CHAPTER 4.0
CLOSURE ACTIVITIES

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FIGURES

TABLES

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4.0 CLOSURE ACTIVITIES

The physical activities required to close 1324-N and 1324-NA in accordance with WAC 173-303-610 and the Permit will be integrated with the ROD for DOE/RL-96-39, Rev. 1 and the 100-NR-1/100-NR-2 corrective measure study. Closure activities necessary to comply with dangerous waste regulations and the Permit will need to be consistent with CERCLA activities. CERCLA activities will be required to include elements necessary for closure of a dangerous waste unit.

4.1 Removal of Structures

There will be no remediation excavation in the 1324-N/NA earthen basins for closure, but the Hypalon™ liner and leak detection systems in the 1324-N Surface Impoundment will be removed, using conventional excavation equipment, and disposed as noncontaminated waste. In addition, the sampling shed and perimeter fence will be removed. The structures are discussed in DOE/RL-96-39, Rev. 1, Section 2.4.4. DOE/RL-96-39, Rev. 1, Figure 2-29 shows the surface impoundment, sampling shed and perimeter fence.

The Hypalon™ liner, sampling shed, perimeter fence, and signage will be demolished and removed using conventional demolition/earthmoving equipment. The demolished components will be disposed of in an appropriate non-hazardous disposal facility or recycled as scrap, as appropriate.

4.2 Piping Removal or Characterization as Clean

Should a determination be made that piping associated with the units may be able to meet clean closure standards and be left in place, the determination will then be submitted to Ecology for its concurrence. This determination may be based on process knowledge, sampling, or both. Specific sampling requirements will be developed after the ROD and during the remedial design phase of the remedial action. Where piping cannot be determined to be clean, the influent pipelines between the 163-N facility and the 1324-N/NA units will be excavated and removed for disposal as scrap metal destined for recycling. Should piping not be appropriate for recycling, it will be sampled to determine its regulatory status and treated and disposed of accordingly. This piping is shown in DOE/RL-96-39, Rev. 1, Figure 2-28. DOE/RL-96-39, Rev. 1, Appendix D provides the reference maps and estimated pipe lengths.

If removal of the buried pipelines is required, they will be unearthed by conventional excavation equipment. The exposed piping will be segmented for removal manually or with the excavation equipment. Contamination controls will focus on the drainage of residual fluids in the piping prior to, and during, segmentation and on the control of airborne contamination during cutting and pipe handling operations. After the piping has been removed, the pipe bedding soil will be surveyed for residual contamination, excavated, and disposed as necessary.

4.3 Evaluation of Soil Data

4.3.1 Sampling and Analysis

Soil samples associated with the vadose zone at 1324-N and 1324-NA were collected from two boreholes and one test pit in late 1992 and early 1993. The test pit was excavated in the 1324-NA percolation pond, and samples were collected from the surface to 21.3 m (70 ft) in 1.5-m (5-ft) intervals. Samples from borehole 199-N-88 were collected from the surface to 21.9 m (72 ft), and samples from borehole 199-N-89 were collected from the surface to 23.2 m (76 ft). All the borehole samples were collected in approximately 1.5-m (5-ft) intervals, and composited over 0.15- to 0.76-m (0.5- to 2.5-ft) intervals. A total of 53 samples were collected from the three areas. Figure 4.1 contains a map showing the sample locations.

Data for ICP metals, mercury, cyanide, pH, and anions are presented in DOE/RL-96-39, Rev. 1, Attachment B-4. Analyses for organic constituents were also performed, but none of these were present above detection limits; thus, they will not be discussed further. The following sections use these data to

evaluate whether the activities that occurred at 1324-N and 1324-NA have impacted the vadose zone soils.

Samples collected from the test pit and borehole 199-N-88 provide data on vadose zone soil composition beneath 1324-NA and the South Settling Pond, respectively. If significant amounts of contamination were deposited in the vadose zone under these two ponds, the data presented here would likely show evidence of this contamination. Borehole 199-N-89 is located to the northwest of 1324-N. Because of the boreholes location, using data from it to assess dangerous waste in the vadose zone is questionable.

4.3.2 Assessment of Contamination

In order to evaluate if 1324-N and 1324-NA have released contamination into the vadose zone, the data described above were statistically summarized and compared to background levels for the Hanford Site. Background is allowed as a default cleanup level in most environmental regulations (e.g., WAC 173-303, WAC-173-340), which recognize that background levels are rarely detrimental to human health or the environment and that remediating to levels below background concentrations is futile. The comparison with background values follows the methodology recommended by Ecology (Ecology 1992).

Table 4.1 lists the upper 95% confidence limit on the mean of the data from the units, as well as other statistical values. The data were determined to follow a log normal distribution, so the statistics were calculated on that basis.

Table 4.2 presents the evaluation of the data compared to background, using the three-part test recommended by Ecology. The data pass the first part of the test, which compares the background value at the 90th percentile to the 95% upper confidence level on the mean of the waste site data. Using this comparison, the data are below background for all analytes.

The second and third parts of the Ecology test evaluate frequency and magnitude of exceedences of the data above comparison criteria levels (background, in this case). The allowable frequency of exceedences for comparison to background is determined by using the binomial theorem to calculate the probability that a single sample is greater than background at a probability of 0.10. This calculation requires knowledge of the percentile chosen for background (0.90), the number of samples from the units (53), and the exceedence frequency (0.10). Using this criterion, a maximum of eight exceedences is allowed. Copper is the only analyte that has a significant number of exceedences (seven samples; see Table 4.2), and it is below the maximum number permitted.

The third part of the Ecology test requires that the largest value from the waste site data be less than two times the cleanup level. As seen in DOE/RL-96-39, Rev. 1, Attachment B-4, none of the analytes exceed this criterion.

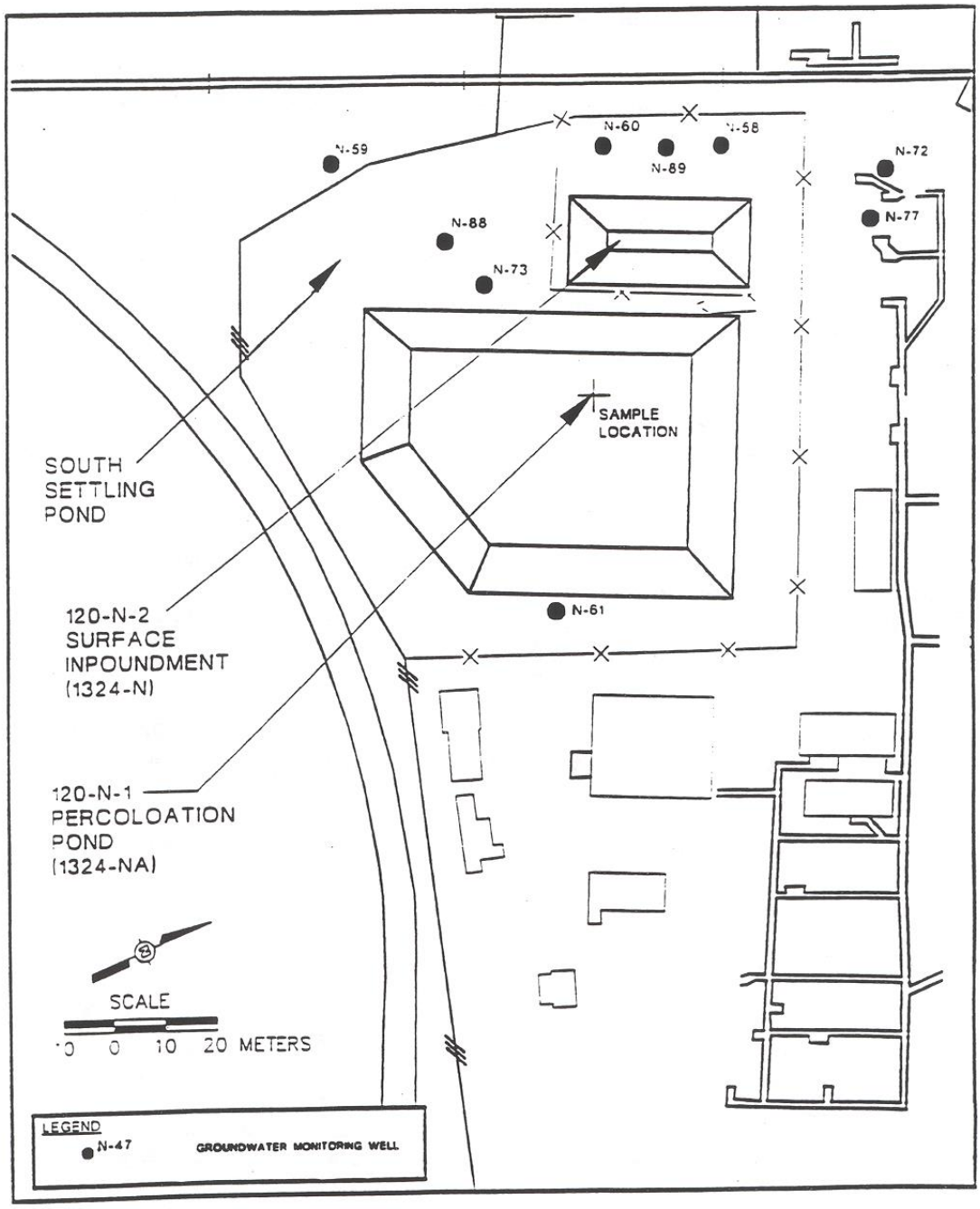

Figure 4.1. Sample Locations for 1324-N and 1324-NA Soil Data

Table 4.1. Statistical Summary of Data from 1324-N/1324-NA/South Settling Pond TSD

	Geo. Mean	Min	Max	N	90th Percentile	95% UCL on Mean
Antimony[a]	3.04	1.70	6.35	53	5.14	3.66
Arsenic	1.05	0.37	3.5	53	2.03	1.37
Barium	48.43	16.80	93.7	53	72.61	54.99
Chromium	4.56	0.65	14.6	53	13.28	8.23
Cobalt	8.12	1.05	15.8	53	16.09	10.78
Copper	14.06	2.60	31.5	53	27.36	18.45
Fluoride	1.14	0.30	3.2	53	2.17	1.47
Lead	2.76	1.50	6.4	53	4.54	3.28
Manganese	213	73.80	702	53	341.81	250
Mercury	0.038	0.02	0.37	53	0.10	0.061
PH	8.10	5.6	9.8	53	9.76	8.42
Nickel	7.40	2.08	17.6	53	12.13	8.77
Selenium[a]	0.60	0.21	2.5	53	1.17	0.79
Sulfate	32.81	6.00	135	53	77.37	49.41
Vanadium	33.02	3.70	81.1	53	80.45	50.96
Zinc	34.74	6.80	94.4	53	67.80	45.66

[a] Background values for these analytes were below detection limit; highest detection limit reported by the laboratory is used. UCL = Upper Confidence Limit

Table 4.2. Comparison of TSD Soil Data to Background

	Average	Upper 95 UCL on Mean	Background, 90th percentile	# of data > BG	% of data > BG	Max value/ background
Antimony	3.29	3.66	11.1	0	0.0	0.57
Arsenic	1.20	1.37	6.47	0	0.0	0.54
Barium	50.68	54.99	132	0	0.0	0.71
Chromium	6.00	8.23	18.5	0	0.0	0.79
Cobalt	9.07	10.78	15.7	1	1.9	1.01
Copper	15.70	18.45	22	7	13.2	1.43
Fluoride	1.28	1.47	2.81	3	5.7	1.14
Lead	2.99	3.28	10.2	0	0.0	0.63
Manganese	227	250	512	1	1.9	1.37
Mercury	0.05	0.06	0.33	1	1.9	1.12
Nickel	7.92	8.77	19.1	0	0.0	0.92
Selenium	0.70	0.79	5	0	0.0	0.50
Sulfate	40.69	49.41	237	0	0.0	0.57
Vanadium	39.40	50.96	85.1	0	0.0	0.95
Zinc	38.85	45.66	67.8	4	7.5	1.39

UCL = Upper Confidence Limit

4.3.3 Summary and Recommendations

The data presented here strongly indicate that the vadose zone under 1324-N, 1324-NA, and the South Settling Pond has concentrations of metals indistinguishable from background compositions. The data used to lead to this conclusion were obtained from samples located in areas expected to record adverse impacts from the units. An exception to this is the lack of data from samples that may have been influenced by an overflow of the North Settling Pond. There are some indications that this event may have occurred and that standing water was present in the northern portion of the units. To evaluate any impacts from an event of this kind, two samples will be collected from the northern part of the units and

analyzed for metals, pH, and sulfate. The location of the samples will be determined and agreed upon by all parties involved in the closure decisions.

4.4 Waste Management

Closure of the 1324-N and 1324-NA units may generate small quantities of clean or contaminated nonradioactive debris. Disposal of these wastes will be dependent upon their level of contamination. It is doubtful that dangerous waste will be generated during cleanup of these units, however, should dangerous waste be generated, its management will occur in compliance with WAC 173-303. Waste generated as part of this closure activity will be managed and disposed of in such a way as to ensure protection of human health and the environment.

Waste generation, management, and disposal will be conducted in accordance with operational procedures and with all State, Federal, and DOE Orders and regulations dealing with waste, including agreements with the public and stakeholders.

4.5 Site Restoration

After the system structures and piping have been removed or they have been characterized as clean, the earthen basins will be backfilled, regraded, and revegetated in a manner consistent with the prior site condition.

4.6 Personnel Training

No radioactive or dangerous waste constituent hazards are expected to be encountered during closure activities at 1324-N and 1324-NA, nor are dangerous wastes expected to be generated. However, should hazards be encountered or dangerous waste be generated that were not anticipated, training will be provided to site personnel in accordance with the site-specific training plan contained in DOE/RL-96-39, Rev. 1, Attachment B-5.

Training required during closure activities for personnel involved in the groundwater-monitoring program are the same as those identified in Attachment 42, Chapter 5.0, §5.5 the Postclosure Plan.

4.7 Closure Contact

The DOE-RL will be the official contact during the postclosure period at the following address:

Director, Office of Environmental Services*
U.S. Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

*or its equivalent should there be a future reorganization at DOE-RL

4.8 Closure Schedule

The closure schedule for 1324-N (120-N-2) and 1324-NA (120-N-1) is presented in Figure 4.2. Closure activities (actual cleanup) for the 120-N-1 and 120-N-2 will begin in July 2001 and will continue for an approximate duration of 15 months. The corrective action schedule of compliance for 100-N-58 will be the same as the closure schedule.

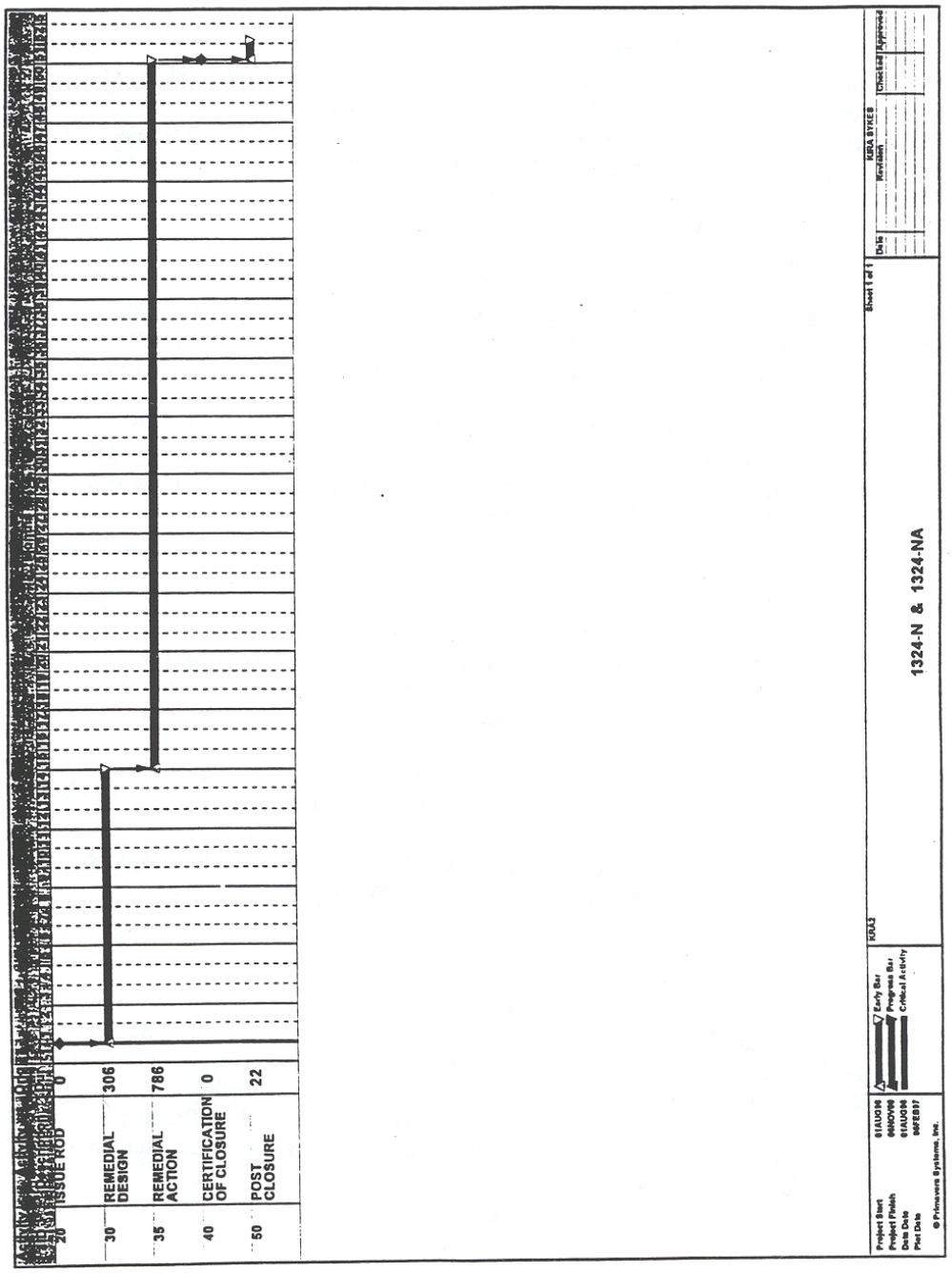

Figure 4.2. Closure Schedule for 1324-N and 1324-NA

4.9 Amendment of Closure Plan

The 1324-N and 1324-NA closure plan will be amended whenever changes in closure activities or postclosure requirements occur and prior to certification of closure and postclosure, respectively, that would constitute a Class 1, 2, or 3 modification to the Permit (WAC 173-303-830).

4.10 Certification of Closure

In accordance with WAC 173-303-610(6), within 60 days of closure of 1324-N and 1324-NA, RL will submit to Ecology a certification of closure signed by both RL and an independent registered professional engineer. The certification will specify that the units have been closed in accordance with specifications contained within the approved closure plan as contained in the Permit.

4.11 Survey Plat and Notice in Deed

A survey plat will be submitted by RL to the Benton County Planning Department no later than 60 days after certification of closure of each unit in accordance with WAC 173-303-610(10). Also, a notice in deed will be submitted by RL to the Auditor of the Benton County no later than 60 days after certification of closure of each unit in accordance with WAC 173-303-610(10). After submitting this notice, a certification signed by the Permittees will be submitted to Ecology stating that notification has been recorded along with a copy of the notice in deed. The notice in deed will specify the type, location, and quantity of dangerous wastes remaining after closure actions have been completed.

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