

START

PLEASE PRINT OR TYPE IN BLOCK LETTERS
(11-12 in areas are spaced for site type, i.e., 12 characters/inch)

FORM 3	DANGEROUS WASTE PERMIT APPLICATION	I. EPA/STATE I.D. NUMBER <table border="1" style="width:100%; border-collapse: collapse; text-align: center;"> <tr> <td>W</td><td>A</td><td>7</td><td>8</td><td>9</td><td>0</td><td>0</td><td>0</td><td>8</td><td>9</td><td>6</td><td>7</td> </tr> </table>	W	A	7	8	9	0	0	0	8	9	6	7
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.)

2. NEW FACILITY (Complete item below.)

<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width: 30px;">MO</td> <td style="width: 30px;">DAY</td> <td style="width: 30px;">YR</td> </tr> <tr> <td style="text-align: center;">01</td> <td></td> <td style="text-align: center;">78</td> </tr> </table> <p>FOR EXISTING FACILITIES, PROVIDE THE DATE (mo., day, & yr.) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED (use the boxes to the left)</p>	MO	DAY	YR	01		78	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width: 30px;">MO</td> <td style="width: 30px;">DAY</td> <td style="width: 30px;">YR</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table> <p>FOR NEW FACILITIES, PROVIDE THE DATE (mo., day, & yr.) OPERATION BEGAN OR IS EXPECTED TO BEGIN</p>	MO	DAY	YR			
MO	DAY	YR											
01		78											
MO	DAY	YR											

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

1. FACILITY HAS AN INTERIM STATUS PERMIT

2. FACILITY HAS A FINAL PERMIT

III. PROCESSES — CODES AND DESIGN CAPACITIES

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

B. PROCESS DESIGN CAPACITY — For each code entered in column A enter the capacity of the process.

1. AMOUNT — Enter the amount.

2. UNIT OF MEASURE — For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PRO-CESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY	PROCESS	PRO-CESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:			Treatment:		
CONTAINER (barrel, drum, etc.)	301	GALLONS OR LITERS	TANK	T01	GALLONS PER DAY OR LITERS PER DAY
TANK	302	GALLONS OR LITERS	SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
WASTE PILE	303	CUBIC YARDS OR CUBIC METERS	INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
SURFACE IMPOUNDMENT	304	GALLONS OR LITERS	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
Disposal:					
INJECTION WELL	080	GALLONS OR LITERS			
LANDFILL	081	ACRE-FEET (the volume that would cover one acre to a depth of one foot) OR HECTARE-METER			
LAND APPLICATION	082	ACRES OR HECTARES			
OCEAN DISPOSAL	083	GALLONS PER DAY OR LITERS PER DAY			
SURFACE IMPOUNDMENT	084	GALLONS OR LITERS			
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	S
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. PROCESS DESIGN CAPACITY		FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY		FOR OFFICIAL USE ONLY
		1. AMOUNT (specify)	2. UNIT OF MEASURE (enter code)				1. AMOUNT (specify)	2. UNIT OF MEASURE (enter code)	
X-1	S 0 2	600	G		5				
X-2	T 0 3	20	E		6				
1	*T 0 4	17,000 (max), 400 (annual avg)	U		7				
2					8				
3	* This permit covers several treatment technologies/test facilities based upon guidance received from EPA and WDOE in February, 1988.								
4									

Continued from the front.

III. PROCESSES (continued)

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

This permit application covers treatment of radioactive mixed waste (RMW) and hazardous wastes via various thermal treatment R&D processes. The primary thermal treatment (non-incineration) processes are In Situ Vitrification (ISV) and waste vitrification.

ISV is a thermal treatment process that converts contaminated soils and sludges into a glass and crystalline product. An electrical current is passed among an array of four electrodes imbedded in the contaminated soil or sludge, melting and glassifying it. The process continues outward and downward until the appropriate vitrification depth is obtained. RMW and dangerous waste constituents are stabilized in the glass and crystalline product. Organic contaminants are destroyed by pyrolysis, and the pyrolysis products oxidize as they migrate to the surface. PNL currently operates four treatability testing units (bench-, engineering-, pilot-, and large-scale). The engineering- and bench-scale units are located in the 324 Building in the 300 Area on the Hanford Site. The pilot- and large-scale units are transportable within the Hanford Site. The design capacity of the units vary from 5 gallons per day (bench-scale) to 17,000 gallons per day (large-scale).

(continued on following page)

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.

L I N E N O .	A. DANGEROUS WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEAS- URE (enter code)	D. PROCESSES	
				1. PROCESS CODES (enter)	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

Thermal Treatment Test Facilities

III. PROCESSES (continued)

Waste vitrification prototype equipment is located in the 324 Building. Treatability studies are performed using simulated and actual RMW samples. RMW is mixed with glass-forming materials and vitrified into a highly durable glass for disposal. The design capacity ranges from 1.5 gallons per day (bench-scale) to 30 gallons per day (pilot-scale).

In some treatability studies with ISV, vitrified soil is left in place for additional study before either being removed or designated as nonhazardous.

Other thermal treatment processes covered by this permit include plasma arc pyrolysis, in situ heating of soils and sludges for removal of organics, metal melting for volume reduction and immobilization of contaminated metals, gamma induced oxidation of organic chemicals, thermal treatment for the drying and decomposition of liquid slurries, in can melting of soil wastes and liquid slurries, and microwave heating to dry and immobilize liquid and solid wastes.

Continued from page 2.

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

I.D. NUMBER (enter from page 1)									
WA 7890008967									
IV. DESCRIPTION OF DANGEROUS WASTES (continued)									
L I N E N O .	A. DANGEROUS WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEAS- URE (enter code)	D. PROCESSES					
				1. PROCESS CODES (enter)				2. PROCESS DESCRIPTION (If a code is not entered in C(1))	
1	D 0 0 1	30	T	T	0	4			Treatment
2	D 0 0 2	450							
3	D 0 0 3	3							
4	D 0 0 4	450							
5	D 0 0 5	450							
6	D 0 0 6	450							
7	D 0 0 7	450							
8	D 0 0 8	450							
9	D 0 0 9	450	↓	↓					↓
10	D 0 1 0	450							
11	D 0 1 1	450							
12	D 0 1 2	70							
13	D 0 1 3	70							
14	D 0 1 4	70							
15	D 0 1 5	70							
16	D 0 1 6	70	↓	↓					↓
17	D 0 1 7	70							
18	W T 0 1	450							
19	W T 0 2	450							
20	W P 0 1	70							
21	W P 0 2	70							
22	F 0 0 1	70							
23	F 0 0 2	70							
24	F 0 0 3	70							
25	F 0 0 4	70							
26	F 0 0 5	70	↓	↓					↓

Continued from page 2.

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

I.D. NUMBER (enter from page 1)									
WA7890008967									
IV. DESCRIPTION OF DANGEROUS WASTES (continued)									
L I N E N O	A. DANGEROUS WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEAS- URE (enter code)	D. PROCESSES					
				1. PROCESS CODES (enter)				2. PROCESS DESCRIPTION (If a code is not entered in C(1))	
1	F 0 0 6	70	T	T 0 4					Treatment
2	F 0 0 7	1200	T						
3	F 0 0 8	1200	P						
4	F 0 0 9	1200	T						
5	K 0 3 1	1200	P						
6	K 0 3 5	1200	P						
7	K 0 8 4	1200	P						
8	K 1 0 1	1200	P						
9	K 1 0 2	1200	P						
10	W 0 0 1	30	T						
11	Total annual quantity will not exceed 700 T.								
12	U 0 0 1	1000	P						
13	U 2 4 7								
14	P 0 0 1	1000	P						
15	P 1 2 3								
16									
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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 RMW and hazardous waste to be handled in thermal treatment test facilities include listed wastes, wastes from nonspecific sources, characteristic wastes and state-only wastes.

These thermal treatment test facilities are currently tested in the engineering development laboratory (EDL), EDL high bay and hot cell complex of the 324 Building, the ISV test site west of the 300 Area (see attached drawing), the 116-B-6-1 crib, and other selected laboratories in the 324, 325 and 331 Buildings. These technologies may be used in other facilities and at RMW/hazardous waste remedial action locations.

V. FACILITY DRAWING

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

VI. PHOTOGRAPHS

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

VII. FACILITY GEOGRAPHIC LOCATION *This information appears on the attached drawing and photograph.

LATITUDE (degrees, minutes, & seconds)

LONGITUDE (degrees, minutes, & seconds)

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VIII. FACILITY OWNER

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)
Michael J. Lawrence, Manager
U.S. DOE, Richland Operations

SIGNATURE
Michael J. Lawrence

DATE SIGNED
5-19-88

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

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.



Michael J. Lawrence, Manager
Department of Energy
Richland Operations Office

5-19-88
Date

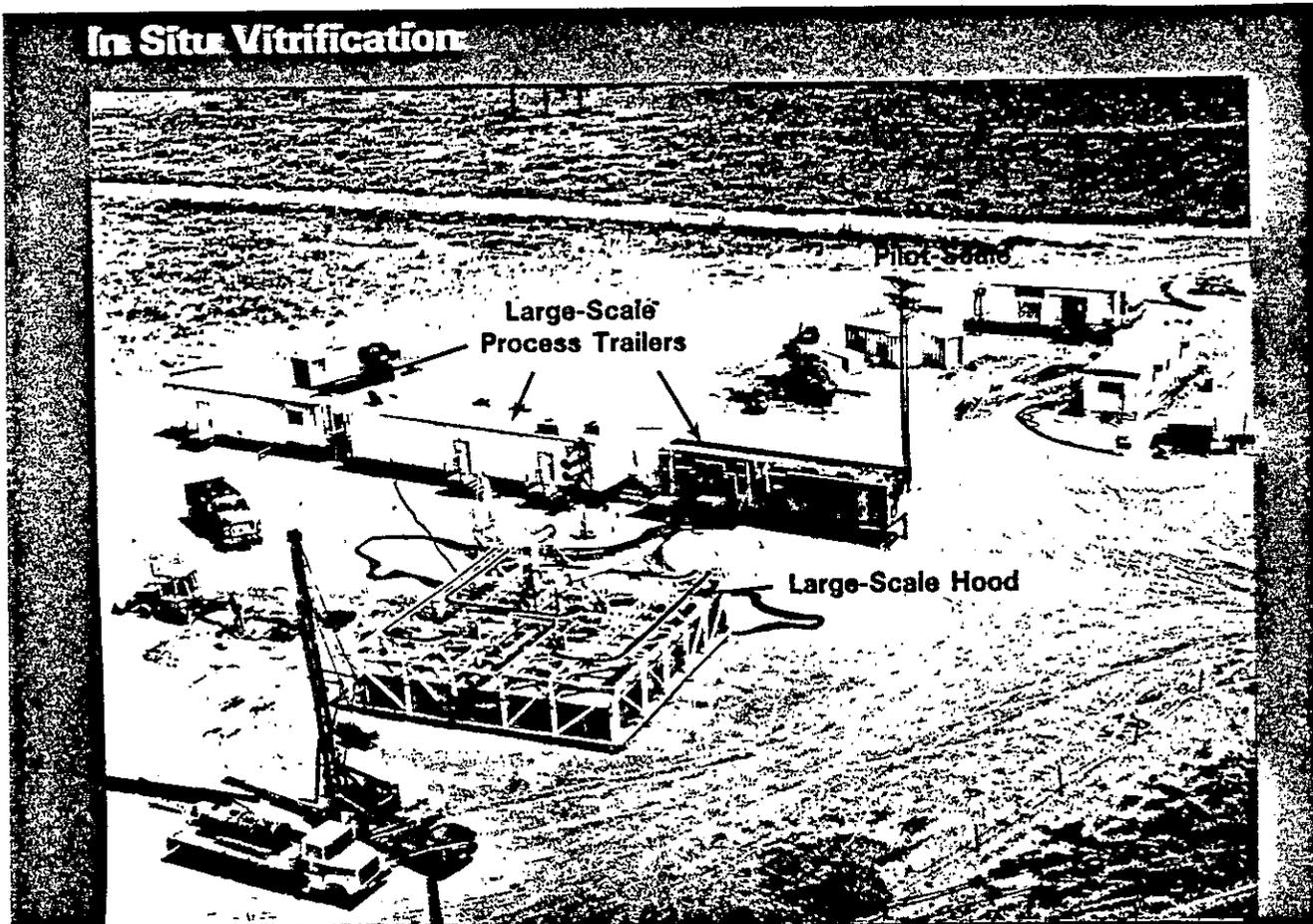


William R. Wiley, Director
Pacific Northwest Laboratory

5/19/88
Date

Thermal Treatment Test Facilities In Situ Vitrification

In Situ Vitrification



Longitude 119° 16' 55"

Latitude 46° 22' 21"

8600495-1CN

Photo Taken 1986

Thermal Treatment Test Facilities Waste Vitrification



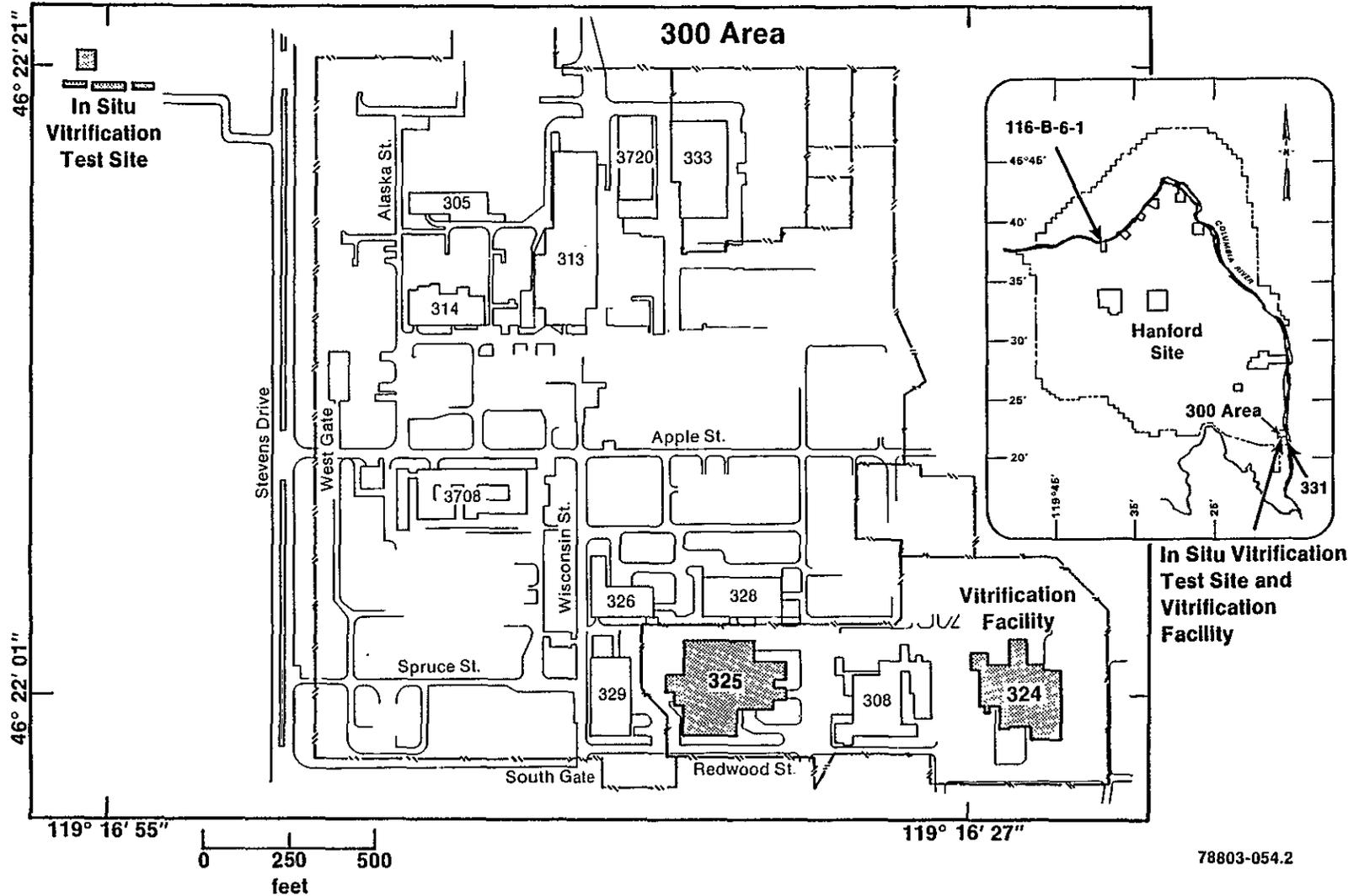
Longitude 119° 16' 27"

Latitude 46° 22' 01"

8605893-4CN

Photo Taken 1986

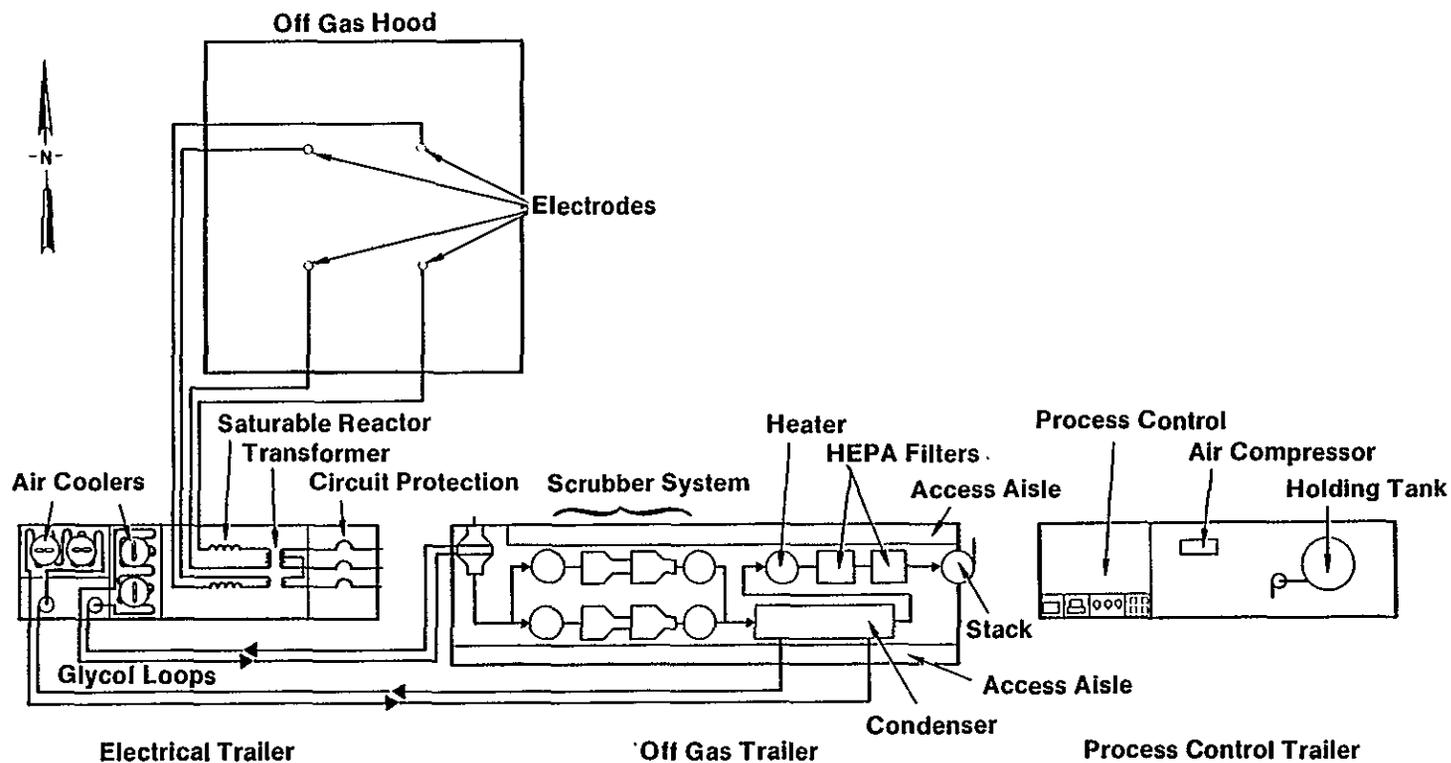
Thermal Treatment Test Facilities Site Plan



78803-054.2

WA7890008967

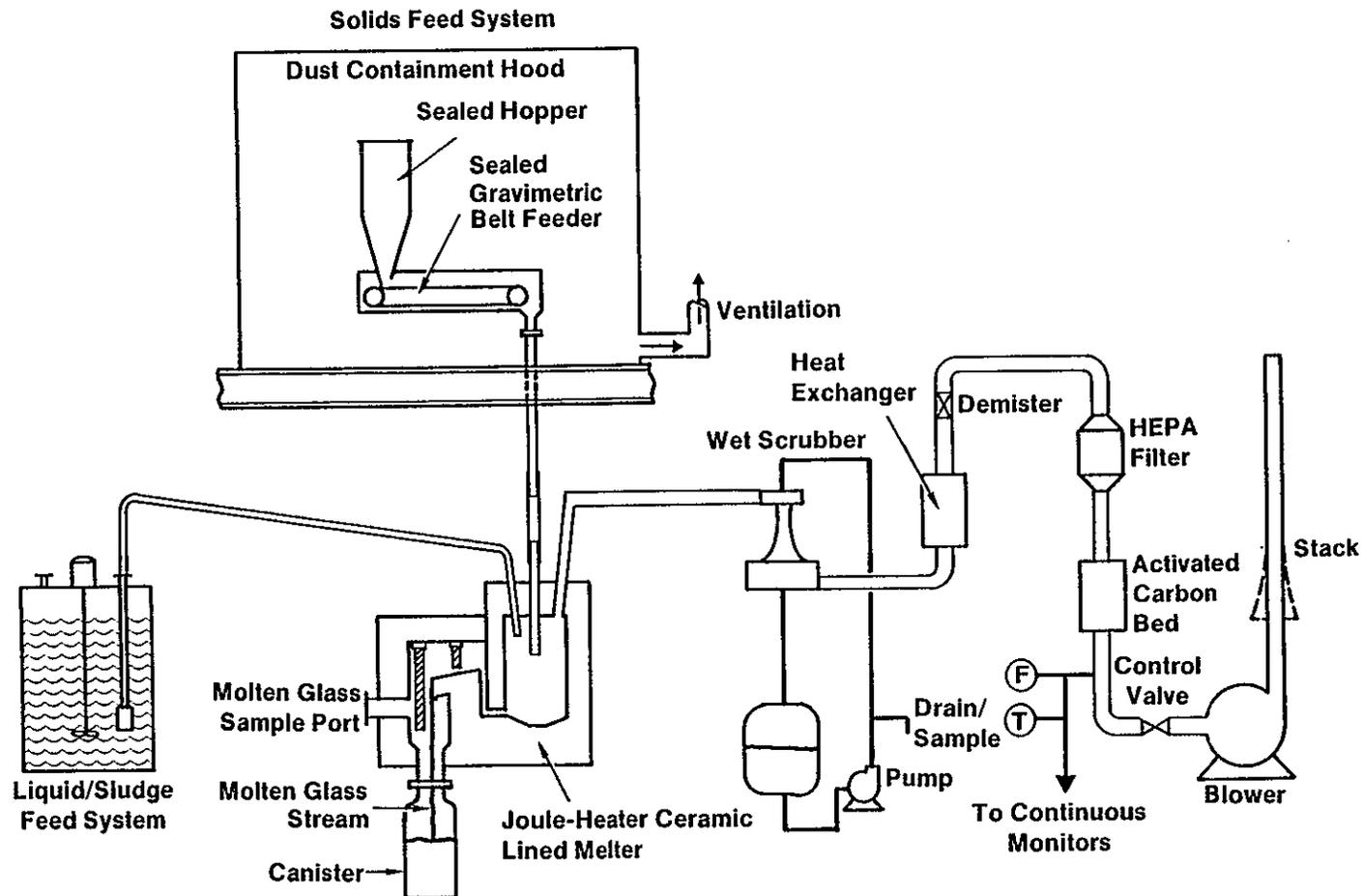
Thermal Treatment Test Facilities In Situ Vitrification Process Trailer Schematic



78803-054.4

Thermal Treatment Test Facilities

Flow Diagram for Vitrification Process



78803-054.5

WA7890008967