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Revision 2

UC-630, 721

The 3718-F Alkali Metal Treatment and Storage Facility Closure Plan

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THE 3718-F ALKALI METAL TREATMENT AND STORAGE FACILITY CLOSURE PLAN

FOREWORD

The Hanford Site is operated by the U.S. Department of Energy, Richland Operations Office. The Hanford Site manages and produces mixed waste (containing both radioactive and dangerous components). The radioactive component of mixed waste is interpreted by the U.S. Department of Energy to be regulated under the *Atomic Energy Act of 1954*; the nonradioactive dangerous waste component of mixed waste is interpreted to be regulated under the *Resource Conservation and Recovery Act of 1976* and the Washington State Department of Ecology *Dangerous Waste Regulations*.

The Hanford Site is considered to be a single facility. The single dangerous waste permit identification number issued to the Hanford Site by the U.S. Environmental Protection Agency and the Washington State Department of Ecology is U.S. Environmental Protection Agency/State Identification Number WA7890008967. This identification number encompasses a number of treatment, storage, and disposal units within the Hanford Facility. All waste management activities carried out under the assigned identification number are considered to be "onsite" as defined in the Washington State Department of Ecology *Dangerous Waste Regulations*, Washington Administrative Code 173-303.

Since 1987, Westinghouse Hanford Company has been a major contractor to the U.S. Department of Energy, Richland Operations Office and has served as co-operator of the 3718-F Alkali Metal Treatment and Storage Facility, the treatment, storage, and disposal unit addressed in this closure plan.

For purposes of the *Resource Conservation and Recovery Act of 1976*, Westinghouse Hanford Company is identified as a "co-operator" and signs in that capacity. Any identification of Westinghouse Hanford Company as an "operator" elsewhere in this closure plan is not meant to conflict with Westinghouse Hanford Company's designation as a co-operator but is rather based on Westinghouse Hanford Company's contractual status (i.e., as a management and operations contractor) for the U.S. Department of Energy.

The 3718-F Alkali Metal Treatment and Storage Facility Closure Plan (Revision 2) consists of a Part A Dangerous Waste Permit Application and a RCRA Closure Plan. An explanation of the Part A Revision (Revision 3) submitted with this document is provided at the beginning of the Part A section. The closure plan consists of nine chapters and three appendices.

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CONTENTS

1.0 INTRODUCTION

2.0 FACILITY DESCRIPTION

3.0 PROCESS INFORMATION

4.0 WASTE CHARACTERISTICS

5.0 GROUNDWATER

6.0 CLOSURE STRATEGY AND PERFORMANCE STANDARDS

7.0 CLOSURE ACTIVITIES

8.0 POSTCLOSURE

9.0 REFERENCES

APPENDICES

3A PHOTOGRAPHS

4A MATERIAL SAFETY DATA SHEETS

6A SUMMARY OF RESULTS FROM THE DATA QUALITY OBJECTIVES (DQO) PROCESS

LIST OF TERMS

3718-F Facility	3718-F Alkali Metal Treatment and Storage Facility
CERCLA	*Comprehensive Environmental Response Compensation and Liability Act of 1980*
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
DOE-RL	U.S. Department of Energy, Richland Operations Office
DQO	Data Quality Objectives
DW	dangerous waste
Ecology	Washington State Department of Ecology
EII	Environmental Investigations Instructions
EPA	Environmental Protection Agency
FY	fiscal year
HWOP	Hazardous Waste Operating Permit
JSA	Job Safety Analysis
LOQ	limit of quantitation
LT	less than
MSDS	Material Safety Data Sheet
MTCA	*Model Toxics Control Act*
QAPP	Quality Assurance Program Plan
QC	quality control
RCRA	*Resource Conservation and Recovery Act of 1976*
RI/FS	Remedial Investigation/Feasibility Study
TCLP	toxicity characteristic leaching procedure
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
WAC	Washington Administrative Code
WHC	Westinghouse Hanford Company

DEFINITIONS OF TERMS

Local Background. Refers to the data set of chemical concentrations from analyses of samples obtained in the local vicinity of a facility. Samples within the facility will be compared to the local background data set to determine the presence or absence of contamination from the facility. For the 3718-F Facility, the samples used to determine the local background concentrations will be obtained within the 300 Area.

Local Background Threshold. Refers to the chemical concentrations that define an upper limit of the local background population. It is not an average local background concentration. However, it is determined statistically (e.g., the tolerance interval approach to the analysis of variance).

Action Levels. Refers to the chemical concentration levels that will prompt an action. Action level values commonly will be local background threshold concentrations, health and environmental based concentrations, toxicity characteristic leaching procedure (TCLP) regulatory levels, and limit of quantitation (LOQ).

Facility. For purposes of the *Resource Conservation and Recovery Act of 1976*, the Hanford Site is considered to be a single facility consisting of a number of treatment, storage, and disposal units. The term 'facility' also is commonly used in building nomenclature throughout the Hanford Site (e.g., 3718-F Alkali Metal Treatment Storage Facility).

PART A APPLICATION

The original Part A, Form 3, Revision 0, "Dangerous Waste Permit Application" was submitted to Washington State Department of Ecology in November 1985. Revision 1 of the Part A, Form 3, was prepared to provide more extensive facility, process, and dangerous waste descriptions, and to remove dangerous waste code D001. Also, one drawing was revised and one drawing and one photograph were removed. Revision 2 of the Part A, Form 3, was prepared to include Westinghouse Hanford Company as co-operator of the 3718-F Facility. Revision 3 of the Part A, Form 3, was prepared to correct process design capacities, to provide more detailed process and dangerous waste descriptions, and to add dangerous waste codes D001, D002, WT01, and WT02. Also, the site drawing was revised and a new photograph was provided.

The Part A, Form 3, Revision 3, included in this closure plan, consists of seven pages, one figure, and one photograph.

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

FORM 3

DANGEROUS WASTE PERMIT APPLICATION

I. EPA/STATE I.D. NUMBER: WA789000896 7

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (mo., day, & yr.)	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/STATE I.D. Number, or if this is a revised application, enter your facility's EPA/STATE I.D. Number in Section 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.)

MO. 09 DAY YR. 68 — FOR EXISTING FACILITIES, PROVIDE THE DATE (mo., day, & yr.) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED (use the boxes to the left)

☐ 2. NEW FACILITY (Complete item below.)

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

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

☒ 1. FACILITY HAS AN INTERIM STATUS PERMIT

☐ 2. FACILITY HAS A FINAL 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 (Section 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	D80	GALLONS OR LITERS
LANDFILL	D81	ACRE-FEET (the volume that would cover one acre to a depth of one foot) OR HECTARE-METER
LAND APPLICATION	D82	ACRES OR HECTARES
OCEAN DISPOSAL	D83	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D84	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; Section 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	O

EXAMPLE FOR COMPLETING SECTION 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.

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. PROCESS DESIGN CAPACITY 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. PROCESS DESIGN CAPACITY 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S02	600	G		5				
X-2	T03	20	E		6				
1	T01	25	V		7				
2	T04	100	V		8				
3	S01	2,000	L		9				
4					10				

Continued from the front

III. PROCESSES (continued)

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

T01, T04, S01

The 3718-F Treatment and Storage Facility (3718-F Facility) was used to treat and store alkali metal waste (sodium, lithium, and sodium potassium alloy) from the Fast Flux Test Facility (FFTF) and from various laboratories that used alkali metals for experiments. The alkali metal waste was treated in a burn shed equipped with two burn pans inside a containment catch pan, a fume scrubber, or two chemical reaction tanks. The chemical reaction tanks were used to treat scrap equipment and piping that contain alkali metal waste by dissolving the waste using either water, methanol, isopropyl alcohol, or 2-butoxy ethanol (T01). The treatment of the bulk alkali metal waste consisted of burning the metals in the burn shed to eliminate their ignitability and reactive characteristics. The gaseous emissions produced by the burn process were removed using a fume scrubber. Because of the corrosivity of the waste (e.g., sodium hydroxide) after the burn treament, the waste was neutralized with acid to a pH of between 2.0 to 12.5 (T04). The 3718-F Facility Storage Building was used to store U.S. Department of Transportation-specification 55-gallon (208-liter) drums of alkali metal waste before treatment (S01).

The 3718-F Facility alkali metal waste treatment process was halted in June 1987 and storage of the alkali metal waste was halted in May 1989.

IV. DESCRIPTION OF DANGEROUS WASTES

A. DANGEROUS WASTE NUMBER — Enter the four digit number from Chapter 173 303 WAC for each listed dangerous waste you will handle. If you handle dangerous wastes which are not listed in Chapter 173 303 WAC, enter the four digit number(s) that describes the characteristics and/or the toxic contaminants of those dangerous 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 dangerous waste: For each listed dangerous waste entered in column A select the code(s) from the list of process codes contained in Section III to indicate how the waste will be stored, treated, and/or disposed of at the facility

For non—listed dangerous wastes: For each characteristic or toxic contaminant entered in Column A, select the code(s) from the list of process codes contained in Section III to indicate all the processes that will be used to store, treat, and/or dispose of all the non—listed dangerous 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: DANGEROUS WASTES DESCRIBED BY MORE THAN ONE DANGEROUS WASTE NUMBER — Dangerous wastes that can be described by more than one Waste Number shall be described on the form as follows

1. Select one of the Dangerous 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 Dangerous 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 Dangerous Waste Number that can be used to describe the dangerous waste

EXAMPLE FOR COMPLETING SECTION 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. DANGEROUS 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 1 D 8 0	
X-3	D 0 0 1	100	P	T 0 1 D 8 0	
X-4	D 0 0 2			T 0 1 D 8 0	included with above

CONTINUE ON PAGE 3

Continued from page 2.

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

I.D. NUMBER (enter from page 1): WA7890008967

IV. DESCRIPTION OF DANGEROUS WASTES (continued)

LINE NO.	A. DANGEROUS WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)				2. PROCESS DESCRIPTION (If a code is not entered in D(1))
1	D001	2,000	K	T01	T04	S01		Treatment-Tank-Chemical/ Treatment-Other-Thermal/
2	D002							Storage-Container
3	D003							
4	WT01							
5	WT02							Included With Above
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

Continued from the front.

V. DESCRIPTION OF DANGEROUS WASTES (continued)

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

The 3718-F Facility was used for the treatment and storage of alkali metal waste. The alkali metal waste was considered characteristic waste due to the ignitability (D001) and reactivity (D003) of the alkali metals and as a toxic state-only waste [WT01 (extremely hazardous waste) and WT02 (dangerous waste)]. The alkali metal waste when treated is considered corrosive (D002) because of the presence of sodium hydroxide. The estimated annual quantity of waste that was treated and stored at the 3718-F Facility was approximately 2000 kilograms (4409 pounds).

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)

II. FACILITY GEOGRAPHIC LOCATION This information is provided on the attached drawings and photos

LATITUDE (degrees, minutes, & seconds)	LONGITUDE (degrees, minutes, & seconds)

VIII. FACILITY OWNER

[X] A. If the facility owner is also the facility operator as listed in Section VII 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 VII on Form 1, complete the following items:

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

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

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.

NAME (print or type)	SIGNATURE	DATE SIGNED
John D. Wagoner, Manager United States Department of Energy DOE Richland Field Office	Edward L. Goldberg	12/20/91

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.

NAME (print or type)	SIGNATURE	DATE SIGNED
SEE ATTACHMENT		

CONTINUE ON PAGE 5

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.

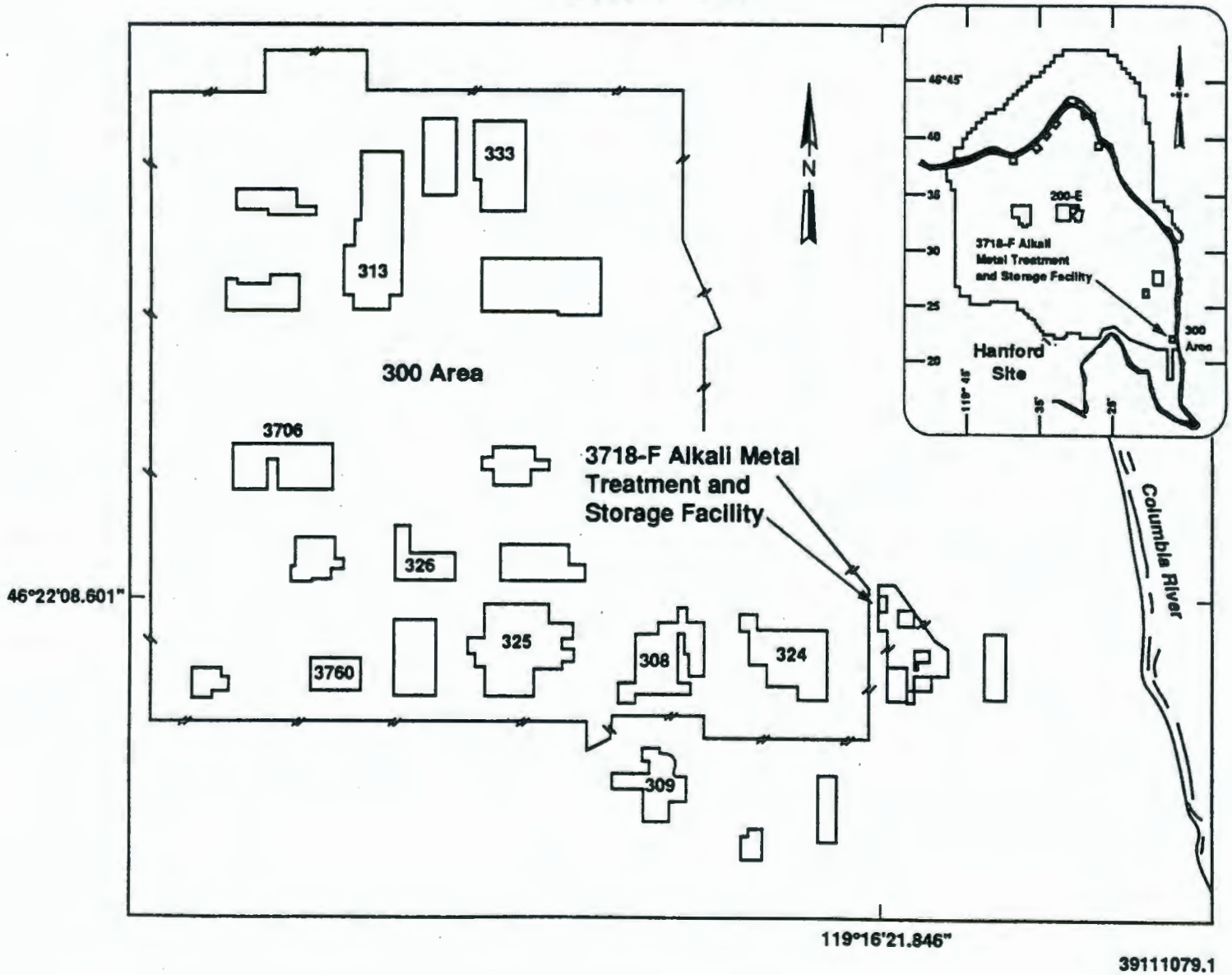
Edward D. Goldberg
Owner/Operator
John D. Wagoner, Manager
U.S. Department of Energy
DOE Richland Field Office

12/20/91
Date

Thomas M. Anderson
Co-operator
Thomas M. Anderson, President
Westinghouse Hanford Company

11/26/91
Date

3817-F Alkali Metal Treatment and Storage Facility
Site Plan



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3718-F ALKALI METAL TREATMENT AND STORAGE AREA

46°22'08.601"
119°16'21.846"

91071032-1CN
(PHOTO TAKEN 1991)

CONTENTS

1.0 INTRODUCTION 1-1

1.1 SUMMARY 1-1

1.2 THE 3718-F ALKALI METAL TREATMENT AND STORAGE FACILITY CLOSURE PLAN CONTENTS 1-1

1.2.1 Facility Description (Chapter 2.0) 1-2

1.2.2 Process Information (Chapter 3.0) 1-2

1.2.3 Waste Characteristics (Chapter 4.0) 1-2

1.2.4 Groundwater (Chapter 5.0) 1-2

1.2.5 Closure Strategy and Performance Standards (Chapter 6.0) 1-2

1.2.6 Closure Activities (Chapter 7.0) 1-3

1.2.7 Postclosure (Chapter 8.0) 1-3

1.2.8 References (Chapter 9.0) 1-3

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1.0 INTRODUCTION

1.1 SUMMARY

The Hanford Site, located northwest of the city of Richland, Washington, houses reactors, chemical-separation systems, and related facilities used for the production of special nuclear materials, as well as for activities associated with nuclear energy development. The 300 Area of the Hanford Site contains reactor fuel manufacturing facilities and several research and development laboratories. The 3718-F Alkali Metal Treatment and Storage Facility (3718-F Facility), located in the 300 Area, was used to store and treat alkali metal wastes. Therefore, it is subject to the regulatory requirements for the storage and treatment of dangerous wastes (DWs). Closure will be conducted pursuant to the requirements of the Washington Administrative Code (WAC) 173-303-610 and 40 Code of Federal Regulations (CFR) 270.1. Closure also will satisfy the thermal treatment facility closure requirements of 40 CFR 265.381.

The 3718-F Facility is operated by the U.S. Department of Energy (DOE) Richland Operations Office (DOE-RL) and managed by Westinghouse Hanford Company (WHC). Although the U.S. Government holds legal title to this facility, DOE-RL, for purposes of *Resource Conservation and Recovery Act of 1976* (RCRA), is considered the legal owner of the facility under existing U.S. Environmental Protection Agency (EPA) interpretive regulations (51 FR 7722, p. 7722).

This closure plan presents a description of the 3718-F Facility, the history of wastes managed, and the approach that will be followed to close the facility. Only hazardous constituents derived from 3718-F Facility operations will be addressed. Therefore, remedial action with respect to contaminants not associated with the 3718-F Facility will be deferred to the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*, (CERCLA) Remedial Investigation/Feasibility Study (RI/FS) process.

The 3718-F Facility is located within the 300-FF-2 (source) and 300-FF-5 (groundwater) Operable Units as designated in the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1995). These operable units will be addressed through the CERCLA RI/FS process.

1.2 THE 3718-F ALKALI METAL TREATMENT AND STORAGE FACILITY CLOSURE PLAN CONTENTS

The 3718-F Facility Closure Plan consists of the following nine chapters:

- Introduction (Chapter 1.0)
- Facility Description (Chapter 2.0)

- Process Information (Chapter 3.0)
- Waste Characteristics (Chapter 4.0)
- Groundwater (Chapter 5.0)
- Closure Strategy and Performance Standards (Chapter 6.0)
- Closure Activities (Chapter 7.0)
- Postclosure (Chapter 8.0)
- References (Chapter 9.0).

A brief description of each chapter is provided in the following subsections.

1.2.1 Facility Description (Chapter 2.0)

This chapter provides a general description of the 3718-F Facility. A brief description and history of the Hanford Site also are provided.

1.2.2 Process Information (Chapter 3.0)

This chapter covers the detailed operation of the 3718-F Facility. Additional information is given concerning the waste stored at the 3718-F Facility.

1.2.3 Waste Characteristics (Chapter 4.0)

This chapter discusses the estimate of maximum inventory of waste and the waste types stored at the 3718-F Facility.

1.2.4 Groundwater (Chapter 5.0)

This chapter explains that groundwater in the 300 Area will be included in the 300-FF-5 Operable Unit and investigated under the CERCLA RI/FS process. Therefore, groundwater monitoring is not included.

1.2.5 Closure Strategy and Performance Standards (Chapter 6.0)

This chapter outlines the closure strategy and the general closure procedure for the 3718-F Facility.

1.2.6 Closure Activities (Chapter 7.0)

This chapter provides a description on how the 3718-F Facility will be cleaned and closed.

1.2.7 Postclosure (Chapter 8.0)

This chapter outlines provision for postclosure care, if required.

1.2.8 References (Chapter 9.0)

References used throughout this closure plan are listed in Chapter 9.0. All references listed here will be made available for review, upon request, to any regulatory agency or public commentator. References can be obtained by contacting the following:

Administrative Records Specialist
Public Access Room H6-08
Westinghouse Hanford Company
P.O. Box 1970
Richland, Washington 99352

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CONTENTS

2.0 FACILITY DESCRIPTION 2-1

2.1 GENERAL HANFORD SITE DESCRIPTION 2-1

2.2 FACILITY DESCRIPTION 2-1

2.3 SECURITY 2-2

FIGURES

2-1. Hanford Site and Regional Map. F2-1
2-2. The 300 Area at the Hanford Site. F2-2
2-3. The 3718-F Facility Layout. F2-3
2-4. The 3718-F Facility Site Plan, 1968. . . . . F2-4
2-5. The 3718-F Facility Site Plan, 1973. . . . . F2-5
2-6. The 300 Area Operating Plan Process Sewer Lines F2-6

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2.0 FACILITY DESCRIPTION

2.1 GENERAL HANFORD SITE DESCRIPTION

In early 1943, the U.S. Army Corps of Engineers selected the Hanford Site as the location for reactor, chemical separation, and related activities for the production and purification of plutonium. The Hanford Site (Figure 2-1) covers approximately 1,450 km^2 (560 mi^2) of semiarid land located adjacent to the city of Richland, Washington. The Hanford Site is owned by the U.S. Government and operated by the DOE, which operates the Site with the management support of various prime contractors. Since 1987, the Sitewide management and operations contractor has been WHC.

2.2 FACILITY DESCRIPTION

The 3718-F Facility is located in the southeast portion of the 300 Area (Figure 2-2). Figure 2-3 details the layout of the 3718-F Facility. Before 1970, the 3718-F Facility was managed by Pacific Northwest Laboratory as a prime contractor to the DOE-RL.

The 3718-F Facility was designed and constructed in 1968, and redesigned and modified in 1973. Plans of the 3718-F Facility are shown in Figures 2-4 and 2-5.

The 3718-F Facility consists of a single-story storage building (6.1 m by 14.6 m [20 ft by 48 ft]), an adjoining loading pad (3.7 m by 6.1 m [12 ft by 20 ft]), and an adjoining concrete pad (7.6 m by 14.6 m [25 ft by 48 ft]). A burn shed with accompanying fume scrubber, two reaction tanks for cleaning equipment, and a safety shower are located on the adjoining concrete pad. The adjoining concrete pad is 15.2 cm (6 in.) thick and is bermed along two sides (south and north) and sloped towards a third side (east), along the edge of which runs a 7.6 cm (3-in.) wide by 7.6-cm- (3-in.-) deep grated trench. The design of the concrete pad is intended to prevent run-off onto the surrounding soils and channel drainage to a floor drain which, in turn, drains to the process sewer system (Figure 2-6).

The gabled ends, roof, and siding of the storage building are corrugated steel. The building has electric lights, electric space heaters, and two window air conditioning units. The building sits on a concrete pad. The northern half of the building is the storage area and the southern half is a work area.

The burn shed is 3.0 m by 3.7 m (10 ft by 12 ft), with a 2.4-m- (8-ft-) wide roll-up door. There are small stirring ports (7.6-cm- [3-in.-] diameter) and windows in the north and west sides. The fume scrubber is a 125-m^3/min (4,300-cfm) counter-flow water spray column.

In the burn process, the waste alkali metals were placed in burn pans with dimensions of 45.7 cm (18 in.) square, and 10.2 cm (4 in.) deep. In turn, these burn pans were placed in a catch pan with dimensions of 101.6 cm (40 in.) by 76.2 cm (30 in.) by 20.3 cm (8 in.).

The 3718-F Facility includes two tanks. The smaller of the two reaction tanks contained alcohol solutions, and the larger contained water. The alcohol reaction tank has a 511-L (135-gal) capacity (26.7 cm [10.5 in.] wide, 739.1 cm [291 in.] long, 25.4 cm [10 in.] deep) and the water reaction tank has a 1,628-L (430-gal) capacity (74.9 cm [29.5 in.] wide, 304.8 cm [120 in.] long, 71.1 cm [28 in.] deep). The alcohol reaction tank has a hinged solid cover while the water reaction tank has a hinged screen cover. Both tanks are constructed of 0.3-cm (1/8-in.) 304-L stainless steel. A third reaction tank, identical to the water reaction tank, was reported in the Part B Permit Application of 1985, but is no longer present at the 3718-F Facility. No documentation of its whereabouts can be found. It is highly likely that it was disposed of in the Central Waste Landfill.

2.3 SECURITY

This section describes the 24-hour surveillance, barriers, and warning signs used to provide security and control access to the 3718-F Facility.

The entire Hanford Site is a controlled-access area. The Hanford Site maintains around-the-clock surveillance for protection of government property, classified information, and special nuclear material. The Hanford Patrol and Benton County Sheriff Department maintain a continuous presence of protective force personnel to provide additional security.

Access to the 300 Area is limited to authorized personnel. Signs are posted on the perimeter 300 Area, "NO TRESPASSING. SECURITY BADGES REQUIRED BEYOND THIS POINT. GOVERNMENT VEHICLES ONLY. PUBLIC ACCESS PROHIBITED." Additionally, warning signs stating, "DANGER-UNAUTHORIZED PERSONNEL KEEP OUT" are posted at the 3718-F Facility. The 3718-F Facility is enclosed by a perimeter fence that remains locked.

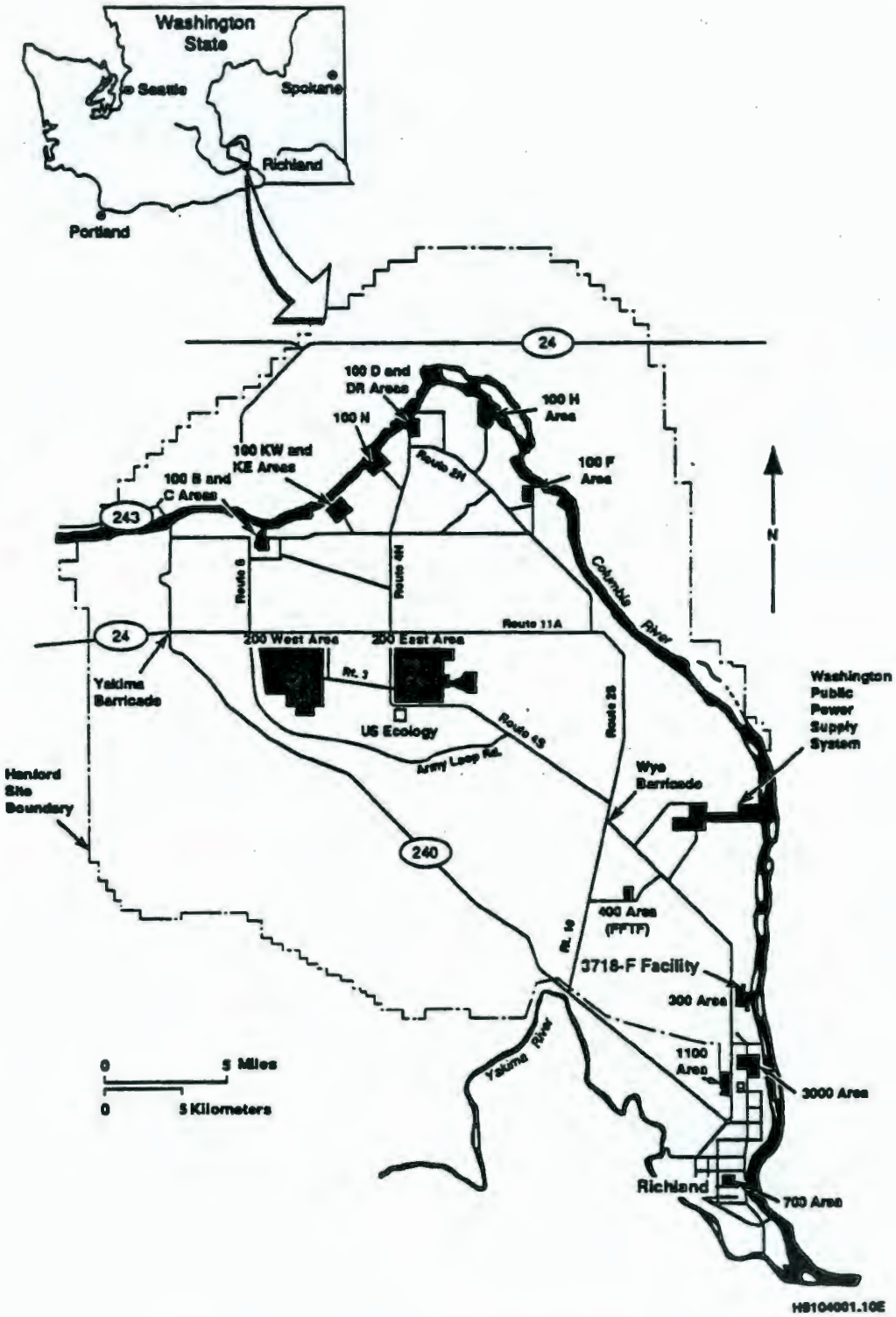
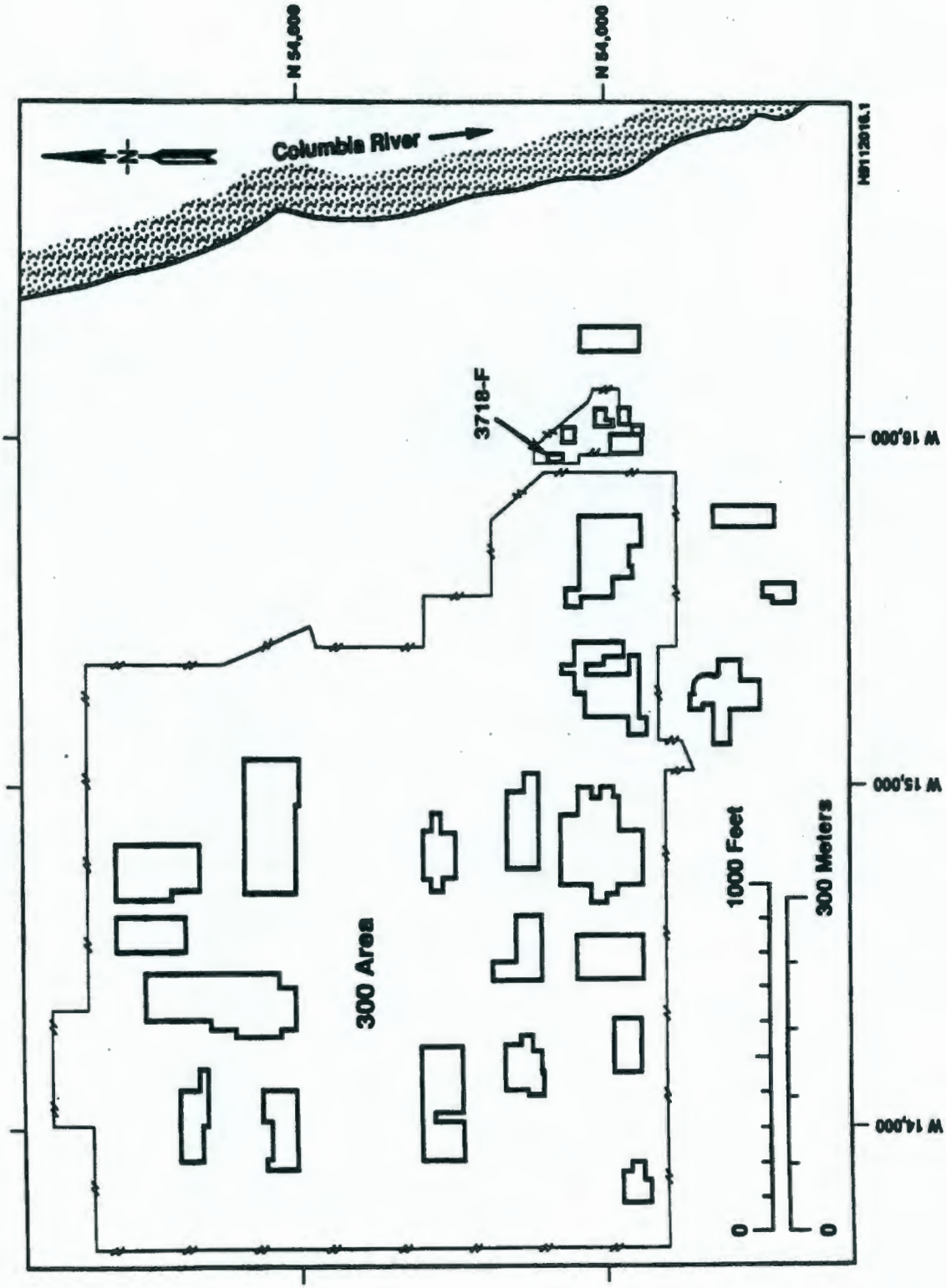


Figure 2-1. Hanford Site and Regional Map.



1 Figure 2-2. The 300 Area at the Hanford Site.

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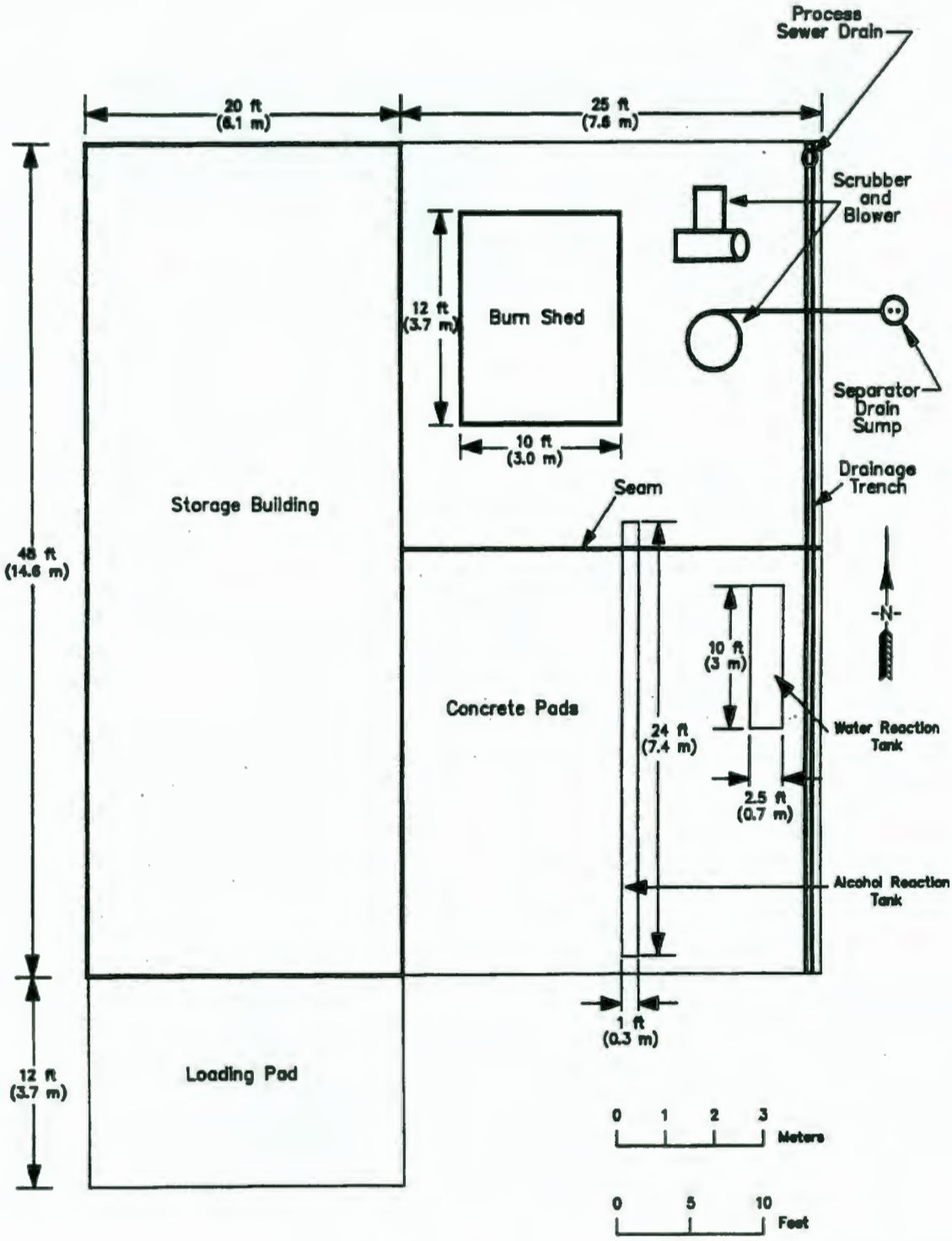

Figure 2-3. The 3718-F Facility Layout.

1 Figure 2-4. The 3718-F Facility Site Plan, 1968.

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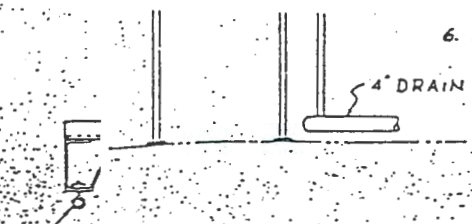

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RICHLAND OPERATIONS OFFICE
HANFORD ENGINEERING DEVELOPMENT LABORATORY
Operated by WADCO

CLEANING & WELDING FACILITY

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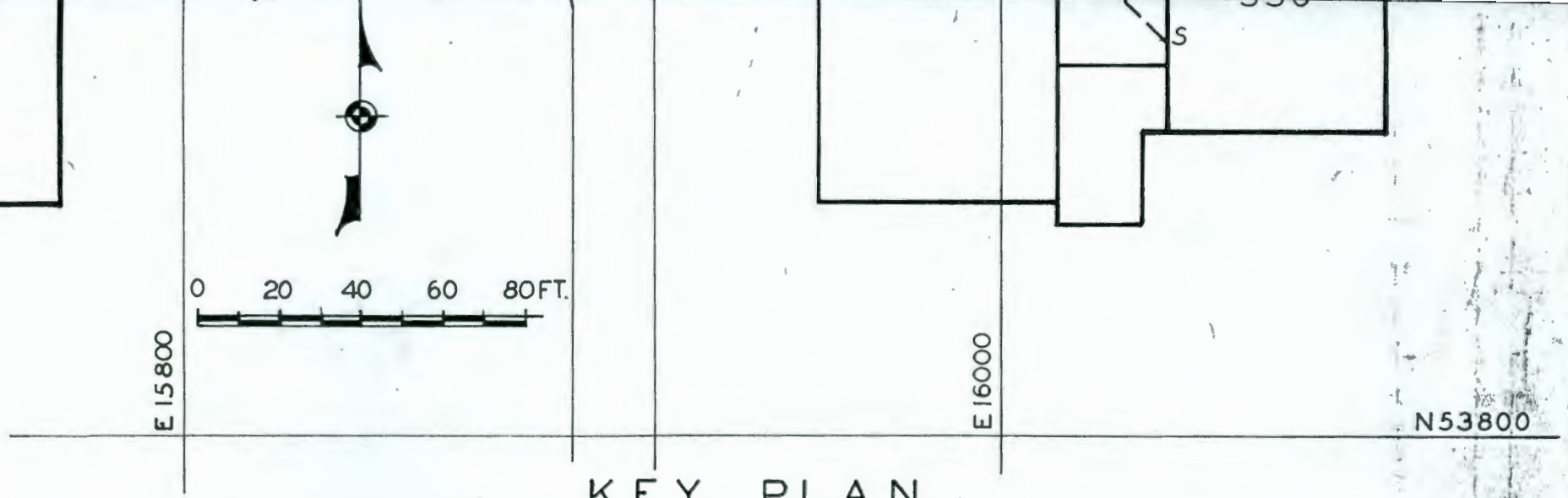
1 Figure 2-5. The 3718-F Facility Site Plan, 1973.



KEY PLAN

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ENGR L.J. NITTEBERG	3/73	
DFTG APPD C.E. Patten	5/4/73	
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1 Figure 2-6. The 300 Area Operating Plan Process Sewer Lines. (Sheet 1 of 2)

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CATCH BASINS
PROCESS SEWER
RETENTION PROCESS SEWER

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ISSUED C C Williamson	DATE 12-3-65	
DES. ENG.	DATE	
PROJECT	INST. NO. F-11099	

CLASSIFIED BY J. C. Williamson
DATE 11-17-65

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NONE

U. S. ATOMIC ENERGY COMMISSION
RICHLAND OPERATIONS OFFICE
Hanford Engineering Development Laboratory
Westinghouse Hanford Company

300 AREA OPERATING PLAN PROCESS SEWER LINES

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Figure 2-6. The 300 Area Operating Plan Process Sewer Lines. (Sheet 2 of 2)

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ABANDONED LINES

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U. S. ATOMIC ENERGY COMMISSION
RICHLAND OPERATIONS OFFICE
Hanford Engineering Development Laboratory
Westinghouse Hanford Company

300 AREA
OPERATING PLAN
PROCESS SEWER
LINES

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CONTENTS

3.0 PROCESS INFORMATION 3-1

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3.0 PROCESS INFORMATION

The 3718-F Facility began treatment of alkali metal waste in 1968 and ended in June 1987. Storage activities also began in 1968 and continued until May 1989. Photographs of the 3718-F Facility are shown in Appendix 3A.

Waste sodium, lithium, and sodium potassium alloy were burned in the burn shed. These metals were placed in small burn pans that sat inside a larger catch pan. Rags were stuffed in and around the metals, then doused with a gasoline/diesel mixture. The rags were ignited with crude torches via the stirring ports. The molten metals were stirred to prevent oxide layers from forming that would extinguish the fire. A water hose was then used to 'fog' the inside of the shed with a water vapor, which completed the oxidation of the metals. The shed was fogged from one stirring port while the metals were stirred from the other port. The burn pans were overflowed into the catch pan to dilute the solution. The solution was allowed to cool, then drained to the process sewer system or, in later years, pH was adjusted to between 2 and 12.5 before draining to the process sewer system. When available, spent acids from laboratories were used for the neutralization process; otherwise, new acid was used. The burn shed and pad were washed down at the completion of the burn process, the wash water going to the process sewer system. Gaseous emissions were removed via the fume scrubber. The scrubber effluent was flushed to the process sewer system. The 3718-F Facility waste streams going into the process sewer system were potentially corrosive and toxic. Burns were only conducted when the prevailing winds were favorable to control the spread of emissions that may have resulted in the event of a scrubber system failure (e.g., power failure).

Equipment contaminated with sodium was cleaned using baths of either water or methanol, isopropyl alcohol, or 2-butoxy ethanol (trade name: Dowanol-EB[1]). The water bath was used only for small unconfined quantities of sodium because of its violent reaction with water. The alcohols were used for confined quantities of sodium because of their slower, controllable reaction with the metal. Initially, the spent alcohol and water baths both were drained into the process sewer system. Later, after the alcohols were regulated in 1985, the spent alcohol baths were drummed and sent to the 616 Nonradioactive Dangerous Waste Storage Facility for disposal. The spent water baths continued to drain to the process sewer system.

The 3718-F Building also stored high purity sodium and sodium potassium alloy for use in laboratories. The metals were dispensed in small quantities from 155-L (30-gal) drums to laboratory-sized containers (5.7 L [1½ gal] maximum).

Occasionally, laboratory-size quantities of reactive and ignitable compounds also were burned at the 3718-F Facility. These compounds were limited to other alkali metals, calcium, red phosphorous, and magnesium fines.

---

[1]Dowanol-EB is a trademark of Dow Chemical Co.

Wastes generated at the 3718-F Facility include alkali metal oxides, hydroxides, carbonates, and alcohol solutions. However, the metal oxides and hydroxides have since transformed into carbonates from exposure to air.

CONTENTS

4.0 WASTE CHARACTERISTICS 4-1

4.1 ESTIMATE OF MAXIMUM INVENTORY OF WASTE 4-1

4.2 WASTE FORMS TREATED AT THE 3718-F Facility 4-1

TABLE

4-1. Wastes Disposed at the 3718-F Facility T4-1

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4.0 WASTE CHARACTERISTICS

4.1 ESTIMATE OF MAXIMUM INVENTORY OF WASTE

The maximum amount of alkali metal waste treated annually was approximately 1,052 kg (2,320 lb) of sodium, 70 kg (155.3 lb) of lithium, and 4.5 kg (10 lb) of sodium potassium alloy. Table 4-1 provides a summary of the alkali metal treated at the 3718-F Facility based on operating logs.

4.2 WASTE FORMS TREATED AT THE 3718-F Facility

Sodium, lithium, and sodium potassium alloy all have been designated as DWs because of their ignitable and reactive characteristics. All waste alkali metals handled in the 3718-F Facility were treated by either burning (which produced oxides, hydroxides, and carbonates) or dissolution in water or alcohols (which produced sodium hydroxide solution). Sodium oxides and hydroxides are strong alkalis, but readily absorb carbon dioxide from the atmosphere and transform to sodium carbonate. Sodium carbonate typically is called soda ash and is found naturally. Similarly, lithium and sodium potassium alloy also result in lithium, sodium, and potassium carbonates.

Sodium, lithium, and potassium carbonates are characteristic Category D (least toxic) DWs. The LD_{50} (lethal dose) by oral exposure to rats is 4,090 mg/kg (NIOSH Registry) for sodium carbonate, 525 mg/kg for lithium carbonate, and 1,870 mg/kg for potassium carbonate. Compounds with LD_{50}s of 500 to 5,000 mg/kg are Category D DWs wastes as established by WAC 173-303-101. The material safety data sheets (MSDS) for sodium carbonate, lithium carbonate, and potassium carbonate have been included in Appendix 4A.

Before 1985, the spent alcohol solutions from the dissolution process were drained to the process sewer system. Consequently, the concrete pad and surrounding soil have the potential of being contaminated by these alcohol solutions. The sodium was reacted with the alcohols 2-butoxy ethanol, methanol, and isopropyl alcohol to form the intermediate products of sodium 2-butoxy ethylate, sodium methoxide, and sodium isopropylate, respectively. However, these sodium salts produced aqueous sodium hydroxide and the original alcohol when reacted with water during the wash down process.

Methanol, 2-butoxy ethanol, and isopropyl alcohol are all Category C or D DWs in accordance with WAC 173-303-100. The LD_{50}s by oral exposure to rats are 5,628 mg/kg, 470 mg/kg, and 5,045 mg/kg, respectively. Similarly, the LC_{50}s by inhalation for these same compounds to rats are 83.89 mg/l, 2.18 mg/l, and 39.34 mg/l. Methanol and isopropyl alcohol also are likely to display the characteristic of ignitability in accordance with WAC 173-303-090. The MSDSs for these chemicals are included in Appendix 4A.

Methanol and isopropyl alcohol are stable. The 2-butoxy ethanol also is stable under normal conditions. However, under vigorous conditions of high

acidity and high temperature, 2-butoxy ethanol may degrade to ethyl alcohol, n-butyl alcohol, ethylene glycol, and butane. These vigorous conditions do not exist at the 3718-F Facility and, therefore, these degradation products are not expected to be found.

The calcium, phosphorous, and magnesium treated at the 3718-F Facility would result in carbonates through the same mechanisms as sodium. However, because the quantity of these metals treated is so minute (85 grams [3 oz] of red phosphorous disposed of between 1982 and 1987, no disposals of calcium or magnesium recorded) compared with the quantities of sodium, lithium, and sodium potassium alloy treated, they will not be addressed in the remediation effort. The total volume of benzene and other dissolved hydrocarbons that had been present in the scrubber effluent from the combustion of the gasoline/diesel mixture and were released into the process sewer system also is considered to be negligible. Hydrocarbon combustion residues that may be present on the burn shed walls, piping, and scrubber system are considered to be of negligible volume.

Table 4-1. Wastes Disposed at the 3718-F Facility.

Year	Disposed (kg)				
	Total	Sodium	Lithium	Sodium potassium alloy	Other
1982	1,061.4	1,052.3	9.1	0	0
1983	719.2	700.8	13.6	4.5	0.23
1984	36.3	36.3	0	0	0
1985	2.3	2.3	0	0	0
1986	186.1	153.3	30.9	1.8	0.09
1987	112.2	41.7	70.4	0	0
Total	2,117.5	1,986.7	124	6.3	0.32

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CONTENTS

5.0 GROUNDWATER 5-1

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5.0 GROUNDWATER

In accordance with the Tri-Party Agreement (Ecology et al. 1995), groundwater in the 300 Area will be included in the 300-FF-5 Operable Unit and investigated under the CERCLA RI/FS process. Therefore, groundwater is not included as part of the 3718-F Facility Closure Plan. The RI/FS draft work plan for the 300-FF-5 Operable Unit was prepared in 1989 (DOE/RL 1989).

The 300-FF-5 Operable Unit consists of the aquifer beneath the 300-FF-1, 300-FF-2, and 300-FF-3 Operable Units. The operable unit is defined by "the observed and assumed extent of uranium contamination in the groundwater" (DOE/RL 1989). Ultimately, the operable unit will include all contamination exceeding applicable or relevant and appropriate requirements emanating from the three operable units, and detected in groundwater and sediments below the water table. The Columbia River forms the eastern boundary of the unit.

The remedial action objectives for this operable unit will be based on the following general objectives:

- Protecting human health by ensuring that applicable or relevant and appropriate requirements will not be exceeded and health risks, as determined through analysis of all exposure pathways, will be kept at or below acceptable limits.

- Ensuring acceptably low risks to the environment, such as Columbia River biota.

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CONTENTS

6.0 CLOSURE STRATEGY AND PERFORMANCE STANDARDS 6-1

6.1 CLOSURE STRATEGY 6-1

6.2 GENERAL CLOSURE PROCEDURES 6-2

6.3 MINIMIZING NEED FOR FURTHER MAINTENANCE 6-3

6.4 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT 6-3

6.5 FUTURE USE 6-3

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6.0 CLOSURE STRATEGY AND PERFORMANCE STANDARDS

6.1 CLOSURE STRATEGY

To aid closure, the 3718-F Facility is divided into five components:

- The storage shed and concrete floor
- The burn building, concrete floor, and scrubber
- The reaction tanks
- The external concrete pad (the concrete pad outside the burn building and storage shed)
- The surrounding soil.

The five components will be evaluated separately for the purpose of preparing the closure plan. The drain lines to the process sewer and soil surrounding the 3718-F Facility will be addressed as a closure activity in the 300-FF-2 Operable Unit work plan.

An important term in the following discussion and closure of the 3718-F Facility is the assignment of an 'action level.' The term 'action level' is defined (see Definition List) as a chemical concentration level that prompts an action. For example, action levels for soil usually are defined in terms of natural background or the *Model Toxics Control Act* (MTCA) Standard. If action levels are exceeded, actions such as additional cleanup or decontamination may be necessary.

As documented in Chapter 4, the dangerous waste compounds of concern include lithium carbonate, sodium carbonate, potassium carbonate, methanol, isopropanol, and 2-butoxyethanol. All of these compounds are classified as Category C or D dangerous waste.

A Data Quality Objectives (DQO) process was conducted to determine the sampling, analysis, and action levels that would be assigned to close the 3718-F Facility. A summary of the DQO process is provided in Appendix 6A. Consistent with the results from the DQO process, the following performance standards and/or action levels will be applied for the cleanup of the 3718-F Facility:

- For the structure components - cleanup level will be set by Ecology in accordance with WAC 173-303-610(2)(a)(ii).

Additionally, it was agreed that the strategy for cleanup would take into consideration the possibility for reuse and recycling of all materials. Also, the methods and approach for cleanup and closure of the 3718-F Facility would be consistent with the methods and approach applied at similar facilities on the Hanford Site and the strategy would take into consideration the planned remediation of the 300-FF-2 Operable Unit.

6.2 GENERAL CLOSURE PROCEDURES

The 3718-F Facility will be closed in a manner consistent with Ecology guidelines and regulations (WAC 173-303-610). Using the general strategy outlined in the previous section, the following general process will be followed:

- Based on existing records, the 3718-F Alkali Metal Treatment Facility did not handle or treat radioactive waste. Therefore, a special radiological survey beyond the routine surveillance conducted across the Hanford Site is considered unnecessary.

- Lithium, sodium, and potassium carbonate are state of Washington characteristic Category D dangerous waste. The designation action level for these wastes on structural components (steel and concrete) will be 10 weight percent.

- Since 10 weight percent of the alkali metal carbonates is detectable by the human eye, a visual inspection of the all structural components will be performed to determine the nature and extent of cleanup.

- The storage building will be inspected visually and clean closed. If the storage building contains waste residue that is greater than the action level, the building will be decontaminated. A visual inspection of the building will be repeated to determine the effectiveness of the decontamination process. If the building does not contain waste residue in excess of the action levels, the building will be clean closed. This component (building and pad) will be left standing and made available for future use.

- The external concrete pad will be inspected visually. If the concrete pad displays waste residue in excess of the specified action level, the concrete pad will be decontaminated. If the concrete pad does not display signs of waste residue in excess of the action levels, no further action will be taken. This component will be made available for possible future use.

- The reaction tanks will be inspected visually and clean closed. The reaction tanks will be made available for other use through the existing government property excess procedure.

- Cleanup of the soil will be deferred to the CERCLA RI/FS process for the 300-FF-2 Operable Unit. The approach that will be used for cleanup of the soil in the vicinity of the 3718-F Facility will be addressed in the 300-FF-2 Operable Unit work plan.

- The burn building, interior concrete pad, and scrubber will be inspected visually and clean closed.

- All sampling and analysis activities will be performed in accordance with existing protocols and procedures.

- All waste material created as a result of either cleanup and/or decontamination activities will be designated prior to disposal.

- All equipment used in performing closure activities will be decontaminated or disposed of at a RCRA-permitted facility.

Closure activities will be monitored by an independent registered professional engineer who will certify that, in his or her judgement, clean closure was accomplished in accordance with the guidelines and specifications of the approved closure plan.

The closure activities will be completed in accordance with the schedule contained in this plan (Chapter 7) after approval of this plan by Ecology. Copies of the closure plan will be available at the following office:

U. S. Department of Energy, Richland Operations Office
Federal Building
825 Jadwin Avenue
P.O. Box 550
Richland, WA 99352

The DOE-RL will be responsible for amending this plan, as amendments become necessary, according to the conditions of the issued permit. The plan will be retained by DOE-RL until closure is completed and certified.

6.3 MINIMIZING NEED FOR FURTHER MAINTENANCE

Closure of the 3718-F Facility by removing or cleaning equipment, bases, structures, and other materials contaminated with dangerous waste or waste residues below action levels will eliminate the need for further maintenance.

6.4 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

As discussed previously, the 3718-F Facility will be clean closed by cleaning to action levels or by removing and disposing of all contaminated materials in a RCRA-permitted landfill, thereby providing an acceptable level of protection to human health and the environment.

6.5 FUTURE USE

The standard, "Returns the land to the appearance and use of the surrounding land area," will be addressed during the preparation of the 300-FF-2 Operable Unit closure work plan. For the near term, there are no plans for future use of this facility after closure. The current strategy plan is to leave the facility (storage building, concrete pad, burn shed, and scrubber) intact if concentrations of the 3718-F Facility derived constituents are below action levels. This strategy is consistent with the near term plan for use of the 300 Area facilities and surrounding land.

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CONTENTS

7.0 CLOSURE ACTIVITIES 7-1

7.1 INTRODUCTION 7-1

7.2 REMOVAL OF DANGEROUS WASTE INVENTORY 7-1

7.3 FACILITY CLEANUP, DECONTAMINATION, AND SAMPLING 7-1
7.3.1 Basis for Approach 7-1
7.3.2 Storage Shed and Concrete Pad 7-2
7.3.3 Burn Building, Concrete Pad, and Scrubber 7-3
7.3.4 Reaction Tanks 7-3
7.3.5 External Concrete Pad 7-4
7.3.6 Surrounding Soil 7-4

7.4 CONDUCT OF CLEANUP OPERATIONS 7-5
7.4.1 Field Record 7-5
7.4.2 Chain of Custody 7-5

7.5 SCHEDULE FOR CLOSURE 7-5

7.6 AMENDMENT OF PLAN 7-5

7.7 CERTIFICATION OF CLOSURE AND SURVEY PLAT 7-6

FIGURES

7-1. 3718-F Alkali Metal Treatment and Storage Facility Inspection Checklist for Carbonates Above Action Levels F7-1
7-2. Professional Engineer's Certification Statement 3718-F Facility Closure Plan Certification F7-2

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7.0 CLOSURE ACTIVITIES

7.1 INTRODUCTION

Chapter 7.0 provides a description of the activities necessary to close the 3718-F Facility. The closure plan follows the overall strategy described in Chapter 6.0 and the results of the DQO process summarized in Appendix 6A.

7.2 REMOVAL OF DANGEROUS WASTE INVENTORY

All dangerous waste that was stored at the 3718-F Facility has been removed. All suspect waste product (floor sweepings, brushings, etc.) that may result from either cleanup or decontamination activities will be designated prior to disposal.

7.3 FACILITY CLEANUP, DECONTAMINATION, AND SAMPLING

The 3718-F Facility is divided into five components for purposes of closure. The list of components includes the following:

1. The storage building and concrete floor
2. The burn building, concrete floor, and scrubber
3. The reaction tanks
4. The external concrete pad
5. Surrounding soil.

The cleanup, decontamination, and sampling activities will be discussed for each component.

7.3.1 Basis for Approach

Alkali metals have the property of being very reactive in an air environment. As a result, any treated or accidentally released alkali metal are not expected to be found in an unreacted state. The compounds expected after reaction are lithium carbonate, sodium carbonate, and potassium carbonate.

The lithium, sodium, and potassium carbonate are state of Washington criteria characteristic Category D (least toxic) dangerous waste. Using the toxicity criteria outlined in WAC 173-303-100 (5)(ii) and (iii), and the toxicity waste graph in WAC 173-303-9906, the threshold concentration was calculated to be 10 weight percent of the contaminated material. Since this concentration is detectable by the human eye, it was agreed that a visual inspection would be performed and the results from this inspection would provide the basis for cleanup, decontamination, and sampling activities.

Using this approach, all concrete and metal surfaces were inspected visually for alkali metal carbonate deposits.

Methanol, isopropanol, and 2-butoxyethanol also are designated characteristic Category C or D dangerous waste. As discussed in Chapter 3, these materials were last used as cleaners in June 1987, and since 1986 were drummed and sent to the 616 Nonradioactive Dangerous Waste Storage Facility. Because of the volatile/reactive nature of these alcohols, it is doubtful that any waste remains. A visual inspection for these wastes on the surface of the reaction tanks and soil surface also will form the basis for cleanup, decontamination, and sampling.

7.3.2 Storage Shed and Concrete Pad

A preliminary visual survey of the storage shed and concrete pad has been completed. This inspection did not result in the identification of any visual carbonate deposits on any surface of the storage shed or the concrete floor. Generally, this component was observed to be in condition for clean closure. Consistent with this observation, the following steps will be taken to close this component:

Step 1: A second more detailed visual examination of the storage building and concrete floor will be performed.

Step 2: If suspect deposit or evidence of carbonate residue is found, then these areas will be treated using a coarse brush. All waste that is removed as a result of this treatment, will be collected and designated prior to disposal. Once the visible deposits have been removed, the surface will be considered clean.

Step 3: A third visual inspection will be performed following step 2, if step 2 is performed. If evidence of carbonate residue remains, then an appropriate chemical or reactive wash will be performed. All wash and rinse will be collected and designated prior to disposal. If this treatment removes all visible deposits, then the surface will be considered clean.

Step 4: If, by visual inspection, residue is found to remain after the chemical wash, steps will be taken to revise the closure plan and strategy for closure.

Step 5: If the second visual inspection (Step 1) does not reveal any additional evidence of carbonate residue, the storage shed and concrete pad will be considered free of contamination. The walls and floor may be swept, however, the sweepings will not be collected. A sample from the floor sweepings at the 4843 Alkali Metal Storage Facility was collected and analyzed. These sweeping did not contain evidence of dangerous waste. It has been concluded that the operation of the two facilities is similar and, using this process knowledge, it was concluded that the waste sweeping from the 3718-F Facility would be

similar in nature. Therefore, the sweepings at the storage building and concrete pad will not be collected.

7.3.3 Burn Building, Concrete Pad, and Scrubber

The preliminary inspection of the 3718-F Facility did not allow for a complete assessment of this component. As a result, the first step in the cleanup, decontamination, and sampling of the burn building, concrete pad, and scrubber components will be to remove sufficient cover material so that a better visual examination of the internal parts of this component can be performed. The steps for visual examination are as follows:

Step 1: Lower the burn pan (if present) in the burn shed and remove the cover and access plates along the external surface of the scrubber. Drawings of the scrubber will be obtained as necessary to determine if additional access is required to assess the presence of dangerous waste. If additional access is required, this access may be obtained by using either a remote video camera or a cutting torch.

Step 2: Conduct a visual inspection of all interior metal surfaces of the burn building, burn pad, and scrubber. Particular attention will be given to the baffles. If any internal surface displays carbonate deposits, the surface will be brushed. All brushings will be collected and retained for waste designation.

Step 3: If all carbonate deposits can be removed by brushing, all contamination will be considered removed and the scrubber considered clean. The clean scrubber either will be left intact or dismantled and disposed as a solid waste or recycled as scrap depending on possible future use and/or economics. Present plans call for the burn shed and scrubber to be left intact and assumes clean closure of this component.

Step 4: If the interior metal surfaces cannot be cleaned, the structure will be removed and disposed as a dangerous waste. The closure plan will be revised as necessary to accommodate this closure process.

Step 5: A visual inspection of the concrete floor in the burn building will be performed. All carbonate deposits will be removed by brushing or sweeping. All sweepings will be collected and designated prior to disposal. If no carbonate deposits are observed, the surface will be considered free of contamination.

7.3.4 Reaction Tanks

The reaction tanks are fabricated from stainless steel. The tanks were used to clean sodium contaminated equipment using either water or alcohol baths (methanol, isopropanol, or 2-butoxyethanol). Before 1986, spent or

waste alcohol was discharged to the process sewer. Beginning in 1986, all spent alcohol was drummed and sent to the 616 Nonradioactive Dangerous Waste Storage Facility. As a result, it is assumed that all metal oxide was removed and, therefore, no metal carbonates derived from the treatment process exist on the reaction tanks. The visual examinations that have been performed are consistent with this assumption. These tanks will be clean closed and removed. The tanks will be made available for possible future use. The steps for clean closure and removal are as follows:

Step 1: A visual examination of the reaction tanks will be performed. If any alkali metal carbonate residue is observed, it will be removed using a wet rag and brush that will not scratch the stainless steel surface. All wet rags and rinse (if used) and brushings will be collected and retained for waste designation.

Step 2: A visual inspection of the reaction tanks for any sign of residue from the alcohol bath will be performed. Since all alcohols that were used are water soluble, it is assumed that scrubbing with a water-soaked rag or brush will remove any residue that is found.

Step 3: If additional cleanup is required, the closure plan and cleanup strategy will be revised.

Step 4: Assuming that all signs of contamination are removed during Steps 1 and 2, and/or no evidence of contamination is found during Step 1, the reaction tanks will be excessed and made available to both future onsite and offsite users through the DOE Excess Pool.

7.3.5 External Concrete Pad

The concrete pad was not used for treatment of alkali metal. A preliminary inspection of the external concrete pad did not reveal any conditions that require additional cleanup. Based on the results from the preliminary inspection and from the DQO process, it was agreed that a final inspection of the pad will be performed. If no carbonate deposits are found and no evidence of past spills are found during this inspection, the external concrete pad will be accepted as clean closed.

7.3.6 Surrounding Soil

As shown in Figure 2-3, the drainage trench is located along the east side of the concrete pad. The drain for both the separator and the process sewer is located in the northeast corner of the pad. Therefore, derived waste may have flowed inadvertently from the drain into the surrounding soil.

The operation of the 3718-F treatment facility was terminated during calendar year 1987. Since that date, the soil around the facility has been disturbed on several occasions as a result of various construction activities. This is particularly true along the north and east side of the pad where communication and process sewer line improvements have occurred since 1987.

This information combined with overall process and operational knowledge, and the environmental setting (nature of the soil; largely sand and gravel) suggested that no meaningful data could be derived from an analysis of soil samples. As a result, it was agreed that all soil sampling and all decisions on the surrounding soil will be deferred to the CERCLA remediation of the 300-FF-2 Operable Unit.

7.4 CONDUCT OF CLEANUP OPERATIONS

As discussed in Section 7.3, all closure activities require a visual inspection for the presence of derived contaminants. Based on a preliminary visual inspection, it is not believed that any field samples will be collected for the purpose of quantifying contaminant concentration. Therefore, no sampling and analysis plan is required. A field record, including checklists, will be prepared and 'chain of custody' practices will be followed for any waste product that results from the cleanup activities.

7.4.1 Field Record

All field activities will be recorded and checklists will be completed. An example of the checklist that will be used is provided in Figure 7-1. Photographs may be taken whenever possible to help document the decision making process and unusual circumstances that are encountered.

7.4.2 Chain of Custody

Chain-of-custody activities will meet the requirements of EII 5.1, 'Chain of Custody' (WHC 1988). Chain of custody documentation will be used whenever necessary to ensure the traceability of samples used for the purpose of waste designation and disposal of dangerous waste.

7.5 SCHEDULE FOR CLOSURE

Closure of the 3718-F Facility will begin upon notification by Ecology of closure plan approval. Closure activities will be completed within 180 days.

7.6 AMENDMENT OF PLAN

The closure plan will be amended whenever changes in the closure strategy and plan for closure are modified as a result of unexpected or unanticipated events. Several potential conditions that could result in amending the closure plan are mentioned in Section 7.3. The closure plan will be amended in accordance with WAC 173-303-610(3). This plan may be amended anytime before certification of final closure of the 3718-F Facility.

If an amendment to the approved closure plan is required, DOE-RL will submit a written request to Ecology to authorize a change. The request will include a copy of the closure plan amendment for approval.

7.7 CERTIFICATION OF CLOSURE AND SURVEY PLAT

Within 60 days of closure of the 3718-F Facility, DOE-RL will submit to Ecology a certification of closure. The certification will be signed by both DOE-RL and an independent professional engineer registered in the state of Washington, stating the unit has been closed in accordance with the approved closure plan. The certification will be submitted by DOE-RL to Ecology. Documentation supporting the independent professional engineers certification will be retained and provided to Ecology on request. The DOE-RL will self-certify with the following statement (or a similar statement):

> "We, the undersigned, hereby certify that all 3718-F Alkali Metal Treatment and Storage Facility closure activities were performed in accordance with the specifications in the approved closure plan."

DOE-RL and the independent professional engineer registered in the state of Washington will certify with a document similar to Figure 7-2.

3718-F ALKALI METAL TREATMENT AND STORAGE FACILITY INSPECTION CHECKLIST FOR CARBONATES ABOVE ACTION LEVELS

The following components were visually inspected for the presence of alkali metal carbonate deposits:

1. Storage Building and Concrete Floor
2. Burn Building, Concrete Floor, and Scrubber
3. Reaction Tanks
4. External Concrete Pad
5. Surrounding Soil.

For each component, an X in the Accepted column means that the component was found to be free of alkali metal carbonate deposit and acceptable as is for clean closure. An X in the Not Accepted column means that the component was found not to be free of alkali metal carbonate deposits and require additional cleanup prior to clean closure:

COMPONENT	ACCEPTED	NOT ACCEPTED
Storage Building and Concrete Floor	_____	_____
Burn Building, Concrete Floor, and Scrubber	_____	_____
Reaction Tanks	_____	_____
External Concrete Pad	_____	_____

All cleanup activities associated with the Surrounding Soil will be deferred to the remediation of the 300-FF Operable Unit.

_____ _____ /_____
Name: Subject Matter Expert Signature Date

_____ _____ /_____
Name: Subject Matter Expert Signature Date

Note: Action levels for the alkali metal carbonates as derived from the equivalent concentration criteria (WAC 173-303-100) for characteristic Category D (least toxic) dangerous waste is 10 percent weight of contaminated material. At this concentration, the presence of the waste can be discerned through a visual inspection.

Figure 7-1. 3718-F Alkali Metal Treatment and Storage Facility Inspection Checklist for Carbonates Above Action Levels.

PROFESSIONAL ENGINEER'S CERTIFICATION STATEMENT
3718-F FACILITY CLOSURE PLAN CERTIFICATION

I the undersigned, an independent registered Professional Engineer, hereby certify that I have reviewed and approved the Closure Plan and supporting closure documentation for the 3718-F Alkali Metal Treatment and Storage Facility closure, and to the best of my information and belief, closure activities were performed in accordance with the specifications in the approved closure plan, except as discussed in the attached Specifications and Limitations of Professional Engineer's Certification. This certification is based solely on a review of documents, interviews, and an observation of the facility by me and/or my representative.

The above statements are true and complete to the best of my knowledge and within the limits of professional judgement under the prevailing standards of practice on this __ day of _____, 19__.

Figure 7-2. Professional Engineer's Certification Statement 3718-F Facility Closure Plan Certification.

CONTENTS

8.0 POSTCLOSURE 8-1

8.1 NOTICE IN DEED BOOK 8-1

8.2 POSTCLOSURE CARE 8-2

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8.0 POSTCLOSURE

8.1 NOTICE IN DEED BOOK

This closure plan proposes clean closure of the 3718-F Facility. However, if clean closure cannot be obtained, the following action will be taken in accordance with WAC 173-303-610(1)(b). Within 60 days of the certification of closure, DOE-RL will sign, notarize, and file for recording the notice indicated below. The notice will be sent to the Auditor of Benton County, P.O. Box 470, Prosser, Washington, with instructions to record this notice in the deed book.

TO WHOM IT MAY CONCERN

The United States Department of Energy, Richland Operations Office, an operations office of the United States Department of Energy, which is a department of the United States government, the undersigned, whose local address is the Federal Building, 825 Jadwin Avenue, Richland, Washington, hereby gives the following notice as required by 40 CFR 265.120 and WAC 173-303-610(10) (whichever is applicable):

(a) The United States of America is, and since April 1943, has been in possession in fee simple of the following described lands: (legal description of 3718-F Alkali Metal Treatment and Storage Facility Site).

(b) The United States Department of Energy, Richland Operations Office, by operation of the 3718-F Alkali Metal Treatment and Storage Facility, has disposed of hazardous and/or dangerous waste under the terms of regulations promulgated by the United States Environmental Protection Agency and the Washington State Department of Ecology (whichever is applicable) at the above described land.

(c) The future use of the above described land is restricted under terms of 40 CFR 264.117(c) and WAC 173-303-610(7)(d) (whichever is applicable).

(d) Any and all future purchasers of this land should inform themselves of the requirements of the regulations and ascertain the amount and nature of wastes disposed on the above described property.

(e) The United States Department of Energy, Richland Operations Office, has filed a survey plat with the Benton County Planning Department and with the United States Environmental Protection Agency, Region 10, and the Washington State Department of Ecology (whichever are applicable) showing the location and dimensions of the 3718-F Alkali Metal Treatment and Storage Facility site and a record of the type, location, and quantity of waste treated.

8.2 POSTCLOSURE CARE

Postclosure care generally is required when a waste management facility cannot attain a clean closure. At the 3718-F Facility, underlying soils and groundwater may have been contaminated by waste generated during operations in the 300 Area. Under the Tri-Party Agreement (Ecology et al. 1995), source contamination and groundwater will be investigated and remediated through the operable units under the CERCLA RI/FS process.

With the exception of an imminent health threat, all soil remediation will take place under the CERCLA RI/FS process. If the soil within the 3718-F Facility boundary is found to be contaminated (chemical concentrations above background threshold concentrations) from operations conducted (chemicals used or waste stored) at the 3718-F Facility, the facility will not be considered closed until the remediation under CERCLA is complete. During the time between closure of the building, floor, and pads and any soil remediation under CERCLA, steps will be taken to isolate any contamination.

Temporary covers will be installed, if necessary, to prevent migration of any contamination. The temporary covers would be less permeable than the surrounding soil and may be composed of constituents such as asphalt, clay, or a fixative spray. The existing facility floor and pads may be used as covers if they were found to be uncontaminated or were decontaminated. The exact nature of any covers would be determined at the time the need was identified, and this information would be added to the closure plan. Additionally, access to the areas of contamination would be controlled, if necessary, to protect personnel or prevent the migration of contamination.

During the period between closure of the building and soil remediation under CERCLA, the facility area would be inspected, at a minimum, once a week. This inspection would be combined with facility inspection presently conducted. The inspections would determine the need for maintenance of any temporary covers or other physical barriers. Any required maintenance would be performed by trained personnel from the Hanford Site.

Any data obtained from sampling and analyses during RCRA closure activities will be part of the record and included in the closure plan. This data will be taken into account and used during the CERCLA evaluation of the 300-FF-3 Operable Unit, as well as data collected specifically for the CERCLA evaluation.

CONTENTS

9.0 REFERENCES 9-1

9.1 DOCUMENTS 9-1

9.2 CODE OF FEDERAL REGULATION AND FEDERAL REGISTER 9-1

9.3 FEDERAL AND STATE ACTS 9-1

9.4 REVISED CODE OF WASHINGTON AND WASHINGTON ADMINISTRATIVE CODE 9-1

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9.0 REFERENCES

9.1 DOCUMENTS

DOE/RL, 1989, *Draft Remedial Investigation/Feasibility Study Work Plan for the 300-FF-5 Operable Unit, Hanford Site, Richland, Washington*, DOE/RL-89-14, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Ecology, EPA, and DOE 1995, *Hanford Federal Facility Agreement and Consent Order*, as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.

WHC, 1988, *Environmental Investigations and Site Characterization Manual*, WHC-CM-7-7, Westinghouse Hanford Company, Richland, Washington.

9.2 CODE OF FEDERAL REGULATION AND FEDERAL REGISTER

40 CFR 264, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, as amended.

40 CFR 265, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, as amended.

40 CFR 270, "EPA Administered Permit Programs: The Hazardous Waste Permit Program," *Code of Federal Regulations*, as amended.

51 FR 7722, 1986, "Hazardous Waste Management System, Supplement to Preamble and Final Codification Rule," *Federal Register*, Vol. 51, p. 7722 (March 5).

9.3 FEDERAL AND STATE ACTS

Comprehensive Environmental Response Compensation and Liability Act of 1980, as amended, 42 USC 9601 et seq.

Resource Conservation Act of 1976, as amended, 42 USC 6901 et seq.

9.4 REVISED CODE OF WASHINGTON AND WASHINGTON ADMINISTRATIVE CODE

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended.

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APPENDICES

3A PHOTOGRAPHS

4A MATERIAL SAFETY DATA SHEETS

6A SUMMARY OF RESULTS FROM THE DATA QUALITY OBJECTIVES (DQO) PROCESS

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APPENDIX 3A

PHOTOGRAPHS

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Figure 3A-1. The 3718-F Treatment and Storage Facility.

Figure 3A-2. The 3718-F Building Burn Shed and Reaction Tanks.

APPENDIX 4A

MATERIAL SAFETY DATA SHEETS

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MSDS #1082

MATERIAL SAFETY DATA SHEET OHS03540

OCCUPATIONAL HEALTH SERVICES, INC.
450 SEVENTH AVENUE, SUITE 2407
NEW YORK, NEW YORK 10123
(800) 445-MSDS (212) 967-1100

EMERGENCY CONTACT:
JOHN S. BRANSFORD, JR. (615) 292-1180

SUBSTANCE IDENTIFICATION

CAS-NUMBER 111-76-2
RTEC-NUMBER KJ8575000

SUBSTANCE: BUTYL CELLOSOLVE

TRADE NAMES/SYNONYMS:
ETHANOL, 2-BUTOXY-: BUTYL OXITOL: ETHYLENE GLYCOL MONOBUTYL ETHER: 2-BUTOXYETHANOL: BETA-BUTOXYETHANOL: BUTYL GLYCOL: ETHYLENE GLYCOL BUTYL ETHER: ETHYLENE GLYCOL N-BUTYL ETHER: DOWANOL EB: GLYCOL BUTYL ETHER: GLYCOL MONOBUTYL ETHER: MONOBUTYL GLYCOL ETHER: GAFCOL EB: BUTYL MONOETHER GLYCOL: ETHYLENE GLYCOL MONO-N-BUTYL ETHER: EKTASOLVE EB: UN 2369: E-179: 13073: C6H1402: OHS03540

CHEMICAL FAMILY:
ETHER, ALIPHATIC

MOLECULAR FORMULA: C4-H9-O-C-H2-C-H2-O-H MOLECULAR WEIGHT: 118.18

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=2 REACTIVITY=0 PERSISTENCE=0
NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=2 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: BUTYL CELLOSOLVE PERCENT: 100

OTHER CONTAMINANTS: NONE

EXPOSURE LIMIT:
BUTYL CELLOSOLVE (ETHYLENE GLYCOL MONOBUTYL ETHER):
50 PPM (240 MG/M3) OSHA TWA (SKIN)
25 PPM (120 MG/M3) ACGIH TWA (SKIN)

SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

PHYSICAL DATA

DESCRIPTION: COLORLESS LIQUID WITH A MILD, ETHEREAL ODOR.

BOILING POINT: 340 F (171 C) MELTING POINT: -94 F (-70 C)

SPECIFIC GRAVITY: 0.9015 EVAPORATION RATE: (BUTYL ACETATE=1) 0.06

SOLUBILITY IN WATER: SOLUBLE VAPOR DENSITY: 4.1

VAPOR PRESSURE: 0.76 MMHG @ 20 C

MSDS # 1082

OTHER SOLVENTS (SOLVENT - SOLUBILITY):
SOLUBLE IN ALCOHOL, ETHER, MOST ORGANIC SOLVENTS,
MINERAL OIL

OTHER PHYSICAL DATA
VISCOSITY: 3.5 CS AT 25 C

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD
MODERATE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.

VAPOR-AIR MIXTURES ARE EXPLOSIVE ABOVE FLASH POINT.

FLASH POINT: 143 F (62 C) (CC) UPPER EXPLOSION LIMIT: 12.7 % @ 275 F

LOWER EXPLOSION LIMIT: 1.1% @ 200 F AUTOIGNITION TEMP.: 460 F (238 C)

FLAMMIBILITY CLASS (OSHA): IIIA

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, HALON, WATER SPRAY OR ALCOHOL FOAM
(1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL FOAM
(1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. COOL FIRE-EXPOSED CONTAINERS WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM STORAGE TANK ENDS. FOR MASSIVE FIRE IN STORAGE AREA, USE UNMANNED HOSE HOLDER OR MONITOR NOZZLES, ELSE WITHDRAW FROM AREA AND LET FIRE BURN. WITHDRAW IMMEDIATELY IN CASE OF RISING SOUND FROM VENTING SAFETY DEVICE OR ANY DISCOLORATION OF STORAGE TANK DUE TO FIRE (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4, GUIDE PAGE 26).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED; USE FLOODING AMOUNTS OF WATER AS A FOG, SOLID STREAMS MAY BE INEFFECTIVE. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING VAPORS, KEEP UPWIND.

ALCOHOL FOAM (NFPA FIRE PROTECTION GUIDE ON HAZARDOUS MATERIAL, EIGHTH EDITION).

TRANSPORTATION

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49CFR172.101:
COMBUSTIBLE LIQUID

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49CFR172.101 AND 172.402:

NONE

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: NONE
EXCEPTIONS: 49CFR173.118A

MSDS # 1082

TOXICITY

BUTYL CELLOSOLVE (ETHYLENE GLYCOL MONOBUTYL ETHER):
500 MG OPEN SKIN-RABBIT MILD IRRITATION; 18 MG EYE-RABBIT IRRITATION; 100 MG/24 HOURS EYE-RABBIT MODERATE IRRITATION; 100 PPM INHALATION-HUMAN TCLO; 195 PPM/8 HOURS INHALATION-HUMAN TCLO; 700 PPM/7 HOURS INHALATION-MOUSE LC50; 220 MG/KG SKIN-RABBIT LD50; 230 MG/KG SKIN-GUINEA PIG LD50; 470 MG/KG ORAL-RAT LD50; 1230 MG/KG ORAL-MOUSE LD50; 300 MG/KG ORAL-RABBIT LD50; 1200 MG/KG ORAL-GUINEA PIG LD50; 220 MG/KG INTRAPERITONEAL-RAT LD50; 536 MG/KG INTRAPERITONEAL-MOUSE LD50; 220 MG/KG INTRAPERITONEAL-RABBIT LD50; 500 MG/KG SUBCUTANEOUS-MOUSE LDLO; 340 MG/KG INTRAVENOUS-RAT LD50; 1130 MG/KG INTRAVENOUS-MOUSE LD50; 280 MG/KG INTRAVENOUS-RABBIT LD50; REPRODUCTIVE EFFECTS DATA (RTECS).
CARCINOGEN STATUS: NONE.
BUTYL CELLOSOLVE IS TOXIC, A SKIN, EYE, AND MUCOUS MEMBRANE IRRITANT, CENTRAL NERVOUS SYSTEM DEPRESSANT, HEMOLYTIC AGENT AND NEPHROTOXIN. POISONING MAY ALSO AFFECT THE LIVER.

HEALTH EFFECTS AND FIRST AID

INHALATION:
BUTYL CELLOSOLVE (ETHYLENE GLYCOL MONOBUTYL ETHER):
IRRITANT/NARCOTIC/HEMOLYTIC AGENT/NEPHROTOXIN/TOXIC.
700 PPM IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.
ACUTE EXPOSURE- INHALATION OF VAPORS MAY CAUSE IRRITATION OF THE UPPER RESPIRATORY TRACT AND DYSPNEA. SOME CELLOSOLVES MAY CAUSE NAUSEA, VOMITING, DIARRHEA, ANEMIA, POSSIBLE ABDOMINAL AND LUMBAR PAIN, AND SYMPTOMS OF CENTRAL NERVOUS SYSTEM DEPRESSION INCLUDING HEADACHE, DIZZINESS, DROWSINESS, WEAKNESS, SLURRED SPEECH, RECRUDESCENT STUTTERING, STAGGERING GAIT, TREMORS, BLURRED VISION, AND PERSONALITY CHANGES RESEMBLING SCHIZOPHRENIA OR NARCOLEPSY. SEVERE EXPOSURES MAY RESULT IN ANOREXIA, WEIGHT LOSS, APATHY, VISCERAL CONGESTION, HEMORRHAGING OF THE LUNGS, AND LIVER AND KIDNEY DAMAGE. KIDNEY EFFECTS MAY INCLUDE TRANSIENT POLYURIA, ALBUMINURIA, HEMATURIA, HEMOGLOBINURIA, OLIGURIA PROGRESSING TO ANURIA, AND ACUTE RENAL FAILURE. EFFECTS ON THE BLOOD MAY INCLUDE ERYTHROPENIA, RETICULOCYTOSIS, LEUKOCYTOSIS, GRANULOCYTOSIS, AND INCREASED ERYTHROCYTE FRAGILITY WHICH MAY RESULT IN HEMOLYSIS. NARCOSIS, PULMONARY EDEMA, AND BONE MARROW DEPRESSION HAVE ALSO BEEN REPORTED. INHALATION OF 700 PPM/7 HOURS RESULTED IN DEATH IN MICE DUE TO LUNG AND KIDNEY INJURY.
CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE TO VAPOR CONCENTRATIONS WOULD BE EXPECTED TO CAUSE IRRITATION OF THE RESPIRATORY TRACT, NARCOSIS, AND LIVER AND KIDNEY DAMAGE IN HUMANS. IN ANIMALS, REPEATED EXPOSURES TO 100-400 PPM MAY CAUSE VISCERAL EFFECTS AND MILD HEMOLYTIC ANEMIA; OVEREXPOSURE TO VAPORS MAY RESULT IN FATIGUE AND LETHARGY, HEADACHE, NAUSEA, ANOREXIA, AND TREMOR; AND OVEREXPOSURE TO HIGH CONCENTRATIONS MAY RESULT IN LIVER AND KIDNEY INJURY, HEMOGLOBINURIA, GREATLY INCREASED ERYTHROCYTE FRAGILITY, PULMONARY HEMORRHAGE, AND DEATH FROM RENAL FAILURE. EFFECTS ON THE FEMALE REPRODUCTIVE SYSTEM, FERTILITY, AND SPECIFIC DEVELOPMENTAL ABNORMALITIES HAVE BEEN REPORTED FROM EXPOSURE OF PREGNANT

MSDS # 1082

RATS AND RABBITS TO BUTYL CELLOSOLVE.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
BUTYL CELLOSOLVE (ETHYLENE GLYCOL MONOBUTYL ETHER):
IRRITANT/NARCOTIC/HEMOLYTIC AGENT/NEPHROTOXIN/TOXIC.
ACUTE EXPOSURE- DIRECT CONTACT WITH THE LIQUID MAY CAUSE IRRITATION WITH REDNESS. BUTYL CELLOSOLVE MAY BE RAPIDLY ABSORBED THROUGH INTACT SKIN TO CAUSE NAUSEA, VOMITING, DIARRHEA, ANEMIA, ABDOMINAL AND LUMBAR PAIN, AND SYMPTOMS OF CENTRAL NERVOUS SYSTEM DEPRESSION INCLUDING HEADACHE, DROWSINESS, DIZZINESS, WEAKNESS, SLURRED SPEECH, RECRUDESCENT STUTTERING, STAGGERING GAIT, TREMORS, AND BLURRED VISION. PERSONALITY CHANGES RESEMBLING SCHIZOPHRENIA OR NARCOLEPSY MAY ALSO OCCUR. SEVERE EXPOSURES MAY RESULT IN ANOREXIA, WEIGHT LOSS, APATHY, VISCERAL CONGESTION, HEMORRHAGING OF THE LUNGS, AND LIVER AND KIDNEY DAMAGE. KIDNEY EFFECTS MAY INCLUDE TRANSIENT POLYURIA, ALBUMINURIA, HEMATURIA, HEMOGLOGINURIA, OLIGURIA PROGRESSING TO ANURIA, AND ACUTE RENAL FAILURE. EFFECTS ON THE BLOOD MAY INCLUDE ERYTHROPENIA, RETICULOCYTOSIS, LEUKOCYTOSIS, GRANULOCYTOSIS, AND INCREASED ERYTHROCYTE FRAGILITY WHICH MAY RESULT IN HEMOLYSIS. NARCOSIS, PULMONARY EDEMA, AND BONE MARROW DEPRESSION HAVE ALSO BEEN REPORTED.
CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT MAY CAUSE DEFATTING OF THE SKIN, DERMATITIS, AND SYMPTOMS AS IN ACUTE EXPOSURE.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
BUTYL CELLOSOLVE (ETHYLENE GLYCOL MONOBUTYL ETHER):
IRRITANT.
ACUTE EXPOSURE- EXPOSURE TO VAPOR CONCENTRATIONS OF >100 PPM MAY CAUSE IRRITATION WITH MILD PAIN, REDNESS, AND LACRIMATION. DIRECT CONTACT WITH THE LIQUID CAUSED IRRITATION WITH REDDENING AND SWELLING OF THE CONJUNCTIVA, PAIN, AND SLIGHT TRANSITORY CORNEAL CLOUDING IN RABBITS. THE DEGREE OF INJURY WAS GRADED 4 ON A SCALE OF 1-10 AFTER 24 HOURS.
CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
BUTYL CELLOSOLVE (ETHYLENE GLYCOL MONOBUTYL ETHER):
NARCOTIC/HEMOLYTIC AGENT/NEPHROTOXIC/TOXIC.
ACUTE EXPOSURE- INGESTION MAY CAUSE SOUR TASTE, TONGUE NUMBNESS, NAUSEA, VOMITING, DIARRHEA, ABDOMINAL AND LUMBAR PAIN, AND EFFECTS ON THE CENTRAL NERVOUS SYSTEM INCLUDING HEADACHE, DROWSINESS, DIZZINESS, WEAKNESS, SLURRED SPEECH, RECRUDESCENT STUTTERING, STAGGERING GAIT, TREMORS, BLURRED VISION, AND PERSONALITY CHANGES RESEMBLING SCHIZOPHRENIA OR NARCOLEPSY. SEVERE EXPOSURES MAY RESULT IN ANOREXIA, WEIGHT LOSS, APATHY, VISCERAL CONGESTION, HEMORRHAGING OF THE LUNGS, AND LIVER AND KIDNEY DAMAGE. KIDNEY EFFECTS MAY INCLUDE TRANSIENT POLYURIA, ALBUMINURIA, HEMATURIA, HEMOGLOBINURIA, OLIGURIA PROGRESSING TO ANURIA, AND ACUTE RENAL EFFECTS ON THE BLOOD MAY INCLUDE ERYTHROPENIA, RETICULOCYTOSIS,

MSDS # 1082

LEUKOCYTOSIS, GRANULOCYTOSIS, AND INCREASED ERYTHROCYTE FRAGILITY WHICH MAY RESULT IN HEMOLYSIS. NARCOSIS, PULMONARY EDEMA, AND BONE MARROW DEPRESSION HAVE ALSO BEEN REPORTED. INGESTION OF 470 MG/KG WAS LETHAL TO RATS. DEATHS IN ANIMALS RESULTING FROM SINGLE EXPOSURES ARE GENERALLY DUE TO NARCOSIS.

CHRONIC EXPOSURE- REPEATED OR PROLONGED INGESTION MAY CAUSE GROWTH DEPRESSION, INCREASED LIVER AND KIDNEY DAMAGE, AND EFFECTS AS IN ACUTE EXPOSURE. DELAYED DEATHS IN ANIMALS ARE GENERALLY A RESULT OF LUNG CONGESTION AND/OR RENAL FAILURE. EFFECTS ON FERTILITY HAVE BEEN REPORTED FROM EXPOSURE OF PREGNANT MICE TO BUTYL CELLOSOLVE.

FIRST AID- REMOVE BY GASTRIC LAVAGE OR EMESIS. MAINTAIN BLOOD PRESSURE AND AIRWAY. GIVE OXYGEN IF RESPIRATION IS DEPRESSED. DO NOT PERFORM GASTRIC LAVAGE OR EMESIS IF VICTIM IS UNCONSCIOUS. GET MEDICAL ATTENTION IMMEDIATELY. (DREISBACH, HANDBOOK OF POISONING, 11TH ED.) ADMINISTRATION OF GASTRIC LAVAGE OR OXYGEN SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.

ANTIDOTE:
NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY SECTION

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:
BUTYL CELLOSOLVE (ETHYLENE GLYCOL MONOBUTYL ETHER):
CAUSTICS (STRONG): DECOMPOSITION.
OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.

DECOMPOSITION:
THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC OXIDES OF CARBON.

POLYMERIZATION:
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE-DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE.

STORAGE

STORE IN ACCORDANCE WITH 29 CFR 1910.106.

BONDING AND GROUNDING: SUBSTANCES WITH LOW ELECTROCONDUCTIVITY, WHICH MAY BE IGNITED BY ELECTROSTATIC SPARKS, SHOULD BE STORED IN CONTAINERS WHICH MEET THE BONDING AND GROUNDING GUIDELINES SPECIFIED IN NFPA 77-1983, RECOMMENDED PRACTICE ON STATIC ELECTRICITY.

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

MSDS # 1082

CONDITIONS TO AVOID

MAY BE IGNITED BY HEAT, SPARKS OR FLAMES. CONTAINER MAY EXPLODE IN HEAT OF FIRE. VAPOR EXPLOSION HAZARD INDOORS, OUTDOORS OR IN SEWERS. RUN-OFF TO SEWER MAY CREATE FIRE OR EXPLOSION HAZARD.

SPILLS AND LEAKS

OCCUPATIONAL-SPILL:
SHUT OFF IGNITION SOURCES. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. NO SMOKING, FLAMES OR FLARES IN HAZARD AREAI KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND DENY ENTRY.

PROTECTIVE EQUIPMENT SECTION

VENTILATION:
PROVIDE LOCAL EXHAUST OR PROCESS ENCLOSURE VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS.

RESPIRATOR:
THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS OR NIOSH CRITERIA DOCUMENTS; OR DEPARTMENT OF LABOR, 29CFR1910 SUBPART Z.
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION.

BUTYL CELLOSOLVE:

250 PPM- ANY SUPPLIED-AIR RESPIRATOR.
ANY SELF-CONTAINED BREATHING APPARATUS.

625 PPM- ANY POWERED AIR-PURIFYING RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE(S).
ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A CONTINUOUS FLOW MODE.

700 PPM- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE OR FRONT- OR BACK-MOUNTED ORGANIC VAPOR CANISTER.
ANY CHEMICAL CARTRIDGE RESPIRATOR WITH A FULL FACEPIECE AND ORGANIC VAPOR CARTRIDGE(S).
ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE.
ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.

ESCAPE- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE OR FRONT- OR BACK-MOUNTED ORGANIC VAPOR CANISTER.
ANY APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS.

MSDS # 1682

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.

SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE AND OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT ANY POSSIBILITY OF SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE. CONTACT LENSES SHOULD NOT BE WORN.

EMERGENCY WASH FACILITIES:
WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES AND/OR SKIN MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN AND QUICK DRENCH SHOWER WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED BY- OCCUPATIONAL HEALTH SERVICES, INC.

CREATION DATE: 12/05/84 REVISION DATE: 07/07/88

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MATERIAL SAFETY DATA SHEET OHS12090

OCCUPATIONAL HEALTH SERVICES, INC.
11 WEST 42ND STREET, 12TH FLOOR
NEW YORK, NEW YORK 10036
1-800-445-MSDS (1-800-445-6737) OR 1-212-789-3535

FOR EMERGENCY SOURCE INFORMATION
CONTACT: 1-615-366-2000

MSDS # 1279

SUBSTANCE IDENTIFICATION

CAS-NUMBER 67-63-0
RTEC-NUMBER NT8050000

SUBSTANCE: ISOPROPYL ALCOHOL

TRADE NAMES/SYNONYMS:
ISOPROPANOL: ETHYL CARBINOL: DIMETHYLCARBINOL: 2-PROPANOL: ISOHOL: SEC-PROPYL ALCOHOL: PROPYL ALCOHOL: XEROX FILM REMOVER (UNION CARBIDE): CTL R-53 REDUCER (CHEMICAL TECHNOLOGY LABS., INC.): TEXPADS (THE TEXWIPE COMPANY): CORONA WIRE CLEANER (CANON BUSINESS MACHINES): DISK DRIVE HEAD CLEANING KIT (DIGITAL EQUIPMENT CORPORATION): LENS CLENS #3 (GENERAL PRODUCTION SERVICES INC.): REDUCER (SHERWIN-WILLIAMS): ISOPROPYL ALC SEMI GO 4X1GPOLY (ASHLAND CHEMICAL COMPANY): ADPRO-MULTISURF (MALLINCKRODT): 108 THINNER (KESTER SOLDER COMPANY): STCC 4904205: UN 1219: C3H8O: OHS12090

CHEMICAL FAMILY:
ALCOHOL, ALIPHATIC

MOLECULAR FORMULA: C-H3-C-H-(O-H)-C-H3 MOLECULAR WEIGHT: 60.10

CERCLA RATINGS (SCALE 0-3): HEALTH=2 FIRE=3 REACTIVITY=0 PERSISTENCE=0
NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=3 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: ISOPROPYL ALCOHOL (ISOPROPANOL) CAS# 67-63-0
PERCENT: 100.0

OTHER CONTAMINANTS: NONE

EXPOSURE LIMIT:
ISOPROPYL ALCOHOL (ISOPROPANOL; 2-PROPANOL):
400 PPM (980 MG/M3) OSHA TWA; 500 PPM (1225 MG/M3) OSHA STEL
400 PPM (980 MG/M3) ACGIH TWA; 500 PPM (1225 MG/M3) ACGIH STEL
400 PPM NIOSH RECOMMENDED 10 HOUR TWA;
800 PPM NIOSH RECOMMENDED 15 MINUTE CEILING

SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

PHYSICAL DATA

DESCRIPTION: COLORLESS LIQUID WITH AN ODOR OF ALCOHOL.

BOILING POINT: 180 F (82 C) MELTING POINT: -129 F (-89 C)

SPECIFIC GRAVITY: 0.7855 EVAPORATION RATE: (BUTYL ACETATE=1)

2.88

MSDS # 1279

VOLATILITY: 100%

SOLUBILITY IN WATER: SOLUBLE

VAPOR DENSITY: 2.1

VAPOR PRESSURE: 40 MMHG @ 24 C

ODOR-THRESHOLD: 40-45 PPM

OTHER SOLVENTS (SOLVENT - SOLUBILITY):
SOLUBLE IN ALCOHOL, ETHER, CHLOROFORM, ACETONE, BENZENE; INSOLUBLE IN SALT SOLUTIONS.

OTHER PHYSICAL DATA
VISCOSITY: 2.1 CPS @ 25 C

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD
DANGEROUS FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.

VAPOR-AIR MIXTURES ARE EXPLOSIVE.

FLASH POINT: 53 F (12 C) (CC)

UPPER EXPLOSION LIMIT: 12.7% @ 93 C

LOWER EXPLOSION LIMIT: 2.0%

AUTOIGNITION TEMP.: 750 F (399 C)

FLAMMABILITY CLASS (OSHA): IB

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR ALCOHOL-RESISTANT FOAM (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL-RESISTANT FOAM (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

ALCOHOL FOAM
(NFPA 325M, FIRE HAZARD PROPERTIES OF FLAMMABLE LIQUIDS, GASES, AND VOLATILE SOLIDS, 1984).

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. APPLY COOLING WATER TO SIDES OF CONTAINERS THAT ARE EXPOSED TO FLAMES UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM ENDS OF TANKS. FOR MASSIVE FIRE IN CARGO AREA, USE UNMANNED HOSE HOLDER OR MONITOR NOZZLES; IF THIS IS IMPOSSIBLE, WITHDRAW FROM AREA AND LET FIRE BURN. WITHDRAW IMMEDIATELY IN CASE OF RISING SOUND FROM VENTING SAFETY DEVICE OR ANY DISCOLORATION OF TANK DUE TO FIRE. ISOLATE FOR 1/2 MILE IN ALL DIRECTIONS IF TANK, RAIL CAR OR TANK TRUCK IS INVOLVED IN FIRE (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 26).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED; USE WATER IN FLOODING AMOUNTS AS FOG, SOLID STREAMS MAY NOT BE EFFECTIVE. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING VAPORS, KEEP UPWIND.

MSDS # 1279

WATER MAY BE INEFFECTIVE (NFPA 325M, FIRE HAZARD PROPERTIES OF FLAMMABLE LIQUIDS, GASES, AND VOLATILE SOLIDS, 1984)

TRANSPORTATION

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49 CFR 172.101:
FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49 CFR 172.101 AND SUBPART E:
FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49 CFR 173.125
EXCEPTIONS: 49 CFR 173.118

TOXICITY

ISOPROPYL ALCOHOL (ISOPROPANOL; 2-PROPANOL):
IRRITATION DATA: 500 MG SKIN-RABBIT MILD; 16 MG EYE-RABBIT; 10 MG EYE-RABBIT MODERATE; 100 MG/24 HOURS EYE-RABBIT MODERATE.
TOXICITY DATA: 12,800 PPM/3 HOURS INHALATION-MOUSE LCLO; 16,000 PPM/4 HOURS INHALATION-RAT LCLO; 12,800 MG/KG SKIN-RABBIT LD50; 5272 MG/KG ORAL-MAN LDLO; 14,432 MG/KG ORAL-MAN TDLO; 3570 MG/KG ORAL-HUMAN LDLO; 223 MG/KG ORAL-HUMAN TDLO; 5045 MG/KG ORAL-RAT LD50; 3600 MG/KG ORAL-MOUSE LD50; 6410 MG/KG ORAL-RABBIT LD50; 4797 MG/KG ORAL-DOG LD50; 6000 MG/KG SUBCUTANEOUS-MOUSE LDLO; 6 MG/KG SUBCUTANEOUS-MAMMAL LDLO; 1088 MG/KG INTRAVENOUS-RAT LD50; 1509 MG/KG INTRAVENOUS-MOUSE LD50; 1184 MG/KG INTRAVENOUS-RABBIT LD50; 1963 MG/KG INTRAVENOUS-CAT LDLO; 5120 MG/KG INTRAVENOUS-DOG LDLO; 2735 MG/KG INTRAPERITONEAL-RAT LD50; 4477 MG/KG INTRAPERITONEAL-MOUSE LD50; 667 MG/KG INTRAPERITONEAL-RABBIT LD50; MUTAGENIC DATA (RTECS); REPRODUCTIVE EFFECTS DATA (RTECS).
CARCINOGEN STATUS: HUMAN INADEQUATE EVIDENCE, ANIMAL INADEQUATE EVIDENCE (IARC GROUP-3). STRONG ACID MANUFACTURING PROCESS: KNOWN HUMAN CARCINOGEN (NTP); HUMAN SUFFICIENT EVIDENCE (IARC GROUP-1). WORKERS INVOLVED IN THE MANUFACTURE OF ISOPROPYL ALCOHOL BY THE STRONG-ACID PROCESS, INVOLVING THE FORMATION OF ISOPROPYL OILS, SHOWED AN INCREASE IN PARANASAL AND LARYNGEAL CANCERS.
LOCAL EFFECTS: IRRITANT- INHALATION, EYE.
ACUTE TOXICITY LEVEL: SLIGHTLY TOXIC BY INGESTION, DERMAL ABSORPTION.
TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT.
AT INCREASED RISK FROM EXPOSURE: PERSONS WITH PRE-EXISTING SKIN DISORDERS; IMPAIRED LIVER, RENAL AND/OR PULMONARY FUNCTION.
ADDITIONAL INFORMATION: POTENTIATES THE EFFECT OF CARBON TETRACHLORIDE AND OTHER HEPATOTOXIC CHLORINATED ALIPHATIC HYDROCARBONS.

HEALTH EFFECTS AND FIRST AID

INHALATION:
ISOPROPYL ALCOHOL (ISOPROPANOL; 2-PROPANOL):
IRRITANT/NARCOTIC. 12,000 PPM IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.

MSDS #127

ACUTE EXPOSURE- HUMAN SUBJECTS EXPOSED TO 400 PPM FOR 3-5 MINUTES HAD MILD IRRITATION OF THE NOSE AND THROAT. AT 800 PPM THE IRRITATION WAS NOT SEVERE BUT UNCOMFORTABLE. HIGHER CONCENTRATIONS MAY CAUSE EFFECTS AS DETAILED IN ACUTE INGESTION. THE LENGTH OF TIME REQUIRED TO PRODUCE DEEP NARCOSIS IN ANIMALS WAS INVERSELY PROPORTIONAL TO THE CONCENTRATION: THE ONSET OF DEEP NARCOSIS RANGED FROM 460 MINUTES AT 3250 PPM TO 100 MINUTES AT 24,500 PPM.

CHRONIC EXPOSURE- MICE SUBJECTED TO 10900 PPM ISOPROPYL ALCOHOL IN AIR FOR ABOUT 4 HOURS/DAY UNTIL THEY HAD ACCUMULATED 123 HOURS OF EXPOSURE WERE NARCOTIZED BUT SURVIVED. REVERSIBLE FATTY CHANGES WERE OBSERVED IN THE LIVER. MALE MICE EXPOSED TO EITHER 1000 OR 5000 PPM OF ISOPROPYL ALCOHOL VAPOR FOR 6 HOURS A DAY FOR 9 EXPOSURES EXHIBITED HYALINE DROPLET NEPHROPATHY. REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN ANIMALS. THERE HAS BEEN AN INCREASED INCIDENCE OF CANCER OF THE PARANASAL SINUSES, AND POSSIBLY OF THE LARYNX, IN THE MANUFACTURE OF ISOPROPYL ALCOHOL BY THE STRONG ACID PROCESS, INVOLVING THE FORMATION OF ISOPROPYL OILS. IT IS NOT CLEAR WHICH SUBSTANCES ARE RESPONSIBLE.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
ISOPROPYL ALCOHOL (ISOPROPANOL; 2-PROPANOL):
NARCOTIC.

ACUTE EXPOSURE- CONTACT WITH THE SKIN MAY CAUSE SLIGHT IRRITATION. CONTACT DERMATITIS HAS BEEN REPORTED IN A FEW SENSITIVE INDIVIDUALS. SUBSTANCE MAY BE DERMALLY ABSORBED RESULTING IN SYSTEMIC TOXICITY AS DETAILED IN ACUTE INGESTION. TOXIC EFFECTS MAY BECOME MORE MARKED IF ABSORPTION AND INHALATION OCCUR CONCURRENTLY.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE DERMATITIS DUE TO THE DEFATTING ACTION ON THE SKIN. REPEATED AND PROLONGED EXPOSURE TO THE SKIN OF RABBITS CAUSED SLIGHT ERYTHEMA, DRYING, AND SUPERFICIAL DESQUAMATION.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
ISOPROPYL ALCOHOL (ISOPROPANOL; 2-PROPANOL):
IRRITANT.

ACUTE EXPOSURE- 400-800 PPM MAY CAUSE IRRITATION. IN RABBIT EYES, A DROP CAUSED MILD TRANSITORY INJURY AND A 50% AQUEOUS SOLUTION AFTER 3 MINUTES CAUSED MODERATE IRRITATION. CONTACT WITH A 70% SOLUTION CAUSED CONJUNCTIVITIS, IRITIS, AND CORNEAL OPACITY.

CHRONIC EXPOSURE- PROLONGED OR REPEATED EXPOSURE TO VAPORS MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
ISOPROPYL ALCOHOL (ISOPROPANOL; 2-PROPANOL):
NARCOTIC.

ACUTE EXPOSURE- INGESTION MAY CAUSE ABDOMINAL PAIN, HEMATEMESIS, NAUSEA, VOMITING, AND HEMORRHAGE. CENTRAL NERVOUS SYSTEM DEPRESSION MAY OCCUR WITH

MSDS # 1279

HEADACHE, DIZZINESS, FLUSHING, INCOORDINATION, STUPOR, CONFUSION, HYPOTENSION, AREFLEXIA, AND REFRACTORY NARCOSIS. OLIGURIA FOLLOWED BY DIURESIS AND COMA MAY ALSO OCCUR. OTHER SYMPTOMS MAY INCLUDE HYPOGLYCEMIA, TENDERNESS AND EDEMA OF MUSCLES, AND ARRHYTHMIAS. VOMITING WITH ASPIRATION MAY CAUSE ASPIRATION PNEUMONIA. DEPRESSED RESPIRATION AND DEATH DUE TO RESPIRATORY PARALYSIS MAY OCCUR IN A FEW HOURS AFTER EXPOSURE. SEVERE AND PROLONGED SHOCK MAY LEAD TO SERIOUS OR FATAL RENAL DAMAGE AFTER SEVERAL DAYS. PATHOLOGIC FINDINGS HAVE INCLUDED EXTENSIVE HEMORRHAGIC TRACHEOBRONCHITIS, BRONCHOPNEUMONIA AND HEMORRHAGIC PULMONARY EDEMA.

CHRONIC EXPOSURE- NO ADVERSE EFFECTS RESULTED IN HUMANS FOLLOWING DAILY INGESTION OF 2.6 AND 6.4 MG/KG FOR 6 WEEKS. RATS THAT INGESTED 0.5 TO 10.0% ISOPROPYL ALCOHOL IN DRINKING WATER FOR 27 WEEKS SHOWED DECREASED BODY WEIGHT. PROLONGED ORAL ADMINISTRATION IN RABBITS PRODUCED ANESTHESIA AND DEATH. REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN ANIMALS.

FIRST AID- IN RESPIRATORY DEPRESSION, GIVE OXYGEN BY ARTIFICIAL RESPIRATION. GIVE ACTIVATED CHARCOAL. GASTRIC LAVAGE WITH PROTECTED AIRWAY IS USEFUL EVEN IF DELAYED. DO NOT ATTEMPT EMESIS IF RESPIRATION IS DEPRESSED. MAINTAIN BLOOD PRESSURE. TREATMENT SHOULD BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL. (DREISBACH, HANDBOOK OF POISONING, 12TH ED.) GET MEDICAL ATTENTION.

ANTIDOTE:
NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY SECTION

REACTIVITY:
ISOPROPYL ALCOHOL (ISOPROPANOL; 2-PROPANOL):
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES. MAY SLOWLY PEROXIDISE ON EXPOSURE TO AIR UNDER NORMAL STORAGE CONDITIONS. AN EXPLOSION HAZARD MAY EXIST IF THE SUBSTANCE IS DISTILLED OR ALLOWED TO EVAPORATE TO DRYNESS.

INCOMPATIBILITIES:
ISOPROPYL ALCOHOL (ISOPROPANOL; 2-PROPANOL):
ALUMINUM: DISSOLUTION IS EXOTHERMIC.
BARIUM PERCHLORATE: FORMATION OF EXPLOSIVE COMPOUND.
2-BUTANONE (METHYL ETHYL KETONE): ACCELERATES THE PEROXIDATION OF THE ALCOHOL.
CHROMIUM TRIOXIDE (GRANULAR): IGNITION.
COATINGS: MAY BE ATTACKED.
DIOXYGENYL TETRAFLUOROBORATE: IGNITION AT AMBIENT TEMPERATURES.
HYDROGEN + PALLADIUM (PARTICLES): IGNITION ON EXPOSURE TO AIR.
HYDROGEN PEROXIDE: FORMATION OF EXPLOSIVE COMPOUND.
KETONES: MARKEDLY INCREASES THE POSSIBILITY OF PEROXIDATION.
NITROFORM (TRINITROMETHANE): DISSOLVES LIBERATING HEAT AND POSSIBLY EXPLODING.
OLEUM: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.
OXYGEN (GAS): AUTOXIDATION, ON EXPOSURE TO LIGHT, RESULTS IN FORMATION OF KETONES AND POTENTIALLY EXPLOSIVE HYDROGEN PEROXIDE.
PHOSGENE: IN THE PRESENCE OF IRON SALTS, MAY EXPLODE.
PLASTICS: MAY BE ATTACKED.
POTASSIUM TERT-BUTOXIDE: IGNITION.
RUBBER: MAY BE ATTACKED.
SODIUM DICHROMATE + SULFURIC ACID: EXOTHERMIC REACTION WITH POSSIBLE

MSDS # 1279

INCANDESCENCE.
SEE ALSO ALCOHOLS.

ALCOHOLS:
ACETALDEHYDE: VIOLENT CONDENSATION REACTION.
BARIUM PERCHLORATE: FORMATION OF HIGHLY EXPLOSIVE PERCHLORIC ESTER ON REFLUXING.
CHLORINE: FORMATION OF HIGHLY EXPLOSIVE ALKYL HYPOCHLORITES.
DIETHYL ALUMINUM BROMIDE: SPONTANEOUS IGNITION.
ETHYLENE OXIDE: POSSIBLE EXPLOSION.
HEXAMETHYLENE DIISOCYANATE: POSSIBLE EXPLOSION IN ABSENCE OF SOLVENT.
HYDROGEN PEROXIDE + SULFURIC ACID: POSSIBLE EXPLOSION.
HYPOCHLOROUS ACID: FORMATION OF HIGHLY EXPLOSIVE ALKYL HYPOCHLORITES.
ISOCYANATES: POSSIBLE EXPLOSION IN ABSENCE OF SOLVENT.
LITHIUM ALUMINUM HYDRIDE: VIGOROUS REACTION.
NITROGEN TETROXIDE: POSSIBLE EXPLOSION.
PERCHLORIC ACID (HOT): DANGEROUS INTERACTION.
PERMONOSULFURIC ACID: POSSIBLE EXPLOSION ON CONTACT WITH PRIMARY OR SECONDARY ALCOHOLS.
TRI-ISO-BUTYL ALUMINUM: VIOLENT REACTION.

DECOMPOSITION:
THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC OXIDES OF CARBON.

POLYMERIZATION:
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE-DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

STORAGE

STORE IN ACCORDANCE WITH 29 CFR 1910.106.

BONDING AND GROUNDING: SUBSTANCES WITH LOW ELECTROCONDUCTIVITY, WHICH MAY BE IGNITED BY ELECTROSTATIC SPARKS, SHOULD BE STORED IN CONTAINERS WHICH MEET THE BONDING AND GROUNDING GUIDELINES SPECIFIED IN NFPA 77-1983, RECOMMENDED PRACTICE ON STATIC ELECTRICITY.

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

DISPOSAL

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262. EPA HAZARDOUS WASTE NUMBER D001.
100 POUND CERCLA SECTION 103 REPORTABLE QUANTITY.

CONDITIONS TO AVOID

MSDS # 1279

AVOID CONTACT WITH HEAT, SPARKS, FLAMES, OR OTHER SOURCES OF IGNITION. VAPORS MAY BE EXPLOSIVE AND POISONOUS; DO NOT ALLOW UNNECESSARY PERSONNEL IN AREA. DO NOT OVERHEAT CONTAINERS; CONTAINERS MAY VIOLENTLY RUPTURE AND TRAVEL A CONSIDERABLE DISTANCE IN HEAT OF FIRE.

SPILLS AND LEAKS

OCCUPATIONAL-SPILL:
SHUT OFF IGNITION SOURCES. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. NO SMOKING, FLAMES OR FLARES IN HAZARD AREA. KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND DENY ENTRY.

PROTECTIVE EQUIPMENT SECTION

VENTILATION:
PROVIDE LOCAL EXHAUST OR GENERAL DILUTION VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS. VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

RESPIRATOR:
THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29 CFR 1910 SUBPART Z.
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

ISOPROPYL ALCOHOL:

1000 PPM- ANY POWERED AIR-PURIFYING RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE(S).
ANY CHEMICAL CARTRIDGE RESPIRATOR WITH A FULL FACEPIECE AND ORGANIC VAPOR CARTRIDGE(S).

10,000 PPM- ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A CONTINUOUS FLOW MODE.

12,000 PPM- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE OR FRONT- OR BACK-MOUNTED ORGANIC VAPOR CANISTER.
ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.
ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE.

ESCAPE- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE OR FRONT- OR BACK-MOUNTED ORGANIC VAPOR CANISTER.
ANY APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN

MSDS # 1279

PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE AND OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

EMERGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED BY- OCCUPATIONAL HEALTH SERVICES, INC.

CREATION DATE: 02/26/85 REVISION DATE: 10/09/90

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MSDS # 1484.

MATERIAL SAFETY DATA SHEET OHS21080

OCCUPATIONAL HEALTH SERVICES, INC.
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EMERGENCY CONTACT:
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SUBSTANCE IDENTIFICATION

CAS-NUMBER 497-19-8
RTEC-NUMBER VZ4050000

SUBSTANCE: SODIUM CARBONATE

TRADE NAMES/SYNONYMS:
CARBONIC ACID, DISODIUM SALT: BISODIUM CARBONATE: CALCINED SODA: CARBONIC ACID SODIUM SALT: CARBONIC ACID SODIUM SALT (1:2): DISODIUM CARBONATE: NA-X: SODA: SODA ASH: S-261: S-262: S-263: S-264: S-281: S-495: S-636: OHS21080

CHEMICAL FAMILY:
INORGANIC SALT

MOLECULAR FORMULA: C-O3.2NA MOLECULAR WEIGHT: 105.99

CERCLA RATINGS (SCALE 0-3): HEALTH=2 FIRE=0 REACTIVITY=1 PERSISTENCE=0
NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=0 REACTIVITY=1

COMPONENTS AND CONTAMINANTS

COMPONENT: SODIUM CARBONATE PERCENT: 100

OTHER CONTAMINANTS: NONE

EXPOSURE LIMIT:
NO OCCUPATIONAL EXPOSURE LIMITS ESTABLISHED BY OSHA, ACGIH, OR NIOSH.

PHYSICAL DATA

DESCRIPTION: ODORLESS, COLORLESS TO WHITE, HYGROSCOPIC CRYSTALLINE POWDER, SMALL CRYSTALS, OR GRANULES WITH AN ALKALINE TASTE.

BOILING POINT: DECOMPOSES MELTING POINT: 1564 F (851 C)

SPECIFIC GRAVITY: 2.536 SOLUBILITY IN WATER: 7.1% @ 0 C

PH: 11.5 @ 1% AQ SOLN

OTHER SOLVENTS (SOLVENT - SOLUBILITY):
SOLUBLE IN GLYCEROL; INSOLUBLE IN ALCOHOL, ACETONE

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD
NEGLIGIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

MSDS # 1484

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, HALON, WATER SPRAY OR STANDARD FOAM (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR STANDARD FOAM (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FIREFIGHTING:
NO ACUTE HAZARD. MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. AVOID BREATHING VAPORS OR DUSTS; KEEP UPWIND.

TOXICITY

SODIUM CARBONATE:
ANHYDROUS: 500 MG/24 HOURS SKIN-RABBIT MILD IRRITATION; 100 MG/24 HOURS EYE-RABBIT MODERATE IRRITATION; 100 MG RINSED EYE-RABBIT MILD IRRITATION; 4090 MG/KG ORAL-RAT LD50; 2300 MG/M3/2 HOURS INHALATION-RAT LC50; 1200 MG/M3/2 HOURS INHALATION-MOUSE LC50; 2210 MG/KG SUBCUTANEOUS-MOUSE LD50; 117 MG/KG INTRAPERITONEAL-MOUSE LD50; 800 MG/M3/2 HOURS INHALATION-GUINEA PIG LC50; REPRODUCTIVE EFFECTS DATA (RTECS).
MONOHYDRATE: NO DATA AVAILABLE.
DECAHYDRATE: NO DATA AVAILABLE.
CARCINOGEN STATUS: NONE.
SODIUM CARBONATE IS TOXIC AND A SEVERE EYE, SKIN, AND MUCOUS MEMBRANE IRRITANT.

HEALTH EFFECTS AND FIRST AID

INHALATION:
SODIUM CARBONATE:
IRRITANT/TOXIC.
ACUTE EXPOSURE- DUSTS OR VAPORS MAY CAUSE MUCOUS MEMBRANE IRRITATION WITH COUGHING, SHORTNESS OF BREATH, AND GASTROINTESTINAL CHANGES. EXPOSURE TO 1200 MG/M3/2 HOURS WAS THE LETHAL CONCENTRATION IN MICE TESTED.
CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE PERFORATION OF THE NASAL SEPTUM. EXPOSURE TO A CONCENTRATION OF 10 TO 20 MG/M3 OF A 2% AQUEOUS SOLUTION OF SODIUM CARBONATE FOR 4 HOURS/DAY, 5 DAYS/WEEK, FOR 3 AND A HALF MONTHS CAUSED NO PRONOUNCED EFFECTS IN MALE MICE. HOWEVER, AT HIGHER CONCENTRATIONS, A DECREASE IN WEIGHT GAIN WAS RECORDED. HISTOLOGICAL EXAMINATIONS SHOWED THICKENING OF THE INTRA-ALVEOLAR WALLS, HYPEREMIA, LYMPHOID INFILTRATION, AND DESQUAMATION OF THE LUNGS.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
SODIUM CARBONATE:
IRRITANT.

MSDS # 1484

ACUTE EXPOSURE- CONTACT MAY CAUSE IRRITATION AND REDNESS. CONCENTRATED SOLUTIONS MAY CAUSE ERYTHEMA, BLISTERING AND SKIN NECROSIS. 500 MG APPLIED TO RABBIT SKIN FOR 24 HOURS PRODUCED MILD IRRITATION. A SINGLE APPLICATION OF A 50% WEIGHT BY VOLUME AQUEOUS SOLUTION OF SODIUM CARBONATE TO INTACT SKIN OF RABBITS, GUINEA PIGS, AND HUMANS SHOWED NO ERYTHEMA, EDEMA, OR CORROSION. HOWEVER, WHEN APPLIED TO ABRADED SKIN, MODERATE ERYTHEMA AND EDEMA RESULTED IN RABBITS AND HUMANS, WITH NEGLIGIBLE EFFECTS IN GUINEA PIGS. IN ONE-THIRD OF THE HUMAN VOLUNTEERS, TISSUE DESTRUCTION WAS SEEN AT THE ABRADED SITES.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE DERMATITIS AND POSSIBLE "SODA ULCERS" OF THE HANDS AND WRISTS. SENSITIVITY REACTIONS MAY OCCUR FROM REPEATED EXPOSURES.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
SODIUM CARBONATE:
IRRITANT.

ACUTE EXPOSURE- CONTACT WITH DUSTS MAY CAUSE SEVERE IRRITATION WITH REDNESS, PAIN, AND BLURRED VISION. APPLICATION OF 100 MG TO RABBIT EYES AND THEN RINSED CAUSED ONLY MILD IRRITATION. IN SOLUTION, SODIUM CARBONATE IS SUFFICIENTLY ALKALINE TO DAMAGE THE CORNEAL EPITHELIUM, BUT IF PROMPTLY WASHED FROM THE EYES WITH WATER IT IS UNLIKELY TO CAUSE PERMANENT DAMAGE TO THE CORNEAL STROMA. AN APPLICATION OF SEVERAL DROPS OF A 10% SOLUTION (PH 10.7) TO A RABBIT'S EYE FOLLOWED BY IRRIGATION WITH WATER FOR 30 SECONDS CAUSED NO DETECTABLE INJURY. CONCENTRATED SOLUTIONS MAY CAUSE NECROSIS OF THE EYE.

CHRONIC EXPOSURE- DEPENDING UPON CONCENTRATION AND DURATION, SYMPTOMS MAY BE THOSE AS FOR ACUTE EXPOSURE.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). CONTINUE IRRIGATING WITH NORMAL SALINE UNTIL THE PH HAS RETURNED TO NORMAL (30-60 MINUTES). COVER WITH STERILE BANDAGES. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
SODIUM CARBONATE:
CORROSIVE.

ACUTE EXPOSURE- INGESTION MAY CAUSE CORROSION OF THE GASTRIC MUCOSA WITH SORE THROAT AND PAIN. IT MAY CAUSE GASTROINTESTINAL DISTURBANCES SUCH AS NAUSEA, VOMITING, ABDOMINAL PAIN, AND DIARRHEA. DEATH IS GENERALLY DUE TO CIRCULATORY COLLAPSE. THE ESTIMATED LETHAL HUMAN DOSE IS APPROXIMATELY 30 GRAMS.

CHRONIC EXPOSURE- SODIUM CARBONATE IS USED AS A GENERAL PURPOSE FOOD ADDITIVE. NO ADVERSE EFFECTS HAVE BEEN REPORTED FROM EXPOSURE TO SMALL AMOUNTS.

FIRST AID- DILUTE THE ALKALI BY GIVING WATER OR MILK IMMEDIATELY AND ALLOW VOMITING TO OCCUR. AVOID GASTRIC LAVAGE OR EMETICS. ESOPHAGOSCOPY IS THE ONLY WAY TO EXCLUDE THE POSSIBLITY OF CORROSION IN THE UPPER GASTROINTESTINAL TRACT; IF CORROSION IS SUSPECTED, ESOPHAGOSCOPY SHOULD USUALLY BE PERFORMED WITHIN 24 HOURS. (DREISBACH, HANDBOOK OF POISONING, 12TH ED.). MAINTAIN AIRWAY AND TREAT SHOCK. IF VOMITING OCCURS, KEEP HEAD BELOW HIPS TO HELP PREVENT ASPIRATION. GET MEDICAL ATTENTION IMMEDIATELY.

ANTIDOTE:

NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

MSDS # 1484

REACTIVITY SECTION

REACTIVITY:
REACTS WITH WATER WITH THE EVOLUTION OF HEAT.

INCOMPATIBILITIES:
SODIUM CARBONATE:
ACIDS (STRONG): MAY REACT VIOLENTLY.
ALUMINUM (HOT): EXPLOSIVE REACTION.
AMMONIA + SILVER NITRATE: EXPLOSIVE REACTION UPON HEATING.
AN AROMATIC AMINE + A CHLORONITRO COMPOUND: EXOTHERMIC REACTION.
2,4-DINITROTOLUENE: INCREASES EXPLOSIVENESS.
FLUORINE: VIOLENT IGNITION.
LITHIUM (BURNING): RELEASES REACTIVE SODIUM.
PHOSPHORUS PENTOXIDE: HIGHLY EXOTHERMIC REACTION.
SODIUM SULFIDE (HOT): EXPLOSIVE REACTION ON CONTACT WITH WATER.
SULFURIC ACID: VIOLENT ERUPTION.
2,4,6-TRINITROTOLUENE: REDUCED EXPLOSION TEMPERATURE.
ZINC: CORROSIVE.

DECOMPOSITION:
THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC SODIUM OXIDE AND TOXIC OXIDES OF CARBON.

POLYMERIZATION:
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE-DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE.

STORAGE

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

CONDITIONS TO AVOID

NONE REPORTED.

SPILLS AND LEAKS

MSDS # 1484

OCCUPATIONAL-SPILL:
SWEEP UP AND PLACE IN SUITABLE (FIBERBOARD) CONTAINERS FOR RECLAMATION OR LATER DISPOSAL.

PROTECTIVE EQUIPMENT SECTION

VENTILATION:
PROVIDE LOCAL EXHAUST OR GENERAL DILUTION VENTILATION SYSTEM.

RESPIRATOR:
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON THE CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION.
THE FOLLOWING RESPIRATORS ARE RECOMMENDED BASED ON THE DATA FOUND IN THE PHYSICAL DATA, HEALTH EFFECTS AND TOXICITY SECTIONS. THEY ARE RANKED IN ORDER FROM MINIMUM TO MAXIMUM RESPIRATORY PROTECTION:

DUST AND MIST RESPIRATOR WITH A FULL FACEPIECE.

AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.

POWERED AIR-PURIFYING RESPIRATOR WITH A TIGHT-FITTING FACEPIECE AND HIGH-EFFICIENCY PARTICULATE FILTER.

TYPE 'C' SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE OR WITH A FULL FACEPIECE, HELMET OR HOOD OPERATED IN CONTINUOUS-FLOW MODE.

SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.

SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE AND OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT

MSDS #1484

CONTACT WITH THIS SUBSTANCE. CONTACT LENSES SHOULD NOT BE WORN.

EMERGENCY WASH FACILITIES:
WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES AND/OR SKIN MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN AND QUICK DRENCH SHOWER WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED BY- OCCUPATIONAL HEALTH SERVICES, INC.

CREATION DATE: 12/19/84 REVISION DATE: 03/22/89

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MATERIAL SAFETY DATA SHEET OHS12880

MSDS # 1614

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SUBSTANCE IDENTIFICATION

CAS-NUMBER 554-13-2
RTEC-NUMBER OJ5800000

SUBSTANCE: LITHIUM CARBONATE

TRADE NAMES/SYNONYMS:
CARBONIC ACID, DILITHIUM SALT: DILITHIUM CARBONATE: CARBONIC ACID, LITHIUM SALT: LITHIUM CARBONATE (LI2CO3): CARBOLITH: ESKALITH: HYPNOREX: LITHONATE: LITHOTABS: PLENUR: L-119: CLI2O3: OHS12880

CHEMICAL FAMILY:
INORGANIC SALT

MOLECULAR FORMULA: LI2-C-O3 MOLECULAR WEIGHT: 73.89

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=0 PERSISTENCE=0
NFPA RATINGS (SCALE 0-4): HEALTH=U FIRE=0 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: LITHIUM CARBONATE PERCENT: 100

EXPOSURE LIMIT:
NO OCCUPATIONAL EXPOSURE LIMITS ESTABLISHED BY OSHA, ACGIH, OR NIOSH.

PHYSICAL DATA

DESCRIPTION: WHITE CRYSTALLINE POWDER.

BOILING POINT: 2390 F (1310 C)
(DECOMPOSES)

MELTING POINT: 1333 F (723 C)

SPECIFIC GRAVITY: 2.11

SOLUBILITY IN WATER: 1.54% @ 0 C

PH: 11.2 @ I% SOLUTION

OTHER SOLVENTS (SOLVENT - SOLUBILITY):
INSOLUBLE IN ALCOHOL, ACETONE, AMMONIA.

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD
NEGLIGIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

MSDS # 1614

FIREFIGHTING MEDIA:
EXTINGUISH USING AGENT SUITABLE FOR TYPE OF SURROUNDING FIRE.

FIREFIGHTING:
NO ACUTE HAZARD. MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. AVOID BREATHING VAPORS OR DUSTS; KEEP UPWIND.

TOXICITY

LITHIUM CARBONATE:
1111 MG/KG ORAL-HUMAN TDLO; 54 MG/KG ORAL-MAN TDLO; 8 MG/KG ORAL-MAN TDLO; 080 MG/KG/13 WEEKS INTERMITTENT ORAL-MAN TDLO; 120 MG/KG/10 DAYS INTERMITTENT ORAL-WOMAN TDLO; 525 MG/KG ORAL-RAT LD50; 531 MG/KG ORAL-MOUSE LD50; 556 MG/KG/32 DAYS UNREPORTED-WOMAN TDLO; 500 MG/KG ORAL-DOG LD50; 156 MG/KG INTRAPERITONEAL-RAT LD50; 241 MG/KG INTRAVENOUS-RAT LD50; 434 MG/KG SUBCUTANEOUS-RAT LD50; 236 MG/KG INTRAPERITONEAL-MOUSE LD50; 497 MG/KG INTRAVENOUS-MOUSE LD50; 413 MG/KG SUBCUTANEOUS-MOUSE LD50; MUTAGENIC DATA (RTECS); REPRODUCTIVE EFFECTS DATA (RTECS); TUMORIGENIC DATA (RTECS).
CARCINOGEN STATUS: NONE.
LITHIUM CARBONATE IS AN EYE IRRITANT AND MAY IRRITATE THE SKIN AND MUCOUS MEMBRANES. POISONING MAY AFFECT THE NERVOUS SYSTEM, KIDNEYS AND THYROID. PERSONS AT INCREASED RISK FROM EXPOSURE MAY INCLUDE INDIVIDUALS WITH SIGNIFICANT CARDIOVASCULAR OR RENAL DISEASE; SODIUM AND WATER IMBALANCE; AND PREEXISTING HYPOTHYROIDISM. TASKS REQUIRING ALERTNESS MAY BE IMPAIRED.

HEALTH EFFECTS AND FIRST AID

INHALATION:
LITHIUM CARBONATE:
ACUTE EXPOSURE- INHALATION MAY CAUSE COUGHING, SORE THROAT AND IRRITATION.
CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
LITHIUM CARBONATE:
ACUTE EXPOSURE- APPLICATION OF 0.5 GRAMS TO RABBIT SKIN UNDER OCCLUSIVE WRAP FOR 4 HOURS PRODUCED MINIMAL IRRITATION. A GRADE OF 0.3 ON A SCALE OF 0 TO 8 WAS REPORTED FOLLOWING A 30 MINUTE INTERVAL AFTER THE SKIN WAS RINSED. ONE RABBIT IN THE STUDY HAD SLIGHT ERYTHEMA ON DAYS 1-4 FOLLOWING THE EXPOSURE.
CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:

MSDS # 1614

LITHIUM CARBONATE:
IRRITANT.
ACUTE EXPOSURE- INSTILLATION OF 0.10 GRAMS INTO RABBIT EYES PRODUCED MODERATE IRRITATION. SLIGHT TO MILD CORNEAL OPACITIES, IRITIS, SLIGHT TO MODERATE CONJUNCTIVITIS, HEMORRHAGES AND WHITE AREAS ON THE CONJUNCTIVA WERE NOTED. A GRADE OF 41 ON A SCALE OF 0-110 WAS REPORTED AFTER 24 HOURS. NO EFFECTS WERE NOTED BY DAY 7 OF THE STUDY. WASHING THE EYES WITH TAP WATER SHORTLY AFTER EXPOSURE DECREASED BOTH THE SEVERITY AND DURATION OF EFFECTS WITH RECOVERY OCCURRING IN 4 DAYS.
CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE TO IRRITANTS MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
LITHIUM CARBONATE:
ACUTE EXPOSURE- INGESTION OF A LARGE DOSE MAY CAUSE SEVERE GASTROENTERITIS AND EFFECTS ON THE CENTRAL NERVOUS SYSTEM, RENAL FUNCTION AND FLUID AND ELECTROLYTE BALANCE. SYMPTOMS, POSSIBLY DELAYED, MAY INCLUDE NAUSEA, VOMITING, THIRST, ANOREXIA, DIARRHEA, BLURRED VISION, DROWSINESS, WEAKNESS, TREMOR, STAGGERING, BRADYCARDIA AND COMA. MORE UNUSUAL REACTIONS MAY INCLUDE DELIRIUM WITH EEG CHANGES, ACTION MYOCLONUS, RHABDOMYOLYSIS, ECG CHANGES, GLYCOSURIA, AND ALLERGIC ERYTHEMA. A PAINFUL DISCOLORATION OF THE FINGERS AND TOES AND COLDNESS OF THE EXTREMITIES WITHIN 1 DAY OF THERAPEUTIC USE HAS BEEN REPORTED. IN SEVERE CASES, DEATH MAY OCCUR DUE TO RENAL FAILURE OR CARDIAC OR PULMONARY COMPLICATIONS. SOME SURVIVORS MAY HAVE LONG-LASTING OR PERMANENT SEQUELAE, MOSTLY OF CEREBELLAR NATURE BUT, SOMETIMES WITH PERIPHERAL NEUROPATHY OR PARKINSONISM.
CHRONIC EXPOSURE- REPEATED OR PROLONGED INGESTION MAY CAUSE SYMPTOMS AS DETAILED IN ACUTE INGESTION. IN ADDITION, A METALLIC TASTE, DRY MOUTH, EXCESSIVE THIRST, ABDOMINAL PAIN AND INCONTINENCE OF URINE AND FECES MAY OCCUR. NERVOUS SYSTEM EFFECTS MAY INCLUDE A DAZED FEELING, CONFUSION, GIDDINESS, MENTAL LAPSES, DYSPRAXIA, DROWSINESS, VERTIGO, HEADACHE, APATHY, RESTLESSNESS, ANXIETY, SOME SUPPRESSION OF THE REM PHASES OF SLEEP, POSITIVE ROMBERG SIGN, BLACKOUT SPELLS, STUPOR, TINNITUS, AND UNCONSCIOUSNESS. NEUROLOGIC ASYMMETRY, PSYCHOMOTOR RETARDATION, SLURRED SPEECH, NYSTAGMUS AND EPILEPTIFORM SEIZURES MAY OCCUR. PSEUDOTUMOR CEREBRI (INCREASED INTRACRANIAL PRESSURE AND PAPILLEDEMA) HAS BEEN REPORTED AND MAY POSSIBLY RESULT IN ENLARGEMENT OF THE BLIND SPOT, CONSTRICTION OF VISUAL FIELDS AND EVENTUAL BLINDNESS DUE TO OPTIC ATROPHY. PHOTOPHOBIA HAS BEEN REPORTED. MUSCULAR EFFECTS MAY INCLUDE TREMORS, ATAXIA, MUSCULAR AND REFLEX HYPERIRRITABILITY WITH FASCICULATIONS, TWITCHING AND SPASTIC OR CHOREO-ATHETOTIC MOVEMENTS, COGWHEEL RIGIDITY, PARKINSONISM AND DYSTONIA. TWO CASES INVOLVING SEVERE GENERALIZED SENSORIMOTOR PERIPHERAL NEUROPATHY HAVE BEEN REPORTED. CARDIAC ARRHYTHMIAS, HYPOTENSION, PERIPHERAL CIRCULATORY COLLAPSE, AND INTERSTITIAL MYOCARDITIS ARE POSSIBLE. LEUKOCYTOSIS IS FAIRLY COMMON. ENDOCRINE EFFECTS MAY INCLUDE DISTURBED IODINE METABOLISM, STIMULATION OF ANTITHYROIDAL AUTO-ANTIBODIES, HYPOTHYROIDISM WITH MYXEDEMA, OR RARELY HYPERTHYROIDISM. OSTEOPOROSIS, AN INCREASE IN SERUM TOTAL CALCIUM, IONIZED CALCIUM AND PARATHYROID HORMONE AND INDEPENDENTLY FUNCTIONING PARATHYROID ADENOMAS HAVE BEEN REPORTED. TRANSITORY NEPHROTIC SYNDROME AND ACQUIRED NEPHROGENIC DIABETES INSIPIDUS MAY OCCUR. TRANSIENT HYPERGLYCEMIA, LOWERED URINARY CONCENTRATING ABILITY LEADING TO HYPERNATREMIA AND HYPEROSMOLALITY, SODIUM DEPLETION, POLYURIA,

MSDS # 1614

GLYCOSURIA, OLIGURIA, ANURIA, AND AZOTEMIA ARE POSSIBLE. MORPHOLOGIC CHANGES WITH GLOMERULAR AND INTERSTITIAL FIBROSIS AND NEPHRON ATROPHY HAVE BEEN REPORTED. HOWEVER, A CAUSAL RELATIONSHIP HAS NOT BEEN ESTABLISHED. DERMATOLOGIC EFFECTS MAY INCLUDE CUTANEOUS HYPERALGESIA OR ANESTHESIA, XEROSIS CUTIS, CHRONIC FOLLICULITIS, GENERALIZED PRURITUS WITH OR WITHOUT RASH, DEVELOPMENT OR EXACERBATION OF ACNE OR PSORIASIS, CUTANEOUS ULCERS AND ALOPECIA. HYPER- OR HYPOTHERMIA, WEIGHT GAIN, EDEMA OF THE ANKLES AND WRISTS, AND SEXUAL DYSFUNCTION HAVE BEEN REPORTED. DEATH MAY OCCUR DUE TO RENAL FAILURE, BRAIN DAMAGE OR PULMONARY COMPLICATIONS. LITHIUM READILY CROSSES THE PLACENTAL BARRIER AND IS EXCRETED IN BREAST MILK. THE USE OF LITHIUM IN PREGNANCY HAS BEEN ASSOCIATED WITH NEONATAL GOITER, CARDIAC ANOMALIES, ESPECIALLY EBSTEIN'S, CENTRAL NERVOUS SYSTEM DEPRESSION AND HYPOTONIA. MARKED FUNCTIONAL AND STRUCTURAL CHANGES IN THE KIDNEYS OF NEWBORN RATS EXPOSED TO LITHIUM VIA THEIR MOTHER'S MILK HAVE BEEN REPORTED. ADVERSE EFFECTS ON NIDATION IN RATS AND EMBRYO VIABILITY IN MICE HAVE BEEN ATTRIBUTED TO LITHIUM, AS HAVE TERATOGENICITY IN SUBMAMMALIAN SPECIES AND CLEFT PALATES IN MICE. HOWEVER, OTHER STUDIES IN RATS, RABBITS AND MONKEYS HAVE SHOWN NO EVIDENCE OF LITHIUM-INDUCED DEVELOPMENTAL DEFECTS. LEUKEMIA HAS BEEN REPORTED DURING LITHIUM TREATMENT. HOWEVER, AN EPIDEMIOLOGIC STUDY INVOLVING A POPULATION OF 173,000 PERSONS YEILDED NEGATIVE RESULTS.

IRST AID- IF VICTIM IS CONSCIOUS AND PRODUCTIVE VOMITING HAS NOT ALREADY OCCURRED, REMOVE POISON BY IPECAC EMESIS OR GASTRIC LAVAGE. (GOSSELIN, SMITH AND HODGE, CLINICAL TOXICOLOGY OF COMMERCIAL PRODUCTS, 5TH EDITION) MAINTAIN AIRWAY, RESPIRATION AND BLOOD PRESSURE. GET MEDICAL ATTENTION. ADMINISTRATION OF GASTRIC LAVAGE SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.

NTIDOTE:
O SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY SECTION

EACTIVITY:
TABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

NCOMPATIBILITIES:
ITHIUM CARBONATE:
ACIDS (DILUTE): DECOMPOSES.
ACIDS (STRONG): MAY REACT VIOLENTLY.
FLUORINE: DECOMPOSES WITH INCANDESCENCE.
METALS: MAY BE CORROSIVE IN THE PRESCENCE OF MOISTURE.

ECOMPOSITION:
HERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC OXIDES OF CARBON.

OLYMERIZATION:
AZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL EMPERATURES AND PRESSURES.

STORAGE-DISPOSAL

MSDS # 1614

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

STORAGE

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

CONDITIONS TO AVOID

PREVENT DISPERSION OF DUST IN AIR.

SPILLS AND LEAKS

OCCUPATIONAL-SPILL:
FOR LARGE SPILLS, SWEEP UP WITH A MINIMUM OF DUSTING AND PLACE INTO SUITABLE CLEAN, DRY CONTAINERS FOR RECLAMATION OR LATER DISPOSAL.

RESIDUE SHOULD BE CLEANED UP USING A HIGH-EFFICIENCY PARTICULATE FILTER VACUUM.

PROTECTIVE EQUIPMENT SECTION

VENTILATION:
PROVIDE LOCAL EXHAUST OR GENERAL DILUTION VENTILATION SYSTEM.

RESPIRATOR:
THE FOLLOWING RESPIRATORS ARE RECOMMENDED BASED ON INFORMATION FOUND IN THE PHYSICAL DATA, TOXICITY AND HEALTH EFFECTS SECTIONS. THEY ARE RANKED IN ORDER FROM MINIMUM TO MAXIMUM RESPIRATORY PROTECTION.
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

DUST AND MIST RESPIRATOR.

AIR-PURIFYING RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.

POWERED AIR-PURIFYING RESPIRATOR WITH A DUST AND MIST FILTER.

POWERED AIR-PURIFYING RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.

TYPE 'C' SUPPLIED-AIR RESPIRATOR OPERATED IN THE PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE OR CONTINUOUS-FLOW MODE.

SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

MSDS # 1614

SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.

SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE AND OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

LOTHING:
PROTECTIVE CLOTHING NOT REQUIRED. AVOID REPEATED OR PROLONGED CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE. CONTACT LENSES SHOULD NOT BE WORN.

AUTHORIZED BY- OCCUPATIONAL HEALTH SERVICES, INC.

CREATION DATE: 10/23/84 REVISION DATE: 06/27/89

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MATERIAL SAFETY DATA SHEET OHS19290 MSDS # 2875

OCCUPATIONAL HEALTH SERVICES, INC.
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EMERGENCY CONTACT:
JOHN S. BRANSFORD, JR. (615) 292-1180

SUBSTANCE IDENTIFICATION

CAS-NUMBER 584-08-7
RTEC-NUMBER TS7750000

SUBSTANCE: POTASSIUM CARBONATE

TRADE NAMES/SYNONYMS:
CARBONIC ACID, DIPOTASSIUM SALT: SALT OF TARTAR: POTASH: PEARL ASH:
DIPOTASSIUM CARBONATE: OHS19290

CHEMICAL FAMILY:
INORGANIC SALT

MOLECULAR FORMULA: C-03.2K MOLECULAR WEIGHT: 138.21

CERCLA RATINGS (SCALE 0-3): HEALTH=2 FIRE=0 REACTIVITY=1 PERSISTENCE=0
NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=0 REACTIVITY=1

COMPONENTS AND CONTAMINANTS

COMPONENT: POTASSIUM CARBONATE PERCENT: 100

OTHER CONTAMINANTS: NONE

EXPOSURE LIMIT:
NO OCCUPATIONAL EXPOSURE LIMITS ESTABLISHED BY OSHA, ACGIH, OR NIOSH.

PHYSICAL DATA

DESCRIPTION: ODORLESS, COLORLESS, HYGROSCOPIC, MONOCLINIC CRYSTALS, GRANULES OR POWDER WITH A STRONG ALKALINE TASTE.

BOILING POINT: DECOMPOSES MELTING POINT: 1636 F (891 C)

SPECIFIC GRAVITY: 2.428 SOLUBILITY IN WATER: 112% @ 20 C

PH: 11.6

OTHER SOLVENTS (SOLVENT - SOLUBILITY):
INSOLUBLE IN ALCOHOL, ACETONE, ETHYL ALCOHOL

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD
NEGLIGIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

2875

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR FOAM

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL FOAM

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. DO NOT SCATTER SPILLED MATERIAL WITH MORE WATER THAN NEEDED FOR FIRE CONTROL. DIKE FIRE CONTROL WATER FOR LATER DISPOSAL

USE AGENTS SUITABLE FOR TYPE OF SURROUNDING FIRE. AVOID BREATHING HAZARDOUS VAPORS, KEEP UPWIND.

TOXICITY

POTASSIUM CARBONATE:
TOXICITY DATA:
ANHYDROUS: 1870 MG/KG ORAL-RAT LD50; 100 MG/KG ORAL-WILD BIRD LD50.
SESQUIHYDRATE: NO DATA AVAILABLE.
CARCINOGEN STATUS: NONE.
LOCAL EFFECTS: IRRITANT- INHALATION, SKIN, EYES.
ACUTE TOXICITY LEVEL: MODERATELY TOXIC BY INGESTION.
TARGET EFFECTS: NO DATA AVAILABLE.

HEALTH EFFECTS AND FIRST AID

INHALATION:
POTASSIUM CARBONATE:
IRRITANT.
ACUTE EXPOSURE- INHALATION OF DUSTS MAY CAUSE MUCOUS MEMBRANE EFFECTS INCLUDING COUGH, PAINFUL THROAT AND NASAL IRRITATION. SUPERFICIAL DESTRUCTION OF THE MUCOUS MEMBRANES MAY OCCUR.
CHRONIC EXPOSURE- PROLONGED INHALATION OF ALKALINE MATERIALS MAY PRODUCE LESIONS OF THE NASAL SEPTUM.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. MAINTAIN AIRWAY AND BLOOD PRESSURE AND ADMINISTER OXYGEN IF AVAILABLE. KEEP AFFECTED PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. ADMINISTRATION OF OXYGEN SHOULD BE PERFORMED BY QUALIFIED PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
POTASSIUM CARBONATE:
IRRITANT.
ACUTE EXPOSURE- DIRECT CONTACT MAY PRODUCE STRONG IRRITATION AND SUPERFICIAL DESTRUCTION OF THE SKIN. DEPENDING UPON THE DURATION OF CONTACT; BURNS MAY OCCUR.
CHRONIC EXPOSURE- PROLONGED CONTACT WITH CARBONATE SOLUTIONS MAY CAUSE ECZEMA, DERMATITIS AND ULCERATION. CONTACT WITH BAGGED CARBONATES MAY CAUSE CHERRY-SIZED NECROTIC PORTIONS OF THE SKIN. SUBSEQUENT DEEP

2875

ULCERATED PITTING OF THE SKIN IS SOMETIMES OBSERVED.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). IN CASE OF CHEMICAL BURNS, COVER AREA WITH STERILE, DRY DRESSING. BANDAGE SECURELY, BUT NOT TOO TIGHTLY. GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
POTASSIUM CARBONATE:
IRRITANT.
ACUTE EXPOSURE- CONTACT WITH DUSTS MAY CAUSE IRRITATION. EXPERIMENTAL IRRIGATION OF THE SURFACE OF THE EYES OF RABBITS WITH A 10% SOLUTION AT PH 11.6 FOR 30 SECONDS CAUSED PAIN AND VERY SLIGHT TRANSIENT OPTICAL IRREGULARITY OF THE EPITHELIUM. HOWEVER, 1 TO 2 HOURS LATER THE CORNEAS AND CONJUNCTIVA APPEARED NORMAL UPON EXAMINATION. CONCENTRATED ALKALIES MAY CAUSE CONJUNCTIVAL EDEMA AND CORNEAL DESTRUCTION.
CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE TO IRRITANTS MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). CONTINUE IRRIGATING WITH NORMAL SALINE UNTIL THE PH HAS RETURNED TO NORMAL (30-60 MINUTES). COVER WITH STERILE BANDAGES. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
POTASSIUM CARBONATE:
ACUTE EXPOSURE- THE ESTIMATED FATAL DOSE FOR POTASSIUM CARBONATE IS 20 GRAMS. INGESTION OF A STRONG ALKALI MAY CAUSE SEVERE PAIN, VOMITING, DIARRHEA, AND COLLAPSE. THE VOMITUS MAY CONTAIN BLOOD AND DESQUAMATED MUCOSAL LINING. IF DEATH DOES NOT OCCUR IN THE FIRST 24 HOURS, THE PATIENT MAY IMPROVE FOR 2-4 DAYS AND THEN HAVE A SUDDEN ONSET OF SEVERE ABDOMINAL PAIN, BOARDLIKE ABDOMINAL RIGIDITY, AND RAPID FALL OF BLOOD PRESSURE INDICATING DELAYED GASTRIC OR ESOPHAGEAL PERFORATION. EVEN THOUGH THE PATIENT RECOVERS FROM THE IMMEDIATE DAMAGE, ESOPHAGEAL STRICTURE CAN OCCUR WEEKS, MONTHS, OR EVEN YEARS LATER TO MAKE SWALLOWING DIFFICULT. APPROXIMATELY 25% OF THOSE WHO INGEST STRONG ALKALI DIE FROM THE IMMEDIATE EFFECTS. DAMAGE TO THE ESOPHAGUS AND STOMACH AFTER INGESTION MAY PROGRESS FOR 2-3 WEEKS. DEATH FROM PERITONITIS MAY OCCUR AS LATE AS 1 MONTH AFTER INGESTION. APPROXIMATELY 95% OF THOSE WHO INGEST STRONG ALKALI AND RECOVER FROM THE IMMEDIATE EFFECTS HAVE PERSISTENT ESOPHAGEAL STRICTURE.
CHRONIC EXPOSURE- IN A STUDY FOR THE FOOD AND DRUG ADMINISTRATION, POTASSIUM CARBONATE WAS FOUND TO BE NONTERATOGENIC IN MICE WHEN THEY WERE GIVEN DAILY ORAL INTUBATIONS OF UP TO 290 MG/KG ON DAYS 6-15 OF GESTATION.

FIRST AID- DILUTE THE ALKALI BY GIVING WATER OR MILK IMMEDIATELY AND ALLOW VOMITING TO OCCUR. AVOID GASTRIC LAVAGE OR EMETICS. ESOPHAGOSCOPY IS THE ONLY WAY TO EXCLUDE THE POSSIBLITY OF CORROSION IN THE UPPER GASTROINTESTINAL TRACT; IF CORROSION IS SUSPECTED, ESOPHAGOSCOPY SHOULD USUALLY BE PERFORMED WITHIN 24 HOURS (DREISBACH, HANDBOOK OF POISONING, 12TH ED.). MAINTAIN AIRWAY AND TREAT SHOCK. IF VOMITING OCCURS, KEEP HEAD BELOW HIPS TO HELP PREVENT ASPIRATION. GET MEDICAL ATTENTION IMMEDIATELY.

ANTIDOTE:
NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

2875.

REACTIVITY SECTION

REACTIVITY:
REACTS WITH WATER WITH THE EVOLUTION OF HEAT.

INCOMPATIBILITIES:
POTASSIUM CARBONATE:
ACIDS: EXOTHERMIC REACTION.
CARBON: POSSIBLE EXPLOSION ON HEATING.
CHLORINE TRIFLUORIDE: VIOLENT REACTION WITH IGNITION.
MAGNESIUM: FORMATION OF EXPLOSIVE COMPOUND ON HEATING.

DECOMPOSITION:
THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC OXIDES OF CARBON.

POLYMERIZATION:
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE-DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

STORAGE

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

CONDITIONS TO AVOID

NONE REPORTED.

SPILLS AND LEAKS

OCCUPATIONAL-SPILL:
NO SPECIAL PRECAUTIONS INDICATED.

PROTECTIVE EQUIPMENT SECTION

VENTILATION:
PROVIDE LOCAL EXHAUST OR GENERAL DILUTION VENTILATION SYSTEM.

RESPIRATOR:
THE FOLLOWING RESPIRATORS ARE RECOMMENDED BASED ON INFORMATION FOUND IN THE PHYSICAL DATA, TOXICITY AND HEALTH EFFECTS SECTIONS. THEY ARE RANKED IN

MSDS #2875

ORDER FROM MINIMUM TO MAXIMUM RESPIRATORY PROTECTION.
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

DUST AND MIST RESPIRATOR WITH A FULL FACEPIECE.

AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.

POWERED AIR-PURIFYING RESPIRATOR WITH A TIGHT-FITTING FACEPIECE AND HIGH-EFFICIENCY PARTICULATE FILTER.

TYPE 'C' SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE OR WITH A FULL FACEPIECE, HELMET OR HOOD OPERATED IN CONTINUOUS-FLOW MODE.

SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE AND OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT ANY POSSIBILITY OF SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

EMERGENCY WASH FACILITIES:
WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES AND/OR SKIN MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN AND QUICK DRENCH SHOWER WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED BY- OCCUPATIONAL HEALTH SERVICES, INC.

CREATION DATE: 12/08/86 REVISION DATE: 12/20/89

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MATERIAL SAFETY DATA SHEET OHS14280

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NEW YORK, NEW YORK 10036
1-800-445-MSDS (1-800-445-6737) OR 1-212-789-3535

FOR EMERGENCY SOURCE INFORMATION
CONTACT: 1-615-366-2000

MSDS # 1329

SUBSTANCE IDENTIFICATION

CAS-NUMBER 67-56-1
RTEC-NUMBER PC1400000

SUBSTANCE: METHYL ALCOHOL

TRADE NAMES/SYNONYMS:
METHANOL: WOOD ALCOHOL: METHYL HYDROXIDE: CARBINOL: MONOHYDROXYMETHANE: WOOD SPIRIT: WOOD NAPHTHA: METHYLOL: COLONIAL SPIRIT: COLUMBIAN SPIRIT: PYROXYLIC SPIRIT: BOOSTER FUEL (HENES PRODUCT CORP.): METHANOL (ELECTROKLEIN) (ROK): METHANOL, SPECTRO QUALITY (MCB MANF. CHEMIST): COULOMATIC (R) CONDITIONER SOLUTION: STANDARD WATER IN METHANOL: STCC 4904230: RCRA U154: UN 1230: CH4O: OHS14280

CHEMICAL FAMILY:
HYDROXYL, ALIPHATIC

MOLECULAR FORMULA: C-H3-O-H MOLECULAR WEIGHT: 32.04

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=3 REACTIVITY=0 PERSISTENCE=0
NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=3 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: METHYL ALCOHOL (METHANOL) CAS# 67-56-1 PERCENT: 100

OTHER CONTAMINANTS: NONE

EXPOSURE LIMIT:
METHYL ALCOHOL (METHANOL):
200 PPM (260 MG/M3) OSHA TWA (SKIN); 250 PPM (325 MG/M3) OSHA STEL
200 PPM (260 MG/M3) ACGIH TWA (SKIN); 250 PPM (310 MG/M3) ACGIH STEL
200 PPM NIOSH RECOMMENDED 10 HOUR TWA;
800 PPM NIOSH RECOMMENDED 15 MINUTE CEILING

5000 POUNDS CERCLA SECTION 103 REPORTABLE QUANTITY
SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

PHYSICAL DATA

DESCRIPTION: CLEAR, COLORLESS LIQUID WITH A CHARACTERISTIC ALCOHOLIC ODOR.

BOILING POINT: 149 F (65 C) MELTING POINT: -137 F (-94 C)

SPECIFIC GRAVITY: 0.7914 EVAPORATION RATE: (BUTYL ACETATE=1) 4.6

VISCOSITY: 0.59 CPS @ 20 C

SOLUBILITY IN WATER: VERY SOLUBLE

VAPOR DENSITY: 1.11

VAPOR PRESSURE: 97.25 MMHG @ 20 C

ODOR-THRESHOLD: 100 PPM

MSDS # 1329

OTHER SOLVENTS (SOLVENT - SOLUBILITY):
SOLUBLE IN ETHER, BENZENE, ALCOHOL, ACETONE,
CHLOROFORM, ETHANOL, KETONES AND MOST OTHER ORGANIC SOLVENTS.

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD
DANGEROUS FIRE HAZARD WHEN EXPOSED TO HEAT, FLAME, OR OXIDIZERS.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.

VAPOR-AIR MIXTURES ARE EXPLOSIVE.

FLASH POINT: 52 F (11 C) (CC)

UPPER EXPLOSION LIMIT: 36.0%

LOWER EXPLOSION LIMIT: 6.0%

AUTOIGNITION TEMP.: 725 F (385 C)

FLAMMABILITY CLASS (OSHA): IB

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR ALCOHOL-RESISTANT FOAM (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL-RESISTANT FOAM (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. DIKE FIRE-CONTROL WATER FOR LATER DISPOSAL; DO NOT SCATTER THE MATERIAL. APPLY COOLING WATER TO SIDES OF CONTAINERS THAT ARE EXPOSED TO FLAMES UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM ENDS OF TANKS. WITHDRAW IMMEDIATELY IN CASE OF RISING SOUND FROM VENTING SAFETY DEVICE OR ANY DISCOLORATION OF TANK DUE TO FIRE. ISOLATE FOR 1/2 MILE IN ALL DIRECTIONS IF TANK, RAIL CAR OR TANK TRUCK IS INVOLVED IN FIRE (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 28).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED; USE WATER IN FLOODING AMOUNTS AS FOG, SOLID STREAMS MAY NOT BE EFFECTIVE. COOL CONTAINERS WITH FLOODING QUANTITIES OF WATER, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING TOXIC VAPORS, KEEP UPWIND.

TRANSPORTATION

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49 CFR 172.101:
FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49 CFR 172.101 AND SUBPART E:

FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49 CFR 173.119
EXCEPTIONS: 49 CFR 173.118

MSDS # 1329

TOXICITY

METHYL ALCOHOL (METHANOL):
IRRITATION DATA: 20 MG/24 HOURS SKIN-RABBIT MODERATE; 40 MG EYE-RABBIT MODERATE; 100 MG/24 HOURS EYE-RABBIT MODERATE.
TOXICITY DATA: 86,000 MG/M3 INHALATION-HUMAN TCLO; 300 PPM INHALATION-HUMAN TCLO; 64,000 PPM/4 HOURS INHALATION-RAT LC50; 1000 PPM INHALATION-MONKEY LCLO; 50 GM/M3/2 HOURS INHALATION-MOUSE LCLO; 44,000 MG/M3/6 HOURS INHALATION-CAT LCLO; 15,800 MG/KG SKIN-RABBIT LD50; 393 MG/KG SKIN-MONKEY LDLO; 428 MG/KG ORAL-HUMAN LDLO; 143 MG/KG ORAL-HUMAN LDLO; 6422 MG/KG ORAL-MAN LDLO; 3429 MG/KG ORAL-MAN TDLO; 4 GM/KG ORAL-WOMAN TDLO; 7 GM/KG ORAL-MONKEY LD50; 5628 MG/KG ORAL-RAT LD50; 7300 MG/KG ORAL-MOUSE LD50; 14,200 MG/KG ORAL-RABBIT LD50; 7500 MG/KG ORAL-DOG LDLO; 9800 MG/KG SUBCUTANEOUS-MOUSE LD50; 2131 MG/KG INTRAVENOUS-RAT LD50; 4710 MG/KG INTRAVENOUS-MOUSE LD50; 8907 MG/KG INTRAVENOUS-RABBIT LD50; 7529 MG/KG INTRAPERITONEAL-RAT LD50; 10,765 MG/KG INTRAPERITONEAL-MOUSE LD50; 1826 MG/KG INTRAPERITONEAL-RABBIT LD50; 868 MG/KG UNREPORTED-MAN LDLO; MUTAGENIC DATA (RTECS); REPRODUCTIVE EFFECTS DATA (RTECS).
CARCINOGEN STATUS: NONE.
LOCAL EFFECTS: IRRITANT- SKIN, EYE.
ACUTE TOXICITY LEVEL: SLIGHTLY TOXIC BY INHALATION, DERMAL ABSORPTION, INGESTION.
TARGET EFFECTS: NEUROTOXIN; CENTRAL NERVOUS SYSTEM DEPRESSANT.
AT INCREASED RISK FROM EXPOSURE: PERSONS WITH KIDNEY, EYE OR SKIN DISORDERS.

HEALTH EFFECTS AND FIRST AID

INHALATION:
METHYL ALCOHOL (METHANOL):
NARCOTIC/NEUROTOXIN. 25,000 PPM IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.
ACUTE EXPOSURE- MAY CAUSE IRRITATION OF THE MUCOUS MEMBRANES, COUGHING, OPPRESSION IN THE CHEST, TRACHEITIS, BRONCHITIS, TINNITUS, UNSTEADY GAIT, TWITCHING, COLIC, CONSTIPATION, NYSTAGMUS, AND BLEPHAROSPASM. SYMPTOMS FROM OCCUPATIONAL EXPOSURE INCLUDE PARESTHESIAS, NUMBNESS AND SHOOTING PAINS IN THE HANDS AND FOREARMS. METABOLIC ACIDOSIS, AND EFFECTS ON THE EYES AND CENTRAL NERVOUS SYSTEM MAY OCCUR AS DETAILED IN ACUTE INGESTION.
CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE EFFECTS AS IN ACUTE INGESTION. REPEATED EXPOSURE TO 200-375 PPM CAUSED RECURRENT HEADACHES IN WORKERS. EXPOSURE FOR 4 YEARS TO 1200-8000 PPM RESULTED IN MARKED DIMINUTION OF VISION AND ENLARGEMENT OF THE LIVER IN A WORKMAN. REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN ANIMALS.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

MSDS # 1329

METHYL ALCOHOL (METHANOL):
IRRITANT/NARCOTIC/NEUROTOXIN.
ACUTE EXPOSURE- CONTACT WITH LIQUID MAY CAUSE IRRITATION. SKIN ABSORPTION MAY OCCUR AND CAUSE METABOLIC ACIDOSIS AND EFFECTS ON THE EYES AND CENTRAL NERVOUS SYSTEM AS DETAILED IN ACUTE INGESTION.
CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT WITH THE LIQUID MAY CAUSE DEFATTING OF THE SKIN RESULTING IN ERYTHEMA, SCALING, AND ECZEMATOID DERMATITIS. CHRONIC ABSORPTION MAY RESULT METABOLIC ACIDOSIS AND EFFECTS AS DETAILED IN ACUTE INGESTION.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
METHYL ALCOHOL (METHANOL):
IRRITANT.
ACUTE EXPOSURE- VAPORS MAY CAUSE IRRITATION. HIGH CONCENTRATIONS HAVE BEEN REPORTED TO CAUSE VIOLENT INFLAMMATION OF THE CONJUNCTIVA AND EPITHELIAL DEFECTS ON THE CORNEA. MILD IRRITATION MAY OCCUR WITH DILUTE SOLUTIONS; THE UNDILUTED LIQUID HAS PRODUCED MODERATE CORNEAL OPACITY AND CONJUNCTIVAL REDNESS IN RABBITS. APPLICATION OF A DROP OF METHANOL IN RABBIT EYES CAUSED A MILD REVERSIBLE REACTION, GRADED 3 ON A SCALE OF 1-10 AFTER 24 HOURS.
CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
METHYL ALCOHOL (METHANOL):
NARCOTIC/NEUROTOXIN.
ACUTE EXPOSURE- MAY CAUSE MILD AND TRANSIENT INEBRIATION AND SUBSEQUENT DROWSINESS FOLLOWED BY AN ASYMPTOMATIC PERIOD LASTING 8-48 HOURS. FOLLOWING THE DELAY, COUGHING, DYSPNEA, HEADACHE, DULLNESS, WEAKNESS, VERTIGO OR DIZZINESS, NAUSEA, VOMITING, OCCASIONAL DIARRHEA, ANOREXIA, VIOLENT PAIN IN THE BACK, ABDOMEN, AND EXTREMITIES, RESTLESSNESS, APATHY OR DELIUIUM, AND RARELY, EXCITEMENT AND MANIA MAY OCCUR. RAPID, SHALLOW RESPIRATION DUE TO METABOLIC ACIDOSIS, COLD AND CLAMMY SKIN, HYPOTENSION, CYANOSIS, OPISTHOTONOS, CONVULSIONS, MILD TACHYCARDIA, CARDIAC DEPRESSION, PERIPHERAL NEURITIS, CEREBRAL AND PULMONARY EDEMA, UNCONSCIOUSNESS, AND COMA ARE POSSIBLE. EFFECTS ON THE EYE MAY INCLUDE OPTIC NEURITIS, BLURRED OR DIMMED VISION, DILATED, UNRESPONSIVE PUPILS, PTOSIS, EYE PAIN, CONCENTRIC CONSTRICTION OF VISUAL FIELDS, DIPLOPIA, CHANGE IN COLOR PERCEPTION, PHOTOPHOBIA, AND OPTIC NERVE ATROPHY. PARTIAL BLINDNESS OR POSSIBLY DELAYED TRANSIENT OR PERMANENT BLINDNESS MAY OCCUR. BILATERAL SENSORINEURAL DEAFNESS HAS BEEN REPORTED IN A SINGLE CASE. LIVER, KIDNEY, HEART, STOMACH, INTESTINAL AND PANCREATIC DAMAGE MAY ALSO OCCUR. DEATH MAY BE DUE TO RESPIRATORY FAILURE OR RARELY FROM CIRCULATORY COLLAPSE. AS LITTLE AS 15 ML HAS CAUSED BLINDNESS; THE USUAL FATAL DOSE IS 60-240 ML. PROLONGED ASTHENIA AND IRREVERSIBLE EFFECTS ON THE NERVOUS SYSTEM INCLUDING DIFFICULTY IN SPEECH, MOTOR DYSFUNCTION WITH RIGIDITY, SPASTICITY, AND HYPOKINESIS HAVE BEEN REPORTED.
CHRONIC EXPOSURE- REPEATED INGESTION MAY CAUSE VISUAL IMPAIRMENT AND BLINDNESS AND OTHER SYSTEMIC EFFECTS AS DETAILED IN ACUTE INGESTION. REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN ANIMALS.

MSDS # 1329

FIRST AID- IF INGESTION OF METHANOL IS DISCOVERED WITHIN 2 HOURS, GIVE SYRUP OF IPECAC. LAVAGE THOROUGHLY WITH 2-4 L OF TAP WATER WITH SODIUM BICARBONATE (20 G/L) ADDED. GET MEDICAL ATTENTION IMMEDIATELY. LAVAGE SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL (DREISBACH, HANDBOOK OF POISONING, 12TH ED.).

ANTIDOTE:
THE FOLLOWING ANTIDOTE(S) HAVE BEEN RECOMMENDED. HOWEVER, THE DECISION AS TO WHETHER THE SEVERITY OF POISONING REQUIRES ADMINISTRATION OF ANY ANTIDOTE AND ACTUAL DOSE REQUIRED SHOULD BE MADE BY QUALIFIED MEDICAL PERSONNEL.

METHANOL POISONING:
GIVE ETHANOL, 50% (100 PROOF), 1.5 ML/KG ORALLY INITIALLY, DILUTED TO NOT MORE THAN 5% SOLUTION, FOLLOWED BY 0.5-1.0 ML/KG EVERY 2 HOURS ORALLY OR INTRAVENOUSLY FOR 4 DAYS IN ORDER TO REDUCE METABOLISM OF METHANOL AND TO ALLOW TIME FOR ITS EXCRETION. BLOOD ETHANOL LEVEL SHOULD BE IN THE RANGE OF 1-1.5 MG/ML (DREISBACH, HANDBOOK OF POISONING, 12TH ED.). ANTIDOTE SHOULD BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL.

ORAL OR INTRAVENOUS ADMINISTRATION OF 4-METHYLPYRAZOLE INHIBITS ALCOHOL DEHYDROGENASE AND HAS BEEN USED EFFECTIVELY AS AN ANTIDOTE FOR METHANOL OR ETHYLENE GLYCOL POISONING (ELLENHORN AND BARCELOUX, MEDICAL TOXICOLOGY).

REACTIVITY SECTION

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:
METHYL ALCOHOL (METHANOL):
- ACETYL BROMIDE: VIOLENT REACTION WITH FORMATION OF HYDROGEN BROMIDE.
- ALKYLALUMINUM SOLUTIONS: VIOLENT REACTION.
- ALUMINUM: CORRODES.
- BARIUM PERCHLORATE: DISTILLATION YIELDS HIGHLY EXPLOSIVE ALKYL PERCHLORATE.
- BERYLLIUM HYDRIDE: VIOLENT REACTION, EVEN AT -196 C.
- BROMINE: VIGOROUSLY EXOTHERMIC REACTION.
- CALCIUM CARBIDE: VIOLENT REACTION.
- CHLORINE: POSSIBLE IGNITION AND EXPLOSION HAZARD.
- CHLOROFORM AND SODIUM HYDROXIDE: EXPLOSIVE REACTION.
- CHROMIUM TRIOXIDE (CHROMIC ANHYDRIDE): POSSIBLE IGNITION.
- CYANURIC CHLORIDE: VIOLENT REACTION.
- DICHLOROMETHANE: POSSIBLE IGNITION AND EXPLOSION.
- DIETHYL ZINC: POSSIBLE IGNITION AND EXPLOSION.
- HYDROGEN PEROXIDE + WATER: EXPLOSION HAZARD.
- IODINE + ETHANOL + MERCURIC OXIDE: EXPLOSION HAZARD.
- LEAD: CORRODES.
- LEAD PERCHLORATE: EXPLOSION HAZARD.
- MAGNESIUM: VIOLENT REACTION.
- MAGNESIUM (POWDERED): MIXTURES ARE CAPABLE OF DETONATION.
- METALS: INCOMPATIBLE.
- NICKEL: POSSIBLE IGNITION IN THE PRESENCE OF NICKEL CATALYST.
- NITRIC ACID (CONCENTRATED): MIXTURES OF GREATER THAN 25% ACID MAY DECOMPOSE VIOLENTLY.
- OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.
- PERCHLORIC ACID: EXPLOSION HAZARD.
- PHOSPHOROUS TRIOXIDE: POSSIBLE VIOLENT REACTION AND IGNITION.
- PLASTICS, RUBBER, COATINGS: MAY BE ATTACKED.

MSDS # 1329

POTASSIUM: POSSIBLE DANGEROUS REACTION.
POTASSIUM HYDROXIDE + CHLOROFORM: EXOTHERMIC REACTION.
POTASSIUM TERT-BUTOXIDE: FIRE AND EXPLOSION HAZARD.
SODIUM + CHLOROFORM: POSSIBLE EXPLOSION.
SODIUM HYPOCHLORITE: EXPLOSION HAZARD.
SODIUM METHOXIDE + CHLOROFORM: VIOLENT REACTION.
SULFURIC ACID: FIRE AND EXPLOSION HAZARD.
ZINC: EXPLOSION HAZARD.

DECOMPOSITION:
THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC OXIDES OF CARBON.

POLYMERIZATION:
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE-DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

STORAGE

STORE IN ACCORDANCE WITH 29 CFR 1910.106.

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

DISPOSAL

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262. EPA HAZARDOUS WASTE NUMBER U154.

CONDITIONS TO AVOID

AVOID CONTACT WITH HEAT, SPARKS, FLAMES OR OTHER IGNITION SOURCES. VAPORS MAY BE EXPLOSIVE. MATERIAL IS POISONOUS; AVOID INHALATION OF VAPORS OR CONTACT WITH SKIN. DO NOT ALLOW MATERIAL TO CONTAMINATE WATER SOURCES.

SPILLS AND LEAKS

SOIL-RELEASE:
DIG HOLDING AREA SUCH AS LAGOON, POND OR PIT FOR CONTAINMENT.

DIKE FLOW OF SPILLED MATERIAL USING SOIL OR SANDBAGS OR FOAMED BARRIERS SUCH AS POLYURETHANE OR CONCRETE.

AIR-RELEASE:

MSDS # 1329

APPLY WATER SPRAY TO KNOCK DOWN VAPORS.

WATER-SPILL:
ALLOW SPILLED MATERIAL TO AERATE.

LIMIT SPILL MOTION AND DISPERSION WITH NATURAL BARRIERS OR OIL SPILL CONTROL BOOMS.

USE SUCTION HOSES TO REMOVE TRAPPED SPILL MATERIAL.

OCCUPATIONAL-SPILL:
SHUT OFF IGNITION SOURCES. DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. NO SMOKING, FLAMES OR FLARES IN HAZARD AREA! KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND DENY ENTRY.

REPORTABLE QUANTITY (RQ): 5000 POUNDS
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT SECTION

VENTILATION:
PROVIDE LOCAL EXHAUST OR PROCESS ENCLOSURE VENTILATION TO MEET THE PUBLISHED EXPOSURE LIMITS. VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

RESPIRATOR:
THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29 CFR 1910 SUBPART Z.
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

METHYL ALCOHOL (METHANOL):

2000 PPM- ANY SUPPLIED-AIR RESPIRATOR.
ANY SELF-CONTAINED BREATHING APPARATUS.

5000 PPM- ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A CONTINUOUS FLOW MODE.

10,000 PPM- ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.
ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE.
ANY SUPPLIED-AIR RESPIRATOR WITH A TIGHT-FITTING FACEPIECE OPERATED IN A CONTINUOUS FLOW MODE.

25,000 PPM- ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE AND OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

MSDS # 132

ESCAPE- ANY APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE AND OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

EMERGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED BY- OCCUPATIONAL HEALTH SERVICES, INC.

CREATION DATE: 09/25/84 REVISION DATE: 10/09/90

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MSDS # 2687

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BATTELLE NORTHWEST
PACIFIC NORTHWEST LABS
ACCOUNTS PAYABLE
P O BOX 999
RICHLAND WA 99352

DATE: 03/24/98
CUST # 130508 P.O. # V8423AR8

MATERIAL SAFETY DATA SHEET

PAGE:

IDENTIFICATION

PRODUCT # 16499-2 NAME: SODIUM METHOXIDE, ANHYDROUS POWDER
CAS # 124-41-4

TOXICITY HAZARDS

RTECS # PC3570000
METHANOL, SODIUM SALT
REVIEWS, STANDARDS, AND REGULATIONS
EPA TSCA CHEMICAL INVENTORY, 1986

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.
MATERIAL IS EXTREMELY DESTRUCTIVE TO TISSUE OF THE MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT, EYES AND SKIN.
INHALATION MAY BE FATAL AS A RESULT OF SPASM, INFLAMMATION AND EDEMA OF THE LARYNX AND BRONCHI, CHEMICAL PNEUMONITIS AND PULMONARY EDEMA.
SYMPTOMS OF EXPOSURE MAY INCLUDE BURNING SENSATION, COUGHING, WHEEZING, LARYNGITIS, SHORTNESS OF BREATH, HEADACHE, NAUSEA AND VOMITING.
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.
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.

PHYSICAL DATA

MELTING POINT: >300 C
VAPOR DENSITY: 1.1
VAPOR PRESSURE: 50.0 MM @ 20 C
96.0 MM @ 25 C

FIRE AND EXPLOSION HAZARD DATA

LOWER EXPLOSION LEVEL: 7.3%
UPPER EXPLOSION LEVEL: 36%

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

CATALOG # 16499-2 NAME: SODIUM METHOXIDE, ANHYDROUS POWDER

EXTINGUISHING MEDIA
DRY CHEMICAL POWDER.
DO NOT USE WATER.
SPECIAL FIRE FIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.
FLAMMABLE SOLID.
UNUSUAL FIRE AND EXPLOSION HAZARDS
THIS MATERIAL, LIKE MOST MATERIALS IN POWDER FORM, IS CAPABLE OF CREATING A DUST EXPLOSION.
EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

---------- REACTIVITY DATA ----------

INCOMPATIBILITIES
CHLORINATED SOLVENTS
MAY DECOMPOSE ON EXPOSURE TO MOIST AIR OR WATER.
REACTS VIOLENTLY WITH:
ACIDS
WATER
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.
WEAR DISPOSABLE COVERALLS AND DISCARD THEM AFTER USE.
COVER WITH DRY-LIME, SAND, OR SODA ASH. PLACE IN COVERED CONTAINERS USING NON-SPARKING TOOLS AND TRANSPORT OUTDOORS.
AVOID RAISING DUST.
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.
LONG RUBBER OR NEOPRENE GAUNTLET GLOVES.
NIOSH/MSHA-APPROVED RESPIRATOR.
SAFETY SHOWER AND EYE BATH.
USE ONLY IN A CHEMICAL FUME HOOD.
USE NONSPARKING TOOLS.
DO NOT BREATHE DUST.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
AVOID PROLONGED OR REPEATED EXPOSURE.
WASH THOROUGHLY AFTER HANDLING.
CORROSIVE.
KEEP TIGHTLY CLOSED.
KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAME.
MOISTURE-SENSITIVE.
STORE IN A COOL DRY PLACE.

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MSDS # 2687

MATERIAL SAFETY DATA SHEET PAGE:

CATALOG # 16499-2 NAME: SODIUM METHOXIDE, ANHYDROUS POWDER

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

NOT APPLICABLE

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APPENDIX 6A

SUMMARY OF RESULTS FROM THE DATA QUALITY OBJECTIVES (DQO) PROCESS

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CONTENTS

6A.0 SUMMARY OF RESULTS FROM THE DATA QUALITY OBJECTIVES (DQO) PROCESS . . . . . APP 6A-1

6A.1 COMPOUNDS OF INTEREST . . . . . APP 6A-1

6A.2 UNIT OPERATIONS . . . . . APP 6A-1

6A.3 ACTION LEVELS AND STRATEGY FOR CLEANUP . . . . . APP 6A-1

6A.4 DISCUSSION . . . . . APP 6A-2

6A.5 CLEANUP STRATEGY . . . . . APP 6A-2
6A.5.1 Soil . . . . . APP 6A-2
6A.5.2 Storage Building . . . . . APP 6A-3
6A.5.3 Concrete Pad . . . . . APP 6A-3
6A.5.4 Reaction Vessels . . . . . APP 6A-3
6A.5.5 Burn Building and Scrubber . . . . . APP 6A-3
6A.5.6 Closure Plan . . . . . APP 6A-3
6A.5.7 Sampling and Analysis Plan . . . . . APP 6A-4

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APPENDIX 6A

6A.0 SUMMARY OF RESULTS FROM THE DATA QUALITY OBJECTIVES (DQO) PROCESS

A meeting was held Friday, August 11, 1995, to develop the Data Quality Objectives (DQO) for closure of the 3718-F Alkali Metal Treatment and Storage Facility (3718-F Facility). A summary of the items that were discussed and agreements that were reached are included in this section.

6A.1 COMPOUNDS OF INTEREST

Waste sodium, lithium, and potassium were burned in the burn shed. Small amounts of gasoline/diesel were used to ignite the burn. Sodium contaminated equipment was cleaned in reaction vessels using either a water or alcohol bath (methanol, isopropanol and 2-butoxyethanol [Dowanol[1]]). These processes resulted in the list of compounds shown in the attachment. Those in attendance agreed that whatever metal oxides that might have remained after treatment have since been transformed into carbonates through exposure to air and water.

6A.2 UNIT OPERATIONS

The treatment and storage unit was divided into five sections for purposes of discussion. The division of the unit allowed the team to focus better on the various storage and treatment activities (unit operations) that took place at the Treatment, Storage, and Disposal (TSD) unit. The five sections consisted of: a storage building, a concrete pad and floor, a burn shed/scrubber system, reactor vessels for cleaning sodium contaminated equipment, and the surrounding soil. An operator from the 3718-F Facility was the subject matter expert on the operation of the TSD and his insight and knowledge was appreciated by the team. The operator stated that during the operation of the facility, a second water reaction vessel was located on the concrete pad in tandem with the vessel that remains. This unit was removed from the facility during its operational phase.

6A.3 ACTION LEVELS AND STRATEGY FOR CLEANUP

Proposed action levels for both soil and structures were proposed and discussed. These action levels and the following three key questions set the stage for development of the cleanup and closure strategy:

- What is the relationship between the closure of the TSD and closure of the 300-FF-2 Operable Unit?

---

[1]Dowanol is a trademark of Dow Chemical Company.

- Are there any future plans for usage of the burn shed and/or scrubber system?

- How do the proposed actions for cleanup and closure compare with similar operations and closure decisions at the 105-DR and 4843 TSDs?

6A.4 DISCUSSION

A discussion of the proposed action levels for both soil and structures included the following:

- For soils, information from the Hanford Site background study should be used as a reference for the elemental metals.

- Recent excavations in the vicinity of the TSD probably rendered any collection of soil sampling to be inconclusive.

- There are no future plans for the burn building and scrubber.

- The water and alcohol cleanup tanks (reaction vessels) were fabricated from stainless steel and will be recycled.

- Cleanup and closure of the storage building will build on the process knowledge obtained from closing the 4843 Alkali Metal Storage TSD.

- Action levels will be set at 10 wt. percent for all Category D waste and a visual inspection will serve as a basis for the clean up of the storage building, concrete pad, burn shed/scrubber, and reaction vessels.

- It was assumed that the acceptance criteria (transfer of closed TSD to the 300-FF-1 Operable Unit) would be satisfied by clean closure of the unit. All human health, safety, and environmental issues will be addressed prior to transfer.

6A.5 CLEANUP STRATEGY

The DQO team agreed on the following cleanup and closure strategy.

6A.5.1 Soil

No soil samples will be collected. It was agreed that the combination of the compounds of interest (organics and carbonates), nature of the soil (sand and gravel, variability of alkali metal background levels), and past excavations, would render the results obtained from any collection and analysis strategy to be inconclusive. The soil in the vicinity of the 3718-F Facility has been disturbed on several occasions by the placement of communication and power lines, and upgrading the process sewer.

6A.5.2 Storage Building

A visual inspection of the storage shed and concrete floor will be performed. If no evidence of contamination (carbonate residue) is observed (i.e., less than 10 wt. percent) the building will be clean closed. The interior concrete pad and interior walls will be swept. The sweepings will not be collected. Process knowledge using the experience gained from samples collected and analyzed at the 4843 Facility was the basis for this decision.

6A.5.3 Concrete Pad

The outside concrete pad will be left in its present condition. It was agreed that any contaminant of interest on the surface of the pad had been weathered sufficiently over the years so that any sampling and analysis for the Category D waste seemed unwarranted. The outside pad will not be swept or brushed and is accepted as clean.

6A.5.4 Reaction Vessels

The reaction vessels will be cleaned and excessed. This will allow for any reuse and/or recycle of this equipment. The reaction vessels will be removed and excessed.

6A.5.5 Burn Building and Scrubber

It was agreed that additional information was needed before a decision on closure of this structure could be made. It was agreed further that WHC would take the action to remove the cover plates and lower the burn pad to provide a better visualization of any potential health hazard. The possibility of using a video camera and a cutting torch to provide a better exposure of where contamination may reside was discussed. It was agreed further that WHC may exercise these options, if necessary, to assess the hazard. Once the structure has been prepared (i.e., cover plates removed, etc.) a meeting will be convened and a visual inspection of the burn building, scrubber, and concrete pad inside the burn building will be performed. A decision will be made in the field on the necessary actions to be taken for cleaning and/or treatment of this structure. The action level will be 10 wt. percent.

6A.5.6 Closure Plan

The closure plan (DOE/RL-91-35, Revision 1) will be revised to incorporate the results from the DQO meeting. Chapters 6 and 7 will be revised to address the cleanup strategy summarized above. Chapters 3 and 4 will be revised to incorporate comments received from Dave Roohr (subject matter expert).

6A.5.7 Sampling and Analysis Plan

Preparation of a separate sampling and analysis plan is not planned at this time. This decision is subject to change pending the future inspection of the burn building and scrubber.

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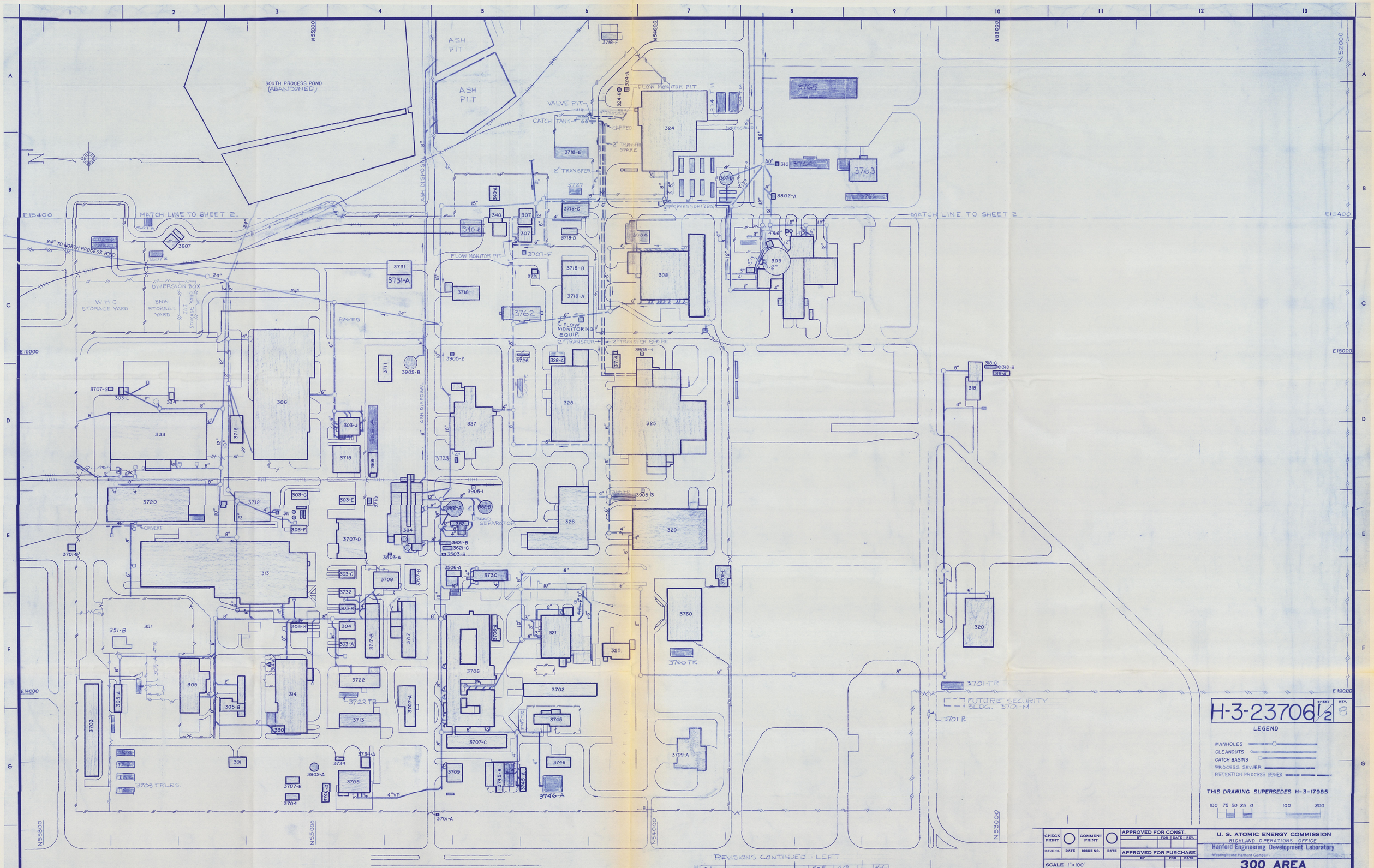

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7	AS-BUILT TO DATE	H.J.M.M. 4/24/74		WEDL	4/24/74

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5	REV. NO. OF 325 & 324.	W.M.SON 8-8-73		WEDL	8/8/73
4	RETENT. PROC. SEWER SYMBOL CHGD. AS-BUILT TO DATE, SHT. 2 ADDED	W.M.SON 11-16-72		WEDL	11/16/72
3	AS-BUILT TO DATE	D.S.H. 26DEC.68		DUN	12/26/68
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PROJECT — INST. NO. F-1099

CLASSIFIED BY R. C. Williamson — DATE 11-17-65

CLASSIFICATION: NONE

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	D. S. Horning	DUN	11-15-65	

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300 AREA OPERATING PLAN PROCESS SEWER LINES

BLDG. NO. 300-G — INDEX NO. 0304

DWG. NO. H-3-23706 — SHT. NO. 1 — SHEETS 2

H-3-23706 1/2 — SHEET — REV. 8

LEGEND

MANHOLES
CLEANOUTS
CATCH BASINS
PROCESS SEWER
RETENTION PROCESS SEWER

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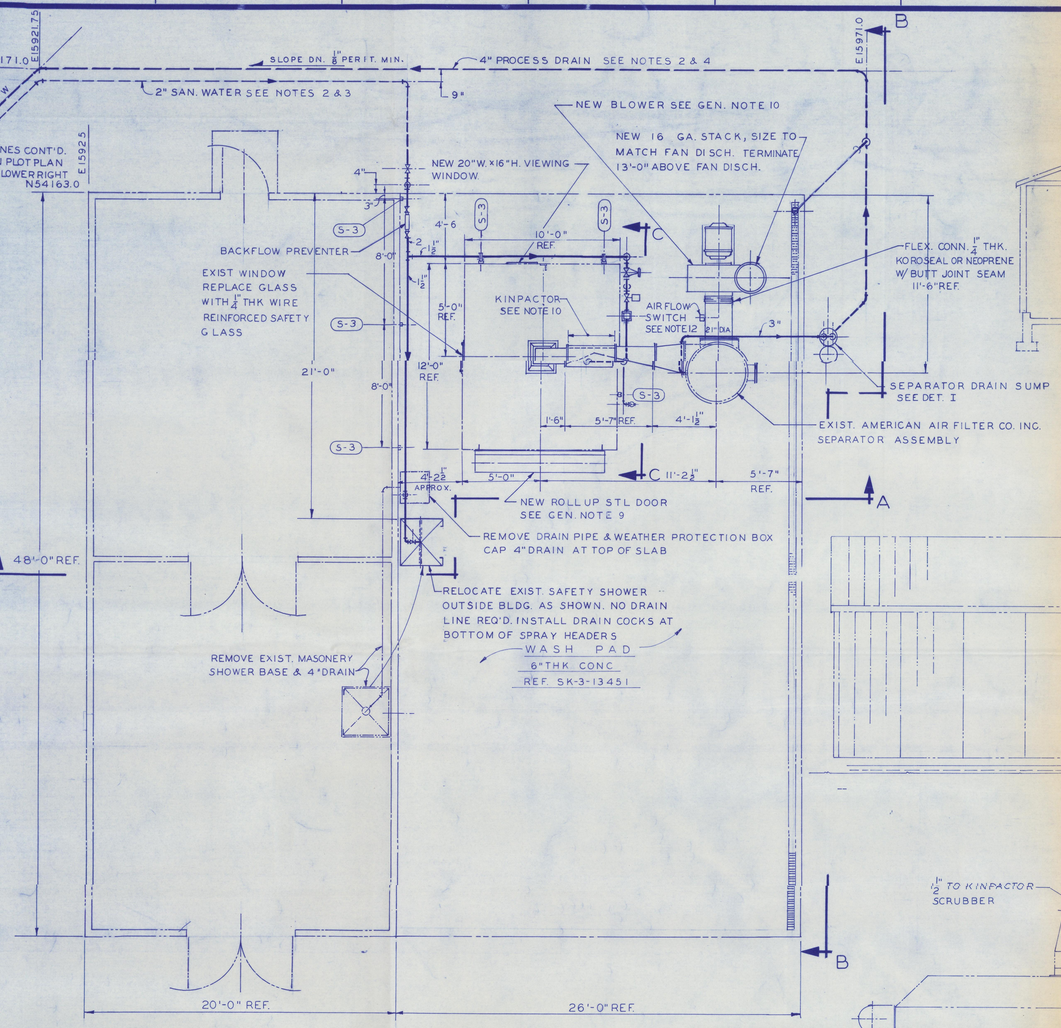
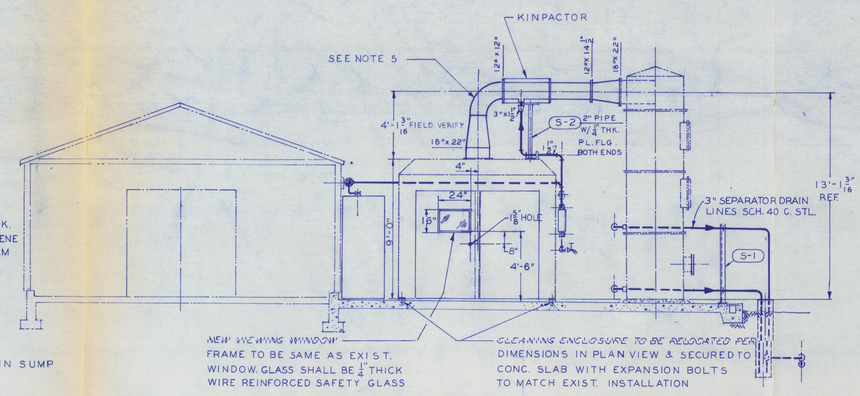
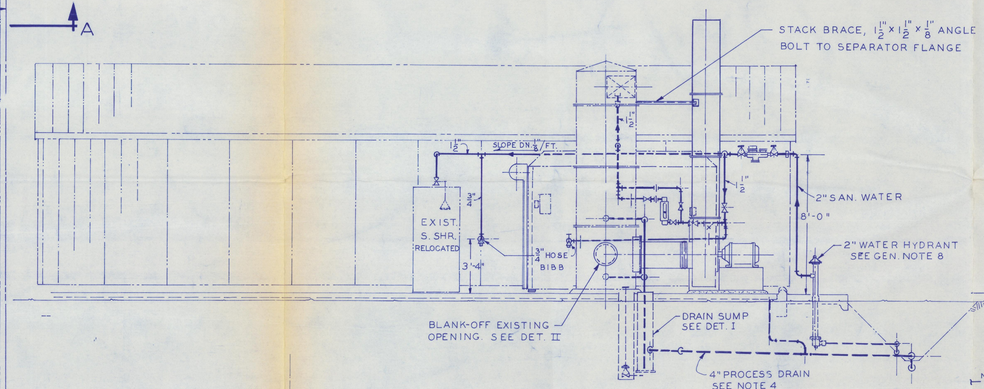


PLAN - SODIUM EQUIP. CLEANING FACILITY, BLDG. 3718-F



SECTION A-A

WITH ROLL-UP DOOR REMOVED



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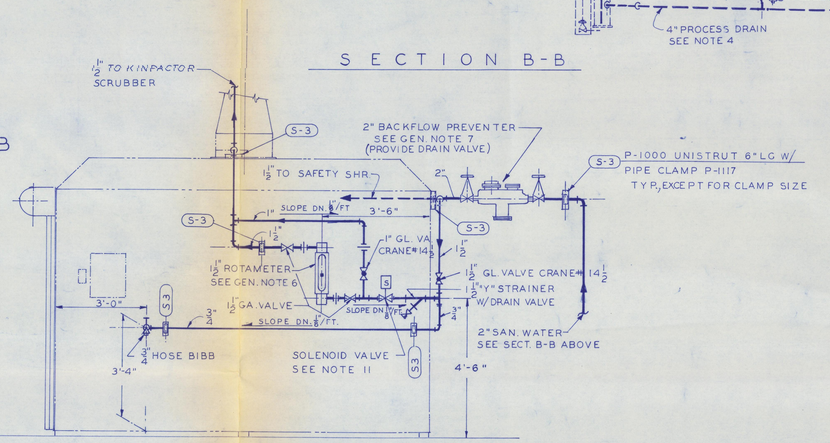
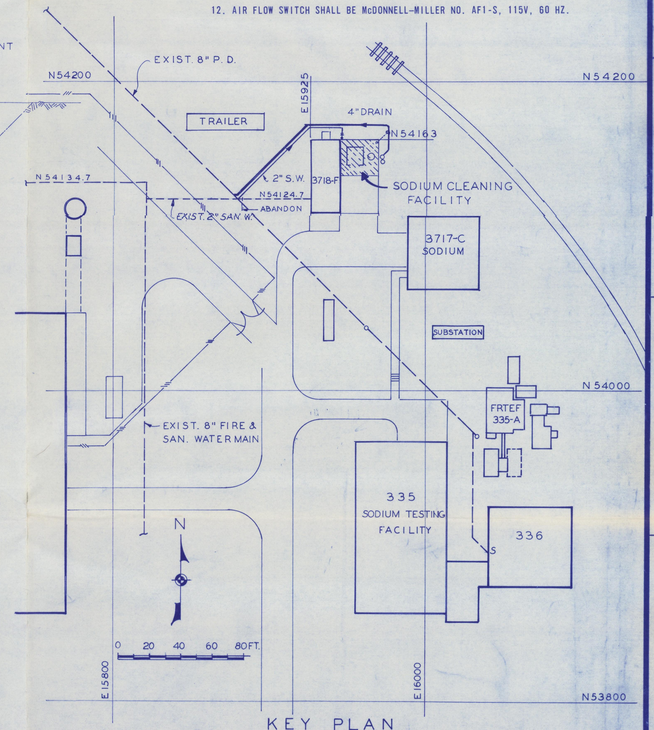


SECTION C-C

SCALE 1/2" = 1'-0"

GENERAL NOTES

1. MATERIAL AND EQUIPMENT SHALL BE AS SPECIFIED OR APPROVED EQUAL.
2. PIPING SHALL BE FABRICATED, TESTED, AND INSTALLED IN ACCORDANCE WITH ANSI B31.1, CODE FOR PRESSURE PIPING, WHAN M-12, MANUAL FOR NON-ALKALI METAL PRESSURE SYSTEMS, AND THE FOLLOWING GENERAL NOTES.
3. SANITARY WATER PIPING MATERIALS, EQUIPMENT, TESTING, DISINFECTING, AND CLEANING SHALL BE IN ACCORDANCE WITH HANFORD GUIDE DG-100-M, GUIDE FOR PROCESS AND SERVICE PIPING, SERVICE TYPE H-19A.
4. UNDERGROUND DRAIN PIPING MATERIALS, INSTALLATION, TESTING, AND CLEANING SHALL BE IN ACCORDANCE WITH HANFORD GUIDE DG-100-M, GUIDE FOR SERVICE PIPING, SERVICE TYPE H-21.
5. EXHAUST DUCTWORK, EXCLUSIVE OF THE SCRUBBER ASSEMBLY, SHALL BE 16 GAGE BLACK STEEL, PAINTED INTERNALLY AND EXTERNALLY WITH RUST INHIBITING PRIMER, TYGON AV-500 AND TWO COATS OF SODIUM HYDROXIDE RESISTANT PAINT, TYGON RO-221.
6. WATER FLOW METER SHALL BE BROOKS INSTRUMENT COMPANY, MODEL 1110, SIZE 12, HAVING A MAXIMUM CAPACITY OF 60 GPM OF CLEAN WATER AT STANDARD CONDITIONS.
7. WATER BACK-FLOW PREVENTER SHALL BE HERSEY NO. 1 DOUBLE CHECK VALVE ASSEMBLY, 2-INCH SIZE.
8. WATER HYDRANT SHALL BE JAMES B. CLOW & SONS NO. 71 TYPE A COMPRESSION FIRE HYDRANT WITH THREADED IRON PIPE INLET AND OUTLET CONNECTIONS. DEPTH OF BURIAL TO BE 3'- 0".
9. ROLLUP DOOR SHALL BE CRAWFORD DOOR COMPANY, NO. 513-1-501, FACE OF WALL TYPE INSTALLATION, WITH CHAIN OPERATOR. WALL OPENING SIZE: 8'- 0" WIDE BY 7'- 0" HIGH.
10. SCRUBBER ASSEMBLY AND FAN SHALL BE AMERICAN AIR FILTER CO KINPACTOR, SIZE 4.
11. SOLENOID VALVE SHALL BE ASCO NO. 8211C22, 1-1/2" PIPE SIZE, 125V, 60 HZ, WATERTIGHT SOLENOID ENCLOSURE.
12. AIR FLOW SWITCH SHALL BE McDONNELL-MILLER NO. AF1-S, 115V, 60 HZ.



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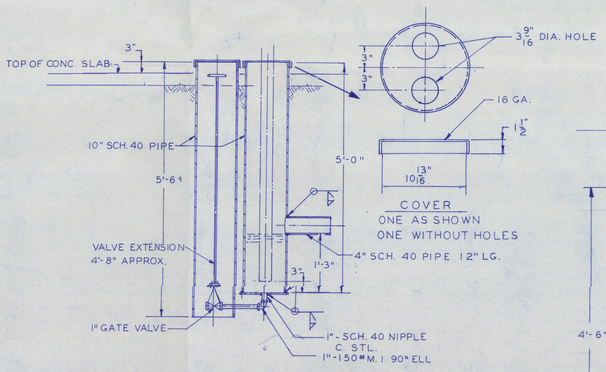

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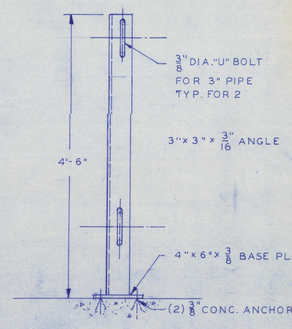
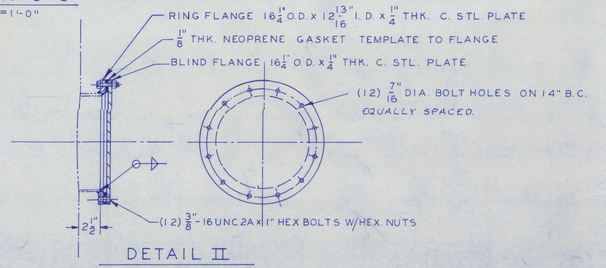


S-1



DETAIL II

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MECHANICAL
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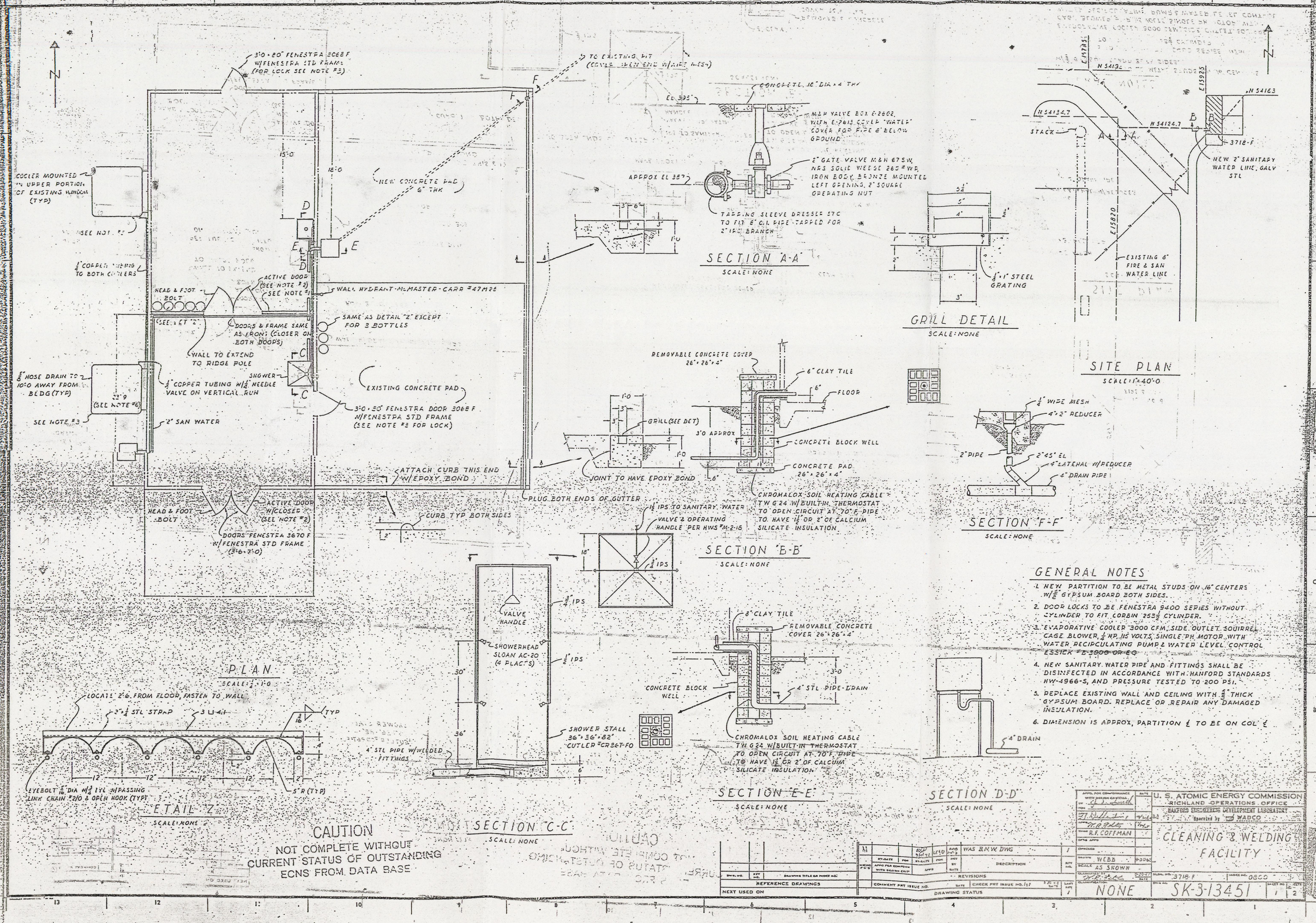
DWG NO. H-3-36492 | SHEET NO. 1 | SHEETS 1

CHARLES BRUNING CO. TYPE 700H-004 500 (5-72)


3'-0 x 80" FENESTRA 3068 F W/FENESTRA STD FRAME (FOR LOCK SEE NOTE #3)
TO EXISTING PIT (COVER OPEN END W/WIRE MESH)
COOLER MOUNTED IN UPPER PORTION OF EXISTING WINDOW (TYP)
SEE NOT. #5
1/4" COPPER TUBING TO BOTH COOLERS
NEW CONCRETE PAD 6" THK
ACTIVE DOOR (SEE NOTE #2)
SEE NOTE #1
WALL HYDRANT-McMASTER-CARR #47M25
HEAD & FOOT BOLT
SEE SHT. 2
DOORS & FRAME SAME AS FRONT (CLOSER ON BOTH DOORS)
SAME AS DETAIL "Z" EXCEPT FOR 3 BOTTLES
WALL TO EXTEND TO RIDGE POLE
SHOWER
3/8" HOSE DRAIN TO 10'-0 AWAY FROM BLDG (TYP)
1/4" COPPER TUBING W/1/4" NEEDLE VALVE ON VERTICAL RUN
EXISTING CONCRETE PAD
3'-0 x 80" FENESTRA DOOR 3068 F W/FENESTRA STD FRAME (SEE NOTE #3 FOR LOCK)
22'-9 (SEE NOTE #6)
SEE NOTE #3
2" SAN WATER
ATTACH CURB THIS END W/EPOXY BOND
ACTIVE DOOR W/CLOSER (SEE NOTE #2)
HEAD & FOOT BOLT
DOORS FENESTRA 3670 F W/FENESTRA STD FRAME (3'-6 x 7'-0)
CURB TYP BOTH SIDES
PLAN
SCALE: 1/2" = 1'-0
CONCRETE, 16" DIA x 4 THK
EL 395'
M&H VALVE BOX E-2602, WITH E-2613 COVER "WATER" COVER FOR PIPE 6' BELOW GROUND
2" GATE VALVE M&H 67 SW, NRS SOLID WEDGE 200 # WP, IRON BODY, BRONZE MOUNTED LEFT OPENING, 2" SQUARE OPERATING NUT
APPROX EL 387
TAPPING SLEEVE DRESSER STC TO FIT 6" C.I. PIPE TAPPED FOR 2" IPS BRANCH
SECTION "A-A"
SCALE: NONE
GRILL DETAIL
SCALE: NONE
1" x 1" STEEL GRATING
STACK
NEW 2" SANITARY WATER LINE, GALV STL
EXISTING 6" FIRE & SAN WATER LINE
SITE PLAN
SCALE: 1" = 40'-0
REMOVABLE CONCRETE COVER 26" x 26" x 4"
6" CLAY TILE
FLOOR
GRILL (SEE DET)
3'-0 APPROX
CONCRETE BLOCK WELL
CONCRETE PAD 26" x 26" x 4"
JOINT TO HAVE EPOXY BOND
PLUG BOTH ENDS OF GUTTER
CHROMALOX SOIL HEATING CABLE TWG 24 W/BUILT IN THERMOSTAT TO OPEN CIRCUIT AT 70°F PIPE TO HAVE 1 1/2" OR 2" OF CALCIUM SILICATE INSULATION
1/2" WIRE MESH
4" x 2" REDUCER
2" PIPE
2" 45° EL
4" LATERAL W/REDUCER
4" DRAIN PIPE
SECTION "F-F"
SCALE: NONE
1 1/2" IPS TO SANITARY WATER
VALVE & OPERATING HANDLE PER HWS #M-2-16
3/4" IPS
SECTION "B-B"
SCALE: NONE
VALVE HANDLE
SHOWERHEAD SLOAN AC-20 (4 PLACES)
1" IPS
SHOWER STALL 36" x 36" x 82" CUTLER #CR36T-FO
4" STL PIPE W/WELDED FITTINGS
SECTION "C-C"
SCALE: NONE
8" CLAY TILE
REMOVABLE CONCRETE COVER 26" x 26" x 4"
CONCRETE BLOCK WELL
4" STL PIPE-DRAIN
CHROMALOX SOIL HEATING CABLE TWG 24 W/BUILT IN THERMOSTAT TO OPEN CIRCUIT AT 70°F PIPE TO HAVE 1 1/2" OR 2" OF CALCIUM SILICATE INSULATION
SECTION "E-E"
SCALE: NONE
4" DRAIN
SECTION "D-D"
SCALE: NONE
LOCATE 2'-6" FROM FLOOR, FASTEN TO WALL
2" x 1/4" STL STRAP
3 U 4.1
TYP
EYEBOLT 5/16" DIA W/3/4" EYE W/PASSING LINK CHAIN #2/0 & OPEN HOOK (TYP)
5" R (TYP)
DETAIL "Z"
SCALE: NONE
CAUTION
NOT COMPLETE WITHOUT CURRENT STATUS OF OUTSTANDING ECNS FROM DATA BASE
GENERAL NOTES
1. NEW PARTITION TO BE METAL STUDS ON 16" CENTERS W/5/8" GYPSUM BOARD BOTH SIDES.
2. DOOR LOCKS TO BE FENESTRA 9400 SERIES WITHOUT CYLINDER TO FIT CORBIN 253 1/2 CYLINDER.
3. EVAPORATIVE COOLER 3000 CFM, SIDE OUTLET, SQUIRREL CAGE BLOWER, 1/4 HP, 115 VOLTS, SINGLE PH MOTOR, WITH WATER RECIRCULATING PUMP & WATER LEVEL CONTROL ESSICK #E-3000 OR EQ
4. NEW SANITARY WATER PIPE AND FITTINGS SHALL BE DISINFECTED IN ACCORDANCE WITH HANFORD STANDARDS HW-4966-S, AND PRESSURE TESTED TO 200 PSI.
5. REPLACE EXISTING WALL AND CEILING WITH 1/2" THICK GYPSUM BOARD. REPLACE OR REPAIR ANY DAMAGED INSULATION.
6. DIMENSION IS APPROX, PARTITION ℄ TO BE ON COL ℄
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CLEANING & WELDING FACILITY
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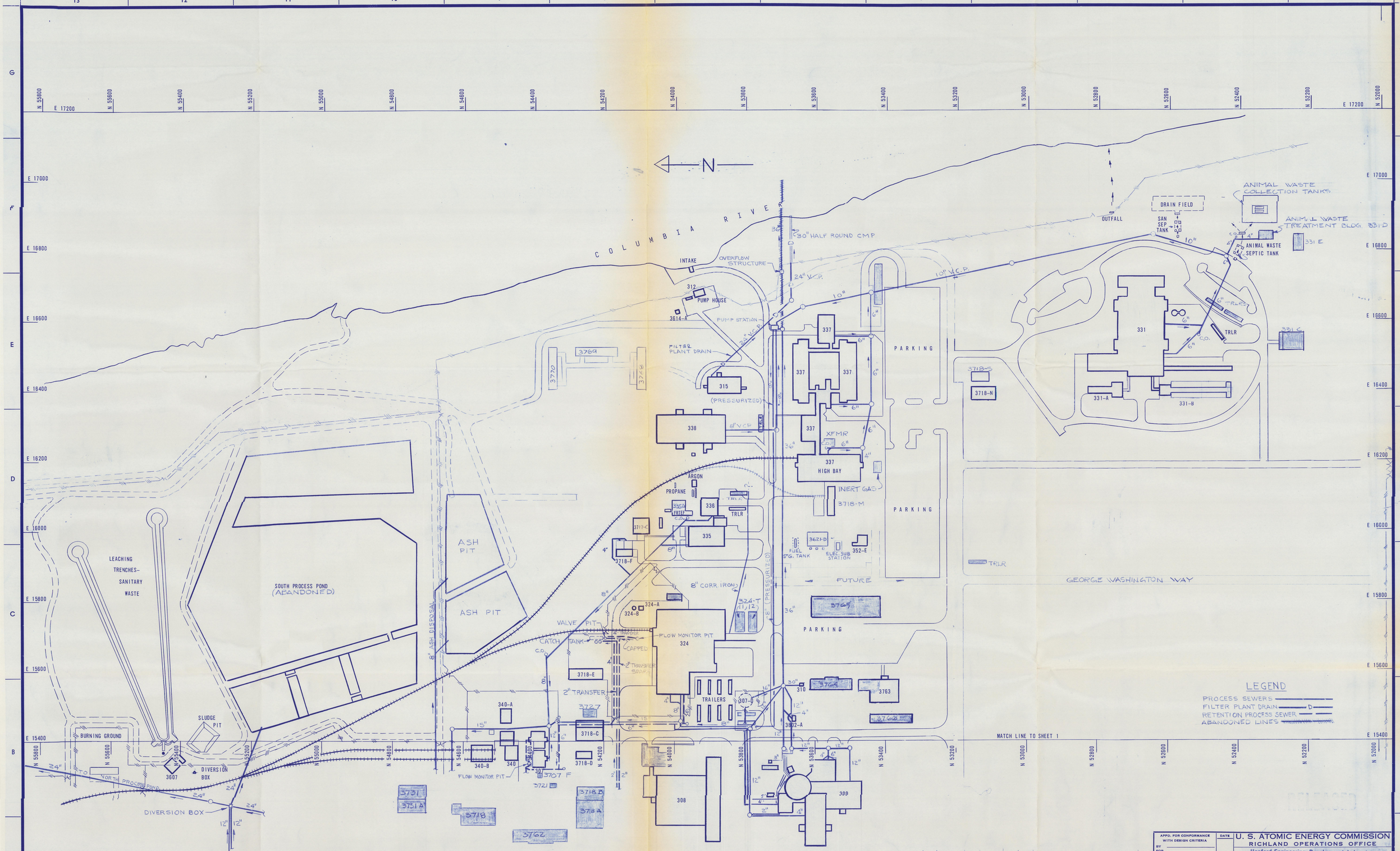
0800
SK-3-13451



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			11/20/72	HEDL	WB SON 12-20-72	UPDATED NORTH OF 324.	1

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CLASSIFICATION NONE	

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300 AREA
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BLDG. NO.	INDEX NO.	DWG NO.	SHEET NO.	SHEETS
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