INFORMATION CLEARANCE FORM

A. Information Category

- [ ] Abstract
- [ ] Journal Article
- [ ] Summary
- [ ] Internet
- [ ] Visual Aid
- [ ] Software
- [ ] Full Paper
- [x] Report
- [ ] Other RCRA closure plan

B. Document Number DOE/RL-90-11, Rev 2

C. Title
300 Area Waste Acid Treatment System Closure Plan

D. Internet Address

E. Required Information

1. Is document potentially Classified? (●) No ( ) Yes (MANDATORY)
   R. H. Engelmann 5-11-99
   Manager's Signature Required

   If Yes ______ (●) No ( ) Yes Classified
   ADC Signature Required

2. Internal Review Required? (●) No ( ) Yes
   If Yes, Document Signatures Below

   Counsel ______

   Program ______

3. References in the Information are Applied Technology (●) No ( ) Yes
   Export Controlled Information (●) No ( ) Yes

4. Does Information Contain the Following: (MANDATORY)
   a. New or Novel (Patentable) Subject Matter? (●) No ( ) Yes
      If "Yes", Disclosure No.: ______
   b. Information Received in Confidence, Such as Proprietary and/or Inventions?
      (●) No ( ) Yes If "Yes", Affix Appropriate Legends/Notices.
   c. Copyrights? (●) No ( ) Yes If "Yes", Attach Permission.
   d. Trademarks? ( ) No (●) Yes If "Yes", Identify in Document.

5. Is Information requiring submission to OSTI? ( ) No (●) Yes
   If Yes UC-630 and B&R-______

6. Release Level? (●) Public ( ) Limited

7. Charge Code 101336/CA30/HN990101

F. Complete for a Journal Article

1. Title of Journal

G. Complete for a Presentation

1. Title for Conference or Meeting ______
2. Group Sponsoring ______
3. Date of Conference ______
4. City/State ______
5. Will Information be Published in Proceedings? ( ) No ( ) Yes
6. Will Material be Handed Out? ( ) No ( ) Yes

H. Author/Requestor
S. N. Luke [signature]
(Print and Sign)

Responsible Manager
R. H. Engelmann R. H. Engelmann 5-11-99
(Print and Sign)

I. Reviewers

	Yes	Print	Signature	Public Y/N (If N, complete J)
General Counsel	[ ]			Y / N
Office of External Affairs	[ ]			Y / N
DOE-RL	[x]	See Transmittal Letter		Y / N
Other	[ ]			Y / N
Other	[ ]			Y / N

J. If Information Includes Sensitive Information and is not to be released to the Public indicate category below.

- [ ] Applied Technology
- [ ] Protected CRADA
- [ ] Personal/Private
- [ ] Export Controlled
- [ ] Proprietary
- [ ] Procurement-Sensitive
- [ ] Business-Sensitive
- [ ] Patentable
- [ ] Predecisional
- [ ] Other (Specify) ______
- [ ] UCNI

Information Clearance Approval

APPROVED FOR RELEASE
OFFICIAL DOCUMENT
Date 5-17-99

K. If Additional Comments, Please Attach Separate Sheet

A-6001-401 (02/98)

S

DOE/RL-90-11
Revision 2

UC-630

300 Area Waste Acid Treatment System Closure Plan

Date Published
May 1999

United States
Department of Energy

P.O. Box 550
Richland, Washington 99352

Approved for Public Release

RELEASE AUTHORIZATION

Document Number:	DOE/RL-90-11, Rev. 2
Document Title:	300 Area Waste Acid Treatment System Closure Plan

This document, reviewed in accordance with DOE Order 241.1, "Scientific and Technical Information Management," and DOE G 241.1-1, "Guide to the Management of Scientific and Technical Information," does not contain classified or sensitive unclassified information and is:

APPROVED FOR PUBLIC RELEASE

Christine Willingham — 5/17/99

C. Willingham — Date

Lockheed Martin Services, Inc.
Document Control/Information Release

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300 AREA WASTE ACID TREATMENT SYSTEM CLOSURE PLAN

FOREWORD

The *Hanford Facility Dangerous Waste Permit Application* is considered to be a single application organized into a General Information Portion (document number DOE/RL-91-28) and a Unit-Specific Portion. The scope of the Unit-Specific Portion includes closure plan documentation submitted for individual, treatment, storage, and/or disposal units undergoing closure, such as the 300 Area Waste Acid Treatment System.

Documentation contained in the General Information Portion is broader in nature and could be used by multiple treatment, storage, and/or disposal units (e.g., the glossary provided in the General Information Portion). Whenever appropriate, 300 Area Waste Acid Treatment System documentation makes cross-reference to the General Information Portion, rather than duplicating text.

This *300 Area Waste Acid Treatment System Closure Plan* (Revision 2) includes a Hanford Facility Dangerous Waste Permit Application, Part A, Form 3. Information provided in this closure plan is current as of April 1999.

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DOCUMENT CONTENTS

APPENDICES

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METRIC CONVERSION CHART

Into metric units | Out of metric units

If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
inches	25.40	millimeters	millimeters	0.0393	inches
inches	2.54	centimeters	centimeters	0.393	inches
feet	0.3048	meters	meters	3.2808	feet
yards	0.914	meters	meters	1.09	yards
miles	1.609	kilometers	kilometers	0.62	miles
Area			**Area**		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.092	square meters	square meters	10.7639	square feet
square yards	0.836	square meters	square meters	1.20	square yards
square miles	2.59	square kilometers	square kilometers	0.39	square miles
acres	0.404	hectares	hectares	2.471	acres
Mass (weight)			**Mass (weight)**		
ounces	28.35	grams	grams	0.0352	ounces
pounds	0.453	kilograms	kilograms	2.2046	pounds
short ton	0.907	metric ton	metric ton	1.10	short ton
Volume			**Volume**		
fluid ounces	29.57	milliliters	milliliters	0.03	fluid ounces
quarts	0.95	liters	liters	1.057	quarts
gallons	3.79	liters	liters	0.26	gallons
cubic feet	0.03	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.76456	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Energy			**Energy**		
kilowatt hour	3,412	British thermal unit	British thermal unit	0.000293	kilowatt hour
kilowatt	0.948	British thermal unit per second	British thermal unit per second	1.055	kilowatt
Force			**Force**		
pounds per square inch	6.895	kilopascals	kilopascals	1.4504×10^{-4}	pounds per square inch

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE., Second Ed., 1990, Professional Publications, Inc., Belmont, California.

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

FORM 3

DANGEROUS WASTE PERMIT APPLICATION

1. EPA/STATE I.D. NUMBER

W A 7 8 9 0 0 0 8 9 6 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.	DAY	YR.
0 3	2 2	4 3

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

*The date construction of the Hanford Facility commenced.

☐ 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)*

[X] 1. FACILITY HAS AN INTERIM STATUS PERMIT

[X] 2. FACILITY HAS A FINAL PERMIT

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

EXAMPLE FOR COMPLETING 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.1. AMOUNT *(specify)*	B.2. UNIT OF MEASURE *(enter code)*	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE *(from list above)*	B.1. AMOUNT *(specify)*	B.2. UNIT OF MEASURE *(enter code)*	FOR OFFICIAL USE ONLY
	300 Area Waste Acid Treatment System				5	311 Tanks			
					6				
1	T 0 1	14,006	V		7	T 0 1	18,927	V	
2	S 0 2	16,505	L		8	S 0 2	34,069	L	
3	T 0 4	15,898	V		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 CAPACI[TY]

Refer to the following pages.

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 3, D 8 0	
X-3	D 0 0 1	100	P	T 0 3, D 8 0	
X-4	D 0 0 2			T 0 3, D 8 0	*Included with above*

 CONTINUE ON PAGE 3

FORM 3 DANGEROUS WASTE PERMIT APPLICATION
U.S. ENVIRONMENTAL PROTECTION AGENCY/STATE IDENTIFICATION NUMBER WA7890008967

Section III.C., Description of Process Codes Listed in Section III.A.

T01, S02, T04 - The 300 Area Waste Acid Treatment System (300 WATS) and Tank 40 began waste management operations in April 1973; auxiliary equipment and centrifuge operations began in November 1995. The 300 WATS was used for the treatment and storage of mixed waste generated during fuel fabrication operations in the 300 Area. The 300 WATS also was used for disposing of used and/or unneeded chemicals for other Hanford Facility operations. A portion of the waste initially was treated in two tanks (tanks 7 and 11) in the 333 Building to reduce the chromium (VI) to chromium (III). From May 1983 to January 1987, tanks 7 and 11 were used twice a year to treat up to 757 liters (200 gallons) per day of waste (T01). This waste, along with all other waste acid generated in the 333 Building, was drained to the 334-A Building and stored in two storage tanks (tanks B and C) (S02), with a combined volume of 15,142 liters (4,000 gallons). Previously, waste entered the 334-A Building passing through a settling tank [tank A, volume 1,363 liters (360 gallons)] before entering tanks B and C. Tank A ceased receiving waste in August 1984 when piping was disconnected to the tank and waste was routed directly to tanks B and C. Tank A was cleaned out and the polyvinyl chloride liner removed in 1988.

From startup in April 1973 until August 1973, the waste acid from the 333 Building was collected in a plastic-lined steel underground 14,385 liter (3,800 gallon) tank and a plastic-lined steel aboveground 22,712 liter (6,000 gallon) tank (tank 4) in the 334 Tank Farm. At that time, the underground tank developed a leak and was removed from service. The 334-A Building storage tanks replaced this underground tank in December 1974. Tank 4 was retained for emergency storage when the 313 Building neutralization activities were down for maintenance or modifications. Tank 4 usually was empty and when the tank was filled in January 1986, a leak developed near the top of the tank. Tank 4 was emptied and abandoned at that time. Tank 4 was removed, cleaned, and disposed of onsite in 1988.

The waste acid was pumped from the 334-A Building to the 313 Building where the waste acid underwent pH adjustment in a waste acid neutralization tank (tank 2) (T01). Tank 2 was capable of treating a maximum of 13,249 liters (3,500 gallons) per day of waste acid. The waste acid was pumped from tank 2 to tank 11 and then to a centrifuge where the waste acid underwent further treatment to separate the liquid and solid phases (T04). A maximum of 11,356 liters (3,000 gallons) of waste acid per day could be treated in the centrifuge. The solid waste from the centrifuge was collected in containers and transferred to the 303-K Storage Unit. The liquid effluent was pumped from the centrifuge to tank 5 and to a filter press for additional treatment to remove fine solids (T04), which remained following treatment in the centrifuge. The filter press treated a maximum of 4,542 liters (1,200 gallons) per day. Solids collected in the filter press were sent to the uranium recovery system or to the 303-K Storage Unit. The filtered liquid effluent was drained into effluent collection tanks (tanks 9 and 10), where the liquid effluent was stored temporarily before being pumped to the 311 Tank Farm.

Section III.C., Description of Process Codes (Cont.)

T01, S02 - The 311 Tank Farm was used for storage of treated liquid effluents from both the 300 WATS and the uranium recovery process. Storage occurred in two tanks (tanks 40 and 50) with capacities of 15,142 and 18,927 liters (4,000 and 5,000 gallons), respectively. Tanks 40 and 50 are constructed of stainless steel. Tank 50, the 18,927 liter (5,000 gallon) tank, occasionally was used for decanting waste when the centrifuge in the 313 Building was down for maintenance. Tank 50 was capable of treating up to 18,927 liters (5,000 gallons) per day, but only was used occasionally for decanting waste (a total of five times between January 1986 and December 1987).

Auxiliary equipment (two pumps, two cartridge filters, and two sample ports) are housed in the adjacent 303-F Building. Auxiliary equipment was used to filter solutions and to recirculate the solutions between various tanks and the 313 Building for reprocessing.

Continued from page 2.
NOTE: *Photocopy this page before completing if you have more than 26 wastes to list.*

I.D. NUMBER *(entered from page 1)*

W	A	7	8	9	0	0	0	8	9	6	7

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)*				D. PROCESSES 2. PROCESS DESCRIPTION *(if a code is not entered in D(1))*
1	300 Area Waste Acid Treatment System							
2	D001	2,086,525	K	T01	S02	T04		Tank-Treatment/Tank-Storage/
3	D002							Treatment-Other (Phase Seperation)
4	WT02							
5	D004							
6	through							
7	D009							Included With Above
8	D007	907	K	T01				Treatment-Tank (chemical treatment)
9	311 Tanks							
10	WT02	2,086,525	K	T01	S02			Treatment-Tank/Storage-Tank
11	D002							
12	D004							
13	through							
14	D009							Included With Above
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

Continued from the front.

IV. DESCRIPTION OF DANGEROUS WASTES (continued)

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

The 300 WATS was used to treat both mixed and dangerous waste from fuels fabrication operations in the 333 Building and from nonroutine waste additions. Treatment was performed to make the waste more amenable for further treatment and for storage. The 333 Building waste primarily consisted of hydrofluoric acid, nitric acid, sulfuric acid, and copper nitrate. These routine waste types exhibited the dangerous waste characteristics of ignitability (D001) and corrosivity (D002) as the nitric acid is considered an oxidizer in accordance with Washington Administrative Code 173-303. Routine waste also was considered a state-only, toxic, dangerous waste (WT02). Additionally, some of the routine waste was designated characteristic waste due to chromium (D007). Nonroutine waste added to the system included characteristic waste due to arsenic (D004), barium (D005), cadmium (D006), lead (D008), and mercury (D009). Approximately 2,086,525 kilograms (4,600,000 pounds) of waste were treated and stored yearly in this system. Approximately 907 kilograms (2,000 pounds) of waste (D007, chromium IV to chromium III) were treated per year.

The 311 tank system was used for the treatment and storage of waste. This waste was effluent from the waste acid treatment and uranium recovery process. This waste, depending on the variations in the treatment process, was considered mixed waste due to toxicity (WT02). Routine and nonroutine waste added to the waste acid treatment system included characteristic waste due to arsenic (D004), barium (D005), cadmium (D006), chromium (D007), lead (D008), and mercury (D009). The waste frequently had a pH greater than 12.5, which exhibits the dangerous waste characteristic of corrosivity (D002). Approximately 2,086,525 kilograms (4,600,000 pounds) of waste were treated and stored per year in the 311 tanks.

V. FACILITY DRAWING Refer to attached drawing(s).

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 Refer to attached photograph(s).

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

VII. FACILITY GEOGRAPHIC LOCATION This information is provided on the attached drawing(s) and photograph(s).

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 U.S. Department of Energy Richland Operations Office	John D. Wagoner	9/26/96

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.

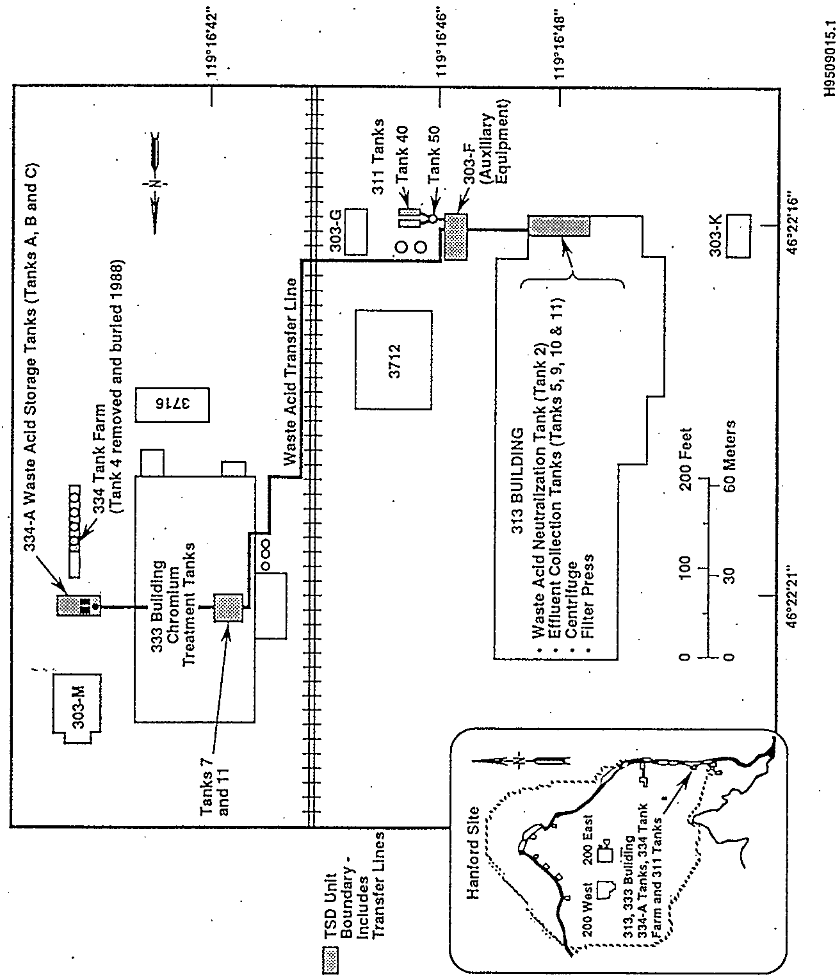
John D. Wagoner (signature) — 9/26/96

Owner/Operator — Date
John D. Wagoner, Manager
U.S. Department of Energy
Richland Operations Office

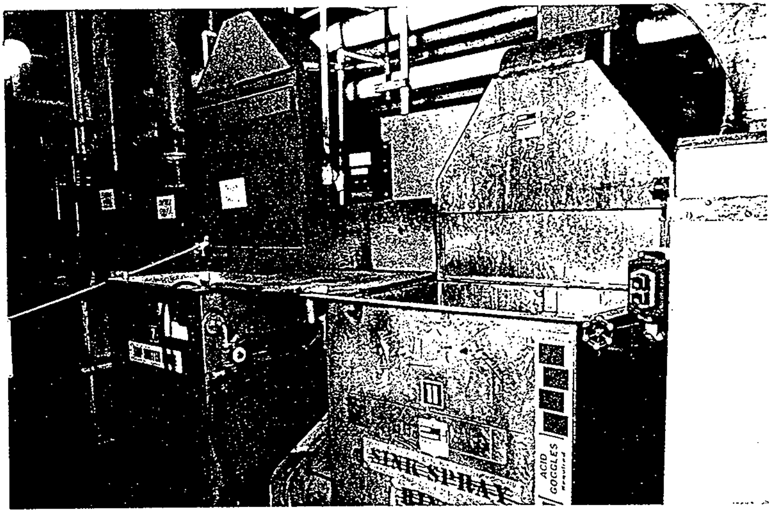
(signature) — 9/13/96

Co-operator — Date
H. J. Hatch,
President and Chief Executive Officer
Fluor Daniel Hanford, Inc.

300 Area Waste Acid Treatment System



300 AREA WASTE ACID TREATMENT SYSTEM--333 BUILDING

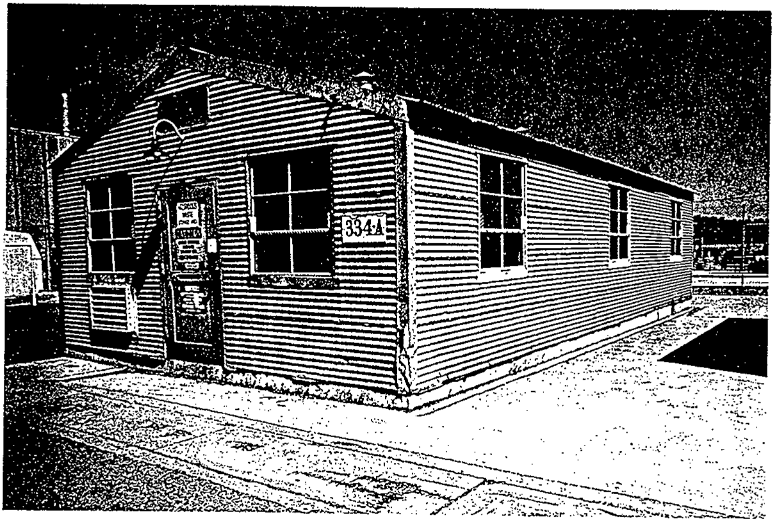


TANKS 7 AND 11--CHROMIUM (IV) REDUCTION

46°22'21"
119°16'42"

95080690-2CN
(PHOTO TANK 1987)

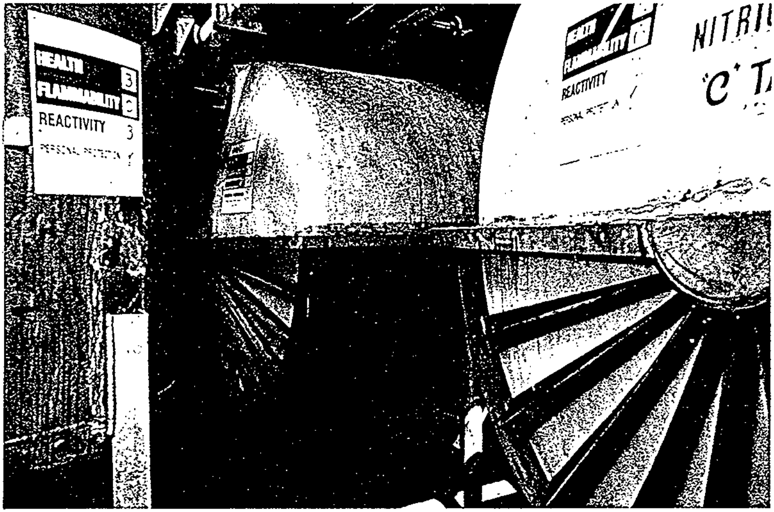
300 AREA WASTE ACID TREATMENT SYSTEM--334-A BUILDING



46°22'21"
119°16'42"

95080690-12CN
(PHOTO TANK 1995)

300 AREA WASTE ACID TREATMENT SYSTEM--334-A WASTE ACID STORAGE TANKS

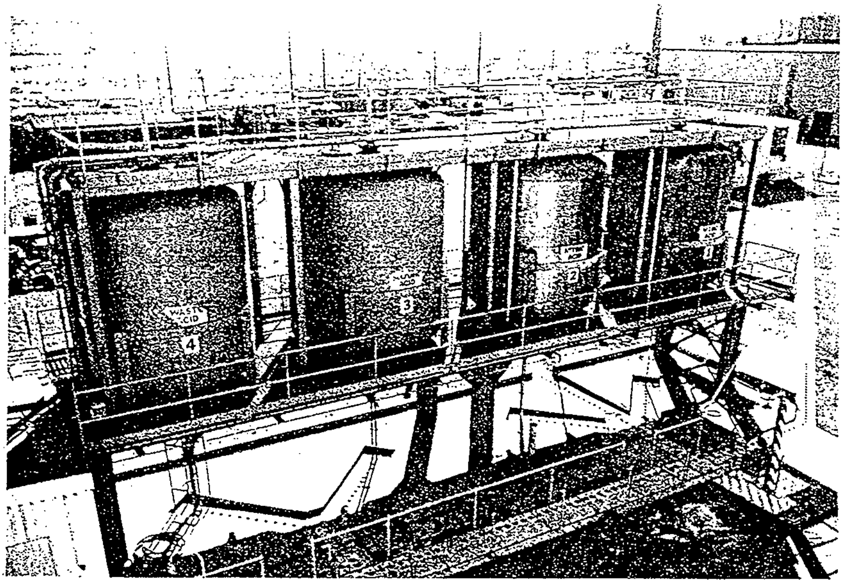


TANKS A, B, AND C
(TANK A TAKEN OUT OF SERVICE IN 1988)

46°22'21"
119°16'42"

95080690-22CN
(PHOTO TANK 1995)

300 AREA WASTE ACID TREATMENT SYSTEM--334 TANK FARM

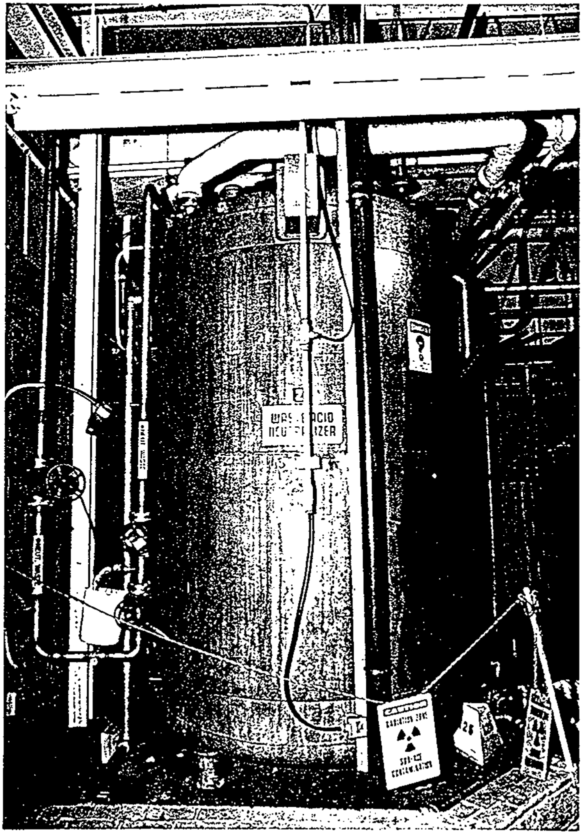


WASTE ACID TANK 4 (REMOVED, CLEANED, AND BURIED IN 1988)

46°22'21"
119°16'42"

8306387-6CN
(PHOTO TANK 1983)

300 AREA WASTE ACID TREATMENT SYSTEM--313 BUILDING WASTE ACID NEUTRALIZATION TANK

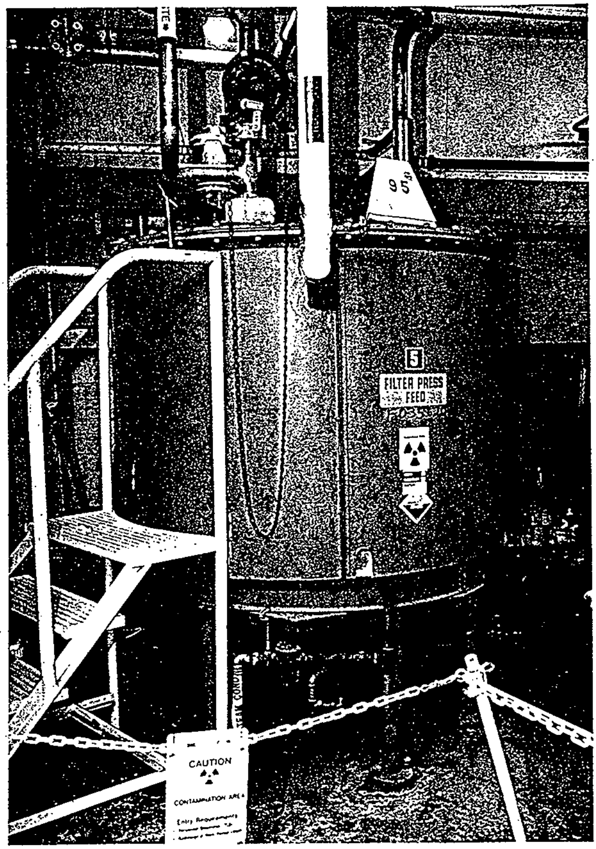


TANK 2

46°22'16"
119°16'48"

8704479-6CN
(PHOTO TAKEN 1987)

300 AREA WASTE ACID TREATMENT SYSTEM-- 313 BUILDING

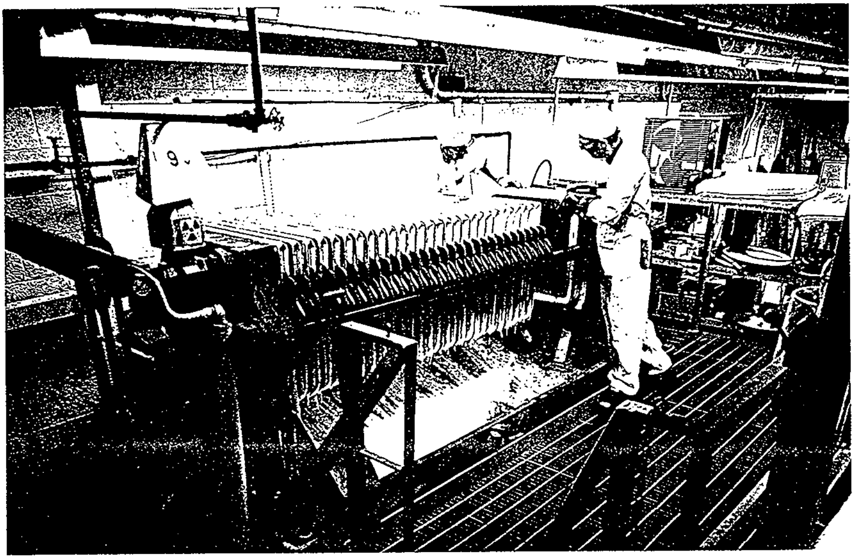


TANK 5

46°22'16"
119°16'48"

95080690-26CN
(PHOTO TAKEN 1987)

300 AREA WASTE ACID TREATMENT SYSTEM--313 BUILDING

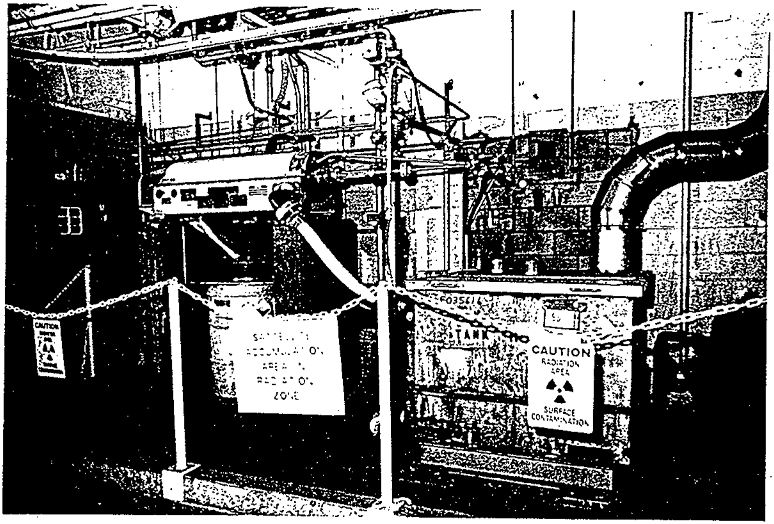


FILTER PRESS

46°22'16"
119°16'48"

7510170-19CN
(PHOTO TANK 1975)

300 AREA WASTE ACID TREATMENT SYSTEM--313 BUILDING

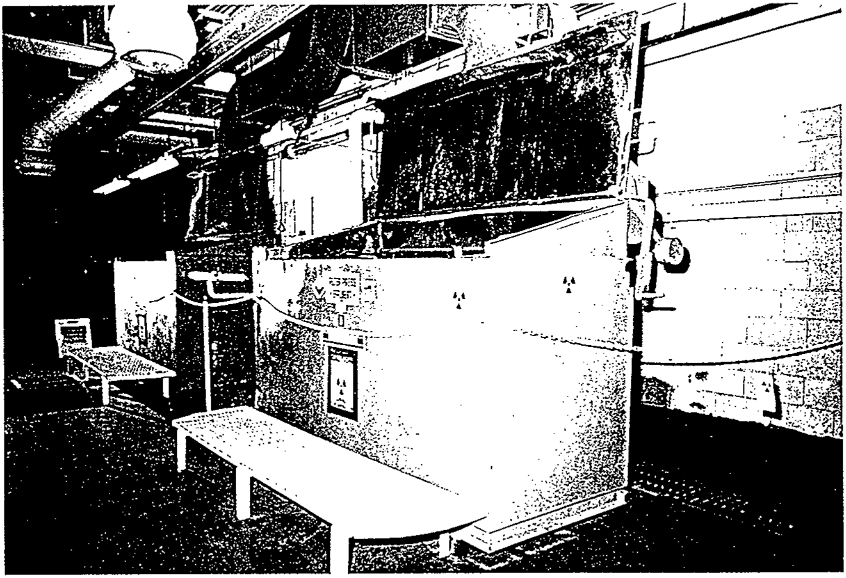


CENTRIFUGE WITH LIQUID RECEIVING TANK 11

46°22'16"
119°16'48"

90022759- 5CN
(PHOTO TANK 1989)

300 AREA WASTE ACID TREATMENT SYSTEM--313 BUILDING

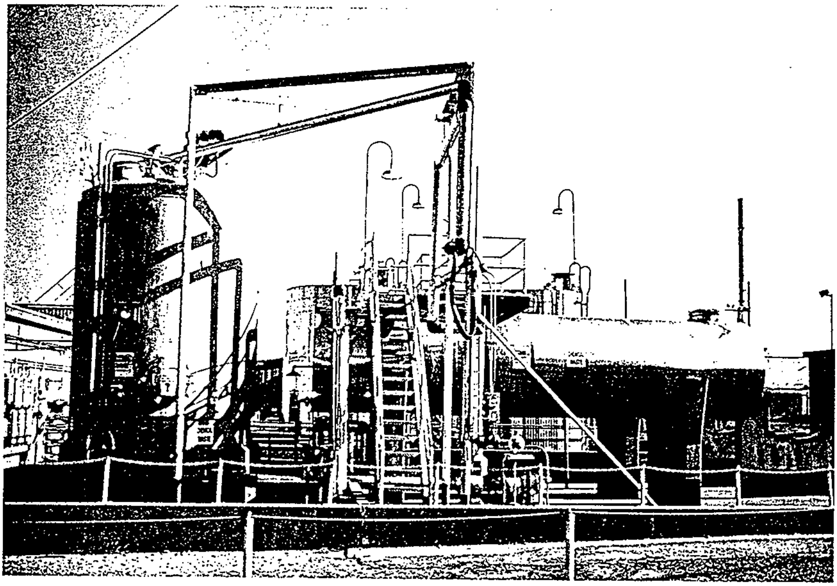


TANKS 9 AND 10--EFFLUENT COLLECTION TANKS

46°22'16"
119°16'48"

9022759-7CN
(PHOTO TANK 1990)

300 AREA WASTE ACID TREATMENT SYSTEM--311 TANK FARM

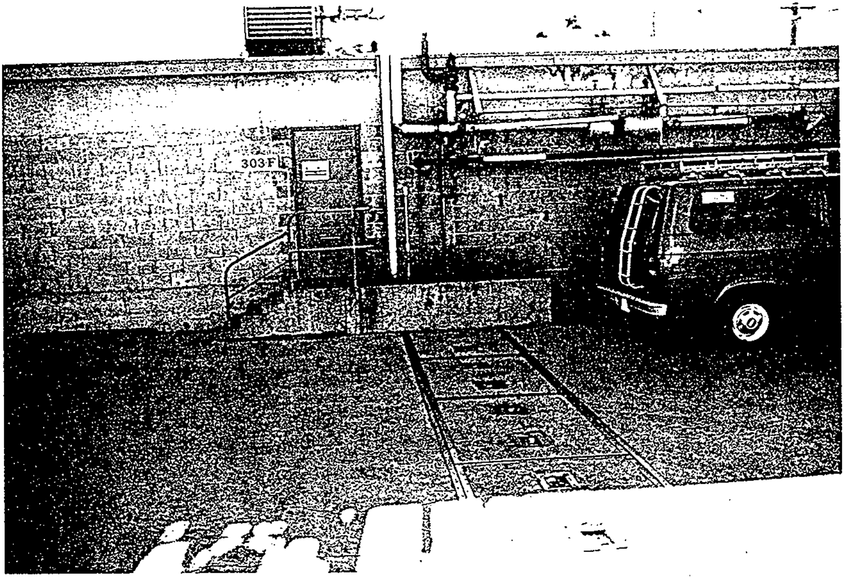


TANKS 40 AND 50

46°22'16"
119°16'46"

85050353-9CN
(PHOTO TANK 1985)

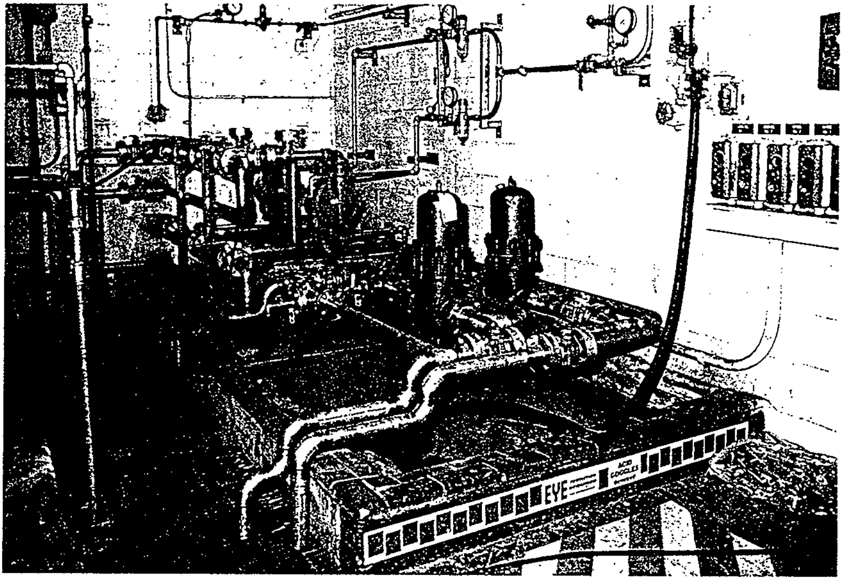
300 AREA WASTE ACID TREATMENT SYSTEM--303-F BUILDING



46°22'16"
119°16'46"

89050353-8CN
(PHOTO TANK 1989)

300 AREA WASTE ACID TREATMENT SYSTEM--303-F BUILDING



AUXILIARY EQUIPMENT (PUMPS, FILTERS, AND SAMPLE PORTS)

46°22'16"
119°16'46"

89050353-7CN
(PHOTO TANK 1989)

CONTENTS

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300 AREA WASTE ACID TREATMENT SYSTEM CLOSURE PLAN

1.0 INTRODUCTION

The 300 Area Waste Acid Treatment System (WATS) is a tank system that was used to treat and store nonrecoverable uranium-bearing waste acid from reactor fuel fabrication operations. Waste acid neutralization occurred in portions of what now is the 300 Area WATS before operation of the system as a *Resource Conservation and Recovery Act* (RCRA) *of 1976* unit. This closure plan details closure of RCRA components and areas, and of contamination resulting from RCRA operations. This unit consists of portions of four buildings and two tank farms: 334-A Building, 313 Building, 303-F Building, 333 Building, and 334 and 311 Tank Farms.

300 Area WATS is proposed to undergo clean or modified closure to the performance standards of *Dangerous Waste Regulations,* Washington Administrative Code (WAC) 173-303-610 and WAC 173-303-640 with respect to all dangerous waste, materials, and media (i.e., soil) contaminated from operation of the 300 Area WATS as a RCRA unit. The closure process for 300 Area WATS is divided into two primary steps that will occur over an extended closure period. The first step is partial clean closure that occurs under this closure plan. This will be achieved by clean closing aboveground structures and components and soils not impacted by 300 Area WATS operations. The activities for partial clean closure activities currently are ongoing using a three-phased approach. After partial clean closure, the unit will be transitioned to Hanford's Environmental Restoration Contractor (ERC) to disposition soil identified in this closure plan as impacted by 300 Area WATS operations and to coordinate final 300 Area WATS closure. Soil disposition will be performed at a later date under other documents in conjunction with the future 300-FF-2 *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) *of 1980* operable unit (OU) remedial action. The results of final closure activities will be documented in a later revision to this plan.

The 300 Area Process Sewer (PS) and the WATS and U-Bearing Piping Trench will be investigated by the CERCLA remedial investigation/feasibility study (RI/FS) process for the 300-FF-2 OU outside the scope of 300 Area WATS closure. Potential contamination at 300 Area WATS locations, identified by the closure process as predating RCRA operations or originating from non-RCRA systems or components, will be addressed outside the scope of 300 Area WATS closure.

Some 300 Area WATS tanks and structures will remain after closure. The Declaration of the Record of Decision (ROD) (DOE et al., 1996) for the 300-FF-1 and 300-FF-5 OUs reflects industrial usage of the 300 Area for the foreseeable future. It is likely that the 300-FF-2 ROD will retain the industrial usage scenario and there could be a future use for such tanks and structures after clean closure. If no future use is identified for these materials, the materials could be disposed as a portion of decontamination and decommissioning (D&D) activities.

300 Area WATS is within the 300-FF-2 (source) and 300-FF-5 (groundwater) OUs, as designated in the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1999). 300-FF-2 and 300-FF-5 OUs are scheduled to be remediated using the CERCLA RI/FS process. Any remediation of groundwater contamination within these OUs, although not expected as a result of 300 Area WATS RCRA operations, would occur under the 300-FF-5 OU RI/FS processes.

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CONTENTS

FIGURES

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2.0 FACILITY DESCRIPTION

The 300 Area WATS is located in the 300 Area (Figure 2-1) of the Hanford Site and operated as a tank system for treatment and storage of waste acid. The 300 Area WATS consisted of tanks, ancillary equipment, and secondary containment structures located in portions of the 334-A Building, 303-F Building, 333 Building, 313 Building, and the 311 and 334 Tank Farms. Transfer piping between the buildings is contained in a covered concrete pipe trench identified as the WATS and U-Bearing Piping Trench. Figure 2-2 shows the location of the buildings and trenches. Each area and its components are further identified in Figures 2-3 through 2-10.

300 Area WATS closure activities began in 1996. Although 300 Area WATS remains unclosed, most 300 Area WATS tanks and equipment have been removed. The following description is before commencing closure activities.

2.1 GENERAL DESCRIPTION AND OPERATIONS

Waste acids treated in the 300 Area WATS were generated during fuel fabrication operations in the 333 Building. Fuel fabrication process tanks 7 and 11, which are located in the 333 Building, also were used to treat the waste acid by reducing chromium from Cr^{+6} to Cr^{+3}. From the 333 Building, waste acids were piped to the 334-A Building for temporary storage in tanks A, B, C, or tank 4 of the 334 Tank Farm. Tank 4 was removed and disposed in the Low-Level Burial Grounds (LLBG). The acids were piped to the south room of the 313 Building, which was called the uranium recovery area, for neutralization. Before 1985, the neutralized acid slurry was stored in tank 40 of the 311 Tank Farm until transferred by tanker truck to the 183-H Solar Evaporation Basins. After 1985, the slurry underwent solids separation at the 313 Building through the combined use of a centrifuge and a filter press. Solids from the centrifuge were drummed for transport to the 303-K Storage Unit or the LLBG for disposal. Solids from the filter press were not considered waste and were drummed for offsite uranium recovery. The 313 Building effluents were pumped for storage to tanks 40 and 50 in the 311 Tank Farm. Effluent was circulated between the tanks and sometimes back to the 313 Building by pumps located in the 303-F Building. The effluent exited the system by being offloaded into tanker trucks for long-term storage in the Double-Shell Tank (DST) System.

2.1.1 Waste Transfer Piping and the WATS and U-Bearing Piping Trench

The waste acid transfer lines between the 333, the 334-A, and the 313 Buildings are of polyvinyl chloride (PVC) construction. The treated effluent transfer lines between the 313 Building and the 311 Tank Farm are stainless steel. These lines are contained in the WATS and U-Bearing Piping Trench, a contiguous, belowgrade concrete structure connecting various 300 Area WATS buildings and structures. This trench has concrete cover blocks or metal cover plates and totals about 195 meters in length. The portion of the trench between the 333 Building and the 303-F Pumphouse was constructed with 3.8 centimeter weepholes, spaced approximately every 6 meters, along the bottom to allow precipitation to drain to soil. The TSD unit boundary includes the transfer lines but not the trench structure. This trench was constructed in the early 1960s and predates 300 Area WATS operations. The trench houses other piping systems, including Uranium-Bearing System piping that, for many years before WATS operations, transported similar waste that contaminated the trench with similar waste constituents.

2.1.2 333 Building Description

The 300 Area WATS components of the 333 Building are tanks 7 and 11 (Figure 2-3), and the 2-inch PVC drain piping from these tanks and from non-WATS tanks that also drained waste acid to the 334-A Building storage tanks. The location of waste transfer piping within the building is identified in Figure 2-4. Tanks 7 and 11 are square, uncovered metal tanks used for chrome reduction treatment.

Sawcuts exist in the floor near tanks 7 and 11 that are smooth and narrow (approximately 0.64 centimeter wide) (Figure 2-3). The sawcuts are filled with an unidentified crack sealant material. The limited potential for these cracks to have received RCRA spills is discussed in Chapter 3.0, Section 3.2.1. The origin and depth of the sawcuts are unknown.

2.1.3 334-A Building Description

300 Area WATS areas and components of the 334-A Building are identified in Figure 2-5. The building shell was moved to this location and renovated in 1974 into the present 334-A Building. The dimensions of the 334-A Building are 11.77 meters by 5.58 meters. The abovegrade area of the building is used only for general storage of nonhazardous products. The belowgrade area (tank pit) housed piping and components to transfer and store waste acid.

The tank pit contains three tanks: tanks A, B, and C. Tank A is a vertical tank with a capacity of 1,135 liters. In 1988, the tank was cleaned and removed from service. Discussions with 300 Area personnel involved with this activity indicated that after tank A was removed from service, the associated pump, piping, and the tank PVC liner were flushed, removed, and containerized in a burial box for transfer to LLBG. Records of the cleanout and disposal activity have not been located. Tank A was cleaned and the plastic liner was removed when the tank was taken out of service in 1988; no visible regulated waste or waste residues from operations existed in this tank. However, the tank had been opened and contained minor amounts of nonregulated debris (dirt) that fell into the tank from the grating above.

Tanks B and C, which have a capacity of 7,570 liters each, are horizontal cylindrical tanks of high-density polyethylene construction supported belowgrade by stainless-steel saddles. These tanks are 3.54 meters long and 1.77 meters in diameter (outside dimensions) and sit approximately 51 centimeters above the floor. Tank wall thicknesses are unknown, but are highly variable as a result of the molded plastic construction. A maintenance hole with a stainless-steel cover is located on the top of each tank above the normal acid levels. Electrode-type high-level alarms and float- and cable-level indicator systems remain in the tanks. As dangerous waste tanks, inspections of each tank, adjacent piping, and surrounding areas were performed weekly to check for damage, deterioration, or leakage. The completed inspection forms are filed in the 333 Building.

The tank pit is a 5.7-meter-long, by 5.58-meter-wide, by 3-meter-deep that serves as a containment basin in the event of tank or piping failure. The pit is covered by a metal grate. The floor grating directly above the tank pit and the 334-A Building above the grating were never 300 Area WATS operational areas and are outside the scope of 300 Area WATS closure. The pit is constructed of reinforced concrete with a glass-filled polyester acid-resistant coating on the floor and lower 61 centimeters of the walls. The tank pit originally was coated with Carboglas[1] 1601 SG. In 1987, the floor and bottom 53 centimeters of the walls were overcoated with Semstone[2] 884, an impermeable acid-resistant coating.

[1] Carboglas is a trademark of the Carboline Company.
[2] Semstone is a trademark of Century Polymer Company.

Where the new coating was placed, the old coating was removed completely and the floor and portions of the walls were decontaminated aggressively by sandblasting. Some of the original coating extends approximately 7.6 to 10.1 centimeters above the new coating on the wall to a height of approximately 61 centimeters from the floor. Currently, a coating of 5-centimeter styrofoam insulation, overlaid with 2-centimeter cement slurry and wire mesh, begins 2.5 centimeters from the pit floor and rises to the bottom of the grate covering.

The floor drain to the PS was fitted with a removable PVC plug in 1986 to prevent the entry of acids into the sewer in the event of a spill. Before the use of the PVC plug, a 61-centimeter-high PVC standpipe was installed in the floor drain.

A plastic pump (since removed) located in the 334-A Building pit transferred the waste acid through a 294-meter-long, 2-inch-diameter pipe from the 334-A Building tanks to tank 2 in the 313 Building for neutralization.

2.1.4 334 Tank Farm Description

The 300 Area WATS portions of the 334 Tank Farm are the uncoated concrete pad and drainage trench (identified in Figure 2-6) and the tank support structure. The pad is located directly below where 300 Area WATS tank 4 and three other similar, non-300 Area WATS tanks were supported by a large steel structure. No cracks exist in the concrete pad. Tank 4 was a lined carbon steel tank that usually was empty but was kept available as an overflow tank for the tanks in the 334-A Building. In 1986, tank 4 failed near the top, above the liner. In 1988, tank 4 was removed, cleaned, and disposed in the LLBG. The paint on the tank support structure predates this spill. Portions of the painted surface exhibit rust. No 300 Area WATS piping remains at this location.

2.1.5 313 Building Description

The 300 Area WATS portions of the 313 Building were contained in one room (Figure 2-7), called the uranium recovery area. The 313 Building was constructed on a concrete slab. Currently, all tanks in this room are surrounded by 22-centimeter-high berms installed to contain spills. The berms (Figure 2-5) divide the room into four separate bermed areas.

2.1.5.1 Bermed Areas

The oldest bermed area is located in the northwest corner of the room and dates from 1953. This area contains 300 Area WATS tanks 2 and 5. The berm and the concrete floor are covered with acid split brick. Acid split brick is half brick with a glazed coating that was intended to be impervious to spilled acid. The acid brick originally was painted yellow with Amercoat[1]. A drainage trench running east-west the length of this area contains a sump that, until 1987, allowed spills to drain to the PS. The drainage trench is covered with removable cast-iron alloy metal grates. The trench originally was covered with acid brick, but now is lined with a stainless steel catch pan that was installed before RCRA operations in the early 1970's during floor repairs (BHI 1993). In 1987, the sump was backfilled with concrete, and the drain to the PS was plugged.

The second bermed area was created in 1983 when a berm was built around the filter press. The floor in this area is not covered with acid brick and currently is covered with an unidentified, blue-colored

[1] Amercoat is a trademark of American Paint Corporation.

coating. The berm is coated with acid-resistant epoxy paint. Condensate drain piping from equipment in bermed areas 1 and 2 is routed to a protruding floor drain. The floor drain discharges to a sump located in an unbermed, open area of the floor at the east end of the room.

The third bermed area was created in 1985 when a berm was built around the newly installed centrifuge. The berm and floor are coated with an epoxy floor covering. The sump in this area originally drained to the PS and is covered with a cast iron grate. In 1987, the sump was backfilled with concrete and the drain to the PS was plugged.

The fourth bermed area was created in 1987 when berms were built around tanks 9 and 10 and an east-west running trench. A contiguous area of the floor beneath tanks 9 and 10, and the drainage trench in this area, were covered with acid split brick in 1953. This area was sandblasted before constructing the berm and recoating the floor with Semstone. The trench contains a sump that was backfilled with concrete in 1987, plugging the drain to the PS. As discussed in Chapter 3.0, soil beneath this portion of the floor could be contaminated from defective drains. The trench was covered with removable cast-iron alloy metal grates and lined with a stainless steel catch pan similar to the liner installed in the early 1970's in bermed area 1. The floor around the tanks was sloped to drain to the trench.

A sump exists at the east end of the room, which originally drained to the PS and is not in one of the bermed areas. This sump also was backfilled with concrete, and the drain lines to the PS plugged in 1987. The sump appears to be bare concrete covered with a cast iron metal grate.

2.1.5.2 313 Building Components and Piping

Tank 2 is a vertical, cylindrical tank with a nominal capacity of 5,678 liters and a small top inspection plate. An external water jacket surrounds 80 percent of the sidewall and provided cooling of the neutralization reaction. The tank is constructed of Type 347 stainless steel with 1.3-centimeter-thick bottom and sidewalls. The tank is equipped with a float-and-cable level indicator with a high-level alarm and pump cut off. An encapsulated tilt switch, which is suspended in the top of the tank, provided an alarm to indicate overfilling of the tank. The tank is 271.8 centimeters in height and 172.7 centimeters in diameter.

Pump P2 was used as a recirculation pump during neutralization in tank 2. From January 1975 to November 1985, pump P2 transferred neutralized slurry from tank 2 through a 2-inch-diameter stainless steel line to tank 40 in the 311 Tank Farm. After that time, pump P2 pumped tank 2 waste to a metal centrifuge, installed in November 1985, to separate liquids and solids. A maximum of 11,356 liters of waste could be treated per day, but generally operated at a rate much less than maximum capacity.

Tank 11, installed in 1985, is a square 984-liter tank with a flat, sloped bottom and a loose lid. The tank was used as an effluent receiving tank for the centrifuge. The tank has a shell that is constructed of 304-L stainless steel (designed to provide support only and not intended as a liquid barrier) and is lined with 0.64 centimeter of PVC. A high-level and low-level electrode-type level control provided control of transfer pump P9, which transferred effluent from tank 11 to tank 5 or tanks 40 and 50 in the 311 Tank Farm. Inside, the tank is 122 centimeters long, 122 centimeters wide, and 94 centimeters high.

Tank 5, the filter press feed tank, is a 2,498-liter, vertical, cylindrical tank with a flat, sloping bottom and a vented flat lid. Construction is listed as 18-8 Cb-type stainless steel with a wall and base thickness of 0.64 centimeter. An external steam coil and sidewall insulation also are present. The tank is equipped with a tilt-switch, high-level sensor. The tank is 1.6 meters in diameter, 1.4 meters high, and 5.1 meters in circumference.

Pump 7 was used to force the slurry through the plate-and-frame filter press. The filter press frame is constructed of cast iron. The plates were cast iron until the early 1980's, when the plates were replaced with polypropylene plates. The press could treat a maximum of 4,542 liters per day.

Tanks 9 and 10 are rectangular 2,119-liter tanks with hinged covers. These tanks did not enter operations as 300 Area WATS components until 1985, and were used primarily for emergency storage of clarified, room temperature filter press effluent before transfer to chemical waste storage tanks. The wetted portions are constructed of 0.51-centimeter-thick monel, with a metal skin that protects the exterior insulation on the sidewalls and bottoms. Overfill alarm tilt switches are suspended near the top of the tanks. An air diaphragm pump (P8) transferred liquid from tanks 9 or 10 to any of several locations within the 313 Building, including tank 5 and to tanks 40 and 50 in the 311 Tank Farm. The tanks are 2.5 meters long, 1 meter wide, and 1.25 meters high.

Before use as 300 Area WATS effluent tanks (1953 to 1971), tanks 9 and 10 contained a boiling caustic bath for stripping aluminum cladding from fuel assemblies. The ventilation hoods above tanks 9 and 10 were connected to a roof fan that removed chemical fumes from the room. The ventilation hoods have not been used for 300 Area WATS operations because tanks 9 and 10 did not produce chemical fumes.

2.1.6 303-F Building Description

The 300 Area WATS portions of the 303-F Building are identified in Figure 2-8. The 303-F Building is 14 meters long, 7.6 meters wide, and 3 meters high. The building has a concrete floor with acid split brick in several areas and 30-centimeter-thick concrete block walls. Doors are on the north, west, and south sides.

The 300 Area WATS activities began in this building in November 1985 when two pumps, two cartridge filters, two sample ports, and the piping (Figure 2-9) were installed in the 303-F Building pumphouse to serve new tank 50 and existing tank 40. The pumps recirculated and filtered solutions in tanks 40 and 50 or transferred solutions between tanks 40 and 50 or back to tank 5 in the 313 Building for further treatment. These components are located above a pre-existing, concrete catch basin with two adjacent, stainless steel catch pans to contain spills (if any). The tops of the catch basin walls are lined with acid brick.

2.1.7 311 Tank Farm Description

The 300 Area WATS portions of the 311 Tank Farm are identified in Figure 2-10. These areas are located inside two separate concrete containment catch basins. The tank 50 basin was constructed in 1986, and tank 40 basin was constructed before RCRA operations. Both basins drained to the PS.

Tank 40 was installed in 1953 and was used for storage of product nitric acid until 1973, when the tank was converted to neutralized waste storage. Tank 40 is a horizontal, cylindrical, stainless steel tank with a 15,141-liter capacity that is supported by two concrete saddles. The tank has a diameter of 1.8 meters and a length of 7.25 meters. Construction is of 304-L stainless steel with 0.64-centimeter-thick walls and 0.84-centimeter-thick heads. Two maintenance holes are provided at the top of the tank. The tank had external electric heat and full insulation for freeze protection. The tank had an air supply for agitation if needed. A float-type level indicator installed in one maintenance hole operated an overfill alarm. The support pad for tank 40 is surrounded by a 60-centimeter-high concrete berm to contain any spillage. The floor of the tank 40 catch basin was sandblasted and resurfaced with an acid-resistant, epoxy coating in 1988. A low-point drain exists at the northwest corner of this basin where the north basin wall meets the basin floor. The drain assembly consists of approximately 10 feet of small bore, stainless steel piping with a manually operated valve at the end. This drain piping was removed and replaced in 1996 after 300 Area WATS operations ceased. The original valve was reused. Since operations ceased in 1995, the coating at basin lowpoints visibly has deteriorated.

Tank 50 was installed in November 1982 in a new concrete catch basin with an acid resistant coating. The original basin coating remains intact. Tank 50 is a vertical, cylindrical, 304-L stainless-steel tank with a capacity of 18,927 liters. The wall and head thickness of the tank is 0.64 centimeter. The tank diameter is 2.87 meters, and the height is 4 meters. The tank had external electrical heat and full insulation for freeze protection. Two maintenance holes are provided, one on top and one in the lower south side. The tank is equipped with a slow-speed mechanical agitator and an ultrasonic indicator that acted as an overfill alarm. A low-point floor drain exists at the northeast corner of the tank 50 basin. The drain discharges to the 300 Area PS via the WATS and U-Bearing Piping Trench located beside the basin. The drain is connected to a pipe stub with a manually operated valve located just outside the basin wall. During operations, this valve remained closed except during draining. This valve is now kept open.

Solutions from tanks 40 and 50 were pumped via transfer pump P10 into a tank trailer and transported to the 340-B Building for transfer by railcar to the DST System, or were transported offsite for disposal.

The 311 Tank Farm currently contains a 15,141-liter tank used to store product nitric acid that was removed from service before RCRA operations, and two 37,854-liter tanks used to store sodium hydroxide (tanks 1 and 2). All of these tanks were process chemical (product) tanks that did not manage RCRA waste and are not a portion of the 300 Area WATS closure.

2.2 SECURITY INFORMATION

Security information for the Hanford Facility is discussed in the *Hanford Facility Dangerous Waste Permit Application, General Information Portion* (DOE/RL-91-28).

All persons entering the 300 Area must display a DOE-issued security identification badge indicating appropriate authorization. Personnel are subject to random searches of items carried into and out of the 300 Area. Signs posted at the 300 Area boundaries inside the Hanford Site state:

> NO TRESPASSING. SECURITY BADGES REQUIRED BEYOND THIS POINT.
> GOVERNMENT VEHICLES ONLY. PUBLIC ACCESS PROHIBITED.

or an equivalent legend.

To preclude unknowing access into the unit by unauthorized individuals, the 334-A Building, 313 Building, and the 303-F Building are kept padlocked. These buildings also are posted to allow entry by authorized personnel only and to identify hazards presented by the facilities. The 300 Area WATS area of the 333 Building, and the 334 and 311 Tank Farms that are outdoors, are roped off and posted to allow authorized entry only.

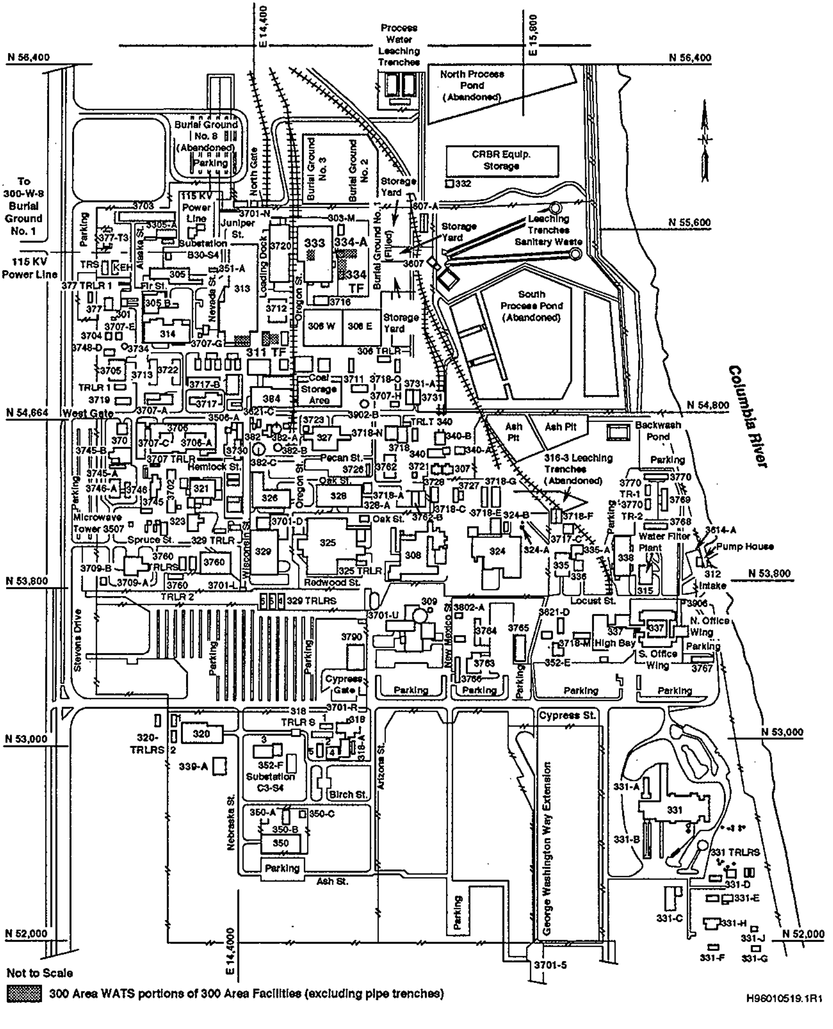


Figure 2-1. 300 Area.

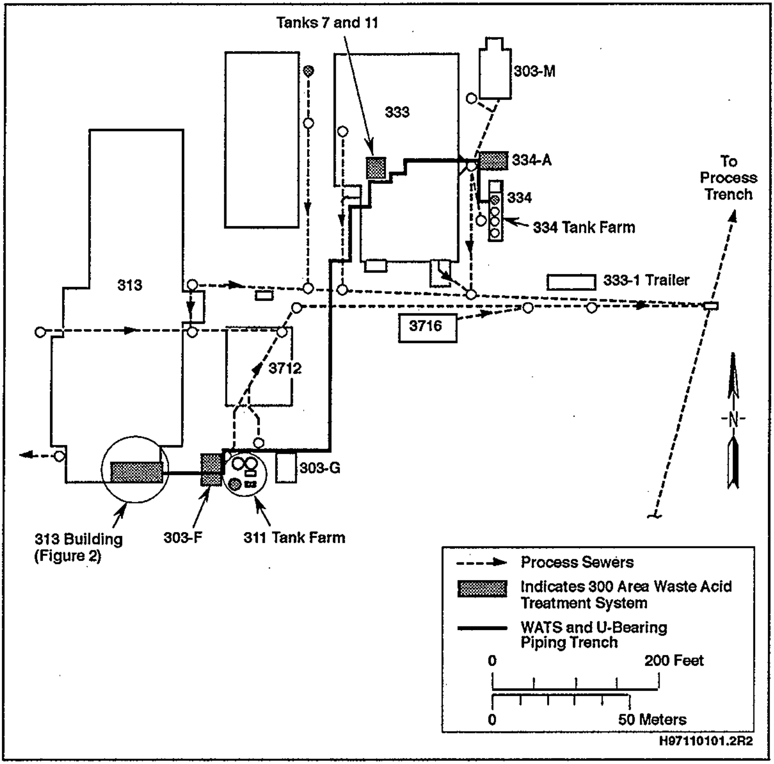


Figure 2-2. 300 Area Waste Acid Treatment System Layout.

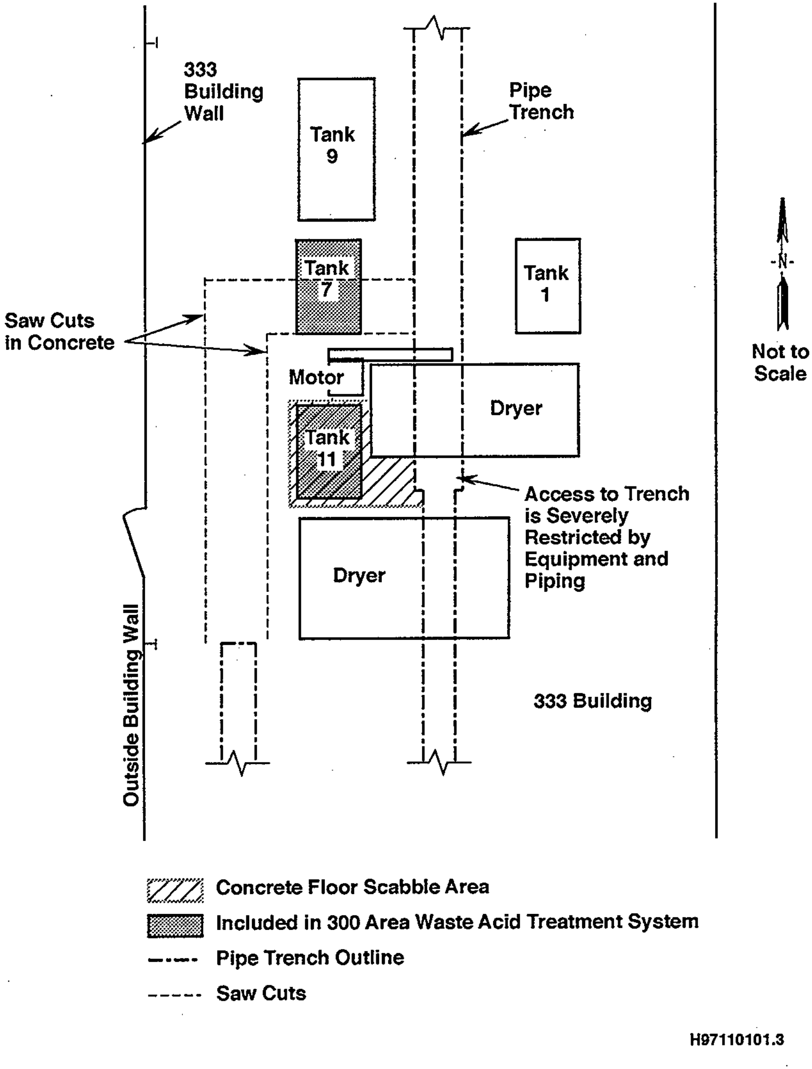


Figure 2-3. 300 Area Waste Acid Treatment System Portion of the 333 Building.

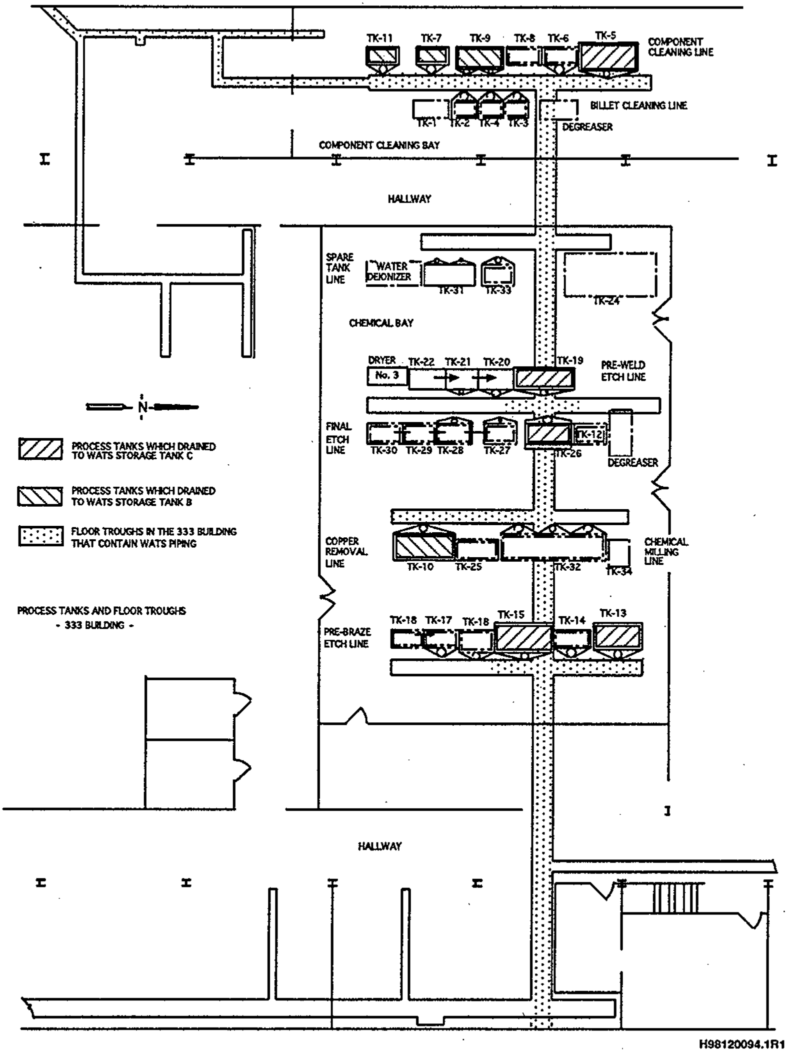


Figure 2-4. 300 Area Waste Acid Treatment System Piping Within the 333 Building.

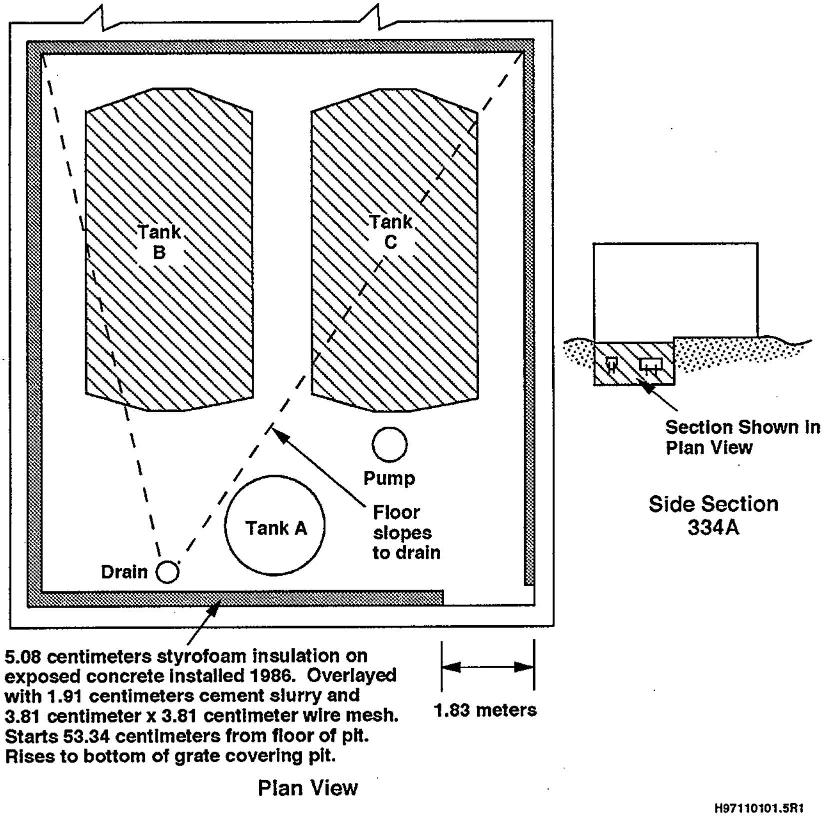


Figure 2-5. 300 Area Waste Acid Treatment System Portion of the 334-A Building.

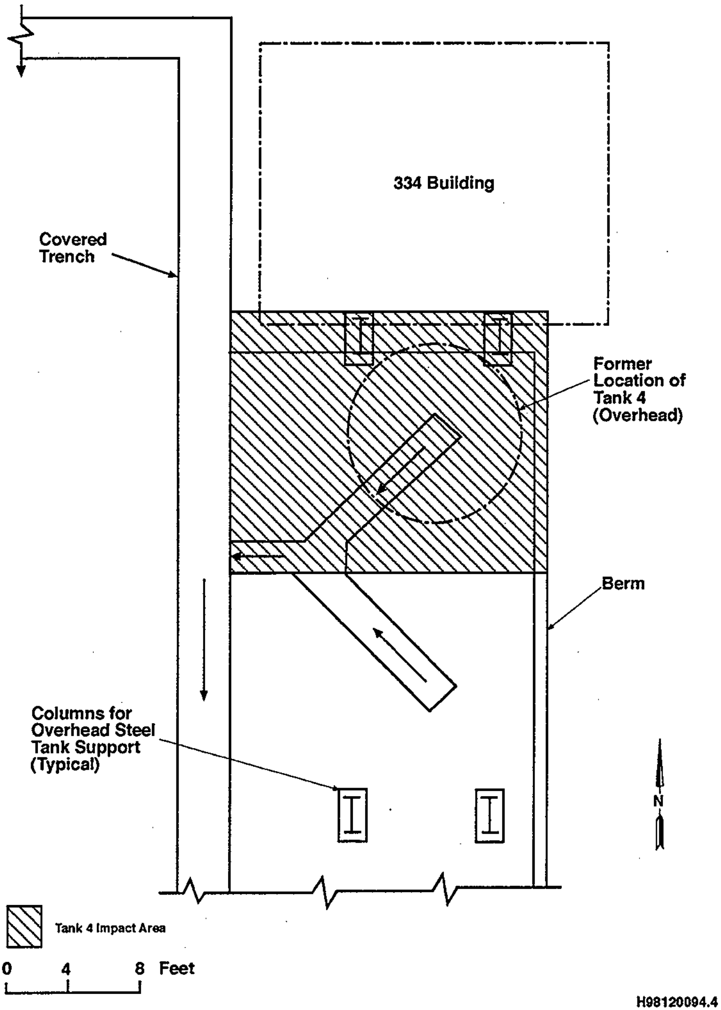
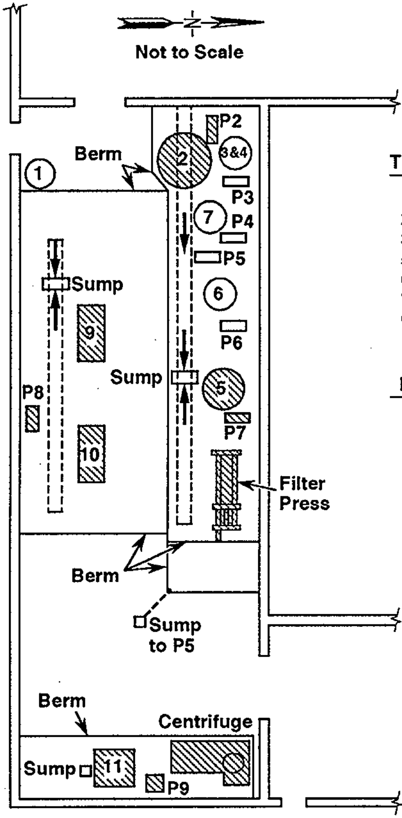


Figure 2-6. 300 Area Waste Acid Treatment System Portion of the 334 Tank Farm.



Tank No.	Use
1	Hot Water Heat Exchanger
2	Waste Acid Neutralizer
3 and 4	Uranium-Bearing Acid Holding Tanks
5	Filter Press Feed Tank
6	NaOH Mixing Tank
7	Uranium-Bearing Acid Neutralizer
9 and 10	Filter Press Effluent Tanks
11	Centrifuge Effluent Tank

Pumps	
P2	Tank 2 Recirculation and Transfer to Centrifuge
P3	Uranium-Bearing Acid Feed to Tank 7
P4	pH Recirculation for Tank 7
P5	Transfer from Tank 7 to 6 or 5
P6	Transfer from Tank 6 to 7
P7	Transfer from Tank 5 Through Filter Press
P8	Transfer from Tanks 9 and 10 to Tank 5 or Outside Storage Tanks
P9	Transfer from Tank 11 to Tank 5 or Outside Storage Tanks

Indicates Waste Acid Treatment System Components

H96010003.1b

Figure 2-7. 300 Area Waste Acid Treatment System Portion of the 313 Building.

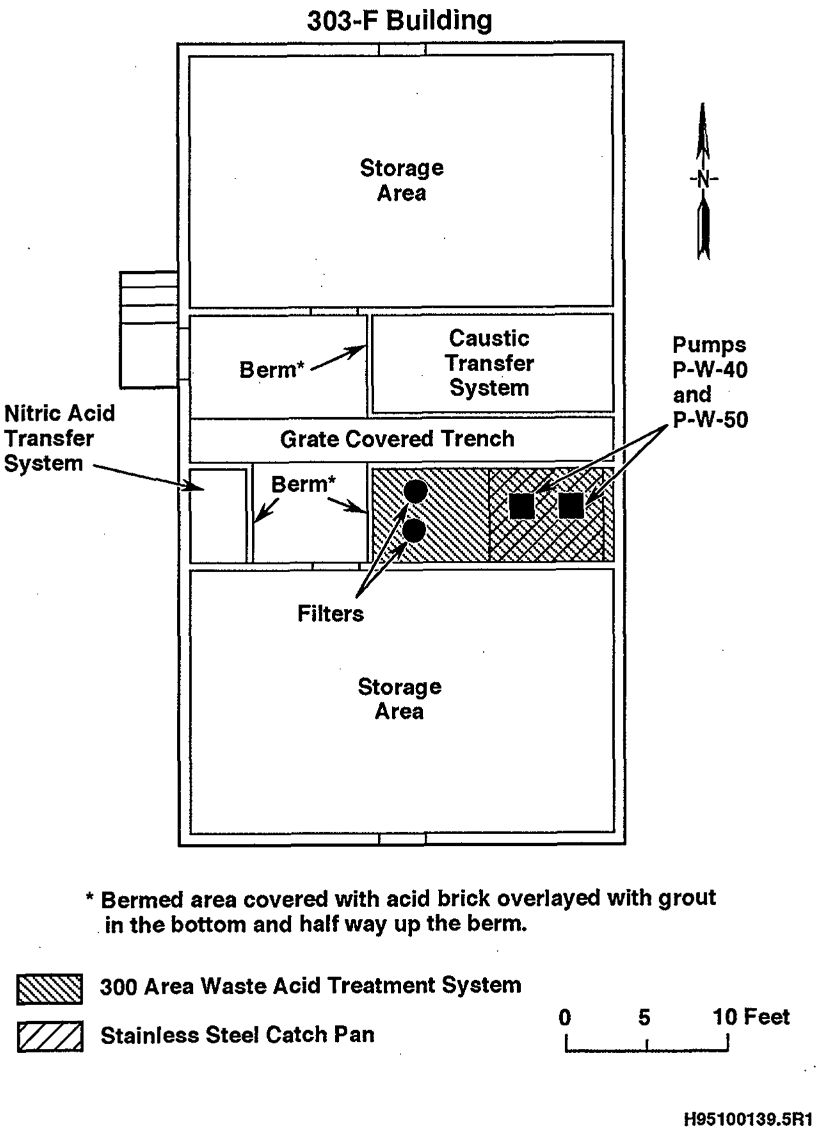


Figure 2-8. 300 Area Waste Acid Treatment System Portion of the 303-F Building.

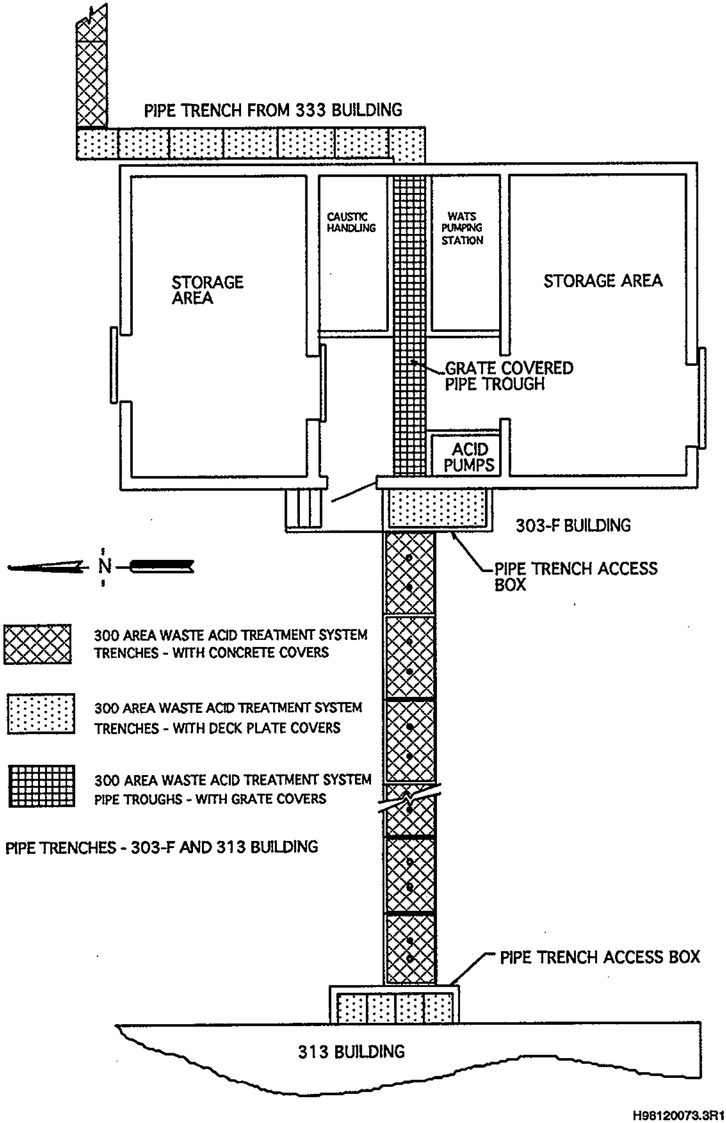


Figure 2-9. 300 Area Waste Acid Treatment System Piping Within the 303-F Building.

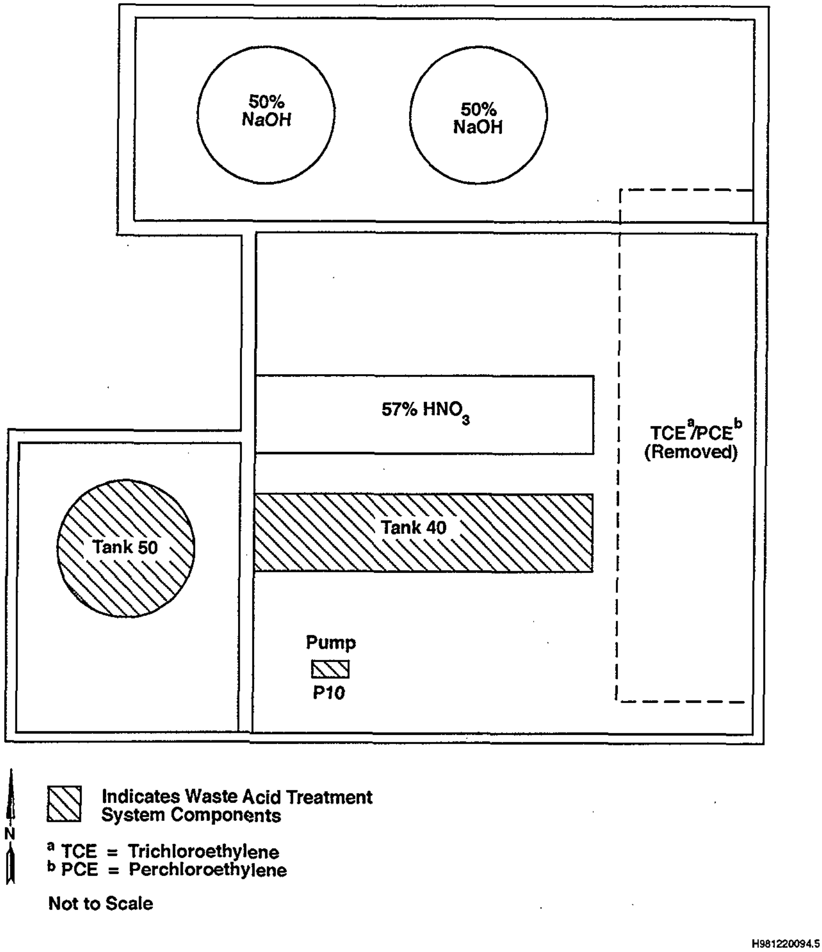


Figure 2-10. 300 Area Waste Acid Treatment System Portion of the 311 Tank Farm.

CONTENTS

APPENDICES

FIGURES

TABLES

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3.0 PROCESS INFORMATION

This chapter describes the 300 Area WATS history of operations, the processes that generated the waste acid that was treated, and the treatment and storage process for the waste acid.

3.1 HISTORY OF SYSTEM OPERATIONS

The 300 Area WATS began partial operations in January 1973 with tank storage and treatment of waste acid and entered full operations in 1975. The 300 Area WATS did not begin operations as a RCRA TSD unit until November 19, 1980. The primary source of the waste acid was N Reactor fuel fabrication operations that occurred in tanks in the 333 Building from 1961 until 1987. The waste acids from these operations that contained nonrecoverable uranium were treated in the 300 Area WATS. Because this acid waste contained small amounts of uranium, the waste is considered to have been a mixed waste entering the 300 Area WATS. However, from the beginning of 300 Area WATS RCRA operations, small quantities of waste acids and chemicals from other 300 Area and onsite activities (Section 3.3) also were added and treated in the system as either mixed or dangerous waste.

Until April 1973, waste acid from the 333 Building had been neutralized in a 14,384-liter underground tank that contained limestone located on the east side of the 333 Building where the 334-A Building now stands. The neutralized acid was discharged from this tank to the PS. Between April and August 1973, this tank and tank 4 of the 334 Tank Farm were used to collect acid for transfer to the 313 Building for neutralization in the 300 Area WATS. The tank was removed from service in 1973 when the tank developed a leak and from then until January 1975, waste acid was discharged directly to the 300 Area PS where the acid was neutralized. In January 1975, three new tanks in the 334-A Building began storing waste acid for transfer to the 313 Building for neutralization in tank 2. After neutralization, the waste slurry was pumped to tank 40, located in the 311 Tank Farm.

Until November 1985, tank 40 waste was transported to the 183-H Basins by tank trailer. After November 1985, the neutralized waste acid underwent solids separation in the 313 Building by use of a centrifuge. The solids were containerized in the building, underwent monthly composite sampling and analysis for 300 Area WATS primary process parameters (i.e., pH, ions, metals, and uranium), and were disposed in the LLBG. The liquid effluent was pumped to tank 40 or to the newly installed tank 50. Until March 1988, this effluent was taken from tanks 40 and 50 by tanker truck to the 340-B Radioactive Liquid Waste System for storage while awaiting transport by railcar to the DST System for long-term storage. From March 1988 to July 1995, some nonhazardous, nonradioactive effluent was sent offsite. In July 1995, the last shipment of effluent from tank 50 was pumped via the 340-B Building to a tanker truck and transported to the DST System.

3.2 WASTE STORAGE AND TREATMENT PROCESSES

The following sections summarize the process information for each of the facilities included in the 300 Area WATS. This plan does not include those tanks and associated pumps and piping used solely for uranium recovery.

Historical information regarding spills to the 300 Area WATS location that either predated RCRA operations or were from non-300 Area WATS components is presented for information only in Appendix 3A, Table 3A-1 and 3A-2, respectively. These non-RCRA spills will be addressed at the time of final disposition of affected locations in accordance with past-practice processes (Chapter 1.0) where not incidentally closed out during 300 Area WATS phased closure activities. Table 3-1 identifies spills to 300 Area WATS containment and to the piping trench that will be tracked to final disposition as a requirement of 300 Area WATS closure (Chapter 1.0). All documented 300 Area WATS releases have been identified in waste identification data system (WIDS).

The WATS and U-Bearing Piping Trench constitutes the RCRA/CERCLA interface between the 300 Area WATS RCRA closure and the future 300-FF-2 OU remedial action. Soils beneath the portions of the trench identified in Figure 3-1 are within the scope of 300 Area WATS closure. As previously agreed to by RCRA and CERCLA regulators and by effected DOE-RL programs in a meeting on September 3, 1998, the WATS and U-Bearing Piping Trench infrastructure will be investigated and undergo D&D as part of the 300-FF-2 OU remedial action, outside the scope of 300 Area WATS closure (refer to Appendix 6B). The entire trench has been identified in WIDS for tracking to final disposition under site code 300-224.

3.2.1 333 Building

The only 300 Area WATS components of the 333 Building are tanks 7 and 11, and PVC drain lines from process tanks 5, 7, 9, 10, 11, 13, 15, 19, 26, and 31 to storage tanks in the 334-A Building. The 300 Area WATS portion of this piping begins at the drain valve below each of these process tanks.

The fuel fabrication operations that occurred in these process tanks included component cleaning, acid copper removal, end recessing chemical milling, prebraze cleaning, preweld cleaning, and final bright etch steps. 300 Area WATS tanks 7 and 11 were used for component cleaning. Tank 11 was used for deoxidation of copper and copper-silicon components in Zinctone[1]. Tank 7 was used to rinse components with water after deoxidation in tank 11. Twice per year, chromium (Cr^{+6}) in the solution in tanks 7 and 11 was reduced to Cr^{+3} with sulfuric acid and sodium sulfite before discharge to the 334-A Building

Information regarding process, capacity, chemical output, and solution changeout schedule for each tank is presented in Table 3-2. The waste from these tanks was drained through the PVC drain lines to the 334-A Building storage tanks. The chemical output from these tanks primarily consisted of hydrofluoric, nitric, and sulfuric acids with copper, zirconium, chromium, and uranium in solution.

The only 300 Area WATS known spill to the tank 7 and 11 location occurred August 17, 1981 (Table 3-1). Sawcuts in the floor near tanks 7 and 11, described in Chapter 2.0, Section 2.1.2, likely were not exposed to this spill. A relatively small quantity of acid, 397.5 liters, leaked over the period of a weekend from a defective drain valve directly under tank 11. This leak would have flowed directly into the nearby floor trench and would not have overcome the 10 centimeter per meter upward slope of the floor away from the drainage trench to reach the sawcuts or to have laterally spread beyond the width of tank 11. Only one fine surface crack is visible in the floor in the vicinity of tanks 7 and 11. This crack, which emanates from an area where the concrete surface has deteriorated, is too fine to have provided a pathway to soil for spilled effluents.

3.2.2 334-A Building (Storage)

Before 1975, the 334-A Building site was occupied by a 3,800-gallon underground neutralization tank containing limestone. In 1973, this tank failed and leaked waste acid solution to the soil.

[1] Zinctone is a trademark of Turco Products, Inc.

Characterization or remediation of soil with respect to this leak will be performed by the remedial action process for the 300-FF-2 OU. The 334-A Building was completed in late 1974 and entered service in January 1975 to replace the failed tank.

Three tanks (A, B, and C) in the 334-A Building were used to store waste acids from the 333 Building. Tank A, with a capacity of 1,363 liters, was used as an inline settling tank. Tanks B and C, with a capacity of 7,570 liters each, were used for storage. Waste gravity-drained from the 333 Building to the 334-A Building via PVC transfer pipe. The tanks received approximately 794,905 liters of waste acids per year from the fuels fabrication process.

In the early 1980's, in an effort to reduce sludge build-up, the waste stream from the 333 Building was separated into copper-bearing and zirconium-bearing streams directed to tanks B and C, respectively. In August 1984, the piping to tank A was disconnected, and all waste was routed directly to tanks B or C.

The tank pit contained a spill sensor set to alarm at approximately 1.27 centimeters above the high point of the floor. If a leak occurred to the pit, an alarm sounded in the 333 Building chem bay. The collected solution was sampled and analyzed. If acidic, the solution was pumped into tank A or B. If process water, the solution was released to the PS.

A plastic pump (now removed) in the 334-A Building pit transferred the waste acid through 293 meters of 2-inch-diameter PVC transfer pipe from the 334-A Building tanks to neutralization tank 2 in the 313 Building. The waste was pumped at a rate of approximately 19 to 38 liters per minute to control the heat of neutralization.

Table 3-1 presents a description of spills that are known to have occurred in the 334-A Building portion of the 300 Area WATS since the beginning of RCRA operations.

One large spill occurred in the tank pit in June 1978 (Appendix 3A, Table 3A-1) when fluid levels rose above the 60-centimeter-high standpipe. This was caused when a process water fill line to a 333 Building process tank was left on for 2 days. The standpipe was removed and replaced with a PVC plug and since then there have been only minor spills, primarily leaks from valves or pump fittings. Tank exteriors and the sealed pit floor and pit walls to approximately 60 centimeters above the floor have been in contact with waste acid resulting from accidental spills. No cracks exist in the tank pit floor or walls that could have provided a pathway to soil for contamination from 300 Area WATS operations

3.2.3 334 Tank Farm (Storage)

From 1975 to 1986, tank 4 in the 334 Tank Farm was available for use as an overflow tank for the tanks in the 334-A Building. Although usually empty, tank 4 was used to store waste acid solutions in January 1986 because of equipment problems in the 313 Building. Shortly after that transfer, tank 4 developed holes near the top. The tank maintained integrity below the failure line and no more leakage was reported after the original loss. In the late summer of 1988, tank 4 was removed and disposed in the LLBG. The 334 Tank Farm is outdoors and uncovered. Table 3-1 describes the only spill of waste acid that occurred at the 334 Tank Farm during RCRA operations (tank 4). This spill remained contained by the pad and did not reach soil. Exposure to weather over many years is expected to have rendered the tank support structure and concrete pad naturally decontaminated from the single spill in 1986 (tank 4).

3.2.4 313 Building (Treatment and Storage)

In January of 1975, nonrecoverable uranium-bearing waste acids were pumped fulltime from the 334-A Building into tank 2 in the 313 Building for neutralization with sodium hydroxide to achieve a pH of 10 to 12. Following neutralization, the metals in this waste (Chapter 7.0, Table 7-1) were present primarily in the form of precipitates. Until 1985, the neutralized waste slurry was transferred to tank 40 in the 311 Tank Farm.

In November 1985, a centrifuge was installed in the 313 Building to perform solids separation on the waste slurry. Solids from the centrifuge were drummed and transferred within 90 days to the 303-K Storage Facility for storage or to the LLBG for disposal. Table 3-3 identifies the quantity and makeup of the waste shipped to LLBG. A sample from each drum was taken for chemical analysis. Additionally, a composite sample of all drums in one neutralization tank run was analyzed for uranium. Sample results, along with the gross, tare, and net weight of each drum, were recorded in a logbook. A monthly composite sample of drummed material was analyzed and recorded for constituents such as chromium, copper, nitrate, and fluoride.

The liquid from the centrifuge was discharged to tank 11. Pump 9 transferred effluent from tank 11 to tank 5 that fed a filter press used to further clarify the effluent. Effluent from the filter press flowed by gravity to tanks 9 and 10, examined visually for clarity and, if clear, pumped to tank 40 or tank 50. If cloudy, the effluent was pumped back to tank 5 to be recycled through the filter press.

Until mid 1987, the solids from the filter press were included with the recyclable uranium-bearing sludge shipped to the Feed Material Production Center in Fernald, Ohio.

Table 3-1 describes known spillage to the 300 Area WATS portion of the 313 Building since the beginning of RCRA operations. The floor and drainage trenches have a history of exposure to chemical spills and floor coatings might have covered contamination from spills. In the early 1970's, the PS under the floor on the west side of the room had leaked to ground for an undetermined period of time, potentially contaminating the soil under the west side of the building with uranium, copper, and other substances (BHI 1993). This potential soil contamination will be addressed by the past-practice processes (Chapter 1.0). No cracks exist in this floor that could have provided a pathway to soils for contamination from 300 Area WATS operations. However, soil beneath the portion of the floor identified in Figure 3-2 could have been contaminated by 300 Area WATS operations through defective drains.

3.2.5 303-F Pumphouse (Waste Transfer and Filtration)

The 303-F Pumphouse began 300 Area WATS operations in November 1985. Before this time, building pumps were used to transfer 50 percent sodium hydroxide from tanks in the 311 Tank Farm to neutralization tanks 2 and 6 in the 313 Building. In November 1985, two new pumps, cartridge filters, and sample ports were installed in the 303-F Pumphouse to recirculate and filter waste acid solutions while in tanks 40 and 50 of the 311 Tank Farm, and also to transfer solutions back to tank 5 in the 313 Building.

No spills to this location have been documented since the beginning of 300 Area WATS RCRA operations in November 1985. However, white residues are visible on the filter cartridges, piping, catch basin liner, and acid brick indicating a potential for surface contamination. Although not visible on the white painted surface of the adjacent concrete block wall, the residues also could exist there. The mortar between the acid bricks that cap the basin shows numerous fine cracks. The catch basin prevented any contamination from RCRA operations from reaching soil at this location.

3.2.6 311 Tank Farm (Storage and Treatment)

From 1973 to 1985, neutralized WATS and U-Bearing system effluents from the 313 Building were combined for storage and treatment in aboveground tank 40 in the 311 Tank Farm. Tank 40 waste was transferred to the 183-H Solar Evaporation Basins. The quantity is identified in Table 3-4. In November 1985, tank 50 was installed in the 311 Tank Farm to also store neutralized effluent. Tank 50 also was used four times during 1986 and 1987 to decant waste when the centrifuge was out of service. Decanted effluents were transferred to tank 40. The tanks received approximately 1,589,868 liters of waste solutions per year.

The neutralized effluent was stored in tanks 40 and 50 until it exited the 300 Area WATS by being pumped, using pump P10, to a tanker truck. The tanker truck transported the effluent to the 340-B Building, where the effluent was pumped into holding tanks. Table 3-5 identifies the quantity and makeup of the waste transferred to the 340-B Building. From the 340-B Building, the effluent was pumped to railcars for transport to the DST System. A sample of each tank trailer load was taken for chemical analysis. A logbook was kept on the volume of each load, the pH, the concentration of sulfate and uranium, and on whether the liquid was free of particulate. Additionally, the monthly environmental performance reports listed the amounts and constituents of neutralized waste acid transferred to the 340-B Building or offsite. A monthly composite sample was analyzed and recorded for constituents such as chromium, copper, nitrate, sulfate, and uranium.

The basin valve drain remained closed during operations except when draining precipitation accumulations. Before draining normal precipitation, the effluent was sampled for pH (because the neutralized waste generally was caustic) to confirm that there had been no spills. After known spills, basin effluent was pumped back into the 300 Area WATS. Basin drains are now kept open to preclude precipitation accumulation. Table 3-1 describes known spills to the 300 Area WATS portions of the 311 Tank Farm during RCRA operations. There are no documented spills to the tank 50 catch basin, no visual evidence of waste exist, and the basin retains the original surface coating.

In 1988, tank 40 catch basin was resurfaced. Until then, spills to the tank 40 catch basin had been washed to the PS via the WATS and U-Bearing Piping Trench. Only minor spills (Table 3-1) were recorded during RCRA operations and before resurfacing and no spills are documented after resurfacing in 1988. No waste was managed at the location before the coatings began to fail after 1995 (Chapter 2.0, Section 2.1.7). No cracks in the 311 Tank Farm catch basins exist that could have provided a pathway to soil for contamination from 300 Area WATS operations.

3.3 NONROUTINE CHEMICAL ADDITIONS

Beginning in 1975 and ending in 1988, waste acids and chemicals that were not from 333 Building operations were added to various locations of the 300 Area WATS. The additions made during the RCRA timeframe (since 1980) and the points at which the additions were made are summarized in Table 3-6. Nonroutine chemical additions to the 300 Area WATS before RCRA operations are summarized in Appendix 3B.

These waste additions consisted of used and unused acid and caustic chemical solutions. The waste often contained dangerous waste constituents (e.g., heavy metals) and sometimes radionuclides (primarily uranium), and could have been designated as mixed or dangerous waste on addition to the system. This waste was generated from decontamination, electroplating, battery acid disposal, X-ray film development, various research and development projects, and fuel fabrication (other than routine 333 Building processes).

Until early 1986, this nonroutine waste was added to the treatment system at tanks 9 and 10 in the 313 Building or at previously existing tanks 12, 14, 15, and 16 in the old 313 Building cleanup line. Waste added at tanks 9 and 10 was transferred directly to the 311 Tank Farm. Waste that was added to non-300 Area WATS tanks 12, 14, 15, and 16 in the old 313 Building cleanup line might have been pumped back to the 334-A Building for further treatment and, at that point, would have become 300 Area WATS waste.

Beginning in August 1986, waste was allowed to be added to the system at any of the following locations using a barrel pump: (1) tanks 9 or 10 in the 313 Building, (2) tanks B or C in the 334-A Building, or (3) tank 2 in the 313 Building. The chemical waste disposal permits did not specify the location of the addition.

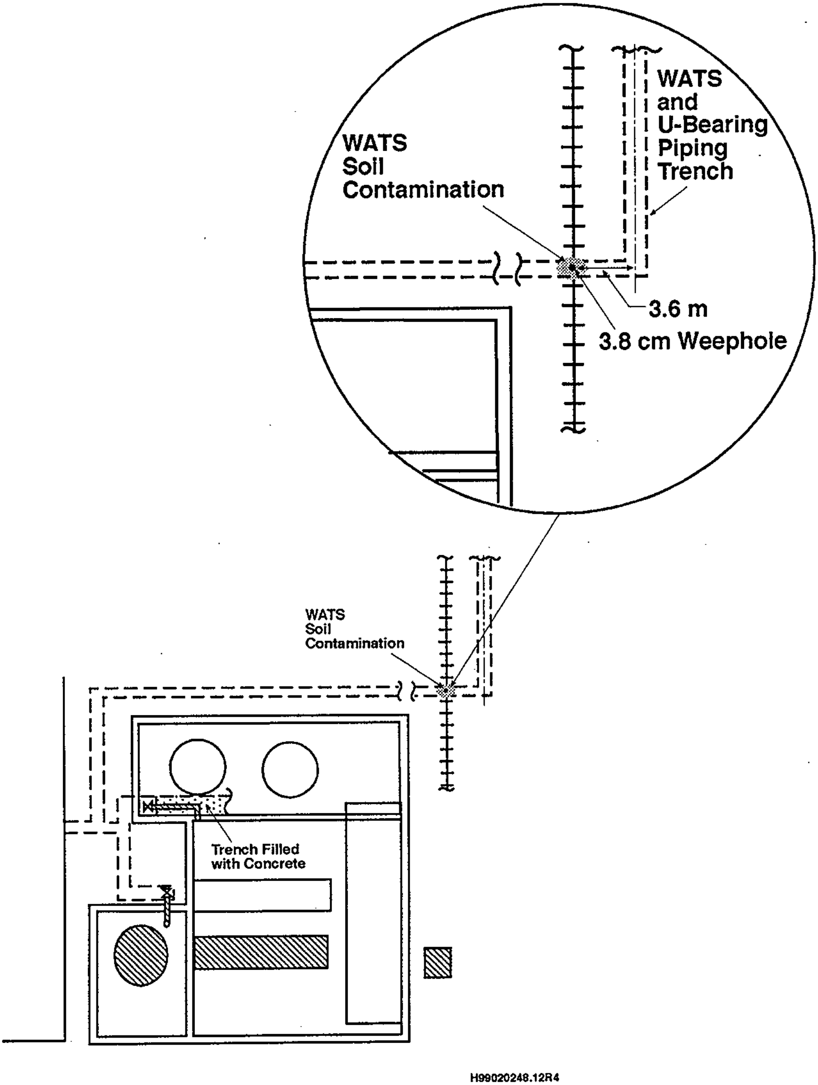

Figure 3-1. 300 Area WATS Related Soil Contamination Beneath the WATS and U-Bearing Piping Trench.

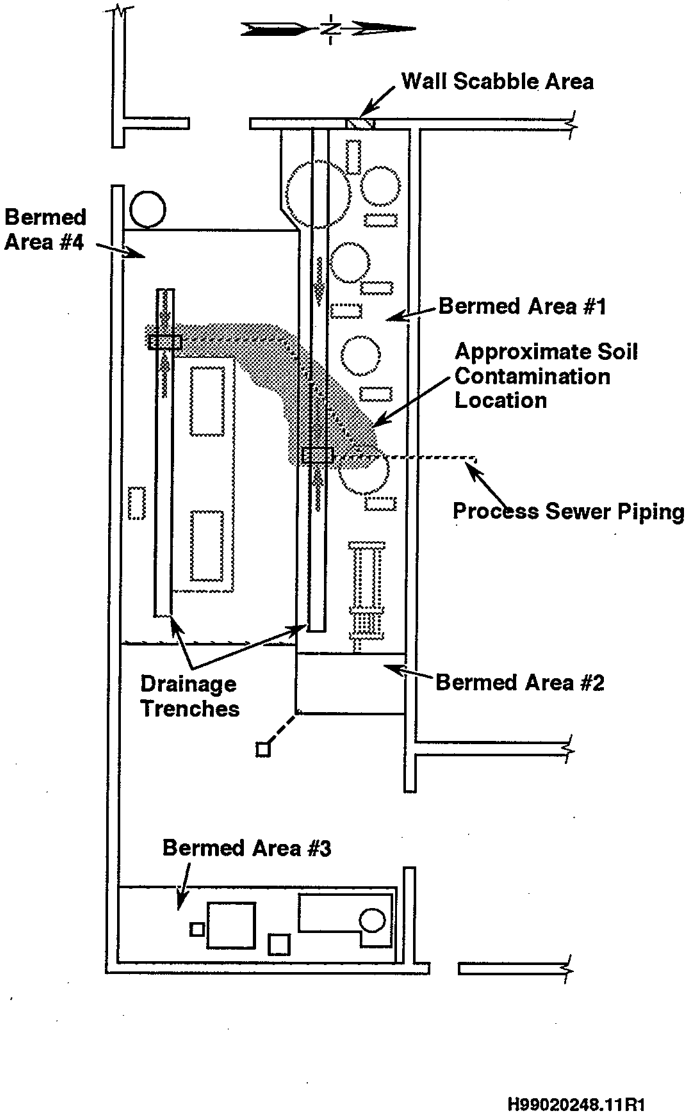

Figure 3-2. 313 Building Subfloor.

Table 3-1. Known Spills During 300 Area Waste Acid Treatment System RCRA Operations*.

Location	Date	Spill origination point	Material spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
333 Building	08/17/81	Tank 11	Newly mixed acid solution	HNO_3, H_2SO_4, and CrO_3 acid solution	105 gal	Slow leak from defective drain valve.	Drained to process sewer.	This could have released 20 lbs of Cr+6 to the process sewer.
334-A Building	09-16-82	Pipe trench between 334-A Building and 333 Building in component cleaning area.	Waste etch acids	HNO_3, HF, H_2SO_4, and CrO_3 acids containing uranium, copper, and zirconium in solution	Exact quantity unknown. However, more than 100 gal was discharged.	The PVC waste acid transfer line broke, resulting in discharge to the process sewer. Weekly process sewer sample for the 333 Building showed elevated copper levels (3.9 ppm).	Pipe was repaired. Flushed leak area into process sewer.	Comparing the copper content in the weekly process sewer sample (3.9 ppm) with a normal average concentration (0.3 ppm), it appears that 82 lb of copper could have been released in this event. This would indicate that the current CERCLA RQ for $Cu(NO_3)_2$ (100 lb) would have been exceeded with this spill.
	11-22-82	334-A Building - storage tanks	Waste etch acids	HNO_3, HF, H_2SO_4, and CrO_3 acids containing uranium, copper, and zirconium metals in solution	Exact quantities unknown (see comments)	In attempting to backflush a transfer line to clear blockage, water was discharged into storage tanks, causing overflow. Weekly 333 process sewer sample showed an elevated level of fluoride (4.1 ppm).	Spilled solution was flushed into process sewer.	Based on average F- content of 1.4 ppm (weekly process sewer composite sample). 75 lb of HF could have been involved in the spill. Copper content in weekly composite sample also was elevated (1.7 ppm vs 0.4 ppm in a normal week) indicating that 35 lb of copper ion [105 lb $Cu(NO_3)_2$] could have been discharged in the spill event. The process sewer stream pH was 1.3 to 2.0 for ~45 min during the course of the spill. This would indicate a release of up to 350 lb of HNO_3 (assuming a process sewer stream flow of 500 gal/min). The current CERCLA RQs are: HF (100 lb), $CU(NO_3)_2$ (100 lb), HNO_3 (1,000 lb).
	1-03-83	334-A Building - storage tanks	Waste etch acid	HNO_3, HF, H_2SO_4, and CrO_3 acids containing uranium, copper, and zirconium in solution	1,500 gal	A siphon condition was established in the overflow piping on tank 10. Acid was added to tank 10 at the same time solution from Tank 26 was run into the waste piping system. As a result, the overflow piping remained submerged and continued to siphon through the waste piping and into the 334-A tanks. The B and C tanks overflowed into the pit area.	Acid was pumped from building pit to a tanker truck. Modifications were made to system to prevent future spills by siphoning.	No discharges to the process sewer.

Table 3-1. Known Spills During 300 Area Waste Acid Treatment System RCRA Operations*.

Location	Date	Spill origination point	Material spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
334-A Building (cont)	1-05-83	334-A Building - storage tanks storage	Waste etch acids	HNO_3, HF, H_2SO_4, and CrO_3 acids containing uranium, copper, and zirconium in solution	200 gal	When tank 15 was drained to the 334-A Building, the B and C tanks overflowed. Depth gages did not work properly.	Acid was cleaned up and not allowed to enter the process sewer.	Depth gages and high-level alarms were recalibrated.
	08-15-83	334-A Building - storage tanks	Waste etch acids	HNO_3, HF, and H_2SO_4 acids containing copper, uranium, and zirconium in solution	Approximately 100 gal of acid solution	333 Building process sewer analyses showed elevated levels of copper (2.2 ppm). Apparent cause was clean out of storage tanks in 334-A Building. Pump used to transfer material from tanks was leaking; leakage was discharged into process sewer.	None.	Based on normal average copper content in weekly process sewer sample of 0.3 ppm and using a total process sewer flow of 2,874,700 gal, it is estimated that 45 lb of copper could have been involved in this release. This corresponds to 135 lb expressed as $Cu(NO_3)_2$.
	10-27-83*	334-A Building - storage tanks	Waste etch acids	HNO_3, HF, and H_2SO_4 acids containing copper, uranium, and zirconium in solution	Unknown volume. Refer to description of event and comment columns for estimated weights.	Following desludging of the 334-A storage tanks, leak testing with water routinely was pursued. The water used for this effort was discharged into the process sewer. In the 10-27-83 effort, one of the tanks apparently had not been desludged and the leak test solutions (containing the waste acids and crystalline sludge) mistakenly was discharged into the process sewer. The weekly 333 process sewer sample showed elevated levels of fluoride (15.8 ppm) and copper (3.6 ppm) and a low pH (2.87).	When operator recognized that acidic solution was being discharged, the release was halted.	Based on the weekly process sewer composite sample, and using normal average values for fluoride (1.2 ppm), copper (0.3 ppm) and pH (3.8), the release could have involved as much as 500 lb of HF, 100 lb of copper, and 860 lb of HNO_3. Total weekly process sewer flow averages 3,940,900 gal. Current CERCLA RQs for these materials are HF (100 lb), $CU(NO_3)_2$ (expressed as copper) (34 lb), HNO_3 (1,000 lb).
	08-29-85	Pipe trench between 333 Building and 303-F Building. West side of 333 Building.	Waste etch acids	HNO_3, HF, and H_2SO_4 acids containing uranium, copper, and zirconium metals in solution	Apparently a small quantity	Leak testing of PVC acid transfer system revealed a leak in the line. This leak had spilled onto a carbon steel pipe below, corroding the line and resulting in spillage of the trench heating system solution (ethylene glycol) contained therein.	Material remaining in pipe trench (that which hadn't reached process sewer) was neutralized, absorbed, and cleaned up.	Acidic solution reaching process sewer was apparently of low quantity, as weekly process sewer composite sample did not show any attributable increases in levels of NO_3-, F-, or copper or any decrease in pH. (Indicates that release was insignificant in comparison with routine operational discharges.)

Table 3-1. Known Spills During 300 Area Waste Acid Treatment System RCRA Operations*.

Location	Date	Spill origination point	Material spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
334-A Building (cont)			Trench heating system solution	50% ethylene glycol solution	50-75 gal		Piping leaks were repaired.	—
	01-02-86	334 Tank Farm - Tank 4	Waste etch acids	HNO_3, HF, and H_2SO_4 acids containing copper, uranium, and zirconium in solution	Approximately 350 gal of solution containing 170 lb of HF acid	Failure of liner in waste acids storage tank resulted in corrosion of carbon steel shell, followed by acid leakage into the process sewer.	The tank contents were removed to prevent further discharge. Approximately 60 gal of 50% NaOH was discharged into the process sewer in an attempt to maintain a caustic pH at the process trenches. Special groundwater monitoring was initiated at 300 Area wells to determine impact of release. Spill area was flushed into the process sewer.	Release was reported as CERCLA RQ event due to HF quantity, which exceeded CERCLA RQ of 100 lb. Based on comparison of average weekly process sewer composite sample levels with levels measured for the week of the spill, it is estimated that the release also involved 700 lb of HNO_3 (79 ppm vs 57.5 ppm in a typical week); 16 lb of copper (0.7 ppm vs 0.2 ppm typical); and 20 lb of uranium (0.9 ppm vs 0.27 typical). (Estimates are based on process sewer flow of 3,893,000 gal for the week.) Tank was removed, cleaned out, and buried in the LLBG in September 1988.
	01-17-86	334-A Building	Waste etch acids	HNO_3, HF, and H_2SO_4 acids containing copper, uranium, and zirconium in solution	10 - 15 gal	Outlet hose on feed pump 2 came off during waste acid pumping operations resulting in acid spill.	Pump was stopped and hose reattached. Waste acids were cleaned up.	No discharges into the process sewer.
	02-25-86	334-A Building	Waste etch acids	HNO_3, HF, and H_2SO_4 acids containing copper, uranium, and zirconium in solution	Small quantity	A discharge hose for the acid transfer pump 1 came loose from pump allowing the acid to spill into the pit near pump 1. Spill resulted from improper clamping of hose and an unauthorized modification.	Pump was secured and taken out of service until repairs were completed.	No discharges into the process sewer; the two feed pumps were replaced with one pump that is connected by PVC piping - no flexible hoses.
	07-28-86	334-A Building	Waste etch acids	HNO_3, HF, and H_2SO_4 acids containing copper, uranium, and zirconium in solution	Approximately 1 qt of acidic solution containing <1 lb of HNO_3 and <1/2 lb of HF acid	Small leak in the spent etch acid transfer system resulted in release of a small quantity of material.	Spilled material was discharged into the process sewer.	Quantity involved was insignificant compared with CERCLA RQs for HNO_3 (1,000 lb) and HF (100 lb). No attributable increase was seen in weekly process sewer composite sample, indicating that spill was insignificant compared to routine operational releases.

Table 3-1. Known Spills During 300 Area Waste Acid Treatment System RCRA Operations*.

Location	Date	Spill origination point	Material spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
334-A Building (cont)	02-23-88	334-A Building	Waste etch acids	HNO_3 and HF acids containing copper, uranium, and zirconium in solution	About 1 qt	During maintenance activities, acid had been placed in a plastic jug that leaked allowing acid to spill onto the floor.	Spill was washed into the process sewer.	Very small quantity of acid - would not be a reportable amount.
313 Building	Week ending 06-15-81	Uranium recovery area	Neutralized waste	$NaNO_3$, Na_2SO_4, NaF, and $Na_2Cr_2O_7$ solution with precipitates of copper, uranium, and zirconium	Unknown	Process sewer analyses showed high nitrate (115 ppm) and high sulfate (100 ppm) values. No known spill discovered.	None.	Based on a normal NO_3- content of 24 ppm and a total process sewer flow of 30,000 gal for the week, ~31 lb of $NaNO_3$ could have been involved in this spill. There is no CERCLA RQ for $NaNO_3$.
	Week ending 08-17-81	Uranium recovery area	Neutralized waste	$NaNO_3$, Na_2SO_4, NaF, and $Na_2Cr_2O_7$ solution with precipitates of copper, uranium, and zirconium	Unknown	Leak around pump shaft seal at the waste acid neutralization tank resulted in discharge into the process sewer.	Leaking shaft seal was replaced after the summer outage. Solution was washed into the process sewer.	The weekly process sewer composite sample showed an elevated pH compared to normal (10.1 vs 8.0) and a much elevated F- level compared to normal (5.1 ppm vs 0.2 ppm). Based on a total weekly flow of 174,000 gal ~16 lb of NaF could have been involved in this discharge. This is well below the current CERCLA RQ limit of 1,000 lb of NaF.
	12-14-81	Uranium recovery area	Neutralized waste	$NaNO_3$, Na_2SO_4, NaF, and $Na_2Cr_2O_7$ solution with precipitates of copper, uranium, and zirconium	Approximately 500 gal of solution	Valve left open at neutralizing tank pH meter, allowing neutralized spent acid solution to discharge into the process sewer.	pH value was closed, stopping the release. Solution washed into the process sewer.	Weekly process sewer sample showed F- level of 11.4 ppm; NO_3- level of 592 ppm; pH of 9.62. Based on typical process sewer values for F-, the spill could have involved 41 lb of NaF. This value is well below the current CERCLA RQ for NaF of 1,000 lb.
	06-20-83	Uranium recovery area	Neutralized waste	NaF, $NaNO_3$, and Na_2SO_4, solution with precipitates of copper, chromium, uranium, and zirconium	Unknown (small quantity)	Leaking packing at neutralization tank pump resulted in release to the process sewer. Weekly 313 process sewer sample showed elevated levels of fluoride (6.3 ppm) and copper (2.2 ppm).	Pump packing was repaired. Solution washed into the process sewer.	Based on the normal average weekly composite sample F- content of 0.4 ppm, and the normal average copper content of 0.1 ppm, it is estimated that 28 lb of NaF and 4 lb of copper could have been involved in this release (254,000 gal total process sewer flow). The CERCLA RQ for NaF is 1,000 lb, well above the quantity estimated to have been released in this event.

Table 3-1. Known Spills During 300 Area Waste Acid Treatment System RCRA Operations*.

Location	Date	Spill origination point	Material spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
313 Building (cont)	11-03-83	Uranium recovery area	Waste etch acids	HNO_3, HF, and H_2SO_4 acid containing copper chromium, uranium, and zirconium in solution	Approximately 1 gal of solution	While disconnecting piping at a component cleaning line pump (P-1) for maintenance, solution leaked from pipe into process sewer.	No cleanup action. Bucket was placed under pipe to collect remaining acid solution.	Quantity was apparently well below any CERCLA RQs. A valve was installed to isolate the pump when maintenance was required.
	03-26-84	311 Tank Farm and uranium recovery area	Neutralized waste	NaF, $NaNO_3$, and Na_2SO_4, solution with precipitates of copper, chromium, uranium, and zirconium	Unknown	Weekly 313 process sewer sample for the week of 03-19-84 to 03-26-84 showed elevated level of fluoride (4.8 ppm). This was apparently due to three separate events: • A leak at the 313 recovery area neutralized pump • Washdown of 311 catch basin (including crystals from apparent previous spill) into the process sewer • Washdown of acid sump behind 303-F Building in preparation for repair work.	None.	Based on a normal average weekly process sewer sample F- content of 0.7 ppm and using a total stream flow of 311,100 gal, 23 lb of NaF could have been released in this spill. This is well below the CERCLA RQ for this compound of 1,000 lb.
	03-12-87	313 Building - recovery area	Waste etch acids	HNO_3, HF, and H_2SO_4 acid containing uranium, copper chromium, and zirconium in solution	3/4 gal	Acid sprayed out of air-actuated inline valve above tank 2. Approximately 1/4 gal of acid reached process sewer and activated pH monitor alarm. Remaining acid puddled on floor. Appeared that mechanical stops in valve were out of adjustment.	Spill kits were used to clean up floor and walls, which were scrubbed and washed down. Air valve was repaired, and pressure in system investigated.	--
	08-08-89	313 Building - recovery area	Radioactive contaminated water	--	270 gal	Valve of hot water hose leaked water into radioactively contaminated processing area. Leak filled sump under the process tanks and then containment overflowed into hallway at south end of building.	Water pumped from containment area for processing; mopped up outside containment. Valve was repaired. Contamination survey was performed.	--

Table 3-1. Known Spills During 300 Area Waste Acid Treatment System RCRA Operations*.

Location	Date	Spill origination point	Material spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
311 Tank Farm	07-19-82	311 Tank Farm	Neutralized waste	NaF, $NaNO_3$, $Na_2Cr_2O_7$, and Na_2SO_4, solution with precipitates of uranium, copper, and zirconium	Unknown (small quantity)	35 lb of oxalic acid were transferred into the outside storage tank, resulting in a chemical reaction that foamed out of the tank and into the process sewer system.	Remaining foam was washed into the process sewer.	Estimate: copper (56 lb), NO_3- (970 lb), fluoride (50 lb), uranium (0.3 lb). Estimated quantity of NaF involved (100 lb) was well below current CERCLA RQ of 1,000 lb.
	Week ending 02-13-83	311 Tank Farm	Neutralized waste	NaF, $NaNO_3$, $Na_2Cr_2O_7$, and Na_2SO_4, solution with precipitates of uranium, copper, and zirconium	Unknown	Overflow of storage tank in 311 Tank Farm. Weekly 313 process sewer sample showed elevated levels of fluoride (7 ppm) and nitrate (158 ppm). High-level alarm was out of adjustment.	Washed into the process sewer	This weekly process sewer composite normal average fluoride content was 0.3 ppm; the average NO_3 content was 11.4 ppm. Based upon a total flow of 313,000 gal, the quantity released in this event is estimated to have been 39 lb of NaF and 525 lb of $NaNO_3$. The CERCLA RQ for NaF is 1,000 lb; there is no RQ for $NaNO_3$. Repaired high-level alarm.
	08-24-87	311 Tank Farm - east pipe trench at railroad underpass	Waste etch acids	HNO_3, H_2SO_4, and HF acids containing uranium, copper, and zirconium in solution	Not reported	Acid leak found in trench that damaged two adjacent lines containing ethylene glycol. Leak was contained in trench and railroad underpass.	Pipes were flushed and soda ash was applied to neutralize acid.	Railroad underpass was pumped out and all liquids and solids in trench disposed. Piping was repaired. There was no discharge to the process sewer.
	08-08-89	311 Tank Farm - bermed containment area and sump	Waste etch acids	HNO_3, H_2SO_4, and HF acids containing uranium, copper, and zirconium in solution	Not reported	Leak in cemented joint of aging PVC pipe resulted in acidic pH in containment area and sump pump effluent.	205 gal of liquid was pumped from bermed containment area and neutralized in tank 2. Joint was replaced.	There was no discharge to the process sewer.
	12-05-89	311 Tank Farm - bermed containment area and sump	Caustic solution; weak etch acids	50% NaOH and HNO_3, H_2SO_4, and HF acids containing uranium, copper, and zirconium in solution	Small quantity	Small leak in joint of acid transfer line dripped onto the steel caustic transfer pipe connected to tank 2. The acid caused a caustic line underneath to begin leaking, resulting in a high pH in the sump water.	Leak was fully contained. Applicable valves and pumps were locked out and temporary repairs were ordered.	Collected solution and rinse water were added to 300 Area WATS in the 313 Building.

Table 3-1. Known Spills During 300 Area Waste Acid Treatment RCRA Operations.

HNO_3	= nitric acid.
H_2SO_4	= sulfuric acid.
CrO_3	= chromic acid.
HF	= hydrofluoric acid.
NO_3^-	= nitrate ion.
F^-	= fluoride ion.
NaOH	= sodium hydroxide.
ppm	= parts per million.
PVC	= polyvinyl chloride.
CERCLA	= Comprehensive Environmental Response, Compensation, and Liability Act of 1980.
RQ	= reportable quantity.
$Cu(NO_3)_2$	= cupric nitrate.
$NaNO_3$	= sodium nitrate.
Na_2SO_4	= sodium sulfate.
NaF	= sodium fluoride.
$Na_2Cr_2O_7$	= sodium dichromate.
300 Area WATS	= Waste Acid Treatment System.

* For purposes of consistency with the records from which these data were derived, all quantities are entered in English units as originally recorded.

** This likely documents a direct discharge to the process sewer and not a spill.

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Table 3-2. Description of Building 333 Chemical Process Tanks.

Tank number/ description	Process	Capacity (gal)	Example of solution qty. for 1 yr. (gal)	Chemical input	Primary chemical output	Example of output qty. for 1 yr. (lb)	When solution changed
2-Cold HNO_3 etch	Uranium-billet cleaning	105	1,113	HNO_3	$UO_2(NO_3)_2$ HNO_3	81 3,996	0.3 lb uranium/gal
4-Hot HNO_3 etch	Uranium-billet cleaning	105	2,449	HNO_3	$UO_2(NO_3)_2$ HNO_3	2,432 15,940	1 lb uranium/gal
5-Zircaloy-2 component etch	Cleaning of Zircaloy-2 rolled stock, clad shells, end caps, cast braze rings, and support hardware	473	6,518	HNO_3 HF	$Cr(NO_3)_3$ $Fe(NO_3)_3$ H_2ZrF_6 HF HNO3	12 28 3,583 1,141 20,812	0.3 lb zirconium/gal
7-Water rinse	Water rinse after cleaning in tank 11	105		None	NA	NA	
9-Copper/Cu-Si component etch	Copper and copper-silicon component cleaning	255	4,054	HNO_3 HF	$Cu(NO_3)_2$ $Mn(NO_3)_2$ SiO_2 HF HNO_3	1,602 24 64 2,202 16,194	1 lb copper/gal
10-Copper strip	Copper-silicon removal	578	33,697	HNO3	$Al(NO_3)_3$ $Cu(NO_3)_2$ $Fe(NO_3)_3$ $Mn(NO_3)_2$ $NaNO_3$ SiO_2 H_2ZrF_6 $UO_2(NO_3)_2$ HNO_3	174 132,254 74 1,007 414 3,253 191 614 82,558	When Cu-Si removal rate is too slow
11-Zinctone* copper brightener	Copper and copper-silicon component cleaning	105	210**	CrO_3 H_2SO_4 Na_2SO_4 HNO_3	$Cr_2(SO_4)_3$ $CuSO_4$ Na_2SO_4 HNO_3 H_2SO_4	151 161 272 36 132	Twice a year
13-Zircaloy-2 etch (for rework fuel)	Prebraze etch	360	1,526	HNO_3 HF	$Fe(NO_3)_3$ H_2ZrF_6 HF HNO_3	12 781 180 5,426	0.3-0.4 lb zirconium/gal

Table 3-2. Description of Building 333 Chemical Process Tanks.

Tank number/ description	Process	Capacity (gal)	Example of solution qty. for 1 yr. (gal)	Chemical input	Primary chemical output	Example of output qty. for 1 yr. (lb)	When solution changed
15-Zircaloy-2 etch	Prebraze etch; bell jar cleaning	473	20,557	HNO_3 HF	$Cr(NO_3)_3$ $Cu(NO_3)_2$ $Fe(NO_3)_3$ $Ni(NO_3)_2$ SiO_2 H_2ZrF_6 HF HNO_3	69 25 147 20 21 13,777 3,104 69,234	0.3-0.4 lb zirconium/gal
16***-Uranium etch	Prebraze etch; bell jar cleaning	177	2,814	HNO_3 $Al(NO_3)_3$	$Al(NO_3)_3$ $Fe(NO_3)_3$ $UO_2(NO_3)_2$ HNO_3	352 13 262 17,955	0.7 lb uranium/gal
19-Zircaloy-2 etch	Preweld etch, braze ring cleaning (optional)	473	13,727	HNO_3 HF	$Al(O_3)$ $Cr(NO_3)_3$ $Fe(NO_3)_3$ $Ni(NO_3)_2$ SiO_2 H_2ZrF_6 $Be(NO_3)_2$ HF HNO3	50 26 130 14 19 9,045 24 2,183 46,727	0.3-0.4 lb zirconium/gal
25***-Static water rinse	Copper strip and chemical milling rinse	140	11,130	None	$Cu(NO_3)_2$ H_2SO_4 $UO_2(NO_3)_2$ HNO_3	1,151 1,233 462 962	One or two times per week
26-Final etch	Final bright etch	473	11,532	HNO_3 HF	$Cr(NO_3)_3$ $Fe(NO_3)_3$ $Ni(NO_3)_2$ SiO_2 $Be(NO_3)_2$ HF HNO_3 H_2ZrF_6	49 14 15 17 31 1,903 31,078 7,573	0.3-0.4 lb zirconium/gal
31-Spare HNO_3 tank	Decontamination of fuels	208	Minimal - tank is used infrequently.				

Table 3-2. Description of Building 333 Chemical Process Tanks.

Tank number/ description	Process	Capacity (gal)	Example of solution qty. for 1 yr. (gal)	Chemical input	Primary chemical output	Example of output qty. for 1 yr. (lb)	When solution changed
32***-Chemical milling	Chemical milling	907	27,881	HNO_3 H_2SO_4	$Cr(NO_3)_3$ $Cu(NO_3)_2$ $Fe(NO_3)_3$ $UO_2(NO_3)_2$ HNO_3 H_2SO_4	27 41 303 26,540 30,318 128,415	1 lb uranium/gal

HNO_3 = nitric acid.
$UO_2(NO_3)_2$ = uranyl nitrate.
HF = hydrofluoric acid.
$Cr(NO_3)_3$ = chromic nitrate.
$Fe(NO_3)_3$ = ferric nitrate.
H_2ZrF_6 = hydrogen hexafluorozirconate.
$Cu(NO_3)_2$ = cupric nitrate.
$Mn(NO_3)_2$ = manganese nitrate.
SiO_2 = silicon dioxide.
$Al(NO_3)_3$ = aluminum nitrate.
$NaNO_3$ = sodium nitrate.
CrO_3 = chromic acid.
H_2SO_4 = sulfuric acid.
Na_2S0_4 = sodium sulphate.
$Cr_2(SO_4)_3$ = chromic sulfate.
$CuSO_4$ = cupric sulfate.
$Ni(NO_3)_2$ = nickel nitrate.
Al_2O_3 = aluminum oxide.
$Be(NO_3)_2$ = beryllium nitrate.

Note: For purposes of consistency with the records from which these data were derived, all quantities are entered in English units as originally recorded
* Zinctone = 0.37 lb/gal chromium trioxide, 1.63 lb/gal sulfuric acid, and 0.17 lb/gal nitric acid.
** Before reducing CR+6 to Cr+3 in tanks 7 and 11.
*** This tank discharged to the uranium-bearing system.

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Table 3-3. 300 Area Waste Acid Treatment System Sludge Transferred to the Low-Level Burial Grounds.*

Year	Total pounds	Number of drums	Pounds of material				
			Uranium	Chromium	Copper	Fluoride ion	Nitrate ion
1985	44,912	198	97	13	9,857	3,029	3,100
1986	298,720	633	775	104	32,346	22543	33,275
1987	46,977	98	178	3	4,801	2,050	5,525
1988	534	2	1	14	70	3	3
1989	3,620	7	31	3	533	35	232
Total	394,763	938	1,082	137	47,607	27,660	42,135

*Sludge from centrifuge. Sulfate ion shown on Tables 3-4 and 3-5 but not on this table was from the uranium recovery system waste that was not processed through the centrifuge.

Conversion: pounds to kilograms = multiply pounds by 0.45.

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Table 3-4. 300 Area Waste Acid Treatment System (RCRA) Slurry Transferred to 183-H Basins 1980 to 1985.

Year	Total gallons[b]	Number of loads	Pounds[a] of material							
			Uranium	Chromium	Manganese	Copper	Fluoride ion	Nitrate ion	Sulfate ion	Ammonium ion
1980	151,000	60	410	200	300	33,200	10,800	151,800	59,900	130
1981	200,000	75	520	150	340	38,200	12,700	252,700	50,800	260
1982	247,000	112	470	130	420	44,600	17,700	309,400	58,000	290
1983	406,000	184	630	120	380	72,600	22,700	451,300	122,300	760
1984	416,000	185	600	90	300	57,000	32,700	431,700	141,200	660
1985	369,000	163	440	90	200	49,000	27,000	550,000	97,000	520
Total	1,789,000*	779	3,070	780	1,940	294,600	123,600	2,146,900	529,200	2,620

*Weighted average pH was 9.8.

Conversion:
pounds to kilograms = multiply pounds by 0.45.
gallons to liters = multiply gallons by 3.79.

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Table 3-5. 300 Area Waste Acid Treatment System Effluent Transferred to the 340-B Building and Offsite.

Year	Total pounds	Number of drums	Pounds of material					
			Uranium	Chromium	Copper	Fluoride ion	Nitrate ion	Sulfate ion
A: Transferred to the 340-B Building								
1985	46,250	20	1	1	2	7,013	39,677	17,001
1986	327,588	125	10	15	10	5,742	300,035	92,185
1987	51,165	19	2	1	1	628	33,060	9,038
1988	5,500	3	1	1	<1	99	2,904	110
1995	31,545	NA	<1	<1	<1	95	449	1,214
Total	462,048[a]	167	14	18	13	13,577	376,128	119,548
B: Shipped offsite								
1989	11,414[b]	3	2	2	<1	317	9,039	468

[a]Weighted average pH was 13.18.
[b]Weighted average pH was 12.63.

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Table 3-6. Nonroutine Waste Managed in the 300 Area Waste Acid Treatment System.

Waste disposal permit number	Permit date	Material description	Quantity (gallons)	Quantity (pounds)	Summary of lab results	
1-80	02/01/80	Used sulfuric acid from startup tests of acid digestion system		935	230 g/L	sulfuric acid
					30 ppm	barium
					30 ppm	chromium
					300 ppm	copper
					30 ppm	manganese
					5 ppm	molybdenum
					3,000 ppm	sodium
					60 ppm	nickel
					1 ppm	vanadium
					300 ppm	zinc
					500 ppm	aluminum
					300 ppm	calcium
					300 ppm	iron
4-80	10/02/80	Used glycol/sodium metasilicate-based proprietary silk screen cleaning soluiton	100		pH = 12.1	
					90-100 ppm	barium
					10 ppm	cadmium
					30 ppm	copper
					500-1,100 ppm	potassium
					16,000-21,000 ppm	sodium
					40-60 ppm	lead
					40 ppm	zinc
					5-10 ppm	boron
1-81	02/12/81	Used copper strip solution containing depleted uranium	300		2.63 lb/gal	nitric acid
					1.46 lb/gal	copper
					0.022 lb/gal	uranium
					30 ppm	chromium
					6 ppm	manganese
					10 ppm	nickel
					40 ppm	zinc
					200 ppm	aluminum
					150 ppm	calcium
3-81	12/03/81	Unused chemicals:				
		Nickel acetate solution	0.25		pH = 3.24	
					13 ppm	arsenic
					1 ppm	zinc
					1 ppm	nickel
					20 ppm	aluminum
		Proprietary chemical 1	1.5		pH = 7.79	
					90 ppm	chromium,
					570 ppm	sodium
					1 ppm	antimony
		Proprietary chemical 2	0.75		pH = 7.45	
					350 ppm	sodium
		Nickel sulfate solution	1		pH = 5.34	
					1,530 ppm	nickel

Table 3-6. Nonroutine Waste Managed in the 300 Area Waste Acid Treatment System.

Waste disposal permit number	Permit date	Material description	Quantity (gallons)	Quantity (pounds)	Summary of lab results	
					1 ppm	arsenic
3-81 (cont)					1 ppm	cobalt
					1 ppm	chromium
		Proprietary chemical 3	0.75		pH = 8.43	
					25 ppm	cobalt
					150 ppm	sodium
		Proprietary chemical 4	0.75		pH = 8.92	
					80 ppm	chromium
					1 ppm	antimony
					360 ppm	sodium
1-82	01/05/82	Used copper strip solution containing depleted uranium	300		<0.1 lb/gal	nitric acid
					1.31 lb/gal	copper
					0.152 lb/gal	uranium
					6 ppm	cobalt
					28 ppm	nickel
					100 ppm	zinc
					20 ppm	titanium
2-82	01/05/82	Used glycol/sodium metasilicate-based proprietary silk screen cleaner	50		pH = 11.78	
					28 ppm	barium
					140 ppm	copper
					4,100 ppm	sodium
					26 ppm	lead
					3 ppm	zinc
					1 ppm	chromium
					5 ppm	titanium
					12 ppm	phosphorus
3-82	07/09/82	Unused chemicals:				
		Oxalic acid		35	None	
		Proprietary chemical	55		pH = 13.7	
					18 ppm	copper
					3,800 ppm	silicon
					13 ppm	zinc
		Solution in unmarked container	5		pH = 13.3	
					6 ppm	copper
4-82	11/05/82	Used nitric acid solution containing uranium	13		0.32 lb/gal	nitric acid
					607 ppm	uranium
1-83	01/17/83	Used absorbing solution containing mercuric chloride (100 g/L = 9.8 lb)	12		None	
2-83	04/22/83	Used glycol/sodium metasilicate-based proprietary silk screen cleaning solution (two drums):				
		Drum 1	30		pH = 10.7	
					2 ppm	barium

Table 3-6. Nonroutine Waste Managed in the 300 Area Waste Acid Treatment System.

Waste disposal permit number	Permit date	Material description	Quantity (gallons)	Quantity (pounds)	Summary of lab results	
					630 ppm	sodium
2-83 (cont)		Drum 2	30		pH = 12.8	
					20 ppm	barium
					2 ppm	molybdenum
					1,400 ppm	sodium
					260 ppm	lead
					2 ppm	strontium
3-83	04/25/83	Used copper strip solution containing depleted uranium	400		1.07 lb/gal	nitric acid
					1.52 lb/gal	copper
					0.816 lb/gal	uranium
					280 ppm	zinc
					790 ppm	titanium
					30 ppm	nickel
					170 ppm	iron
					470 ppm	calcium
4-83	07/11/83	Used copper strip solution containing depleted uranium	550		3.0 lb/gal	nitric acid
					1.5 lb/gal	copper
					0.3 lb/gal	uranium
					324 ppm	zinc
					30 ppm	nickel
					270 ppm	titanium
					98 ppm	lead
					1,178 ppm	magnesium
					230 ppm	calcium
1-84	04/18/84	Used glycol/sodium metasilicate-based proprietary silk screen cleaning solution (three drums):				
		Drum 1	30		pH = 12.9	
					45 ppm	barium
					12 ppm	chromium
					10,900 ppm	sodium
					110 ppm	lead
					2,200 ppm	silicon
					2.7 ppm	strontium
		Drum 2	30		pH = 11.9	
					1.1 ppm	chromium
					670 ppm	sodium
					370 ppm	phosphorus
					340 ppm	silicon
					1,160 ppm	potassium
		Drum 3	30		pH = 12.2	
					42 ppm	barium
					6 ppm	chromium
					1 ppm	copper
					10,600 ppm	sodium
					50 ppm	lead
					1 ppm	strontium

Table 3-6. Nonroutine Waste Managed in the 300 Area Waste Acid Treatment System.

Waste disposal permit number	Permit date	Material description	Quantity (gallons)	Quantity (pounds)	Summary of lab results	
					2,480 ppm	silicon
1-84 (cont)					2 ppm	zinc
					20 ppm	phosphorus
2-84	05/03/84	Used copper strip solution containing depleted uranium	225		0.19 lb/gal	nitric acid
					1.80 lb/gal	copper
					0.44 lb/gal	uranium
					336 ppm	lead
					588 ppm	zinc
					212 ppm	titanium
					374 ppm	chromium
					3,820 ppm	gadolinium
					1,120 ppm	phosphorus
1-85	04/12/85	used copper strip solution containing depleted uranium	200		0.07 lb/gal	nitric acid
					1.60 lb/gal	copper
					0.394 lb/gal	uranium
					1,400 ppm	aluminum
					60 ppm	cobalt
					1,600 ppm	sodium
					2,000 ppm	magnesium
					600 ppm	phosphorus
					700 ppm	silicon
					300 ppm	zinc
					150 ppm	titanium
2-85	05/10/85	Used phosphoric/citric-acid-based proprietary cleaning solution	80		pH = 1.0	
					0.38 lb/gal	phosphoric acid
					1,400 ppm	citrate
					30 ppm	sodium
3-85	05/21/85	Residual 36% sulfuric acid in 20 drums	Unknown (residue in 'empty' drums)		None	
4-85	10/16/85	Used copper strip solution containing depleted uranium	200		0.032 lb/gal	nitric acid
					1.19 lb/gal	copper
					0.249 lb/gal	uranium
					1,200 ppm	magnesium
					90 ppm	titanium
1-86	01/09/86	Uranium-bearing nitric acid solution from the 325 Building used in chop leach testing	8.4		1.74 lb/gal	nitric acid
					0.91 lb/gal	uranium
					80 ppm	aluminum
					40 ppm	iron
2-86	08/15/86	Used copper strip solution containing depleted uranium	250		0.097 lb/gal	nitric acid
					1.8 lb/gal	copper
					0.31 lb/gal	uranium

Table 3-6. Nonroutine Waste Managed in the 300 Area Waste Acid Treatment System.

Waste disposal permit number	Permit date	*Material description*	Quantity (gallons)	Quantity (pounds)	Summary of lab results	
1-87	04/18/87	Used copper strip solution containing depleted uranium	200		0.033 lb/gal	nitric acid
1-87 (cont)					1.68 lb/gal	copper
					0.28 lb/gal	uranium
					230 ppm	titanium
2-87	05/06/87	Nitric acid solution from analyzing weir box sludge	31		4.00 lb/gal	nitric acid
					1.22 lb	uranium
					0.11 lb	copper
					0.12 lb	magnesium
					0.09 lb	manganese
					0.08 lb	nickel
					0.30 lb	aluminum
					1.01 lb	calcium
					0.68 lb	iron
3-87	10/06/87	Solutions in Tank 15 and 19 that had been used for testing zirconium removal and hydrofluoric acid rejuvenation	110		None	
1-88	02/26/88	Used copper strip solutions containing depleted uranium	150		0.021 lb/gal	nitric acid
					1.69 lb/gal	copper
					0.293 lb/gal	uranium
					100 ppm	titanium
					20 ppm	iron
N/A	01/75 to 11/86	Solutions from decontaminating autoclaves after a fuel element failure:				
		Decon solution makeup:	1,440			
		Sodium hydroxide		1,248		
		Potassium permanganate		208		
		Final cleaner makeup:	1,350			
		Ammonium citrate dibasic		195		
		Ethylenediaminetraacetic acid		12		
N/A	01/75 to 01/86	X-ray film chemicals:			None	
		Developer chemicals:	2,336			
		Sodium sulfite		2,797		
		Hydroquinone		934		
		Potassium/sodium hydroxide		374		
		Sodium carbonate		374		
		Diethylene glycol		374		
		Acetic acid		449		
		1-phenyl-3-pyrazolidone		66		
		Glutaraldehyde		772		
		Fixer chemicals:	6,811			
		Ammonium thiosulfate		9,184		
		Sodium bisulfite		576		
		Acetic acid		751		

Table 3-6. Nonroutine Waste Managed in the 300 Area Waste Acid Treatment System.

Waste disposal permit number	Permit date	Material description	Quantity		Summary of lab results	
			(gallons)	(pounds)		
		Aluminum sulfate		250		
		Gluconic acid		250		
		System cleaners:	3,438			
		Sodium dichromate		139		
		Sulfuric acid		139		
		Roller cleaner:	1,017			
		Sulfamic acid		67		
		Potassium dichromate		40		

g/L = grams per liter.
lb = pound.
lb/gal = pounds per gallon.
ppm = parts per million.

Conversion:
pounds to kilograms = multiply pounds by 0.45.
gallons to liters = multiply gallons by 3.79.
pounds/gallon to grams per liter = multiply pounds/gallon by 119.82.

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4.0 WASTE CHARACTERISTICS

This chapter discusses the inventory and the characteristics of the waste treated and stored in the 300 Area WATS tank system.

4.1 ESTIMATE OF MAXIMUM INVENTORY OF WASTE

From the beginning of 300 Area WATS RCRA operations (November 19, 1980) until November 1985, the waste stream consisted of a waste acid slurry that was transported by tanker trailer to the 183-H Basins for volume reduction through solar evaporation (Chapter 3.0, Table 3-4). In November 1985, the slurry began being separated into solids (sludge) and effluent. The sludge was containerized and transported to the LLBG for disposal (Chapter 3.0, Table 3-3). The effluent was transferred to the 340-B Building for temporary tank storage until transferred to the DST System, or if below radioactive release limits to an offsite TSD facility (Chapter 3.0, Table 3-5). The unit also managed nonroutine waste acid (Section 3.0, Table 3-6).

The estimated maximum inventory of waste acid treated in the 300 Area WATS from 1980 through 1989, when the unit essentially ceased processing fuel fabrication waste and nonroutine waste, is 1,786,907 kilograms. This was determined by summing the quantities presented in Chapter 3.0, Tables 3-3, 3-4, and 3-5 of sludge, slurry, and effluent collected from the system for disposal or long-term storage. The maximum quantity of waste treated during any 1 year was 1,576,646 liters (Chapter 3.0, Table 3-4).

4.2 WASTE CHARACTERISTICS

The 300 Area WATS routinely managed waste originating from fuel fabrication process tanks located in the 333 Building. The chemical and radioactive constituents from each of these tanks are shown in the primary chemical output column and in the footnotes of Chapter 3.0, Table 3-2. Although waste designation was not performed on this waste before disposal to the system, on entry into the system some waste would have exhibited dangerous waste characteristics of ignitability (D001), corrosivity (D002), and Washington State toxicity (WT02), and toxicity due to chromium (D007). No 'listed' waste (in accordance with WAC 173-303-081 and WAC 173-303-082) existed or was managed in any portion of the 300 Area WATS during RCRA operations.

Until 1988, the 300 Area WATS also treated corrosive dangerous or mixed waste from other locations in the 300 Area and from onsite on a nonroutine basis (Table 3-6). Although waste designation was not performed on this waste before entry to the system, some waste would have exhibited dangerous waste characteristics of ignitability (D001), corrosivity (D002), and EP toxicity (now TCLP) due to arsenic (D004), barium (D005), cadmium (D006), and lead (D008).

The neutralized effluent stored in tanks 40 and 50 could have remained corrosive (D002) dangerous waste because of the over addition of NaOH during waste acid neutralization. In the past, such waste also might have retained its toxicity characteristics from the heavy metals. However, waste designation, based on sampling of the process effluent, indicated that, although remaining radioactive, the waste was nondangerous.

Table 4-1 presents the known chemical constituents from 333 Building operations and from nonroutine chemical additions managed in the 300 Area WATS. Most of these constituents were not added to the system in significant quantities or above dangerous waste designation levels.

Table 4-1. Chemical Waste Constituents Managed in the 300 Area WATS.

Metals	Organic Materials
Aluminum	Acetate ion
Antimony	Citrate ion
Arsenic	Choline chloride
Barium	Deoxycholic acid
Beryllium	Diethanolamine
Boron	Diethylene glycol
Cadmium	Ethylenediamine
Calcium	Ethylenediamine-
Cerium	Tetraacetic acid
Chromium	Gluconic acid
Cobalt	Glutaraldehyde
Copper	Hydroquinone
Gadolinium	Mercaptoacetic acid
Iron	Oxalate ion
Lead	1-phenyl-3-pyra zolidone
Lithium	Rhodamine-B
Magnesium	Trichloroacetic acid
Manganese	Urea
Mercury	
Molybdenum	
Nickel	
Phosphorus	
Potassium	
Silicon	
Silver	
Sodium	
Strontium	
Titanium	
Uranium	
Vanadium	
Zinc	
Zirconium	

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FIGURE

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5.0 GROUNDWATER

A groundwater monitoring program in accordance with WAC 173-303-645 was not required during operations. The 300 Area WATS was not a regulated unit under the definitions of WAC 173-303-040 (i.e., surface impoundment, waste pile, land treatment unit, landfill) that would require such monitoring.

In accordance with the Tri-Party Agreement (Ecology et al. 1999), all groundwater in the contiguous 300 Area has been included in the 300-FF-5 (groundwater) OU. This OU includes groundwater beneath the 300 Area WATS. The 300-FF-5 OU consists of the aquifers beneath the 300-FF-1 OU and the contiguous 300 Area portion of the 300-FF-2 OU. This OU is bounded by the Columbia River on the east (Figure 5-1). The 300-FF-5 OU is defined by the "observed and assumed extent of uranium contamination in the groundwater" and includes all contamination exceeding applicable or relevant and appropriate requirements emanating from the two OUs, and detected in ground and sediment below the water table (DOE/RL-89-14).

This groundwater has been investigated under the 300-FF-5 CERCLA OU RI/FS process. In accordance with the Tri-Party Agreement, this groundwater would have been cleaned up under the 300-FF-2 OU remedial action process, if necessary. However, in accordance with the ROD for the 300-FF-1 [source] and the 300-FF-5 [groundwater] OUs (DOE/RL, et al, 1996), 300 Area groundwater will not be remediated. Consequently, groundwater remediation is not a requirement of 300 Area WATS closure.

Monitoring of groundwater beneath the 300 Area WATS during 300 Area WATS closure, while awaiting CERCLA cleanup of 300 Area WATS soil or after soil cleanup, will not be required. The few and minor 300 Area WATS releases to soil have not impacted groundwater. The 300-FF-1 and 300-FF-5 ROD identifies that within the contiguous 300 Area, only the groundwater beneath the land-based disposal units (i.e., Process Trenches and Process Ponds of the 300-FF-1 OU) is contaminated above health-based levels. This groundwater will continue to be monitored for dangerous contaminants 1,2-Dichloroethene and trichloroethene, neither of which were managed at the 300 Area WATS. While awaiting CERCLA soil cleanup, 300 Area WATS soil contamination locations (Chapter 3.0) will remain capped by the concrete structures currently in place, which will ensure that soil contaminants remain immobilized and present no threat to groundwater during this interim period. Because groundwater protection is a remedial action objective of CERCLA soil disposition, any contaminants remaining in 300 Area WATS soil after soil disposition will have been determined to not present a threat to groundwater.

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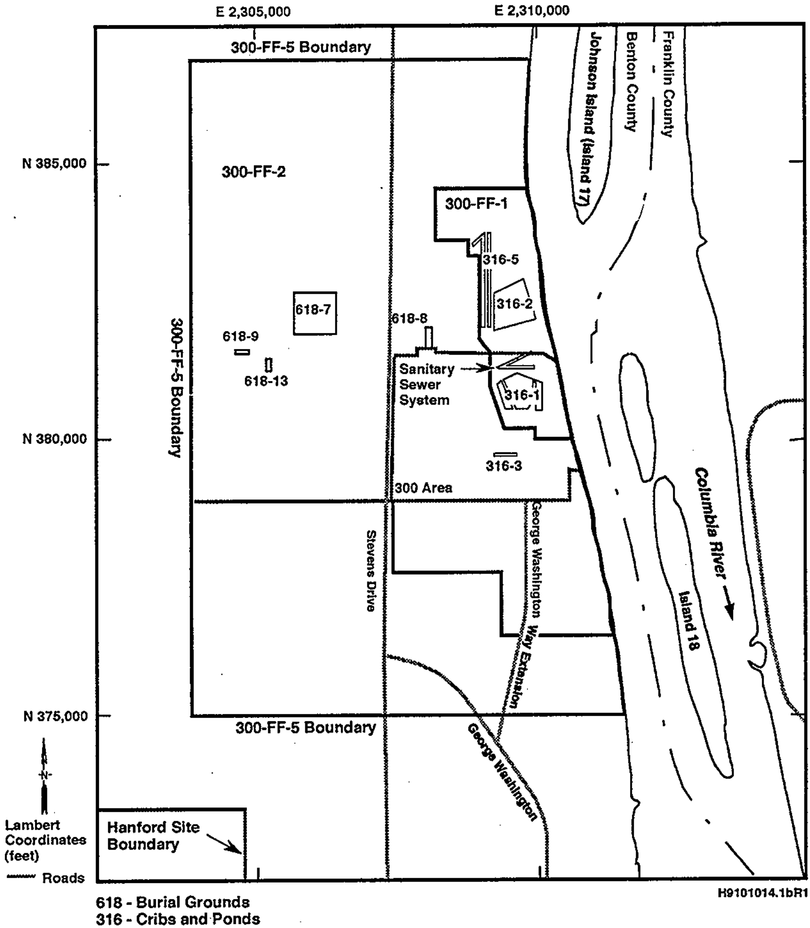

Figure 5-1. 300-FF-5 Operable Unit.

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APPENDICES

FIGURE

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6.0 CLOSURE STRATEGY AND PERFORMANCE STANDARDS

This chapter describes the 300 Area WATS closure strategy and closure performance standards.

6.1 CLOSURE STRATEGY

The 300 Area WATS will undergo clean or modified closure with respect to dangerous waste contamination resulting from RCRA operations. Past-practice contamination beneath 300 Area WATS structures and contamination resulting from non-RCRA activities is considered CERCLA-only contamination and outside the scope of 300 Area WATS closure activities. 300 Area WATS closure will occur over an extended closure period in two primary steps. A two-step approach is necessary because not all 300 Area WATS soil can be clean closed at this time. The first step will be partial clean closure that will include the activities necessary to clean close all 300 Area WATS aboveground structures and components and most soils. Partial closure activities currently are ongoing and will be completed under this closure plan. The second step will be final closure that will occur at a later date under other closure documents and will include the activities necessary to disposition the 300 Area WATS soil left unclosed after partial closure (Chapter 3.0). The results of final closure activities will be documented in a later revision to this plan.

Clean closure activities for structures and components are underway in three Ecology-approved phases (Phases 1 through 3). Phases 1 and 2 activities are complete, PE-certified, and concurred with by Ecology (Appendix 6A). Phase 3 closure has begun and currently is scheduled to be completed in September 1999. After completing Phase 3 closure, the activities will be PE-certified and Phase 3 closure verification information will be added to Appendix 6A.

Where 300 Area WATS containment existed and remained intact precluding 300 Area WATS contaminants from reaching soil, the soil will be clean closed at the time of partial closure. All 300 Area WATS soil will be clean closed in this manner except the soil beneath portions of the WATS and U-Bearing Piping Trench (Chapter 3.0, Figure 3-1) and the 313 Building (Chapter 2.0 and Chapter 3.0, Figure 3-2). At these locations, 300 Area WATS contaminants possibly could have reached soil (Chapter 3.0, Table 3-1) requiring further disposition.

The unclosed 300 Area WATS soil also is contaminated from past-practice operations. The contamination cannot be dispositioned without extensive sampling and possibly remediation that must await structure demolition to gain access to the soil. Because of this and to ensure consistency of RCRA and CERCLA unit soil cleanup, disposition of 300 Area WATS contaminated soil will be performed as an activity of the 300-FF-2 CERCLA OU remedial action, under CERCLA documents (ERC 1998). TSD soil cleanup levels will be consistent with 300-FF-2 OU cleanup levels established by the 300-FF-2 OU record of decision (ROD). The ROD will be guided by the substantive requirements of RCRA as an applicable or relevant and appropriate requirement to the CERCLA action. These potential soil contamination locations have been identified in WIDS for tracking to final disposition.

Upon completion of Phase 3 closure, the 300 Area WATS Part A, Form 3, will be revised to identify clean closed locations and unclosed 300 Area WATS soil. The 300 Area WATS will be transitioned to the ERC for soil disposition and final closure. Concrete surfaces over unclosed soils will remain until the time of soil disposition. The schedule for OU activities will be in accordance with applicable Tri-Party Agreement milestones. Tri-Party Agreement M-16-03A currently identifies June 2002 as the date for establishing the schedule for 300-FF-2 CERCLA OU remedial actions.

The flowchart in Figure 6-1 shows the strategy for closure of 300 Area WATS tanks, structures, equipment, and soils.

6.2 CLOSURE PERFORMANCE STANDARDS

This section describes the closure performance standards and the decontamination and waste removal standards for partial and final clean closure of 300 Area WATS structures and soil.

6.2.1 Performance Standards

This closure plan has been developed to provide for 300 Area WATS partial closure under this plan and final closure under other documents in a manner that meets closure performance standards of WAC 173-303-610 (2)(a) and WAC 173-303-640. The standard will be met at partial closure by removing or decontaminating all 300 Area WATS structures and tank system components, and by identifying all soils that can be clean closed with regard to contamination from RCRA operations. The standard will be met for final closure by removing or decontaminating 300 Area WATS soil to clean or modified closure removal and decontamination standards.

6.2.2 Soil and Structure Removal or Decontamination Standards

Clean closure removal and decontamination standards for 300 Area WATS soil, structures, and tank system components have been established in accordance with WAC 173-303-610(2)(b).

Clean or modified closure standards for soil within the scope of 300 Area WATS closure (Section 6.1) are in accordance with WAC 173-303-610(2)(b)(i) and Section II.K of the Hanford Facility RCRA Permit. These standards identify a cleanup level for each constituent of concern shown in Table 6-1. For clean closure, the cleanup level for each constituent of concern is the greater of its numeric, health-based cleanup level calculated using WAC 173-340 (MTCA) Method B formulas (or Method A tables, if appropriate) or natural background (DOE/RL-92-24). For modified closure, MTCA Method C cleanup levels will be used. Constituent concentrations will be verified at the time of final closure through analytical sampling and analysis performed under the 300-FF-2 CERCLA OU remedial action process. As a portion of future, final closure activities, soil beneath the 313 Building south and the WATS and U-Bearing Piping Trench must be shown to meet clean closure standards (Section 6.1).

The clean closure standard for contaminated 300 Area WATS structures and components is in accordance with WAC 173-303-610 (2)(b)(ii). This standard is the visually verifiable 'clean debris surface' standard for hazardous debris from Table 1 of 40 CFR 268.45 even though such material is not hazardous debris. "A clean debris surface means the surface, when viewed without magnification, shall be free of all visible contaminated soil and dangerous waste, except that residual staining from soil and waste consisting of light shadows, slight streaks, and minor discoloration; and soil and waste in cracks, crevices, and pits shall be limited to no more that 5 percent of each square inch of surface area" (40 CFR 268.45). This standard is consistent with Ecology guidance (Ecology 94-11).

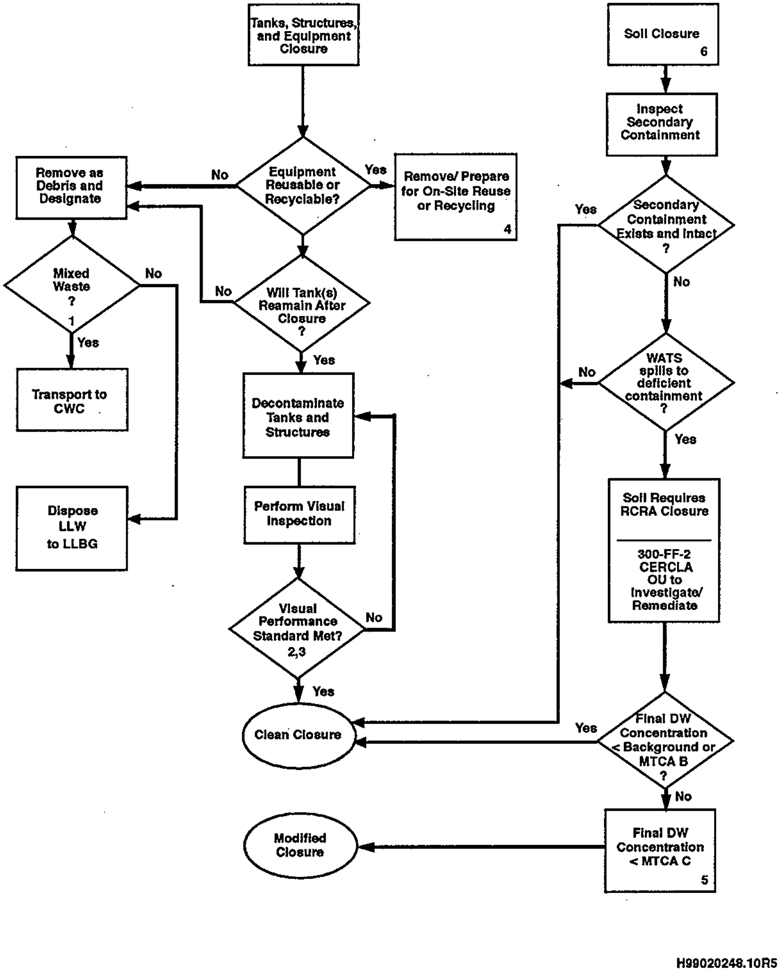

Figure 6-1. Closure Strategy Flowchart for the 300 Area Waste Acid Treatment System. (sheet 1 of 2)

Notes:

[1]Assumption: Most waste will contain both dangerous and radioactive components.

[2]The clean closure performance standard for these materials is 'clean debris surface' (Section 6.2.2).

[3]Assumption: Additional documentation will be possible and desirable where performance standards initially are not met.

[4]Must be radiologically releasable for recycling.

[5]Assumption: 300-FF-2 CERCLA OU cleanup levels will be required, at a minimum, to meet MTCA C industrial cleanup standards and closure as landfill will not be considered.

[6]Soil closure is with regard to contamination from RCRA 300 WATS operations.

Background	= Hanford Sitewide background threshold (upper limit range of concentrations) for soil (DOE-RL 92-24).
CERCLA	= Comprehensive Environmental Response, Compensation, and Liability Act of 1980.
CWC	= Central Waste Complex.
LLBG	= Low-Level Burial Grounds.
LLW	= low-level waste.
MTCA	= Model Toxics Control Act (WAC 173-304) residential and industrial formulas.
MW	= mixed waste.
RCRA	= Resource Conservation and Recovery Act of 1976.

Figure 6-1. Closure Strategy Flowchart for the 300 Area Waste Acid Treatment System. (sheet 2 of 2)

Table 6-1. Soil Cleanup Levels for Potential Constituents.

Constituent	CAS #	Background[c] mg/kg (ppm)	Method A cleanup level[a] mg/kg (ppm)	Method B cleanup levels[e] mg/kg (ppm)		Method C cleanup levels[f] mg/kg (ppm)	
				Carcinogenicity	Toxicity	Carcinogenicity	Toxicity
Metals							
Barium	7440-39-3	175.0	[b]	[h]	5.6+3	[h]	2.45+5
Beryllium	7440-41-7	1.8	[b]	2.33-1	4.0+2	3.05+1	1.75+4
Chromium	16065-83-1	28.0	100.0	[h]	8.0+4	[h]	3.5+6
Copper	7440-50-8	30.0	[b]	[h]	2.96+3	[h]	1.3+5
Lead	7439-92-1	14.9	250.0	[g]	[g]	[g]	[g]
Mercury	7439-97-6	1.3	1.0	[h]	2.4+1	[h]	1.05+3
Nickel	7440-02-0	25.0	[b]	[h]	1.6+3	[h]	7.0+4
Vanadium	7440-62-2	107.0	[b]	[h]	5.6+2	[h]	2.45+4
Zinc	7440-66-6	79.0	[b]	[h]	2.4+4	[h]	1.05+6
Anions							
Nitrate	14797-55-8	208.0	[b]	[h]	1.2+5	[h]	5.6+6
Nitrite	14797-55-0	[d]	[b]	[h]	8.0+3	[h]	3.5+5

Notes:

[a] Method A cleanup levels from MTCA, WAC 173-340-740, Table 2, Method A Cleanup Levels -- Soil.
[b] No Method A cleanup level for this constituent.
[c] 95/95 reference threshold value from DOE/RL 92-24.
[d] Not calculated in Hanford Site background document (DOE/RL 92-24).
[e] Method B cleanup levels from formulas in MTCA, WAC 173-340-740, as shown in the CLARC II Database (Ecology 94-145).
[f] Method C cleanup levels from formulas in MTCA, WAC 173-340-745, Soil Cleanup Standards for Industrial Sites, as shown in the CLARC II Database (Ecology 94-145).
[g] Insufficient toxicity (reference dose) information or carcinogenicity information is available from the EPA to calculate a health-based cleanup level.
[h] Not classified as a carcinogen or insufficient EPA carcinogenicity information available (EPA 1994).

CAS # = Chemical Abstract Service number.
mg/kg = milligrams per kilogram.
ppm = parts per million.

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7.0 CLOSURE ACTIVITIES

This chapter discusses the activities necessary to implement the 300 Area WATS partial clean closure described in Chapter 6.0.

7.1 INTRODUCTION

The first step of 300 Area WATS closure will be partial clean closure. This step will be completed under this closure plan and will be achieved by clean closing aboveground structures and components in three Ecology-approved phases (Phases 1, 2 and 3). The decontamination and verification activities for these closure phases are in accordance with Ecology-approved phase-specific decontamination and inspection plans (DIP). Phase 1 activities for closure of the 313 Building (aboveground) were completed in accordance with the Phase 1 DIP (WHC-SD-ENV-AP-001, Rev. 0) in September of 1997. Phase 2 activities for closure of the 334-A Building, the 333 Building, and the 303-F Building were completed in accordance with the Phase 2 DIP (HNF-1784, Rev. 1) in September of 1998. Ecology has concurred with Phase 1 and 2 closure activities (Appendix 6A).

Phase 3 closure activities currently are underway in accordance with the Ecology-approved Phase 3 DIP (HNF-2814, Revision 0). Phase 3 closure of 300 Area WATS portions of the 334 and 311 Tank Farms will complete closure of the 333 and 303-F Buildings by removing piping from the buildings, and will remove piping from the WATS and U-Bearing Piping Trench. Phase 3 activities are scheduled to be complete in September 1999. Decontamination, verification, and Ecology concurrence for Phase 3 closure will be added to Appendix 6A.

The activities in support of partial closure are as follows:

- Remove dangerous waste inventory
- Remove tank system components and equipment
- Decontaminate 300 Area WATS structures and components that will remain after closure to visually verifiable 'clean debris surface' clean closure standard
- Visually inspect decontaminated surfaces for a clean debris surface
- Inspect secondary containment to identify any cracks that could have provided a pathway to soil for 300 Area WATS contaminants
- Certify partial closure activities.

7.2 REMOVAL OF WASTE INVENTORY

The last remaining system effluent was removed from tank 50 of the 300 Area WATS on July 25, 1995 (Chapter 3.0, Table 3-5) in a manner consistent with previous waste removals described in Chapter 3.0. The effluent was pumped to a tank trailer and transported to the 340-B Building for transfer to the DST System.

7.2.1 Field Documentation

Personnel conducting decontamination and inspections will maintain an official logbook. The field logbook will be bound and have consecutively numbered pages. All information pertinent to the activities will be recorded in the logbook in a legible fashion. The field logbook will be reviewed and signed by the person in charge on days when work is performed. If changes are necessary, the changes will be indicated by a single line drawn through the affected text. Modifications will be recorded in the field logbook along with circumstances requiring the action. Modifications to closure activities identified in the approved DIP were discussed with Ecology, approved by way of Project Manager Meetings, and performed. The individual responsible for the change will initial and date the entry. Each day's activities must be signed or initialed. The logbook should be protected, stored in a safe file or other repository, and kept as a permanent record. Copies of the field logbook will be made available to Ecology upon request.

7.2.2 Waste Designation and Disposal

Designation of closure waste and debris will meet the requirements of WAC 173-303. The land disposal restriction (LDR) notification and certification requirements of WAC 173-303-140 and all applicable requirements will be met. Designation of waste generated during phased-clean closure activities has been based on sampling and process knowledge described in the phase-specific DIPs and follows the logic identified in Figure 7-1.

Closure waste and debris will be accumulated in satellite accumulation areas at appropriate locations at the unit in accordance with WAC 173-303-200 while awaiting designation and transfer to a storage or disposal unit. Containers used for transfer of regulated materials will be U.S. Department of Transportation-approved containers compatible with the waste. The containers will be labeled and appropriate waste acceptance documentation completed for the receiving unit. After designation, waste will be managed as follows.

- Low-level waste will be disposed onsite in the LLBG.
- Mixed waste will be transferred to the Central Waste Complex for storage to await further treatment before final disposal.
- Dangerous waste, if any, would be transported offsite.
- Nondangerous and nonradioactive waste could be disposed through contracts with the city of Richland.

7.3 PHASE 1 CLOSURE ACTIVITIES - 313 BUILDING

Phase 1 closure included activities necessary to clean close 300 Area WATS portions of the uranium recovery room, which was the only 300 Area WATS operational area of the 313 Building. Phase 1 closure was completed in September 1997 in accordance with Ecology approved DIP (WHC-SD-ENV-AP-001, Rev. 0) and Ecology has concurred with the activities (Appendix 6A).

7.3.1 Equipment Removal

The 300 Area WATS tanks, components, and equipment of the 313 Building included pumps 2, 7, 8, and 9; metal transfer piping in the room; tanks 2, 5, 9, 10, and 11; and centrifuge, filter press, and metal support structures. These materials were removed as debris, designated as low-level waste, and disposed at the LLBG.

7.3.2 Decontamination of Concrete and Metal Surfaces

Equipment support structures, a portion of one concrete block building wall, the concrete floor, and metal drainage trench liner surfaces were decontaminated to meet the 'clean debris surface' clean closure standard (Figure 7-2).

The concrete bermed areas of the uranium recovery room floor were decontaminated to a 'clean debris surface' by scabbling off 0.6 centimeter of the contaminated surface layer. The lower 15 centimeters of the walls of the bermed areas and an area of the west wall near tank 2 also were scabbled. The scabbled wall area was approximately 1.2 meters wide starting at the floor and extending upward to the height of the block wall (approximately 2.4 meters). Scabbling occurred in a high-efficiency particulate air (HEPA)-filtered 'greenhouse' enclosure to prevent the escape of contamination. Scabbling residues were vacuumed into containers as generated using a HEPA-filtered vacuum system attached to the scabbler. Acid brick that capped the berm around bermed area 1 and that lies below floor coatings in bermed areas 1 and 3 could not be decontaminated. The acid brick was removed mechanically to the original concrete surface, and because the acid brick is integral to this surface, its removal constituted removal of the 0.6-centimeter surface for these areas. The scabbling and clean debris surface inspection of the acid brick removal area and the scabbled concrete floor were documented using a location-specific waste and residue removal verification (WRRV), similar to Figure 7-3 (refer to Appendix 6A-14). Scabbling and acid brick removal debris were collected, designated as low-level waste based on the results of waste designation sampling, and disposed at LLBG.

The exposed surfaces of the stainless steel liners for the two drainage trenches were decontaminated to a 'clean debris surface' by hand brushing and scrubbing using a detergent-water solution, and damp wiping. The decontamination and final visual acceptance are documented on a WRRV (refer to Appendix 6A-15). Decontamination waste (rags, etc.) was collected, designated as low-level waste, and disposed at LLBG.

The cast iron gratings over the drainage trenches were removed for disposal, designated as low-level waste, and disposed at LLBG.

7.4 PHASE 2 CLOSURE ACTIVITIES

Phase 2 closure provided for clean closure of all 300 Area WATS portions of the 334-A Building, and for some, but not all, 300 Area WATS portions of the 333 Building and the 303-F Buildings. Phase 2 closure was completed in September 1998 in accordance with Ecology-approved DIP (HNF-1784-1) and Ecology has concurred with the activities (Appendix 6A).

7.4.1 333 Building

Closure of the 333 Building addressed removal of metal tanks 7 and 11 and decontamination and inspection of the concrete floor beneath Tank 11. These matrixes existed in one small area of the 333 Building (Figure 7-4). The 300 Area WATS drain piping routed to the 334-A Building storage tanks is located in the concrete piping trenches and will be removed as a portion of Phase 3 closure.

Tanks 7 and 11 underwent radiation survey and were not radioactive above the release limits. These tanks were hand washed to remove visible waste residues and were removed for processing as recyclable scrap metal to gain access to the concrete floor for decontamination. Under the scrap metal exclusions of WAC 173-303-120 (2)(a)(iv), recyclable scrap metal is not subject to the dangerous waste designation requirement. Decontaminated scrap metal was inspected randomly to ensure residue removal. The decontaminated tanks were stored at a nearby laydown area for retrieval by the recycler. Decontamination solutions, rags, etc., were collected, designated, based on the results of tank residue sampling, and disposed as nonregulated.

A portion of the concrete floor of the 333 Building (Figure 7-3) was scabbled as described in Section 7.7.1 to achieve a 'clean' debris surface. The decontamination and visual verification are documented on a WRRV (refer to Appendix 6A-7).

7.4.2 334-A Building

Closure of 300 Area WATS portions of the 334-A Building addressed metal tank A and miscellaneous metal surfaces (e.g., metal tank supports, pit access ladder), plastic tanks B and C, PVC waste acid transfer piping in the building, and the concrete tank pit floor and lower 0.6 meter of the walls.

The PVC drain piping in the 334-A Building was disconnected from the tanks, surveyed for radioactivity, designated as low-level waste, and disposed at LLBG.

Metal tank A will remain after closure. Because tank A was cleaned and the plastic liner removed when the tank was taken out of service in 1988, no visible waste residues from operations existed in this tank at the time of Phase 2 closure activities. However, the tank had been open since 1988 and contained minor amounts of uncontaminated soil from foot traffic on the overhead grating. The tank was vacuumed and scrubbed by hand. Metal tank supports and the pit access ladder were hand scrubbed to a 'clean debris surface' as described in Section 7.3.2. Decontamination and visual acceptance were documented on a WRRV (refer to Appendix 6A-4). Decontamination solutions, rags, etc., were collected, designated as low-level waste, and disposed at LLBG.

Polyethylene plastic tanks B and C were removed during closure because not all tank and tank support surfaces were accessible for decontamination. The tanks were dismantled in sections to facilitate removal through the hatch in the overhead grating. Work started from the top of each tank to gain access to tank interiors for decontamination before removal and disposal. Loose residues existing at the bottom of these tanks were removed to the extent practicable by wiping or vacuuming using a HEPA-filtered vacuum assembly and were sampled for tank section designation. All tank sections designated as low-level waste were disposed at LLBG.

The belowgrade 334-A Building concrete tank pit and lower 61 centimeters of the wall were decontaminated to a clean debris surface. The current coating did not require removal (Chapter 2.0, Section 2.1.3). The floor and walls were hand scrubbed to achieve a clean debris surface. To facilitate the decontamination and inspection, tank-pit wall coverings (styrofoam overlain with wire mesh and cement slurry) were removed as debris from the walls to a point 0.76 meter above the floor. The decontamination and inspection to verify achievement of a 'clean debris surface' were documented on a WRRV (refer to Appendix 6A-5). The removed wall coverings and other decontamination debris were collected, designated as low-level waste, and disposed at LLBG.

7.4.3 303-F Building

The 300 Area WATS portion of the 303-F Building included metal pumps P-40 and 50, metal transfer piping protruding above pipe trench grating in the building (including two in-line cartridge filters), and the metal-lined catch basin.

Transfer piping, pumps, and cartridge filters were removed during closure as debris, designated as low-level waste, and disposed at LLBG.

The catch basin housing the stainless steel liner is constructed of concrete covered with acid brick. The acid brick was removed to achieve a clean debris surface for these areas. The acid brick removal activity and the clean debris surface inspection are documented on a WRRV (refer to Appendix 6A-6). The acid brick debris was collected, designated as low-level waste, and disposed at LLBG.

The surface of the metal catch basin liner and the lower 0.6 meter of the east and south coated concrete block wall immediately adjacent to the catch basin were decontaminated of visible, white waste residues by hand scrubbing to a 'clean debris surface'. The decontamination and clean debris surface visual acceptance were documented on a WRRV (refer to Appendix 6A-8). Decontamination solutions, rags, etc., were collected, designated as low-level waste, and disposed at LLBG.

7.5 PHASE 3 CLOSURE ACTIVITIES

Phase 3 closure will include the activities necessary to clean close 300 Area WATS portions of the 334 and 311 Tank Farms, to complete clean closure activities for the 333 and 303-F Buildings by removing 300 Area WATS piping from these buildings, and to remove 300 Area WATS piping from the WATS and U-Bearing Piping Trench. Phase 3 closure activities have begun in accordance with the Ecology-approved DIP (HNF-2814) and tentatively are scheduled to be completed in September 1999. Decontamination and clean debris surface inspections will be documented on the appropriate task-specific WRRV identified in the Phase 3 DIP.

7.5.1 333 Building

Phase 3 closure will complete clean closure activities for the 333 Building begun during Phase 2. Phase 3 closure activities for the 333 Building will consist of removal and disposal of 300 Area WATS PVC drain piping from 300 Area WATS tanks 7 and 11 and non-300 Area WATS tanks 5, 9, 13, 15, 19, 26, and 31 to the 334-A Building storage tanks. These drain lines are located in pipe trenches within the 333 Building and between the 333 and 334-A Buildings. The trench structure is a portion of the WATS and U-Bearing Piping Trench that is outside the scope of 300 Area WATS closure.

Piping will be disconnected from the drain valves beneath these tanks and removed from the trench. Trench grating will be removed to gain access to piping for removal and will be replaced. Piping debris will be designated and managed as described in Section 7.2.2. Removal of this piping will be documented in the field logbook. No WRRV will be generated for this activity.

7.5.2 303-F Building

Phase 3 closure will complete clean closure activities for the 303-F Building begun during Phase 2 closure. Phase 3 closure activities for the 303-F Building will consist of removing and disposing of 300 Area WATS stainless steel and PVC piping located in the WATS and U-Bearing Piping Trench that is between the 313, 334-A, and 303-F Buildings and inside the 303-F Building. The trench structure is outside the scope of 300 Area WATS closure.

Concrete blocks, cover plates, and grating covering the trench will be removed to gain access to piping. The blocks, cover plates, and grating will be replaced after piping removal. Piping debris will be designated and managed as described in Section 7.2.2. Removal of this piping will be documented in the field logbook. No WRRV will be generated for this activity.

7.5.3 The 311 Tank Farm

Closure of 300 Area WATS portions of the 311 Tank Farm will address the following: tanks 40 and 50, pump 10; transfer piping at the tank farm and in the pipe trench, and the concrete catch basins around tanks 40 and 50. The 311 Tank Farm is outdoors and all components are exposed to the weather.

7.5.3.1 Tanks 40 and 50

Tanks 40 and 50 are expected to be clean closed and remain in place after closure. Alternatively, if during closure, removal is determined to be a cost-effective method of disposition, the tanks would be removed as debris.

Remaining tank(s) will have the interior and exterior decontaminated to a clean debris surface using a high-pressure water wash or by hand washing. Before decontamination, piping will be disconnected from the tank. The tank 40 stainless steel outer jacket will be removed to gain access to exterior surfaces for decontamination. Sludge in tank 40 will be removed before tank decontamination. Only minor cracks exist in concrete containment coatings and crack repair or sealing will occur before decontamination. Decontamination solutions and materials will be collected, such as by using liners placed in the existing catch basins, containerized, designated, and managed as described in Section 7.2.2. Decontaminated tank surfaces will be inspected to verify achievement of a clean debris surface and the inspections documented on a WRRV.

Alternatively, tanks 40 and 50 could be removed as debris. If removed, all but tightly adhered residues would be removed from tank interiors to facilitate designation as low-level waste, thereby reducing the generation of mixed waste. The tanks will be removed whole or in sections, whichever is deemed most appropriate at closure. On removal, the tanks or tank sections would be designated as described in Section 7.2.2 and managed accordingly. The concrete supports for each tank would remain in place and would be addressed as discussed in Section 7.5.3.3.

7.5.3.2 Pump 10 and Transfer Piping

Loadout pump P-10 and stainless steel transfer piping from the 303-F and 313 Buildings will be removed from the tank farms as debris. The material will undergo waste designation and will be managed as described in Section 7.2.2.

7.5.3.3 Concrete Catch Basin for Tank 40

The tank 40 concrete containment catch basin and tank concrete support pedestals will remain after closure and must meet the clean debris surface standard. Because no spills occurred to bare concrete surfaces (Chapter 3.0, Section 3.2.6), all concrete surfaces will be addressed in the same fashion. The bottom of the basin and 30.5 centimeters up the basin sides will be decontaminated by hand washing or scrubbing to a clean debris surface. This decontamination will be documented on a WRRV. The through-wall penetration sleeve at the lowpoint drain will be decontaminated and inspected for dangerous waste staining. The drain valve will be removed and replaced with a new valve at closure. All decontaminated portions of the basin, including the drain penetration sleeve, will be inspected to verify achievement of a clean debris surface and the inspection documented on a WRRV. Decontamination solutions and materials will be collected, designated, and managed as described in Section 7.2.2.

7.5.3.4 Concrete Catch Basin for Tank 50

The tank 50 concrete containment catch basin will remain after closure and so must meet the clean debris surface standard. No spills to this basin are documented (Chapter 3.0, Section 3.2.6). However, the bottom of the basin and 30.5 centimeters up each basin wall will be washed down/scrubbed. The piping and valve for the floor drain located at the northeast corner of the basin (Chapter 2.0, Section 2.1.7) will be removed, designated, and disposed. The drain cover will be removed and the drain will be cleaned. The cleaning activities will be documented on a WRRV. The pad and drain will be inspected to verify existence of a clean debris surface and the inspection documented on a WRRV. Decontamination solutions and materials will be collected, designated, and managed as described in Section 7.2.2.

7.5.4 334 Tank Farm

300 Area WATS portions of the 334 Tank Farm include the portion of the painted metal structure that supported tank 4 (now removed) and the concrete containment pad directly beneath where tank 4 existed. The concrete drainage trench directly beneath the tank 4 location is a portion of the WATS and U-Bearing Piping Trench and is outside the scope of 300 Area WATS closure.

7.5.4.1 Tank 4 Support Structure

The tank 4 metal support structure will remain after closure and must meet the clean debris surface standard. Portions of the structure that potentially contacted waste from the single spill in 1986 will be decontaminated to a clean debris surface. Because the paint is an integral part of the debris matrix, the clean debris surface standard is achievable without removal of the paint. Loose rust, scale, and visible residues will be removed by scraping, brushing, and/or scrubbing. The decontamination will be documented on a WRRV.

The decontaminated surface will be inspected for a clean debris surface and the inspection documented on a WRRV. The structure surface after decontamination will be tightly adhered paint with indications of weathering or oxidation and/or will be bare metal, likely showing indications of corrosion (rust or pitting). Visible rust or oxidation that is not stained from dangerous waste could remain on portions of the structure and not affect achievement of a clean debris surface. All rinsates or decontamination materials (e.g., rags, brushes) will be collected, designated, and managed as described in Section 7.2.2.

7.5.4.2 Containment Pad

The bermed concrete pad will remain after closure and must meet the clean debris surface standard. This pad is not expected to be contaminated (Chapter 3.0, Section 3.2.3) but will be cleaned. The pad will be washed down/scrubbed using scrub brushes, abrasive pads, nonregulated detergents, and/or bleach. The pad will be inspected for a clean debris surface. The decontamination and final inspection will be documented on a WRRV. The trench structure is a portion of the WATS and U-Bearing Piping Trench and is outside the scope of 300 Area WATS closure.

7.6 OTHER ACTIVITIES REQUIRED FOR CLOSURE

Temporary containment 'greenhouse' structure(s) for control of airborne contamination from decontamination activities will be constructed in accordance with the appropriate job safety documents to provide negative air pressure, airlock entry and exits, HEPA filtration, and other attributes, as necessary, to protect personnel and the environment.

All equipment brought onsite and used during closure activities will be decontaminated, reused, or disposed using onsite methods.

After partial closure, the unit will no longer be operating and waste will no longer be managed. The unit will remain open and will be addressed as a dangerous waste management unit in the following manner. The concrete structures over the unclosed, potentially contaminated soil identified in Chapter 3.0 will be inspected annually for cracks or major degradation. Such conditions will be repaired to ensure that potential soil contamination at these locations remains immobilized. A building emergency plan, personnel training, waste acceptance plan, or contingency plan will not be required for the unit after partial closure.

7.7 PERSONNEL TRAINING

Table 7-1 contains a brief description of training courses that fulfill WAC 173-303-330 requirements for personnel performing closure activities at a TSD unit potentially containing mixed waste. Before performing actual closure activities, site-specific work plans detailing specific work activities, site conditions, hazard characteristics, and closure equipment will be available to Ecology upon request. These documents might provide additional personnel training requirements than those described in Table 7-1.

7.8 SCHEDULE OF CLOSURE

Because of its size and complexity, closure of the 300 Area WATS will occur in two steps over an extended closure period. The first step is partial closure being performed in three, Ecology-approved phases (Phase 1 through 3). Phase 1, in accordance with Figure 7-5, addressed closure of the 313 Building, which was completed September 1997. Phase 2, in accordance with Figure 7-6, addressed closure of the 333, 334-A, and the 303-F Buildings, which was completed September 1998. Phase 3 closure currently is underway, in accordance with Figure 7-7, and addresses closure of the 311 and 334 Tank Farms and 300 Area WATS piping in the WATS and U-Bearing Piping Trench. Phase 3 closure is scheduled to be completed in September 1999. If the time required to complete Phase 3 closure activities exceeds 180 days from the time of closure plan approval, Ecology approval of an extension of the partial closure period will be requested.

Final closure will be coordinated with the future remedial action for the 300-FF-2 OU that will occur in accordance with future Tri-Party Agreement milestones. Completion of final closure therefore will require longer than the normal 180-day closure period. By approval of this closure plan, Ecology is granting a WAC 173-303-610 (4)(b) extension to the closure period.

7.9 AMENDMENT OF PLAN

The closure plan for the 300 Area WATS will be amended as described in the *Hanford Facility Dangerous Waste Permit Application, General Information Portion* (DOE/RL-91-28).

7.10 CERTIFICATION OF CLOSURE

Certification of final closure will be as described in the *Hanford Facility Dangerous Waste Permit Application, General Information Portion* (DOE/RL-91-28).

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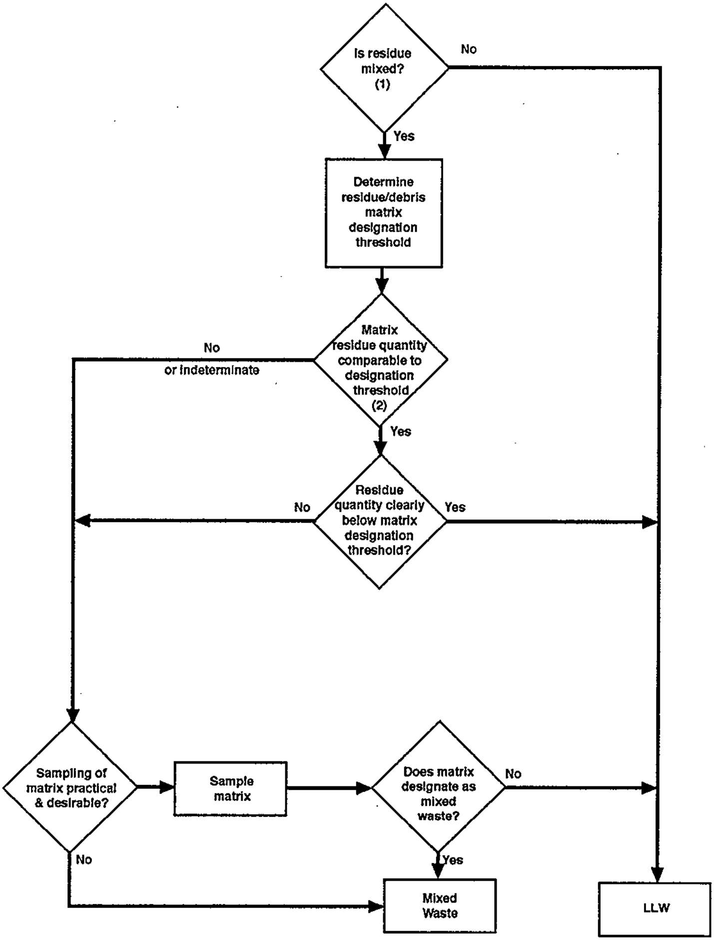

Notes:
(1) Determination for residues based on residue sampling results.
(2) Debris matrix designation begins at this point.
(3) Nondestructive assay performed to determine the quantity of waste residues on component based on the relationship of radionuclides to waste constituents in resides.
(4) NDA = nondestructive assay.
LLW = low-level waste.

HG97110101.1R1

Figure 7-1. Logic Flowpath for Designation of Waste Acid Treatment System Debris that Contacted System Residues.

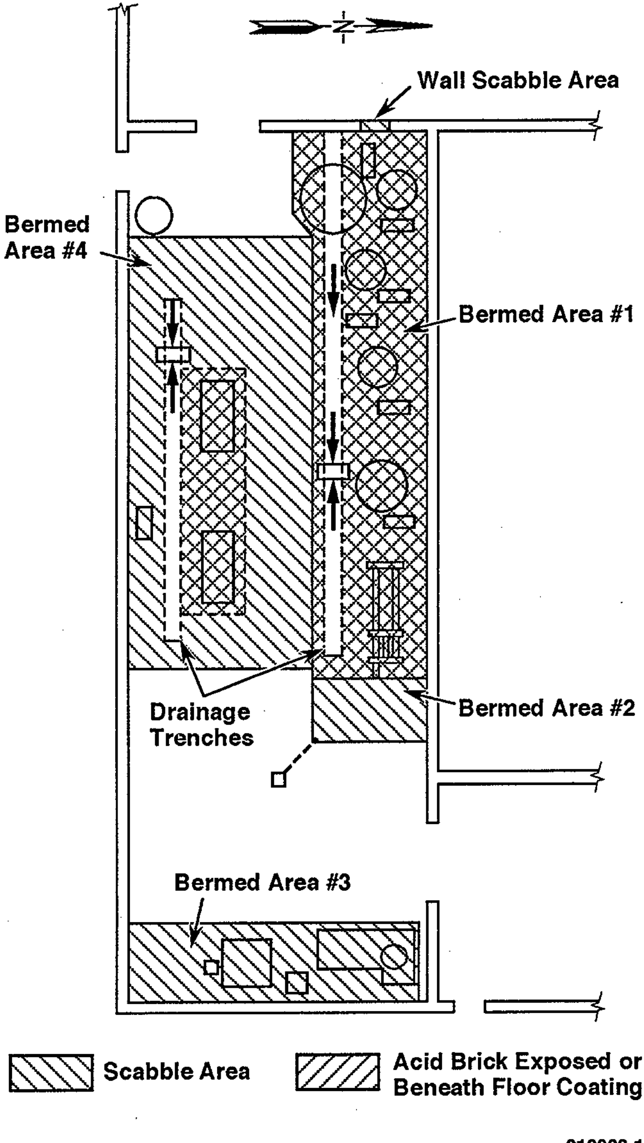

Figure 7-2. Plan View 313 Uranium Recovery Room Scabble Area.

EXAMPLE WASTE AND RESIDUE REMOVAL VERIFICATION
300 Area Waste Acid Treatment System

This checklist is intended to document a 'clean debris surface' for the following 300 Area WATS components, structures and/or materials.

1. Building/location: ________

2. Component(s)/Area(s): ______________________

3. Material (e.g., concrete, metal, plastic): ____________

4. Decontamination
   A. Method[1] (NA if not performed): ______
   B. Parameters (check/fill in appropriate parameters):
      [ ] Temperature ___________
      [ ] Propellant ___________
      [ ] Solid Media (e.g., shot, grit, beads) ___________
      [ ] Pressure ___________
      [ ] Residence time ___________
      [ ] Surfactant(s) ___________
      [ ] Detergents ___________
      [ ] Grinding/striking media (e.g., wheels, piston heads) ____
      [ ] Depth of surface layer removal (cm) (e.g., for concrete)
      [ ] Other ___________

   C. The decontamination of the components/areas/materials identified in steps 1 through 3 was completed as specified at step 4.

   ______________ ______________/______
   Title Signature Date

5. Performance Standard:

   The identified material(s) have been inspected visually and a clean debris surface[2] has been attained.

   Authorized Representative: ______________/__________
   Signature Date

[1] Although not mandatory, decontamination may use a physical extraction method from Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45). Treatment will use an appropriate Table 1 method.
[2] Clean debris surface as defined in Table 1, "Alternative Treatment Standards for Hazardous Debris" (40 CFR 268.45): Surface, when viewed without magnification, is free of all visible contaminated soil and dangerous waste, except allowed as follows:

- Residual staining from soil and waste consisting of light shadows, slight streaks, and minor discoloration.
- Soil and waste in cracks, crevices, and pits limited to no more that 5 percent of each square centimeter of surface area.

Note: This verification form is based on Debris Rule performance standards of 40 CFR 268.45 and does not originate in regulations or guidance documents.

Figure 7-3. Example Waste and Residue Removal Verification.

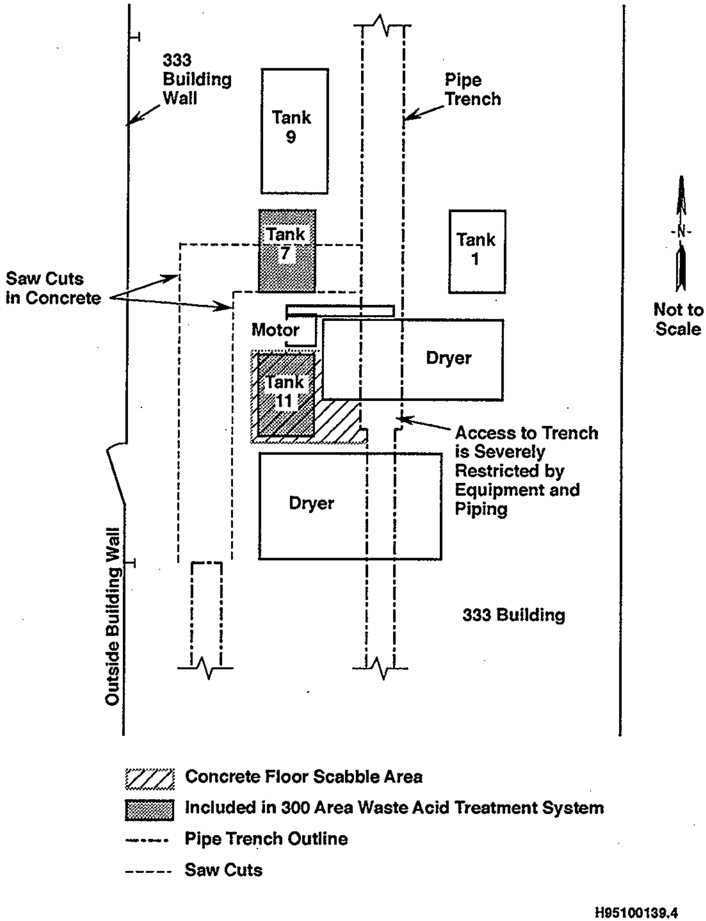

Figure 7-4. The 300 Area Waste Acid Treatment System Portion of the 333 Building.

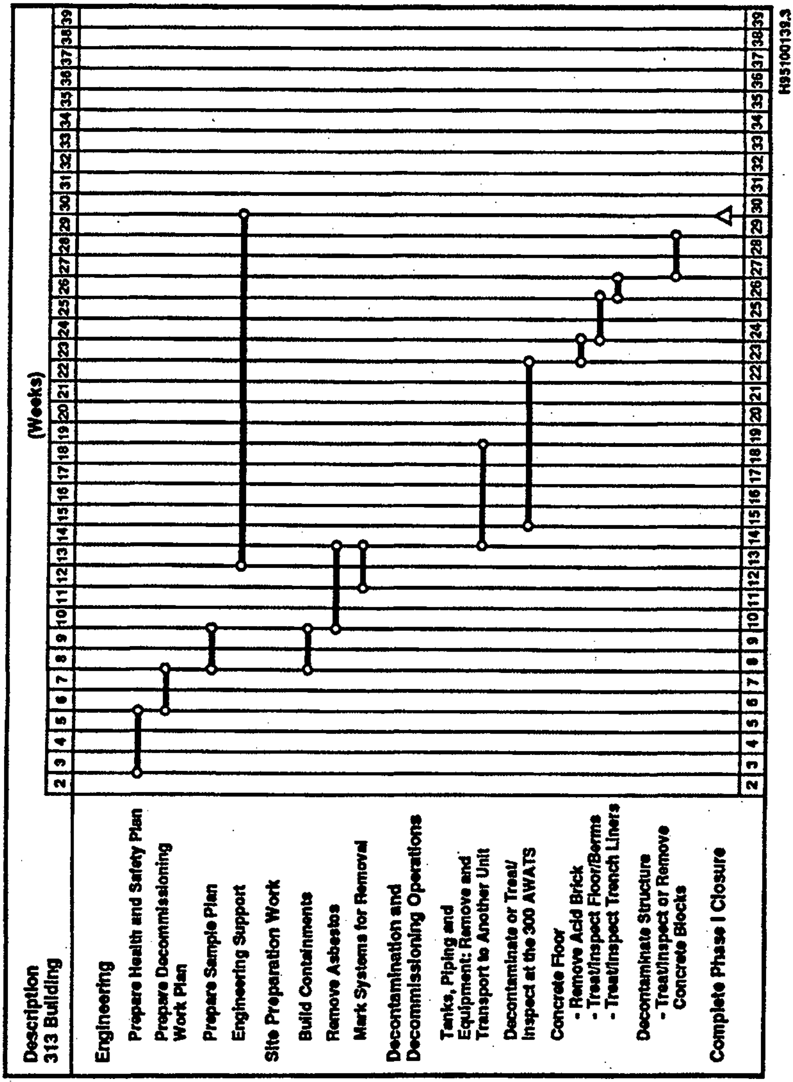

Figure 7-5. Phase 1 Closure Schedule (Completed).

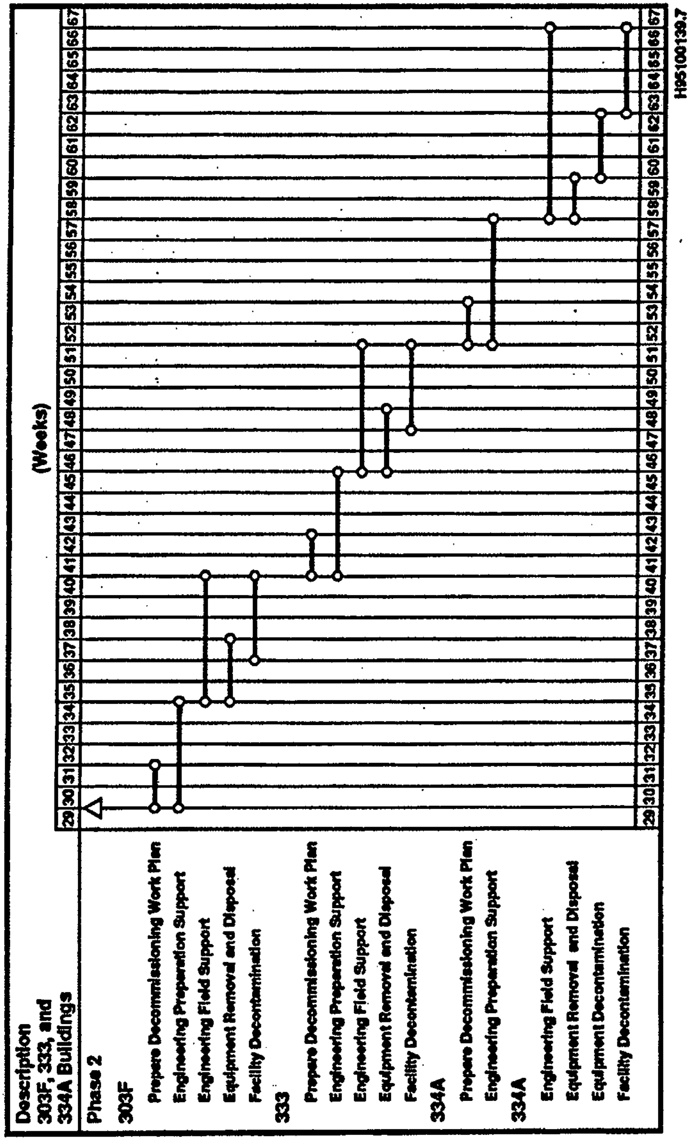

Figure 7-6. Phase 2 Closure Schedule (Completed).

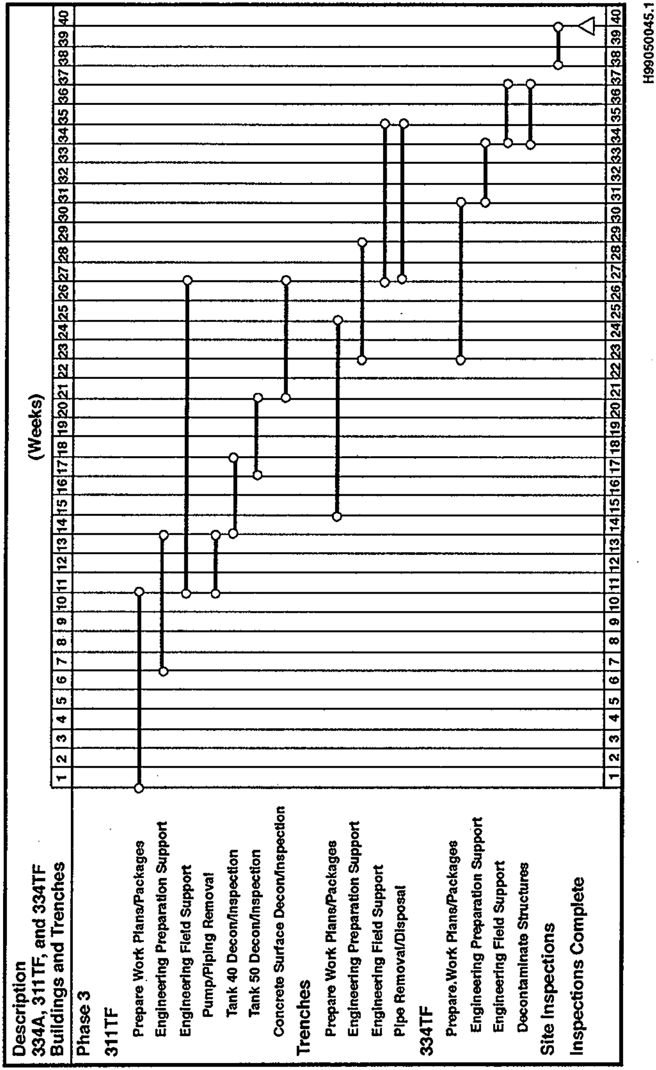

Figure 7-7. Phase 3 Closure Schedule.

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Table 7-1. Training Requirements for Resource Conservation and Recovery Act Closure Plan Activities.

	Course number	Course Name	Description
1.	000001	Hanford General Employee Training	Course provides a refresher overview of the federal and applicable hazard communication programs and hazardous and/or dangerous waste programs for all employees.
2.	02006G	Waste Management Awareness	Course provides the hazardous and/or dangerous material/waste worker who generates dangerous or mixed waste with the fundamentals for use and disposal of hazardous and/or dangerous materials.
3.	03E972	Unit-specific contingency plan/hazard/communication/ emergency preparedness	Course (s) provides specific information on hazardous and/or dangerous chemicals and waste management at the employees' TSD unit.
4.	020159	Advanced Course 2 - Hazardous Waste Shipper Certification	Course provides an in depth look at federal, state, and Hanford Site requirements for nonradioactive hazardous and/or dangerous waste management and transportation.
5.	035010	Waste Designation	Course provides dangerous waste designation per WAC 173-303.
6.	035020	Facility Waste Sampling and Analysis	Course provides waste sampling methodologies according to EPA Protocols SW-846, Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Course also addresses sampling plan, field and laboratory quality assurance/quality control (QA/QC) and use of sampling equipment.
7.	035100	Container Waste Management - Initial	Course provides general training requirements for waste management in containers at 90-day accumulation areas and TSD units.
	035110	Requalification	
8.	035120	Waste Management Administration	Course provides the administrative aspects of dangerous and/or mixed waste management and covers regulatory and company policies, forms, reports, forecasts and plans.
	035130	Requalification	
9.	02028B	Building Emergency Director Training	Course provides an overview of the responsibilities of the building warden and identifies building emergency organizations, emergency actions, implementing the contingency plan, and drill and exercises requirements.
	037510	Requalification	

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8.0 POSTCLOSURE

This closure plan proposes clean or modified closure of the 300 Area WATS in two steps occurring over an extended closure period. The first step will be partial clean closure of portions of the TSD under this closure plan. The second step will be final closure to occur at a later date (Chapter 6.0). As described in Chapter 7.0, Section 7.6, during the period between partial and final closure, an annual inspection and maintenance, if required, will occur, which does not equate to postclosure care.

Postclosure care would be required if the unit cannot be clean closed at the time of final closure. Under these conditions, alternative RCRA unit closure methods are landfill closure and modified closure. Landfill closure will not be considered here because, as with the adjacent 300-FF-1 [source] OU, the 300-FF-2 CERCLA [source] OU ROD is anticipated to require cleanup to industrial levels that will, at a minimum, qualify the unit for modified closure. Modified closure could occur if RCRA unit dangerous waste constituents in soil exceed the clean closure performance standards of WAC 173-303-610 (2)(b)(i) but do not exceed MTCA, WAC 173-340-745, Method C cleanup levels. Modified closure (if necessary) would not occur until a determination was made that soil contamination would not be remediated under the CERCLA 300-FF-2 OU cleanup action to RCRA clean closure standards. Modified closure would occur under the conditions of the *Hanford Facility RCRA Permit*, Section II.K.D. Postclosure requirements for inspections, maintenance, monitoring, institutional controls, and periodic assessments at the site during a modified closure period would be in accordance with a postclosure permit application. This closure plan would be revised to include the conditions of modified closure as stipulated in a postclosure permit application if modified closure occurs.

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9.0 REFERENCES

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HNF-1784, "Phase 2 Decontamination Inspection Plan", Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-2814, "Phase 3 Decontamination Inspection Plan", Fluor Daniel Hanford, Inc., Richland, Washington.

WHC-SD-ENV-AP-001, "Phase 1 Decontamination Inspection Plan", Westinghouse Hanford Company, Richland, Washington.

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APPENDIX 3A

KNOWN SPILLS TO 300 AREA WASTE ACID TREATMENT SYSTEM LOCATIONS PREDATING RESOURCE CONSERVATION AND RECOVERY ACT OPERATIONS AND FROM NON-300 AREA WASTE ACID TREATMENT SYSTEM ACTIVITIES

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Table 3A-1. Known Spills Predating the 300 Area Waste Acid Treatment System RCRA Operations. (sheet 1 of 2)

Location	Date	Spill origination point	Material spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
334-A Building	01-30-75	333 Building - chemical bay	Waste etch acids	HNO_3, HF and CrO_3 acids containing copper, uranium, and zirconium in solution	Small quantity	A chemical reaction occurred when a carbonate-bearing waste solution was added to the tanks in the 334-A Building. This caused foaming, which backed up in the drain line from the 333 Building and over-flowed the process tanks, into the process sewer.	Washed foam into process sewer.	Carbonate-bearing solutions were added to system in Tanks 9 and 10 in 313 Building after this incident.
	06-02-78	334-A Building -storage tanks	Waste etch acids	HNO_3, HF, H_2SO_4, and CrO_3 acids containing copper, uranium, and zirconium in solution	Estimated 18,780 gal of solution (primarily water with some waste etch acids)	Open water fill line in 333 Building caused process tank overflow into the containment pit. The pit when overflowed into the process sewer system. Overflow to the process sewer apparently began at 7:30 a.m. on June 3, and was discovered on the morning of June 5. Due to water input, overflow into the process sewer was primarily water with some acid content (pH 2.6).	Additional solution remaining in the 334-A pit also was drained into the process sewer. (Analysis showed NO_3^- [152 ppm[h]]; fluoride [220 ppm]; and copper [220 ppm].	Weekly composite process sewer sample did not indicate increased concentration of F^-, NO_3^-, copper, or uranium. Composite pH also was normal. This would imply that release was insignificant in comparison with routine operational releases.
313 Building	12-02-63	313 Building - uranium recovery area	Uranium-bearing acid	HNO_3[a] and H_2SO_4[b] acids containing uranium in solution	Not reported	The 2-in. Saran[c]-lined black iron pipe leaked.	Not reported	The 2-in. Saran-lined black iron pipe from the 333 Building was replaced with acid resistant stainless-steel line.
	1950 to early 1970	313 Building - uranium recovery area	Uranium-bearing acid possibly in neutralized form	HNO_3 and H_2SO_4 acids containing uranium in solution; NaOH[d] solution when neutralized	Unknown (Substantial)	During repair of a floor in the 313 Building, in early 1970's, solution was found running into a hallway from beneath the acid brick on the floor.	Seeping material was collected and processed through uranium recovery operation.	From recoverable uranium-bearing acid system. Removal of contaminated subfloor was not complete; contamination under repaired floor is still present.

Table 3A-1. Known Spills Predating the 300 Area Waste Acid Treatment System RCRA Operations. (sheet 2 of 2)

Location	Date	Spill origination point	Material spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
303-F & 311 Tank Farm	1954 to 1986	Caustic storage tanks in 311 Tank Farm	Caustic solution	50% NaOH	Unknown	Tank overflows and minor fitting leaks over the years of use.	None.	Soil around tanks still exhibits high pH necessitating use of chemical resistant suits when excavating in area.
	07-19-63	Pipe trench between 311 Tank Farm and 303-F Building	Uranium-bearing acid	HNO_3 and H_2SO_4 acids containing uranium in solution	Unknown (Substantial)	The 2-in. Saran-lined black iron pipe leaked into the process sewer. An amount of acid leaking to the process sewer must have been substantial since bottom of concrete trench was severely etched.	Flushed to process sewer.	The 2-in. Saran-lined pipe was replaced with stainless steel in early 1964. The bottom of the pipe trench was relined with concrete in early 1975.
	Prior to 10-74	Process sewer drain from 303-F Building	Caustic solution	NaOH solutions up to 50% concentration	Unknown	In October 1974, it was found that a drain pipe to the process sewer manhole was broken or had dissolved away. From appearances, it had been that way for years.	Replaced damaged pipe.	It is believed that the 50% NaOH solutions had damaged the drain line. The NaOH solutions were routinely discharged from the 303-F Building to the process sewer to keep the 300 Area ponds basic.
334-A Building & 334 Tank Farm	08-01-73	Current site of 334-A Building (before building was constructed)	Waste etch acids	HNO_3, HF^g, and CrO_3 acids containing copper, uranium, and zirconium in solution	About 1,300 gal.	Failure of the limestone neutralization tank resulted in a discharge to the ground. As a consequence of the tank failure, routine operations involved discharging spent waste acids directly into the process sewer system. This practice continued until January 1975. Because of this leak, the 334-A Building and Tanks A, B, and C were installed in late 1974.	Routed to 300 Area Process Pond for disposal. Added 1,910 lb of NaOH to the tank and allowed this solution to drain out the leak to neutralize the soil.	During construction of the 334-A Building, some of the contaminated soil was removed and disposed of in the 200 Area Burial Ground. The estimated amount is NO_3^{-e} (4,432 lb), F^{-f} (96 lb), copper (477 lb), and uranium (3 lb).

[a] HNO_3 = nitric acid
[b] H_2SO_4 = sulfuric acid
[c] Saran is a trademark of Dow Chemical Company.
[d] NaOH = sodium hydroxide
[e] NO_3^- = nitrate ion
[f] F^- = fluoride ion
[g] HF = hydrofluoric acid

Table 3A-2. Known Spills from Non-300 Area Waste Acid Treatment System Activities in the 300 Area Waste Acid Treatment System Location. (sheet 1 of 4)

Location	Date	Spill Origination point	Material Spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
334 Tank Farm	07-18-75	Sulfuric acid high tank	Acid	90% H_2SO_4[a]	About 1,200 gal	A PVC[b] fill line from the sulfuric acid high tank broke in the pipe *trench near the tank farm.* The acid drained through a limestone pit on the east side of the tank farm into the 618-1 Burial Ground.	The trench was rinsed to the *limestone pit.* The pipe was repaired.	In 1977, the trench to the limestone pit was blocked and a *drain line was installed* to the process sewer.
	01-02-81	334 outside storage tank area	Acid	57% HNO_3[c]	About 94 gal	Valve was found leaking around packing at the HNO_3 acid storage tank.	Valve packing was tightened, stopping the leak. Washed spill area into process sewer.	Weekly composite process sewer sample showed NO_3^-[d] content of 63.5 ppm[e]. Average value during normal week was 30 ppm. Based on a total process sewer flow of 2,081,400 gal, ~600 lb of HNO_3 could be attributed to the spill. Current CERCLA[f] RQ[g] for HNO_3 is 1,000 lb in a 24-h period.
313 Building	08-19-80	Uranium recovery area	Uranium-bearing acid	HNO_3 and H_2SO_4 acids containing uranium in solution	Unknown	Overflow of storage tank in 313 Building, resulting in an overflow of catch barrel into the process sewer system.	Open valve was closed, stopping overflow. Washed spill area into process sewer.	Weekly composite process sewer sample showed level of 36 ppm NO_3^- and 0.5 ppm uranium. Average of normal operating week was 8 ppm NO_3^- and 0.1 ppm uranium. Using a weekly flow of 102,000 gal, 24 lb of HNO_3 and 0.3 lb of uranium could have been involved in this release. CERCLA RQ for HNO_3 is 1,000 lb; RQ for $UO_2(NO_3)_2$[h] is 100 lb.
	06-15-81	Uranium recovery area	Caustic	50% NaOH[i]	Unknown	Corroded fill line to Tanks 2 and 6 leaked NaOH to process sewer.	Replaced corroded fill line.	The pH was 11.37 for 313 Building process sewer system.
	09-14-81	Uranium recovery area	Uranium-bearing acid	HNO_3 and H_2SO_4 acids containing uranium in solution	Unknown	Transfer of acid from one storage tank to the other resulted in overflow when the receiving tank level gage failed to operate properly.	Spilled solution was washed into process sewer.	Estimated 2.5 lb of uranium; 11.6 lb of HNO_3. Estimated release quantities are small compared with current CERCLA RQs of 1,000 lb and 100 lb of HNO_3 and $UO_2(NO_3)_2$[i] respectively. an alarm was installed in the catch drum.

Table 3A-2. Known Spills from Non-300 Area Waste Acid Treatment System Activities in the 300 Area Waste Acid Treatment System Location. (sheet 2 of 4)

Location	Date	Spill Origination point	Material Spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
313 Building (cont)	08-05-82	Uranium recovery area	Uranium-bearing acid	HNO_3 and H_2SO_4 acids containing uranium in solution	30 gal of acid	In order to provide additional storage capacity, drums were placed in the 313 Building to receive waste acids from the 333 Building. Carbon steel drums were used, which rapidly dissolved and spilled solution into the process sewer.	Solution was flushed into process sewer.	Estimated quantity of uranium (13 lb as $UO_2(NO_3)_2$) was well below current CERCLA RQ of 100 lb. Personnel were instructed not to use carbon-steel drums for HNO_3 - only stainless-steel or plastic drums.
	11-04-82	Uranium recovery area	Degreasing solvent	Perchloroethylene (tetrachloroethylene)	126 gal (approximately)	On 11-03-82, the degreaser solution was drained into the process sewer system during cleanout effort 401.25 liters (106 gallons). On 11-04-82, an additional 75.7 liters (20 gallons) were discharged as a result of the drain valve on the degreaser still being open.	Valve was closed, stopping further release. Floor area was washed into process sewer.	The estimated perchloroethylene release (126 gal) represents about 1,700 lb of material. The current CERCLA RQ for this substance is 1 lb.
	06-30-83	Uranium recovery area	Neutralized uranium-bearing etch solution	$NaNO_3$[j], Na_2SO_4[k], and uranium precipitates	Unknown	Failure of mechanical seal at uranium acid neutralizer tank resulted in release into process sewer.	Neutralizer tank was emptied to prevent further release. Pump was repaired.	The weekly composite process sewer sample showed approximately normal level of F^- and copper. Uranium concentration was elevated (1.7 ppm vs 0.03 ppm typically) as was NO_3^- (21 ppm vs 6 p/m normally). Based on a total process sewer flow of 296,800 gal, the spill could have involved 4 lb of uranium and 51 lb of $NaNO_3$.
	08-03-84	Uranium recovery area	Neutralized uranium etch solution	$NaNO_3$, Na_2SO_4, and uranium precipitates	Approximately 10 gal of solution containing about 1 lb of uranium	A pH meter drain valve at the uranium acid neutralization tank was left open, allowing solution to be discharged into the process sewer.	Material on floor, which hadn't reached process sewer, was absorbed. Open valve was closed, stopping discharge.	Quantities of materials involved were well below any CERCLA RQ limits.

Table 3A-2. Known Spills from Non-300 Area Waste Acid Treatment System Activities in the 300 Area Waste Acid Treatment System Location. (sheet 3 of 4)

Location	Date	Spill Origination point	Material Spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
313 Building (cont)	09-18-84	Uranium recovery area	Degreasing solvent	Perchloroethylene	12 gal	An open valve at the end of an out of service degreaser line released perchloroethylene into a work area in the south east corner of the building. Event occurred when operators pressurized the perchloroethylene pumping line to fill some barrels in the 303-F Building.	Valve was closed, and unused line was removed. Spill was absorbed with pads, collected in containers beneath line, and recovered in sump near line.	No spilled solvent was believed to have entered the process sewer.
	02-77-85	313 Building - process sewer	Uranium-bearing and waste etch acids and neutralized waste	HNO_3 and H_2SO_4 acids with uranium in solution; and HNO_3, HF and CrO_3 acids with uranium, copper, and zirconium in solution. $NaNO_3$, Na_2SO_4, NaF, and $Na_2Cr_2O_7$ solution with precipitates of copper, chromium uranium, and zirconium	Unknown	In January 1985, while a new extrusion press was being installed, a leak was discovered in a section of the process sewer line. the leak resulted in a discharge to the ground. It is unknown when the leak started. Spills and routine discharges in the 313 Uranium Recovery Area could have entered this line, resulting in ground disposal of hazardous substances.	None.	The entrances to the leaky section of process sewer were plugged in 1987.
	06-07-86	Uranium recovery area	Caustic solution	25% NaOH	Less than 1 qt.	Failed pump seal in Pump 6 resulted in caustic leak into process sewer over weekend.	Area was flushed into process sewer and pump isolated. Seal was repaired, pump was replaced, and weekend surveillance initiated.	Not a reportable quantity.
303-F Building & 311 Tank Farm	01-12-80	Caustic storage tank in 311 Tank Farm	Caustic solution	50% NaOH	Very small quantity	Condensate from steam heating line in storage tank caused overflow into process sewer.	None. Steam line was shut off to stop discharge.	Less than 1/10 lb of NaOH. Insignificant in comparison with CERCLA RQ of 1,000 lb for NaOH.
	09-22-80	Caustic storage tank in 311 Tank Farm	Caustic solution	50% NaOH	290 gal	A defective valve in the storage tank steam sparge line allowed steam condensate to overflow the storage tank into the process sewer system.	None. A second steam valve was closed, stopping overflow.	Weekly composite process sewer samples showed pH of 11.9. The 290 gal of 50% NaOH corresponds to 1,860 lb (as NaOH). The current CERCLA RQ for NaOH is 1,000 lb.

Table 3A-2. Known Spills from Non-300 Area Waste Acid Treatment System Activities in the 300 Area Waste Acid Treatment System Location. (sheet 4 of 4)

Location	Date	Spill Origination point	Material Spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
303-F Building & 311 Tank Farm (cont)	01-05-81	Transfer line in trench from 311 Tank Farm to 333 Building	Degreasing solvent	Perchloroethylene	About 116 gal unrecovered	Hose connection in transfer line blew off allowing solvent to drain into railroad underpass. The connection had been improperly installed.	255 gal were removed. The unrecovered solvent evaporated.	No solvent reached the process sewer. The transfer line was removed from service and further solvent transfers from the 311 Tank Farm were done in 55-gal drums.
	09-08-83	303-F Building - caustic mix tank	Caustic solution	NaOH solution	1,200 gal maximum	A slow leak through a water fill valve caused drip overflow of the caustic mix tank in the 303-F Building. The actual cause of the leak was discovered a day after the first indication of high pH in the 313 process sewer system. The weekly sample evidenced a high pH (11.9). Valve was replaced.	None.	A weekly process sewer composite pH indicates a total NaOH release of about 1,200 lb (based upon 462,000 gal total stream flow). This quantity was spread over a few days and appears high when compared with the slow drip nature of the spill. The CERCLA RQ for NaOH is 1,000 lb in a 24-h period.
	02-??-85	Overhead pipe in 311 Tank Farm	Uranium-bearing acid	HNO_3 and H_2SO_4 acids containing uranium in solution	<10 gal	A leak from the uranium-bearing acid transfer line occurred as a result of a gasket failure caused by freezing of the solution in the line. Analyses showed solution contained NO_3^- (3,480 ppm), $SO_4^=$ (6,960 ppm), and uranium (920 ppm). Ground beneath showed radioactive contamination from spill.	Some soil was exhumed, packaged, and sent to 200 Area for burial.	Lines above heated pipe trenches were heat taped and insulated.
	11-11-86 and 11-14-86	311 Tank Farm area - pipe trench	Caustic solution	50% NaOH solution	Small quantity	The 313 process sewer pH monitoring system rose to about 10.0 on 11-11-86 and to about 11.0 on 11-14-86, indicating a caustic solution release. Investigation showed that a sump in the 311 Tank Farm (which discharges into the process sewer) contained some caustic material. It appears that material was washed into the sump via rainwater flow through the piping trenches, which contained a small quantity of NaOH from a previous release.	Attempt was made to neutralize solution in sump.	A weekly process sewer composite sample pH was 8.4, compared with an average composite value of about 7.2. This would indicate a NaOH release of <0.1 lb. This quantity is insignificant compared with the CERCLA RQ for NaOH of 1,000 lb. Total weekly process sewer flow was 68,200 lb.

[b] H_2SO_4 = sulfuric acid
[c] PVC = polyvinyl chloride
[d] HNO_3 = nitric acid
[e] NO_3 = nitrate ion
[f] ppm = parts per million
[g] CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980.
[h] RQ = recordable quantity
[i] $UO_2(NO_3)_2$ = uranyl nitrate
[j] NaOH = sodium hydroxide
[k] $NaNO_3$ = sodium nitrate
[l] Na_2SO_4 = sodium sulfate
SO_4 = sulfate ion.

APPENDIX 3B

NONROUTINE CHEMICAL WASTE TREATED IN THE 300 AREA WASTE ACID TREATMENT SYSTEM BEFORE NOVEMBER 19, 1980.

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Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 1 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
1-75	07/21/75	Used sulfamic-acid-based proprietary solution from film developing process	35		pH = 1.7 684 ppm[a] chromium 34 ppm iron 14 ppm aluminum
2-75	12/11/75	Used chromium plating solution	55		Total acid normality = 1.9 >20,000 ppm chromium 2,000 ppm copper 1,000 ppm iron 20 ppm barium 40 ppm cadmium 10 ppm molybdenum
3-75	12/12/75	Synthetic salt solution; Initial makeup was: Sodium hydroxide-13% Sodium aluminate-5% Sodium nitrate-24% Sodium nitrite-8% Water-50%	495		pH = 12.0 Spectrochemical analysis showed no heavy metals
1-76	1/15/76	Unused oxalic acid		70	None
		Formic acid		2	None
2-76	1/15/76	Unused chemicals:			None
		Hydrobromic acid		19	
		Hydroiodic acid		2	
		Perchloric acid		3	
		Phosphoric acid	5		
		Hydrochloric acid	0.5		
		Hypophosphorus acid	1		
4-76	1/19/76	Used absorbing solution containing mercuric chloride (0.067 lb/gal), ethylenediaminetetraacetic acid (0.01 lb total), and potassium chloride (0.05 lb/gal)	20		None

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 2 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
5-76	1/30/76	Used battery acid containing sulfuric acid and lead	240		None
6-76	2/02/76	Used battery acid containing sulfuric acid and lead	140		None
7-76	2/17/76	Used battery acid containing sulfuric acid and lead	52		Approximately 2 lb sulfuric acid/gal 1 ppm lead 2 ppm barium 1 ppm cobalt 5 ppm chromium 2 ppm copper 5 ppm nickel
8-76	2/20/76	Used battery acid containing sulfuric acid and lead	275		None
9-76	3/08/76	Unused oxalic-acid-based proprietary chemicals:			
		Chemical 1		45	10,000 ppm calcium
		Chemical 2		30	500 ppm calcium 200 ppm sodium
		Chemical 3		26	20,000 ppm sodium 2,000 ppm calcium
		Chemical 4	6		pH = 4.39 >5,000 ppm sodium
10-76	3/08/76	Unused ethylenediaminetetra-acetic acid-based chemicals:			
		Chemical 1	3		>5,000 ppm sodium
		Chemical 2	3		>5,000 ppm sodium
		Chemical 3		35	50 ppm calcium
		Chemical 4		100	200 ppm sodium
		Chemical 5		25	200 ppm sodium
11-76	3/08/76	Unused chemicals:			
		Sodium hydrosulfite		75	None
		Sodium sulfite		10	None

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 3 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
12-76	3/08/76	Unused phosphoric acid-based proprietary chemicals:			
		Chemical 1	10		2,000 ppm aluminum 2,000 ppm silicon 5 ppm barium 50 ppm iron 50 ppm calcium 200 ppm sodium
		Chemical 2	4		700 ppm aluminum 700 ppm silicon 10 ppm nickel 20 ppm iron 20 ppm calcium 100 ppm sodium
		Chemical 3	4		200 ppm aluminum 700 ppm silicon 40 ppm iron 20 ppm calcium 100 ppm sodium
		Chemical 4	3.5		600 ppm aluminum 600 ppm silicon 20 ppm iron 20 ppm calcium 60 ppm sodium
		Chemical 5	2		600 ppm aluminum 600 ppm silicon 20 ppm iron 20 ppm calcium 100 ppm sodium
		Chemical 6	4		250 ppm aluminum 250 ppm silicon 3 ppm nickel 1 ppm vanadium 5 ppm iron 10 ppm calcium 100 ppm sodium

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 4 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
12-76 (continued)		Chemical 7	5		500 ppm aluminum 250 ppm silicon 5 ppm barium 2 ppm vanadium 2 ppm cobalt 1 ppm molybdenum 5 ppm nickel 10 ppm iron 30 ppm calcium 100 ppm sodium
		Chemical 8	1		200 ppm aluminum 200 ppm silicon 1 ppm barium 1 ppm vanadium 1 ppm nickel 10 ppm iron 10 ppm calcium 100 ppm sodium
		Chemical 9	1		500 ppm aluminum 250 ppm silicon 1 ppm barium 1 ppm vanadium 2 ppm nickel 5 ppm iron 10 ppm calcium 100 ppm sodium
		Chemical 10	1		300 ppm aluminum 300 ppm silicon 1 ppm barium 1 ppm vanadium 3 ppm nickel 5 ppm iron 15 ppm calcium 150 ppm sodium

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 5 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
12-76 (continued)		Chemical 11	4		350 ppm aluminum 350 ppm silicon 2 ppm barium 2 ppm vanadium 3 ppm nickel 7 ppm iron 20 ppm calcium 200 ppm sodium
		Chemical 12	13		1,000 ppm aluminum 1,000 ppm silicon 10 ppm barium 100 ppm iron 30 ppm calcium 300 ppm sodium
		Chemical 13	11		700 ppm aluminum 700 ppm silicon 20 ppm iron 20 ppm calcium 200 ppm sodium
13-76	3/8/76	Unused sulfamic-acid-based proprietary chemicals: Chemical 1		75	100 ppm silicon 50 ppm calcium 10,000 ppm sodium
		Chemical 2		75	20,000 ppm sodium 2,000 ppm calcium
16-76	3/17/76	Used battery acid containing sulfuric acid and lead	107		5.7 normal hydrogen ion 0.2 ppm silver 0.05 ppm chromium 2 ppm lead 2 ppm copper > 100 ppm sodium
17-76	3/17/76	Used battery acid containing sulfuric acid	72		3.0 normal hydrogen ion 0.5 ppm nickel 0.5 ppm lead 1 ppm copper 50 ppm sodium

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 6 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
18-76	3/25/76	Unused chemicals: Nickel plating solution	0.75		pH approximately 7.0 >2% nickel 2,000 ppm boron 10 ppm cobalt 20 ppm copper 40 ppm manganese
		Copper sulfate		4	None
19-76	3/25/76	Unused chemicals: Proprietary solution containing sulfuric acid and nitric acid	5		9.1 normal hydrogen ion 200 ppm copper 20,000 ppm sodium
		Fuming sulfuric acid	1		None
20-76	3/25/76	Unused chromic acid		100	None
21-76	6/29/76	Unused chemicals: Sodium aluminate solution	55		pH = 10.5 1,000 ppm aluminum 40 ppm copper 200 ppm nickel 40,000 ppm sodium 20 ppm iron
		Proprietary caustic materials: Chemical 1			
		Solution	55		pH = 11.8
		Powder		125	>100,000 ppm sodium 200 ppm phosphorus 5 ppm lead 2 ppm aluminum 50 ppm calcium
		Aluminum cleaner		400	pH = 11.2 10,000 ppm phosphorus 100,000 ppm sodium

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 7 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
21-76 (continued)		All-purpose synthetic cleaner	55		pH = 11.2 1,000 ppm phosphorus 10 ppm copper 6,000 ppm sodium 10,000 ppm silicon 6 ppm iron
		Chemical 2		275	pH = 9.2 10,000 ppm phosphorous >100,000 ppm sodium 20,000 ppm silicon 50 ppm iron 20 ppm aluminum 200 ppm calcium
		Chemical 3	0.25		pH = 12.3 100 ppm aluminum 4 ppm barium 10,000 ppm sodium 1,000 ppm silicon 40 ppm calcium
		Alkaline rust remover		6	5 ppm manganese 100,000 ppm sodium 20 ppm strontium 10 ppm aluminum
22-76	6/29/76	Unused acid-plating solutions:			
		Cobalt plating solution	0.25		pH = 2.3 >20,000 ppm cobalt 200 ppm nickel 2 ppm magnesium
		Activating solution #2	0.25		100 ppm nickel >20,000 ppm sodium 10 ppm cobalt
		Nickel acid solution	0.125		pH = 1.5 30,000 ppm nickel 100 ppm copper 10 ppm manganese 10 ppm chromium 300 ppm cobalt

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 8 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
22-76 (continued)		Activating solution #1	0.25		0.2 ppm nickel 0.1 ppm aluminum 0.1 ppm iron
		Copper acid solution	0.25		pH = 1.1 20,000 ppm copper 20 ppm nickel 10 ppm iron
		Used Zinctone solution containing nitric, sulfuric, and chromic acid	20		None
23-76	6/29/76	Unused chemicals:			
		Copper sulfate		100	None
		Ferric sulfate		2	
		Sodium hypophosphite		0.25	
		Urea		1	
		Vanadium pentoxide	0.25		
		Proprietary solution	0.37		pH = 7.3 >20,000 ppm nickel 10,000 ppm phosphorus 1,000 ppm cobalt 10 ppm chromium
24-76	7/12/76	Caustic materials in drums found onsite (4 drums):			
		Drum 14		55	500 ppm aluminum 500 ppm iron 100 ppm uranium 10 ppm chromium 2,000 ppm calcium 50 ppm strontium 50 ppm nickel 5 ppm lead >100,000 ppm sodium 5 ppm manganese 1 ppm copper 1,000 ppm silicon 10 ppm magnesium

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 9 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
24-76 (continued)		Drum 40		39	1,000 ppm aluminum 500 ppm iron 100 ppm nickel 20 ppm strontium 10 ppm chromium 5 ppm manganese 50 ppm barium 100,000 ppm sodium 10 ppm magnesium 200 ppm calcium 100 ppm silicon
		Drum 31	15.5		pH = 8.5 >3,000 ppm copper 30 ppm nickel 6 ppm cadmium 5 ppm aluminum 10 ppm magnesium 300 ppm calcium 60 ppm sodium
		Drum 39	0.5		90 ppm iron 90 ppm manganese 4 ppm chromium 1 ppm nickel 2 ppm barium 900 ppm sodium 40 ppm aluminum 1 ppm magnesium
25-76	7/12/76	Strong acid solution found in drum	1.5		4,000 ppm iron 800 ppm nickel 800 ppm molybdenum 400 ppm copper 80 ppm chromium 40 ppm manganese 40 ppm cobalt 4 ppm vanadium 80 ppm aluminum 8 ppm magnesium
26-76	8/05/76	Used battery acid containing sulfuric acid and lead	60		None

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 10 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
27-76	8/17/76	Unused chemicals:			
		Acetic acid	0.75		None
		Diethanolamine	0.25		None
		Mercuric nitrate	0.125		None
		Sodium hydroxide	0.25		None
		Mercaptoacetic acid	0.125		None
		Choline chloride		2.25	None
		Deoxycholic acid		0.125	None
		Phosphomolybdic acid		1	None
		Sodium chromate		2	None
		Trichloracetic acid		0.25	None
28-76	8/17/76	Used phosphorus pentaoxide desiccant		5	None
29-76	8/17/76	Used ethylenediaminetra-acetic acid solution	185		10 ppm chromium 6,000 ppm copper 6,000 ppm iron 600 ppm manganese 100 ppm molybdenum 1,000 ppm sodium 300 ppm nickel 100 ppm lead 10 ppm zinc 30 ppm aluminum 100 ppm calcium 100 ppm magnesium
30-76	9/2/76	Used hydrochloric acid solution (<1 normal) contains 1 g beryllium	0.25		None
31-76	10/01/76	Sodium nitrate contaminated with dirt		150	None
32-76	10/11/76	Used battery acid containing sulfuric acid and lead	301.5		None

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 11 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
33-76	10/28/76	Used wetting and foaming agent from testing of corrosion rate with uranium; test makeup included 0.003 lb uranium and 0.006 gal wetting and foaming agent	5		None
34-76	12/14/76	Used inhibited hydrochloric acid cleaning solution from derusting of degreasing solvent storage tank; makeup solution of 20% hydrochloric acid and 1% amine-based inhibitor	2,000		None
1-77	1/24/77	Unused 35% hydrogen peroxide solution	6		None
2-77	2/28/77	Unused chemicals:			
		Phosphoric acid	0.25		None
		Acetic acid	2.5		None
3-77	3/01/77	Unused ammonium bifluoride crystals		400	None
4-77	3/07/77	Unused chemicals:			
		Nickel chloride		5	None
		Nickel sulfate		5	None
		Sodium phosphate		1	None
		Sodium borate		1	None
		Boric acid		1	None
		Cupric sulfate		6	None
		Lithium fluoride		1	None
		Aluminum chloride		1	None
		Sodium fluoride		1	None

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 12 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
6-77	3/09/77	Unused chemicals:			
		Ammonium fluoride		4	None
		Sodium fluoride		2.5	None
		Sodium chromate		4	None
		Ammonium citrate		3	None
		Oxalic acid		12	None
		Citric acid		6	None
		Barium perchlorate		4	None
		Ammonium ceric sulfate		4	None
8-77	3/09/77	Unused chromic acid		6	None
11-77	4/13/77	Unused chemicals:			
		Potassium nitrate		2	None
		Potassium dichromate		2	None
		Sodium dichromate		1	None
		Sodium citrate		1	None
		Sodium acetate		1	None
13-77	5/23/77	Used sulfuric acid solution	450		70% sulfuric acid solution; 0.2 ppm silver, 10 ppm barium, 5 ppm cobalt, 100 ppm chromium, 30 ppm copper, 50 ppm manganese, 500 ppm molybdenum, 500 ppm nickel, 10 ppm lead, 5 ppm vanadium, 30 ppm iron, 10 ppm magnesium, 3 ppm titanium, 300 ppm zinc
		Used nitric acid solution	50		None
14-77	6/13/77	Unused nickel sulfate solution containing 62 g/L of nickel sulfate	20		None

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 13 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
15-77	9/13/77	Unused chemicals:			
		Proprietary alkaline rust remover		440	>100,000 ppm sodium 2,000 ppm calcium 500 ppm iron
		Proprietary chemical (apparently contains sodium bisulfate)		200	>100,000 ppm sodium
		Ammonium persulfate		220	None
		Ethylenediamine	39		None
16-77	9/13/77	Used drum dryer product containing aluminum nitrate and sodium nitrate		400	30,000 ppm aluminum 50,000 ppm calcium 100 ppm copper 3,000 ppm iron 5,000 ppm magnesium 10 ppm manganese 100,000 ppm sodium 10 ppm boron
5-78	5/02/78	Unused proprietary rust prevention material containing sodium nitrite		55	None
6-78	5/08/78	Used absorbing solution consisting of neutral salt mixture of mercuric chloride (10 g/L) ethylenediaminetetraacetic acid (0.07 g/L) and potassium chloride (6 g/L)	10		None
8-78	9/07/78	Used copper strip solution containing depleted uranium	200		0.66 lb/gal nitric acid 1.22 lb/gal copper 0.18 lb/gal uranium 15 ppm cobalt 2 ppm chromium 2 ppm manganese 2 ppm nickel 2 ppm titanium

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 14 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
2-79	1/26/79	Waste nitric acid solution containing depleted uranium	526		111 lb (total) of depleted uranium; 810 lb (total) of nitric acid
4-79	7/05/79	Used derusting solution; prior to neutralization with sodium hydroxide, solution consisted of 2.5% oxalic acid, 3.9 vol% hydrogen peroxide, and 0.01 vol% of concentrated sulfuric acid	165		None
5-79	10/30/79	Unused chromic acid plating solution containing 40 oz/gal chromic acid and 1% sulfuric acid	30		None
6-79	10/30/79	Dilute beryllium sulfate solution containing 10 ppm beryllium sulfate from testing of effects on trout fry and eggs		220	None
8-79	12/13/79	Used copper strip solution containing depleted uranium		300	300 g/L nitric acid 185 g/L copper 14.37 g/L uranium 2 ppm silver 2 ppm manganese

APPENDIX 6A

PHASED CLOSURE DOCUMENTATION

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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
1315 W. 4th Avenue • Kennewick, Washington 99336-6018 • (509) 735-7581

September 17, 1998

Mr. James E. Rasmussen
U.S. Department of Energy
P.O. Box 550, MSIN: A5-15
Richland, WA 99352

Dear Mr. Rasmussen:

Re: 300 Area Waste Acid Treatment Closure Phase 2 of 3

The Washington State Department of Ecology (Ecology) has reviewed and evaluated Phase 2 of the proposed 3 phase closure strategy for the 300 Area Waste Acid Treatment System Closure. Ecology has no additional comments on the Phase 2 Decontamination and Inspection Plan (DIP).

Ecology has received two copies of the final DIP and has been in the field during some of the closure activities to verify implementation of the Phase 2 DIP as the work progressed. A final walkdown for the conclusion of Phase 2 work performed in accordance with Ecology's "Clean Closure Guidance Document" method of a clean debris surface, was conducted on August 25, 1998. Phase 2 of this closure has been tentatively approved by Ecology.

These closure activities are being carried out prior to the final approval of this unit's closure plan, which requires a public review and comment process to be completed before Ecology can provide its final approval. Hence, this work is completed under your own risk as the public review process may result in a major change to the existing closure plan.

If you have any questions regarding the above information, please contact me at (509) 736-3025.

Sincerely,

Greta P. Davis, 300 Area WATS Unit Manager
Nuclear Waste Program

GPD:sdb

cc: Dave Einan, EPA
Ellen Mattlin, USDOE
Scott Luke, B&W
Jon Remaize, B&W
Mary Lou Blazek, ODOE
Admin. Record: 300 Area WATS, 300-FF-2

**PROFESSIONAL ENGINEER'S CERTIFICATION STATEMENT
PHASE 2 OF THE 300 AREA WASTE ACID TREATMENT SYSTEM**

I, the undersigned, an independent registered Professional Engineer, hereby certify that, to the best of my knowledge, all Phase 2 closure activities for the 300 Area Waste Acid Treatment system were performed in accordance with the Ecology approved closure documents except as discussed in the attached Specifications and Limitations of Professional Engineer's Certification.

RONALD G. HOLLENBECK
STATE OF WASHINGTON
23750
REGISTERED
PROFESSIONAL ENGINEER

9-28-98

EXPIRES 3/17/00

Ronald G. Hollenbeck, P.E.
Washington #23750
Fluor Daniel Northwest Inc.

SPECIFICATIONS AND LIMITATIONS OF PROFESSIONAL ENGINEER'S CERTIFICATION FOR PHASE 2 CLOSURE OF THE 300 AREA WASTE ACID TREATMENT SYSTEM

Closure for Phase 2 of the 300 Area Waste Acid Treatment System (WATS) was authorized by the Washington State Department of Ecology in a letter dated September 17, 1998 entitled "300 Area Waste Acid Treatment Closure Phase 2 of 3". The closure was performed in accordance with the Ecology approved "Decontamination and Inspection Plan for Phase 2 Closure of the 300 Area Waste Acid Treatment System" (HNF-1784 Rev 1).

This certification was conducted in accordance with WAC 173-303-610(6) to independently certify that the closure activities were performed in accordance with the approved closure documents. This review does not certify that the closure documents meet the regulatory requirements. Periodic site visits, phone conversations and document reviews were conducted to observe and document the closure activities. Each inspection activity was recorded in the facility logbook and documented on Field Trip Report forms filled out by the certifying engineer.

Phase 2 closure strategy was to remove dangerous waste and dangerous waste residues to clean closure levels from the WATS portions of the 334-A, 333 and 303 F Buildings. The clean closure performance standard of a 'clean debris surface' was used to close unit structures and components remaining after closure.

All requirements for closure activities stipulated by the closure documents have been met. The periodic inspections including the final inspection revealed no discrepancies.

HNF-1784-0

WASTE AND RESIDUE REMOVAL VERIFICATION
300 Area Waste Acid Treatment System

This documents decontamination and 'clean debris surface' verification inspections for the following components, structures and/or materials.

1. TSD Unit: 300 Area Waste Acid Treatment System
2. Building/location: 334-A Building Tank Pit
3. Component(s)/Area(s): Metal tank A and miscellaneous metal surfaces
4. Material (e.g., concrete, metal, plastic): Stainless and carbon steel
5. Decontamination:

   A. Method[1] (NA here if no decontamination performed): Sanding and Hand washing

   B. Parameters (check appropriate parameters):

[ ]	Temperature	
[ ]	Propellant	
[ ]	Solid media (e.g., shot, grit, beads)	
[ ]	Pressure	
[ ]	Residence time	
[ ]	Surfactant(s)	
[x]	Detergents	De-Solv-It or equivalent nonregulated cleaner
[X]	Grinding/striking media (e.g., wheels, piston heads)	Sandpaper (hand held)
[ ]	Depth of surface layer removal	
[x]	Other	Applicators (rags, etc.)

   C. The decontamination of the components/areas/materials identified in steps 1 through 4 was completed as specified in step 5.

   KE [signature], 9-30-98
   Signature, Date

6. Verification of Performance Standard: The identified components, areas, and/or materials have been inspected visually and have attained a clean debris surface[2].

Authorized Representative: [signature], 9/30/98
Signature, Date

1. Although not mandatary, decontamination could use a physical extraction method from Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45).
2. Definition of "clean debris surface' from Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45): "'Clean debris surface' means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits, may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area."

Note: This form does not originate in dangerous waste regulations or closure guidance documents.

Figure 4-2. 334-A Building Metal Surfaces Decontamination Verification.

WASTE AND RESIDUE REMOVAL VERIFICATION
300 Area Waste Acid Treatment System

This documents decontamination and 'clean debris surface' verification inspections for the following components, structures, and/or materials.

1. TSD Unit: 300 Area Waste Acid Treatment System
2. Building/location: 334-A Building Tank Pit
3. Component(s)/Area(s): Floor and walls
4. Material (e.g., concrete, metal, plastic): Coated concrete
5. Decontamination:

A. Method[1] (NA if no decontamination performed): Handwashing/scrubbing

B. Parameters (check appropriate parameters):

[ ] NA if no decontamination performed
[ ] Temperature
[ ] Propellant
[ ] Solid media (e.g., shot, grit, beads)
[ ] Pressure
[ ] Residence time
[ ] Surfactant(s)
[x] Detergents — De-Solv-It or equivalent nonregulated cleaner
[ ] Grinding/striking media (e.g., wheels, piston heads)
[ ] Depth of surface layer removal
[x] Other — Brushes, mops, rags, etc.

C. The decontamination of the components/areas/materials identified in steps 1 through 4 was completed as specified in step 5.

[signature] / 9-30-98
Signature — Date

6. Verification of Performance Standard: The identified components, areas, and/or materials have been inspected visually and have attained a clean debris surface[2].

Authorized Representative: [signature] / 9/30/98
Signature — Date

1. Although not mandatory, decontamination could use a physical extraction method from Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45).
2. Definition of "clean debris surface' from Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45): "'Clean debris surface' means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits, may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area."

Note: This form does not originate in dangerous waste regulations or closure guidance documents.

Figure 4-3. 334-A Building Concrete Tank Pit Decontamination Verification.

HNF-1784-0

WASTE AND RESIDUE REMOVAL VERIFICATION
300 Area Waste Acid Treatment System

This documents decontamination and 'clean debris surface' verification inspections for the following components, structures and/or materials.

1. TSD Unit: 300 Area Waste Acid Treatment System
2. Building/location: 303-F Building
3. Component(s)/Area(s): Catch Basin Berm
4. Material (e.g., concrete, metal, plastic): Concrete/Acid Brick
5. Decontamination:

   A. Method[1] (NA if no decontamination performed): Scabbling

   B. Parameters (check appropriate parameters):

[ ]	NA if no decontamination performed	
[ ]	Temperature	
[ ]	Propellant	
[ ]	Solid media (e.g., shot, grit, beads)	
[ ]	Pressure	
[ ]	Residence time	
[ ]	Surfactant(s)	
[ ]	Detergents	
[x]	Grinding/striking media (e.g., wheels, piston heads)	Jackhammer
[x]	Depth of surface layer removal	0.6 centimeter
[ ]	Other	

   C. The decontamination of the components/areas/materials identified in steps 1 through 4 was completed as specified in step 5.

   KE [signature] 9-30-98
   Signature Date

6. Verification of Performance Standard: The identified components, areas, and/or materials have been inspected visually and have attained a clean debris surface[2].

Authorized Representative: [signature] 9/30/98
Signature Date

1. Although not mandatory, decontamination could use a physical extraction method from Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45).
2. Definition of "clean debris surface' from Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45): "'Clean debris surface' means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits, may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area."

Note: This form does not originate in dangerous waste regulations or closure guidance documents.

Figure 4-4. 303-F Building Concrete Catch Basin Decontamination Verification.

WASTE AND RESIDUE REMOVAL VERIFICATION
300 Area Waste Acid Treatment System

This documents decontamination and 'clean debris surface' verification inspections for the following components, structures, and/or materials.

1. TSD Unit: 300 Area Waste Acid Treatment System

2. Building/location: 333 Building

3. Component(s)/Area(s): Floor

4. Material (e.g., concrete, metal, plastic): Concrete

5. Decontamination:

   A. Method[1] (NA if no decontamination performed): Scabbling

   B. Parameters (check appropriate parameters):

   [ ] NA if no decontamination performed
   [ ] Temperature ______
   [ ] Propellant ______
   [ ] Solid media (e.g., shot, grit, beads) ______
   [ ] Pressure ______
   [ ] Residence time ______
   [ ] Surfactant(s) ______
   [ ] Detergents ______
   [x] Grinding/striking media (e.g., wheels, piston heads) Jackhammer
   [x] Depth of surface layer removal 0.6 centimeter
   [ ] Other ______

   C. The decontamination of the components/areas/materials identified in steps 1 through 4 was completed as specified in step 5.

   [signature] Signature — 9/30/98 Date

6. Verification of Performance Standard: The identified components, areas, and/or materials have been inspected visually and have attained a clean debris surface[2].

Authorized Representative: [signature] Signature — 9/30/98 Date

1. Although not mandatary, decontamination could use a physical extraction method from Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45).
2. Definition of "'clean debris surface' from Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45): "'Clean debris surface' means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits, may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area."

Note: This form does not originate in dangerous waste regulations or closure guidance documents.

Figure 4-1. 333 Building Concrete Floor Decontamination Verification.

WASTE AND RESIDUE REMOVAL VERIFICATION
300 Area Waste Acid Treatment System

This documents decontamination and 'clean debris surface' verification inspections for the following components, structures and/or materials.

1. TSD Unit: 300 Area Waste Acid Treatment System

2. Building/location: 303-F Building

3. Component(s)/Area(s): Catch basin liners and walls

4. Material (e.g., concrete, metal): Stainless steel/coated concrete block

5. Decontamination:

A. Method[1] (NA here if no decontamination performed): Hand washing

B. Parameters (check appropriate parameters):

[ ]	Temperature	
[ ]	Propellant	
[ ]	Solid media (e.g., shot, grit, beads)	
[ ]	Pressure	
[ ]	Residence time	
[ ]	Surfactant(s)	
[x]	Detergents	De-Solv-It or equivalent nonregulated cleaner
[ ]	Grinding/striking media (e.g., wheels, piston heads)	
[ ]	Depth of surface layer removal	
[x]	Other	Applicators (e.g., rags)

C. The decontamination of the components/areas/materials identified in steps 1 through 4 was completed as specified in step 5.

[signature], 9-30-98
Signature — Date

6. Verification of Performance Standard: The identified components, areas, and/or materials have been inspected visually and have attained a clean debris surface[2].

Authorized Representative: [signature], 9/30/98
Signature — Date

1. Although not mandatary, decontamination could use a physical extraction method from Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45).
2. Definition of "clean debris surface" from Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45): "'Clean debris surface' means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits, may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area."

Note: This form does not originate in dangerous waste regulations or closure guidance documents.

Figure 4-5. 303-F Building Catch Basin Liner/Wall Decontamination Verification.

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

1315 W. 4th Avenue • Kennewick, Washington 99336-6018 • (509) 735-7581

March 3, 1998

Mr. James E. Rasmussen
U.S. Department Of Energy
P.O. Box 550, MSIN: A5-15
Richland, WA 99352

Dear Mr. Rasmussen:

Re: Washington State Department of Ecology (Ecology) Letter to James E. Rasmussen, Dated February 4, 1998

This letter is being reissued as information was inadvertently omitted from the referenced letter.

Ecology has reviewed and evaluated Phase 1 of the proposed three (3) phase closure strategy for the 300 Area Waste Acid Treatment System Closure (WATS). Ecology has no additional comments on the Phase 1 Decontamination and Inspection Plan (DIP).

A final walkdown for the conclusion of Phase 1 work was performed during the week of October 6, 1997. These closure activities are being carried out prior to the final approval of this unit's closure plan, which requires a public review and comment process to be completed before Ecology can make the final decision. Hence, all this work is completed under your own risk, knowing that the public review process may result in a major change to the existing closure plan. During the walkdown, it was observed that all activities had been performed in accordance with the DIP specifications originally submitted to Ecology.

If you have any questions regarding the above information, please contact me at (509) 736-3025.

Sincerely,

Greta P. Davis

Greta P. Davis, 300 Area WATS Sub-Project Manager
Nuclear Waste Program

GPD:ch

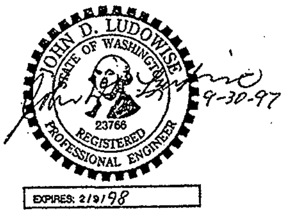
cc: Ellen Mattlin, USDOE
Dave Einan, EPA
Scott Luke, RFSH
Jon Remaize, B&W
Mary Lou Blazek, ODOE
Administrative Record: 300 Area Waste Acid Treatment System (WATS), 300-FF-2 & 300-FF-5

PROFESSIONAL ENGINEER'S CERTIFICATION FOR THE PHASE 1 CLOSURE OF THE 300 AREA WASTE ACID TREATMENT SYSTEM

I, the undersigned, an independent registered Professional Engineer, hereby certify that, to the best of my knowledge and belief, all Phase 1 closure activities for the 300 Area Waste Acid Treatment System were performed in accordance with the approved 300 Area Waste Acid Treatment System Closure Plan and other relevant documents. This certification is based solely on a review of pertinent documents, interviews of cognizant project personnel, my personal observations of decontamination activities, and my own inspection of the decontaminated facility which are described in the attached Specifications and Limitations of Professional Engineer's Certification.

The above statements are true and complete to the best of my knowledge and within the limits of professional judgment under the prevailing standards of practice on this 30th day of September, 1997.

John D. Ludowise
Washington # 23766
CH2M HILL, Inc.



SPECIFICATIONS AND LIMITATIONS OF PROFESSIONAL ENGINEER'S CERTIFICATION FOR THE PHASE 1 CLOSURE OF THE 300 AREA WASTE ACID TREATMENT SYSTEM

The 300 Area Waste Acid Treatment System (WATS) operated as an interim status Resource Conservation and Recovery Act of 1976 (RCRA) treatment, storage and/or disposal (TSD) unit in the tank treatment and storage of dangerous and mixed waste. The 300 Area WATS operations were conducted in portions of four buildings and two tank farms: the 313 Building; the 334-A Building; the 333 Building; the 303-F Building; the 334 Tank Farm; and the 311 Tank Farm. The 300 Area WATS is designated to clean close under RCRA and Washington Administrative Code (WAC) 173-303-610. The closure strategy is to clean close the site through decontamination or removal of contaminated equipment, structures and components in three phases. Phase 1 addresses closure of RCRA portions of the 313 Building. A revised Phase 1 Closure Plan for the 300 Area Waste Acid Treatment System (WATS) was published in March of 1996 (Ref. 1) and a decontamination and inspection plan (DIP) for Phase 1 closure activities was approved in December of 1996 (Ref. 2). The DIP supplements the closure plan and describes the decontamination and verification inspection activities that support the partial clean closure of the RCRA portions of the 313 Building that are part of the 300 Area WATS.

The requirement of the Phase 1 closure strategy (Ref. 2) is to partially clean close the 300 Area WATS portions of the 313 Building "from the floor up." This requirement will be accomplished by: (1) removal of all 300 Area WATS equipment and tank system components from the 313 Building as debris after designation and decontamination (as necessary); (2) decontamination to clean closure standards of the building and secondary containment structures that will remain at the unit after closure; and (3) inspection of remaining structures for attainment of clean closure standards.

The equipment, tank system, and associated piping in the 300 Area WATS portions of the 313 Building were removed from the building over the period between April 1997 and August 1997. Regular updates from the cognizant project engineer plus field inspections by John D. Ludowise (the P.E.), were used to determine that equipment and tank removal activities were conducted according to the DIP.

Decontamination to clean closure standards were conducted between August 1997 and lasted through September 1997. Decontamination activities included the use of air hammers and scabbling equipment. Regular updates from the cognizant project engineer plus field inspections by the P.E., were used to determine that decontamination was conducted in accordance with the DIP, and as amended by the project managers (Ref. 3). Decontamination activities included: the complete removal of acid brick; the scabbling of concrete and concrete block surfaces to a depth of at least one-quarter inch; and removal of equipment pedestals and cleaning of two stainless steel drainage trenches. The removal of the acid brick and equipment pedestals was not specifically required by the DIP, but was done to expedite the decontamination operation and is consistent with the intent of the DIP. The lower 12 inches of concrete block walls was scabbled to a depth of at least one-quarter inch. Two drainage ditches were decontaminated using a combination of hand scrubbing and electric and pneumatic sanding.

An inspection of the facility was conducted by the P.E. on September 30, 1997 for the purpose of confirming that the remaining structures attain clean closure standards. With the exceptions noted and explained below, the P.E. observed that decontamination activities of building and secondary containment structures has resulted in a "clean debris surface" as defined in 40 Code of Federal Regulations (CFR) 268.45, Table I, and as required by the Closure Plan (Ref. 1). Under 40 CFR 268.45, the definition of "'clean debris surface' means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discoloration, and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area."

Exceptions noted during the inspection by the P.E. on September 30, 1997:

1. The concrete floor area in the general vicinity of where Tank 2 once stood has an orange colored stain that appears to be rust. This area was covered with acid brick in early 1953 (Ref. 1) and the pattern of the stain is fairly widespread, and is not consistent with what would be expected if a leak had penetrated cracks in the acid brick and/or mortar. In some areas, there is evidence that the black mastic material that held the acid brick to the floor was laid on top of the rust colored stain so the stain would probably have occurred due to operations conducted prior to 1953 and thus predate RCRA operations which began in 1980.

2. The floor area immediately adjacent to and to the north of the drainage trench in bermed area #1 (Ref. 1) has a rust colored stain. The trench has carbon steel components which were covered by the acid brick in 1953 (Ref. 1). Similar to the discussion above, the stain probably occurred from operations that predate the installation of the acid brick in 1953.

3. The lower portion of the wall area in the northwest of bermed area #1 has an accumulation of yellow powder about 4 inches above the floor in an area in which the acid bricks were removed. It is possible that the substance is a uranium compound that leaked from either of two uranium-bearing acid holding tanks were located in this general vicinity (Ref. 1). Many uranium compounds, including uranyl nitrate and uranium trioxide are yellow. The yellow powder is fairly widespread and the distribution is not consistent with what would be expected if material penetrated a crack in the acid brick and/or mortar. There was no indication of a crack in the acid bricks or mortar in this location (Ref. 1). The deposition of the yellow material would probably have occurred due to operations conducted prior to 1953 and thus predate RCRA operations which began in 1980.

DOCUMENTS REVIEWED FOR PROFESSIONAL ENGINEER'S CERTIFICATION FOR THE PHASE 1 CLOSURE OF THE 300 AREA WASTE ACID TREATMENT SYSTEM

1. *300 Area Waste Acid Treatment System Closure Plan,*DOE/RL-90-11, Rev. 1, Dated March 1996, U.S. Department of Energy, Richland, Washington.

2. *Decontamination and Inspection Plan for Phase 1 Closure of the 300 Area Waste Acid Treatment System,* WHC-SD-ENV-AP-001, Rev. 0, Dated December 17, 1996, Rust Federal Services of Hanford Inc., Richland, Washington.

3. Meeting Minutes: "Project Managers Meeting, 300 Area Waste Acid Treatment System," August 7, 1997.

WASTE AND RESIDUE REMOVAL VERIFICATION
300 Area Waste Acid Treatment System

This documents decontamination and 'clean debris surface' verification inspections for the following components, structures and/or materials.

1. TSD Unit: 300 Area Waste Acid Treatment System
2. Building/location: 313 Building - Sludge Recovery Room
3. Component(s)/Area(s): Floors and Cinderblock Walls
4. Material (e.g., concrete, metal, plastic): Concrete
5. Decontamination:

   A. Method[1] (NA if no decontamination performed): Scabbling

   B. Parameters (Check appropriate parameters):

Parameter	
[ ] NA if no decontamination performed	
[ ] Temperature	
[x] Propellant	Compressed air
[x] Solid Media (e.g., shot, grit, beads)	Steel shot and/or grit
[ ] Pressure	
[ ] Residence time	
[ ] Surfactant(s)	
[ ] Detergents	
[x] Grinding/striking media (e.g., wheels, piston heads)	Steel rods, Jackhammer
[x] Depth of surface layer removal (cm)	.6 cm
[ ] Other	

   C. The decontamination of the components/areas/materials identified in steps 1 - 4 was completed as specified in step 5.

   Signature / Date: 9/30/97

6. Verification of Performance Standard: The above identified components, areas, and/or materials have been visually inspected and have attained a clean debris surface[2].

Authorized Representative: Signature / Date: 9/30/97

Notes:
1. Although not mandatory, decontamination may use a physical extraction method from Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45).
2. Definition of "clean debris surface" from Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45): "'Clean debris surface' means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits, may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area."

Figure 5. Waste and Residue Removal Verification - Concrete.

WASTE AND RESIDUE REMOVAL VERIFICATION
300 Area Waste Acid Treatment System

This documents decontamination and 'clean debris surface' verification inspections for the following components, structures and/or materials.

1. TSD Unit: 300 Area Waste Acid Treatment System

2. Building/location: 313 Building - Sludge Recovery Room

3. Component(s)/Area(s): Drainage Trench Liners

4. Material (e.g., concrete, metal, plastic): Stainless steel

5. Decontamination:

   A. Method[1] (NA here if no decontamination performed): Hand washing

   B. Parameters (Check appropriate parameters):
   [ ] Temperature
   [ ] Propellant
   [ ] Solid Media (e.g., shot, grit, beads)
   [ ] Pressure
   [ ] Residence time
   [ ] Surfactant(s)
   [x] Detergents — "Built" detergent or equivalent cleaner
   [X] Grinding/striking media (e.g., wheels, piston heads) — ELECTRIC & PNEUMATIC SANDERS
   [ ] Depth of surface layer removal (cm)
   [x] Other — Applicators (e.g., rags)

   C. The decontamination of the components/areas/materials identified in steps 1 - 4 was completed as specified in step 5.

   Signature ______ Date 9/30/97

6. Verification of Performance Standard: The above identified components, areas, and/or materials have been visually inspected and have attained a clean debris surface[2].

Authorized Representative: Signature ______ Date 7/30/97

Notes:
1. Although not mandatary, decontamination may use a physical extraction method from Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45).
2. Definition of "clean debris surface' from Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45): "'Clean debris surface' means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits, may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area."

1 Figure 7. Waste and Residue Removal Verification - Metal.

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