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CHAPTER 2.0
UNIT DESCRIPTION

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CHAPTER 2.0
UNIT DESCRIPTION

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2.0 UNIT DESCRIPTION

The closure plan for the 1301-N Liquid Waste Disposal Facility (1301-N), also known by the designation 116-N-1, and for the 1325-N Liquid Waste Disposal Facility (1325-N), also known by the designation 116-N-3. The 1301-N and 1325-N terminology will be used throughout this appendix because the Liquid Waste Disposal Facilities are identified as such in their interim status Part A Permit Applications. These radioactive dangerous waste units operated as soil column disposal units, most recently under the authority of the *Washington Administrative Code* ([WAC 173-303](#)). Closure of these units will commence pursuant to [WAC 173-303-610](#) and the Hanford Facility Dangerous Waste Permit (Permit). Modification of the Permit to include this closure plan is scheduled to occur in calendar year 1999. However, because of the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) milestone that requires one document be submitted to address the four treatment, storage, and disposal (TSD) units this closure plan will be incorporated into the Permit Modification in December 1998.

This closure plan is part of the 100-NR-1 Treatment, Storage, and Disposal Corrective Measures Study (DOE/RL-96-39, Rev. 1A). Approval of this closure plan will be obtained through the Permit modification process. Contaminated groundwater associated with 1301-N and 1325-N TSD operations is defined as the 100-NR-2 Operable Unit (OU). Remedial alternatives associated with contaminated groundwater are defined in the 100-NR-1/NR-2 Treatment, Storage, and Disposal Corrective Measures Study. Chosen remedial actions for 100-NR-2 groundwater will be defined in a separate Record of Decision (ROD) and, again, incorporated into the Permit through Permit modification. Actual closure activities necessary to close these units are not known at this time because the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) alternative selection process has not been completed. Therefore, this closure plan contains closure activities that may be required for the range of 1301-N and 1325-N remedial alternatives presented in Permit Attachment 41, Chapter 5.0. This range includes two closure options available to dangerous waste units under [WAC 173-303](#) and the Permit: modified closure or landfill closure.

2.1 Regulatory Background

The 1301-N and 1325-N units are operated by the U.S. Department of Energy (DOE), Richland Operations Office (RL), and co-operated by Bechtel Hanford, Inc. Although the U.S. Government holds legal title to this facility, the RL, for purposes of regulation under [WAC 173-303](#), is considered the legal owner of the facility under existing U.S. Environmental Protection Agency (EPA) interpretive regulations (51 Federal Register 7722).

The Part A, Form 3, dangerous waste permit application documentation for 1301-N originally was submitted to the Washington State Department of Ecology (Ecology) and the EPA in August 1986. Documentation for the 1325-N Liquid Waste Disposal Facility originally was submitted in February 1987.

The Part A identifies the listed waste spent solvent, methanol (F003), as being disposed to 1301-N and 1325-N. Any media or debris that came into contact with wastewaters disposed to these units may also, by definition, be considered to be a listed dangerous waste in lieu of an approved contained-in determination. The reason this is not stated definitively is because, federally, F003 spent solvents are no longer listed if they do not exhibit the characteristic of ignitability ([40 CFR 261.3\[a\]\[2\]\[iii\]](#)), however, a similar 'exclusion' does not exist in State regulation.

Soil samples taken from the 1325-N Trench resulted in non-detectable levels of methanol. The values reported for the nondetects range from 5.0 to 5.4 mg/kg and are well below the Model Toxics Control Act Method B cleanup of 400 mg/kg. Sampling of the 1301-N Crib was not conducted since it is considered to be analogous with the 1325-N Trench. In December 2000, Washington State Department of Ecology granted a contained-in determination for the soils located within the 1325-N and 1301-N Liquid Waste Disposal Facilities.

2.2 Closure Plan and Corrective Measures Study Integration

Closure of the 1301-N and 1325-N units will occur under the authority of [WAC 173-303](#).

1 These units are also defined under the 100-NR-1 OU and are part of DOE/RL-96-39, Rev. 1A. Integrated
 2 TSD and OU closure actions will be necessary to remediate contaminated soil and groundwater. Actions
 3 taken to remediate these TSDs will comply with the provisions of both CERCLA and Resource
 4 Conservation and Recovery Act (RCRA). The CERCLA public involvement, including public notice and
 5 opportunity to comment, has been enhanced to concurrently satisfy the RCRA closure process. The
 6 remedy selected under CERCLA will be incorporated into the Hanford Facility RCRA Permit as the
 7 RCRA closure action after issuance of the public notice and comment process.

8 The CERCLA ROD was issued subsequent to the Hanford Facility RCRA Permit modification. Should
 9 the CERCLA ROD contain provisions inconsistent with the approved RCRA modifications, the Hanford
 10 Facility RCRA Permit will be again modified to reconcile these differences during the next permit
 11 modification cycle.

12 Closure options available under [WAC 173-303-610](#) and the Permit are as follows:

13 **Clean closure** - requires that groundwater be uncontaminated by dangerous waste constituents (as
 14 evidenced through compliance with [WAC 173-303-645](#)) and that soils contain concentrations of
 15 dangerous waste constituents below *Model Toxics Control Act* (MTCA) Method B direct soil exposure
 16 and groundwater protection levels ([WAC 173-303-610](#)[2][b][I] and Permit Condition II.K.1). This
 17 closure option is compatible with both exposure scenarios presented in DOE/RL-96-39, Rev. 1A, rural-
 18 residential and the modified Columbia River Comprehensive Impact Assessment (CRCIA)
 19 Ranger/Industrial Scenario because it allows for unrestricted use of the units after closure. Because it is
 20 unclear at this time whether the groundwater under 1301-N and 1325-N has been contaminated with
 21 dangerous waste constituents from past operation of these units, as defined under [WAC 173-303-645](#), this
 22 closure option has not been identified as available to 1301-N and 1325-N in this closure plan. Should a
 23 clean soil column be attained and future groundwater monitoring indicate levels of dangerous waste
 24 constituents are below MTCA Method B levels, this option will be revisited through Permit modification.

25 **Modified closure** - requires that soil concentrations of dangerous waste constituents not exceed MTCA
 26 Method C direct soil exposure and groundwater protection levels. Groundwater may or may not be
 27 contaminated by dangerous waste constituents (Permit Condition II.K.3). This closure option is only
 28 compatible with modified CRCIA ranger/industrial uses of the land (as defined for the purposes of Permit
 29 Attachment 41) because institutional controls would be required in order to limit access to the
 30 contaminated media.

31 **Landfill closure** - required when soils contain concentrations of dangerous waste constituents above
 32 MTCA Method C direct soil exposure and groundwater protection levels. Groundwater may or may not
 33 be contaminated by dangerous waste constituents (Permit Condition II.K.4). This closure option is only
 34 compatible with modified CRCIA ranger/industrial uses of the land because capping and other
 35 institutional controls would be required in order to limit access to the contaminated media.

36 Closure option decisions at 1301-N and 1325-N will be driven by decisions made pursuant to a CERCLA
 37 ROD for these units. Remedial alternatives compared in Permit Attachment 41 encompass modified and
 38 landfill closure options available under [WAC 173-303-610](#) and the Permit. Therefore, information is
 39 contained in Permit Attachment 41 that address compliance with all potential closure options. Remedial
 40 alternatives compared are presented below:

- 41 • No Action under a rural residential or modified CRCIA ranger/industrial exposure scenario.
 42 (RRES-1), (MCRIS-1)
- 43 • Remove/Treat if Required/Dispose/Backfill under a residential or modified CRCIA
 44 ranger/industrial exposure scenario. (RRES-6), (MCRIS-6)
- 45 • Remove to 3.0 m (10 ft) below ground surface (bgs)/Treat if Required/Dispose/Backfill/Cap for
 46 Groundwater Protection under a modified CRCIA ranger/industrial exposure scenario.
 47 (MCRIS-7)
- 48 • Remove to 3.0 m (10 ft) bgs/Treat if Required/Dispose/Vitrify for Groundwater
 49 Protection/Backfill under a modified CRCIA ranger/industrial exposure scenario (MCRIS-8).

1 The RRES-1 and MCRIS-1 Alternatives are presented in DOE/RL-96-39, Rev. 1A for baseline
2 comparison but are not considered viable alternatives for 1301-N and 1325-N. MCRIS-6 and MCRIS-8
3 Alternatives may result in a modified closure decision, depending upon the concentrations of dangerous
4 waste constituents left in the units after excavation is completed. Landfill closure is precluded by the
5 RRES-6, MCRIS-6, and MCRIS-8 Alternatives because they do not include placement of a final cover
6 over the units. The MCRIS-7 Alternative may result in a modified closure or landfill closure decision
7 depending upon the concentrations of dangerous waste constituents left after excavation. Although
8 unlikely, a modified closure option may still be viable for the MCRIS-7 Alternative because capping of
9 these units may be required for purposes unrelated to closure of these units under [WAC 173-303-610](#),
10 i.e., protection of the groundwater from radiological contaminants remaining in soils below 3.0 m (10 ft).

11 **2.3 Closure Performance Standards**

12 The closure performance standards of [WAC 173-303-610](#)(2) require that the owner/operator of a TSD
13 unit close the unit in a manner that (1) minimizes the need for further maintenance; (2) controls,
14 minimizes, or eliminates postclosure escape of dangerous waste to the extent necessary to protect human
15 health and the environment; and (3) returns the land to the appearance and use of surrounding land areas.

16 **2.3.1 Minimize the Need for Further Maintenance**

17 The extent of future site maintenance depends on the closure option chosen for 1301-N and 1325-N
18 (i.e., modified, or landfill closure). Maintenance, monitoring, and inspections necessary to minimize the
19 need for further maintenance of the units under a modified or landfill closure option are defined in Permit
20 Attachment 41, Chapter 5.0.

21 **2.3.2 Control Dangerous Waste Escape to Protect Human Health and the Environment**

22 Closure activities defined in Permit Attachment 41, Chapter 4.0 will ensure the control of dangerous
23 waste during closure activities. Because these activities cannot be fully defined until a remedial
24 alternative is chosen through a ROD and remedial design is defined, these activities describe a range of
25 activities that may be undertaken in order to achieve modified or landfill closure. Closure activities will
26 meet the remedial action objectives for soils as defined in Permit Attachment 41, Chapter 3.0. Remedial
27 action objectives for contaminated groundwater associated with 1301-N and 1325-N operations are
28 defined in Permit Attachment 41, Chapter 4.0. These objectives are designed to protect both human
29 health and the environment.

30 **2.3.3 Return Land to Appearance and Use of Surrounding Area**

31 The appearance and use of 1301-N and 1325-N after closure will be consistent with the future use of the
32 100-N Area. Permit Attachment 41 defines two possible exposure scenarios: rural-residential and
33 modified CRCIA ranger/industrial. All alternatives include the commitment to revegetate the surface
34 soils.

35 **2.4 General Description of Units**

36 This section provides a general description of the 1301-N and 1325-N Liquid Waste Disposal Facilities.
37 This description is intended to provide an overview of these units.

38 The 1301-N and 1325-N surface soils and subsoils, including the UPR-100-N-31 spill, and associated
39 structures and piping that have been contaminated by dangerous waste constituents from these units are
40 subject to this [WAC 173-303](#) closure action.

41 The 1301-N and 1325-N units were the primary Liquid Waste Disposal Facilities for the N Reactor.
42 Wastes disposed included reactor coolant, spent fuel storage basin, and periphery cooling systems bleed
43 off. Also included were reactor primary coolant loop decontamination rinse solution and discharges from
44 building drains containing radioactive wastes generated in reactor support facilities. The 1301-N unit was
45 operated from December 1963 until September 1985. The 1325-N unit was operated from October 1983
46 until April 1991. From October 1983 to September 1985, both units were in operation.

1 For a general discussion on the N Reactor facility background and more in-depth description of these
2 units, refer to DOE/RL-96-39, Rev. 1A, Section 2.0.

3 **2.4.1 Topographical Maps**

4 General topographical maps for the area surrounding the 1301-N and 1325-N units are provided in
5 [Figures 2.1](#) and [2.2](#).

6 **2.4.2 Floodplain**

7 The U.S. Army Corp of Engineers has calculated the probable maximum flood based on the upper limit of
8 precipitation falling on a drainage area and other hydrologic factors such as antecedent moisture
9 conditions, snowmelt, and tributary conditions that could lead to a maximum runoff. The probable
10 maximum flood for the Columbia River below Priest Rapids Dam has been calculated to be
11 41 million L/s (1.4 million ft³/s). The floodplain associated with the probable maximum flood is shown
12 in Permit Attachment 33 (DOE/RL-91-28), General Information Portion, §2.2.1.4, Flood Plain Area. The
13 1301-N and 1325-N units would not be affected by the probable maximum flood.

14 **2.4.3 Traffic**

15 The majority of traffic inside the Hanford Site boundaries consists of light-duty vehicles used to transport
16 employees to work areas. The 1301-N and 1325-N units are located within the Hanford Controlled
17 Access Area where roadways cannot be accessed by the general public. These facilities are isolated from
18 the nearest public highway, State Highway 24, by approximately 6 km (4 mi). Vehicle traffic around the
19 units is restricted and is minimal, as the area is enclosed by a fenced with locked gates and is posted as a
20 radiation zone. DOE/RL-96-39, Rev. 1A, Section 2.4 provides additional details about the current
21 postings on the perimeter fence.

22 **2.4.4 General Hydrogeologic Conditions**

23 DOE/RL-96-39, Rev. 1A, Section 2.3.2 provides information on the geology and hydrogeology
24 underlying the 1301-N and 1325-N units.

25 **2.4.5 Physical Dimensions of the Units**

26 The 1301-N unit consists of a 16-m by 3.7-m (52- by 12-ft) weir box inside a 38- by 88-m (125-by 290-ft)
27 rectangular basin (crib). A zigzag extension trench, approximately 490 m (1,600 ft) long, 15 m (50 ft)
28 wide, and 3.7 m (12 ft) deep, was added to the crib.

29 The 1325-N unit includes a concrete header box inside a 73- by 76-m (240- by 250-ft) rectangular basin
30 (crib). A straight extension trench, approximately 914 m (3,000 ft) long, 16.8 m (55 ft) wide, and 3.0 m
31 (10 ft) deep, was also added to this crib.

32 **2.4.6 Design Capacity**

33 Both the 1301-N and 1325-N Liquid Waste Disposal Facilities were designed with a discharge capacity of
34 11,400 L/min (3,000 gal/min). The average flow rate was approximately 6,400 L/min (1,700 gal/min).

35 **2.4.7 Ancillary Equipment**

36 The 1301-N and 1325-N units are passive liquid waste disposal facilities that do not rely on active
37 systems for operations support. The units consist of transfer piping, concrete effluent distribution
38 structures, and soils to distribute liquid wastes.

39 **2.4.8 Containment Systems**

40 The 1301-N and 1325-N units do not include any containment systems.

41 **2.4.9 Structures and Piping Requiring Removal or Characterization as Clean**

42 The structures in the 1301-N and 1325-N Liquid Waste Disposal Facilities include concrete structures and
43 earthen basins and trenches.

44

1 The 1301-N unit consists of a 16- by 3.7-m (52- by 12-ft) weir box, a 38- by 88-m (125- by 290-ft)
2 rectangular basin (crib), and a zigzag extension trench, approximately 490 m (1,600 ft) long, 15 m (50 ft)
3 wide, and 3.7 m (12 ft) deep.

4 The 1325-N unit includes a concrete header box, a 73- by 76-m (240- by 250-ft) rectangular basin (crib),
5 a tie-in structure, and a straight extension trench, approximately 914 m (3,000 ft) long, 16.8 m (55 ft)
6 wide, and 3.0 m (10 ft) deep.

7 [Figure 2.1](#) shows the pipelines to be removed or characterized as clean between the 1722-N Building and
8 1301-N and between 1310-N and 1301-N. [Figure 2.2](#) shows the piping between the 1301-N Crib and the
9 1325-N Crib.

10 Refer to Permit Attachment 41, Chapter 4.0, Closure Activities, for a more in-depth discussion on the
11 removal of structures.

12 **2.4.10 Security**

13 The entire Hanford Site is a controlled-access area. The Hanford Site maintains around-the-clock
14 surveillance to restrict unauthorized access for the protection of the public and of government property,
15 classified information, and special nuclear materials. The Hanford Patrol maintains a continuous
16 presence of protective force personnel to provide Hanford Site security.

17 Within the Hanford Site are operational areas, including 100-N, to which access is restricted. There is a
18 staffed checkpoint at the Wye Barricade through which access to the 100-N Area is allowed only to
19 authorized personnel. Authorized personnel are those individuals with a DOE-issued security
20 identification badge indicating the appropriate authorization. Such personnel are subject to a search of
21 items carried into or out of controlled areas.

22 **2.5 Waste Characteristics**

23 **2.5.1 Liquid Waste Discharges**

24 The wastes disposed in 1301-N and 1325-N were generated from N Reactor operations. The waste
25 streams included the following:

- 26 • Reactor coolant system bleed off.
- 27 • Spent fuel storage basin cooling water overflow.
- 28 • Reactor periphery cooling systems bleed off.
- 29 • Reactor primary coolant loop decontamination rinse solution.
- 30 • Building drains serving reactor support facilities.

31 The combination of these waste streams resulted in an average flow of approximately 6,400 L/min
32 (1,700 gal/min). Results of influent sampling and analysis ([Table 2.1](#)) did not indicate the characteristics
33 of a dangerous waste.

34 **Reactor primary coolant system.** The reactor primary coolant system was supplied by demineralized
35 water with chemicals added for water quality control (QC). Ammonium hydroxide was used for pH
36 control and was injected at a concentration of approximately 40 ppm to maintain a pH of 10.2 to
37 10.4 standard units. Hydrazine was introduced for oxygen control at a concentration of 0.04 ppm.

38 **Fuel storage basin cooling water.** The spent fuel storage basin was supplied by filtered water with
39 chlorine added as an algaecide. A trace amount of residual chlorine was maintained to ensure complete
40 treatment.

1 **Reactor periphery cooling systems.** Reactor periphery cooling systems that discharged bleed-off wastes
2 to 1301-N and 1325-N include the following:

- 3 • Graphite and shield cooling.
- 4 • Reactor control rod cooling.
- 5 • Reactor secondary coolant loop.

6 As with other reactor, cooling systems, bleed off and spillage from the periphery cooling systems resulted
7 in small continuous discharge.

8 **Graphite and Shield Cooling.** The graphite and shield cooling system was supplied by demineralized
9 water with chemicals added for water QC. Ammonium hydroxide was injected at a concentration of
10 approximately 40 ppm to maintain a pH of 10.0 to 10.2 standard units. Hydrazine was injected for
11 oxygen control at a concentration of 0.04 ppm.

12 **Reactor Control Rod Cooling.** The reactor control rod cooling system was supplied by demineralized
13 water with chemicals added for water QC. Ammonium hydroxide was injected at a concentration of
14 approximately 40 ppm to maintain a pH of 7.0 standard units. Hydrazine is injected for oxygen control at
15 a concentration of 0.15 ppm.

16 **Reactor Secondary Coolant Loop.** The reactor secondary coolant loop was supplied by demineralized
17 water with chemicals added for water QC. Morpholine was injected at a concentration of approximately
18 4 ppm to maintain a pH of 8.6 to 9.2 standard units. Hydrazine was injected for oxygen control at a
19 concentration of 1 ppm or less.

20 **Reactor primary coolant loop decontamination.** The reactor primary coolant loop was decontaminated
21 every 2 to 4 years. The decontamination solution consisted of 79,500 L (21,000 gal) TURCO 4512-A™
22 (70% phosphoric acid) and 136 to 181 kg (300 to 400 lb) of diethylthiourea. This solution was diluted to
23 an 8 wt% phosphoric acid solution as it entered the reactor coolant loop.

24 After the pH of the rinsate was verified between 6.0 and 9.0 standard units, the final rinse solution
25 containing approximately 378,500 L (100,000 gal) of demineralized water was discharged. The
26 calculated phosphoric acid released per decontamination was 5.7 L (1.5 gal), and the calculated amount of
27 diethylthiourea was 2.3 g (0.0051 lb).

28 **Building drains.** The radioactive drain system collected radioactive water from throughout the 109-N
29 and 105-N Buildings. Pump leakage, system bleed off from the reactor primary and periphery cooling
30 systems, laboratories, decontamination activities, and other routine activities were drained to 1301-N and
31 1325-N via this system.

32 Three of the waste streams exhibited characteristics of a dangerous waste at the point of generation.
33 These were leaks and spills from the auxiliary power battery lockers, hydrazine mixing spills, and
34 laboratory wastes. Each of these wastes contained contaminants that are designated dangerous wastes
35 under [WAC 173-303-090](#). However, sampling of the 1301-N and 1325-N influent ([Table 2.1](#)) did not
36 identify characteristics of a dangerous waste at the point of discharge into 1301-N and 1325-N.

37 **Wastes from Chemical Analyses.** Chemical analyses were performed in laboratories to determine
38 hydrazine, ammonia, chloride, and fluoride concentrations in reactor coolant. Waste characterization
39 indicated that approximately 9,800 L/yr (2,600 gal/yr) contained constituents designated as dangerous
40 wastes under [WAC 173-303-090](#).

41 **Auxiliary Power Battery Lockers.** Spills and leaks from the auxiliary power battery lockers contributed
42 300 to 450 L/yr (80 to 120 gal/yr) of waste from nickel-cadmium and lead-acetate batteries. It is
43 estimated that approximately 40% of the spilled material was from nickel-cadmium batteries and 60%
44 from lead-acetate batteries.

45 **Hydrazine Mixing and Injection Area Floor Drains.** Hydrazine spills from mixing and injection
46 activities entered the radioactive drain system. Spills were very small in volume and, in the case of the
47 mixed solution, were extremely dilute.

- 1 Approximately 160 kg (350 lb) of hydrazine was spilled yearly in this manner.
- 2 **2.5.2 Liquid Waste Discharge Chronology**
- 3 A chronology of liquid waste discharges to 1301-N and 1325-N is provided in [Table 2.2](#).

Table 2.1. 1301-N and 1325-N Effluent Analysis

Parameter (MDL)	Sample			
	1	2	3	Average
pH (standard units)	6.58	6.56	6.97	6.70
Conductivity (micromhos)	148	155	190	164
Mercury (.001 ppm)	ND	ND	ND	ND
Ethylene glycol (10 ppm)	ND	ND	ND	ND
Enhanced thiourea (.2 ppm)	ND	ND	ND	ND
TOC (1 ppm)	0.0018	0.002	0.002	0.0019
Cyanide (.01 ppm)	ND	ND	ND	ND
Barium (.006 ppm)	0.03	0.027	0.027	0.028
Cadmium (.002 ppm)	ND	ND	ND	ND
Chromium (.01 ppm)	ND	ND	ND	ND
Lead (.03 ppm)	ND	ND	ND	ND
Silver (.01 ppm)	ND	ND	ND	ND
Sodium (.1 ppm)	1.831	1.819	1.781	1.810
Nickel (.01 ppm)	ND	ND	ND	ND
Copper (.01 ppm)	ND	ND	ND	ND
Vanadium (.005 ppm)	ND	ND	ND	ND
Antimony (.1 ppm)	ND	ND	ND	ND
Aluminum (.15 ppm)	ND	ND	ND	ND
Manganese (.005 ppm)	ND	ND	ND	ND
Potassium (.1 ppm)	0.647	0.608	0.606	0.620
Iron (.05 ppm)	0.081	0.077	0.050	0.069
Beryllium (.005 ppm)	ND	ND	ND	ND
Osmium (.3 ppm)	ND	ND	ND	ND
Strontium (.3 ppm)	ND	ND	ND	ND
Zinc (.005 ppm)	ND	ND	ND	ND
Calcium (.05 ppm)	14.40	13.97	14.05	14.14
Nitrate (.5 ppm)	ND	ND	ND	ND
Sulphate (.5 ppm)	12.41	11.53	11.97	11.97
Fluoride (.5 ppm)	ND	ND	ND	ND

Table 2.1. 1301-N and 1325-N Effluent Analysis

Parameter (MDL)	Sample			
	1	2	3	Average
Chloride (.5 ppm)	1.57	1.48	1.53	1.53
Phosphate (1 ppm)	ND	ND	ND	ND
Phosphorus Pesticides (.005 ppm)	ND	ND	ND	ND
Chlorinated Pesticides (.001 ppm)	ND	ND	ND	ND
Enhanced ABN List	ND	ND	ND	ND
Citrus Red (1 ppm)	ND	ND	ND	ND
Arsenic (.005 ppm)	ND	ND	ND	ND
Ammonium Ion (.05 ppm)	ND	ND	ND	ND
Coliform (3 MPN)	---	0.023	0.009	0.016
Selenium (.005 ppm)	ND	ND	ND	ND
Thallium (.01 ppm)	ND	ND	ND	ND

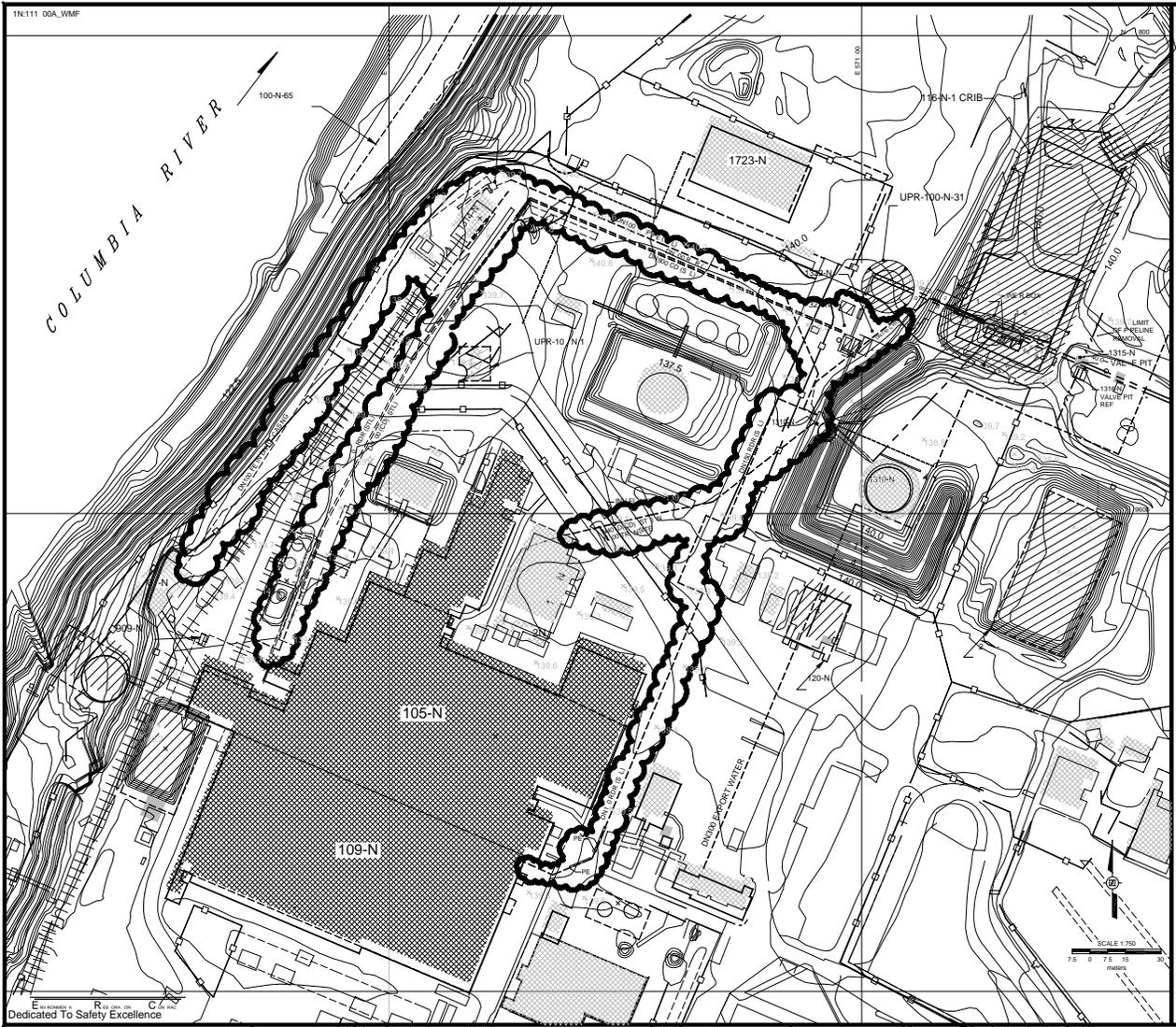
ND = Not Detected MDL = Minimum Detection Limit Data obtained from samples taken August 1985 Diediker and Hall. (1987)

Table 2.2. Chronology of Liquid Waste Discharges

Year	Liquid Waste Discharge to 1301-N Liquid Waste Disposal Facility (L/day)	Liquid Waste Discharge to 1325-N Liquid Waste Disposal Facility (L/day)
1964	9,462,500*	0
1965	9,462,500*	0
1966	9,462,500*	0
1967	9,462,500*	0
1968	9,462,500*	0
1969	9,462,500*	0
1970	9,462,500*	0
1971	9,462,500*	0
1972	9,462,500*	0
1973	8,702,000	0
1974	9,500,000	0
1975	9,500,000	0
1976	9,900,000	0
1977	14,500,000	0
1978	12,500,000	0
1979	13,500,000	0
1980	12,500,000	0
1981	10,500,000	0
1982	10,500,000	0
1983	6,942,000	1,960,000
1984	8,100,000	1,900,000
1985	7,200,000	2,800,000
1986	0	7,250,000
1987	0	2,100,000
1988	0	1,660,000
1989	0	1,660,000
1990	0	1,660,000
1991+	0	0

¹WHC-SD-ER-TA-001, Rev. 0 (WHC 1991).

*There are no reliable data available for average flow rates and effluent discharge rates for 1301-N. Estimates based on discharge volumes from 1973 to 1976 were used for 1964 through 1972. Data for 1973 through 1989 were taken from the yearly effluent release reports.



1 **Figure 2.2. 116-N-1 Crib Influent Piping to be Rescheduled for Remediation**

2 Legend

3  116- N-1 Crib influent piping to be rescheduled for remediation

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