility for Facility Closure, under Subpart H of 35 Illinois Administrative Code Parts 724 and 725, we are forwarding instruments and backup information for the following facility owned by Akzo Chemicals Inc. in the State of Illinois:

EPA I.D. No.	FACILITY NAME & ADDRESS	COVERAGE	COST EST.
ILD 065237851	Akzo Chemicals Inc. Morris Facility Route 6 and Tabler Road Morris, Illinois 60450	Closure	$52,460
ILD 000805705	Akzo Chemicals Inc. McCook Research Facility 8401 West 47th Street McCook, Illinois 60525	Closure	$49,450

Akzo Chemicals Inc. has chosen the corporate guarantee method of financial assurance for all of its facilities. The guarantee is made by Akzo Chemicals Inc.'s parent corporation, Akzona Incorporated. The following instruments are submitted in support of financial assurance for Akzo Chemicals Inc.:

(1) A Corporate Guarantee for Closure Care signed by the Financial Vice President and Treasurer of Akzona Incorporated;

(2) A letter from Akzona Incorporated's Financial Vice President and Treasurer;

(3) A copy of the latest Financial Report for Akzona Incorporated;

Akzo Chemicals Inc.
300 South Riverside Pl
Chicago, Illinois 60606
Tel. (312) 906 7500
Fax (312) 906 7680

(4) A copy of the independent certified public accountant's report of examination of Akzona Incorporated's Financial Statements for Fiscal 1988 (included in the annual Financial Report); and

(5) A special report from the independent certified public accountant as specified in Subpart H of 35 Illinois Administrative Code Parts 724 and 725.

(6) An Endorsement and/or Certificate of Insurance as required.

Should you have any questions concerning our submissions, please call me at (312) 906-7598.

Sincerely,

Vincent A. Mietlicki

Vincent A. Mietlicki
Assistant Counsel

adh

cc: D. Frank (w/attach)
J. Taylor (w/attach)
File

Corporate Guarantee and
Letter from Chief
Financial Officer

CORPORATE GUARANTEE FOR CLOSURE AND POST-CLOSURE CARE

Guarantee made this March 31, 1989 (1) by Akzona Incorporated (2), a business corporation organized under the laws of the State of Delaware, herein referred to as guarantor, to the Illinois Environmental Protection Agency (IEPA), obligee, on behalf of our subsidiary Akzo Chemicals Inc. (3), of 300 South Riverside Plaza, Chicago, Illinois 60606 (4) (5)

Recitals

1. Guarantor meets or exceeds the financial test criteria and agrees to comply with reporting requirements for guarantors as specified in Illinois Administrative Code 724.243(f), 724.245(f), 725.243, and 725.245.

2. Akzo Chemicals Inc. (6) owns or operates the following hazardous waste management facility(ies) covered by this guarantee:

	Closure Amount (8)	Post-Closure Amount (9)	Closure and Post-Closure Amount (10)
USEPA I.D. No. ILD 065237851 (7) Name Akzo Chemicals Inc. Address Route 6 and Tabler Road City Morris, Illinois 60450	$52,460	0	$52,460
USEPA I.D. No. ILD 000805705 (7) Name Akzo Chemicals Inc. Address 8401 West 47th Street City McCook, Illinois 60525	$49,450	0	$49,450

Please attach a separate page if more space is needed for all facilities.

3. "Closure plans" and "post-closure plans" as used below refer to the plans maintained as required by Subpart G of 35 Illinois Administrative Code Parts 724 and 725 for the closure and/or post-closure care of facilities as identified above.

4. For value received from Akzo Chemicals Inc., guarantor guarantees to IEPA that in the event that Akzo Chemicals Inc. (11) fails to perform closure (12) of the above facility(ies) in accordance with the closure and/or post-closure plans and other permit or interim status requirements whenever required to do so, the guarantor shall do so or establish a trust fund as specified in Subpart H of 35 Illinois Administrative Code Parts 724 and 725, as applicable, in the name of Akzo Chemicals Inc. (14) in the amount of the current closure and/or post-closure cost estimates as specified in Subpart H of 35 Illinois Administrative Code Parts 724 and 725.

This Agency is authorized to require this information under Illinois Revised Statutes, 1981, Chapter 111 1/2, Section 21(f). Disclosure of this information is required. Failure to do so may result in a penalty not to exceed $25,000 per day of violation. Falsification of this information may constitute a Class 4 felony ... $5,000 per day of violation for the first offense. This form has been approved by the Forms Management Center.

LETTER FROM CHIEF FINANCIAL OFFICER

(Assurance of closure and/or post-closure care)

Director
Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, Illinois 62706

Dear Sir or Madam:

I am the chief financial officer of Akzona Incorporated, 111 W. 40th St., New York, NY 10018. (1)

This letter is in support of this firm's use of the financial test to demonstrate financial assurance, as specified in Subpart H of 40 CFR Parts 264 and 265 and/or Subpart H of 35 Illinois Administrative Code Parts 724 and 725.

Instruction (2)

1. This firm is the owner or operator of the following facilities for which financial assurance for closure and/or post-closure care is demonstrated through the financial test specified in Subpart H of 35 Ill. Adm. Code Parts 724 and 725. The current closure and/or post-closure cost estimates covered by the test are shown for each facility: (LIST ALL THE ILLINOIS FACILITIES USING THE FINANCIAL TEST)

USEPA I.D. No. (3)	NONE	Closure Amount (4)	Post-Closure Amount (5)	Closure and Post-Closure Amounts (6)
Name				
Address				
City				
USEPA I.D. No.				
Name				
Address				
City				

Please attach a separate page if more space is needed for all facilities.

2. This firm guarantees, through the corporate guarantee specified in Subpart H of 35 Ill. Adm. Code Parts Parts 724 and 725, the closure and/or post-closure care of the following facilities owned or operated by subsidiaries of this firm. The current cost estimates for closure and/or post-closure care so guaranteed are shown for each facility: (LIST ALL THE ILLINOIS FACILITIES USING THE CORPORATE GUARANTEE)

USEPA I.D. No. (3)		Closure Amount (4)	Post-Closure Amount (5)	Closure and Post-Closure Amounts (6)
USEPA I.D. No. ILD 000805705				
Name	Akzo Chemicals Inc., McCook Research Laboratory			
Address	8401 West 47th Street	$49,450	0	$49,450
City	McCook, Illinois 60525			
USEPA I.D. No. ILD 065237851				
Name	Akzo Chemicals Inc., Morris Facility			
Address	Route 6 and Tabler Road	$52,460	0	$52,460
City	Morris, Illinois 60450			

Please attach a separate page if more space is needed for all facilities.

This Agency is authorized to require this information under Illinois Revised Statutes, 1981, Chapter 111 1/2, Section 2101. Disclosure of this information is required. Failure to do so may result in a civil penalty not to exceed $25,000 per day of violation. Falsification of this information may constitute a Class 4 felony, which also carries a fine of up to $25,000 per day of violation for the first offense. This form has been approved by the Forms Management Center.

IL 532-1204 LPC 152 2/84

3. For states other than Illinois this firm, as owner or operator or guarantor, is demonstrating fi[illegible] for the closure and/or post-clos[illegible] care of the following facilities through the use of a test equivalent or substantially equival[illegible] [illegible]al test specified in Subpart H of CFR Parts 264 and 265. The current closure and/or post-closure cost estimates covered by [illegible] [illegible]own for each facility: (LIST A[illegible] FACILITIES WHICH ARE NOT IN ILLINOIS BUT ARE SUBJECT TO A STATE OR FEDER[illegible]L F[illegible]NANCIAL ASSURANCE REQUIREME[illegible] THAT ARE ASSURED BY A FINANCIAL TEST OR CORPORATE GUARANTEE)

SEE ATTACHMENT 1

USEPA I.D. No. (3)	[illegible] (4)	Post-Closure Amount (5)	Closure an[illegible] Post-Closu[illegible] Amounts (6)
Name			
Address			
City			
USEPA I.D. No.			
Name			
Address			
City			

Please attach a separate page if more space is needed for all facilities.

4. This firm is the owner or operator of the following hazardous waste management facilities for which financial assurance for closure or, if a [illegible]posal facility, post-closure care, is *NOT* demonstrated either to IEPA, USEPA or a State through the financial test or any other fina[illegible] assurance mechanism specified in Subpart H of 40 CFR Parts 264 and 265 or equivalent or substantially equivalent state mechanisms. The [illegible]rent closure and/or post-closure cost estimates not covered by such financial assurance are shown for each facility: (LIST FACILITIES IN R[illegible] AUTHORIZED STATES WHERE THERE IS NO STATE FINANCIAL ASSURANCE REQUIREMENT)

NONE

USEPA I.D. No. (3)	Closure Amount (4)	Post-Closure Amount (5)	Closure a[illegible] Post-Closu[illegible] Amount (6)
Name			
Address			
City			
USEPA I.D. No.			
Name			
Address			
City			

Please attach a separate page if more space is needed for all facilities.

This firm is not required (7) to file a Form 10K with the Securities and Exchange Commission (SEC) for the latest fiscal ye[illegible]

The fiscal year of this firm ends on December 31 (8) *. The figures for the following items marked with an asterisk are derived fro[illegible] firm's independently audited, year-end financial statements for the latest completed fiscal year, ended December 31, 1988 (9).

See Instruction (10) (Letter From Chief Financial Officer)

Alternative I

1. Sum of current closure and post-closure cost estimates (total of all cost estimates shown in the four paragraphs above) ..... $ 1,857,047

2. [illegible] liabilities (if any portion of the closure or post-closure cost estimates is included in total liabilities, you may deduct the amount of that portion from this line and add that amount to lines 3 and 4) ..... $ 427,099,000

*3. T[illegible] ..... $ 381,501,000

*4. N[illegible] ..... $ 709,001,000

*5. C[illegible] ..... $ 389,900,000

*6. [illegible] liabilities ..... $ 132,599,000

7. Net working capital (line 5 minus line 6) ..... $ 257,301,000

*8. The sum of net income plus depreciation, depletion, and amortization ..... $ 86,000,000

*9. Total assets in U.S. (required only if less than 90% of firm's assets are located in the U.S.) ..... $ N/A

		Yes	No
10.	Is line 3 at least $10 million?	x	
11.	Is line 3 at least 6 times line 1?	x	
12.	Is line 7 at least 6 times line 1?	x	
*13.	Are at least 90% of firm's assets located in the U.S.?	x	
	If not, complete line 14.		
14.	Is line 9 at least 6 times line 1?	N/A	
15.	Is line 2 divided by line 4 less than 2.0?	x	
16.	Is line 8 divided by line 2 greater than 0.1?	x	
17.	Is line 5 divided by line 6 greater than 1.5?	x	

Signature: P B Davis

Typed name: Peter B. Davis

Title: Financial Vice President & Treasurer

Date: March 31, 1989

See Instruction (10) (Letter From Chief Financial Officer)

Alternative II

1. Sum of current closure and post-closure cost estimates (total of all cost estimates shown in the four paragraphs above) ..... $_____

2. Current bond rating of most recent issuance of this firm and name of rating service ..... _____

3. Date of issuance of bond ..... _____

4. Date of maturity of bond ..... _____

*5. Tangible net worth (if any portion of the closure and post-closure cost estimates is included in "total" on your firm's financial statements, you may add the amount of that portion to this line) ..... _____

*6. Total assets in U.S. (required only if less than 90% of firm's assets are located in the U.S.) ..... $_____

	Yes	No
7. Is line 5 at least $10 million?	_____	_____
8. Is line 5 at least 6 times line 1?	_____	_____
*9. Are at least 90% of firm's assets located in the U.S.? If not, complete line 10.	_____	_____
10. Is line 6 at least 6 times line 1?	_____	_____

Signature _____

Typed name _____

Title _____

Date _____

ATTACHMENT 1

EPA I.D. No.	FACILITY NAME & ADDRESS	CLOSURE AMOUNT	POST-CLOSURE AMOUNT	CLOSURE & POST CLOSURE AMOUNT
NYD 043815158	Akzo Chemicals Inc., Burt Facility 2153 Lockport-Olcott Road Burt, New York 14028	$135,350	0	$ 135,350
TXD 073920399	Akzo Chemicals Inc., Bayport Facility 13000 Baypark Road Pasadena, Texas 77507	$ 15,950	0	$ 15,950
DED 98055166	Akzo Chemicals Inc., Delaware City Facility Schoolhouse Road Delaware City, Delaware 19700	$ 32,050	0	$ 32,050
NYD 056301104	Akzo Chemicals Inc., Dobbs Ferry Research Facility Livingstone Avenue Dobbs Ferry, New York 10522	$125,014	0	$ 125,014
ALD 008161176	Akzo Chemicals Inc., LeMoyne Facility Highway 43 North Axis, Alabama 36505	$321,473	$780,000	$1,104,473
MID 005039458	Akzo Chemicals Inc., Weston Facility 9901 Sand Creek Highway Weston, Michigan 49289	$259,000	0	$ 259,000
TXD 057191199	Texas Alkyls, Inc., 730 Battleground Road Deer Park, Texas 77536	$ 86,300	0	$ 86,300

AKZONA INCORPORATED

CONSOLIDATED STATEMENT OF INCOME

(In thousands of dollars)

Year ended December 31	[illegible]	1987*
Revenues:		
Net sales	$ [illegible]	$602,684
Costs and expenses:		
Cost of sales (excluding depreciation and depletion)	579,800	379,961
Selling, administrative and general	155,000	119,203
Depreciation, amortization and depletion	65,600	35,572
Research and development	34,100	21,240
	834,500	555,976
Operating income	65,800	46,708
Other income (expense):		
Interest and other income	9,700	11,071
Interest expense	(35,800)	(20,885)
	(26,100)	(9,814)
Income before income taxes	39,700	36,894
Provision for income taxes	(19,300)	(14,900)
Net income	$ 20,400	$ 21,994

*Certain 1987 amounts have been reclassified to conform with 1988 presentation.

See notes to consolidated financial statements.

AKZONA INCORPORATED

CONSOLIDATED STATEMENT OF FINANCIAL CONDITION

(In thousands of dollars)

ASSETS	December 31, 1988	December 31, 1987
Current assets:		
Cash	$ -	$ -
Marketable securities, at cost which approximates market	-	2,206
Accounts and notes receivable	197,000	159,583
Refundable income taxes	-	137
Inventories -		
Finished goods	120,700	112,992
Work in process	7,800	4,865
Raw materials	49,800	26,542
General stores	12,200	15,429
	190,500	159,828
Prepaid expenses	2,400	1,885
Total current assets	389,900	323,639
Property, plant and equipment, at cost:		
Land	13,700	13,164
Buildings and structures	131,400	101,224
Machinery and equipment	473,200	383,691
Salt deposits and shafts	14,200	14,235
Construction work in progress	38,800	29,818
	671,300	542,132
Less accumulated depreciation and depletion	258,000	208,441
	413,300	333,691
Other assets:		
Other assets	5,400	10,167
Goodwill and other intangibles	327,500	345,862
	$1,136,100	$1,013,359

LIABILITIES AND STOCKHOLDER'S EQUITY	December 31, 1988	December 31, 1987
Current liabilities:		
Accounts payable	$ 71,100	$ 68,914
Accrued liabilities	55,499	67,134
Current portion of long-term debt	3,600	3,681
Accrued income taxes	2,400	2,800
Total current liabilities	132,599	142,529
Non-current liabilities and credits:		
Long-term debt	54,400	59,004
Deferred income taxes and income taxes payable to parent	67,600	56,826
Payable to parent	112,400	13,395
Other	60,100	55,031
Stockholder's equity:		
Common Stock $1.25 par value:		
Authorized-10,000 shares;		
Issued and outstanding-1,000 shares	1	1
Additional capital	395,815	393,788
Accumulated income reinvested in the business	313,185	292,785
Total stockholder's equity	709,001	686,574
	$1,136,100	$1,013,359

See notes to consolidated financial statements.

AKZONA INCORPORATED
CONSOLIDATED STATEMENT OF CASH FLOWS
(In thousands of dollars)

Year ended December 31	1988	1987
Cash flows from operating activities:		
Net income	$ 20,400	$ 21,994
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation, amortization and depletion	65,600	5,572
Deferrals of taxes	12,274	1,385
Unconsolidated affiliates	3,727	1,049
Other	3,600	
Changes in operating assets & liabilities excluding effects from acquisitions:		
(Increase) in accounts receivable	(19,517)	(29,556)
Increase in payable to parent	99,005	73,252
(Increase) in inventories	(12,472)	(15,265)
(Increase) decrease in prepaid expenses	485	(400)
Decrease in refundable income taxes	137	68
Increase (decrease) in accounts payable & accrued liabilities	(21,949)	41,717
(Decrease) in accrued income taxes	(400)	(808)
Increase (decrease) in other non-current liabilities	(16,031)	7,169
Net cash provided by operating activities	134,859	152,047
Investing activities:		
Expenditures for property, plant and equipment	(69,500)	(56,903)
Investment in unconsolidated affiliates	-	(429)
Book value of property disposals	1,491	1,227
Purchase price of acquisitions	(75,100)	(459,977)
Reduction in Stauffer purchase price	12,900	-
Other	(1,871)	(1,999)
Net cash (used) in investing activities	(132,080)	(518,081)
Financing activities:		
Proceeds from long-term debt	1,000	1,400
Payments on long-term debt	(5,985)	(6,026)
Contribution to capital	-	322,000
Decrease in demand note receivable from parent	-	50,000
Net cash (used) provided by financing activities	(4,985)	367,374
Net (decrease) increase in cash & cash equivalents	(2,206)	1,340
Cash and cash equivalents at the beginning of year	2,206	866
Cash and cash equivalents at the end of year	$ -	$ 2,206
Supplemental disclosures of cash flow information:		
Cash paid during the year for:		
Interest expense (net of capitalized interest)	$ 35,900	$ 20,885
Income tax payments	6,018	4,949
Details of businesses acquired in purchase transactions were as follows:		
Fair value of assets acquired	$108,900	$544,083
Liabilities assumed or created	33,800	84,106
Cash paid for acquisitions	75,100	459,977
Less cash acquired	-	-
Net cash paid for acquisitions	$ 75,100	$459,977

See notes to consolidated financial statements.

AKZONA INCORPORATED

CONSOLIDATED STATEMENT OF STOCKHOLDER'S EQUITY

Years ended December 31, 1988 and 1987

(In thousands of dollars)

	Common Stock		Additional Capital				
	Shares	Amount	Additional Paid-In Capital	Cumulative Currency Translation Adjustment	Total	Accumulated Income Reinvested in the Business	Total
Balance at December 31, 1986	1,000	$ 1	$ 73,031	$(2,401)	$ 70,630	$270,791	$341,422
Net income						21,994	21,994
Foreign currency translation adjustment				1,158	1,158		1,158
Capital contribution	-	-	322,000	-	322,000	-	322,000
Balance at December 31, 1987	1,000	1	395,031	(1,243)	393,788	292,785	686,574
Net income						20,400	20,400
Foreign currency translation adjustment				2,027	2,027		2,027
Balance at December 31, 1988	1,000	$ 1	$395,031	$ 784	$395,815	$313,185	$709,001

See notes to consolidated financial statements.

AKZONA INCORPORATED
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 1988

1. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of consolidation - The consolidated financial state [illegible] include the accounts of Akzona Incorporated and all wholly-o[illegible] subsidiaries (the "Company"), including foreign operations. [illegible] December 31, 1988 and 1987, the investment in a corporation owned on an equal basis with Akzo America Inc. (the U.S. parent of the Company), as well as investments in less than majority-owned companies in which there is a 20% or greater ownership, is reflected on an equity basis. Other income has been reduced to reflect net equity reduction of $1,200,000 in 1988 and $3,168,000 in 1987, representing the Company's share of the results of operations of these corporations. All significant intercompany transactions between consolidated Akzona companies are eliminated.

Inventories - Inventories are stated at the lower of cost (using the first-in, first-out method, except as discussed below) or mar[illegible]t. Market represents replacement cost with respect to raw materials and the net realizable value with respect to work in process and finished goods.

Certain inventories of the Company are accounted for using the last-in, first-out method. If the first-in, first-out method had been used, inventories at December 31, 1988, would have increased by $1,000,000, while inventories at December 31, 1987 would have decreased by $600,000. Income before taxes and net income for the year ended December 31, 1988 would have increased by $1,600,000 and $960,000, respectively, while income before taxes and net income for the year ended December 31, 1987 would have decreased by $600,000 and $360,000, respectively.

AKZONA INCORPORATED
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 1988

1. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (Continued)

Depreciation and depletion - For financial reporting purposes, depreciation of property, plant and equipment is calculated on the straight-line basis over the estimated useful lives of the respective assets. The estimated lives used are: buildings and structures - 14 to 50 years; machinery and equipment - 5 to 25 years. Depletion of salt deposits is calculated on the basis of estimated recoverable tons of salt.

Cash and cash equivalents - Cash equivalents consist of short-term deposits and highly liquid marketable securities which are stated at cost and approximate market value. In fiscal 1988, the Company adopted Statement of Financial Accounting Standards No. 95 - "Statement of Cash Flows." Prior year amounts in the statement have been reclassified to conform with current year presentation.

AKZONA INCORPORATED
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 1988

1. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (Continued)

Foreign currency translation - The financial statements of operations have been translated into U.S. dollar equivalents. asset and liability accounts have been translated using current exchange rates, and income statement items have been translated using the average exchange rates, by quarter, during the year. The translation adjustment is excluded from net income and is included directly in stockholder's equity.

Capitalization of interest expense - The Company capitalizes the cost of funds related to certain construction projects. Interest capitalized amounted to $3,000,000 and $851,000 in 1988 and 1987, respectively.

Investment tax credit - The Company accounts for investment tax credits using the flow-through method whereby investment tax credits are used to reduce current federal income tax expense in the year the related assets are placed in service.

Research and development - Research and development costs are expensed as incurred. Such costs were approximately $34,100,000 in 1988 and $21,240,000 in 1987.

AKZONA INCORPORATED
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 1988

2. ACQUISITIONS

The Company acquired certain businesses in 1988 and 1987 as follows:

Business Acquired	Approximate Purchase Price
March 1, 1988:	
Diamond Crystal Salt Division	$ 75,100,000
August 31, 1987:	
Stauffer Specialty and Food Products Inc., the specialty chemical business of Stauffer Chemical Company	$447,100,000*

The above acquisitions have been accounted for using the purchase method whereby the purchase price was allocated based on the fair market value of the assets acquired and the results of the Company reflect the results of the acquired businesses from the date of acquisition.

The excess of the purchase prices over the fair market value of net assets acquired is being amortized on a straight-line basis over a period of 40 years.

* The worldwide Stauffer purchase price allocation was finalized in 1988. The purchase price attributable to the Company's U.S. operations, allocated from Akzo N.V. to the Company, was reduced by $12,900,000 from $460,000,000 to $447,100,000.

AKZONA INCORPORATED
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 1988

3. DEBT

At December 31, long-term debt consisted of:

	1988	1987
7 1/2% debentures due 1997	$ 3,274,000	$ 4,324,0
9 1/4% notes due 1989-1996	26,000,000	29,000,0
8 3/8% Pollution Control Bonds due 1991-2000	17,355,000	17,355,000
Other	11,371,000	12,006,000
Total long-term debt	58,000,000	62,685,000
Less current portion	3,600,000	3,681,000
Total long-term portion	$54,400,000	$59,004,000

The Company has purchased $56,726,000 face value of its 7 1/2% debentures which are sufficient to meet future sinking fund requirements through 1996. The Company realized gains of $100,000 in 1988 and $209,000 in 1987, which have been included in other income in the accompanying consolidated statement of income.

Long-term debt, including the current portion, maturing annually during each of the years 1989 through 1993 amounts to $3,600,000; $3,500,000; $4,400,000; $5,400,000; and $4,700,000, respectively.

AKZONA INCORPORATED
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 1988

3. DEBT (Continued)

The m[illegible]icant loan agreements contain, among other matters, covenants [illegible] to the maintenance of consolidated working capital and curr[illegible], the amount of debt permitted, minimum net worth and the payment of cash dividends. At December 31, 1988, approximately $65,495,000 of accumulated income reinvested in the business was available for the payment of cash dividends under the most restrictive agreement.

4. INCOME TAXES

The income tax provision is comprised of the following:

	1988	1987
Provision (benefit) for income taxes:		
Current - Federal and state	$15,500,000	$13,500,000
Foreign	4,100,000	2,400,000
Deferred - Federal and state	-	(1,200,000)
Foreign	(300,000)	200,000
	$19,300,000	$14,900,000

Investment tax credits included in the provision for income taxes were $-0- in 1988 and $3,300,000 in 1987.

The Company's accounts are included in the consolidated federal income tax return of its parent, Akzo America Inc., which at December 31, 1988 had available a consolidated net operating loss carryforward of

AKZONA INCORPORATED
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 1988

4. INCOME TAXES (Continued)

approximately $140 million and investment tax credit carryforward of approximately $17 million. In 1987, the terms of the tax sharing agreement between the Company and its parent provide that so long as Company and its subsidiaries remain a part of the consolidated group, the Company will record its federal income tax provision as if it were filing a separate income tax return. In 1988, a new tax sharing agreement between the Company and its parent calls for a federal and state tax provision at a specified percentage of U.S. pretax income, as defined, payable to the Company's parent.

A reconciliation between the amount of reported income tax expense and the amount computed by multiplying the income before income taxes by the U.S. federal statutory tax rate of 34% in 1988 and 40% in 1987 follows:

	1988	1987
Amount computed using statutory federal income tax rate	$13,500,000	$14,758,000
Investment tax credit	-	(3,300,000)
Depletion	(2,700,000)	(1,452,000)
Equity in non-consolidated affiliates	400,000	1,267,000
State income taxes	2,000,000	1,676,000
Foreign tax differential	800,000	214,000
Amortization of intangibles	3,800,000	1,382,000
Other	1,500,000	355,000
Reported income tax expense	$19,300,000	$14,900,000

AKZONA INCORPORATED
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 1988

5. CONTINGENCIES AND COMMITMENTS

Various suits and claims arising in the ordinary course of business are pending against the Company and its subsidiaries. In the opinion of the Company's management, amounts provided for such suits and claims are adequate and final disposition or settlement will have no material effect on consolidated financial position or results of operations.

The Company has several agreements through 1992 for the purchase of salt at an average annual cost approximating $7,000,000. Amounts expended in 1988 and 1987 under these agreements amounted to $2,600,000 and $2,624,000, respectively.

The Company and its subsidiaries lease office space, warehouses, and transportation and other equipment under a number of leases extending for varying periods of time. Many of the leases have specific renewal options or are expected to be renewed or replaced in the ordinary course of business. Net rental expense amounted to $16,482,000 in 1988 and $13,175,000 in 1987, after deducting sub-leasing income and mileage credits of $2,408,000 and $270,000 in those respective years. The minimum rental commitments under all non-cancellable leases were as follows:

	Transportation Equipment	Other	Total
1989	$5,338,000	$ 8,355,000	$13,693,000
1990	4,034,000	7,469,000	11,503,000
1991	2,826,000	6,560,000	9,386,000
1992	1,162,000	5,459,000	6,621,000
1993	785,000	4,684,000	5,469,000
Thereafter	137,000	63,591,000	63,728,000

AKZONA INCORPORATED
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 1988

6. RETIREMENT PROGRAMS

The Company and its subsidiaries have retirement and pension plans which provide benefits for eligible salaried and hourly-paid employees. Benefits under these plans are generally based on final earnings (as defined) and years of service. The cost of these plans amounted to approximately $4,100,000 in 1988 and $3,000,000 in 1987. It is the Company's policy to make contributions sufficient to meet the minimum funding requirements of applicable laws and regulations, plus such additional amounts, if any, as the Company and its actuarial consultants consider to be appropriate.

The net pension cost of the Company's U.S. defined benefit plans, (including its share of the Akzo America Retirement Plan pension cost), for 1988 and 1987 includes the following components:

	1988	1987
Service cost - benefits earned during the period	$ 3,139,198	$ 2,400,685
Interest cost on projected benefit obligation	6,471,271	6,753,527
Actual return on plan assets	(453,011)	(12,669,519)
Net amortization and deferral	(5,356,758)	6,267,985
Net pension cost	$ 3,800,700	$ 2,752,678

Although the actual return on plan assets is shown, the expected long-term rate of return used in determining net pension cost was 8%. The difference between the actual return and expected return is included in net amortization and deferral. The actuarial present value of benefits was determined using a discount rate of 9%. The assumed rate of increase in compensation levels used in the measurement of the projected benefit obligation was approximately 7%.

AKZONA INCORPORATED
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 1988

6. RETIREMENT PROGRAMS (Continued)

The funded s[illegible] the Company's U.S. defined benefit pension plans and the Akzon Ame[illegible] tirement Plan (AARP), in which several Akzona companies participate, is as follows:

	1988	
	Separate Plans of Akzona Companies	AARP
Actuarial present value of benefit obligations:		
Vested benefits	$(37,431,000)	$(63,246,000)
Non-vested benefits	(3,109,000)	(2,673,000)
Accumulated benefit obligation	(40,540,000)	(65,919,000)
Effect of assumed increase in compensation levels	(4,966,000)	(9,026,000)
Projected benefit obligation for services rendered to date	(45,506,000)	(74,945,000)
Plan assets at fair value	44,115,000	81,109,000
Excess of assets over projected benefit obligation	(1,391,000)	6,164,000
Unrecognized net (gain)	(1,266,000)	(3,986,000)
Unrecognized prior service cost	401,000	10,000
Unrecognized net transition (asset)	(1,280,000)	848,000
Fourth Quarter contribution	16,000	-
Prepaid Pension Cost (Unfunded Accrued Pension Liability)	$ (3,520,000)	$ 3,036,000

AKZONA INCORPORATED
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 1988

6. RETIREMENT PROGRAMS (Continued)

Plan assets consist principally of marketable equity securities, fixed income securities and short-term investments. The funded status table noted above reflects the measurement of plan assets and obligations as of September 30, 1988.

7. POSTRETIREMENT HEALTH CARE AND LIFE INSURANCE BENEFITS

In addition to providing pension benefits, the Company and its subsidiaries provide certain health care and life insurance benefits for retired employees. The majority of the Company's employees, including employees in foreign countries, may become eligible for those benefits if they reach retirement age while working for the Company. Those and similar benefits for active employees are provided through an insurance company whose premiums are based on the benefits paid during the year. Those costs are recognized as expense as health care claims are incurred and life insurance premiums are paid. For 1988 and 1987 the expense associated with providing these benefits amounted to $13,636,000 and $8,269,000, respectively. In 1988, approximately $1,927,000 was applicable to 1,407 retirees and $11,709,000 was applicable to 5,113 active employees. In 1987, approximately $1,143,000 was applicable to 690 retirees and $7,126,000 was applicable to 3,264 active employees.

ARZONA INCORPORATED
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 1988

8. TRANSACTIONS WITH AFFILIATES

All of the Company's common stock is owned directly by Akzo America Inc. and beneficially by Akzo N.V. (Akzo), a Netherlands corporation, which operates internationally in many of the same businesses as the Company. The Company and Akzo have various agreements which provide for the sharing of business knowledge and research efforts. The more significant agreements, which are not material in amount, are long-term and provide for sharing of specific research costs. The companies also engage in other less significant transactions, principally related to the sale and purchase of products. Amounts included in the consolidated statement of financial condition with respect to transactions with affiliates are set forth below:

	1988	1987
Accounts and notes receivable	$21,200,000	$17,500,000
Accounts and notes payable	7,100,000	8,400,000

In addition, the Company's U.S. parent, Akzo America Inc. manages the excess cash of all the U.S. companies. Interest is paid or charged to the Company based on its cash position with the parent. Substantially all new borrowings since January 1, 1985, except for those assumed from acquisitions, have been made by Akzo America Inc. In addition, substantially all headquarters' general and administrative functions are conducted by Akzo America Inc., the costs for which have been allocated to each of its subsidiaries.

A MEMBER OF ARTHUR YOUNG INTERNATIONAL

Arthur Young

277 Park Avenue
New York, New York 10172
Telephone: (212) 407-1500
Telex: ITRT-177704

**Report of Independent
Public Accountants**

The Board of Directors and Stockholder
Akzona Incorporated

We have audited the accompanying consolidated statement of financial condition of Akzona Incorporated at December 31, 1988 and 1987 and the related consolidated statements of income, stockholder's equity, and cash flows for the years then ended. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the statements referred to above present fairly, in all material respects, the consolidated financial position of Akzona Incorporated at December 31, 1988 and 1987, and the consolidated results of operations and cash flows for the years then ended, in conformity with generally accepted accounting principles.

As described in Note 8, the Company has certain transactions with affiliates.

Arthur Young & Company

February 3, 1989

A MEMBER OF ARTHUR YOUNG INTERNATIONAL

Arthur Young

277 Park Avenue
New York, New York 10172
Telephone: (212) 407-1500
Telex: TRT-177704

Th[illegible]rd of Directors
A[illegible] Incorporated

We have audited the consolidated statement of financial condition of Akzona Incorporated at December 31, 1988, and the related consolidated statements of income, stockholder's equity and cash flows for the year then ended, and have issued our report thereon dated February 3, 1989. Our audit was made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

We have compared the amounts included under Alternative I for items 2 through 8 in Mr. Peter B. Davis' March 31, 1989 letter to the Director of Illinois Environmental Protection Agency to amounts included in or derived from the Company's consolidated financial statements for the year ended December 31, 1988. In connection with this procedure, nothing came to our attention which caused us to believe that the amounts included in Altern[illegible]tiv[illegible] I for items 2 through 8 require adjustment.

Arthur Young & Company

March 31, 1989

APPENDIX I2

LIABILITY COVERAGE

HAZARDOUS WASTE FACILITY CERTIFICATE OF LIABILITY INSUR

1. ZURICH INSURANCE COMPANY (1), (the "Insurer"), of 800 NORTH PLAZA DR (2) SCHAUMBURG, IL. 60196 hereby certifies that it has issued liability insurance covering bodily injury and property dama to AKZO CHEMICALS INC., (the "insured"), of 300 SOUTH RIVERSIDE PL (4) CHICAGO, IL. 60606 (3) in connection with the insured's obligation to demonstrate financi responsibility under 35 Illin Administrative Code Parts 724.247 or 725.247. The coverage applies at:

	Sudden Accidental Occurrences (2)	Non Acc Occ	Sudden and Nonsudden Accidental Occurrences (4)
USEPA I.D. No. (1) ILD 065237851			
Name AKZO CHEMICALS INC. MORRIS FACILITY			
Address ROUTE 6 AND TABLER ROAD			2,000,00
City MORRIS ILL. 60450			
USEPA I.D. No. ILD 000805705			
Name AKZO CHEMICALS INC., MC COOK RESEARCH FACILITY			
Address 8401 WEST 47TH STREET			2,000,00
City MC COOK, ILLINOIS 60525			

Please attach a separate page if more space is needed for all facilities.

The limits of liability are $ 2,000,000 (9) each occurrence and $ 2,000,000 (10) annual aggregate exclusive of legal defense costs. The coverage is provided under policy number GLC38-97-176-05 (11) issued on JANUARY 1, 1989 (12)

The effective date of said policy is JANUARY 1, 1989 (13).

2. The Insurer further certifies the following with respect to the insurance described in Paragraph 1:

(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 insured for any such payment made by the Insurer. This provision does not apply with respect to that amount of any deductible for wh coverage is demonstrated as specified in 35 Illinois Administrative Code 724.247(f) or 725.247.

(c) Whenever requested by the Director of the Illinois Environmental Protection Agency (IEPA), the Insurer agrees to furnish to the Direct 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 expira of sixty (60) days after a copy of such written notice is received by the IEPA Director.

(e) Any other termination of the insurance will be effective only upon written notice and only after the expiration of thirty (30) days aft copy of such written notice is received by the IEPA Director.

I hereby certify that the Insurer is licensed to transact the business of insurance, or eligible to provide insurance as an excess or surplus lines insure one or more States.

Signature Lorri Pierce

Typed name LORRI PIERCE

Title INTERNATIONAL ACCOUNT REPRESENTATIVE

Authorized Representative of ZURICH AMERICAN INSURANCE COMPANY

Address of Representative 44 WALL STREET, NEW YORK, NY 10005

I-39 (REVISED 2-15-90)

This Agency is authorized to require that the Insured submit this document under Illinois Revised Statutes, 1981, Chapter 111 1/2, Section 2110. Failure to do so may result in a civil penalty again Insured of not to exceed $25,000 per day of violation. Falsification of this information by any person may constitute a Class 4 felony, and may also carry a fine of not to exceed $25,000 per day of the offense. This form has been approved by the Forms Management Center.

Appendix I-3

Health and Safety Provisions
For Akzo Employees Involved in Closure Operations

I. Physical Exams

Any participating employees who have not had a company-sponsored physical within the past 12 months will undergo a complete physical prior to beginning closure-related work. This exam includes chest x-ray, spirometry, blood and urine analyses.

Only employees who are physically fit to wear all types of respirators (cartridge, air-line, SCBA) may work on this project.

Health monitoring for participating employees will include blood chemistry tests before and after the closure project.

II. Personnel Protective Equipment

Table I-3 (attached) outlines the minimum level of protective equipment to be worn during tasks associated with the closure project.

III. Air Monitoring

The Akzo corporate industrial hygiene department and the Akzo McCook Research safety mgr. and industrial hygiene coordinator will design a personnel monitoring program for any specific contaminants identified during the closure activities. Direct-readout sampling tubes will also be used where available for specific contaminants identified.

IV. Decontamination

A decontamination station will be set up at a strategic location during each phase of the closure project. Containers will be provided for disposal of contaminated disposable gear.

V. Pre-Closure Training Sessions

Special training sessions will be held prior to beginning closure work, to review all aspects of the closure tasks, and to demonstrate decontamination procedures. The RCRA Contingency Plan will also be reviewed, with emphasis on response procedures for spills and first aid emergencies.

Table I-3A

Protective Equipment for Closure Tasks

Task	Protective Equipment
Decontamination of Drums, Concrete Pad	- Full face cartridge respirator - Saranex coveralls with boots - Chem resist gloves (e.g. Neoprene)
Sampling of Washwater, Concrete Pad	- Same as above plus hearing protection during concrete coring.
Soil sampling	- Respirator, coveralls and gloves of types determined by results of washwater and concrete analyses.
Soil excavation	- Respirator, coveralls and gloves of types determined by results of soil analyses.

SECTION J

OTHER FEDERAL LAWS

The McCook Research facility complies with the Clean Air Act by maintaining the necessary air operating permit to operate the pilot plant. All wastewater discharges are to the publicly owned treatment works and are in compliance with the Clean Water Act.

The location of this facility is not subject to federal laws such as the Wild and Scenic Rivers Act, National Historic Preservation Act of 1966, Endangered Species Act, Coastal Zone Management Act and Fish and Wildlife Coordination Act.

CERTIFICATION

" 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."

James M. Richmond

Dr. James Richmond
Chemical Research Manager
Akzo Chemicals Inc.

2-15-90
Date

SECTION L

CONTINUING RELEASES AT PERMITTED FACILITIES

L-1: SOLID WASTE MANAGEMENT UNITS

There are three types of units which are used for management of solid wastes within the Akzo Chemicals Inc. McCook Research facility:

1.) Hazardous Waste Drum Storage Area
2.) Drums Stored in Hazardous Waste Drum Storage Area
3.) Nonhazardous Liquid Waste Accumulation Tanks (2)- also known as Pitch Tanks

Each of the units are described below. The locations of the units are shown in Figure L1, which is identical to Figure B6.

L-1a: CHARACTERIZE THE SOLID WASTE MANAGEMENT UNIT

1.) Hazardous Waste Drum Storage Area

The design of the hazardous waste drum storage area, and related drawings, are provided in Section D of this permit application. The area consists of a fenced-in, diked concrete base that is equipped with a sump for collection of rainwater or any possible spillage or leakage from drums in the storage area. Warning signs are posted on all four sides of the area, designating it as a "hazardous", "no smoking or fires" and "authorized personnel only" area.

The maximum capacity of the storage area is 200 55-gallon drums, or 11,000 gallons total. The actual inventory of waste will vary from zero to 11,000 gallons during use of the storage area. At the time of this permit application submission, there is one 55-gallon drum of waste in the storage area.

The storage area is used for hazardous waste that can be safely stored in drums in outdoor conditions. The area has been in operation since June of 1987. The types of waste to be stored are listed in Part A of this permit application, and include:

- "characteristic" wastes D001 through D011, and D016
- spent solvent wastes F002, F003 and F005
- various "U-list" wastes corresponding to possible spills of common reagents used onsite

2.) Drums Stored in Hazardous Waste Drum Storage Area

As described above, the number of drums in the hazardous waste storage area will vary between none and (the equivalent of) 11,000 gallons. The types of drums used for waste storage include 55-gallon and 75-gallon (overpack) drums made of polyethylene, epoxy-coated steel or polyethylene-lined steel, and occasionally smaller drums (5-30 gallons). Drums types will be chosen on the basis of compatibility with waste, and will meet the D.O.T. specifications of 49 CFR Part 173.

3.) Nonhazardous Liquid Waste Accumulation Tanks (Pitch Tanks)

The pitch tanks are two carbon steel tanks having capacity of 3200 gallons each. The tanks are located in the pilot plant yard area, south of the laboratory building. The tanks were installed in 1966, but use of these tanks for accumulation of nonhazardous liquid waste did not begin until 1980. Both tanks are 8.0-feet in diameter and 8.5-feet in height. The most recent in-house thickness gaugings (1987) indicate a wall thickness of 0.35-0.36 inch, measured at 12 points.

4.) Former Hazardous Waste Management Units

Former hazardous waste management units that were included in previous Part A permit submissions include the following:

Drum Storage Area

This storage area was formally closed in 1987. A copy of the closure acknowledgement by IEPA is presented in Appendix L1.

Treatment Tank

This was a 200-gallon autoclave vessel in Room 44 of our pilot plant. The unit still exists, but was never used for the treatment of hazardous waste. The unit was not formally closed before it was dropped from the Part A permit.

5.) Other Possible Solid Waste Management Units

The following units were mentioned as possible SWMU's in comments from the IEPA permit reviewer. Their locations are noted on Figure L1 for reference.

Wastewater Treatment Units

There is a unit, commonly known as a clarifier, that was originally installed in 1966 for the purpose of skimmimg fatty material off wastewater from a pilot plant process. This is a rectangular carbon steel tank, 6.0 ft. wide by

6.0 ft. high by 25.0 ft. long, that sits in a concrete-lined vault below grade and is open to the air on top.

The clarifier was partially dismantled in the early 1970's, to remove the skimming equipment, as the process for which it was installed was shut down. Currently, all wastewater from the pilot plant and two lab rooms passes through this clarifier. However, the clarifier has no effect on the water.

There is also a water-screening device installed in an area that contains a small-scale paper mill. This is a small capacity microscreen that strains paper pulp from wastewater generated during equipment cleaning. The purpose of this screening is to avoid buildup of pulp in downstream sewer pipe or wastewater troughs. The screen was installed in 1989.

Autoclave

This is the same as the treatment tank described above under "Former Hazardous Waste Management Units".

Distillation Unit

This is actually a wiped-film evaporator that was used as part of a closed-loop process. Freon was used to extract a fatty Akzo product from porous polymer, and was then fed to the evaporator for recovery and immediate re-use. The evaporator was operated for this purpose in 1981-1983. The unit still exists, but is not in useable condition. This was not a SWMU.

Special Waste Dumpster

This is a 15 cubic yard dumpster used for accumulation of special waste solids from the lab and pilot plant. The solids are disposed under a special waste disposal permit.

L-2: RELEASES

L-2b: NO RELEASES

There are no reports on file, or existing physical evidence, to indicate that there are, or have been, releases to the environment from the solid waste management units within this facility. The facility maintains records of all unusual incidents, and conducts regular inspections of the solid waste management units specified in this permit application. Appendix L1 contains the most recent document submitted to the United States Environmental Protection Agency which addresses the issue of releases from solid waste management units, "Questionnaire GA; General Facility Information".

Containment for the former hazardous waste storage area was excavated at the time of closure. The floor of the storage area was made of acid-proof brick. A composite sample of this material was analyzed and found to be adequately clean.

The currently used drum storage area has a containment system described in Section D of ths permit application.

The pitch tanks for accumulation of nonhazardous liquid waste are not diked.

A drawing of the reinforced concrete vault around the clarifier unit is shown in Figure L2.

The autoclave and evaporator were not diked. They are indoors.

The special waste solids dumpster is lined with a plastic membrane during use.

Figure L1

Location of Pitch Tanks and Drum Storage Area

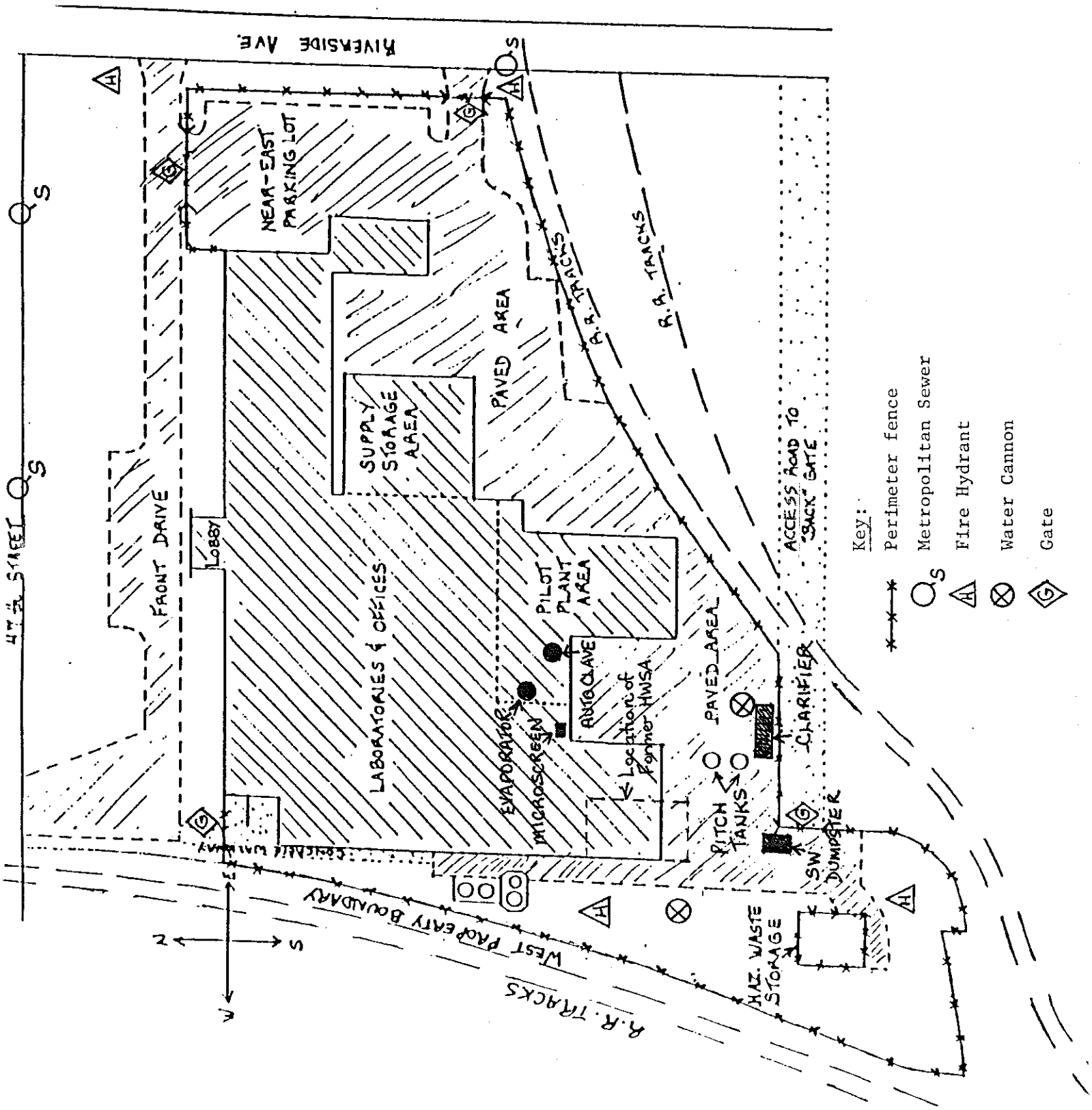


FIGURE L2

CLARIFIER VAULT

APPENDIX L1

1.) H.W.S.A. CLOSURE ACKNOWLEDGEMENT

2.) SURVEY SUBMITTED TO USEPA

Illinois Environmental Protection Agency · 2200 Churchill Road, Springfield, IL 62706

217/782-6762

Refer to: 0311740009 -- Cook County
McCook/Akzo Chemie America
Closure Plan Approved: May 5, 1987 Log #308
ILD000805705
RCRA-Closure

July 1, 1987

Akzo Chemie America
Attention: Charles E. Plank
8401 W. 47th Street
McCook, Illinois 60525

Dear Mr. Plank:

The subject hazardous waste management facility was inspected by a representative of this Agency on June 8, 1987. The inspection revealed that the closure activity was completed in accordance with the approved closure plan dated March 5, 1987.

Certification that the storage (S01) area had been closed in accordance with the approved closure plan by the owner/operator, Akzo Chemie America, and an independent registered professional engineer, James E. Huff, P.E., of Illinois was received at this Agency May 21, 1987.

The Agency has determined that the closure of the storage (S01) area has apparently met the requirements of Interim Status Standards, 35 Ill. Admin. Code, Part 725 (40 CFR, Part 265). Please note, the Agency has approved your modified Part A application dated April 3, 1987 to reflect the status change due to completed closure activities.

This facility must continue to meet the requirements of 35 Ill. Admin. Code, Part 722 (40 CFR Part 262) -- Standards Applicable to Generators of Hazardous Waste and 35 Ill. Admin. Code, Part 723 (40 CFR Part 263) -- Standards Applicable to Transporters of Hazardous Waste.

If you have any questions, please contact Eugene W. Dingledine at 217/785-2892.

Very truly yours,

Lawrence W. Eastep, P.E., Manager
Permit Section
Division of Land Pollution Control

LWE:EWD:rd2971g/56-57

cc: Northern Region
USEPA Region V, Mary Murphy
USEPA Region V, Art Kawatachi
James E. Huff, P.E.
Division File
Financial Assurance Unit
Compliance Monitoring

Akzo Chemie America

Research

8401 W. 47th Street
McCook, Illinois 60525
312/442-7100
Twx 910 259 1770
Answer back: Armak Res Mcck

February 18, 1988

U.S. Environmental Protection Agency
MD. 99-RTI
Research Triangle Park, NC 27711

Dear Sir or Madam:

Enclosed are the completed Questionnaire GA "General Facility Information" and Questionnaire GB "Hazardous Waste Characterization". These are submitted for Akzo Chemie America, Research Facility, 8401 West 47th Street, McCook, Illinois 60525.

If you have any questions, I can be reached at (312) 442-7100, ext. 366.

Sincerely,

Charles E. Plank
Environmental Engineer

CP/djk

Enclosures

OMB No. 2050-0075
Expires November 1989

EPA

National Survey of Hazardous Waste Generators

QUESTIONNAIRE GA

GENERAL FACILITY INFORMATION

RTI ID: 012856 Q-GA 1 of 1
EPA ID: ILD000805705

AKZO CHEMIE AMERICA
8401 W 47TH ST
MCCOOK IL 60525-3208

TSDR PO

NOTE: ALL FACILITIES NEED TO COMPLETE THIS QUESTIONNAIRE.

WASTE DESCRIPTION CODES

These waste description codes were developed specifically for this survey to supplement the descriptions listed with the RCRA and other waste codes. (These waste description codes are not regulatory definitions.)

WASTE DESCRIPTION CODES FOR HAZARDOUS WASTE DESCRIBED BY A SINGLE RCRA F, K, P, OR U WASTE CODE

A01 Spent solvent (F001-F005, K086)
A02 Other organic liquid (F001-F005, K086)
A03 Still bottom (F001-F005, K086)
A04 Other organic sludge (F001-F005, K086)
A05 Wastewater or aqueous mixture
A06 Contaminated soil or cleanup residue
A07 Other F or K waste, exactly as described*
A08 Concentrated off-spec or discarded product
A09 Empty containers
A10 Incinerator ash
A11 Solidified treatment residue
A12 Other treatment residue (specify in the answer space provided)
A13 Other untreated waste (specify in the answer space provided)

*"Exactly as described" means that the waste matches the description of the RCRA waste code.

WASTE DESCRIPTION CODES FOR HAZARDOUS WASTE DESCRIBED BY A SINGLE RCRA D OR X WASTE CODE* OR THAT DESCRIBED BY MORE THAN ONE RCRA OR X WASTE CODE

INORGANIC LIQUIDS—Waste that is primarily inorganic and highly fluid (e.g., aqueous), with low suspended inorganic solids and low organic content.

B01 Aqueous waste with low solvents
B02 Aqueous waste with low other toxic organics
B03 Spent acid with metals
B04 Spent acid without metals
B05 Acidic aqueous waste
B06 Caustic solution with metals but no cyanides
B07 Caustic solution with metals and cyanides
B08 Caustic solution with cyanides but no metals
B09 Spent caustic
B10 Caustic aqueous waste
B11 Aqueous waste with reactive sulfides
B12 Aqueous waste with other reactives (e.g., explosives)
B13 Other aqueous waste with high dissolved solids
B14 Other aqueous waste with low dissolved solids
B15 Scrubber water
B16 Leachate
B17 Waste liquid mercury
B18 Other inorganic liquid (specify in the answer space provided)

INORGANIC SLUDGES—Waste that is primarily inorganic, with moderate-to-high water content and low organic content; pumpable.

B19 Lime sludge without metals
B20 Lime sludge with metals/metal hydroxide sludge
B21 Wastewater treatment sludge with toxic organics
B22 Other wastewater treatment sludge
B23 Untreated plating sludge without cyanides
B24 Untreated plating sludge with cyanides
B25 Other sludge with cyanides
B26 Sludge with reactive sulfides
B27 Sludge with other reactives
B28 Degreasing sludge with metal scale or filings
B29 Air pollution control device sludge (e.g., fly ash, wet scrubber sludge)
B30 Sediment or lagoon dragout contaminated with organics
B31 Sediment or lagoon dragout contaminated with inorganics only
B32 Drilling mud
B33 Asbestos slurry or sludge
B34 Chloride or other brine sludge
B35 Other inorganic sludge (specify in the answer space provided)

INORGANIC SOLIDS—Waste that is primarily inorganic and solid, with low organic content and low-to-moderate water content; not pumpable.

B36 Soil contaminated with organics
B37 Soil contaminated with inorganics only
B38 Ash, slag, or other residue from incineration of wastes
B39 Other "dry" ash, slag, or thermal residue
B40 "Dry" lime or metal hydroxide solids chemically "fixed"
B41 "Dry" lime or metal hydroxide solids not "fixed"
B42 Metal scale, filings, or scrap
B43 Empty or crushed metal drums or containers
B44 Batteries or battery parts, casings, cores
B45 Spent solid filters or adsorbents
B46 Asbestos solids and debris
B47 Metal-cyanide salts/chemicals
B48 Reactive cyanide salts/chemicals
B49 Reactive sulfide salts/chemicals
B50 Other reactive salts/chemicals
B51 Other metal salts/chemicals
B52 Other waste inorganic chemicals
B53 Lab packs of old chemicals only
B54 Lab packs of debris only
B55 Mixed lab packs
B56 Other inorganic solids (specify in the answer space provided)

INORGANIC GASES—Waste that is primarily inorganic with a low organic content and is a gas at atmospheric pressure.

B57 Inorganic gases

ORGANIC LIQUIDS—Waste that is primarily organic and is highly fluid, with low inorganic solids content and low-to-moderate water content.

B58 Concentrated solvent-water solution
B59 Halogenated (e.g., chlorinated) solvent
B60 Nonhalogenated solvent
B61 Halogenated/nonhalogenated solvent mixture
B62 Oil-water emulsion or mixture
B63 Waste oil
B64 Concentrated aqueous solution of other organics
B65 Concentrated phenolics
B66 Organic paint, ink, lacquer, or varnish
B67 Adhesives or expoxies
B68 Paint thinner or petroleum distillates
B69 Reactive or polymerizable organic liquid
B70 Other organic liquid (specify in the answer space provided)

ORGANIC SLUDGES—Waste that is primarily organic, with low-to-moderate inorganic solids content and water content; pumpable.

B71 Still bottoms of halogenated (e.g., chlorinated) solvents or other organic liquids
B72 Still bottoms of nonhalogenated solvents or other organic liquids
B73 Oily sludge
B74 Organic paint or ink sludge
B75 Reactive or polymerizable organics
B76 Resins, tars, or tarry sludge
B77 Biological treatment sludge
B78 Sewage or other untreated biological sludge
B79 Other organic sludge (specify in the answer space provided)

ORGANIC SOLIDS—Waste that is primarily organic and solid, with low-to-moderate inorganic content and water content; not pumpable.

B80 Halogenated pesticide solid
B81 Nonhalogenated pesticide solid
B82 Solid resins or polymerized organics
B83 Spent carbon
B84 Reactive organic solid
B85 Empty fiber or plastic containers
B86 Lab packs of old chemicals only
B87 Lab packs of debris only
B88 Mixed lab packs
B89 Other halogenated organic solid (specify in the answer space provided)
B90 Other nonhalogenated organic solid (specify in the answer space provided)

ORGANIC GASES—Waste that is primarily organic with low-to-moderate inorganic content and is a gas at atmospheric pressure.

B91 Organic gases

*A list of X waste codes was developed specifically for this survey. These X codes are not official RCRA waste codes and should be used ONLY for this survey.

Read the Instructions booklet **BEFORE** you answer this questionnaire. The Instructions contain example questions, lists of RCRA and other waste codes, and other important information you will need to consult as you complete the questions.

This questionnaire asks for general information about the hazardous waste generation operations at this facility:

- Facility identification, ownership, operator, and contact information.
- Quantities for special types of hazardous waste generated—contained gaseous material, highly reactive material, and radioactive mixed waste.
- Quantities discharged under a NPDES permit or discharged to a POTW.
- Description of hazardous waste minimization procedures and the effect these procedures have had on the quantity and toxicity of hazardous waste generated.
- Hydrogeologic and exposure information.
- Quantities and status information for Solid Waste Management Units (SWMUs).
- Closure of surface impoundments and waste piles.
- Accumulation of hazardous waste in containers.
- A general facility-wide schematic and detailed schematics showing all hazardous waste management operations.

If you wish to clarify or explain any answers you give, use the two lined pages labeled "FACILITY NOTES" at the end of this questionnaire. Beside each question you wish to clarify or explain, write "see note." Then turn to the note pages, enter the question number, and write your comments beside that number. If a single note applies to more than one question, write the numbers of all the questions the note applies to.

If you need more answer spaces or have any questions about this survey or this questionnaire, call the Survey Helpline (1-800-635-8850).

For this survey, report all waste in the following categories as hazardous waste:

- Any waste considered hazardous waste under RCRA. This includes hazardous wastewater pretreated prior to discharge under a National Pollutant Discharge Elimination System (NPDES) permit or prior to discharge to a publicly owned treatment works (POTW); hazardous waste generated in a production process or waste treatment process; and hazardous waste that is a characteristic waste, even though it may lose its hazardous waste characteristic through mixing with other wastewater or by treatment.
- Any waste considered hazardous by your state.
- Wastes containing polychlorinated biphenyls (PCBs).
- Wastes containing asbestos.
- Wastes containing dioxins/furans.
- Radioactive waste mixed with hazardous waste.

For this survey, ***facility*** is defined as the site at which hazardous waste is generated.

1. **Which of the following BEST DESCRIBES the status of the "hazardous waste generation activities" onsite at this facility?** *(Circle one)*

   Carefully read all options and circle only one. Do not base your answer on the quantity of hazardous waste generated onsite. Call the Survey Helpline (1-800-635-8850) if you are uncertain of the status of your facility.

   01 Hazardous waste is currently generated onsite. *(Go to next question)*
   02 Hazardous waste was generated onsite during 1986, but is no longer generated onsite. *(Go to next question)*
   03 Hazardous waste was generated onsite prior to 1986, but not during 1986, and will not be generated onsite in the future. *(Skip to Question 156 on page 79)*
   04 Hazardous waste was generated onsite in the past, but that hazardous waste has since been delisted and no other hazardous waste is generated onsite at this facility. *(Skip to Question 156 on page 79)*
   05 No hazardous waste has ever been generated onsite at this facility. Notification of hazardous waste generation activities was submitted as a protective measure. Further evaluation showed that the waste generated onsite is not hazardous. *(Skip to Question 156 on page 79)*

2. **Did this facility generate, in ANY month during 1986, more than 1,000 kilograms of hazardous waste?** *(Circle one)*

   01 Yes *(Skip to Question 6)*
   02 No *(Go to next question)*

3. **Did this facility accumulate, AT ANY TIME DURING 1986, more than 1,000 kilograms of hazardous waste?** *(Circle one)*

   Do not base your answer on when the hazardous waste was generated. For example, if 600 kilograms of hazardous waste were generated in one month and 500 kilograms of hazardous waste were generated in the next month, and this total quantity was onsite at any time, you would answer "Yes."

   01 Yes *(Skip to Question 6)*
   02 No *(Go to next question)*

4. **Did this facility generate, in ANY month during 1986, more than 100 kilograms of hazardous waste?** *(Circle one)*

   01 Yes *(Skip to Question 6)*
   02 No *(Go to next question)*

5. **Did this facility generate, in ANY month during 1986, more than one kilogram of acutely hazardous waste?** *(Circle one)*

   The following are acutely hazardous wastes: F020, F021, F022, F023, F026, F027, and all of the RCRA "P" wastes. See Appendix C of the Instructions booklet for a list of RCRA "P" wastes.

   01 Yes *(Go to next question)*
   02 No *(Skip to Question 156 on page 79. DO NOT SKIP if your facility generated, in any month during 1986, more than 100 kilograms of hazardous waste.)*

Use the list of four-digit Standard Industrial Classification (SIC) codes in Appendix B of the Instructions booklet to answer Questions 6 and 7.

6. **What is the primary four-digit SIC code for this facility?**

   2869

7. **What other four-digit SIC codes describe this facility?** *(Enter up to three SIC codes. If there are no other four-digit SIC codes appropriate for this facility, enter "NA.")*

   a. 2843 b. ____ c. ____

8. **Who owns this facility?** *(Circle one)*

   01 Federal government
   02 State government
   03 Local government
   (04) Private owner—sole proprietor, partnership, or corporation
   05 Other owner _____ *(describe)*

9. **Who operates this facility?** *(Circle one)*

   01 Federal government
   02 State government
   03 Local government
   (04) Private operator—sole proprietor, partnership, or corporation
   05 Other operator _____ *(describe)*

10. **What was the typical number of employees onsite at this facility during 1986? What operations we they typically employed in?**

Count ONLY ONCE any employee who works in more than one area. If there are no employees working in an area described below, enter zero. The sum of b, c, d, and e must equal a.

Number of Employees Onsite	
Question	**Number of Employees**
a. Typical number of employees	100
b. Typical number of employees in hazardous waste management operations	15
c. Typical number of employees in the production of goods and services	72
d. Typical number of employees in management/administration (including clerical)	9
e. Typical number of employees in plant operation and maintenance, other than hazardous waste management	3
f. Typical number of contractor personnel onsite in hazardous waste management operations	1

11. **What is the total land area of this facility?** *(Include in your answer the total land area of the facility, NOT just the area where hazardous waste is managed.)*

10 acres

12. **What are the latitude and longitude of this facility?**

Latitude and Longitude of This Facility	*Enter your answer in degrees and minutes.*
a. Latitude	41 degrees 47 minutes
b. Longitude	87 degrees 49 minutes

13. **Does this facility have a National Pollutant Discharge Elimination System (NPDES) permit?** *(Circle one)*
    01 Yes *(Go to next question)*
    (02) No *(Skip to Question 16)*

14. **What is the NPDES permit number(s) for this facility?** *(Enter your 9-digit NPDES permit number)*
    a. [ ][ ][ ][ ][ ][ ][ ][ ][ ]
    b. [ ][ ][ ][ ][ ][ ][ ][ ][ ]
    c. [ ][ ][ ][ ][ ][ ][ ][ ][ ]
    d. [ ][ ][ ][ ][ ][ ][ ][ ][ ]

15. **What quantity of wastewater, RESULTING FROM ONLY THOSE PROCESSES THAT GENERATED OR MANAGED HAZARDOUS WASTE, was discharged under this permit during 1986?**

Quantity of Wastewater Discharged Under NPDES Permit	*Enter the quantity and circle a unit of measure. Sum the quantities if this facility has more than one NPDES permit.*	
	Unit of measure *(Circle one)*	
Quantity	**Tons**	**Gallons**
[ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]	01	02

16. **Does this facility discharge wastewater to a publicly owned treatment works (POTW)?** *(Circle one)*
    (01) Yes *(Go to next question)*
    02 No *(Skip to Question 19)*

17. **What is the name and location (city and state) of this POTW?**
    a. Name: METROPOLITAN SANITARY DISTRICT OF GC
    b. Location: STICKNEY (City) IL (State)

18. **What quantity of wastewater, RESULTING FROM ONLY THOSE PROCESSES THAT GENERATED (MANAGED HAZARDOUS WASTE, was discharged to this POTW during 1986?**

Quantity of Wastewater Discharged to POTW	*Enter the quantity and circle a unit of measure.*
Quantity	Unit of measure *(Circle one)* Tons / Gallons
14716800	01 / 02

19. **What quantity of wastewater (both hazardous and nonhazardous) was generated onsite during 198**

Quantity of Wastewater Generated	*Enter the quantity and circle a unit of measure; if none, enter zero.*
Quantity	Unit of measure *(Circle one)* Tons / Gallons
15644032	01 / 02

20. **Of the quantity reported in Question 19, estimate the amount that was hazardous wastewater. This amount should include hazardous wastewater pretreated prior to discharge under a NPDES permit or prior to discharge to a POTW; hazardous wastewater generated in a production process or waste treatment process; and hazardous wastewater that is a characteristic waste, even though it may lose its hazardous waste characteristic through mixing with other wastewater or by treatment.**

Include in your answer the total quantity of wastewater, not just the quantity of hazardous material in the wastewater.

Quantity of HAZARDOUS Wastewater Generated	*Enter the quantity and circle a unit of measure. if none, enter zero.*
Quantity	Unit of measure *(Circle one)* Tons / Gallons
2783000	01 / 02

NOTE: *Report all hazardous wastewater in Questionnaire GB, "Hazardous Waste Characterization." Report any processes used to treat hazardous wastewater, including pretreatment processes, in Questionnaire GE, "Wastewater Treatment."*

21. **Does this facility send hazardous waste to offsite facilities UNDER THE SAME OWNERSHIP or parent ownership?** *(Circle one)*

01 Yes *(Go to next question)*
(02) No *(Skip to Question 23)*

22. **What facilities UNDER THE SAME OWNERSHIP or parent ownership does this facility send hazardous waste to?**

Enter the name, EPA identification number, and the location (city and state) for each. Call the Survey Helpline (1-800-635-8850) if you need additional answer spaces.

a. **Facility 1**

i. Name:

ii. EPA ID number:

iii. Location: (City) (State)

b. **Facility 2**

i. Name:

ii. EPA ID number:

iii. Location: (City) (State)

c. **Facility 3**

i. Name:

ii. EPA ID number:

iii. Location: (City) (State)

d. **Facility 4**

i. Name:

ii. EPA ID number:

iii. Location: (City) (State)

23. **What quantity of hazardous waste was shipped offsite during 1986 to be managed by another fa under the same ownership? What quantity of hazardous waste was shipped offsite during 1986 managed by a facility NOT under the same ownership?**

Quantity of Hazardous Waste Shipped Offsite	Enter waste quantities that need to be reported in tons in r a and waste quantities that need to be reported in gallc in row b. If none, enter zero.	
Quantity shipped offsite to a facility under the same ownership	Quantity shipped offsite to a facility NOT under the same ownership	Unit of meas
a. 0	0	Tons
b. 0	5000	Gallons

24. **Does this facility have any plans before January 1992 to start managing its hazardous waste onsite rather than shipping it offsite for treatment, storage, disposal, or recycling?** *(Circle one)*

01 Yes
02 No
03 All hazardous waste is currently managed onsite

25. **Is the waste (both hazardous and nonhazardous) that is generated onsite tested (i.e., samples are taken for analysis)?** *(Circle one)*

01 Yes *(Go to next question)*
02 No *(Skip to Question 27)*

26. **Why does this facility test the waste that is generated onsite?** *(Circle all that apply)*

01 To determine the constituents present and their concentration
02 To determine if the waste is a hazardous waste
03 Other _____
(specify)

HAZARDOUS WASTE GENERATION

27. What quantity of hazardous waste was generated onsite during 1986?

Report here the TOTAL quantity of hazardous waste that was generated onsite during 1986. Include in your answer hazardous waste and hazardous wastewater treated using exempt processes, for example, wastewater treatment processes that discharge under a NPDES permit or discharge to a POTW and exempt recycling processes.

Quantity of Hazardous Waste Generated Onsite	*Enter waste quantities that need to be reported in tons in row a and waste quantities that need to be reported in gallons in row b. The sum of the two quantities reported in this question equal the TOTAL quantity of hazardous waste generated onsite during 1986.*
Quantity	**Unit of measure**
a. 0	Tons
b. 2793175	Gallons

28. Did this facility generate contained gaseous material onsite during 1986 that was classified as hazardous waste? *(Circle one)*

01 Yes *(Go to next question)*
02 No *(Skip to Question 31)*

29. What quantity of contained gaseous material that was classified as hazardous waste was generated onsite during 1986?

STP is standard temperature and pressure, one atmosphere, and 77 degrees Fahrenheit.

Quantity of HAZARDOUS CONTAINED GASEOUS MATERIAL Generated Onsite	*Enter the quantity and circle a unit of measure.*
Quantity (at STP)	**Unit of measure** *(Circle one)* ft^3 m^3 Other _____ *(specify)*
	01 02 03

30. How was this hazardous contained gaseous material managed? *(Circle all that apply)*

01 Stored onsite
02 Chemically treated onsite
03 Thermally treated (including flaring) onsite
04 Catalytically oxidized onsite
05 Other onsite management _____ *(specify)*
06 Sent offsite for management

31. Did this facility generate highly reactive material (e.g, explosive, shock-sensitive, or water-reactiv materials, excluding cyanides and sulfides) onsite during 1986 that was classified as a RCRA rea waste (D003)? *(Circle one)*

01 Yes *(Go to next question)*
(02) No *(Skip to Question 34)*

32. What quantity of highly reactive material was generated onsite during 1986?

Quantity of HIGHLY REACTIVE Material Generated Onsite	*Enter the quantity and circle a unit of measure.*	
Quantity	**Unit of measure** *(Circle one)*	
	Tons	**Gallons**
☐☐☐☐☐☐☐☐	 01	..... 02 .....

33. How was this highly reactive material managed? *(Circle all that apply)*

01 Stored onsite
02 Chemically treated onsite
03 Incinerated onsite
04 Open detonation/open burning onsite
05 Other onsite management _____ *(specify)*
06 Sent offsite for management

34. **Did this facility generate radioactive mixed waste onsite during 1986 that was classified as RCRA hazardous waste?** *(Circle one)*

RADIOACTIVE MIXED WASTE is waste that contains both hazardous waste subject to RCRA and radioactive waste subject to the Atomic Energy Act.

01 Yes *(Go to next question)*
02 No *(Skip to page 12)*

35. **What quantity of radioactive mixed waste was generated onsite during 1986?**

Quantity of RADIOACTIVE MIXED Waste Generated Onsite	*Enter the quantity and circle a unit of measure.*	
	Unit of measure *(Circle one)*	
Quantity	**Tons**	**Gallons**
	 01	..... 02 .....

36. **How was this radioactive mixed waste managed?** *(Circle all that apply)*

01 Stored onsite
02 Treated onsite
03 Disposed onsite
04 Other onsite management _____ *(specify)*
05 Sent offsite for management

WASTE MINIMIZATION

The information requested in this section and several questions from Questionnaire GB, "Hazardous Waste Characterization" will be used to understand this facility's waste minimization program, to assess the effect your program has had on reducing waste volume and toxicity, and to determine the broad effect of the program on different media in the environment.

Under the Hazardous and Solid Waste Amendments of 1984 (HSWA), facilities that send hazardous waste offsite are required to certify on the manifest that they have a program in place to minimize, to the extent economically practicable, the volume and toxicity of the hazardous waste generated onsite. HSWA also requires facilities that are permitted to treat, store, or dispose of hazardous waste to certify yearly that they have a waste minimization program in place. Several questions in this section address procedures that are legal requirements for facilities that ship hazardous waste offsite or that were granted a permit after HSWA went into effect; however, these procedures are not legal requirements for facilities that manage all hazardous waste onsite and that have not received a permit.

It may appear that this section underemphasizes the role of recovery and recycling processes in waste minimization; however, these processes are addressed elsewhere in this survey. If this facility operates recovery or recycling processes, complete the appropriate questionnaire for the type of recovery or recycling process onsite. EPA considers recycling, reuse, and reclamation processes important components of a generator's waste minimization program.

Waste minimization is the reduction, to the extent feasible, of the hazardous waste that is generated or subsequently treated, stored, or disposed of. It includes any *source reduction* or *recycling* activity undertaken that results in either (1) the reduction of total volume or quantity of hazardous waste or (2) the reduction of toxicity of hazardous waste, or both, so long as such reduction is consistent with the goal of minimizing present and future threats to human health and the environment.

Source reduction refers to the reduction or elimination of hazardous waste generation at the source, usually within a process. Source reduction measures can include process modifications, feedstock substitutions or improvements in feedstock purity, various housekeeping and management practices, increases in the efficiency of machinery, and even recycling within a process. Source reduction implies any action that reduces the amount of hazardous waste exiting from a process.

Recycling refers to the use or reuse of a hazardous waste as an effective substitute for a commercial product, or as an ingredient or feedstock in an industrial process. It also refers to the reclamation of useful constituent fractions within a waste material or removal of contaminants from a waste to allow it to be reused. Recycling implies use, reuse, or reclamation of a hazardous waste either onsite or offsite after it is generated by a particular process.

COMPONENTS OF A WASTE MINIMIZATION PROGRAM

37. **Does this facility have a waste minimization (i.e., source reduction or recycling) program in place?** *(Circle one)*
    01 Yes *(Go to next question)*
    02 No *(Skip to Question 39)*

38. **How long has this waste minimization program been in effect?**
    [ ][8] years

39. **Does this facility have a written policy or statement that outlines goals, objectives, and methods for waste minimization (i.e., source reduction or recycling)?** *(Circle one)*
    01 Yes
    02 No

40. **Does management at this facility actively encourage the implementation of source reduction and recycling practices?** *(Circle one)*
    01 Yes
    02 No

41. **Since November of 1984, has this facility conducted a waste minimization opportunity assessment or a waste minimization audit?** *(Circle one)*

    A waste minimization opportunity assessment/audit is a procedure that identifies waste generating processes and opportunities for source reduction or recycling of that waste.

    01 Yes *(Go to next question)*
    02 No *(Skip to Question 44)*

42. What was the scope of this waste minimization opportunity assessment/audit? *(Circle one)*

01 Facility-wide
02 Restricted to one or several processes

43. How often does this facility conduct waste minimization opportunity assessments/audits? *(Circle*

01 Less than once per year
02 Once per year
03 More than once per year _____
(specify the number of times per year)

44. Since November of 1984, has this facility identified or discovered new opportunities to reduce the volume or toxicity of the hazardous waste generated through source reduction and recycling practices? *(Circle one)*

01 Yes *(Go to next question)*
02 No *(Skip to Question 46)*

45. Were these new opportunities to reduce the volume or toxicity of the hazardous waste generated onsite identified through a waste minimization opportunity assessment/audit? *(Circle one)*

01 Yes
02 No

46. Does this facility take into account the management of generated hazardous waste and possible waste minimization opportunities during the development of a new product or process line? *(Circle one)*

01 Yes
02 No

47. Is this facility currently planning or investigating any of the following so that they may reduce the volume or toxicity of the hazardous waste generated or subsequently treated, stored, or disposed o onsite? *(Circle all that apply)*

01 Equipment or technology modification/substitution
02 Process or procedure modification/substitution (including closed-loop recycling)
03 Reformulation or redesign of product
04 Modification/substitution of input or raw material
05 Better housekeeping, better operating practices
06 Waste stream segregation
07 Onsite recycling or recovery for reuse
08 Offsite recycling or recovery for reuse
09 None
10 Other _____
(specify)

48. **Are any employees at this facility SPECIFICALLY ASSIGNED to investigate and identify possible waste minimization practices such as modification or substitution of a raw material, reformulation or redesign of a product, modification of a process or equipment, segregation of waste streams, recycling of waste streams, or development of better operating practices, in order to reduce the volume or toxicity of the hazardous waste generated or subsequently treated, stored, or disposed of onsite?** *(Circle one)*

01 Yes
02 No

49. **Are any employees at this facility ENCOURAGED to investigate and identify possible waste minimization practices such as modification or substitution of a raw material, reformulation or redesign of a product, modification of a process or equipment, segregation of waste streams, recycling of waste streams, or development of better operating practices, in order to reduce the volume or toxicity of the hazardous waste generated or subsequently treated, stored, or disposed of onsite?** *(Circle one)*

01 Yes
02 No

50. **Are any employees at the PARENT COMPANY of your facility specifically assigned to investigate and identify possible waste minimization practices such as modification or substitution of a raw material, reformulation or redesign of a product, modification of a process or equipment, segregation of waste streams, recycling of waste streams, or development of better operating practices, in order to reduce the volume or toxicity of the hazardous waste generated or subsequently treated, stored, or disposed of onsite?** *(Circle one)*

01 Yes
02 No
03 This facility does not have a parent company

51. **Does this facility have an employee training program to educate and encourage employees to practice good operating procedures and to identify to management possible source reduction and recycling practices?** *(Circle one)*

01 Yes
02 No

52. **Does this facility have an incentive (rewards) program to encourage employees to identify and develop possible source reduction and recycling practices?** *(Circle one)*

01 Yes
02 No

53. **Since November of 1984, has this facility received information or technical assistance on waste minimization?** *(Circle one)*

01 Yes *(Go to next question)*
02 No *(Skip to Question 56)*

54. **From whom does this facility receive information or technical assistance on waste minimization?** *(Circle all that apply)*
    01 Local government agencies
    02 State government agencies
    03 Federal agencies
    04 Trade associations
    05 Suppliers/vendors
    06 Other parts of your firm or facility
    07 Literature/magazines
    08 Consulting engineers
    09 Universities
    10 Conferences/seminars
    11 Other firms
    12 Other _____ *(specify)*

55. **Has any information or technical assistance received been used to develop or implement waste minimization practices at this facility?** *(Circle one)*
    01 Yes
    02 No

56. **Since November of 1984, has this facility applied for financial assistance, loans, grants, or preferential tax treatment from the state government for the implementation of waste minimization practices?** *(Circle one)*
    01 Yes *(Go to next question)*
    (02) No *(Skip to Question 58)*

57. **Since November of 1984, has this facility RECEIVED financial assistance, loans, grants, or preferential tax treatment from the state government for the implementation of waste minimization practices?** *(Circle one)*
    01 Yes
    02 No

58. **Since November of 1984, has this facility applied for or received financing from the private market fo the implementation of waste minimization practices?** *(Circle one)*
    01 Yes
    (02) No

REASONS FOR CONDUCTING WASTE MINIMIZATION

59. **Since November of 1984, has this facility implemented any source reduction practices such as modification or substitution of a raw material, reformulation or redesign of a product, modification of a process or equipment, or segregation of waste streams?** *(Circle one)*
    01 Yes *(Go to next question)*
    02 No *(Skip to Question 61)*

60. **Were these source reduction practices implemented as a result of a waste minimization opportunity assessment/audit?** *(Circle one)*
    01 Yes
    02 No

61. **Since November of 1984, has this facility implemented any recycling practices such as metals recovery for reuse, solvent recovery for reuse, or other recycling of waste?** *(Circle one)*
    01 Yes *(Go to next question)*
    02 No *(Skip to Question 63)*

62. **Were these recycling practices implemented as a result of a waste minimization opportunity assessment/audit?** *(Circle one)*
    01 Yes
    02 No

63. **Why are waste minimization practices being planned, investigated, or implemented at this facility?** *(Circle all that apply)*
    01 No waste minimization practices have been planned, investigated, or implemented *(Skip to Question 76 on page 20)*
    02 To reduce the concentrations of constituents in the waste in order to meet the discharge standards
    03 New technology or product became available that reduces the volume or toxicity of waste generated
    04 To improve public perception
    05 Competitors were conducting waste minimization programs
    06 To reduce the cost of production
    07 To reduce the cost of hazardous waste management
    08 Lack of available capacity to treat, store, or dispose of hazardous waste
    09 Waste or effluent permitting or compliance difficulties
    10 RCRA corrective action requirements
    11 Potential financial liability for improperly managed wastes
    12 Difficulty in obtaining liability insurance
    13 Protect human health and the environment
    14 Other _____
    (specify)

64. Was it necessary for this facility to make any capital investments for equipment in order to implement its waste minimization practices? *(Circle one)*

01 Yes *(Go to next question)*
02 No *(Skip to Question 68)*

65. Does this facility intend to recover the cost of these capital investments through decreased production costs or decreased hazardous waste management costs? *(Circle one)*

01 Yes
02 No

66. What costs does this facility's accounting system charge back to specific waste-generating operations? *(Circle all that apply)*

01 Total hazardous waste management charges
02 Process specific charges that are adjusted for such items as waste volume, type of treatment, and disposal
03 Insurance and other costs associated with hazardous waste management
04 Other _____ *(specify)*

67. What was the average pay-back period for the waste minimization practices implemented? *(Circle one)*

01 Six months
02 One year
03 Eighteen months
04 Two years
05 Three years
06 Four years
07 Five or more years

68. What effect do this facility's waste minimization practices have on the quantity of water effluent generated by hazardous waste generation processes? *(Circle one)*

01 Increase in the quantity of water effluent generated
02 Decrease in the quantity of water effluent generated
03 No effect on the quantity of water effluent generated

69. What effect do this facility's waste minimization practices have on the toxicity of water effluent generated by hazardous waste generation processes? *(Circle one)*

01 Increase in the concentration of hazardous constituents
02 Decrease in the concentration of hazardous constituents
03 No effect on the concentration of hazardous constituents

70. **Was it necessary to revise this facility's NPDES permit due to the increase/decrease in the quantity or toxicity of water effluent generated?** *(Circle one)*
    01 Yes
    02 No
    03 This facility does not have a NPDES permit

71. **What effect do this facility's waste minimization practices have on the quantity of air emissions generated by hazardous waste generation processes?** *(Circle one)*
    01 Increase in the quantity of air emissions generated
    02 Decrease in the quantity of air emissions generated
    03 No effect on the quantity of air emissions generated

72. **What effect do this facility's waste minimization practices have on the toxicity of air emissions generated by hazardous waste generation processes?** *(Circle one)*
    01 Increase in the concentration of hazardous constituents
    02 Decrease in the concentration of hazardous constituents
    03 No effect on the concentration of hazardous constituents

73. **Was it necessary to install an air pollution control device (APCD), modify an existing APCD, or add an additional APCD to an existing APCD as a result of this facility's waste minimization practices?** *(Circle one)*
    01 Yes
    02 No

74. **Was it necessary to modify onsite hazardous waste treatment or pretreatment processes as a result of this facility's waste minimization practices?** *(Circle one)*
    01 Yes
    02 No

75. **Was it necessary to revise this facility's RCRA permit as a result of its waste minimization practices?** *(Circle one)*
    01 Yes
    02 No

76. Why have waste minimization practices not been implemented at this facility? *(Circle all that app*

01 Sufficient capital not available to install new equipment
02 Lack of technical information on source reduction and recycling techniques
(03) Not economically feasible—does not decrease hazardous waste management costs or productio or expected cost savings will not recover the initial capital investment
04 Concerned that the product quality may decline if waste minimization is implemented
05 Requirements to manifest wastes prevent or inhibit shipments offsite for recycling
06 Financial liability provisions prevent or inhibit shipments offsite for recycling
07 Technical limitations of production processes
08 Permitting burdens
09 Other _____ *(specify)*

77. Are any of the hazardous wastes that were generated onsite at this facility during 1985 no longe generated onsite? *(Circle one)*

(01) Yes *(Go to next question)*
02 No *(Skip to page 21)*

78. Why is this hazardous waste(s) no longer generated onsite? *(Circle all that apply)*

01 Similar wastes are now generated onsite but the hazardous constituents have been removed as a r of process or equipment modification
(02) Change or elimination of a production process
03 Source reduction practices implemented
04 Onsite or offsite recycling of waste
05 Purchase of exact same input or raw material from offsite
06 Other _____ *(specify)*

79. List a RCRA waste code for each type of hazardous waste that was generated onsite at this facilit during 1985 but is no longer generated onsite. *(See Appendix C of the Instructions booklet for a list of RCRA and other waste codes.)*

a.	F002	f.	
b.	D002	g.	
c.		h.	
d.		i.	
e.		j.	

HYDROGEOLOGIC AND EXPOSURE INFORMATION

EPA has developed models that predict the fate and transport of hazardous constituents by air, groundwater, and surface water. These models predict the exposure to the environment from the management of hazardous waste. The questions in this section have been developed to supplement the available data, which will be used as inputs to these models. Provide responses to the questions in this section using the best information available, even if this requires you to make estimates. (Hydrogeologic terms used in these questions have been defined in the Instructions booklet.)

The phrase "area where hazardous waste is handled" is used throughout these questions to refer to container accumulation or storage areas, units with a RCRA permit or interim status, and units exempt from RCRA permitting requirements.

80. **Is the area where hazardous waste is handled located in any of the following?** *(Circle 01 or 02 for each)*

	Yes	No
a. 100-year floodplain	01	02
b. Area designated as a wetland	01	02
c. Karst terrain	01	02

81. **Is the bottom of the area where hazardous waste is handled located completely above the seasonal high water table?** *(Circle one)*

01 Yes *(Go to next question)*
02 No *(Skip to Question 85)*

82. **What is the predominant type of soil between the seasonal high water table and the bottom of the area where hazardous waste is handled?** *(Circle one)*

01 Gravel
02 Sandy gravel
03 Sand
04 Silty sand
05 Silt
06 Silty clay
07 Clay
08 Other _____ *(specify)*

83. What is the predominant type of geologic material in the uppermost aquifer? *(Circle one)*

01 Sandstone
02 Limestone
03 Gravel
04 Sandy gravel
05 Sand
06 Silty sand
07 Silt
08 Silty clay
09 Clay
10 Other _____ *(specify)*

84. What is the depth from the bottom of the area where hazardous waste is handled to the seasonal high water table?

[ ][>][1][5] feet

85. What is the average permeability (hydraulic conductivity), porosity, hydraulic gradient, and thickne of the uppermost aquifer beneath this facility?

a. Permeability (hydraulic conductivity) ..... DK centimeter per secc

b. Porosity ..... [ ][D][K] percent

c. Hydraulic gradient ..... [ ][D][K] percent

d. Thickness ..... [ ][D][K] feet

86. What is the average horizontal flow rate of the groundwater in the uppermost aquifer beneath this facility?

[ ][ ][D][K] feet per year

87. What is the predominant direction of groundwater flow in the uppermost aquifer beneath this facility? *(Enter the answer in degrees with North = 0, East = 90, South = 180, and West = 270.)*

[ ][D][K] degrees

88. **What source was used to supply the hydrogeologic information for Questions 80 through 87?** *(Circle all that apply)*
   - (01) Site-specific hydrogeologic study data
   - (02) Hydrogeologic information obtained from general literature, such as county reports
   - 03 No hydrogeologic data available; "best estimates" provided
   - 04 Other _____ *(specify)*

89. **What is the shortest distance from the edge of any area where hazardous waste is handled to the property boundary?**

		6	0

   feet

90. **What type of hazardous waste area is this?** *(Circle one)*
   - (01) Container storage or accumulation area
   - 02 Tank storage or accumulation area
   - 03 Treatment/recovery tanks
   - 04 Incinerator
   - 05 Boiler
   - 06 Furnace
   - 07 Waste pile
   - 08 Surface impoundment
   - 09 Landfill
   - 10 Land treatment area
   - 11 Underground injection well
   - 12 Other _____ *(specify)*

91. **What is the direction of the shortest straight line from the edge of this area to the property boundary?** *(Enter the answer in degrees with North = 0, East = 90, South = 180, and West = 270.)*

2	7	0

   degrees

92. **Estimate the number of people who live within one mile of the edge of this area.**

	2	5	0	0

93. **What is the shortest distance from a residence to the edge of any area where hazardous waste is handled?**

1	5	0	0

   feet

94. What type of hazardous waste area is this? *(Circle one)*

(01) Container storage or accumulation area
02 Tank storage or accumulation area
03 Treatment/recovery tanks
04 Incinerator
05 Boiler
06 Furnace
07 Waste pile
08 Surface impoundment
09 Landfill
10 Land treatment area
11 Underground injection well
12 Other _____ *(specify)*

95. What is the direction of the shortest straight line from the edge of this area to this residence? *(Enter the answer in degrees with North = 0, East = 90, South = 180, and West = 270.)*

| 0 | 0 | 0 | degrees

96. Are any PRIVATE drinking water wells located within one mile downgradient of the edge of any ar where hazardous waste is handled? *(Circle one)*

01 Yes *(Go to next question)*
(02) No *(Skip to Question 100)*

97. What type of hazardous waste area is this? *(Circle one)*

01 Container storage or accumulation area
02 Tank storage or accumulation area
03 Treatment/recovery tanks
04 Incinerator
05 Boiler
06 Furnace
07 Waste pile
08 Surface impoundment
09 Landfill
10 Land treatment area
11 Underground injection well
12 Other _____ *(specify)*

98. **What is the distance from the closest downgradient PRIVATE drinking water well to the edge of this area?**

[ ][ ][ ] feet

99. **Estimate the number of people who use these PRIVATE wells for drinking water.** *(If none, enter zero)*

[ ][ ][ ][ ][ ]

100. **Are any PUBLIC drinking water wells located within one mile downgradient of the edge of any area where hazardous waste is handled?** *(Circle one)*

01 Yes *(Go to next question)*
02 No *(Skip to Question 104)*

101. **What type of hazardous waste area is this?** *(Circle one)*

01 Container storage or accumulation area
02 Tank storage or accumulation area
03 Treatment/recovery tanks
04 Incinerator
05 Boiler
06 Furnace
07 Waste pile
08 Surface impoundment
09 Landfill
10 Land treatment area
11 Underground injection well
12 Other _____ *(specify)*

102. **What is the distance from the closest downgradient PUBLIC drinking water well to the edge of this area?**

[ ][ ][ ][ ] feet

103. **Estimate the number of people who use these PUBLIC wells for drinking water.** *(If none, enter zero)*

[ ][ ][ ][ ][ ][ ]

104. **Are there any river or stream segments that are within one mile and at lower elevations than any area where hazardous waste is handled?** *(Circle one)*

01 Yes *(Go to next question)*
02 No *(Skip to Question 108)*

105. What type of hazardous waste area is this? *(Circle one)*

(01) Container storage or accumulation area
02 Tank storage or accumulation area
03 Treatment/recovery tanks
04 Incinerator
05 Boiler
06 Furnace
07 Waste pile
08 Surface impoundment
09 Landfill
10 Land treatment area
11 Underground injection well
12 Other _____ *(specify)*

106. What is the distance from the closest downgradient river or stream segment to the edge of this ar

3700 feet

107. Estimate the number of people who use these rivers or streams for drinking water. *(If none, enter ze*

0

108. Are there any lakes or reservoirs that are within one mile and at lower elevations than the edge of a area where hazardous waste is handled? *(Circle one)*

01 Yes *(Go to next question)*
(02) No *(Skip to Question 112)*

109. What type of hazardous waste area is this? *(Circle one)*

01 Container storage or accumulation area
02 Tank storage or accumulation area
03 Treatment/recovery tanks
04 Incinerator
05 Boiler
06 Furnace
07 Waste pile
08 Surface impoundment
09 Landfill
10 Land treatment area
11 Underground injection well
12 Other _____ *(specify)*

110. **What is the distance from the closest downgradient lake or reservoir to the edge of this area?**

[ ][ ][ ][ ] feet

111. **Estimate the number of people who use these lakes or reservoirs for drinking water.**
(If none, enter zero)

[ ][ ][ ][ ][ ][ ][ ][ ]

112. **Is groundwater quality monitored periodically at this facility?** *(Circle one)*

01 Yes *(Go to next question)*
02 No *(Skip to Question 114)*

113. **Complete the following table describing the upgradient and downgradient groundwater monitoring wells at this facility.**

Upgradient and Downgradient Groundwater Monitoring Wells	*Enter the quantity specified; if none, enter zero.*	
Question	**Upgradient Wells**	**Downgradient Wells**
a. Number of monitoring wells at this facility	[ ][ ][ ]	[ ][ ][ ]
b. Average depth of wells from ground surface	[ ][ ][ ] ft	[ ][ ][ ] ft
c. Average number of times per year wells are sampled	[ ][ ]	[ ][ ]
d. Number of samples per well per sampling period	[ ][ ]	[ ][ ]
e. Maximum number of years any of these wells have been sampled	[ ][ ] yr	[ ][ ] yr

114. **Does this facility discharge effluents directly to surface waters?** *(Circle one)*

01 Yes *(Go to next question)*
02 No *(Skip to Question 118)*

115. How often is the discharged effluent sampled? *(Circle one)*

01 The discharged effluent is not sampled
02 Monthly
03 Quarterly
04 Semiannually
05 Annually
06 Less than once per year _____
(specify how frequently)

116. Is the discharged effluent monitored for any 40 CFR §261 Appendix IX constituents? *(Circle one)*

01 Yes
02 No
03 Don't know

117. Are any of the 40 CFR §261 Appendix IX constituents found in the discharged effluent regulated this facility's NPDES permit? *(Circle one)*

01 Yes
02 No
03 Don't know

118. Does this facility monitor surface water? *(Circle one)*

01 Yes *(Go to next question)*
02 No *(Skip to page 29)*

119. Where is the surface water monitored? *(Circle all that apply)*

01 At each NPDES outfall
02 Downstream of the NPDES outfall
03 Upstream of the NPDES outfall
04 Other _____
(specify)

120. How many times per year is the surface water sampled?

SOLID WASTE MANAGEMENT UNITS (SWMUs)

In this section, EPA is trying to obtain information on SWMUs at two types of facilities:

- Facilities that have a permit or seek a permit to treat, store, or dispose of hazardous waste.
- Facilities that generate hazardous waste and accumulate it onsite for 90 days or less before shipping it offsite for management (90-day generators).

The information provided in survey responses from those facilities that have or seek a permit to treat, store, or dispose of hazardous waste will be used to help support technical development and to assess the impacts of corrective action requirements at treatment, storage, and disposal facilities. This information will also be used to evaluate public comment on the proposed rule and modify the proposed standards for corrective action.

The information provided in survey responses from 90-day generators will be used to assess the extent of the impact on the environment of SWMUs at these facilities. EPA will also use this information in developing standards and requirements for cleanup of SWMUs at these facilities and to assess the impacts of corrective action requirements.

A ***solid waste management unit*** (SWMU) includes any unit at a facility at which solid or hazardous waste has been placed at any time, irrespective of whether the units were intended for the management of SOLID OR HAZARDOUS wastes. This includes container areas, tank areas or systems, waste piles, surface impoundments, landfills, land treatment areas, incinerators, boilers, furnaces, and chemical, physical, or biological treatment units irrespective of whether the unit or area is regulated, permitted, or exempt from RCRA. In addition, EPA has interpreted the term SWMU to apply to areas associated with production processes that have become contaminated as a result of routine and systematic releases of hazardous wastes or constituents.

121. Does this facility have or is it currently pursuing a permit to treat, store, or dispose of hazardous waste? *(Circle one)*

Answer "No" if this facility notified EPA only as a 90-day generator and the facility is not seeking a permit to trea store, or dispose of hazardous waste.

(01) Yes
02 No

122. What financial arrangements has this facility made to respond to releases from, closure of, and postclosure of SWMUs at this facility? *(Circle all that apply)*

01 Trust fund
02 Letter of credit
(03) Environmental impairment liability insurance
04 None
(05) Other FINANCIAL ASSURANCE DOCUMENT
(specify)

123. Have any of the units or areas onsite that are CURRENTLY RECEIVING HAZARDOUS WASTE had a release of hazardous material into the environment which required notification under 40 CFR §302.6? *(Circle one)*

01 Yes *(Go to next question)*
(02) No *(Skip to Question 125 on page 33)*

124. Complete a separate Solid Waste Management Unit (SWMU) Form for EACH unit and area that is currently receiving hazardous waste and that has had a release of hazardous material into the environment which required notification under 40 CFR §302.6.

This questionnaire contains two SWMU Forms for units and areas that are currently receiving hazardous waste and that have had a release of hazardous material into the environment. If your facility has more than two SWMUs, call the Survey Helpline (1-800-635-8850) and we will provide you with additional SWMU Forms—do not photocopy to create additional forms.

After you have completed a SWMU Form for each unit and area, GO TO QUESTION 125 ON PAGE 33.

QUESTION 124

SWMUs Currently Receiving Hazardous Waste That Have Had a Release of Hazardous Material into the Environment

SWMU No. 1

124a. What type of SWMU is this? *(Circle one)*

01 Container storage or accumulation area
02 Tank area or system
03 Surface impoundment
04 Waste pile
05 Land treatment area
06 Landfill
07 Incinerator
08 Boiler
09 Furnace
10 Production area contaminated as a result of routine and systematic releases of hazardous wastes or constituents
11 Other _____ *(specify)*

124b. Which questionnaire from EPA's National Survey of Hazardous Waste Treatment, Storage, Disposal, and Recycling Facilities or from EPA's National Survey of Hazardous Waste Generators was completed for this unit? What number was assigned to the unit? *(If this SWMU is a storage area or a production area, enter "NA.")*

Questionnaire ... [ ][ ] *(Enter the letter from the cover of the Questionnaire)*

Unit number ..... [ ][ ][ ] *(Enter the column number. For tanks, enter the number assigned by you for the survey.)*

124c. What was the quantity of hazardous material released from this SWMU into the environment? *(Enter the quantity and a unit of measure)*

Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

Unit of measure *(Circle one)*
1 Pounds
2 Gallons

124d. Describe the hazardous material released from this SWMU into the environment. *(Enter RCRA waste codes from Appendix C of the Instructions booklet to describe the hazardous material. If there are no RCRA waste codes for the hazardous material, enter the chemical name.)*

_____

_____

124e. Where was the hazardous material released to? *(Circle all that apply)*

01 Soil
02 Groundwater
03 Surface water
04 Air
05 Other _____ *(specify)*

124f. Was corrective action taken for each of the following? *(Circle 01 or 02 for each)*

	Yes	No
i. Releases into the soil	01	02
ii. Releases into the groundwater	01	02
iii. Releases into the surface water	01	02
iv. Releases into the air	01	02
v. Other _____ *(specify)*	01	02

NOTE: GO TO QUESTION 125 ON PAGE 33 IF YOU HAVE COMPLETED A SWMU FORM FOR EACH SWMU THAT IS CURRENTLY RECEIVING HAZARDOUS WASTE AND THAT HAS HAD A RELEASE OF HAZARDOUS MATERIAL INTO THE ENVIRONMENT.

QUESTIO

SWMUs Currently Receiving Hazardous Waste That Have Had a Release of Hazardous Material Into the Environment

SWMU

124a. What type of SWMU is this? *(Circle one)*

01 Container storage or accumulation area
02 Tank area or system
03 Surface impoundment
04 Waste pile
05 Land treatment area
06 Landfill
07 Incinerator
08 Boiler
09 Furnace
10 Production area contaminated as a result of routine and systematic releases of hazardous wastes or constituents
11 Other _____ *(specify)*

124b. Which questionnaire from EPA's National Survey of Hazardous Waste Treatment, Storage, Disposal, and Recycling Facilities or from EPA's National Survey of Hazardous Waste Generators was completed for this unit? What number was assigned to the unit? *(If this SWMU is a container area or a production area, enter "NA.")*

i. Questionnaire ... [ ][ ] *(Enter the letter from the cover of the Questionnaire)*

ii. Unit number ..... [ ][ ][ ] *(Enter the column number. For tanks, enter the number assigned by you for the survey.)*

124c. What was the quantity of hazardous material released from this SWMU into the environment? *(Enter the quantity and circle a unit of measure)*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Pounds
02 Gallons

124d. Describe the hazardous material released from thi into the environment. *(Enter RCRA waste codes from Appendix C of the Instructions booklet to describe the hazardous material. If there are no RCRA waste codes f hazardous material, enter the chemical name.)*

_____

_____

124e. Where was the hazardous material released to? *(Circle all that apply)*

01 Soil
02 Groundwater
03 Surface water
04 Air
05 Other _____ *(specify)*

124f. Was corrective action taken for each of the followin *(Circle 01 or 02 for each)*

	Yes	
i. Releases into the soil	01	....
ii. Releases into the groundwater	01	....
iii. Releases into the surface water	01	....
iv. Releases into the air	01	....
v. Other _____ *(specify)* ..	01	....

NOTE: GO TO QUESTION 125 ON PAGE 33 IF YOU HAVE COMPLETED A SWMU FORM F EACH SWMU THAT IS CURRENTLY RECEI HAZARDOUS WASTE AND THAT HAS HAD RELEASE OF HAZARDOUS MATERIAL INT THE ENVIRONMENT.

125. **What types of units and areas does this facility have onsite that are currently receiving ONLY nonhazardous waste? How many units or areas of each type does this facility have onsite?**

DO NOT INCLUDE IN YOUR ANSWER UNITS AND AREAS THAT ARE CURRENTLY RECEIVING HAZARDOUS WASTE.

Type and Number of Units and Areas That Are Currently Receiving ONLY Nonhazardous Waste	*Indicate whether or not this facility has a unit or area of each type onsite. If you circle 01, indicate how many units or areas of that type this facility has onsite.*		
	Does this facility have this type of unit or area onsite? *(Circle one)*		**How many units or areas of this type does this facility have onsite?**
Type of unit or area	**Yes**	**No**	
Container storage or accumulation area	01	02	01
Tank area or system	01	02	01
Surface impoundment	01	02	
Waste pile	01	02	
Land treatment area	01	02	
Landfill	01	02	
Incinerator	01	02	
Boiler	01	02	
Furnace	01	02	
Production area contaminated as a result of routine and systematic releases of hazardous wastes or constitutents	01	02	
Other _____ *(specify)*	01	02	

GO TO QUESTION 126 if you circled 01 (Yes) for AT LEAST ONE of the unit and area types listed above.

GO TO QUESTION 127 on page 44 if you circled 02 (No) for ALL of the unit and area types listed above.

126. **Complete a separate Solid Waste Management Unit (SWMU) Form for EACH unit and area included in your response to Question 125.**

This questionnaire contains five SWMU Forms for units and areas that are currently receiving ONLY nonhazardous waste. If your facility has more than five SWMUs, call the Survey Helpline (1-800-635-8850) and we will provide you with additional SWMU Forms—do not photocopy to create additional forms.

After you have completed a SWMU Form for each unit and area included in your response to Question 125, GO TO QUESTION 127 ON PAGE 44.

SWMUs Currently Receiving ONLY Nonhazardous Waste

QUESTION

SWMU N

126a. What type of SWMU is this? *(Circle one)*

(01) Container storage or accumulation area
02 Tank area or system
03 Surface impoundment
04 Waste pile
05 Land treatment area
06 Landfill
07 Incinerator
08 Boiler
09 Furnace
10 Production area contaminated as a result of routine and systematic releases of hazardous wastes or constituents
11 Other _____ *(specify)*

126b. What was the annual quantity of solid waste entering this SWMU during 1986? *(Enter the quantity and circle a unit of measure)*

i. Quantity 22
ii. Unit of measure *(Circle one)*
(01) Tons
02 Gallons

126c. What is the remaining capacity of this SWMU that can be used for the management of solid waste? *(Enter the quantity and circle a unit of measure. If this SWMU is a unit other than a landfill, surface impoundment, or waste pile, enter "NA.")*

i. Quantity ..... NA
ii. Unit of measure *(Circle one)*
01 Acre feet
02 Cubic yards

126d. In what year was solid waste first placed in this SWMU?

1980

126e. What is the total cumulative quantity of solid waste in this SWMU? *(Enter the quantity and circle a unit of measure. If this SWMU is a unit other than a landfill, surface impoundment, or waste pile, enter "NA.")*

i. Quantity ..... NA
ii. Unit of measure *(Circle one)*
01 Tons
02 Gallons

126f. What is the area of this SWMU? *(If this SWMU is an incinerator, boiler, or furnace, enter "NA.")*

i. Quantity 2c
ii. Unit of measure *(Circle one)*
01 Acres
(02) Square feet

126g. Is this SWMU inside a building? *(Circle one)*

01 Yes
(02) No

126h. What are the top five wastes (by volume) placed in thi SWMU?

For each waste, enter a RCRA waste code and a Waste Des tion Code. See Appendix C of the Instructions booklet for a RCRA and other waste codes. See the inside front cover of questionnaire for the list of Waste Description Codes. If the requires you to specify, do so in the space provided. If the IS NOT A RCRA WASTE or one of the other wastes specifiec Appendix C, enter "NA" in the RCRA Waste Code column, enter a Waste Description Code and specify the waste in th space provided.

	RCRA Waste Code	Waste Description Code
No. 1	NA	B90
Specify	Nitrogen Derivatives	
No. 2	NA	B90
Specify	Fatty Acids	
No. 3		
Specify		
No. 4		
Specify		
No. 5		
Specify		

Do you conduct groundwater monitoring of this SWMU? (Circle one)

- Yes—facility groundwater monitoring system is designed to individually monitor this SWMU
- Yes—facility groundwater monitoring system is designed to monitor all or some SWMUs as a group, including this SWMU
- No

Has this SWMU had a release of hazardous material into the environment which required notification under 40 CFR §302.6? *(Circle one)*

- Yes *(Go to next question)*
- No *(Skip to the note at the end of this SWMU Form)*

What was the quantity of hazardous material released from this SWMU into the environment? *(Enter the quantity and unit of measure)*

Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

Unit measure *(Circle one)*

- Pounds
- Gallons

Describe the hazardous material released from this SWMU into the environment. *(Enter RCRA waste codes from Appendix C of the Instructions booklet to describe the hazardous material. If there are no RCRA waste codes for the hazardous material, enter the chemical name.)*

_____

_____

126m. Where was the hazardous material released to? *(Circle all that apply)*

01 Soil
02 Groundwater
03 Surface water
04 Air
05 Other _____ *(specify)*

126n. Was corrective action taken for each of the following? *(Circle 01 or 02 for each)*

	Yes	No
i. Releases into the soil	01	02
ii. Releases into the groundwater	01	02
iii. Releases into the surface water	01	02
iv. Releases into the air	01	02
v. Other _____ *(specify)*	01	02

NOTE: GO TO QUESTION 127 ON PAGE 44 IF YOU HAVE COMPLETED A SWMU FORM FOR EACH SWMU YOU INCLUDED IN YOUR RESPONSE TO QUESTION 125.

SWMUs Currently Receiving ONLY Nonhazardous Waste

QUESTION

SWMU N

126a. What type of SWMU is this? *(Circle one)*

01 Container storage or accumulation area
(02) Tank area or system
03 Surface impoundment
04 Waste pile
05 Land treatment area
06 Landfill
07 Incinerator
08 Boiler
09 Furnace
10 Production area contaminated as a result of routine and systematic releases of hazardous wastes or constituents
11 Other _____ *(specify)*

126b. What was the annual quantity of solid waste entering this SWMU during 1986? *(Enter the quantity and circle a unit of measure)*

i. Quantity 5000
ii. Unit of measure *(Circle one)*
01 Tons
(02) Gallons

126c. What is the remaining capacity of this SWMU that can be used for the management of solid waste? *(Enter the quantity and circle a unit of measure. If this SWMU is a unit other than a landfill, surface impoundment, or waste pile, enter "NA.")*

i. Quantity ..... NA
ii. Unit of measure *(Circle one)*
01 Acre feet
02 Cubic yards

126d. In what year was solid waste first placed in this SWMU?

1980

126e. What is the total cumulative quantity of solid waste in this SWMU? *(Enter the quantity and circle a unit of measure. If this SWMU is a unit other than a landfill, surface impoundment, or waste pile, enter "NA.")*

i. Quantity ..... NA
ii. Unit of measure *(Circle one)*
01 Tons
02 Gallons

126f. What is the area of this SWMU? *(If this SWMU is an incinerator, boiler, or furnace, enter "NA.")*

i. Quantity 1
ii. Unit of measure *(Circle one)*
01 Acres
(02) Square feet

126g. Is this SWMU inside a building? *(Circle one)*

01 Yes
(02) No

126h. What are the top five wastes (by volume) placed in thi SWMU?

For each waste, enter a RCRA waste code and a Waste Des tion Code. See Appendix C of the Instructions booklet for a RCRA and other waste codes. See the inside front cover of questionnaire for the list of Waste Description Codes. If the requires you to specify, do so in the space provided. If the IS NOT A RCRA WASTE or one of the other wastes specified Appendix C, enter "NA" in the RCRA Waste Code column, t enter a Waste Description Code and specify the waste in the space provided.

	RCRA Waste Code	Waste Description Code
No. 1	NA	B62
Specify	ASPHALT EMULSION	
No. 2	NA	B70
Specify	Fatty Amines	
No. 3	NA	B60
Specify		
No. 4		
Specify		
No. 5		
Specify		

125. **Do you conduct groundwater monitoring of this SWMU?** *(Circle one)*

01 Yes—facility groundwater monitoring system is designed to individually monitor this SWMU

02 Yes—facility groundwater monitoring system is designed to monitor all or some SWMUs as a group, including this SWMU

03 No

126. **Has this SWMU had a release of hazardous material into the environment which required notification under 40 CFR §302.6?** *(Circle one)*

01 Yes *(Go to next question)*

02 No *(Skip to the note at the end of this SWMU Form)*

126k. **What was the quantity of hazardous material released from this SWMU into the environment?** *(Enter the quantity and a unit of measure)*

Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

Unit of measure *(Circle one)*

01 Pounds

02 Gallons

126l. **Describe the hazardous material released from this SWMU into the environment.** *(Enter RCRA waste codes from Table C of the Instructions booklet to describe the hazardous material. If there are no RCRA waste codes for the hazardous material, enter the chemical name.)*

_____

_____

126m. **Where was the hazardous material released to?** *(Circle all that apply)*

01 Soil

02 Groundwater

03 Surface water

04 Air

05 Other _____ *(specify)*

126n. **Was corrective action taken for each of the following?** *(Circle 01 or 02 for each)*

	Yes	No
i. Releases into the soil	01	02
ii. Releases into the groundwater	01	02
iii. Releases into the surface water	01	02
iv. Releases into the air	01	02
v. Other _____ *(specify)*	01	02

NOTE: GO TO QUESTION 127 ON PAGE 44 IF YOU HAVE COMPLETED A SWMU FORM FOR EACH SWMU YOU INCLUDED IN YOUR RESPONSE TO QUESTION 125.

SWMUs Currently Receiving ONLY Nonhazardous Waste

QUESTION

SWMU N

126a. What type of SWMU is this? *(Circle one)*

01 Container storage or accumulation area
02 Tank area or system
03 Surface impoundment
04 Waste pile
05 Land treatment area
06 Landfill
07 Incinerator
08 Boiler
09 Furnace
10 Production area contaminated as a result of routine and systematic releases of hazardous wastes or constituents
11 Other _____ *(specify)*

126b. What was the annual quantity of solid waste entering this SWMU during 1986? *(Enter the quantity and circle a unit of measure)*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]
ii. Unit of measure *(Circle one)*
01 Tons
02 Gallons

126c. What is the remaining capacity of this SWMU that can be used for the management of solid waste? *(Enter the quantity and circle a unit of measure. If this SWMU is a unit other than a landfill, surface impoundment, or waste pile, enter "NA.")*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]
ii. Unit of measure *(Circle one)*
01 Acre feet
02 Cubic yards

126d. In what year was solid waste first placed in this SWMU?

[ ][ ][ ][ ]

126e. What is the total cumulative quantity of solid waste in this SWMU? *(Enter the quantity and circle a unit of measure. If this SWMU is a unit other than a landfill, surface impoundment, or waste pile, enter "NA.")*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]
ii. Unit of measure *(Circle one)*
01 Tons
02 Gallons

126f. What is the area of this SWMU? *(If this SWMU is an incinerator, boiler, or furnace, enter "NA.")*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ]
ii. Unit of measure *(Circle one)*
01 Acres
02 Square feet

126g. Is this SWMU inside a building? *(Circle one)*

01 Yes
02 No

126h. What are the top five wastes (by volume) placed in this SWMU?

For each waste, enter a RCRA waste code and a Waste Des tion Code. See Appendix C of the Instructions booklet for a l RCRA and other waste codes. See the inside front cover of t questionnaire for the list of Waste Description Codes. If the c requires you to specify, do so in the space provided. If the w IS NOT A RCRA WASTE or one of the other wastes specified Appendix C, enter "NA" in the RCRA Waste Code column, th enter a Waste Description Code and specify the waste in the space provided.

	RCRA Waste Code	Waste Description Code
No. 1 ...	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 2 ...	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 3 ...	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 4 ...	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 5 ...	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		

126l. Do you conduct groundwater monitoring of this SWMU? *(Circle one)*

01 Yes—facility groundwater monitoring system is designed to individually monitor this SWMU

02 Yes—facility groundwater monitoring system is designed to monitor all or some SWMUs as a group, including this SWMU

03 No

126j. Has this SWMU had a release of hazardous material into the environment which required notification under 40 CFR §302.67? *(Circle one)*

01 Yes *(Go to next question)*

02 No *(Skip to the note at the end of this SWMU Form)*

126k. What was the quantity of hazardous material released from this SWMU into the environment? *(Enter the quantity and a unit of measure)*

Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

Unit of measure *(Circle one)*

01 Pounds

02 Gallons

126l. Describe the hazardous material released from this SWMU into the environment. *(Enter RCRA waste codes from Appendix C of the Instructions booklet to describe the hazardous material. If there are no RCRA waste codes for the hazardous material, enter the chemical name.)*

_____

_____

126m. Where was the hazardous material released to? *(Circle all that apply)*

01 Soil

02 Groundwater

03 Surface water

04 Air

05 Other _____ *(specify)*

126n. Was corrective action taken for each of the following? *(Circle 01 or 02 for each)*

	Yes	No
i. Releases into the soil	01	02
ii. Releases into the groundwater	01	02
iii. Releases into the surface water	01	02
iv. Releases into the air	01	02
v. Other _____ *(specify)*	01	02

NOTE: GO TO QUESTION 127 ON PAGE 44 IF YOU HAVE COMPLETED A SWMU FORM FOR EACH SWMU YOU INCLUDED IN YOUR RESPONSE TO QUESTION 125.

SWMUs Currently Receiving ONLY Nonhazardous Waste

QUESTION

SWMU N

126a. What type of SWMU is this? *(Circle one)*

01 Container storage or accumulation area
02 Tank area or system
03 Surface impoundment
04 Waste pile
05 Land treatment area
06 Landfill
07 Incinerator
08 Boiler
09 Furnace
10 Production area contaminated as a result of routine and systematic releases of hazardous wastes or constituents
11 Other _____ *(specify)*

126b. What was the annual quantity of solid waste entering this SWMU during 1986? *(Enter the quantity and circle a unit of measure)*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]
ii. Unit of measure *(Circle one)*
01 Tons
02 Gallons

126c. What is the remaining capacity of this SWMU that can be used for the management of solid waste? *(Enter the quantity and circle a unit of measure. If this SWMU is a unit other than a landfill, surface impoundment, or waste pile, enter "NA.")*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]
ii. Unit of measure *(Circle one)*
01 Acre feet
02 Cubic yards

126d. In what year was solid waste first placed in this SWMU?

[ ][ ][ ][ ]

126e. What is the total cumulative quantity of solid waste in this SWMU? *(Enter the quantity and circle a unit of measure. If this SWMU is a unit other than a landfill, surface impoundment, or waste pile, enter "NA.")*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]
ii. Unit of measure *(Circle one)*
01 Tons
02 Gallons

126f. What is the area of this SWMU? *(If this SWMU is an incinerator, boiler, or furnace, enter "NA.")*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ]
ii. Unit of measure *(Circle one)*
01 Acres
02 Square feet

126g. Is this SWMU inside a building? *(Circle one)*

01 Yes
02 No

126h. What are the top five wastes (by volume) placed in t SWMU?

For each waste, enter a RCRA waste code and a Waste D tion Code. See Appendix C of the Instructions booklet for RCRA and other waste codes. See the inside front cover questionnaire for the list of Waste Description Codes. If th requires you to specify, do so in the space provided. If th IS NOT A RCRA WASTE or one of the other wastes specif Appendix C, enter "NA" in the RCRA Waste Code column enter a Waste Description Code and specify the waste in space provided.

	RCRA Waste Code	Waste Description Code
No. 1 ...	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 2 ...	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 3 ...	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 4 ...	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 5 ...	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		

[illegible] **Do you conduct groundwater monitoring of this SWMU?** *(Circle one)*

1. Yes—facility groundwater monitoring system is designed to individually monitor this SWMU
2. Yes—facility groundwater monitoring system is designed to monitor all or some SWMUs as a group, including this SWMU
3. No

[illegible] **Has this SWMU had a release of hazardous material into the environment which required notification under 40 CFR §302.6?** *(Circle one)*

1. No *(Go to next question)*
2. Yes *(Skip to the note at the end of this SWMU Form)*

[illegible] **What was the quantity of hazardous material released from this SWMU into the environment?** *(Enter the quantity and a unit of measure)*

Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

Unit of measure *(Circle one)*

1. Pounds
2. Gallons

[illegible] **Describe the hazardous material released from this SWMU into the environment.** *(Enter RCRA waste codes from Appendix C of the Instructions booklet to describe the hazardous material. If there are no RCRA waste codes for the hazardous material, enter the chemical name.)*

_____

_____

126m. Where was the hazardous material released to? *(Circle all that apply)*

01 Soil
02 Groundwater
03 Surface water
04 Air
05 Other _____ *(specify)*

126n. Was corrective action taken for each of the following? *(Circle 01 or 02 for each)*

	Yes	No
i. Releases into the soil	01	02
ii. Releases into the groundwater	01	02
iii. Releases into the surface water	01	02
iv. Releases into the air	01	02
v. Other _____ *(specify)*	01	02

NOTE: GO TO QUESTION 127 ON PAGE 44 IF YOU HAVE COMPLETED A SWMU FORM FOR EACH SWMU YOU INCLUDED IN YOUR RESPONSE TO QUESTION 125.

SWMUs Currently Receiving ONLY Nonhazardous Waste

QUESTION

SWMU N

126a. What type of SWMU is this? *(Circle one)*

01 Container storage or accumulation area
02 Tank area or system
03 Surface impoundment
04 Waste pile
05 Land treatment area
06 Landfill
07 Incinerator
08 Boiler
09 Furnace
10 Production area contaminated as a result of routine and systematic releases of hazardous wastes or constituents
11 Other _____ *(specify)*

126b. What was the annual quantity of solid waste entering this SWMU during 1986? *(Enter the quantity and circle a unit of measure)*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]
ii. Unit of measure *(Circle one)*
01 Tons
02 Gallons

126c. What is the remaining capacity of this SWMU that can be used for the management of solid waste? *(Enter the quantity and circle a unit of measure. If this SWMU is a unit other than a landfill, surface impoundment, or waste pile, enter "NA.")*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]
ii. Unit of measure *(Circle one)*
01 Acre feet
02 Cubic yards

126d. In what year was solid waste first placed in this SWMU?

[ ][ ][ ][ ]

126e. What is the total cumulative quantity of solid waste in this SWMU? *(Enter the quantity and circle a unit of measure. If this SWMU is a unit other than a landfill, surface impoundment, or waste pile, enter "NA.")*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]
ii. Unit of measure *(Circle one)*
01 Tons
02 Gallons

126f. What is the area of this SWMU? *(If this SWMU is an incinerator, boiler, or furnace, enter "NA.")*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ]
ii. Unit of measure *(Circle one)*
01 Acres
02 Square feet

126g. Is this SWMU inside a building? *(Circle one)*

01 Yes
02 No

126h. What are the top five wastes (by volume) placed in thi SWMU?

For each waste, enter a RCRA waste code and a Waste Des tion Code. See Appendix C of the Instructions booklet for a RCRA and other waste codes. See the inside front cover of questionnaire for the list of Waste Description Codes. If the requires you to specify, do so in the space provided. If the IS NOT A RCRA WASTE or one of the other wastes specified Appendix C, enter "NA" in the RCRA Waste Code column, enter a Waste Description Code and specify the waste in the space provided.

	RCRA Waste Code	Waste Description Code
No. 1 ...	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 2 ...	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 3 ...	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 4 ...	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 5 ...	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		

126k. Do you conduct groundwater monitoring of this SWMU? *(Circle one)*

01 Yes—facility groundwater monitoring system is designed to individually monitor this SWMU

02 Yes—facility groundwater monitoring system is designed to monitor all or some SWMUs as a group, including this SWMU

03 No

126l. Has this SWMU had a release of hazardous material into the environment which required notification under 40 CFR §302.6? *(Circle one)*

01 Yes *(Go to next question)*

02 No *(Skip to the note at the end of this SWMU Form)*

126k. What was the quantity of hazardous material released from this SWMU into the environment? *(Enter the quantity and circle a unit of measure)*

Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

Unit of measure *(Circle one)*

01 Pounds

02 Gallons

126l. Describe the hazardous material released from this SWMU into the environment. *(Enter RCRA waste codes from Appendix C of the Instructions booklet to describe the hazardous material. If there are no RCRA waste codes for the hazardous material, enter the chemical name.)*

_____

_____

126m. Where was the hazardous material released to? *(Circle all that apply)*

01 Soil

02 Groundwater

03 Surface water

04 Air

05 Other _____ *(specify)*

126n. Was corrective action taken for each of the following? *(Circle 01 or 02 for each)*

	Yes	No
i. Releases into the soil	01	02
ii. Releases into the groundwater	01	02
iii. Releases into the surface water	01	02
iv. Releases into the air	01	02
v. Other _____ *(specify)*	01	02

NOTE: GO TO QUESTION 127 ON PAGE 44 IF YOU HAVE COMPLETED A SWMU FORM FOR EACH SWMU YOU INCLUDED IN YOUR RESPONSE TO QUESTION 125.

127. What types of units and areas does this facility have onsite that are closed and used to receive hazardous and/or nonhazardous waste? How many units or areas of each type does this facility have onsite?

DO NOT INCLUDE IN YOUR ANSWER UNITS AND AREAS THAT ARE CURRENTLY RECEIVING HAZARDOUS WASTE.

Type and Number of Units and Areas That Are Closed and Used to Receive Hazardous and/or Nonhazarous Waste	*Indicate whether or not this facility has a unit or area of each type onsite. If you circle 01, indicate how many units or areas of that type this facility has onsite.*		
Type of unit or area	**Does this facility have this type of unit or area onsite?** *(Circle one)* **Yes**	**No**	**How many units or areas of this type does this facility have onsite?**
a. Container storage or accumulation area	01	02	01
b. Tank area or system	01	02	
c. Surface impoundment	01	02	
d. Waste pile	01	02	
e. Land treatment area	01	02	
f. Landfill	01	02	
g. Incinerator	01	02	
h. Boiler	01	02	
i. Furnace	01	02	
j. Production area contaminated as a result of routine and systematic releases of hazardous wastes or constitutents	01	02	
k. Other _____ *(specify)*	01	02	

GO TO QUESTION 128 if you circled 01 (Yes) for AT LEAST ONE of the unit and area types listed above.

SKIP TO QUESTION 129 on page 55 if you circled 02 (No) for ALL of the unit and area types listed above.

128. Complete a separate Solid Waste Management Unit (SWMU) Form for EACH unit and area included in your response to Question 127.

This questionnaire contains five SWMU Forms for units and areas that are closed and that used to receive hazardous and/or nonhazardous waste. If your facility has more than five SWMUs, call the Survey Helpline (1-800-635-8850) and we will provide you with additional SWMU Forms—do not photocopy to create additional forms.

After you have completed a SWMU Form for each unit and area identified in Question 127, GO TO QUESTION 129 ON PAGE 55.

QUESTION 128

Closed SWMUs That Used to Receive Hazardous and/or Nonhazardous Waste

SWMU No. 1

128e. **What type of SWMU is this?** *(Circle one)*

01 Container storage or accumulation area
02 Tank area or system
03 Surface impoundment
04 Waste pile
05 Land treatment area
06 Landfill
07 Incinerator
08 Boiler
09 Furnace
10 Production area contaminated as a result of routine and systematic releases of hazardous wastes or constituents
11 Other _____ *(specify)*

128f. **What is the area of this SWMU?** *(If this SWMU is an incinerator, boiler, or furnace, enter "NA.")*

i. Quantity 1800

ii. Unit of measure *(Circle one)*
01 Acres
02 Square feet

128g. **Is this SWMU inside a building?** *(Circle one)*
01 Yes
02 No

128h. **What are the top five wastes (by volume) placed in this SWMU?**

For each waste, enter a RCRA waste code and a Waste Description Code. See Appendix C of the Instructions booklet for a list of RCRA and other waste codes. See the inside front cover of this questionnaire for the list of Waste Description Codes. If the code requires you to specify, do so in the space provided. If the waste IS NOT A RCRA WASTE or one of the other wastes specified in Appendix C, enter "NA" in the RCRA Waste Code column, then enter a Waste Description Code and specify the waste in the space provided.

	RCRA Waste Code	Waste Description Code
No. 1	F002	B79
Specify	Halogenated Filter Sludge	
No. 2	F002	B71
Specify	Freon Distillation Bottoms	
No. 3	F002	B59
Specify		
No. 4	D001	B60
Specify		
No. 5		
Specify		

128i. **What is the status of this SWMU?** *(Circle one)*

01 Closed—was used to manage ONLY hazardous waste
02 Closed—was used to manage ONLY nonhazardous waste
03 Closed—was used to manage BOTH hazardous and nonhazardous waste

128j. **In what year did this SWMU last receive solid waste?**

87

128k. **In what year was solid waste first placed in this SWMU?**

84

128l. **What is the total cumulative quantity of solid waste in this SWMU?** *(Enter the quantity and circle a unit of measure. If this SWMU is a unit other than a landfill, surface impoundment, or waste pile, enter "NA.")*

Quantity ..... NA

Unit of measure *(Circle one)*
01 Tons
02 Gallons

128l. Do you conduct groundwater monitoring of this SWMU? *(Circle one)*

01 Yes—facility groundwater monitoring system is designed to individually monitor this SWMU

02 Yes—facility groundwater monitoring system is designed to monitor all or some SWMUs as a group, including this SWMU

03 No

128j. Has this SWMU had a release of hazardous material into the environment which required notification under 40 CFR §302.6? *(Circle one)*

01 Yes *(Go to next question)*

02 No *(Skip to the note at the end of this SWMU Form)*

128k. What was the quantity of hazardous material released from this SWMU into the environment? *(Enter the quantity and circle a unit of measure)*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Pounds

02 Gallons

128l. Describe the hazardous material released from this SWMU into the environment. *(Enter RCRA waste codes from Appendix C of the Instructions booklet to describe the hazardous material. If there are no RCRA waste codes for the hazardous material, enter the chemical name.)*

_____

_____

128m. Where was the hazardous material released to? *(Circle all that apply)*

01 Soil

02 Groundwater

03 Surface water

04 Air

05 Other _____ *(specify)*

128n. Was corrective action taken for each of the following? *(Circle 01 or 02 for each)*

	Yes	No
i. Releases into the soil	01	02
ii. Releases into the groundwater	01	02
iii. Releases into the surface water	01	02
iv. Releases into the air	01	02
v. Other _____ *(specify)*	01	02

NOTE: GO TO QUESTION 129 ON PAGE 55 IF YOU HAVE COMPLETED A SWMU FORM FOR EACH SWMU YOU INCLUDED IN YOUR RESPONSE TO QUESTION 127.

Closed SWMUs That Used to Receive Hazardous and/or Nonhazardous Waste

QUESTION 128

SWMU No. 2

128a. What type of SWMU is this? *(Circle one)*

01 Container storage or accumulation area
02 Tank area or system
03 Surface impoundment
04 Waste pile
05 Land treatment area
06 Landfill
07 Incinerator
08 Boiler
09 Furnace
10 Production area contaminated as a result of routine and systematic releases of hazardous wastes or constituents
11 Other _____ *(specify)*

128b. What is the status of this SWMU? *(Circle one)*

01 Closed—was used to manage ONLY hazardous waste
02 Closed—was used to manage ONLY nonhazardous waste
03 Closed—was used to manage BOTH hazardous and nonhazardous waste

128c. In what year did this SWMU last receive solid waste?

[ ][ ][ ][ ]

128d. In what year was solid waste first placed in this SWMU?

[ ][ ][ ][ ]

128e. What is the total cumulative quantity of solid waste in this SWMU? *(Enter the quantity and circle a unit of measure. If this SWMU is a unit other than a landfill, surface impoundment, or waste pile, enter "NA.")*

i. Quantity . . . . . [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Tons
02 Gallons

128f. What is the area of this SWMU? *(If this SWMU is an incinerator, boiler, or furnace, enter "NA.")*

i. Quantity . . . . . [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Acres
02 Square feet

128g. Is this SWMU inside a building? *(Circle one)*

01 Yes
02 No

128h. What are the top five wastes (by volume) placed in this SWMU?

For each waste, enter a RCRA waste code and a Waste Description Code. See Appendix C of the Instructions booklet for a list of RCRA and other waste codes. See the inside front cover of this questionnaire for the list of Waste Description Codes. If the code requires you to specify, do so in the space provided. If the waste IS NOT A RCRA WASTE or one of the other wastes specified in Appendix C, enter "NA" in the RCRA Waste Code column, then enter a Waste Description Code and specify the waste in the space provided.

	RCRA Waste Code	Waste Description Code
No. 1 . . .	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 2 . . .	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 3 . . .	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 4 . . .	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 5 . . .	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		

128i. Do you conduct groundwater monitoring of this SWMU? *(Circle one)*

01 Yes—facility groundwater monitoring system is designed to individually monitor this SWMU

02 Yes—facility groundwater monitoring system is designed to monitor all or some SWMUs as a group, including this SWMU

03 No

128j. Has this SWMU had a release of hazardous material into the environment which required notification under 40 CFR §302.6? *(Circle one)*

01 Yes *(Go to next question)*

02 No *(Skip to the note at the end of this SWMU Form)*

128k. What was the quantity of hazardous material released from this SWMU into the environment? *(Enter the quantity and circle a unit of measure)*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Pounds

02 Gallons

128l. Describe the hazardous material released from this SWMU into the environment. *(Enter RCRA waste codes from Appendix C of the Instructions booklet to describe the hazardous material. If there are no RCRA waste codes for the hazardous material, enter the chemical name.)*

_____

_____

128m. Where was the hazardous material released to? *(Circle all that apply)*

01 Soil

02 Groundwater

03 Surface water

04 Air

05 Other _____ *(specify)*

128n. Was corrective action taken for each of the following? *(Circle 01 or 02 for each)*

	Yes	No
i. Releases into the soil	01	02
ii. Releases into the groundwater	01	02
iii. Releases into the surface water	01	02
iv. Releases into the air	01	02
v. Other _____ *(specify)*	01	02

NOTE: GO TO QUESTION 129 ON PAGE 55 IF YOU HAVE COMPLETED A SWMU FORM FOR EACH SWMU YOU INCLUDED IN YOUR RESPONSE TO QUESTION 127.

Closed SWMUs That Used to Receive Hazardous and/or Nonhazardous Waste

QUESTION 128

SWMU No. 3

128a. What type of SWMU is this? *(Circle one)*

01 Container storage or accumulation area
02 Tank area or system
03 Surface impoundment
04 Waste pile
05 Land treatment area
06 Landfill
07 Incinerator
08 Boiler
09 Furnace
10 Production area contaminated as a result of routine and systematic releases of hazardous wastes or constituents
11 Other _____ *(specify)*

128b. What is the status of this SWMU? *(Circle one)*

01 Closed—was used to manage ONLY hazardous waste
02 Closed—was used to manage ONLY nonhazardous waste
03 Closed—was used to manage BOTH hazardous and nonhazardous waste

128c. In what year did this SWMU last receive solid waste?

[ ][ ][ ][ ]

128d. In what year was solid waste first placed in this SWMU?

[ ][ ][ ][ ]

128e. What is the total cumulative quantity of solid waste in this SWMU? *(Enter the quantity and circle a unit of measure. If this SWMU is a unit other than a landfill, surface impoundment, or waste pile, enter "NA.")*

i. Quantity . . . . . [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Tons
02 Gallons

128f. What is the area of this SWMU? *(If this SWMU is an incinerator, boiler, or furnace, enter "NA.")*

i. Quantity . . . . . [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Acres
02 Square feet

128g. Is this SWMU inside a building? *(Circle one)*

01 Yes
02 No

128h. What are the top five wastes (by volume) placed in this SWMU?

For each waste, enter a RCRA waste code and a Waste Description Code. See Appendix C of the Instructions booklet for a list of RCRA and other waste codes. See the inside front cover of this questionnaire for the list of Waste Description Codes. If the code requires you to specify, do so in the space provided. If the waste IS NOT A RCRA WASTE or one of the other wastes specified in Appendix C, enter "NA" in the RCRA Waste Code column, then enter a Waste Description Code and specify the waste in the space provided.

	RCRA Waste Code	Waste Description Code
No. 1 . . .	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 2 . . .	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 3 . . .	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 4 . . .	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 5 . . .	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		

128i. Do you conduct groundwater monitoring of this SWMU? *(Circle one)*

01 Yes—facility groundwater monitoring system is designed to individually monitor this SWMU

02 Yes—facility groundwater monitoring system is designed to monitor all or some SWMUs as a group, including this SWMU

03 No

128j. Has this SWMU had a release of hazardous material into the environment which required notification under 40 CFR §302.6? *(Circle one)*

01 Yes *(Go to next question)*

02 No *(Skip to the note at the end of this SWMU Form)*

128k. What was the quantity of hazardous material released from this SWMU into the environment? *(Enter the quantity and circle a unit of measure)*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Pounds

02 Gallons

128l. Describe the hazardous material released from this SWMU into the environment. *(Enter RCRA waste codes from Appendix C of the Instructions booklet to describe the hazardous material. If there are no RCRA waste codes for the hazardous material, enter the chemical name.)*

_____

_____

128m. Where was the hazardous material released to? *(Circle all that apply)*

01 Soil

02 Groundwater

03 Surface water

04 Air

05 Other _____ *(specify)*

128n. Was corrective action taken for each of the following? *(Circle 01 or 02 for each)*

	Yes	No
i. Releases into the soil	01	02
ii. Releases into the groundwater	01	02
iii. Releases into the surface water	01	02
iv. Releases into the air	01	02
v. Other _____ *(specify)*	01	02

NOTE: GO TO QUESTION 129 ON PAGE 55 IF YOU HAVE COMPLETED A SWMU FORM FOR EACH SWMU YOU INCLUDED IN YOUR RESPONSE TO QUESTION 127.

Closed SWMUs That Used to Receive Hazardous and/or Nonhazardous Waste

QUESTION 128

SWMU No. 4

128a. What type of SWMU is this? *(Circle one)*

01 Container storage or accumulation area
02 Tank area or system
03 Surface impoundment
04 Waste pile
05 Land treatment area
06 Landfill
07 Incinerator
08 Boiler
09 Furnace
10 Production area contaminated as a result of routine and systematic releases of hazardous wastes or constituents
11 Other _____ *(specify)*

128b. What is the status of this SWMU? *(Circle one)*

01 Closed—was used to manage ONLY hazardous waste
02 Closed—was used to manage ONLY nonhazardous waste
03 Closed—was used to manage BOTH hazardous and nonhazardous waste

128c. In what year did this SWMU last receive solid waste?

[ ][ ][ ][ ]

128d. In what year was solid waste first placed in this SWMU?

[ ][ ][ ][ ]

128e. What is the total cumulative quantity of solid waste in this SWMU? *(Enter the quantity and circle a unit of measure. If this SWMU is a unit other than a landfill, surface impoundment, or waste pile, enter "NA.")*

i. Quantity . . . . . [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Tons
02 Gallons

128f. What is the area of this SWMU? *(If this SWMU is an incinerator, boiler, or furnace, enter "NA.")*

i. Quantity . . . . . [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Acres
02 Square feet

128g. Is this SWMU inside a building? *(Circle one)*

01 Yes
02 No

128h. What are the top five wastes (by volume) placed in this SWMU?

For each waste, enter a RCRA waste code and a Waste Description Code. See Appendix C of the Instructions booklet for a list of RCRA and other waste codes. See the inside front cover of this questionnaire for the list of Waste Description Codes. If the code requires you to specify, do so in the space provided. If the waste IS NOT A RCRA WASTE or one of the other wastes specified in Appendix C, enter "NA" in the RCRA Waste Code column, then enter a Waste Description Code and specify the waste in the space provided.

	RCRA Waste Code	Waste Description Code
No. 1 . . .	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 2 . . .	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 3 . . .	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 4 . . .	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 5 . . .	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		

128i. Do you conduct groundwater monitoring of this SWMU? *(Circle one)*

01 Yes—facility groundwater monitoring system is designed to individually monitor this SWMU

02 Yes—facility groundwater monitoring system is designed to monitor all or some SWMUs as a group, including this SWMU

03 No

128j. Has this SWMU had a release of hazardous material into the environment which required notification under 40 CFR §302.6? *(Circle one)*

01 Yes *(Go to next question)*

02 No *(Skip to the note at the end of this SWMU Form)*

128k. What was the quantity of hazardous material released from this SWMU into the environment? *(Enter the quantity and circle a unit of measure)*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Pounds

02 Gallons

128l. Describe the hazardous material released from this SWMU into the environment. *(Enter RCRA waste codes from Appendix C of the Instructions booklet to describe the hazardous material. If there are no RCRA waste codes for the hazardous material, enter the chemical name.)*

_____

_____

128m. Where was the hazardous material released to? *(Circle all that apply)*

01 Soil

02 Groundwater

03 Surface water

04 Air

05 Other _____ *(specify)*

128n. Was corrective action taken for each of the following? *(Circle 01 or 02 for each)*

	Yes	No
i. Releases into the soil	01	02
ii. Releases into the groundwater	01	02
iii. Releases into the surface water	01	02
iv. Releases into the air	01	02
v. Other _____ *(specify)*	01	02

NOTE: GO TO QUESTION 129 ON PAGE 55 IF YOU HAVE COMPLETED A SWMU FORM FOR EACH SWMU YOU INCLUDED IN YOUR RESPONSE TO QUESTION 127.

Closed SWMUs That Used to Receive Hazardous and/or Nonhazardous Waste

QUESTION 128

SWMU No. 5

128a. **What type of SWMU is this?** *(Circle one)*

01 Container storage or accumulation area
02 Tank area or system
03 Surface impoundment
04 Waste pile
05 Land treatment area
06 Landfill
07 Incinerator
08 Boiler
09 Furnace
10 Production area contaminated as a result of routine and systematic releases of hazardous wastes or constituents
11 Other _____ *(specify)*

128b. **What is the status of this SWMU?** *(Circle one)*

01 Closed—was used to manage ONLY hazardous waste
02 Closed—was used to manage ONLY nonhazardous waste
03 Closed—was used to manage BOTH hazardous and nonhazardous waste

128c. **In what year did this SWMU last receive solid waste?**

[ ][ ][ ][ ]

128d. **In what year was solid waste first placed in this SWMU?**

[ ][ ][ ][ ]

128e. **What is the total cumulative quantity of solid waste in this SWMU?** *(Enter the quantity and circle a unit of measure. If this SWMU is a unit other than a landfill, surface impoundment, or waste pile, enter "NA.")*

i. Quantity . . . . . [ ][ ][ ][ ][ ][ ][ ][ ][ ]
ii. Unit of measure *(Circle one)*
01 Tons
02 Gallons

128f. **What is the area of this SWMU?** *(If this SWMU is an incinerator, boiler, or furnace, enter "NA.")*

i. Quantity . . . . . [ ][ ][ ][ ][ ][ ][ ][ ][ ]
ii. Unit of measure *(Circle one)*
01 Acres
02 Square feet

128g. **Is this SWMU inside a building?** *(Circle one)*

01 Yes
02 No

128h. **What are the top five wastes (by volume) placed in this SWMU?**

For each waste, enter a RCRA waste code and a Waste Description Code. See Appendix C of the Instructions booklet for a list of RCRA and other waste codes. See the inside front cover of this questionnaire for the list of Waste Description Codes. If the code requires you to specify, do so in the space provided. If the waste IS NOT A RCRA WASTE or one of the other wastes specified in Appendix C, enter "NA" in the RCRA Waste Code column, then enter a Waste Description Code and specify the waste in the space provided.

	RCRA Waste Code	Waste Description Code
No. 1 . . .	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 2 . . .	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 3 . . .	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 4 . . .	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		
No. 5 . . .	[ ][ ][ ][ ]	[ ][ ][ ]
Specify _____		

128l. Do you conduct groundwater monitoring of this SWMU? *(Circle one)*

01 Yes—facility groundwater monitoring system is designed to individually monitor this SWMU

02 Yes—facility groundwater monitoring system is designed to monitor all or some SWMUs as a group, including this SWMU

03 No

128j. Has this SWMU had a release of hazardous material into the environment which required notification under 40 CFR §302.6? *(Circle one)*

01 Yes *(Go to next question)*

02 No *(Skip to the note at the end of this SWMU Form)*

128k. What was the quantity of hazardous material released from this SWMU into the environment? *(Enter the quantity and circle a unit of measure)*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Pounds

02 Gallons

128l. Describe the hazardous material released from this SWMU into the environment. *(Enter RCRA waste codes from Appendix C of the Instructions booklet to describe the hazardous material. If there are no RCRA waste codes for the hazardous material, enter the chemical name.)*

_____

_____

128m. Where was the hazardous material released to? *(Circle all that apply)*

01 Soil

02 Groundwater

03 Surface water

04 Air

05 Other _____ *(specify)*

128n. Was corrective action taken for each of the following? *(Circle 01 or 02 for each)*

	Yes	No
i. Releases into the soil	01	02
ii. Releases into the groundwater	01	02
iii. Releases into the surface water	01	02
iv. Releases into the air	01	02
v. Other _____ *(specify)*	01	02

NOTE: GO TO QUESTION 129 ON PAGE 55 IF YOU HAVE COMPLETED A SWMU FORM FOR EACH SWMU YOU INCLUDED IN YOUR RESPONSE TO QUESTION 127.

CLOSURE OF SURFACE IMPOUNDMENTS

129. Does this facility have onsite any surface impoundments that meet ALL of the following criteria?

- **Hazardous waste has been added to them in the past for treatment, storage, or disposal.**
- **Not currently in service—hazardous waste will NOT be added to them in the future for treatment, storage, or disposal.**
- **Not yet undergone closure, currently undergoing closure, or closed during 1986.**

(Circle one)

01 Yes *(Go to next question)*
02 No *(Skip to Question 137 on page 59)*

130. How many surface impoundments onsite at this facility meet the criteria specified in Question 129?

131. Did any of the surface impoundments included in your response to Question 130 undergo closure during 1986? *(Circle one)*

01 Yes *(Go to next question)*

02 No *(Skip to Question 133)*

132. Complete the following table for surface impoundments that were undergoing closure during 1986.

Surface Impoundments Undergoing Closure During 1986	*Enter the quantity specified; if none, enter zero.*
Question	**Quantity**
a. How many surface impoundments were undergoing closure during 1986?	
i. Clean closure—removal of all hazardous waste	
ii. Closure as a landfill—removal of some or no hazardous waste	
b. How many of these surface impoundments:	
i. Completed closure during 1986?	
ii. Completed or will complete closure in 1987?	
iii. Are expected to complete closure in 1988?	
c. What quantity of hazardous waste was or is expected to be removed from these surface impoundments? *(Enter the quantity in tons)*	
i. Quantity removed during 1986	
ii. Quantity removed or expected to be removed in 1987	
iii. Quantity expected to be removed in 1988	
d. For those surface impoundments that underwent **closure as a landfill** during 1986, what quantity of hazardous waste will remain in the closed surface impoundments? *(Enter the quantity in tons)*	

NOTE: *Report the hazardous waste removed from surface impoundments onsite during 1986 in Questionnaire GB, "Hazardous Waste Characterization."*

133. Did any of the surface impoundments included in your response to Question 130 begin closure in 1987? *(Circle one)*

01 Yes *(Go to next question)*

02 No *(Skip to Question 135)*

134. Complete the following table for surface impoundments that began closure in 1987.

Surface Impoundments That Began Closure in 1987	*Enter the quantity specified; if none, enter zero.*
Question	**Quantity**
a. How many surface impoundments began closure in 1987?	
i. Clean closure—removal of all hazardous waste	
ii. Closure as a landfill—removal of some or no hazardous waste	
b. How many of these surface impoundments completed closure in 1987?	
c. What quantity of hazardous waste was or is expected to be removed from these surface impoundments? *(Enter the quantity in tons)*	
i. Quantity removed or expected to be removed in 1987	
ii. Quantity expected to be removed in 1988	
d. For those surface impoundments that began **closure as a landfill** in 1987, what quantity of hazardous waste is expected to remain in the closed surface impoundments? *(Enter the quantity in tons)*	

135. Are any of the surface impoundments included in your response to Question 130 expected to begin closure in 1988? *(Circle one)*

01 Yes *(Go to next question)*

02 No *(Skip to Question 137)*

136. Complete the following table for surface impoundments that are expected to begin closure in 1988.

Surface Impoundments That Are Expected to Begin Closure in 1988	*Enter the quantity specified; if none, enter zero.*
Question	**Quantity**
a. How many surface impoundments will begin closure in 1988?	
i. Clean closure—removal of all hazardous waste	
ii. Closure as a landfill—removal of some or no hazardous waste	
b. What quantity of hazardous waste is expected to be removed from these surface impoundments? *(Enter the quantity in tons)*	
i. Quantity expected to be removed in 1988	
ii. Quantity expected to be removed after 1988	
c. For those surface impoundments that are expected to begin **closure as a landfill** in 1988, what quantity of hazardous waste is expected to remain in the closed surface impoundments? *(Enter the quantity in tons)*	

CLOSURE OF WASTE PILES

137. **Does this facility have onsite any waste piles that meet ALL of the following criteria?**
   - **Hazardous waste has been added to them in the past for treatment or storage.**
   - **Not currently in service—hazardous waste will NOT be added to them in the future for treatment or storage.**
   - **Not yet undergone closure, currently undergoing closure, or closed during 1986.**

   (Circle one)

   01 Yes *(Go to next question)*
   02 No *(Skip to the note on page 63 prior to Question 145)*

138. **How many waste piles onsite at this facility meet the criteria specified in Question 137?**

   [ ][ ]

139. Did any of the waste piles included in your response to Question 138 undergo closure during 1986? *(Circle one)*

01 Yes *(Go to next question)*
02 No *(Skip to Question 141)*

140. Complete the following table for waste piles that were undergoing closure during 1986.

Waste Piles Undergoing Closure During 1986	*Enter the quantity specified; if none, enter zero.*
Question	**Quantity**
a. How many waste piles were undergoing closure during 1986?	
i. Clean closure—removal of all hazardous waste	
ii. Closure as a landfill—removal of some or no hazardous waste	
b. How many of these waste piles:	
i. Completed closure during 1986?	
ii. Completed or will complete closure in 1987?	
iii. Are expected to complete closure in 1988?	
c. What quantity of hazardous waste was or is expected to be removed from these waste piles? *(Enter the quantity in tons)*	
i. Quantity removed during 1986	
ii. Quantity removed or expected to be removed in 1987	
iii. Quantity expected to be removed in 1988	
d. For those waste piles that underwent **closure as a landfill** during 1986, what quantity of hazardous waste will remain in the closed waste piles? *(Enter the quantity in tons)*	

NOTE: *Report the hazardous waste removed from waste piles onsite during 1986 in Questionnaire GB, "Hazardous Waste Characterization."*

141. Did any of the waste piles included in your response to Question 138 begin closure in 1987?
(Circle one)
01 Yes *(Go to next question)*
02 No *(Skip to Question 143)*

142. Complete the following table for waste piles that began closure in 1987.

Waste Piles That Began Closure in 1987	*Enter the quantity specified; if none, enter zero.*
Question	**Quantity**
a. How many waste piles began closure in 1987?	
i. Clean closure—removal of all hazardous waste	☐☐
ii. Closure as a landfill—removal of some or no hazardous waste	☐☐
b. How many of these waste piles completed closure in 1987?	☐☐
c. What quantity of hazardous waste was or is expected to be removed from these waste piles? *(Enter the quantity in tons)*	
i. Quantity removed or expected to be removed in 1987	☐☐☐☐☐☐☐☐
ii. Quantity expected to be removed in 1988	☐☐☐☐☐☐☐☐
d. For those waste piles that began **closure as a landfill** in 1987, what quantity of hazardous waste is expected to remain in the closed waste piles? *(Enter the quantity in tons)*	☐☐☐☐☐☐☐☐

143. Are any of the waste piles included in your response to Question 138 expected to begin closure in 1988? *(Circle one)*

01 Yes *(Go to next question)*

02 No *(Skip to the note on page 63 prior to Question 145)*

144. Complete the following table for waste piles that are expected to begin closure in 1988.

Waste Piles That Are Expected to Begin Closure in 1988	*Enter the quantity specified; if none, enter zero.*
Question	**Quantity**
a. How many waste piles will begin closure in 1988?	
i. Clean closure—removal of all hazardous waste	☐☐
ii. Closure as a landfill—removal of some or no hazardous waste	☐☐
b. What quantity of hazardous waste is expected to be removed from these waste piles? *(Enter the quantity in tons)*	
i. Quantity expected to be removed in 1988	☐☐☐☐☐☐☐☐
ii. Quantity expected to be removed after 1988	☐☐☐☐☐☐☐☐
c. For those waste piles that are expected to begin **closure as a landfill** in 1988, what quantity of hazardous waste is expected to remain in the closed waste piles? *(Enter the quantity in tons)*	☐☐☐☐☐☐☐☐

ACCUMULATION IN CONTAINERS HELD IN AREAS REGULATED UNDER THE 90-DAY RULE

NOTE: Hazardous waste accumulated in containers (stored under the 90-day rule) must:

- Have been **generated onsite.**
- Be held for periods of **90 days or less** (or 180/270 days for small quantity generators).

Do not report satellite accumulation areas in Questions 145 through 147; satellite accumulation areas are addressed in Questions 148 through 150. Do not report the accumulation of hazardous waste in tanks in this section; this is addressed in Questionnaire GI, "Tank Systems."

145. **Does this facility accumulate hazardous waste onsite in drums or containers in areas that are regulated under the 90-day rule and that do not have a RCRA permit or interim status?** *(Circle one)*

01 Yes *(Go to next question)*
02 No *(Skip to Question 148 on page 69)*

146. **How many areas that are regulated under the 90-day rule and that do not have a RCRA permit or interim status are used by this facility to accumulate hazardous waste in containers?**

[ ][ ]

147. **Complete a separate Accumulation Area Form for EACH accumulation area onsite at this facility that you included in your response to Question 146.**

This questionnaire contains five Accumulation Area Forms. If your facility has more than five separate accumulation areas onsite, call the Survey Helpline (1-800-635-8850) and we will provide you with additional Accumulation Area Forms—do not photocopy to create additional forms.

After you have completed an Accumulation Area Form for each accumulation area onsite that you included in your response to Question 146, GO TO QUESTION 148 ON PAGE 69.

QUESTION 147

AREA No. 1

147a. What is the typical number of containers in this accumulation area?

[ ][ ][ ] containers

147b. What was the typical quantity of hazardous waste at any given time in this accumulation area? *(Enter the quantity and circle a unit of measure)*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Tons

02 Gallons

147c. What was the total quantity of hazardous waste that entered this accumulation area during 1986? *(Enter the quantity and circle a unit of measure)*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Tons

02 Gallons

147d. What is the typical residence time for hazardous waste in this accumulation area?

[ ][ ] days

147e. At any given time, what is the total capacity of this accumulation area? *(Enter the capacity and circle a unit of measure)*

i. Capacity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Tons

02 Gallons

147f. How is the surrounding area of this accumulation area lined or protected? *(Circle all that apply)*

01 Synthetic liner

02 Recompacted clay liner

03 Concrete pad

04 Dike or berm

05 Inside building

06 Other _____ *(specify)*

147g. List a RCRA waste code for each type of hazardous waste that entered this accumulation area during 1986. *(See Appendix C of the Instructions booklet for a list of RCRA and other waste codes.)*

a.	[ ][ ][ ][ ]	n.	[ ][ ][ ][ ]
b.	[ ][ ][ ][ ]	o.	[ ][ ][ ][ ]
c.	[ ][ ][ ][ ]	p.	[ ][ ][ ][ ]
d.	[ ][ ][ ][ ]	q.	[ ][ ][ ][ ]
e.	[ ][ ][ ][ ]	r.	[ ][ ][ ][ ]
f.	[ ][ ][ ][ ]	s.	[ ][ ][ ][ ]
g.	[ ][ ][ ][ ]	t.	[ ][ ][ ][ ]
h.	[ ][ ][ ][ ]	u.	[ ][ ][ ][ ]
i.	[ ][ ][ ][ ]	v.	[ ][ ][ ][ ]
j.	[ ][ ][ ][ ]	w.	[ ][ ][ ][ ]
k.	[ ][ ][ ][ ]	x.	[ ][ ][ ][ ]
l.	[ ][ ][ ][ ]	y.	[ ][ ][ ][ ]
m.	[ ][ ][ ][ ]	z.	[ ][ ][ ][ ]

NOTE: GO TO QUESTION 148 ON PAGE 69 IF YOU HAVE COMPLETED AN ACCUMULATION AREA FORM FOR EACH ACCUMULATION AREA YOU INCLUDED IN YOUR RESPONSE TO QUESTION 146.

QUESTION 147

AREA No. 2

147a. What is the typical number of containers in this accumulation area?

[ ][ ][ ] containers

147b. What was the typical quantity of hazardous waste at any given time in this accumulation area? *(Enter the quantity and circle a unit of measure)*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Tons

02 Gallons

147c. What was the total quantity of hazardous waste that entered this accumulation area during 1986? *(Enter the quantity and circle a unit of measure)*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Tons

02 Gallons

147d. What is the typical residence time for hazardous waste in this accumulation area?

[ ][ ] days

147e. At any given time, what is the total capacity of this accumulation area? *(Enter the capacity and circle a unit of measure)*

i. Capacity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Tons

02 Gallons

147f. How is the surrounding area of this accumulation area lined or protected? *(Circle all that apply)*

01 Synthetic liner

02 Recompacted clay liner

03 Concrete pad

04 Dike or berm

05 Inside building

06 Other _____

(specify)

147g. List a RCRA waste code for each type of hazardous waste that entered this accumulation area during 1986. *(See Appendix C of the Instructions booklet for a list of RCRA and other waste codes.)*

a.	[ ][ ][ ][ ]	n.	[ ][ ][ ][ ]
b.	[ ][ ][ ][ ]	o.	[ ][ ][ ][ ]
c.	[ ][ ][ ][ ]	p.	[ ][ ][ ][ ]
d.	[ ][ ][ ][ ]	q.	[ ][ ][ ][ ]
e.	[ ][ ][ ][ ]	r.	[ ][ ][ ][ ]
f.	[ ][ ][ ][ ]	s.	[ ][ ][ ][ ]
g.	[ ][ ][ ][ ]	t.	[ ][ ][ ][ ]
h.	[ ][ ][ ][ ]	u.	[ ][ ][ ][ ]
i.	[ ][ ][ ][ ]	v.	[ ][ ][ ][ ]
j.	[ ][ ][ ][ ]	w.	[ ][ ][ ][ ]
k.	[ ][ ][ ][ ]	x.	[ ][ ][ ][ ]
l.	[ ][ ][ ][ ]	y.	[ ][ ][ ][ ]
m.	[ ][ ][ ][ ]	z.	[ ][ ][ ][ ]

NOTE: GO TO QUESTION 148 ON PAGE 69 IF YOU HAVE COMPLETED AN ACCUMULATION AREA FORM FOR EACH ACCUMULATION AREA YOU INCLUDED IN YOUR RESPONSE TO QUESTION 146.

QUESTION 147

AREA No. 3

147a. What is the typical number of containers in this accumulation area?

☐☐☐ containers

147b. What was the typical quantity of hazardous waste at any given time in this accumulation area? *(Enter the quantity and circle a unit of measure)*

i. Quantity ..... ☐☐☐☐☐☐☐☐☐

ii. Unit of measure *(Circle one)*

01 Tons

02 Gallons

147c. What was the total quantity of hazardous waste that entered this accumulation area during 1986? *(Enter the quantity and circle a unit of measure)*

i. Quantity ..... ☐☐☐☐☐☐☐☐☐

ii. Unit of measure *(Circle one)*

01 Tons

02 Gallons

147d. What is the typical residence time for hazardous waste in this accumulation area?

☐☐ days

147e. At any given time, what is the total capacity of this accumulation area? *(Enter the capacity and circle a unit of measure)*

i. Capacity ..... ☐☐☐☐☐☐☐☐☐

ii. Unit of measure *(Circle one)*

01 Tons

02 Gallons

147f. How is the surrounding area of this accumulation area lined or protected? *(Circle all that apply)*

01 Synthetic liner

02 Recompacted clay liner

03 Concrete pad

04 Dike or berm

05 Inside building

06 Other _____

(specify)

147g. List a RCRA waste code for each type of hazardous waste that entered this accumulation area during 1986. *(See Appendix C of the Instructions booklet for a list of RCRA and other waste codes.)*

a.	☐☐☐☐	n.	☐☐☐☐
b.	☐☐☐☐	o.	☐☐☐☐
c.	☐☐☐☐	p.	☐☐☐☐
d.	☐☐☐☐	q.	☐☐☐☐
e.	☐☐☐☐	r.	☐☐☐☐
f.	☐☐☐☐	s.	☐☐☐☐
g.	☐☐☐☐	t.	☐☐☐☐
h.	☐☐☐☐	u.	☐☐☐☐
i.	☐☐☐☐	v.	☐☐☐☐
j.	☐☐☐☐	w.	☐☐☐☐
k.	☐☐☐☐	x.	☐☐☐☐
l.	☐☐☐☐	y.	☐☐☐☐
m.	☐☐☐☐	z.	☐☐☐☐

NOTE: GO TO QUESTION 148 ON PAGE 69 IF YOU HAVE COMPLETED AN ACCUMULATION AREA FORM FOR EACH ACCUMULATION AREA YOU INCLUDED IN YOUR RESPONSE TO QUESTION 146.

QUESTION 147

AREA No. 4

147a. What is the typical number of containers in this accumulation area?

[ ][ ][ ] containers

147b. What was the typical quantity of hazardous waste at any given time in this accumulation area? *(Enter the quantity and circle a unit of measure)*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Tons

02 Gallons

147c. What was the total quantity of hazardous waste that entered this accumulation area during 1986? *(Enter the quantity and circle a unit of measure)*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Tons

02 Gallons

147d. What is the typical residence time for hazardous waste in this accumulation area?

[ ][ ] days

147e. At any given time, what is the total capacity of this accumulation area? *(Enter the capacity and circle a unit of measure)*

i. Capacity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Tons

02 Gallons

147f. How is the surrounding area of this accumulation area lined or protected? *(Circle all that apply)*

01 Synthetic liner

02 Recompacted clay liner

03 Concrete pad

04 Dike or berm

05 Inside building

06 Other _____

(specify)

147g. List a RCRA waste code for each type of hazardous waste that entered this accumulation area during 1986. *(See Appendix C of the Instructions booklet for a list of RCRA and other waste codes.)*

a.	[ ][ ][ ][ ]	n.	[ ][ ][ ][ ]
b.	[ ][ ][ ][ ]	o.	[ ][ ][ ][ ]
c.	[ ][ ][ ][ ]	p.	[ ][ ][ ][ ]
d.	[ ][ ][ ][ ]	q.	[ ][ ][ ][ ]
e.	[ ][ ][ ][ ]	r.	[ ][ ][ ][ ]
f.	[ ][ ][ ][ ]	s.	[ ][ ][ ][ ]
g.	[ ][ ][ ][ ]	t.	[ ][ ][ ][ ]
h.	[ ][ ][ ][ ]	u.	[ ][ ][ ][ ]
i.	[ ][ ][ ][ ]	v.	[ ][ ][ ][ ]
j.	[ ][ ][ ][ ]	w.	[ ][ ][ ][ ]
k.	[ ][ ][ ][ ]	x.	[ ][ ][ ][ ]
l.	[ ][ ][ ][ ]	y.	[ ][ ][ ][ ]
m.	[ ][ ][ ][ ]	z.	[ ][ ][ ][ ]

NOTE: GO TO QUESTION 148 ON PAGE 69 IF YOU HAVE COMPLETED AN ACCUMULATION AREA FORM FOR EACH ACCUMULATION AREA YOU INCLUDED IN YOUR RESPONSE TO QUESTION 146.

QUESTION 147

AREA No. 5

147a. What is the typical number of containers in this accumulation area?

[ ][ ][ ] containers

147b. What was the typical quantity of hazardous waste at any given time in this accumulation area? *(Enter the quantity and circle a unit of measure)*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Tons

02 Gallons

147c. What was the total quantity of hazardous waste that entered this accumulation area during 1986? *(Enter the quantity and circle a unit of measure)*

i. Quantity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Tons

02 Gallons

147d. What is the typical residence time for hazardous waste in this accumulation area?

[ ][ ] days

147e. At any given time, what is the total capacity of this accumulation area? *(Enter the capacity and circle a unit of measure)*

i. Capacity ..... [ ][ ][ ][ ][ ][ ][ ][ ][ ]

ii. Unit of measure *(Circle one)*

01 Tons

02 Gallons

147f. How is the surrounding area of this accumulation area lined or protected? *(Circle all that apply)*

01 Synthetic liner

02 Recompacted clay liner

03 Concrete pad

04 Dike or berm

05 Inside building

06 Other _____ *(specify)*

147g. List a RCRA waste code for each type of hazardous waste that entered this accumulation area during 1986. *(See Appendix C of the Instructions booklet for a list of RCRA and other waste codes.)*

a.	[ ][ ][ ][ ]	n.	[ ][ ][ ][ ]
b.	[ ][ ][ ][ ]	o.	[ ][ ][ ][ ]
c.	[ ][ ][ ][ ]	p.	[ ][ ][ ][ ]
d.	[ ][ ][ ][ ]	q.	[ ][ ][ ][ ]
e.	[ ][ ][ ][ ]	r.	[ ][ ][ ][ ]
f.	[ ][ ][ ][ ]	s.	[ ][ ][ ][ ]
g.	[ ][ ][ ][ ]	t.	[ ][ ][ ][ ]
h.	[ ][ ][ ][ ]	u.	[ ][ ][ ][ ]
i.	[ ][ ][ ][ ]	v.	[ ][ ][ ][ ]
j.	[ ][ ][ ][ ]	w.	[ ][ ][ ][ ]
k.	[ ][ ][ ][ ]	x.	[ ][ ][ ][ ]
l.	[ ][ ][ ][ ]	y.	[ ][ ][ ][ ]
m.	[ ][ ][ ][ ]	z.	[ ][ ][ ][ ]

NOTE: GO TO QUESTION 148 ON PAGE 69 IF YOU HAVE COMPLETED AN ACCUMULATION AREA FORM FOR EACH ACCUMULATION AREA YOU INCLUDED IN YOUR RESPONSE TO QUESTION 146.

SATELLITE ACCUMULATION AREAS

148. Does this facility have onsite any hazardous waste satellite accumulation areas? *(Circle one)*

A ***satellite accumulation area*** is an area where a facility accumulates hazardous waste in containers in quantities less than 55 gallons (or one quart for acutely hazardous waste) at or near the point of generation where hazardous waste initially accumulates.

01 Yes *(Go to next question)*
02 No *(Skip to Question 151 on page 72)*

149. Complete the following table on the accumulation of hazardous waste in satellite accumulation areas.

Do not include in your answer any accumulation areas you reported in Question 147.

Accumulation of Hazardous Waste in Satellite Accumulation Areas	*Enter the quantities and where appropriate circle a unit of measure. If none, enter zero. Sum information for multiple satellite accumulation areas.*	
Question	**Quantity**	**Unit of measure** *(Circle one)* **Ton** / **Gal**
a. Total number of satellite accumulation areas onsite	001	
b. Total quantity of hazardous waste held in satellite accumulation areas during 1986	440	01 / (02)
c. Typical quantity of hazardous waste held in satellite accumulation areas at any given time	30	01 / (02)
d. Typical residence time	45 days	
e. Percentage of the quantity of hazardous waste in "b" that was held in areas with a synthetic or concrete liner	000 %	
f. Number of satellite accumulation areas that are inside a building	000	
g. What percentage of hazardous waste goes to the management operations listed below IMMEDIATELY after it is removed from the satellite accumulation area?		
i. Other accumulation onsite in containers (90-day units)	0 %	
ii. Other accumulation onsite in tanks (90-day units)	0 %	
iii. Storage onsite in containers held in RCRA permitted or interim status storage areas	100 %	
iv. Storage onsite in RCRA permitted or interim status tanks	0 %	
v. Treatment onsite	0 %	
vi. Recycling onsite	0 %	
vii. Disposal onsite	0 %	
viii. Sent offsite for management	0 %	

150. List a RCRA waste code for each type of hazardous waste that entered satellite accumulation areas during 1986. *(See Appendix C of the Instructions booklet for a list of RCRA and other waste codes.)*

a.	F002	j.			s.			
b.		k.			t.			
c.		l.			u.			
d.		m.			v.			
e.		n.			w.			
f.		o.			x.			
g.		p.			y.			
h.		q.			z.			
i.		r.						

151. Did this facility complete EPA's National Survey of Hazardous Waste Treatment, Storage, Disposal and Recycling Facilities that was mailed to TSDR facilities in the summer of 1987? *(Circle one)*

01 Yes *(Skip to Question 156 on page 79. Because your facility completed EPA's National Survey of Hazardous Waste Treatment, Storage, Disposal, and Recycling Facilities, you do not need to complete Questionnaires QC through GI. However, YOU NEED TO COMPLETE Questionnaire GB, "Hazardous Waste Characterization." This questionnaire asks for information on each hazardous waste that was generated onsite during 1986.)*

02 No *(Go to next question)*

152. Does this facility plan to become a treatment, storage, disposal, or recycling (TSDR) facility before January 1992? *(Circle one)*

01 Yes *(Go to next question)*

02 No *(Skip to Question 154)*

153. What hazardous waste management activities does this facility plan to conduct onsite after it has received a permit to treat, store, or dispose of hazardous waste? *(Circle all that apply)*

01 Incineration

02 Reuse as fuel

03 Fuel blending

04 Solidification/stabilization

05 Solvent or liquid organic recovery for reuse

06 Metals recovery for reuse

07 Wastewater treatment

08 Other treatment/recovery

09 Storage/treatment in waste pile

10 Storage/treatment/disposal in surface impoundment

11 Landfill

12 Land treatment

13 Underground injection

14 Other _____
(specify)

154. Complete the following table on this facility's ONSITE hazardous waste management activities.

Circle 01, "Yes," or 02, "No," for each hazardous waste management activity listed in the table.

Answer "Yes" if this facility:

- *Currently conducts the activity onsite to manage hazardous waste.*
- *Conducted the activity onsite during 1986 to manage hazardous waste, but the activity is no longer operational.*
- *Plans to conduct the activity onsite before January 1992 to manage hazardous waste.*

Answer "Yes" if the activity is exempt from RCRA permitting requirements, for example, processes that pretreat hazardous wastewater prior to discharge under a NPDES permit or prior to discharge to a POTW.

Answer "No" if the activity is conducted offsite but not onsite.

Hazardous Waste Management Activities Onsite	*Circle 01 or 02 for EACH hazardous waste management activity listed below.*	
	Did/Does/Will this facility have hazardous waste management activities of this type onsite? *(Circle one)*	
Type of activity	**Yes**	**No**
a. Fuel blending — Questionnaire GC	01	02
b. Reuse as fuel — Questionnaire GD	01	02
c. Wastewater treatment — Questionnaire GE	01	02
d. Metals recovery from hazardous waste for reuse — Questionnaire GF	01	02
e. Solvent and liquid organic recovery from hazardous waste for reuse — Questionnaire GG	01	02
f. Other recovery process — Questionnaire GH	01	02
g. Treatment, storage, recovery for reuse, or accumulation of hazardous waste in tanks — Questionnaire GI	01	02

Following each type of activity listed in the table above is the questionnaire that should be completed if this hazardous waste management activity was conducted onsite during 1986 (but is no longer operational), is currently conducted onsite, or will be conducted onsite before January 1992. If you circle 01 (Yes) for a type of activity, you need to complete the questionnaire specified and return it in the enclosed envelope. It is not necessary to return any questionnaires you were not required to complete. In addition, you need to complete Questionnaire GB, "Hazardous Waste Characterization." This questionnaire asks for information on each hazardous waste that was generated onsite during 1986. If you have any questions as to what questionnaires you need to complete for your facility, call the Survey Helpline (1-800-635-8850).

155. In order to develop hazardous waste regulations over the next few years, EPA needs to understand the flow of waste within facilities that manage hazardous waste. This and the other questionnaires used in this survey ask important questions about the individual hazardous waste management operations onsite at this facility. In order for us to see how these operations relate to one another, complete (1) a general facility-wide schematic or flow diagram showing the hazardous waste management activities and operations this facility has and how they relate to one another; and (2) detailed schematics (as many as necessary) of the treatment and recycling operations identified in the general facility-wide schematic, showing how individual units within the systems and the processes that occur in them relate to one another.

Prior to completing the schematics, assign a number to EACH hazardous waste tank onsite at this facility. Include only tanks that are used for the management of hazardous waste. The tanks should be numbered sequentially starting with number 1 (for example, tanks 1, 2, 3, 4, 5). These tank numbers will be used throughout the questionnaires in this survey to identify which tanks are used with a particular process.

Refer to Appendix A of the Instructions booklet when completing the schematics for a list of treatment, recycling, accumulation, storage, and disposal process codes and Air Pollution Control Device (APCD) codes.

You may find it easier to modify existing diagrams in response to this question. If you do so, be sure to label all processes and number all tanks. Attach all schematics to Questionnaire GA. (See Figures 1, 2, and 3 for examples of how to draw, label, and organize your schematics.) Be sure the people completing the questionnaires have a copy of the appropriate schematics.

GENERAL FACILITY-WIDE SCHEMATIC

1. Draw a box for each of the hazardous waste treatment, storage, accumulation, and recovery operations that are **currently operating** or that are **temporarily not operating** onsite. Operations that are no longer operational or that are planned do not need to be represented on the schematic. Label each box with a simple description of the type of operation (for example, "accumulation in containers," "wastewater treatment system"). NOTE that more detailed descriptions of treatment and recycling operations showing the types of processes and the individual units in which they occur will be required in the detailed schematics.

   Include a box to indicate any closed-loop recovery systems or totally enclosed treatment units that are present at this facility. However, you need not describe them in detail and you should not report them anywhere else in this survey.

   Operations that are ***currently operating*** are those that are currently being used onsite to manage hazardous waste. Operations that are ***temporarily not operating*** are those that have been used onsite in the past to manage hazardous waste AND that will be used onsite in the future to manage hazardous waste.
2. Identify where waste, including treatment residuals, enters or exits an operation by drawing and labeling arrows leading to and from it. Indicate whether waste entering/exiting an operation is hazardous or nonhazardous by writing HW or NHW.
3. Indicate the point at which residuals that are not managed onsite are sent offsite.
4. General schematics must identify every treatment and recycling operation that is broken down further in the detailed schematics (if detailed schematics are necessary to adequately show all onsite treatment or recycling operations).

DETAILED SCHEMATIC(S)

Complete a detailed schematic for EACH treatment or recycling operation identified in the general facility-wide schematic, showing the types of processes used and any tanks in which these processes occur. Use a separate page for each schematic.

1. Draw a box for each individual unit of the hazardous waste treatment or recycling operation that is currently operating or temporarily not operating onsite. Show all processes occurring in units onsite that are listed in Appendix A of the Instructions booklet. To label each box, use either the name of the process or the process code.
2. Every hazardous waste treatment or recycling process identified in the detailed schematics should be reported in at least one of the Questionnaires GC through GH. It is critical that all entries on the detailed schematics are consistent with answers that you provide to the questions in Questionnaires GC through GI.
3. For each process that uses tanks, enter "tank" and the identification number (assigned by you for this survey) in the box. This is necessary so that we can see how the individual units used for these processes relate to one another. If more than one tank is used for a process, simply write the range of numbers as "Tanks 13-15." If the same tank is used for more than one process, repeat the tank number for each process in which it is used. It is critical for our analysis that the tank numbers appear on the detailed schematics and that they agree with the numbers identified in the questionnaires.
4. Use arrows with labels to show where reagents or chemical additives enter a process.
5. Identify where waste, including treatment residuals, enters or exits a process by drawing and labeling arrows leading to and from it. INDICATE whether waste entering and/or exiting a process is hazardous or nonhazardous by writing HW or NHW. Wherever possible, identify the wastes in general terms in parentheses—for example, "HW (dewatered sludge)."
6. Indicate the point at which residuals that are not managed onsite are sent offsite.
7. Indicate where wastes originated, including if they came from a system described in another detailed schematic (for example, "from wastewater treatment system #2, tank #9 effluent").
8. Indicate locations to which system discharges are routed, including routings to other detailed schematics (for example, "to wastewater treatment system #2). DO NOT INDICATE that a system discharge goes, for example, "to process 63WT," if there is more than one process "63WT," unless you state which "63WT" (for example, "to process 63WT, tank #4").
9. Indicate all Air Pollution Control Devices (APCDs) using the list of codes provided in Appendix A of the Instructions booklet.

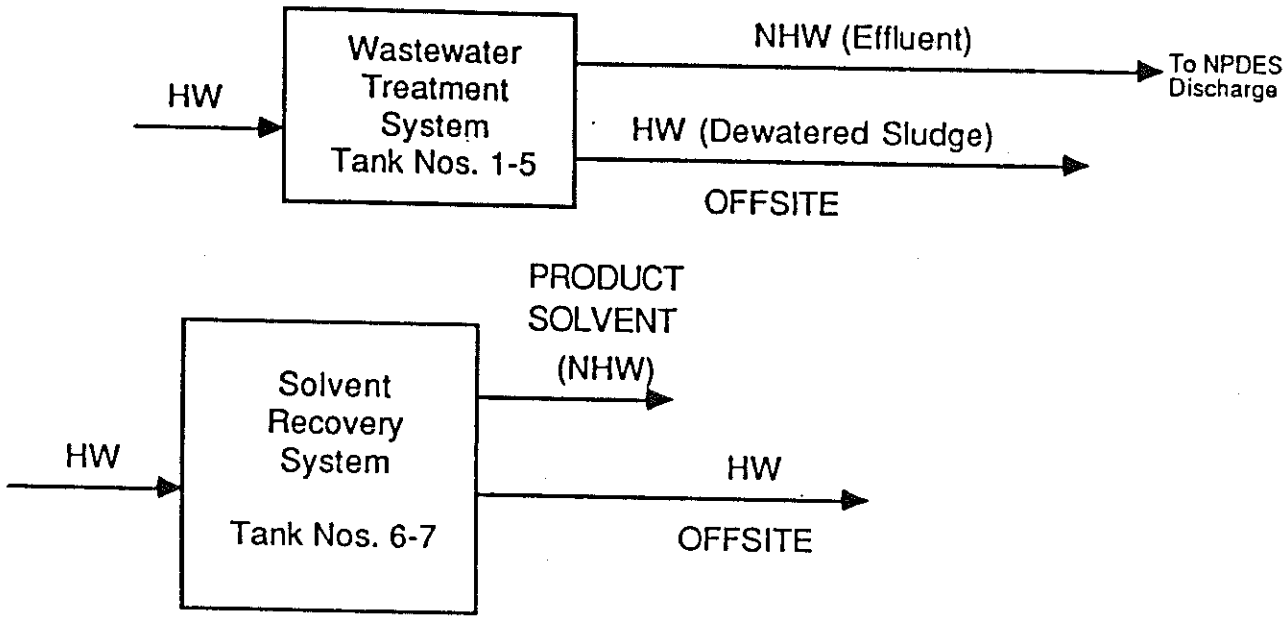


Figure 1. Example of a facility schematic showing all hazardous waste management operations at a facility. (See Figures 2 and 3 for detailed schematics of the wastewater treatment system and the solvent recovery system.)

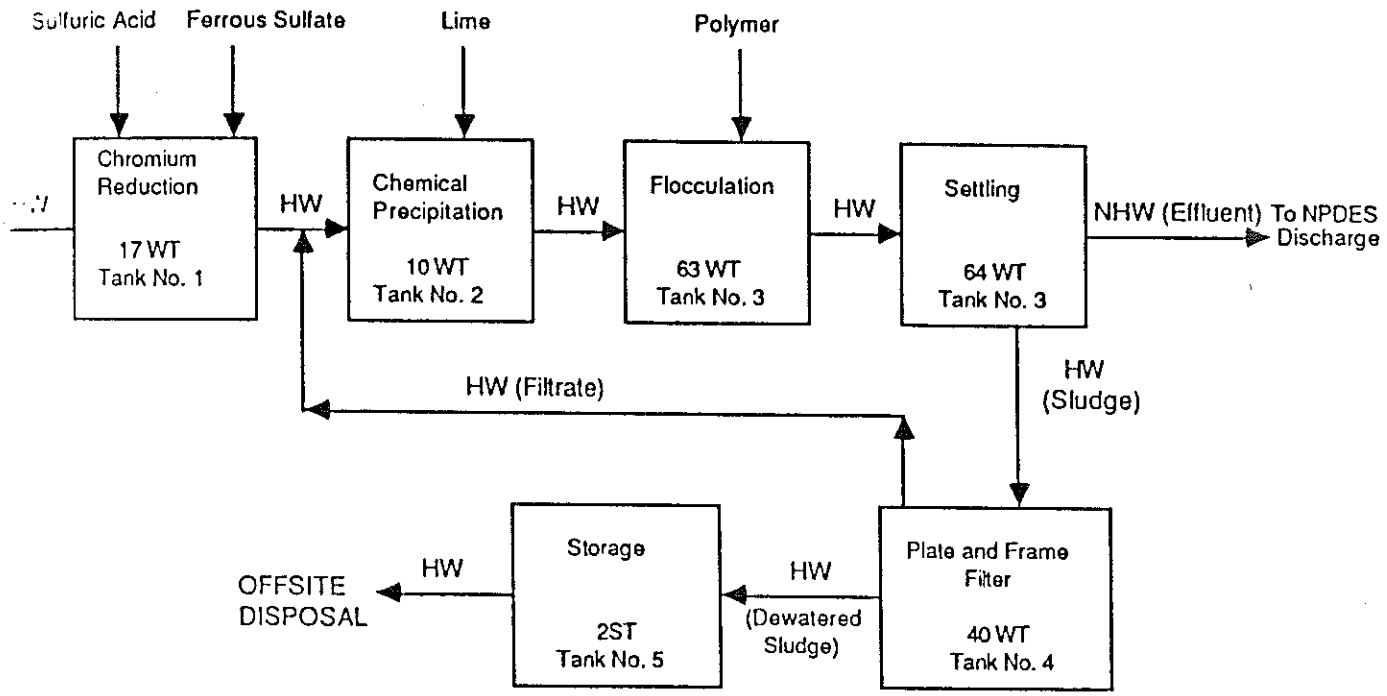


Figure 2. Example of a wastewater treatment system.

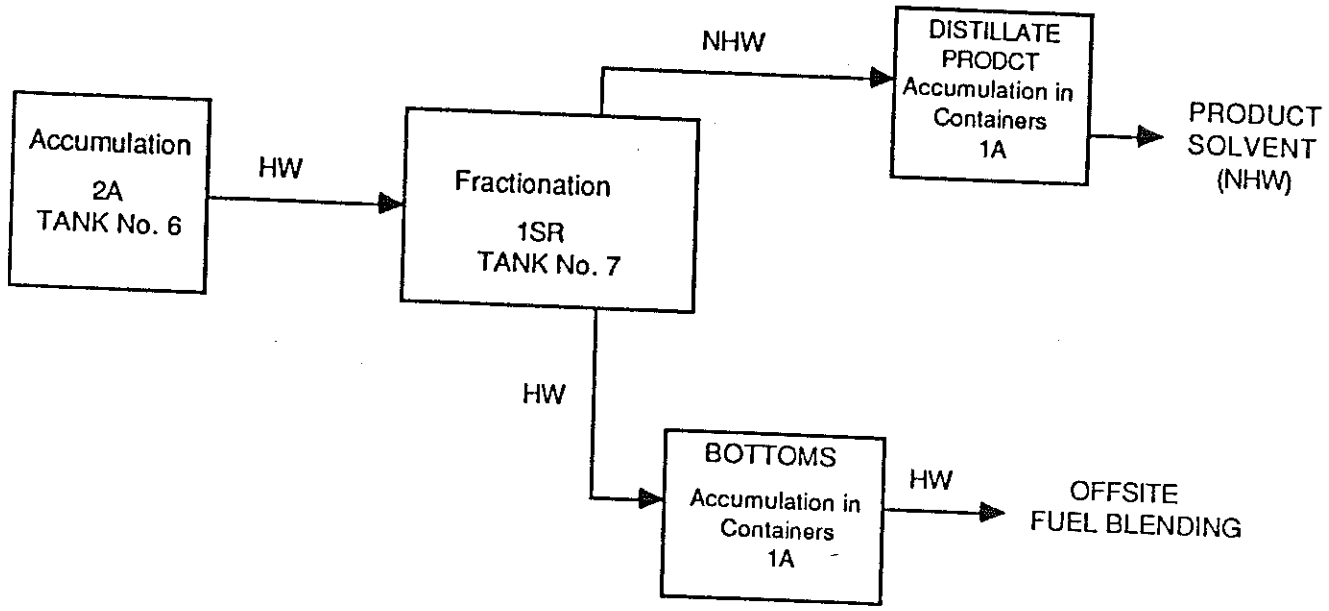


Figure 3. Example of a solvent recovery system.

156. **Provide the following information for potential future survey-related contacts with this facility.**

a. **Is the EPA identification number of this facility the same as that given in the label on the cover of this questionnaire?** *(Circle one)*

(01) Yes *(Skip to Question c)*
02 No *(Go to next question)*

b. **Enter the correct EPA identification number of this facility in the space provided below.**

[ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ] *(Go to Question c)*

c. **Are the COMPANY NAME and MAILING ADDRESS of this facility the same as those given in the label on the cover of this questionnaire?** *(Circle one)*

(01) Yes *(Skip to Question e)*
02 No *(Go to next question)*

d. **Enter the correct COMPANY NAME and MAILING ADDRESS of this facility in the space provided below.**

Company name:

Address:

City: State: ZIP: –

e. **What is the name, title, and telephone number of the person who completed this questionnaire?**

Name: CHARLES G PLANK

Title: ENVIRONMENTAL ENGINEER

Telephone: 312 442 – 7100 *(Go to Question f)*
Area Code

f. **Is YOUR MAILING ADDRESS the same as the address given in the label on the cover of this questionnaire?** *(Circle one)*

"Mailing address" refers to the address at which you can be reached for future survey-related contacts.

(01) Yes *(Skip to note on next page)*
02 No *(Go to next question)*

g. At what MAILING ADDRESS can you be contacted for future survey-related information?

Mailing address:

City:

State: ZIP: –

(Go to note at bottom of page)

NOTE: *You have now completed this questionnaire. If you have also completed all the other questionnaires you must complete, MAKE A PHOTOCOPY OF THEM FOR YOUR RECORDS and send the originals to the following address using the enclosed postage-paid return envelope:*

U.S. Environmental Protection Agency
MD 99-RTI
Research Triangle Park, NC 27711

If you have not completed all the necessary questionnaires, go to the next questionnaire. If you have any questions about this or the other questionnaires used in this survey, call the Survey Helpline (1-800-635-8850).

FACILITY NOTES

Question Number(s)	Notes, comments, etc.

FACILITY NOTES

Question Number(s)	Notes, comments, etc.

SECTIONS M AND N

RESEARCH, DEVELOPMENT AND DEMONSTRATION PERMITS

Sections M and N are not applicable to this facility because it is not an RD&D facility.