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Rev. 0

100-B Area Technical Baseline Report

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Waste Management

Westinghouse
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7. Abstract

This document supports the environmental remediation effort of the 100-B Area by providing remediation planners with key data that characterize the 100-B and 100-C Reactor sites. It provides operational histories of the 100-B and 100-C Reactors and each of their associated liquid and solid waste sites.

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1.0 INTRODUCTION

This document is prepared in support of the Environmental Restoration program at the U.S. Department of Energy's (DOE) Hanford Site near Richland, Washington. It provides a technical baseline and characterization of waste sites located at the 100-B Area and results from an environmental investigation undertaken by the Westinghouse Hanford Company (WHC) History Office in support of the Environmental Restoration Engineering Function. It is based on the review and evaluation of numerous Hanford Site current and historical reports, drawings, and photographs, supplemented by site inspections and employee interviews. No intrusive field investigation or sampling was conducted.

The 100-B Area is made up of three operable units. Two of these, 100-BC-1 and 100-BC-2, are addressed in this report and include liquid and solid waste disposal sites in the vicinity of the 100-B and 100-C Reactors. The third operable unit, 100-BC-5, is concerned with groundwater and is not addressed here. Waste sites described in this report include cribs, trenches, pits, french drains, retention basins, solid waste burial grounds, septic tanks, and drain fields. Each is described separately, and photographs have been included when available. Appendix A contains a list of photographs used throughout the document.

A comprehensive environmental summary for the area is not provided in this report. However, an excellent summary may be may be found in *Hanford Site National Environmental Policy Act (NEPA) Characterization*, which describes the geology and soils, meteorology, hydrology, land use, population, and air quality of the Hanford Site (Cushing 1988).

2.0 BACKGROUND

2.1 GENERAL DESCRIPTION OF THE 100-B AREA

Nine uranium-fueled, graphite-moderated, and water-cooled plutonium production reactors were constructed by the U.S. Government along the Columbia River, at the Hanford Site, during the 20-year period from 1943 to 1963. All nine are owned and managed by the DOE. The reactors are retired from service and have been declared surplus by DOE; all except the 100-N Reactor are currently available for decommissioning (DOE 1992).

The 100-B Area includes two of these reactors, 100-B and 100-C, with their associated water treatment facilities, laboratories, administrative space, and various other buildings. A total of 47 buildings were located in this area. Figure 2-1 is a historical photograph that was taken of the 100-B Area in January 1955. Most 100-B Area buildings are fully deactivated, and some are currently being decommissioned. Figure 2-2, for example, shows a 1993 photograph of the demolition of the 190-B Building. A portion of the water treatment plant continues in operation to provide potable water to the 200 Areas, and the 151-B Electrical Substation continues to provide power. Few personnel are assigned to the area. Boaters and sports fishermen frequent the Columbia River adjacent to the site, but they are legally prohibited from trespassing.

Radiological and chemical wastes were generated in the process of reactor operation. Most of these wastes were disposed of at the 100-B Area in 79 waste sites, including cribs, trenches, burial grounds, retention basins, dry wells, in situ burial sites, and undocumented or suspect waste sites.

The area is divided into three operable units: 100-BC-1, 100-BC-2, and 100-BC-5. Operable units 100-BC-1 and 100-BC-2 are addressed in this document. Because the 100-BC-5 Operable Unit is a groundwater unit, it is beyond the scope of this document and is not discussed.

2.2 AREA HISTORY

The area included in and adjacent to the 100-B Area was used for livestock grazing prior to its acquisition by the U.S. Army in January 1943. Irrigated orchards and homesteads were located nearby to the west and northwest, but none are known to have been located within the 100-B Area boundaries.

The nearest homestead was located about 1 mi to the northwest and was a "1910-1943 farmstead," now characterized by furrowed fields, buried and exposed wooden irrigation water lines, heaps of field cobbles, and concentrations of domestic debris. Heavy equipment disturbance is evident over much of the farm site.

Anciently, the area along the banks of the Columbia River in the area of the Hanford reactors was a favorite camping and village site for northwestern Indian tribes, including the Wanapums and Yakima people of the Chamnapum band,

Figure 2-1. 100-B Area, Looking Northwest, January 1955.

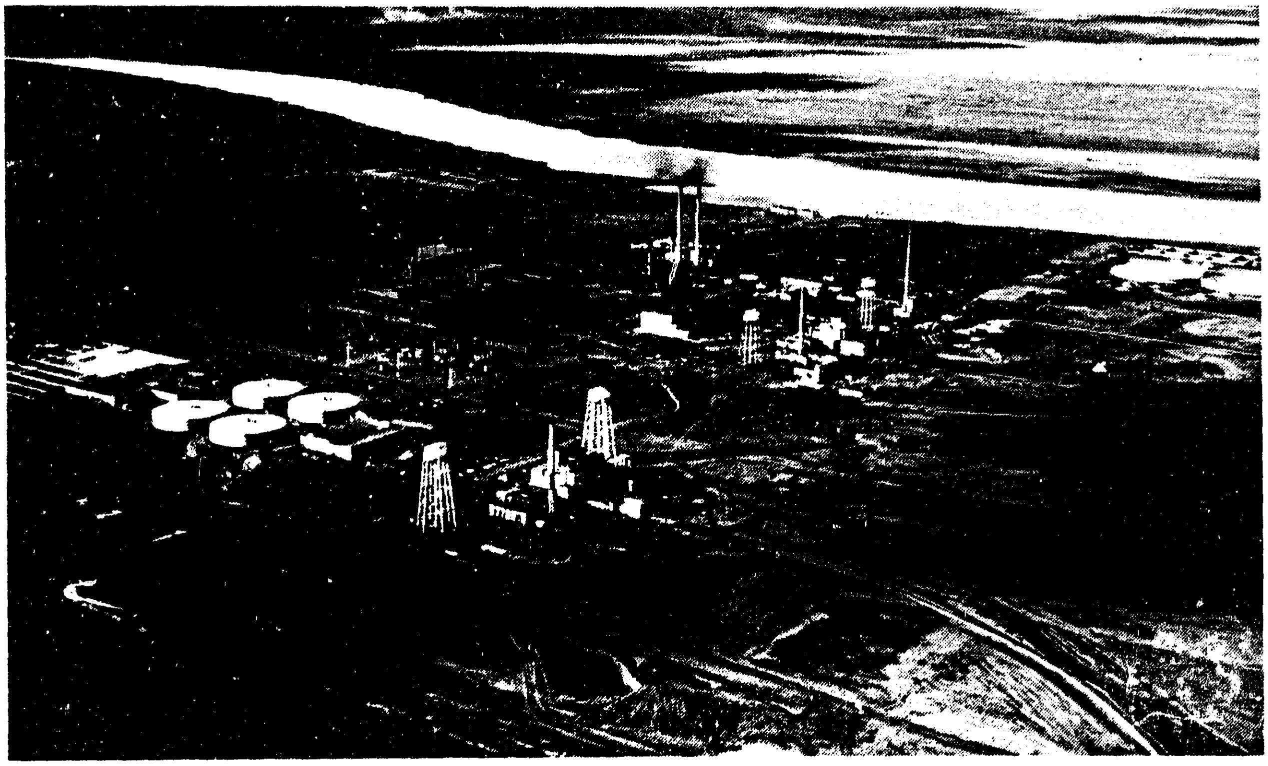
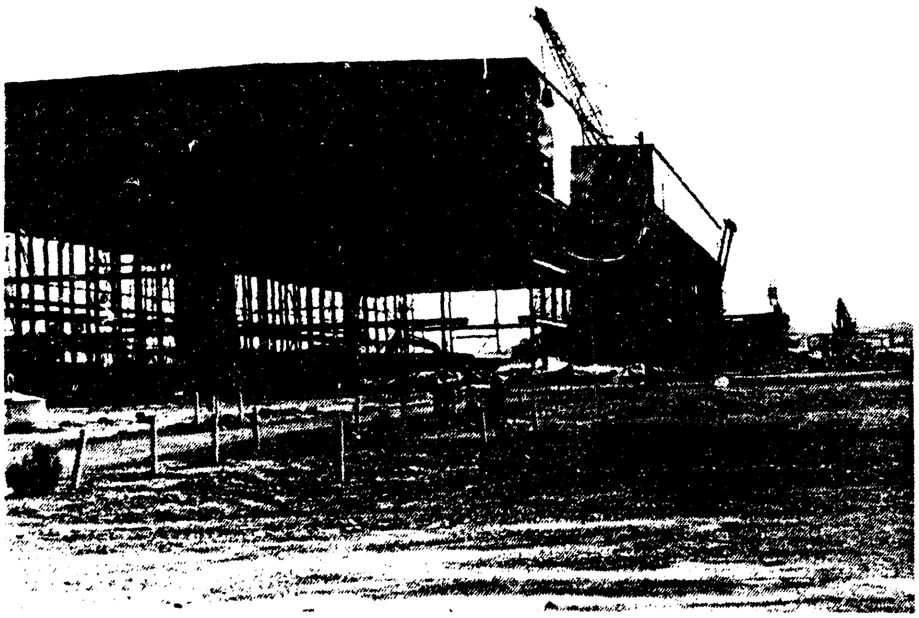


Figure 2-2. 190-B Building Demolition, August 1993.



the Palus people, and the Walla Walla and Umatilla people. Since the advent of dams and reservoirs elsewhere on the Columbia River system, the Hanford Site riverbanks comprise the most archaeologically rich area in the western Columbia Plateau.

Although situated in this culturally rich portion of the plateau, the 100-B Area is, relatively, culturally poor. Only two prehistoric archaeological sites are located within 2 km of the 100-B Area, and just one of those two is within the confines of the operable units (Cushing 1988). That site is identified by Pacific Northwest Laboratory (PNL) as site number 45BN446 and is located east of the 181-B Pumphouse, on the terrace edge just above the riverbank and among gravels of the exposed riverbank below. Visible cultural materials include a scatter of firecracked rock, flakes, and net weights along the shoreline. Shell fragments may be found in ant hills, indicating the presence of buried deposition along the terrace edge and slope (Chatters et al. 1992). All archaeological sites are included in the Locke Island archaeological district (Relander 1956).

2.3 REACTOR DESCRIPTION AND HISTORY

100-B Reactor was the first of three reactors constructed in 1943 and 1944 as part of the U.S. Army Corps of Engineers Manhattan Project. Completed in only 15 months, the reactor produced the plutonium that fueled the world's first atomic explosion at Alamagordo, New Mexico, and the weapon that destroyed Nagasaki, Japan, to hasten the end of World War II. Refer to Figure 2-3 for a historical photograph that was taken of the reactor in January 1955. The 100-B Reactor has been listed on the National Register of Historic Places and as a National Mechanical Engineering Landmark (Cushing 1992). A community effort is currently under way to utilize the 100-B Reactor as a reactor museum.

Operating initially at 250 megawatts (thermal) of power, 100-B Reactor power levels were gradually increased over the years until 2,090 megawatts was authorized in 1961. Operations continued at approximately that level until deactivation in 1968. The reactor has continued in deactivated status since that year.

The reactor was thought to be nearing the end of its effective operational life in early 1946, due to growth and distortion of its graphite core. As a result, the reactor was removed from operation from March 1946 to June 1948. Improved technologies permitted its continued use after 1948.

The 100-C Reactor was Hanford's sixth production reactor. Its construction began in June 1951 and was completed in November 1952. Refer to Figure 2-4 for a historical photograph that was taken of the 105-C Reactor Building under construction in September 1951. Also, refer to Figure 2-5 for another historical photograph that was taken of the reactor and support facilities in October 1952, shortly before construction was finished. The reactor initially operated at 650 megawatts, but its power level was increased over time to 2,360 megawatts. It operated until April 1969 and has remained in deactivated status since then.

A historical photograph of the 100-C Reactor graphite layup, taken in April 1952, is provided as Figure 2-6.

Figure 2-3. 105-B Reactor Building and Support Facilities, January 1955.

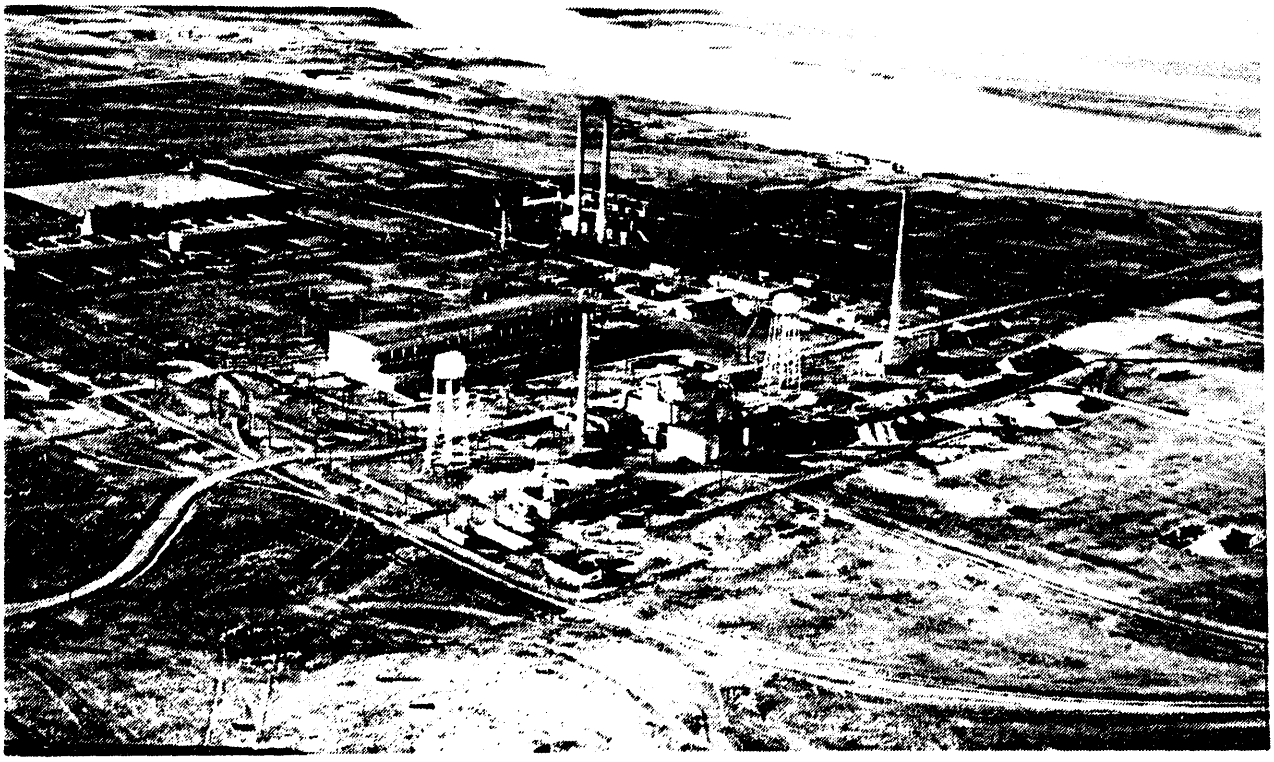


Figure 2-4. 105-C Reactor Building Under Construction, September 1951.

Figure 2-5. 105-C Reactor Building and Support Facilities, October 1952.

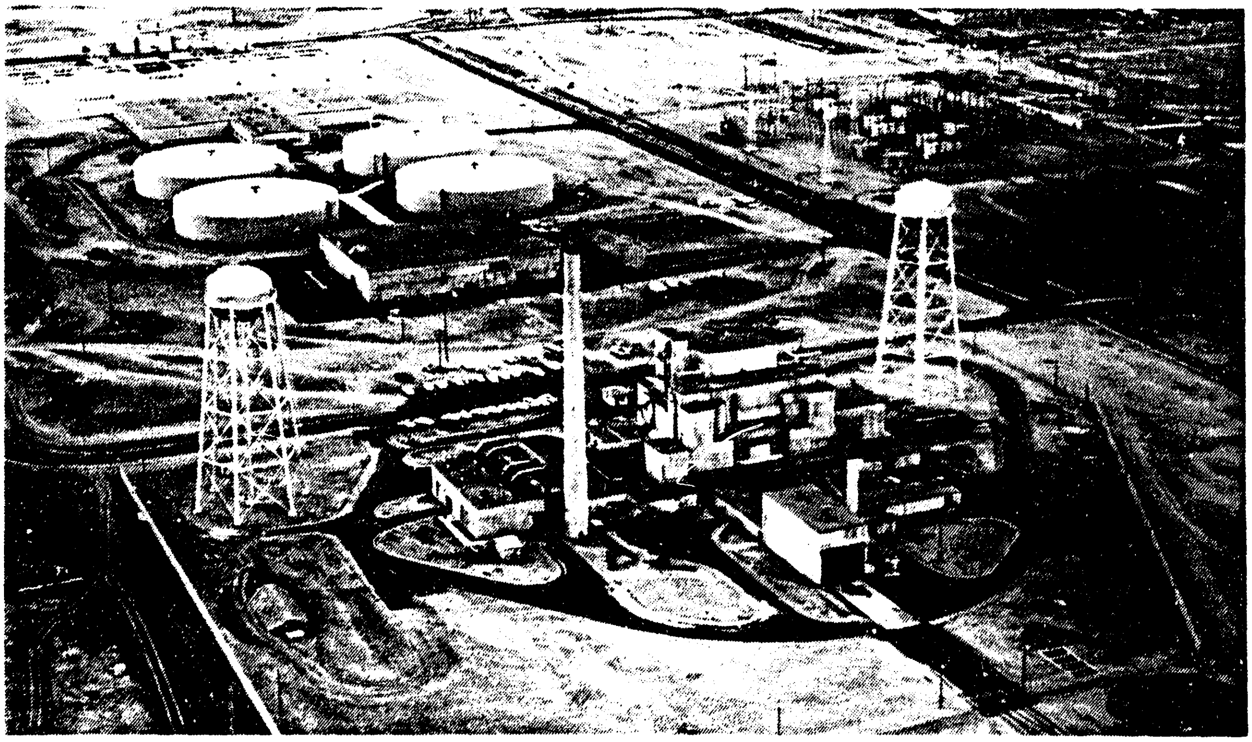


Figure 2-6. 105-C Reactor Building Graphite Layup, April 1952.

The construction of the 100-C Reactor necessitated modifications and additions to the 181-B River Pumphouse, the 184-B Powerhouse, and the 100-B Water Treatment Plant.

2.3.1 Reactor Cooling Water Effluent and Other Liquid Wastes

Liquid effluents generated from reactor operations consisted primarily of reactor cooling water, fuel storage basin water, and decontamination solutions. In terms of potential impact on the groundwater, these effluents are thought to be the most significant wastes in the 100-B Area. Millions of liters of this waste are thought to have been disposed of directly to the soil column, both intentionally and as a result of leaks in the cooling water system (DOE-RL 1992).

A continuous supply of high-quality cooling water was essential to reactor operations. Both reactors had their own water treatment plants. At a daily use rate of between 177 and 246 million gallons, this system generated the largest liquid waste volume in the area.

Cooling water was obtained from the Columbia River and was extensively treated before passing through the reactor. Settling, chemical treatment, filtering, and pH management were utilized to purify and prepare the water. The water circulated in a single pass through the reactor process tubes, cooling tubes imbedded in the thermal shield, and the reactor horizontal control rods.

While passing through the reactor, the water absorbed thermal energy from the nuclear process and became radioactively contaminated. Sources of contamination included the following.

- The high neutron flux in the reactor core activated any minerals or other elements that had not been filtered out of the cooling water. This created species such as ^{41}Ca, ^{51}Cr, and ^{65}Zn. Most of the species were relatively short-lived and have since decayed to negligible levels. Calcium-41 is a notable exception.

- Activation products from the graphite reactor cores, other reactor components, and fuel cladding were picked up and transported by the cooling water. Significant species included tritium, ^{14}C, ^{60}Co, ^{63}Ni, and ^{152}Eu, ^{154}Eu, and ^{155}Eu.

- Fuel element fission products such as ^{90}Sr and ^{137}Cs, and transuranics such as $^{239/240}$Pu, were sometimes introduced into cooling water due to fuel cladding failures.

The concentrations of radionuclides in reactor cooling water were low during normal operations, with an approximated activity of 0.2 μCi/L (Parker 1947).

Cooling water passed through the reactor core at a rate of 51,000 gal/min for the 100-B Reactor and 72,000 gal/min for the 100-C Reactor until 1957, when the flows were increased to 71,000 gal/min and 100,000 gal/min, respectively. Exiting the reactor at a temperature of 90 to 95 °C, the water passed into a retention basin, where it was held for 2.5 to

4.0 h to allow thermal cooling and the radioactive decay of short-lived radionuclides (Gerber 1993, Healy 1951).

From the retention basins, the water was ducted through large underground pipes to the 116-B-7, 132-B-6, and 132-C-2 outfall structures and into pipes that discharged at the center bottom of the Columbia River.

Overflow from the outfall structures could also discharge through spillways directly to the rivershore.

Over time, the retention basins and underground lines developed leaks, releasing cooling water to the area around the basins and lines at a rate as high as several thousand liters per minute (Dorian and Richards 1978). Specific information on leak rates from the retention basins is not available, but contamination detected around the basins indicates that significant leakage did occur. See Sections 4.11 and 4.18 for further information.

In addition to the ongoing leaks previously mentioned, several other leaks occurred and were better documented.

- Two leaks occurred in 1952. One was near the #2 diversion box on the effluent line, and the other was around an 8-in. riser on a temporary bypass line northeast of the 105-B Building. Both of these leak sites were covered by at least 3 ft of clean soil (Dorian and Richards 1978).

- In 1954, a break in the 107-B Basin covered the area around the basin with water. Surveys disclosed contamination levels varying from several hundred counts per minute to 13 mrad/h. Radioactive material in the water was comparable to that in normal effluent water. Beta contamination of the mud was 10^{-4} to 10^{-2} μCi/g. The leak and contamination were confined to the immediate vicinity of the 107-B Basin (Dorian and Richards 1978). See Section 4.11.

2.3.2 Fuel Rod Cladding Failures

Fuel rod cladding failures began to be a problem in 1948, and several hundred failures occurred over the operational lifetimes of the 100-B and 100-C Reactors (DeNeal 1965). These failures occurred when a pinhole-sized rupture in the fuel rod cladding material permitted cooling water to reach the uranium core material. Rapid oxidization of the uranium core would sometimes cause rod distortion and further enlargement of the rupture site. This allowed uranium core material to escape into the cooling water, contaminating the water with uranium and its daughter products. Several methods were devised to handle the contaminated cooling water.

- It is unclear how contaminated cooling water was handled in the first few instances of cladding failures. The water may have been allowed to mix with noncontaminated cooling water before being released to the river.

- After 1948, the contaminated water was segregated in the retention basin and drained to open "basin overflow" trenches (PNL 1975). The retention basins were, by construction, divided into two compartments. When a cladding failure occurred, the highly contaminated water was diverted into one of the two compartments that then was drained to the open trench (called a basin overflow trench or emergency dump trench). This practice continued on a regular basis until 1954, when increased flows and structural stresses on the basins, due to the temperature differences between the full and empty sides, necessitated that both sides of the basin be used in parallel. Overflow trenches continued in use through the operational lives of the reactors.

- Pluto cribs were also used for handling the fuel rod rupture-contaminated cooling water. The water was flushed to the pluto crib directly from the affected process tube before it could mix with water from unaffected tubes. The 116-B-3 and 116-C-2A pluto cribs were used for this purpose for a few years after 1951. The 116-C-2A Pluto Crib was also used for the disposal of decontamination wash pad wastes and metal examination facility wastes.

These trenches and cribs should be recognized as significant waste units, because they consist of direct soil discharges of liquid wastes with relatively high radioisotope contaminant concentrations.

2.3.3 Fuel Storage Basin Water

Following removal from the reactor core, irradiated reactor fuel rods (also called fuel elements) were discharged to and stored at the bottom of large water-filled storage basins pending their shipment to the chemical separation facilities in the 200 Areas. The basins were about 19 ft deep, thus providing shielding between the highly radioactive fuel elements on the basin floor and reactor personnel working around the basin.

Both normal and ruptured fuel elements were discharged to the basins, and the ruptured elements contaminated the basin shielding water. Ruptured fuel examinations were sometimes conducted on the basin floor. This was a procedure that usually required the fuel rod to be cut and sectioned under water, further contaminating the water. It is reported that detailed examinations were performed on each ruptured fuel element that was positively identified, although some ruptured fuel elements could not be isolated from the other fuel elements on the basin floor. The 100-C Reactor fuel basin was constructed with a fuel examination facility, known as the 105-C Metal Examination Facility, which permitted convenient inspection of ruptured and damaged fuel elements (Newell 1964). Some fuel rods were damaged during handling on the basin floor, thus further contaminating the basin water.

The basin water level was lowered when the reactors were deactivated, and both basins were cleaned in 1984. Remaining water was processed and released to the 116-B-15 and 116-C-6 ponds, which had been excavated for that purpose. An asphalt emulsion was applied to basin floors and walls to fix loose contaminants. Remaining basin hardware, perfs, buckets, and scrap were packaged and disposed of as low-level radioactive waste in the 200 Area Burial Grounds (Miller and Steffes 1986).

2.3.4 Decontamination Solutions

During reactor operations and reactor shutdowns, large quantities of decontamination solutions were routinely used to remove radionuclides from reactor hardware and surfaces. Decontamination activities took place at the 100-B Reactor and 100-C Reactor dummy decontamination facilities, the cushion corridor decontamination stations, the 111-B Building, and the 108-B Building.

Known decontamination chemicals included chromic, citric, oxalic, nitric, sulfamic, and sulfuric acids (all of which were neutralized with sodium carbonate before disposal), as well as sodium fluoride. Other chemicals, including organic solvents, were also used for some decontamination processes. These solutions were generally disposed of in cribs, trenches, and/or french drains in the immediate vicinity of the building in which they were used. Decontamination solutions were sometimes combined with reactor cooling water and discharged to the river.

Decontamination solutions contained both radionuclide and chemical contaminants. Some of the compounds used in the decontamination solutions, such as oxalate and organic complexants, may potentially have solubilized and transported radionuclides and metals. The quantities of decontamination solutions, as well as other disposal locations, are not known (DOE-RL 1992).

2.3.5 Radioactive Sludges and Solid Wastes

Several thousand tons of radioactive sludge were generated during reactor operations and accumulated in pipes in the cooling water effluent system, in the cooling water retention basins, and in the reactor fuel storage basins. Smaller volumes of sludge also collected in water traps located in the 115-B/C (132-B-5) Gas Treatment Facility and in the 117-B (132-B-4) and 117-C (132-C-3) air treatment buildings. The sludge consisted of diatomaceous earth, used periodically to scour internal surfaces of the reactor process tubes, and fine particulate matter that originated from dissolved and suspended solids in river water, pipe slag, rust, failed fuel elements, graphite powder, and other undefined solids. It was contaminated with radionuclides and various chemical contaminants. The total volume of sludge generated during reactor operations is unknown.

The greater part of the sludge accumulated in the 116-B-11 and 116-C-5 retention basins and in the reactor fuel storage basins. At least once during reactor operations, an unknown quantity of sludge was removed from the retention basins to burial sites adjacent to the basins. Approximately 2.5 in. and 0.5 in. of sludge are estimated to remain in the 100-B and 100-C retention basins, respectively (Dorian and Richards 1978).

Radioactive solid wastes generally consisted of reactor hardware, contaminated equipment and tools, and miscellaneous contaminated items such as paper, rags, and structural concrete. The main source of these wastes was reactor operations, and the most highly contaminated solid wastes were the reactor components, including aluminum spacers, lead-cadmium reactor neutron-poison pieces, boron splines, graphite, process tubes, and lead. Lesser quantities of gunbarrels, thimbles, control rods, nozzles, pigtails, and cadmium sheets were also present (Miller and Wahlen 1987). These wastes were typically disposed of in 100-B Area burial grounds.

Neutron irradiation of reactor components caused them to become activated. They also became contaminated by contact with radioactive solutions and environments.

The predominant radionuclides associated with the reactor components are ^{60}Co and ^{63}Ni. The following two reactor modification projects were responsible for much of the solid waste from the reactors:

- The Ball 3X Project, in which the liquid boron system for emergency reactor control was replaced with a system using solid boron steel and carbon steel balls

- The tube replacement project, in which aluminum reactor process tubes were replaced (Dorian and Richards 1978).

It is likely that other facilities associated with the 100-B and 100-C Reactors generated radioactive solid wastes. Examples are air filters used in the 132-B-5 Gas Recirculation Building and the 132-B-4 and 132-C-3 Exhaust Air Filter Buildings, equipment used in connection with the cooling water effluent system, and contaminated dirt removed from locations near the effluent lines.

The primary disposal areas for the 100-B Area were the 118-B-1 and 118-C-1 Burial Grounds and the 128-C-1 Burning Pit located in the 100-BC-2 Operable Unit. Irradiated reactor components removed during the 100-B Ball 3X System installations were buried in the 118-B-5 Burial Ground and at other burial sites.

Radioactive solid waste buried within the boundaries of the 100-BC-1 Operable Unit primarily includes building foundations, contaminated underground concrete-lined tunnels and piping systems, and pieces of concrete and other materials from demolished buildings. Contamination in these cases resulted mainly from surface contact with contaminated air, dust, and liquid solutions, and radiation levels are low (DOE-RL 1992).

2.3.6 Reactor Ventilation System and Inert Gas System Wastes

Two gas systems were associated with each of the reactors: the primary ventilation system and the inert gas system. The primary ventilation system circulated fresh air through the staffed areas of the reactor buildings, into zones of increasing contamination levels, and upward past the reactors to overhead ducts. The ducts carried the air to exhaust fan systems located adjacent to the exhaust stacks. Air in the reactor buildings became contaminated with radionuclides that were present as radioactive gases, entrained vapors, and particulates generated by the cascade of cooling water in the reactors. These emissions may have resulted in surface contamination in the 100-B Area, as evidenced in part by the presence of ^{14}C in vegetation. Other radionuclides associated with gaseous emissions include tritium and ^{129}I.

Originally, the ventilation air was released directly from the reactor buildings to the stacks and subsequently to the atmosphere. In 1960, air filtering systems were added to minimize the release of radioactive matter. These filtering systems were placed below ground in the 117-B and 117-C Buildings, just south and southeast of the reactor buildings. The exhaust air was passed downward through ducts to tunnels leading to the filtering buildings. After filtration, the air was routed back through a second set of tunnels to the exhaust stacks.

Two types of filter banks were used: a high-efficiency particulate air (HEPA) bank and a Halogen (activated charcoal) bank. Samples obtained during decommissioning of the 117-B (132-B-4) Building revealed that the inside surfaces of the concrete-lined tunnels, as well as the equipment and wall surfaces of the fan rooms and filter chambers in the 117-B Building, had low-level, surface-smearable radioactive contamination.

The 115-B/C (132-B-5) Gas Recirculating Facility provided service to both reactors. Its purpose was to provide a closed-loop nonreactive gas environment in the graphite cores that would remove moisture and gases from the cores and serve as a heat-transfer medium between the graphite cores and the process tubes. The system also served to detect water leaks within the reactor cores. A mixture of helium and carbon dioxide, driven at low pressure by a blower system, was circulated through the graphite piles. Filters, gas coolers, blowers, condensers, and silica gel drying towers were located in the building. The system maintained gas pressure in the reactors at a slightly positive value with respect to the ventilation air, so that outside air could not make contact with the graphite cores. When a leak was detected, the gas was routed to the ventilation exhaust systems.

Contamination of the 117-B and 117-C Buildings occurred on the inside surfaces of ducts, concrete surfaces, machinery, and filters, as indicated by analysis of smear samples taken from these surfaces (Dorian and Richards 1978). The 115-B/C Building was connected by tunnels to the reactor buildings. The interior surfaces of these tunnels were also radioactively contaminated (DOE-RL 1992). See Section 4.37.

2.4 SANITARY LIQUID WASTES

Sanitary wastes were produced in various 100-B Area buildings equipped with toilet facilities. These wastes were routed by sewer lines to septic tanks and drain fields. There are no records of radiological wastes being disposed of to these sewer systems, but non-sanitary wastes such as detergents, cleaning compounds, and solvents may have been disposed of in them (DOE-RL 1992). Eleven known septic tank systems are located within the 100-B Area. See Sections 4.40, 4.41, 4.42, 4.43, 4.44, 4.45, 4.46, 5.17, 5.18, 5.19, and 5.20 for more information about those septic tank systems.

2.5 NONRADIOACTIVE LIQUID WASTES

Nonradioactive liquid chemical wastes, including hazardous waste substances, were disposed of in 100-B Area liquid waste sites. Contamination from liquids--including gasoline, diesel fuel, solvents, and other chemical compounds--would be expected near storage tanks and their piping systems and in areas where those materials were used or stored. Releases could have resulted from leakage, spillage, or disposal. The following activities may have resulted in the generation of nonradioactive liquid wastes and may require further investigation.

- Water treatment chemicals such as alum, sulfuric acid, chlorine, and sodium dichromate were used and stored at and near the 183-B, 185-B, and 183-C Buildings.

- Wet-type electrical transformers and hydraulic machinery containing oil contaminated with polychlorinated biphenyls (PCBs) were used at several locations within the 100-B Area. Fluids contaminated with PCBs may have been released or disposed of during operation, equipment repair, or decommissioning and demolition activities.

- Ash from the coal-fired powerhouse (184-B) was passed as a water slurry by pipeline to the 126-B-1 ash pit. Leakage in the pipeline and seepage at the ash pit were potential liquid contamination sources.

- Boiler water treatment chemicals for the 184-B Powerhouse included sodium sulfate, trisodium phosphate, and chromates. These chemicals were used to treat the boiler water and ended up in the boiler sludge. Disposal methods for this sludge are not known.

- Three zeolite water softeners were located in the 184-B Powerhouse, where filtered water was treated before use in the heat exchangers. Sodium chloride (salt) solutions were used to regenerate the zeolite ion exchange beds in the water softener tanks. The salt was delivered in railcar lots to brine pits, which were located adjacent to railroad tracks just north of the powerhouse. The disposal of the waste from this process is not known, and there is no record of leaks or spills.

- Fuel oil tanks were located both above ground and underground in the 100-B Area.

- Oils, paints, and solvents were stored and used in the 1715-B, 1716-B, and 1714-C Buildings.

- Automotive repair and service was performed at the 1716-B Building.

- Additional wastewater was generated from various cleaning processes. Disposal locations for these solutions are unknown (DOE-RL 1992).

2.6 NONRADIOACTIVE SOLID WASTES

Nonradioactive solid waste generated in the 100-B Area primarily included miscellaneous materials generated in the facilities, such as paper, trash, pieces of metal, and plastic parts. Some combustible wastes were disposed of in the 128-B-1 and 128-C-1 burn pits (Stenner et al. 1988).

Other solid wastes consisted of relatively uncontaminated concrete, metal parts, and other materials generated during decommissioning and demolition activities. Asbestos, chemical waste, and contaminated solids were typically removed from the area to the 200 Area Burial Grounds during the decontamination and decommissioning work. Building materials that were not considered to be contaminated were buried in place and, in some cases, sold to salvage contractors as excess materials and removed from the site (Wahlen 1991).

Solid waste-generating operations associated with the 184-B Powerhouse consisted of an anthracite coal storage yard and the 126-B-1 Ash Disposal Pit. Leachates may have entered the soil at these sites and along the coal conveyor system.

3.0 SOIL AND VEGETATION SAMPLING

Routine environmental surveillance of the 100-B Area is conducted by WHC to evaluate long-term trends in environmental accumulation of radioactivity. Soil and vegetation samples are collected on a regular basis and analyzed for radioisotope content.

Early each summer, soil and vegetation samples are collected and submitted for radioanalysis. The analyses include those radionuclides expected to be found in the areas sampled, i.e., gamma-emitting radionuclides, strontium isotopes, uranium, and/or plutonium isotopes. The results are compared to regional background levels, which are derived from PNL offsite monitoring data, to determine the difference between contributions from Hanford Site operations and contributions from natural causes and world-wide fallout. The results are also compared to soil contamination standards developed for use by WHC at the Hanford Site (Schmidt et al. 1991).

3.1 SAMPLING AT 100-B AREA, 1981 THROUGH 1991

Vegetation and surface soil samples were taken at various locations in the 100-B Area between 1981 and 1991. Refer to Appendix B, Tables B-1 and B-2, for results of this sampling.

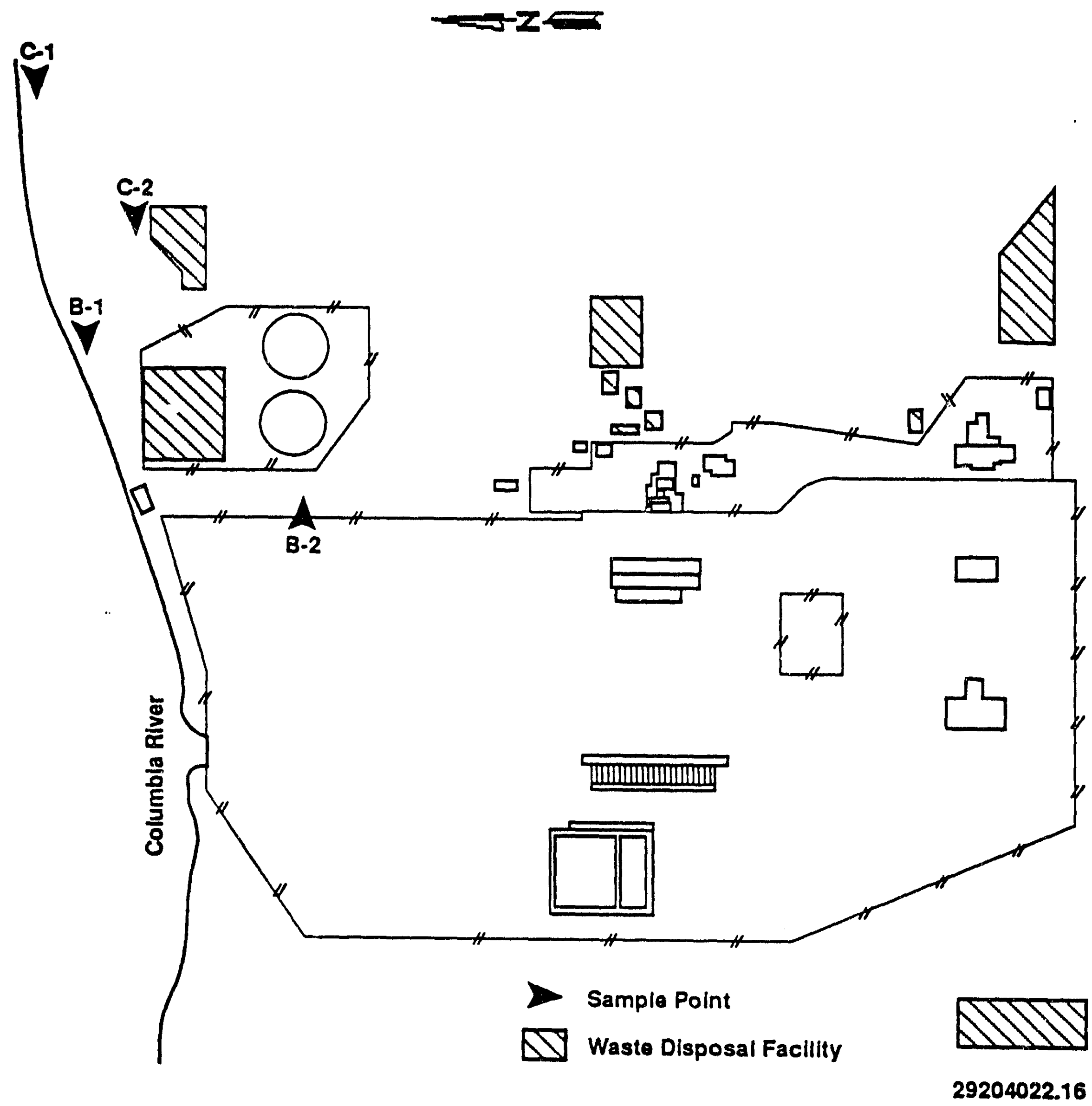
Soil and vegetation sample data broken down by sample sites are lengthy and thus have not been provided in this report. Refer to Schmidt et al. (1991) for specific information.

3.2 SAMPLING AT 100-B AREA, 1992

In 1992, soil and vegetation samples were taken from four different sites located at the 100-B Area. These sites were numbered B-1, B-2, C-1, and C-2. A map showing the sampling site locations is provided in Figure 3-1.

Data from the 1992 soil sampling performed at the four sites are presented in Appendix B, Tables B-3 through B-6. Similarly, data from the vegetation sampling are displayed in Tables B-7 through B-10.

Figure 3-1. Soil and Vegetation Sampling Locations in the 100-B Area, 1992.



4.0 100-BC-1 OPERABLE UNIT

Three operable units are associated with the 100-B Area. 100-BC-1 and 100-BC-2 encompass source operable units that include liquid and solid waste sites. 100-BC-5 is a groundwater operable unit that includes the entire 100-B Area.

100-BC-1 covers the northern portion of the area and primarily includes the 100-B Reactor and associated liquid and sludge disposal sites. 100-BC-2 includes the southern portion of the area and primarily includes the 100-C Reactor, its associated water treatment facilities, solid waste sites associated with the operation of both 100-B and 100-C Reactors, and the 151-B Electrical Power Distribution Substation.

This chapter describes the 100-BC-1 Operable Unit, which includes the sites of all 100-B Reactor buildings and facilities, some of which are active and in use today. It encompasses 51 waste sites, 43 of which are included in the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement; Ecology et al. 1989). These waste sites include decommissioned facilities, trenches, cribs, french drains, septic tanks, burial grounds, and unplanned releases.

Appendix C provides several maps that show the locations of waste sites in the 100-B Area. The relative locations of 100-BC-1, 100-BC-2, and 100-BC-5 are shown in Figure C-1 of that appendix. A map of the 100-BC-1 Operable Unit is provided as Figure C-2. Additional figures are included to clarify the locations of waste sites.

Table 4-1 identifies the sites for which a PNL Hazardous Ranking System Migration score (HRS migration score) has been established. Not all of the waste sites located within the 100-BC-1 Operable Unit have had HRS migration scores applied to them.

Each waste site is described separately.

4.1 116-B-1 (107-B LIQUID WASTE DISPOSAL TRENCH)

116-B-1 is an inactive liquid waste site that operated from 1946 to 1955 (WHC 1991). The site is commonly known as the 107-B Liquid Waste Disposal Trench. It is located at Hanford coordinates N71530 W79600 (Stenner et al. 1988), 200 ft east of the 107-B Retention Basin (WHC 1991). This unlined trench received an estimated 6.0×10^7 L of waste effluents from the 107-B Retention Basin, primarily due to ruptured fuel element outages (Stenner et al. 1988).

Table 4-1. 100-BC-1 Operable Unit Hazardous Ranking System Migration Scores.

Waste site number	HRS migration score
116-B-1	42.32
116-B-2	40.09
116-B-3	16.22
116-B-4	44.55
116-B-5	40.09
116-B-6A	16.22
116-B-6B	16.22
116-B-9	0.00
116-B-10	0.00
116-B-11	76.91
116-C-1	42.32
116-C-5	76.91
118-B-5	3.04
118-B-7	3.04
128-B-1	0.21

Stenner et al. (1988).

Heid (1956) describes this trench as a french drain or an excavation that is partly or completely filled with coarse gravel. The gravel allows the rapid dispersion of liquids discharged to the trench. The trench was 200 ft long, 30 ft wide, and 15 ft deep (WHC 1991).

Radionuclides that were present in the effluent discharged to this trench "included fission products such as ^{90}Sr, ^{99}Tc, ^{134}Cs, ^{137}Cs, ^{152}Eu, ^{154}Eu, ^{155}Eu, and transuranics such as ^{238}Pu, ^{239}Pu, ^{240}Pu, and ^{241}Am" (DOE-RL 1993a). Additionally, reports indicate that between 7 and 60 kg of sodium dichromate was discharged at this site; the sodium dichromate had been added to the cooling water to control corrosion (Cramer 1987, DOE-RL 1993a).

The estimated radionuclide inventory, in curies and calculated to account for decay through April 1, 1986, includes the following.

^{60}Co: 9.780 E-002	^{154}Eu: 1.900 E-001	^{239}Pu: 7.300 E-003
^{134}Cs: 3.900 E-004	^{155}Eu: 2.430 E-002	^{240}Pu: 7.990 E-003
^{137}Cs: 3.060 E-001	^{3}H: 5.730 E-002	^{90}Sr: 7.040 E-002
^{152}Eu: 1.180 E+000	^{238}Pu: 9.000 E-005	^{235}U: 1.300 E-004
		^{238}U: 1.290 E-002

(Stenner et al. 1988)

A 400 c/m contamination level was detected in a soil sample taken from the center of the trench at a depth of 17 ft below grade. Additionally, Stenner et al. (1988) estimated the total radionuclide inventory of this site to be 3.1 Ci.

Dorian and Richards (1978) reports the results of other soil samples that were taken from several locations at the trench. The volume of contaminated soil at the site was estimated to be 7.0 x 10^5 ft^3, and the mass of that soil was estimated to be 4.8 x 10^{10} g. The full report is provided in Appendix D and is summarized in Tables 4-2 and 4-3.

Table 4-2. 116-B-1 Gross Radionuclide Inventory.

Radionuclide	Amount (pCi/g)
Avg. beta/gamma	6.40 E+01
Max. beta/gamma	3.60 E+02
Max. $^{239/240}Pu$	9.90 E+01

Dorian and Richards (1978).

Table 4-3. 116-B-1 Radionuclide Inventory.

Radionuclide	Avg. pCi/g	Curies
^{238}Pu	2.10 E-03	1.00 E-04
$^{239/240}Pu$	1.70 E-01	8.20 E-03
^{90}Sr	1.80 E+00	8.60 E-02
^{3}H	1.90 E+00	9.10 E-02
^{152}Eu	3.70 E+01	1.80 E+00
^{60}Co	6.10 E+00	2.90 E-01
^{154}Eu	7.70 E+00	3.70 E-01
^{134}Cs	1.30 E-01	6.20 E-03
^{137}Cs	7.80 E+00	3.70 E-01
^{155}Eu	1.60 E+00	7.70 E-02
Uranium	2.70 E-01	1.30 E-02
	Total Curies	3.10 E+00

Dorian and Richards (1978).

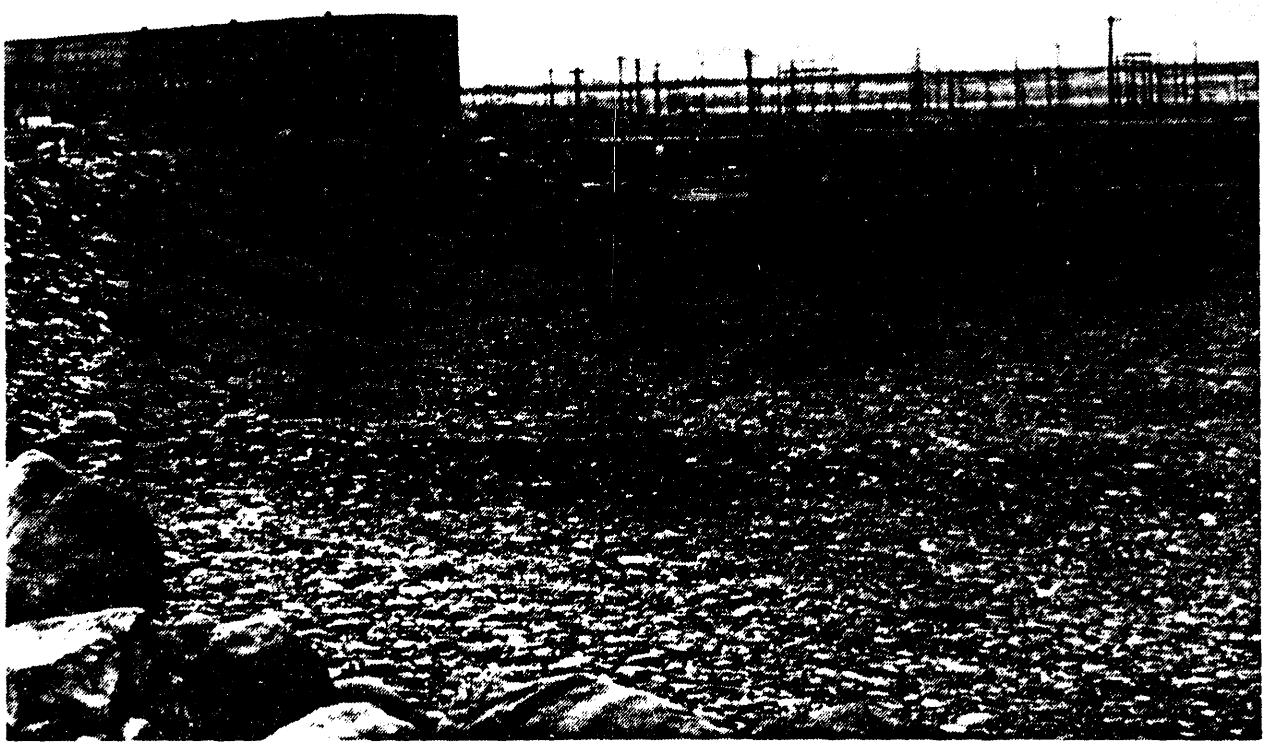
DOE-RL (1993a) reports the results of soil sampling performed at the 116-B-1 vadose borehole, which is located at this site. Chemical analysis indicated the presence of toluene, as well as concentrations of chromium, manganese, and zinc that were above the Hanford Site background 95% upper threshold limit. No semivolatile organic compounds, pesticides, or PCBs were detected. Radionuclide analysis indicated the presence of ^{238}Pu, ^{239}Pu, ^{241}Am,

^{90}Sr, ^{14}C, ^{60}Co, ^{134}Cs, ^{137}Cs, ^{152}Eu, and ^{154}Eu. Geophysical logging at the site showed the presence of ^{60}Co, ^{137}Cs, ^{152}Eu, and ^{154}Eu. The concentrations of radionuclides decreased as the sampled depth increased (DOE-RL 1993a).

This waste site has an HRS migration score of 42.32 (Stenner et al. 1988).

116-B-1 appears today as a vegetation-free, cobble-covered field surrounded by permanent concrete markers and is posted with "Caution: Underground Radioactive Material" warning signs. A significant amount of clean fill material remains at the site and extends 4 to 6 ft above the surrounding grade. Earlier sampling indicates that this fill material may be from the original excavation of the trench and is located just south of the trench. The site is treated with defoliants annually. Figure 4-1 shows a 1993 photograph of this site.

Figure 4-1. 107-B Liquid Waste Disposal Trench (116-B-1).



4.2 116-B-2 (105-B FUEL STORAGE BASIN TRENCH)

116-B-2 is an inactive, low-level liquid waste site located 250 ft northeast of the 105-B Storage Basin at Hanford coordinates N69080 W80250 (WHC 1991). The site is commonly known as the 105-B Fuel Storage Basin Trench, although it has also been known as the B Storage Basin Crib and as the 116-B-2 Storage Basin Trench.

The trench was 75 ft long, 10 ft wide, and 15 ft deep (WHC 1991). It was used only once in 1946 (DOE-RL 1992) to receive contaminated basin water after a fuel element was accidentally cut in half in the 105-B Storage Basin (Stenner et al. 1988). A total of 4 x 10^6 L of liquid waste was received. DOE-RL (1993a) states that radionuclides present in the water included "fission products such as ^{90}Sr, ^{99}Tc, ^{134}Cs, ^{137}Cs, ^{152}Eu, ^{154}Eu, ^{155}Eu, and transuranics such as ^{238}Pu, ^{239}Pu, ^{240}Pu, and ^{241}Am."

Stenner et al. (1988) estimates the radionuclide inventory for the site as follows. Data are presented in curies and have been calculated to account for decay through April 1, 1986.

^{60}Co:	3.000 E-004	^{240}Pu:	2.600 E-004	^{155}Eu:	1.420 E-003
^{137}Cs:	6.450 E-002	^{90}Sr:	1.150 E-002	^{3}H:	8.190 E-003
^{152}Eu:	5.390 E-003	^{238}U:	8.900 E-004	^{239}Pu:	2.340 E-003
^{154}Eu:	5.700 E-004				

(Stenner et al. 1988)

Soil samples were taken from four 116-B-2 sample sites for Dorian and Richards (1978). The contaminated soil volume at these sample sites was estimated to be 6.0 x 10^4 ft^3, and its mass was estimated to be 4.1 x 10^9 g. The full report is provided in Appendix D and is summarized in Table 4-4.

Primary soil contaminants are ^{90}Sr, ^{137}Cs, and $^{239/240}$Pu. Concentrations of ^{90}Sr and ^{137}Cs are 10 pCi/g at a depth of 25 ft at some locations (DOE-RL 1992).

Table 4-4. 116-B-2 Radionuclide Inventory.

Radionuclide	Avg. pCi/g	Curies
^{238}Pu	a	0.0
$^{239/240}$Pu	6.40 E-01	2.60 E-03
^{90}Sr	3.51 E+01	1.40 E-01
^{3}H	3.20 E+01	1.30 E-01
^{152}Eu	2.00 E+00	8.20 E-03
^{60}Co	2.20 E-01	9.00 E-04
^{154}Eu	2.60 E-01	1.10 E-03
^{134}Cs	3.30 E-04	1.40 E-06
^{137}Cs	1.90 E+01	7.80 E-02
^{155}Eu	1.10 E+00	4.50 E-03
Uranium	2.20 E-01	9.00 E-04
	Total Curies	3.70 E-01

[a]Less than analytical detection limit.
Dorian and Richards (1978).

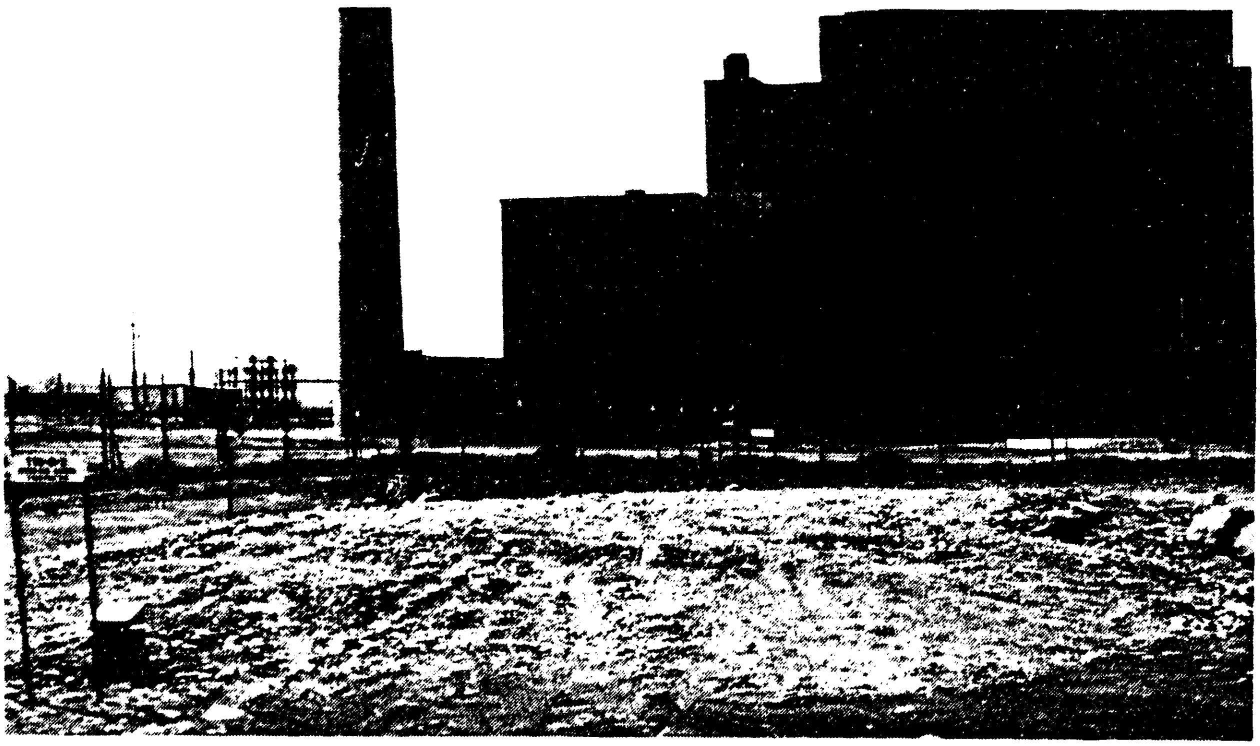
DOE-RL (1993a) reports the results of soil sampling performed at the 116-B-2 vadose borehole, which is located at this site. Chemical analysis indicated the presence of several chemical contaminants, including toluene, methyl isobutyl ketone, pyrene, and n-nitrosodiphenylamine. No pesticides or PCBs were detected, and no metals or inorganic compounds were found in concentrations exceeding the Hanford Site background 95% upper threshold limit. Radionuclide analysis indicated the presence ^{238}Pu, ^{239}Pu, ^{241}Am, ^{90}Sr, ^{14}C, ^{60}Co, ^{137}Cs, ^{152}Eu, and ^{154}Eu. Geophysical logging at the site detected ^{60}Co, ^{137}Cs, ^{152}Eu, and ^{154}Eu (DOE-RL 1993a).

Soil sampling was also performed during the drilling of the borehole for monitoring well 199-B4-9. Chemical analysis detected acetone, benzyl alcohol, and benzoic acid, as well as concentrations of chromium, cadmium, mercury, and nickel that were above the Hanford Site background 95% upper threshold limit. Radionuclide analysis detected ^{22}Na, ^{58}Co, ^{60}Co, ^{90}Sr, ^{134}Cs, ^{137}Cs, ^{154}Eu, ^{226}Ra, ^{228}Th, ^{235}U, ^{238}U, $^{239/240}$Pu, and ^{241}Am. Geophysical logging at the well site detected ^{60}Co, ^{137}Cs, ^{152}Eu, and ^{154}Eu (DOE-RL 1993a).

The HRS migration score assigned to this waste site is 40.09 (Stenner et al. 1988).

The contaminated area was filled with 15 ft of clean soil (WHC 1991). It appears today as a vegetation-free, cobble-covered mound outside the reactor exclusion area fence to the east. The fuel storage basin lies within a larger radiologically controlled area bounded by permanent concrete posts. It is posted with "Caution: Underground Radioactive Material" and "Do Not Excavate" warning signs. The bounded area has recently been labeled as the 116-B-2 Storage Basin Trench. Figure 4-2 shows a 1993 photograph of the site.

Figure 4-2. 105-B Fuel Storage Basin Trench (116-B-2).



4.3 116-B-3 (105-B PLUTO CRIB)

116-B-3, commonly known as the 105-B Pluto Crib and as the B Reactor Pluto Crib, is an inactive liquid waste site that operated from 1951 to 1952 to receive 105-B Reactor cooling water wastes that had been contaminated by fuel cladding ruptures. One data source suggests that it continued in operation until 1956, but this seems unlikely in the context of other 100 Area waste sites.

The crib is a 10-ft-long, 10-ft-wide, and 10-ft-deep wooden vault located 100 ft east of the 105-B Reactor Building at Hanford coordinates N69180 W80460. Clukey (1954) describes this crib as a french drain, a "tile or pipe buried vertically, sometimes gravel-filled" (Clukey 1954). It is probably similar to the system found at 100-F Area.

An estimated 4,000 L of contaminated reactor cooling water was diverted to this crib from reactor process tubes. Radionuclides present in the water included "fission products such as ^{90}Sr, ^{99}Tc, ^{134}Cs, ^{137}Cs, ^{152}Eu, ^{154}Eu, and transuranics such as ^{238}Pu, ^{239}Pu, ^{240}Pu, and ^{241}Am" (DOE-RL 1993a). Additionally, WHC (1991) reports that 4 x 10^{-3} kg of sodium chromate was discharged at this site.

Cooling water diversion occurred when a fuel rupture was detected within a process tube. The water was diverted from the affected process tube through a valve on the rear reactor face known as a "pluto valve" (also referred to as a "pluto cap") and then through a rubber hose to the crib. The hose ran above ground from the rear face of the reactor to the crib. The pluto valve had a bulbous shape suggestive of the nose on the cartoon character "Pluto" (a registered trademark of Walt Disney Company) and is the probable genesis of the popular name for the valve and, by extension, the crib.

The wooden crib was buried so that its upper surface was approximately at grade. A wooden hatch in the upper surface was opened to receive the rubber hose, and the contaminated cooling water was allowed to flood into the crib. The crib may have had a pipe, with a metal cap, exposed at the surface, similar to the system found at 100-F Area.

The estimated radionuclide inventory for 116-B-3, in curies and decayed to April 1, 1986, includes the following.

^{60}Co:	3.170 E-001	^{155}Eu:	7.890 E-003	^{240}Pu:	6.700 E-004
^{134}Cs:	1.410 E-001	^{3}H:	2.270 E-001	^{90}Sr:	1.960 E-002
^{152}Eu:	2.760 E-001	^{238}Pu:	1.220 E-003	^{238}U:	3.400 E-004
^{154}Eu:	3.760 E-002	^{239}Pu:	6.030 E-003		

(Stenner et al. 1988)

DOE-RL (1993a) reports the results of soil sampling performed at the 116-B-3 vadose borehole, which is located at this site. Chemical analysis detected the presence of acetone, benzene, methyl ethyl ketone, and methyl isobutyl ketone. Also, components of creosote--including phenanthrene, anthracene, fluoranthene, benzo(A)anthracine, chrysene, benzo(B)fluoranthene, benzo(K)fluoranthene, and benzo(A)pyrene--were found. Chromium and silver were detected at concentrations above the Hanford Site background 95% upper threshold limit. Radionuclide analysis indicated the presence of ^{90}Sr, ^{14}C,

^{137}Cs, ^{238}Pu, ^{239}Pu, ^{241}Am, and ^{238}Th. Geophysical logging at this site detected ^{137}Cs (DOE-RL 1993a).

Dorian and Richards (1978) reports the results of soil samples taken from 116-B-3. Subsequent reviews have determined, however, that the samples were taken from the 116-B-4 Dummy Decontamination French Drain site instead. The test results are therefore not reported here (DOE-RL 1992).

This waste site is a registered underground injection well (DOE-RL 1988) and has an HRS migration score of 16.22 (Stenner et al. 1988).

After its use was discontinued, the pluto crib unit was reportedly unearthed, shored with railroad ties, filled with gravel, and then covered to grade with clean soil (WHC 1991). It currently appears as a vegetation-free, cobble-covered field. A concrete marker indicates the position of the crib. No posts or fencing mark the site, and the wooden crib is not visible above ground. The crib is posted with signs warning of a potential cave-in hazard. The crib is located within a larger area protected by permanent concrete markers and "Caution: Underground Radioactive Material" signs. The crib site has been slightly raised above the surrounding area, and the cobbles are noticeably larger at that location. Refer to Figure 4-3 for a 1993 photograph of the site.

Figure 4-3. 105-B Pluto Crib (116-B-3).

4.4 116-B-4 (105-B DUMMY DECONTAMINATION FRENCH DRAIN)

116-B-4 is an inactive liquid waste site that operated from 1957 to 1968. It is located at Hanford coordinates N69120 W80430, 70 ft southeast of 116-B-3 (105-B Pluto Crib). The site is commonly known as the 105-B Dummy Decontamination French Drain, although it has also been known as the 116-B-4 French Drain and as the Dummy Decontamination Crib. The site received 3×10^5 L of spent acid rinse water from the 105-B Dummy Decontamination Facility, which was used for the decontamination of fuel element spacers and other reactor hardware (WHC 1991).

The 4-ft-diameter, 20-ft-deep french drain has a graded rock and sand bottom (Stenner et al. 1988). The french drain was fed by a single, underground stainless steel pipe. Acids were neutralized within the decontamination tanks prior to discharge to the french drain.

The radionuclide inventory for this site is estimated to be 4.33 Ci of ^{60}Co. In addition, the hazardous chemical inventory includes 1×10^3 kg of sodium dichromate, 1×10^3 kg of sodium oxalate, and 6×10^3 kg of sodium sulfamate (Cramer 1987).

Dorian and Richards (1978) reports that sampling was not performed because a concrete slab was encountered about 6 ft below grade and could not be penetrated. At that time, this waste site was misidentified as the 105-B Pluto Crib. Tables 4-5 and 4-6 show the results of the sampling effort for what was then thought to be the pluto crib but later identified as 116-B-4. Two sites were sampled. The volume of contaminated soil at those sites was estimated to be 1.8×10^4 ft^3, and the mass of that soil was estimated to be 1.2×10^9 g. The full report is provided in Appendix D and is summarized here.

Table 4-5. 116-B-4 Radionuclide Inventory.

Radionuclide	Avg. pCi/g	Curies
^{238}Pu	1.10 E-01	1.30 E-04
$^{239/240}$Pu	5.60 E+00	6.70 E-03
^{90}Sr	2.00 E+01	2.40 E-02
^{3}H	3.00 E+02	3.60 E-01
^{152}Eu	3.50 E+02	4.20 E-01
^{60}Co	7.80 E+02	9.40 E-01
^{154}Eu	6.10 E+01	7.30 E-02
^{134}Cs	1.30 E-02	1.60 E-05
^{137}Cs	1.40 E+02	1.70 E-01
^{155}Eu	2.10 E+01	2.50 E-02
Uranium	2.80 E-01	3.40 E-04
	Total Curies	2.00 E+00

Dorian and Richards (1978).

Table 4-6. 116-B-4 Radionuclide Inventory from Three Samples.

Isotope	Concentration (pCi/g) Sample A8	Concentration (pCi/g) Sample A10	Concentration (pCi/g) Sample A15
^{238}Pu	3.30 E-01	a	a
$^{239/240}Pu$	8.60 E+00	5.20 E-01	7.70 E+00
^{90}Sr	5.50 E+00	1.10 E+00	3.30 E+00
^{3}H	3.00 E+02	b	b
^{152}Eu	9.50 E+02	3.20 E+01	6.90 E+01
^{60}Co	2.20 E+02	7.40 E+01	5.20 E+01
^{154}Eu	1.60 E+02	6.00 E+00	1.70 E+01
^{134}Cs	a	4.00 E-02	a
^{137}Cs	3.00 E+02	3.50 E+01	9.70 E+01
^{155}Eu	6.10 E+01	3.60 E-01	2.00 E+00
Uranium	2.80 E-01	a	a

[a]Below detectable limits.
[b]No analysis performed.
Dorian and Richards (1978).

DOE-RL (1993a) states, "It is assumed that inorganic and organic contaminants are not present at the 116-B-4 french drain, and that the types of radionuclides that may be present at the 116-B-4 site are similar to those found at the 116-H-3 french drain." Soil sampling performed at the 116-H-3 borehole detected ^{60}Co, ^{226}Ra, ^{228}Th, ^{152}Eu, $^{233/234}U$, and ^{238}U. Geophysical logging performed at the borehole detected ^{60}Co, ^{152}Eu, and ^{154}Eu (DOE-RL 1993a).

This waste site is a registered underground injection well (DOE-RL 1988) and has an HRS migration score of 44.55 (Stenner et al. 1988).

116-B-4 is currently identifiable by four yellow steel posts and a curved stainless steel vent pipe in the center. A square concrete marker is also present at the location. Figure 4-4 shows a 1993 photograph of the french drain site.

Figure 4-4. 105-B Dummy Decontamination French Drain (116-B-4).

4.5 116-B-5 (108-B CRIB)

116-B-5 is an inactive, low-level liquid waste site that is located approximately 150 ft north of the former 108-B Building, and centered at Hanford coordinates N69925 W80654 (Stenner et al. 1988). The site is commonly known as the 108-B Crib, although it has also been known as the 116-B-5 Crib. It operated from 1950 to 1968.

The crib received 1 x 10^7 L of tritium wastes from the 108-B Tritium Separations Facility Building. The 108-B Building, which was originally a water quality facility, was used for recovering tritium from irradiated lithium-aluminum target elements. Only wastes with an activity density of less than 1 μCi/cc were discharged to this site (Dorian and Richards 1978).

This crib has bottom dimensions of 84 ft by 16 ft and is 10 ft deep. A 4-in. pipe enters the south end 1 ft below grade (Stenner et al. 1988). The Waste Information Data System (WIDS) reports that there is a danger of cave-in potential, but does not elaborate on the reason (WHC 1991). Another source document, Clukey (1954), describes this structure as a concrete box.

The estimated radionuclide inventory for this crib is as follows. Amounts have been calculated to account for decay through April 1, 1986.

^{60}Co:	3.710 E-002 Ci	^{154}Eu:	2.320 E-002 Ci	^{90}Sr:	1.150 E-003 Ci
^{134}Cs:	9.700 E-004 Ci	^{155}Eu:	2.200 E-004 Ci	^{235}U:	2.000 E-005 Ci
^{137}Cs:	2.070 E-003 Ci	^{3}H:	1.890 E+002 Ci	^{238}U:	2.770 E-003 Ci
^{152}Eu:	9.200 E-002 Ci				

(Stenner et al. 1988)

Soil samples were taken from three 116-B-5 sample sites, and the results were reported in Dorian and Richards (1978). The contaminated soil volume at the sample sites was estimated to be 1.5×10^5 ft^3, and the mass of that soil was estimated to be 1.0×10^{10} g (Dorian and Richards 1978). The full report is provided in Appendix D and is summarized in Table 4-7.

Table 4-7. 116-B-5 Radionuclide Inventory.

Radionuclide	Avg. pCi/g	Curies
^{238}Pu	a	0.0
$^{239/240}Pu$	a	0.0
^{90}Sr	1.4×10^{-1}	1.4×10^{-3}
^{3}H	1.6×10^{4}	3.0×10^{2}
^{152}Eu	1.4×10^{1}	1.4×10^{-1}
^{60}Co	1.1×10^{1}	1.1×10^{-1}
^{154}Eu	4.5×10^{0}	4.5×10^{-2}
^{134}Cs	1.5×10^{-2}	1.5×10^{-2}
^{137}Cs	2.5×10^{-1}	2.5×10^{-3}
^{155}Eu	7.0×10^{-2}	7.0×10^{-4}
Uranium	2.8×10^{-1}	2.8×10^{-3}
	Total Curies	300

[a]Less than analytical detection limit.
Dorian and Richards (1978).

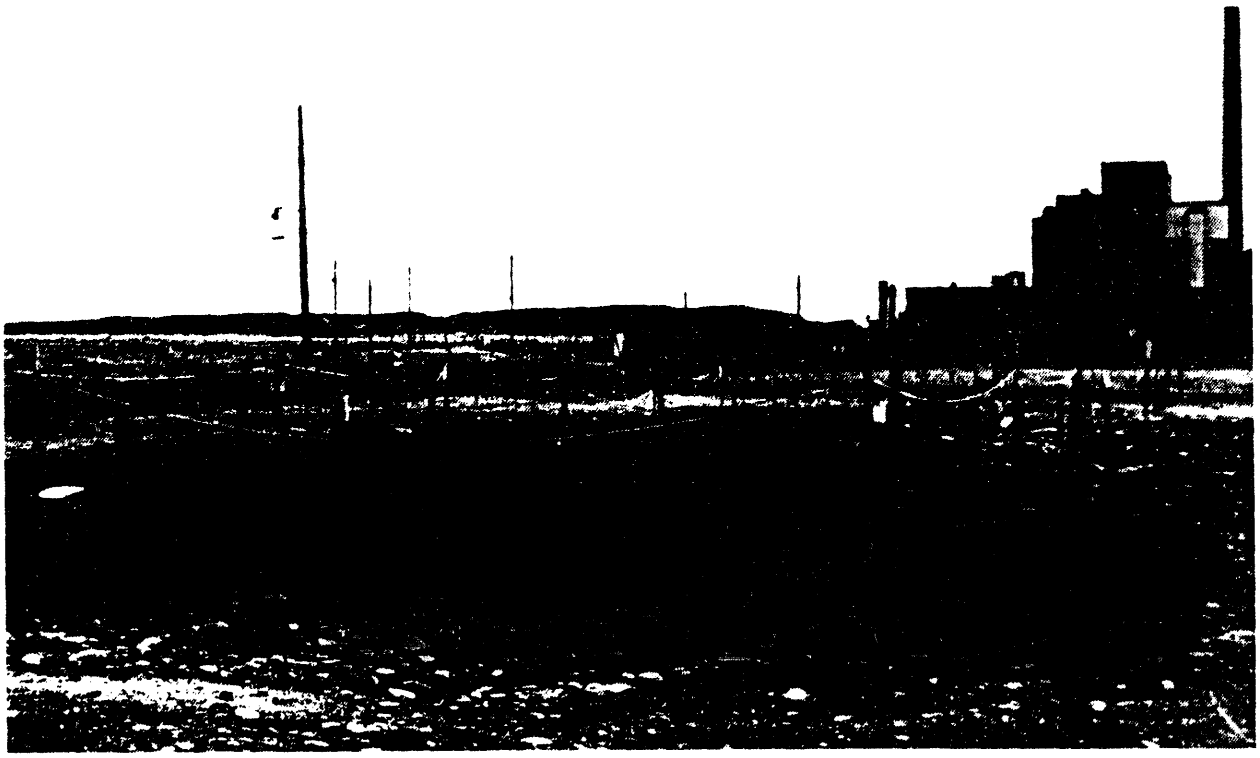
Soil adjacent to the crib was sampled during a 1975/1976 radiological study. Virtually all of the soil contamination was as a result of ^{3}H. The estimated total activity of ^{3}H in the soil below this crib was 3×10^2 Ci as of 1976. Tritium was present in concentrations up to a maximum of 7.3×10^4 pCi/g. The ^{3}H contamination present in the soil beneath the crib is believed to extend to the groundwater. Low concentrations of ^{152}Eu, ^{154}Eu, and ^{60}Co were also detected (DOE-RL 1992).

DOE-RL (1993a) reports the results of soil sampling that was performed at the 116-B-5 vadose zone borehole, which is located at this site. Chemical analysis indicated the presence of carbon disulfide and toluene, as well as concentrations of barium, mercury, and zinc above the Hanford Site background 95% upper threshold limit. Radionuclide analysis indicated the presence of ^{241}Am, ^{60}Co, ^{137}Cs, and ^{90}Sr; all concentrations were less than 1.6 pCi/g. Additionally, geophysical logging showed the presence of ^{60}Co, ^{152}Eu, and ^{154}Eu (DOE-RL 1993a).

The HRS migration score assigned to this waste site is 40.09 (Stenner et al. 1988).

Today, 116-B-5 appears as a level, cobble-covered field with scant vegetation growing on the surface. The area, located outside the reactor exclusion area fence north of the 100-B Reactor, is bounded by a steel post, light-duty barricade chain, and yellow pipes. It is posted with "Caution: Underground Radioactive Material" signs, a "Danger: Cave-In Potential" sign, and a site identification sign. Four characterization wells are located at the site. The pipe leading to the crib has been disconnected just south of the 100-B Area access road and capped. Refer to Figure 4-5 for a 1993 photograph of the 116-B-5 site.

Figure 4-5. 108-B Crib (116-B-5).



4.6 116-B-6A (116-B-6A CRIB)

116-B-6A is an inactive liquid waste site located immediately north of the site of the decommissioned 111-B Building at Hanford coordinates N68620 W80363. This site is commonly known as the 116-B-6A Crib, although it has also been known as the 111-B Crib No. 1 and as 116-B-6-1. It received radioactive liquid wastes from equipment decontamination performed in the 111-B Building, as well as from the decontamination of fuel element spacers. Approximately 5 x 10^3 L of mixed wastes was received at this site between 1951 and its retirement in 1968 (Stenner et al. 1988).

The crib is approximately 12 ft long and 8 ft wide (WHC 1991, PNL 1991, Stenner et al. 1988). Reports conflict as to whether it is 15 ft deep (WHC 1991, DOE-RL 1993a) or 6 ft deep (PNL 1991, Stenner et al. 1988, Clukey 1954).

In April 1990, PNL conducted a treatability test of the in situ vitrification process at the crib site. In situ vitrification is "a thermal treatment process that converts contaminated soil into a chemically inert and stable glass and crystalline product." This test was a demonstration of technology rather than a remedial action to stabilize waste. A barrier wall and cooling system were installed to prevent the nearby 111-B Fuel Examination Tank (116-B-16) from being affected by the heat of vitrification. The in situ vitrification at this site reached 14 ft below grade and produced a block of vitrified material between 35 and 40 ft in diameter, approximately 12 ft high, and weighing between 800 and 900 tons. Samples of the vitrified material were taken during April 1991 for further study (Luey et al. 1992).

The estimated radionuclide inventory for the crib includes the following. Data are presented in curies, with amounts calculated to account for decay through April 1, 1986.

^{60}Co:	2.190 E-003	^{154}Eu:	1.300 E-004	^{240}Pu:	2.000 E-004
^{137}Cs:	1.490 E-001	^{155}Eu:	2.310 E-003	^{90}Sr:	9.000 E-001
^{152}Eu:	6.000 E-005	^{239}Pu:	1.800 E-003	^{238}U:	8.800 E-004

(Stenner et al. 1988)

The crib also contains 50 kg of sodium dichromate, 100 kg of sodium oxalate, and 100 kg of sodium sulfamate (WHC 1991, Stenner et al. 1988).

Dorian and Richards (1978) report the results of soil samples that were taken from a "potentially contaminated soil column" at the 116-B-6A Crib site. The volume of contaminated soil at that site was estimated to be 1.3 x 10^4 ft^3, and its mass was estimated to be 8.9 x 10^8 g (Dorian and Richards 1978). Tables 4-8 and 4-9 list the estimated inventory of radionuclides present in the crib.

Three characterization boreholes were drilled at the crib site during the in situ vitrification treatability study. Soil sampling was performed, and chemical analysis showed concentrations of cadmium, copper, lead, and zinc above the Hanford Site background 95% upper threshold limit. Geophysical logging at the site also determined the presence of ^{137}Cs, ^{90}Sr, and ^{60}Co (DOE-RL 1993a).

Table 4-8. 116-B-6A Gross Radionuclide Inventory.

Radionuclide	Amount (pCi/g)
Avg. beta/gamma	1.4 E+03
Max. beta/gamma	2.6 E+03
Avg. $^{239/240}Pu$	2.3 E+00
Max. $^{239/240}Pu$	3.6 E+00

Dorian and Richards (1978).

Table 4-9. 116-B-6A Radionuclide Inventory.

Radionuclide	Average pCi/g	Curies
^{238}Pu	a	0.0
^{239}Pu, ^{240}Pu	2.3 E+00	2.0 E-03
^{90}Sr	1.2 E+03	1.1 E+00
^{3}H	a	0.0
^{152}Eu	9.7 E-02	8.6 E-05
^{60}Co	7.3 E+00	6.5 E-03
^{154}Eu	2.9 E-01	2.6 E-04
^{134}Cs	a	0.0
^{137}Cs	2.0 E+02	1.8 E-01
^{155}Eu	8.2 E+00	7.3 E-03
Uranium	1.0 E+00	8.9 E-04
	Total Curies	1.3 E+00

[a]Less than analytical detection limit.
Dorian and Richards (1978).

116-B-6A currently appears as a vegetation-free, cobble-covered field located near or within a barricaded area at the former site of the 111-B Building. There are no boundary markers to clearly differentiate the crib from the former site of the 111-B Building, which is just inside the reactor exclusion area fence and to the southeast of the 100-B Reactor. The barricaded area is demarcated by light-duty steel posts with light-duty chain and has been posted with "Caution: Underground Radioactive Material" and waste site identification signs. Part of the building foundation remains visible above ground at the middle of the barricaded area's west side, along with a steel manhole. A capped, curved pipe also protrudes approximately 10 in. above ground near the manhole. Two characterization wells are located just north of the barricaded area, and one characterization well is located to the south.

The exact location of 116-B-6A is unclear. Stenner et al. (1988) and WHC (1991) state that the crib was located to the north of the 111-B Building. The crib is believed to be in one of two locations. The first location is within and at the very north end of the barricaded area. Signs at the site appear to support this belief; the north side of the barricaded area has a sign reading "116-B-6A Crib #1," and the north and west sides are posted with "Crib" signs. The second location, just north of two characterization wells and the bounded area, appears as a vegetation-free pile of cobbles raised approximately 1 ft above grade; it is unmarked and has not been fenced.

The HRS migration score for this crib is 16.22 (Stenner et al. 1988). Average and maximum concentrations of ^{238}Pu were found to be below analytical detection limits (Dorian and Richards 1978).

Refer to Figure 4-6 for a 1993 photograph of the crib site. A historical photograph, Figure 4-7, shows the building foundation and a larger portion of the vent pipe than that currently visible above ground; this figure may give a better idea of the crib's location relative to the foundation of the 111-B Building.

Figure 4-6. 116-B-6A Crib.

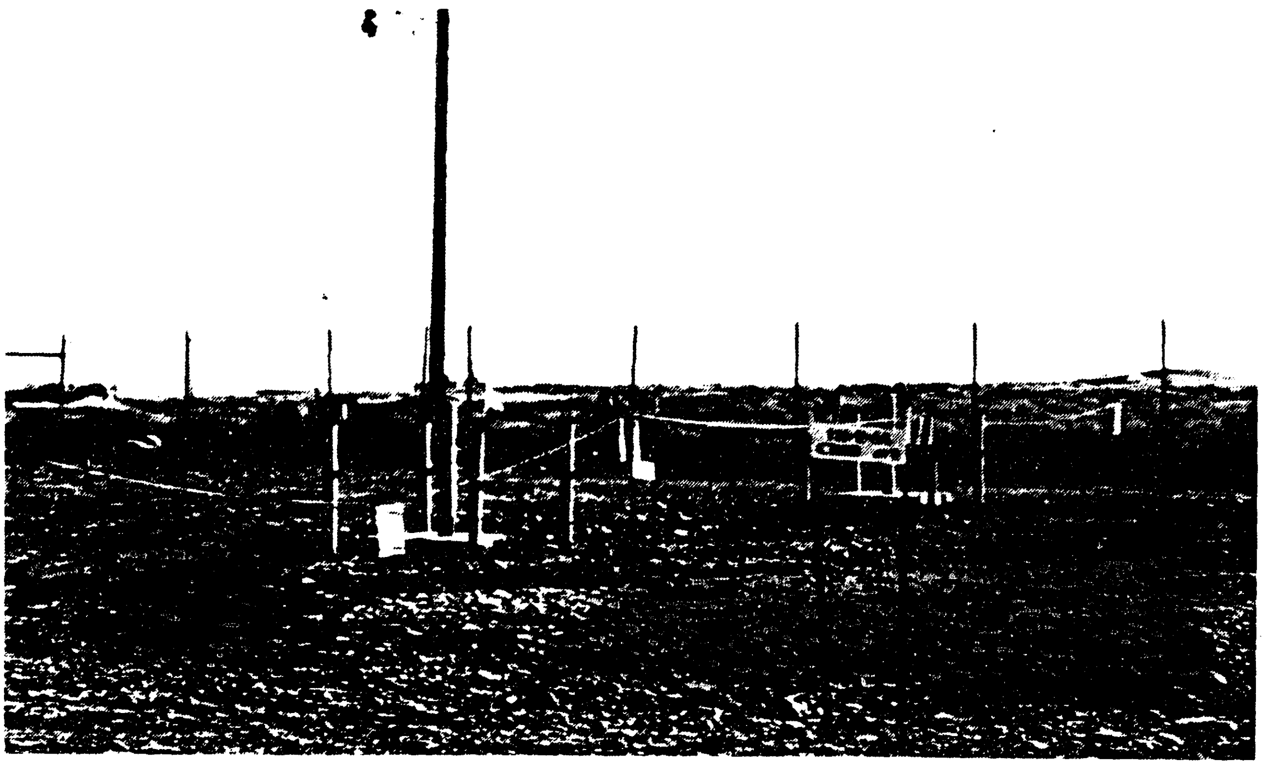


Figure 4-7. Historical Photograph of the 116-B-6A Crib.

4.7 116-B-6B (116-B-6B CRIB)

116-B-6B is an inactive liquid waste site located 30 ft southeast of the former location of the 111-B Building at Hanford coordinates N68549 W80335. This site is commonly known as the 116-B-6B Crib, although it has also been known as 111-B Crib No. 2 and as 116-B-6-2. It received radioactive wastes from equipment decontamination performed in the 111-B Building, as well as liquid wastes from the decontamination of fuel element spacers. Approximately 5×10^3 L of mixed wastes was received at this site between 1950 and its retirement in 1953 (Stenner et al. 1988).

The crib is 12 ft long, 8 ft wide, and 6 ft deep (PNL 1991, Stenner et al. 1988). It is "an unlined excavation, probably filled with gravel" (DOE-RL 1993a).

The estimated radionuclide inventory for the crib includes the following. Data are presented in curies, with amounts calculated to account for decay through April 1, 1986.

^{60}Co:	1.000 E-005	^{155}Eu:	4.000 E-005	^{238}U:	1.000 E-005
^{137}Cs:	2.100 E-004	^{3}H:	7.560 E-003	^{90}Sr:	1.900 E-004
^{152}Eu:	1.600 E-004				

(Stenner et al. 1988)

The crib also contains 50 kg of sodium dichromate, 100 kg of sodium oxalate, and 100 kg of sodium sulfamate (WHC 1991, Stenner et al. 1988).

Dorian and Richards (1978) provides a radionuclide inventory and includes the results of soil samples taken from a "potentially contaminated soil column" at the 116-B-6B site. The volume of contaminated soil located at the site was estimated to be 1.2×10^4 ft^3, and the mass of that soil was estimated to be 8.2×10^8 g. Additional information from the sampling is provided in Tables 4-10 and 4-11.

Table 4-10. 116-B-6B Gross Radionuclide Inventory.

Radionuclide	Amount (pCi/g)
Avg. Beta/Gamma	1.6 E+01
Max. Beta/Gamma	1.6 E+01
Avg. $^{239/240}Pu$	a
Max. $^{239/240}Pu$	a

[a]Less than analytical detection limit.
Dorian and Richards (1978).

Table 4-11. 116-B-6B Radionuclide Inventory.

Radionuclide	Average pCi/g	Curies
^{238}Pu	a	0.0
^{239}Pu, ^{240}Pu	a	0.0
^{90}Sr	2.8 E-01	2.3 E-04
^{3}H	1.5 E+01	1.2 E-02
^{152}Eu	2.9 E-01	2.4 E-04
^{60}Co	5.3 E-02	4.4 E-05
^{154}Eu	0.0	0.0
^{134}Cs	4.1 E-02	3.4 E-05
^{137}Cs	3.1 E-01	2.5 E-04
^{155}Eu	1.7 E-01	1.4 E-04
Uranium	7.7 E-02	1.1 E-05
^{14}C	No data	No data
	Total Curies	1.2 E-02

[a]Less than analytical detection limit.
Dorian and Richards (1978).

DOE-RL (1993a) states, "It is assumed that the crib is underlain and surrounded by sediments analogous to that found in the 116-B-6A in situ vitrification boreholes." Soil sampling performed at the three boreholes detected concentrations of cadmium, copper, lead, and zinc above the Hanford Site background 95% upper threshold limit. Geophysical logging at the boreholes showed the presence of ^{137}Cs, ^{90}Sr, and ^{60}Co (DOE-RL 1993a).

Upon decommissioning, the crib was covered with approximately 6 ft of soil (DOE-RL 1993a).

The HRS migration score for this crib is 16.22 (Stenner et al. 1988).

116-B-6B currently appears as a vegetation-free, cobble-covered field, approximately 30 ft southeast of the former 111-B site. It is marked with a permanent, square concrete burial marker that is approximately 10 ft inside the reactor exclusion area fence. The northwest corner of the waste site is marked by two pieces of wood, perhaps the top ends of two-by-fours buried vertically, that are perpendicular to each other and are barely visible from the surface. Two 4-ft-tall light-duty steel posts are located approximately 5 ft from the concrete burial marker and they are posted with a sign reading "116-B-6B Crib #2." Refer to Figure 4-8 for a 1993 photograph of the 116-B-6B site.

Figure 4-8. 116-B-6B Crib.

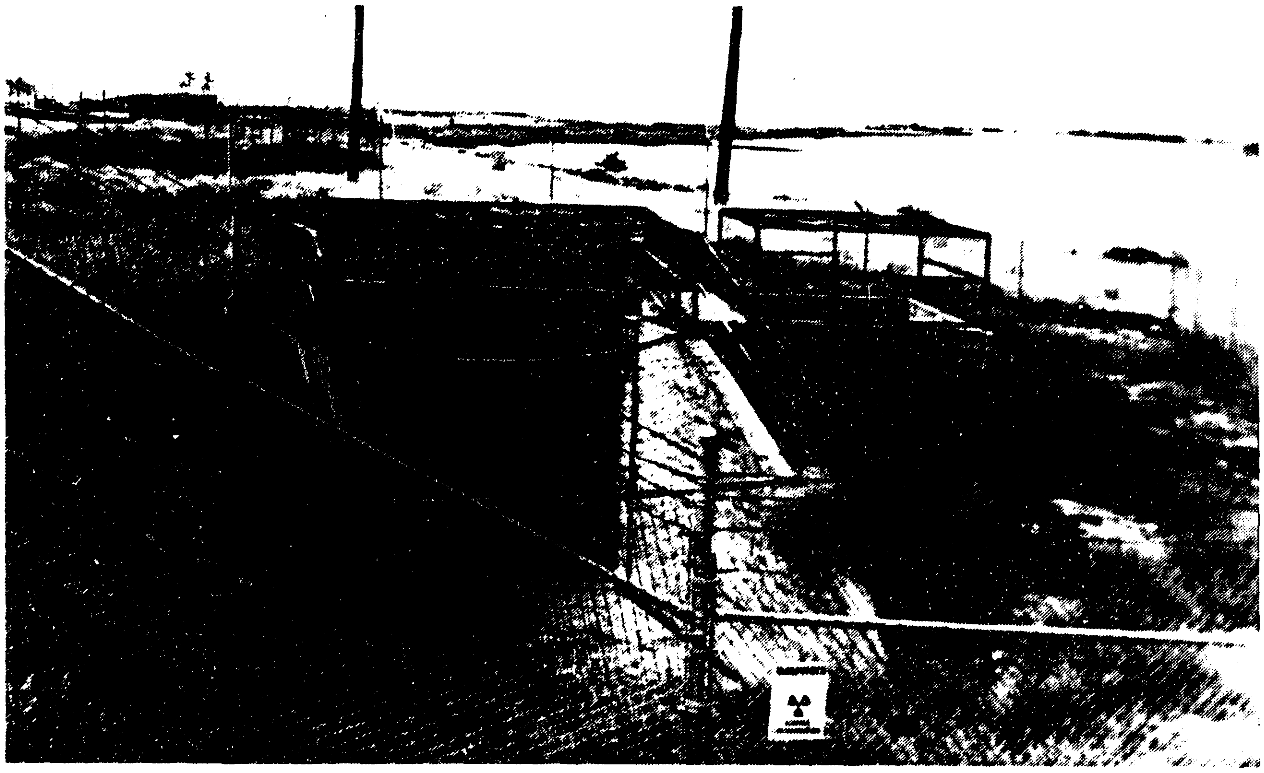
4.8 116-B-7 (1904-B1 OUTFALL)

116-B-7 is an inactive liquid waste site located at Hanford coordinates N71800 W80780. It is atop the riverbank, approximately 200 ft northwest of the 107-B Retention Basin, and is downstream of the 181-B Building. This site is commonly known as the 1904-B1 Outfall, but has also been known as the 116-B-7 Outfall and as the 1904-B1 Outfall Structure. The outfall operated from 1944 to 1972 and was used to dispose of water plant treatment wastes and reactor coolant water from the 107-B Retention Basin. After the completion of Project CG-558, "Cooling Water Expansion," in 1954, this outfall was only used for the discharge of storm runoff and 100-B process sewer wastes from the 100-B water treatment facilities. Another outfall, 132-B-6, was constructed downstream for the disposal of reactor effluents; refer to Section 4.38 for more information concerning that outfall.

The outfall consisted of an open concrete sump and a 42-in. effluent line that ran from the sump to a point mid-channel of the Columbia River, approximately 450 ft from shore. It also included a concrete spillway that terminated at the river shoreline (Dorian and Richards 1978). The outfall structure is 8.2 m long, 4.2 m wide, and 6.4 m deep (DOE-RL 1993a). It is enclosed with hog wire fencing as an aviary exclusion cover (WHC 1991).

Currently, 116-B-7 appears much the same as it did during its operation. The spillway has been backfilled from the outfall structure to the river shoreline. The structure is surrounded by an 8-ft-high chain-link fence and is posted with "Radioactive Surface Contamination" signs. Figure 4-9 shows a 1993 photograph of the outfall structure.

Figure 4-9. 1904-B1 Outfall (116-B-7).



4.9 116-B-9 (104-B-2 FRENCH DRAIN)

116-B-9 is an inactive, low-level liquid waste site that operated from 1952 to 1954 to receive an estimated 4 x 10^4 L of wastewater from the P-10 Storage Building drain (WHC 1991). The site is commonly known as the 104-B-2 French Drain, although it has also been known as the 116-B-9 French Drain. Site documentation establishes the french drain at Hanford coordinates N69743 W80728; however, due to conflicting information, the precise visual location is unclear.

Hanford Site Drawing H-1-4049 shows the french drain to be on the northwest corner of the 104-B-2 Building or directly inside the northwest corner of the fence. Refer to Figure 4-10 and Figure C-7 in Appendix C for an updated version of that drawing. A historical photograph of the 104-B-2 Storage Facility is also provided as Figure 4-20 of Section 4.22; it suggests that the french drain may in fact be on the east side of that building. The photograph clearly shows a vent pipe running up the east side of the building and over to the now-demolished 108-B Building. Generally, all documentation confirms that the french drain is located west of the 132-B-1 Tritium Recovery Facility site, north of the 105-B Reactor Building, and just inside the reactor exclusion area fence.

Approximately 100 ft east of the 104-B-2 storage building is an area, bounded by steel posts and light-duty barricade chain, that has erroneously been labeled as the 116-B-9 French Drain.

The tile drain was 3 ft deep, 4 ft in diameter, and gravel filled (Stenner et al. 1988, Clukey 1954).

Tritium may be a potential contaminant at this site because the P-10 project involved tritium production. More definitive information on potential contamination is unavailable. No sampling has been performed at this site (DOE-RL 1992).

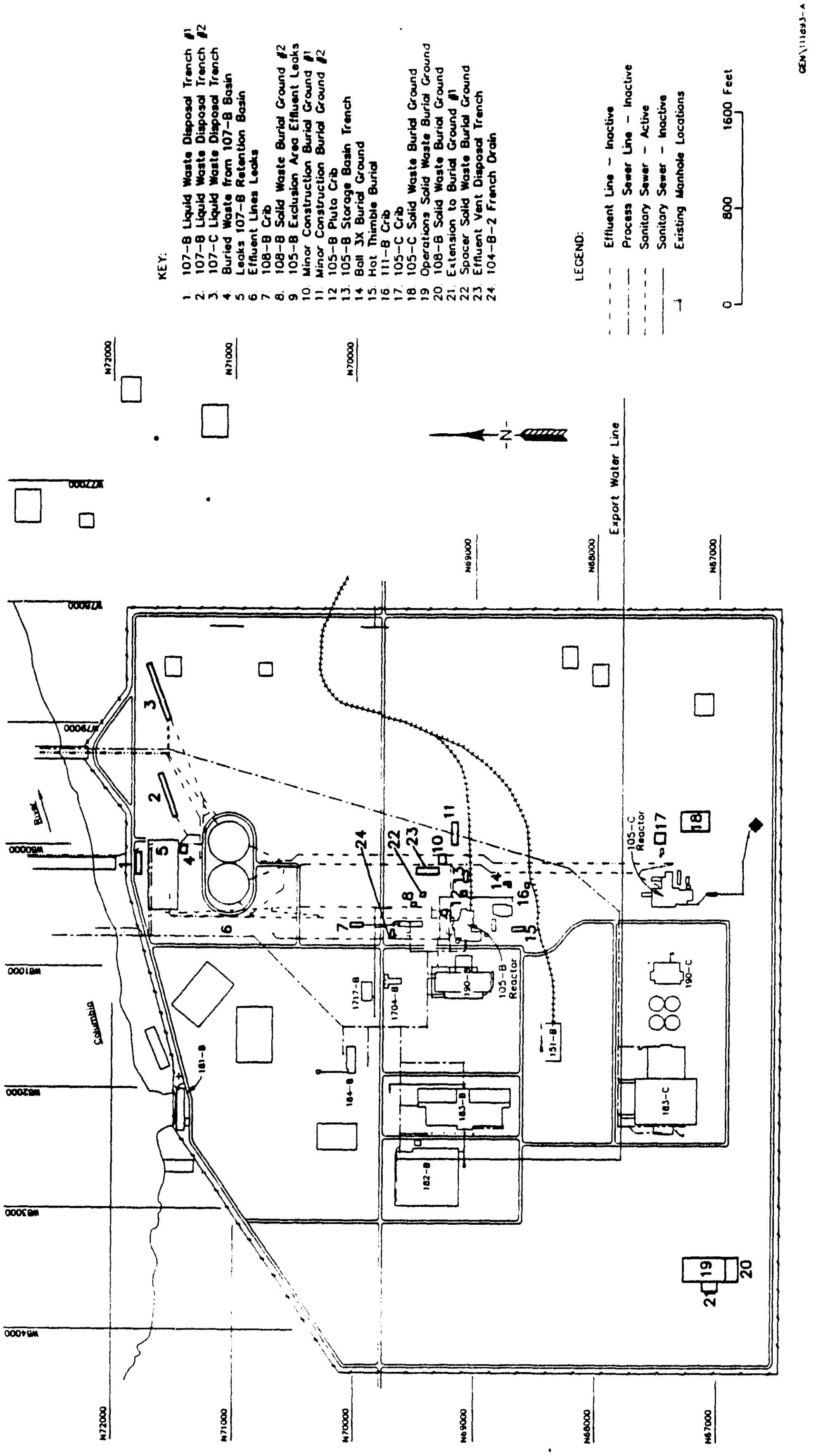
The HRS migration score assigned to this site is 0.00 (Stenner et al. 1988).

4.10 116-B-10 (108-B DRY WELL)

116-B-10 is an inactive liquid waste site that operated from 1950 to 1968. This dry well is most commonly known as the 108-B Dry Well, but is also known as the Quench Tank. It is located at Hanford coordinates N69674 W80722. It was used to collect liquid decontamination wastes from the 108-B Tube Examination and Experimental Facility (WHC 1991). The volume of waste received at this waste site has been estimated at 5 x 10^6 L (Stenner et al. 1988).

Although the site is currently registered as an underground injection well, it might be better described as a collection tank than as a dry well because of its construction and concrete bottom. Hanford Site Drawing H-1-2946 indicates that it was constructed of a 24-in. vitrified clay pipe that rests vertically on a concrete slab. It was used as collection chamber for both 108-B Building process wastes and storm drain wastes from the 108-B Building roof and drained to the 100-B Area Process Sewer via a 4-in.

Figure 4-10. Historical Drawing of Waste Sites in the 100-B Area.



vitrified clay pipe. The tank was originally fed by a single 6-in. process sewer line that entered 3 ft above the bottom. A second drain line, added to the tank in the mid-1950's, consisted of a 1.5-in. drain line that originated at the experimental tube and hardware decontamination facility located on the second floor of the 108-B Building (WHC 1991). At the time of decommissioning, it was fed by two lines. One was a 2-in., galvanized, schedule 40 pipe that entered about 2 ft from the bottom and was the process waste drain line. The second was a 2-in., schedule 40, galvanized pipe that carried storm runoff from the fan room roof.

All of the piping that led into the tank was removed at the time of the 108-B Building demolition. Additionally, a "sheet" of plywood was added to the surface to protect the site before being covered with "at least one meter of clean fill" (Beckstrom 1986).

The radionuclide inventory for this site includes ^{60}Co, ^{137}Ce, ^{152}Eu, ^{154}Eu, and ^{3}H. No other radiological information is available. Additional chemical contaminants normally found in decontamination solutions may be expected at the site, including chromates, nitrates, and solvents.

This site is a registered underground injection well (DOE-RL 1988) and has an HRS migration score of 0.00 (Stenner et al. 1988).

116-B-10 currently appears as a vegetation-free, cobble-covered field and is included in the reactor exclusion area. A site near the east exclusion area fence is identified as 116-B-10 by a small sign mounted on light-duty steel posts. The marked site could not possibly be the dry well, however, because the dry well was located on the northwest corner of Room 15-C, the ventilation supply room, which was on the west side of the 108-B Building (Beckstrom 1986, Hanford Site Drawing H-1-2946). The misidentified site is most likely one of three condensate french drains that were located on the east side of the 108-B Building (Hanford Site Drawing H-1-10260).

4.11 116-B-11 (107-B RETENTION BASIN)

116-B-11 is an inactive, mixed liquid waste site that served as an integral component of the 100-B Reactor cooling system. The site is commonly known as the 107-B Retention Basin. Operating from 1944 to 1968, it received the cooling water effluent from the 100-B Reactor for radioactive decay and thermal cooling prior to release to the Columbia River. The retention basin lies on the northern edge of the 100-B Area at Hanford coordinates N71660 W80560 and is located north of the 107-C Retention Basin (Stenner et al. 1988).

Reports differ as to the size of the retention basin. WHC (1991) states that the basin is 450 ft long, 230 ft wide, and 24 ft deep, while DOE-RL (1993a) reports that the basin is 467 ft long, 230 ft wide, and 20 ft deep. The concrete-lined basin has a vertical baffle that runs lengthwise down the middle. The floor consists of concrete slabs, with joints that were originally closed with neoprene water seals. The walls sloped to a height of almost 10 ft above the floor and were approximately 4 in. thick. The upper sections of the walls, about 10 ft in height, were vertical and range in thickness from about 5 ft, 8 in., at the bottom to 1 ft at the top (Stenner et al. 1988). The walls of the basin have been partially demolished (DOE-RL 1992).

Unplanned releases at this basin were the result of effluent line leakages and basin leakages. Leaks were noticed at the north wall of the basin as early as 1949 (DOE-RL 1993a). In early 1952, gross leakage at the inlet for the 105-B effluent line was detected and steadily increased in volume. In February 1954, a break occurred in the basin. The extent of the contamination from these releases is well within the zone encompassed by the unit and is within the AC-5-40 permanent concrete monuments with underground radiation warning signs (Stenner et al. 1988, Dorian and Richards 1978).

The leaks were greatest at the northeast corner of the basin. Contaminated water was visible on the soil surface around the basin (DOE-RL 1992). There were also leaks in the pipe on the outlet end of the basin. The leaks were not covered with soil. A survey of the water-covered area around the basin on February 25, 1954, disclosed a variation in readings from several hundred counts per minute to 13 mrad/h. The amount of radioactive material in the water was comparable to that in normal reactor effluent water. Beta contaminants in the mud were 10^{-4} to 10^{-2} pCi/g (Dorian and Richards 1978).

After 1954, efforts to repair basin leaks were unsuccessful and the retention basin was taken out of service. The cooling water from the 100-B Reactor was then diverted to the 107-C Retention Basin. For at least 14 years after being retired, the basin was purposely kept wet to prevent it from drying out and allowing wind action to spread contaminants to the surrounding downwind area. To maintain a minimum wetness, overflow water from the 100-B Reactor fuel storage basin was routed to the retention basin. By 1975, the basin was no longer kept wet, and approximately 3.5 ft of soil fill was added on top of the 2.5-in. layer of sludge present in the bottom of the basin. The walls of the basin have been partially demolished (DOE-RL 1992).

Numerous soil samples were taken at and near the basin. The estimated volume of contaminated soil adjacent to the basin was 1.7×10^4 ft^3 with a mass of 1.2×10^9 g (based on surface contamination extending 50 ft away from the north wall, 10 ft away from all other walls, and 1/2 ft deep). The estimated volume of contaminated soils underneath the basin was 3.9×10^6 ft^3 with a mass of 2.7×10^{11} g (based on underground contamination extending 200 ft away from the north wall, 25 ft away from other walls, and 30 ft deep). Table 4-12 is a summary of the radionuclide inventory in soil adjacent to the 107-B Retention Basin.

Table 4-13 summarizes the radionuclide inventory of the contaminated soil underneath the basin at the 0- to 20-ft level.

Table 4-12. 116-B-11 Radionuclide Inventory Adjacent to Basin.

Radionuclide	Surface contamination[a] average pCi/g	Underground contamination average pCi/g	Curies
^{238}Pu	0.0	0.0	0.0
$^{239/240}Pu$	5.0 E-01	2.2 E-01	6.0 E-02
^{90}Sr	1.7 E+01	1.7 E+00	4.8 E-01
^{3}H	3.8 E+00	4.5 E+00	1.2 E+00
^{152}Eu	1.1 E+03	1.4 E+01	5.1 E+00
^{60}Co	1.1 E+03	2.1 E+01	7.0 E+00
^{154}Eu	3.8 E+02	4.2 E+00	1.6 E+00
^{134}Cs	7.1 E+00	7.7 E-02	2.9 E-02
^{137}Cs	2.7 E+02	2.7 E+01	7.6 E+00
^{155}Eu	4.6 E+01	1.3 E+00	4.1 E-01
Uranium	9.2 E-01	2.1 E-01	5.8 E-02
		Total Curies	2.4 E+01

[a]The $^{90}Sr/^{137}Cs$ concentration ratio for the underground contamination analytical results was used to establish the ^{90}Sr concentration for the surface contamination.

Dorian and Richards (1978).

Table 4-13. 116-B-11 Radionuclide Inventory Beneath Basin.

Radionuclide	Avg. pCi/g	Curies
^{238}Pu	1.0 E-01	1.5 E-02
$^{239/240}Pu$	5.0 E+00	7.5 E-01
^{90}Sr	3.6 E+00	5.4 E-01
^{3}H	3.1 E+01	4.7 E+00
^{152}Eu	7.0 E+02	1.1 E+02
^{60}Co	6.0 E+02	9.0 E+01
^{154}Eu	2.8 E+02	4.2 E+01
^{134}Cs	4.4 E+00	6.6 E-01
^{137}Cs	2.1 E+02	3.2 E+01
^{155}Eu	2.4 E+01	3.6 E+00
Uranium	1.7 E-01	2.6 E-02
	Total Curies	2.8 E+02

Dorian and Richards (1978).

Table 4-14 summarizes the average and maximum radionuclide concentrations of the following: the sludge; the soil fill less the sludge; and underneath, adjacent to, and within the concrete for the 107-B Retention Basin.

Additionally, radioactive inventories for beta-gamma contaminants, ^{238}Pu, and $^{239/240}Pu$ are given in Table 4-15 for the same criteria.

Table 4-14. 116-B-11 Radioactive Concentrations In and Near the Basin, in Curies.

Sample substance/ area	Beta-gamma (pCi/g)		^{238}Pu (pCi/g)		$^{239/240}Pu$ (pCi/g)	
	Average	Maximum	Average	Maximum	Average	Maximum
Sludge	6.1 E+04	1.8 E+05	1.9 E+00	8.7 E+00	5.8 E+01	3.4×10^{2}
Fill less sludge	5.9 E+02	9.5 E+03	3.9 E-03	3.9 E-02	7.1 E-01	1.0×10^{1}
Underneath 0-20 ft	1.8 E+03	5.4 E+03	1.0 E-01	5.8 E-01	5.0 E+00	1.8×10^{1}
Adjacent--surface	2.9 E+03	2.9 E+03	a	a	5.0 E-01	5.0×10^{-1}
Adjacent--beneath	7.4 E-01	5.6 E+03	a	a	2.2 E-01	3.3×10^{0}

[a]Less than analytical detection limit.
Dorian and Richards (1978).

Table 4-15. 116-B-11 Radioactive Inventories In and Near the Basin, in Curies.

Type	Sludge	Fill less sludge	Concrete	Under-neath	Adjacent	Total curies
Beta-gamma	9.2 E+01	1.6 E+01	8.0 E+00	2.8 E+02	2.4 E+01	4.2 E+02
^{238}Pu and $^{239/240}Pu$	9.0 E-02	1.8 E-02	1.0 E-02	7.7 E-01	6.0 E-02	9.5 E-01

Dorian and Richards (1978).

Samples were taken of the effluent line scale and sludge at the basin. Direct Geiger-Mueller (GM) instrument readings of the scale were approximately 50,000 c/m. Plutonium-239/240 concentrations ranged from 10 to 300 pCi/g. Beta-gamma contamination levels ranged from 10^3 to 10^5 pCi/g. A sample of mud taken from a diversion box at the 116-C-11 basin had $^{239/240}Pu$ concentrations of 2.8×10^3 pCi/g (Dorian and Richards 1978).

Radioactive contamination is confined to the immediate vicinity of the basin (Dorian and Richards 1978). WIDS reports that a triangular-shaped area of ground, about 8 ft per side, was found to be contaminated with up to 4,000 dpm, but does not specify the precise location.

Also, a 4-ft by 4-ft area west of the 107-B perimeter fence had contamination levels up to 3,500 dpm direct. That contamination was removed on November 1, 1989. Cleanup actions planned for the basin include decontamination and backfill to bring it into compliance with WHC-CM-7-5, *Environmental Compliance Manual* (WHC 1991).

The HRS migration score for this site is 76.91 (Stenner et al. 1988).

116-B-11 appears today as a large rectangular gravel-covered basin with a gravel berm running the length of it down the center. It is inside an 8-ft chain-link fence that is posted with "Caution, Surface Contamination" and "Potentially Hazardous Area, Do Not Enter" warning signs.

4.12 116-B-12 (117-B CRIB)

116-B-12 is an inactive liquid waste site located at Hanford coordinates N69100 W80600. The site is commonly known as the 117-B Crib. It was operational from 1961 to 1968, receiving drainage from the confinement system in the 117 Building seal pits. A total of 4.2×10^5 L of liquid wastes was disposed of at this site (WHC 1991).

The crib is 10 ft long, 10 ft wide, and 10 ft deep. A large steel vent currently marks the site (WHC 1991).

This site was sampled in 1978 and was found to have no contamination above background levels (WHC 1991).

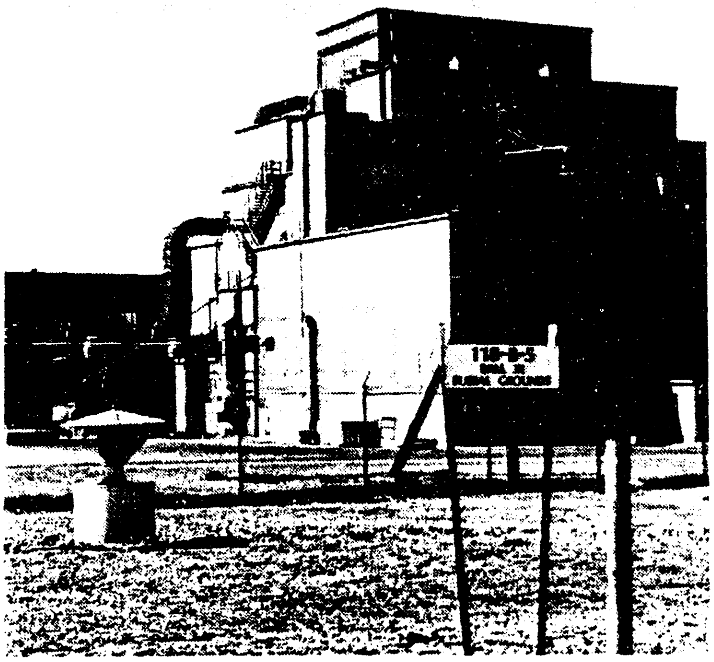
Sampling was not performed at this site for DOE-RL (1993a), a limited field investigation. However, DOE-RL (1993a) states that data from sampling performed at the 116-D-9 and 116-H-9 sites indicate potential contaminants of the 116-B-12 site, since the three sites are analogous. Radionuclide analysis of soil sampling performed at a 116-D-9 crib boring detected acetone, ^{14}C, ^{40}K, ^{90}Sr, ^{226}Ra, ^{228}Th, ^{238}U, and ^{241}Am. No semivolatile organic compounds, pesticides, or PCBs were detected at the 116-D-9 site, and no metals or other inorganic compounds were found in concentrations at or above the Hanford Site background 95% upper threshold limit. Radionuclides detected in 116-H-9 samples included ^{137}Cs, ^{152}Eu, ^{226}Ra, ^{228}Th, and ^{238}U. DOE-RL (1993a) notes that the data from these two sampled sites do not match, and states that this discrepancy indicates "the uncertainty that the use of data from analogous sites entails."

An HRS migration score of 0.00 has been assigned to this site. Stenner et al. (1988) states, "Although the site was used for waste disposal, no inventory was available; therefore, the site did not score." The crib is a registered underground injection well (DOE-RL 1988).

Currently, the 116-B-12 site appears as a vegetation-free, cobble-covered area bounded on the north, east, and south sides by 3-in. yellow steel posts and pairs of light-duty steel posts. The bounded area is approximately 100 ft long and 60 ft wide. The west side of the crib site is bounded by the reactor exclusion area fence. It is located to the east of the 100-B Reactor and is due north and adjacent to the 118-B-5 Burial Ground. The vent pipe, which looks like two inverted cones atop a large pipe, protrudes from the center of the site. Figure 4-11 shows a photograph of the crib site. The north and east sides of the crib site have been incorrectly posted with signs, mounted on light-duty steel posts, that read "118-B-5 Ball 3X Burial Grounds." Figure 4-12 shows a 1993 photograph of the waste site that includes the incorrect signs.

Figure 4-11. Historical Photograph of the 117-B Crib (116-B-12).

Figure 4-12. 117-B Crib (116-B-12).



4.13 116-B-13 (107-B SOUTH SLUDGE TRENCH)

116-B-13 is an inactive liquid waste site that operated in 1952. The site is commonly known as the 107-B South Sludge Trench. It is located at Hanford coordinates N71400 W80100, south of the southeast corner of the 107-B Retention Basin (WHC 1991). The trench was used to dispose of sludge removed from the 107-B Retention Basin.

Originally, this 50-ft-long, 50-ft-wide, and 10-ft-deep trench was marked above ground by two concrete monuments posted with "Do Not Excavate" warning signs (Heid 1956). These concrete monuments no longer remain at the site.

No radiological or hazardous material data specific to this waste site could be found, although the contents of this trench should be similar to those found in the 116-B-14 Trench (described in Section 4.14).

DOE-RL (1993a) states that the 116-B-13 and 116-B-14 trenches are assumed to be "underlain by sediments analogous to that found in the 116-B-1 vadose borehole." Radionuclide analysis of samples taken at the 116-B-1 borehole detected the presence of toluene, ^{238}Pu, ^{239}Pu, ^{134}Cs, ^{137}Cs, ^{152}Eu, ^{154}Eu, ^{60}Co, ^{14}C, ^{90}Sr, and ^{241}Am. Chemical analysis detected chromium, manganese, and zinc were detected in concentrations above the Hanford Site background 95% upper threshold limit. No semivolatile organic compounds, pesticides, or PCBs were detected (DOE-RL 1993a).

The trench was covered with about 6 ft of soil soon after it was used.

The site appears today as a vegetation-free, cobble-covered field within the 107-B and 107-C retention basin area, which is surrounded by an 8-ft chain-link fence and posted with "Radioactive Surface Contamination" signs.

4.14 116-B-14 (107-B NORTH SLUDGE TRENCH)

116-B-14 is an inactive liquid waste site that is located immediately north of the 107-B Retention Basin at Hanford coordinates N71760 W80270. It is located immediately north of the 107-B Retention Basin and outside the exclusion area fence that encloses the 107-B and 107-C retention basins. Its center line is about 40 ft north of the retention basin exclusion area fence.

This site is commonly known as the 107-B North Sludge Trench and received low-level sludge wastes in 1948 from the 107-B Retention Basins (WHC 1991). The total amount of sludge buried in the trench is unknown (DOE-RL 1992).

The trench was 120 ft long, 10 ft wide, and 10 ft deep. After use, the trench was covered over with approximately 6 ft of soil (WHC 1991).

A single soil sample, taken at the trench site, identified a radioactive inventory of 0.8 Ci. Table 4-16 gives the average and maximum concentrations of beta/gamma and $^{239/240}Pu$ found at the site. There is some concern for the accuracy of the sample because the exact location of the trench could not be verified and it is uncertain whether the sample site was inside or immediately outside of the trench (DOE-RL 1992). DOE-RL (1993a) notes that the minimal levels of radionuclides presented in Dorian and Richards (1978) "are not consistent with the levels of radionuclides present in sludge from the 116-C-5 retention basin, which is considered to be analogous."

Table 4-16. 116-B-14 Gross Radionuclide Inventory.

Radionuclide	Amount (pCi/g)
Avg. beta/gamma	2.40 E+02
Max. beta/gamma	6.80 E+02
Avg. $^{239/240}Pu$	7.00 E-01
Max. $^{239/240}Pu$	2.20 E+00

Dorian and Richards (1978).

DOE-RL (1993a) states that the 116-B-13 and 116-B-14 trenches are assumed to be "underlain by sediments analogous to that found in the 116-B-1 vadose borehole." Chemical analysis of soil samples taken at the 116-B-1 borehole site detected the presence of toluene, ^{238}Pu, ^{239}Pu, ^{134}Cs, ^{137}Cs, ^{152}Eu, ^{154}Eu, ^{60}Co, ^{14}C, ^{90}Sr, and ^{241}Am. Chromium, manganese, and zinc were detected in concentrations above the Hanford Site background 95% upper threshold limit. No semivolatile organic compounds, pesticides, or PCBs were detected (DOE-RL 1993a).

Additionally, soil samples were taken when monitoring well 199-B3-47 was installed approximately 40 m north of the 116-B-14 site. The sampling detected methylene chloride, di-n-butyl phthalate, the pesticide "Endrin," ^{90}Sr, ^{134}Cs, ^{137}Cs, ^{226}Ra, ^{228}Th, ^{238}U, and ^{241}Am. No PCBs were detected, and no inorganic compounds or metals were detected at levels exceeding the Hanford Site background 95% upper threshold limit (DOE-RL 1993a).

No HRS migration score has been assigned to this waste site.

116-B-14 currently appears as an open field covered with cobbles and natural vegetation. It is within a larger zone created by permanent concrete monuments and "Caution: Underground Radioactive Material" signs. The trench site is unfenced. Two concrete markers identify the center line of the trench and both markers are located on a gravel and cobble mound. A light-duty steel post is visible near the easternmost concrete marker.

Hanford Drawing H-1-4049 describes the site as site number 1. An updated version of the drawing is provided as Figure 4-13 or Figure C-7 in Appendix C.

4.15 116-B-15 (105-B FUEL STORAGE BASIN CLEANOUT PERCOLATION PIT)

116-B-15 is an inactive, nonhazardous/nonradioactive liquid waste site that received 567,750 L of processed water from the 105-B Fuel Storage Basin cleanup project (Miller and Steffes 1986). The site is commonly known as the 105-B Fuel Storage Basin Cleanout Percolation Pit, although it has also been known as the 105-B Pond, the 105-B Discharge Pond, and the 105-B Fuel Storage Discharge Pond. It is located approximately 500 ft east of the 105-B Reactor Building at Hanford coordinates N69134 W79930 (WHC 1991).

The pit operated from November 1984 to December 1985 (Miller and Steffes 1986). Approximately 120,000 gal of water was discharged into the pit over a 2-week period from November 1, 1984 to November 13, 1984 (Beckstrom 1988).

This 5,000-ft^2 waste site is an open, excavated pit that is 100 ft long, 50 ft wide, and 6 ft deep (Beckstrom 1988). Soil excavated from the center was used as a berm around its perimeter (WHC 1991).

During the cleaning of the 105-B Fuel Storage Basin, radiologically contaminated shielding water was processed through a filter system for decontamination that utilized filtration and ion exchange columns (Miller and Steffes 1986). Before water was discharged to the percolation pit, composite samples were taken to ensure that radionuclide concentrations were below release criteria in Table II of DOE Order 5480.1. No known chemical substances were present in the water; however, chemical analysis during that period was not a standard practice, and there is no evidence that it was performed (WHC 1991).

Beckstrom (1988) provides information about the surveying and radiological release of the percolation pit. Because dose assessment calculations indicated that the pit did not exceed the Allowable Residual Contamination Level (ARCL), the site was given unrestricted release (Beckstrom 1988).

No HRS migration score has been assigned to this waste site (Beckstrom 1988).

116-B-15 appears today as a large open pit with a cobble and soil berm wall. The site has no signs or markers. It is located to the east of the 100-B Reactor, just outside a larger radiologically controlled area that is bounded by permanent concrete markers and posted with "Caution: Underground Radioactive Material" signs. Natural vegetation grows on the surface. The site has no signs or markers.

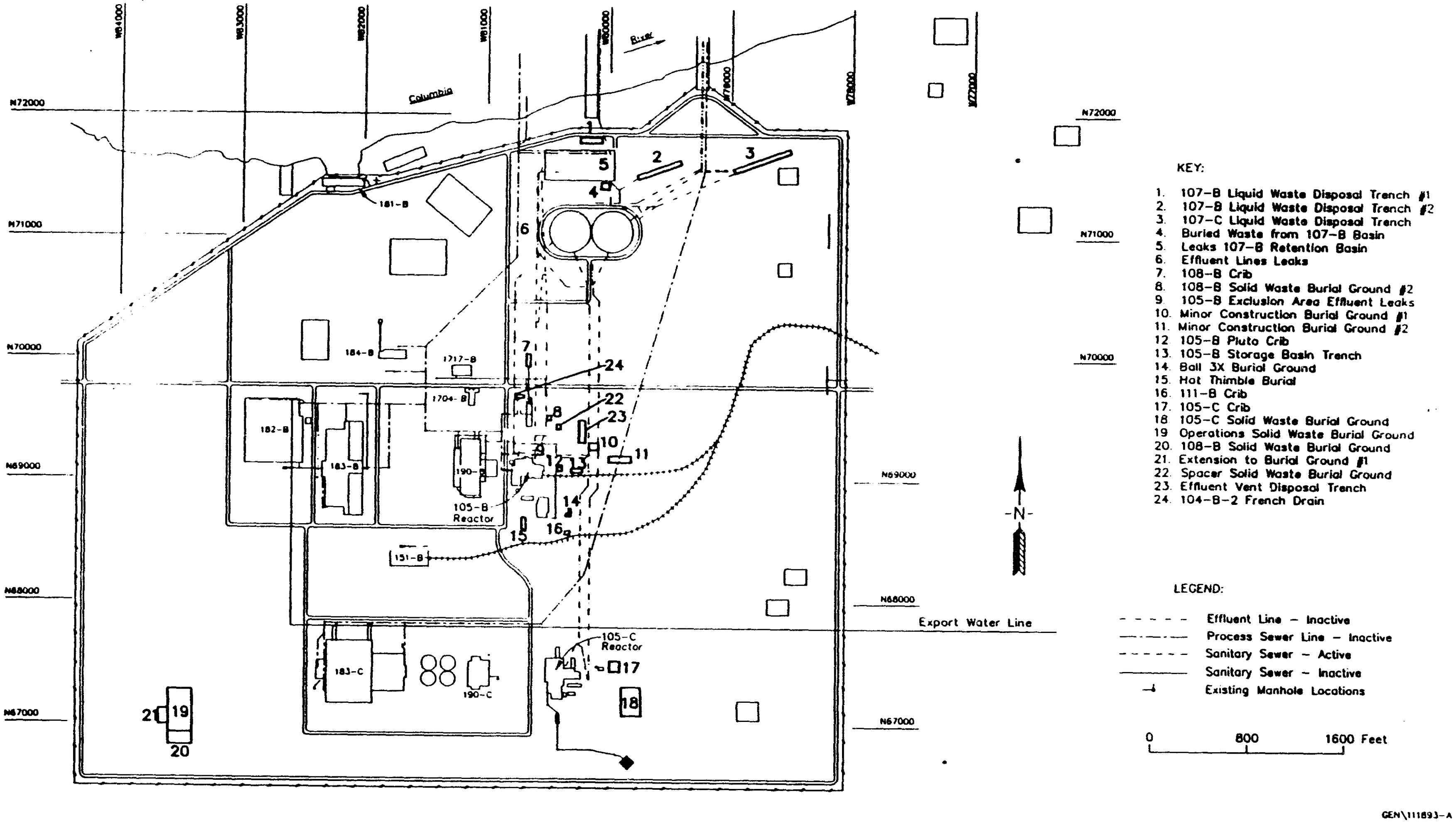


Figure 4-13. Historical Drawing of Waste Sites in the 100-B Area.

4.16 116-B-16 (111-B FUEL EXAMINATION TANK)

116-B-16 is an inactive low-level liquid waste site that was operational during the lifetime of the 111-B Metallurgical Examination Building, until 1968. The site is commonly known as the 111-B Fuel Examination Tank, although it has also been known as the 116-B-16 Storage Tank. It is located at Hanford coordinates N68620 W80363, under the northwest corner of the 111-B Building foundation, and approximately 575 ft southeast of the 105-B Reactor Building. The tank received liquid wastes from the decontamination of fuel element spacers and other equipment as well as from 111-B Building activities (WHC 1991).

The storage tank was constructed of concrete (WHC 1991) and is 10.67 ft long, 5.75 ft wide, and 9 ft deep (Powers 1983).

During an in situ vitrification demonstration at the 116-B-6A Crib, a barrier was constructed between the fuel examination tank and the crib so that the contents of the tank would not be affected by the vitrified material. The barrier wall was built of a plywood form and a 1-ft-thick ceramic wall that was poured to a depth of 15 ft. The space between the fuel examination tank and the barrier wall was filled with large, 2- to 3-in.-diameter rocks. A cooling system, using air flowing through the layer of rocks, was installed to ensure that the tank would not reach temperatures exceeding 200 °F (Luey et al. 1992). It is believed that the barrier wall remains at the site, although documents neither confirm nor deny this.

No documents reporting the inventory of radionuclides or hazardous chemicals at this site could be found.

It is believed that the tank was filled with either sand or concrete before the site was abandoned (WHC 1991). The tank site has a total area of 61.30 ft^2 (Powers 1983).

The 116-B-16 site currently appears as a vegetation-free, cobble-covered field located within a barricaded area at the former site of the 111-B Building, just inside the exclusion area fence and to the southeast of the 100-B Reactor. The barricaded area has been demarcated by light-duty steel posts with light-duty chain and has been posted with "Caution: Underground Radioactive Material" signs.

Part of the 111-B Building foundation remains visible above ground at the middle of the barricaded area's west side, along with a steel manhole. A capped, curved pipe also protrudes approximately 10 in. above ground near the manhole. The north side of the barricaded area has a sign reading "116-B-6A Crib #1," and the north and west sides are also posted with "Crib" signs. Two characterization wells are located just north of the barricaded area, and another is located to the south.

There are no boundary markers or signs to differentiate the tank site from the former site of the 111-B Building. It is believed that the fuel examination tank is located along the west side of the barricaded area, approximately 8 to 12 ft south of the area's north end, beneath the visible building foundation. Refer to Figure 4-14 for a 1993 photograph of this site.

Figure 4-14. 111-B Fuel Examination Tank Site (116-B-16).

4.17 116-C-1 (107-C LIQUID WASTE DISPOSAL TRENCH)

116-C-1 is an inactive liquid waste site that operated from 1952 to 1968 (Stenner et al. 1988). The site is commonly known as the 107-C Liquid Waste Disposal Trench. This unlined trench was located at Hanford coordinates N71560 W79030 (Hanford Site Drawing P-5595), 1,000 ft east of the 107-B Retention Basin. It was used to receive contaminated cooling water from the 107-C Retention Basin after ruptured fuel elements were detected in the reactor (PNL 1975). It also received cooling water from the 107-B Retention Basin, beginning in 1955 (WHC 1991).

The 500-ft-long, 50-ft-wide, and 20-ft-deep trench received liquid wastes via three 24-in. lines that enter the trench on the southwest end 20 ft below grade (Hanford Site Drawing H-1-71728).

Reports provide different estimates of the amount of liquid wastes disposed of at this site. WHC (1991) states that 1.0 x 10^8 L of liquid wastes was received, while DOE-RL (1993a) reports that 7.0 x 10^8 L was received. The liquid wastes disposed of at this site reportedly contained 100 kg of sodium dichromate.

The estimated radionuclide inventory for this site, in curies and calculated to account for decay through April 1, 1986, includes the following.

^{60}Co:	1.080 E+002	^{154}Eu:	6.170 E+001	^{239}Pu:	1.170 E-001
^{134}Cs:	2.500 E-002	^{155}Eu:	3.790 E-001	^{240}Pu:	1.300 E-002
^{137}Cs:	5.790 E+000	^{3}H:	8.810 E-001	^{90}Sr:	1.640 E+000
^{152}Eu:	1.510 E+002	^{235}U:	3.100 E-004	^{238}U:	3.560 E-002

(Stenner et al. 1988)

Soil sampling has indicated that underground contamination extends the entire length of the trench. Maximum contamination levels were found to be about 20 ft below grade in each of the sample locations and ranged from 750 to 2,000 c/m using a GM probe. The contaminated soil volume at the sample sites was estimated to be 2.7 x 10^6 ft^3, and the mass of that soil was estimated to be 1.8 x 10^{11} g. The full report is provided in Appendix D and is summarized in Tables 4-17 and 4-18.

Table 4-17. 116-C-1 Gross Radionuclide Inventory.

Radionuclide	Amount (pCi/g)
Avg. beta/gamma	6.40 E+01
Max. beta/gamma	3.60 E+02
Avg. $^{239/240}$Pu	1.70 E-01
Max. $^{239/240}$Pu	9.90 E+01

Dorian and Richards (1978).

Table 4-18. 116-C-1 Radionuclide Inventory.

Radionuclide	Avg. pCi/g	Curies
^{238}Pu	a	0.0
$^{239/240}$Pu	7.40 E-01	1.30 E-01
^{90}Sr	1.10 E+01	2.00 E+00
^{3}H	7.50 E+00	1.40 E+00
^{152}Eu	1.30 E+02	2.30 E+01
^{60}Co	1.80 E+02	3.20 E+01
^{154}Eu	6.70 E+01	1.20 E+01
^{134}Cs	2.20 E+00	4.00 E-01
^{137}Cs	3.90 E+01	7.00 E+00
^{155}Eu	8.80 E+00	1.20 E+00
Uranium	2.00 E-01	3.60 E-02
^{14}C	a	a
	Total Curies	7.90 E+01

[a]Less than analytical detection limit.
Dorian and Richards (1978).

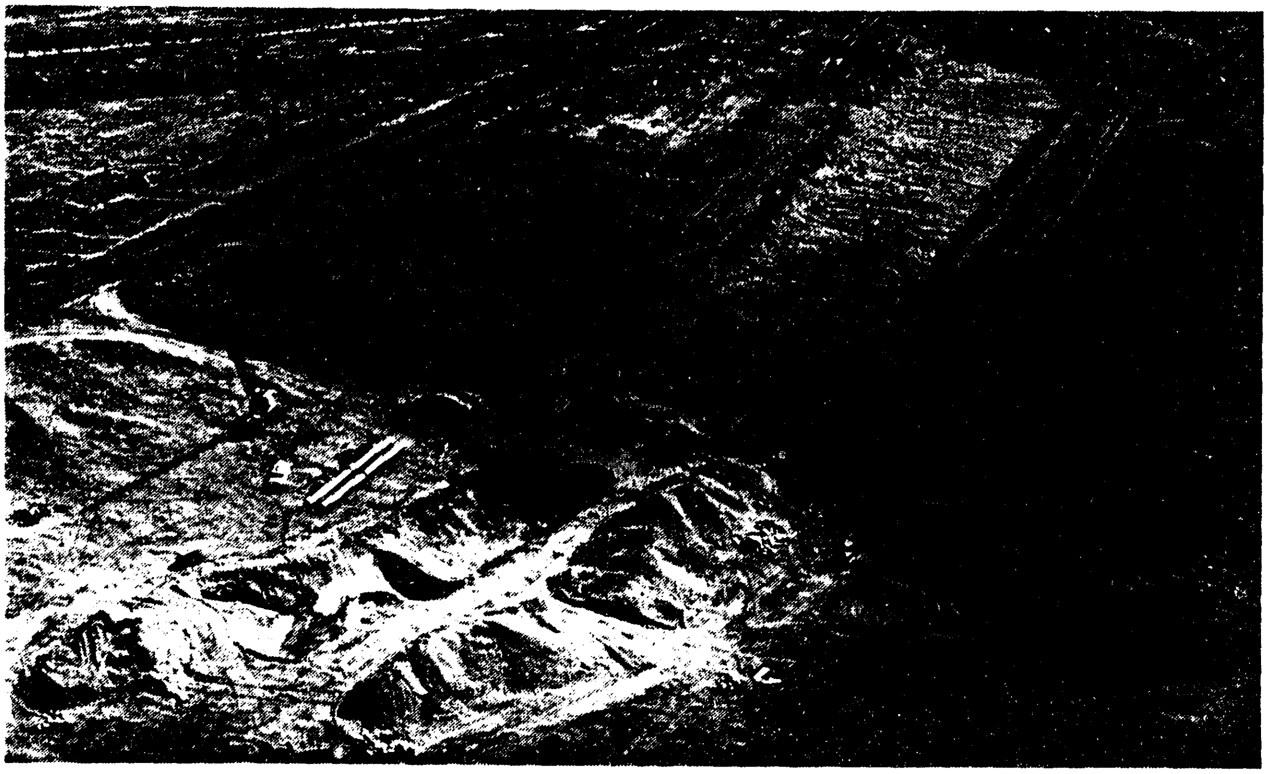
DOE-RL (1993a) reports the results of sampling performed during the drilling of the borehole for monitoring well 199-B3-46. The sampling detected the presence of toluene, diethyl phthalate, di-n-butyl phthalate, and bis(2-ethylhexyl) phthalate. Radionuclide analyses indicated the presence of ^{90}Sr, ^{134}Cs, ^{137}Cs, ^{226}Ra, ^{228}Th, ^{235}U, ^{238}U, and ^{241}Am. No pesticides or PCBs were detected, and no inorganic metal concentrations exceeded the Hanford Site 95% upper threshold limits (DOE-RL 1993a).

The trench has been covered with at least 5 ft of clean fill material (WHC 1991).

Geier (1968) reports that this trench was used for a "B-Area Reactor Effluent Infiltration Test." Reactor effluent was introduced into the trench through two 42-in. pipes that connected to the 66-in. effluent line, which runs from the 107-C West Retention Basin to the river. The installation of these two lines can be seen in Figure 4-15, a photograph taken in June 1967. Hanford Site Drawing H-1-71728 shows the location of the pipe installation.

The infiltration rate is reported to have been about 1,500 gal/ft^3 per day. The calculated wetted surface area was 52,000 ft^2. As a result of this test, an increase in the level of the 100-B Area water table was noted. It was also noted that extensive new seepage, in which the only radionuclide present in "significant quantities" was ^{51}Cr, developed along the riverbank. Based on 150 operating days at the maximum flow rate and calculated infiltration rate, it is estimated that more than 1.17 x 10^{10} gal of effluent water was disposed of in this trench. This test is significant in that the expected spread of contamination in the vicinity of the trench may be greater than that suggested by data listed within WHC (1991).

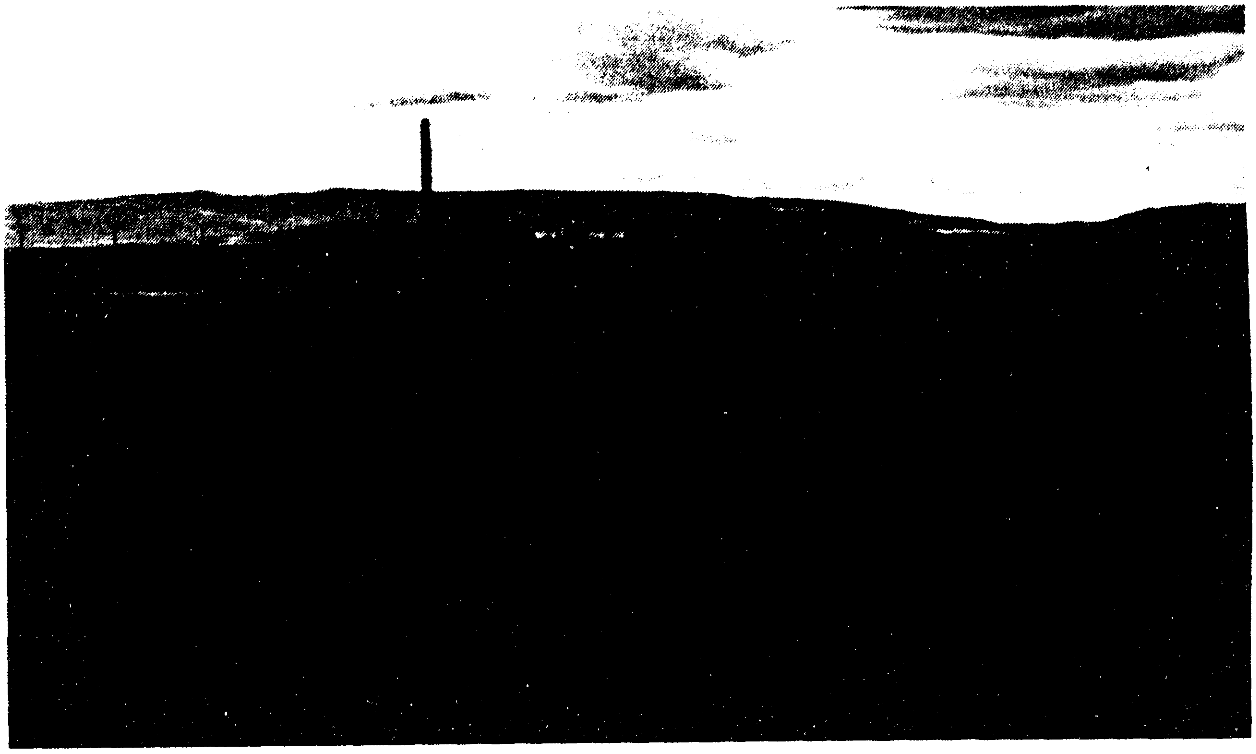
Figure 4-15. Historical Photograph of the 107-C Liquid Waste Disposal Trench (116-C-1).



The HRS migration score assigned to this waste site is 42.32 (Stenner et al. 1988).

116-C-1 appears today as a large, shallow, vegetation-free, cobble-covered depression. The trench area is lower than the surrounding area by approximately 2 to 3 ft. It is included in a larger area surrounded by permanent concrete markers and is posted with "Caution: Underground Radioactive Material" signs. Refer to Figure 4-16 for a 1993 photograph of the site.

Figure 4-16. 107-C Liquid Waste Disposal Trench (116-C-1).



4.18 116-C-5 (107-C RETENTION BASINS)

116-C-5 is an inactive mixed liquid waste site located at Hanford coordinates N71045 W79970, about 3,400 ft north of the 100-C Reactor and just southeast of the 107-B Retention Basin (WHC 1991). This site consists of two circular tanks that are commonly known as the 107-C Retention Basins. In operation from 1952 to 1969, the basins received cooling water effluent from the 100-C Reactor for radioactive decay and thermal cooling prior to its release to the Columbia River. They were, however, used for the disposal of effluents from both the 100-B and 100-C Reactors after 1954 (DOE-RL 1992).

The retention basins were circular, 10-million-gal, open-topped tanks (WHC 1991, Gerber 1993, DOE-RL 1993a). Each tank had a diameter of 330 ft and a depth of 16 ft, and had wooden internal baffles to prevent water from channeling across the tank into the discharge line (DOE-RL 1992, Stenner et al. 1988). The tanks were constructed of welded carbon steel and were set on reinforced concrete foundations and a crushed rock subfloor (DOE-RL 1993a).

Originally, only one tank was filled at a time; this allowed the potential for cooling water contaminated by a ruptured fuel element to be diverted to the second tank. The practice of adding hot water to an empty, cold tank resulted in cracking of the welded seams of the tank. After a series of repair efforts extending into 1958, parallel operation of the tanks became common (DOE-RL 1992).

Using a gravity flow system, effluent flowed into the basins via three 66-in.-diameter steel pipes from the 100-B and 100-C Reactors. Effluent exited the basins via two 60-in. steel pipes to the 1904-B2 and 1904-C outfalls and one 42-in. steel pipe to the 107-C Liquid Waste Disposal Trench (WHC 1991).

Unplanned releases resulted from leaks in the basins and the 5-ft-diameter effluent lines. The leak rate could have been as high as 5,000 to 10,000 gal/min. Several years after operations started, the temperature of the groundwater beneath the site increased noticeably. The temperature increase was caused in most cases by thermally hot reactor effluent cooling water percolating downward into the ground through cracks and joints in the bottom of the retention basin structures, and by leaking effluent lines carrying water to the basins. As a result of this leakage, which greatly increased the hydraulic gradients between the basins and the Columbia River, groundwater mounds were formed beneath the retention basins. The gradients thus formed were sufficient to produce riverbank thermal springs in the proximity of the retention basins (Dorian and Richards 1978). The area of contamination from these releases is well within the zone encompassed by the basin fences and is also within the AC-5-40 permanent posting (Stenner et al. 1988). There is a release potential, as wind has caused surface contamination to spread from rust on the tank walls (WHC 1991).

Numerous soil samples were taken at and in the vicinity of the basins. The estimated volume of contaminated soil adjacent to the basins is 1.1×10^5 ft^3, and the estimated mass of that soil is 7.5×10^9 g. The estimated volume of contaminated soil beneath the basins is 4.4×10^6 g, and the estimated mass of that soil is 3.0×10^{11} g. This includes an area, adjacent to the basins, extending 100 ft to the north and 50 ft in the other directions. The calculation of total curies is based on surface contamination 1/2 ft deep and underground contamination 20 ft deep. The results are summarized in Table 4-19.

Table 4-20 records the radionuclide inventory underneath the basins in curies. The estimated volume of contaminated soil at the 0- to 8-ft levels is 1.4×10^6 ft^3, and the estimated mass of that soil is 9.3×10^{10} g. At the 8- to 20-ft levels, the estimated volume of contaminated soil is 2.0×10^6 ft^3, and the estimated mass of that soil is 1.4×10^{11} g.

Table 4-21 summarizes the average and maximum radionuclide concentrations for the following: the sludge; the soil fill less the sludge; and underneath, adjacent to, and within the concrete for the retention basins.

Table 4-19. 116-C-5 Radionuclide Inventory Adjacent to Basins.

Radionuclide	Surface contamination avg. pCi/g	Underground contamination avg. pCi/g	Curies
^{238}Pu	a	a	0.0
$^{239/240}Pu$	5.1 E-01	1.4 E-02	8.0 E-03
^{90}Sr	3.5 E+00	6.6 E-01	2.3 E-01
^{3}H	1.7 E+00	NA[b]	5.2 E-01
^{152}Eu	3.3 E+01	9.0 E-01	5.2 E-01
^{60}Co	1.7 E+01	2.8 E+00	9.7 E-01
^{54}Eu	1.1 E+01	3.0 E-01	1.7 E-01
^{134}Cs	1.9 E-01	5.0 E-02	1.6 E-02
^{137}Cs	1.2 E+01	5.7 E+00	1.8 E+00
^{155}Eu	2.0 E+01	9.6 E-02	1.8 E-01
		Total Curies	4.4 E+00

[a]Less than analytical detection limit.
[b]Concentrations conservatively assumed to be equivalent to surface contamination for total curies calculation of ^{3}H.
Dorian and Richards (1978).

Table 4-20. 116-C-5 Radionuclide Inventory Underneath Basins, in Curies.

Radionuclide	0 to 8 ft	8 to 20 ft	Curies
^{238}Pu	a	a	0.0
$^{239/240}Pu$	2.0 E+00	4.7 E-01	2.5 E-01
^{90}Sr	1.9 E+01	4.7 E+00	2.4 E+00
^{3}H	5.2 E+00	5.1 E-01	5.6 E-01
^{152}Eu	5.3 E+02	8.1 E+01	6.1 E+01
^{60}Co	5.1 E+02	8.9 E+01	6.0 E+01
^{154}Eu	2.4 E+02	3.6 E+01	2.7 E+01
^{134}Cs	3.2 E+00	2.3 E-01	3.3 E-01
^{137}Cs	1.5 E+02	3.3 E+01	1.9 E+01
^{155}Eu	3.7 E+01	7.0 E+00	4.4 E+00
Uranium	1.8 E-01	NA[b]	4.2 E-02
		Total Curies	1.7 E+02

[a]Less than analytical detection limit.
[b]Concentration conservatively assumed to be the same as 0- through 8-ft intervals for total curies calculation.

Table 4-21. 116-C-5 Radioactive Concentrations In and Near the Basins, in Curies.

Sample substance/ area	Beta-gamma (pCi/g)		^{238}Pu (pCi/g)		$^{239/240}$Pu (pCi/g)	
	Average	Maximum	Average	Maximum	Average	Maximum
Sludge	1.8 E+04	5.5 E+04	2.4 E+00	9.0 E+00	6.5 E+01	2.3 E+02
Fill less sludge	2.7 E+02	1.2 E+03	5.4 E-02	4.9 E-01	7.8 E-01	1.6 E+01
Underneath 0-20 ft	1.5 E+03	4.3 E+03	a	a	2.0 E+00	5.4 E+00
Underneath 8-20 ft	2.5 E+02	1.1 E+03	a	a	4.7 E-01	1.9 E+00
Adjacent--surface	9.8 E+01	2.2 E+02	a	a	5.1 E-01	7.3 E-01
Adjacent--beneath	1.2 E+01	2.2 E+01	a	a	1.4 E-02	4.1 E-02

[a]Less than analytical detection limit.
Dorian and Richards (1978).

In addition, radioactive inventories for beta-gamma contamination, ^{238}Pu, and $^{239/240}$Pu are given in Table 4-22 for the same criteria used above.

Additionally, samples were taken of the effluent line scale and of basin sludge. Direct GM readings of the scale are approximately 50,000 c/m. Plutonium-239/240 concentrations ranged from 10 to 300 pCi/g. Beta-gamma contamination levels ranged from 10^3 to 10^5 pCi/g (Dorian and Richards 1978).

Table 4-22. 116-C-5 Radioactive Inventories In and Near the Basins, in Curies.

Type	Sludge	Fill less sludge	Concrete	Underneath	Adjacent	Total curies
Beta-gamma	9.0 E+00	4.0 E+00	0.0	1.7 E+02	4.0 E+00	1.87 E+02
^{238}Pu and $^{239/240}$Pu	3.3 E-02	1.3 E-02	0.0	2.5 E-01	8.0 E-03	3.0 E-01

Dorian and Richards (1978).

Sludge sampling later performed in the two basins for DOE-RL (1993a) detected the presence of pentachlorophenol, fluoranthene, benzo(A)anthracene, chrysene, benzo(B)fluoranthene, and benzo(K)fluoranthene. Methyl ethyl ketone was also found in a composite sample from the west basin. Radionuclide analysis of the sludge from the two basins detected ^{226}Ra, $^{233/234}$U, ^{235}U, ^{238}U, ^{238}Pu, $^{239/240}$Pu, ^{241}Am, ^{90}Sr, ^{60}Co, ^{137}Cs, ^{152}Eu, ^{154}Eu, and ^{155}Eu. DOE-RL (1993a) states that "there is significant radioactivity in the samples, e.g., 190 pCi/g ^{239}Pu, 770 pCi/g ^{90}Sr, 310 pCi/g ^{60}Co, 800 pCi/g ^{137}Cs, and 1400 pCi/g ^{152}Eu." The distribution of radionuclides was not uniform throughout the sludge (DOE-RL 1993a).

DOE-RL (1993a) reports that soil sampling was also performed at the 116-C-5 vadose zone test pit, which was located in an area contaminated by leakage from the west retention basin. Radionuclide analysis of the samples indicated the presence of ^{60}Co, ^{90}Sr, ^{137}Cs, ^{152}Eu, ^{154}Eu, ^{226}Ra, ^{228}Th, $^{233/234}$U, ^{235}U, $^{239/240}$Pu, and ^{241}Am. No volatile organic compounds, semivolatile organic compounds, pesticides, or PCBs were detected. Chemical analysis found that concentrations of cadmium and barium exceeded the Hanford Site background 95% upper threshold limit (DOE-RL 1993a).

The HRS migration score for this site is 76.91 (Stenner et al. 1988).

116-C-5 appears today much as it did during operation, with the exception of dirt berms that were built at various points along the sides. These berms were stabilized with rocks and used as access ramps for trucks to fill the basins with approximately 4 ft of clean fill material. The basins are located inside an 8-ft chain-link fence, which is posted with "Caution, Surface Contamination" and "Potentially Hazardous Area, Do Not Enter" warning signs.

4.19 118-B-5 (BALL 3X BURIAL GROUND)

118-B-5 is an inactive solid waste burial ground that is located 150 ft east of the 115-B gas recirculation building site, at Hanford coordinates N68700 W80400. The burial ground, which operated only during 1953, is commonly known as the Ball 3X Burial Ground.

The burial ground is 50 ft long and 50 ft wide and was 20 ft deep before backfilling (Stenner et al. 1988, DOE-RL 1993a).

It received 40.00 m^3 of highly contaminated metallic wastes, including thimbles and step plugs, that were removed from the 100-B Reactor during the performance of work for the Ball 3X Project (Stenner et al. 1988, AEC 1974, DOE-RL 1993b). The Ball 3X Project replaced the liquid boron system for emergency reactor control with a system using solid, nickel-plated, boron-steel and carbon-steel balls.

The estimated radionuclide inventory for the 118-B-5 Burial Ground is 1.000 Ci of ^{60}Co, calculated to account for decay through April 1, 1986 (Stenner et al. 1988).

The average and maximum beta-gamma contamination levels found during sampling for Dorian and Richards (1978) are provided in Table 4-23.

Table 4-23. 118-B-5 Gross Radionuclide Inventory.

Radionuclide	Amount (pCi/g)
Avg. beta/gamma	1.4 E+03
Max. beta/gamma	2.6 E+03

Dorian and Richards (1978).

The burial ground was covered with 5 ft of soil after its use was discontinued in 1953.

The HRS migration score assigned to this site is 3.04 (Stenner et al. 1988).

118-B-5 currently appears as a vegetation-free, "L"-shaped mound of cobbles, approximately 3 ft high, that is surrounded by permanent concrete markers. It is posted with signs reading "118-B-5 Ball 3X Burial Grounds." The long, south side of the burial ground is approximately 15 ft from a section of the reactor exclusion area fence that runs from north to south. The west side is approximately 20 ft from the fence. This burial ground is located near several cribs and is outside the 100-B and 100-C Reactors' exclusion area. Refer to Figure 4-17 for a 1993 photograph of the burial ground site.

Figure 4-17. Ball 3X Burial Ground (118-B-5).

A waste site due north of the 118-B-5 Burial Ground has erroneously been posted with signs reading "118-B-5 Ball 3X Burial Grounds." The incorrectly labeled site, which is actually the 116-B-12 Crib, is shown in Figure 4-12 of Section 4.12.

4.20 118-B-7 (111-B SOLID WASTE BURIAL SITE)

118-B-7 is an inactive solid waste burial ground located adjacent to, and just south of, the 111-B Decontamination Station (WHC 1991) at Hanford coordinates N68580 W80363 (Stenner et al. 1988). Another source reports the burial ground as being outside the reactor exclusion area fence and southeast of the 111-B facility (DOE-RL 1992). The site, which was operational from 1951 to 1968 (WHC 1991), is commonly known as the 111-B Solid Waste Burial Site.

The burial ground was 8 ft long, 8 ft wide, and 8 ft deep before backfilling (WHC 1991). It received small amounts of waste from the 111-B facility (DOE-RL 1992), which was originally used as a charge makeup and reactor fuel inspection station. After 1 year as a reactor fuel inspection station, the 111-B facility was used as a decontamination facility for equipment and a workshop for low-level contaminated equipment (Miller and Wahlen 1987). The burial ground also received decontamination materials and assorted equipment from that building (WHC 1991). Small amounts of reactor hardware may also have been placed in the burial ground (DOE-RL 1992).

Stenner et al. (1988) estimates the radionuclide inventory for the 118-B-7 Burial Ground as 1.00×10^0 Ci of ^{60}Co. This amount was calculated to account for decay through April 1, 1986.

This waste site has an HRS migration score of 3.04 (Stenner et al. 1988).

118-B-7 currently appears as the southern portion of a cobble-covered field located about 15 ft west of the reactor exclusion area fence. The central portion of the field is covered with natural vegetation, and there is a permanent concrete marker in the southern section. The field is surrounded with light-duty chain fence and is posted with "Caution: Underground Radioactive Material" signs. The soil within the chained area is built up above grade and there is evidence of subsidence. Refer to Figure 4-18 for a 1993 photograph of the burial ground site.

4.21 118-B-8 (105-B REACTOR BUILDING)

118-B-8, the 105-B Reactor Building, is an inactive solid waste site that operated from 1944 to 1968 and was the first full-scale operating nuclear reactor in the world. It is located at Hanford coordinates N69050 W80680, 1/2 mi from the Columbia River shoreline at milepoint 384 (PNL 1975).

This facility is described more fully in Chapter 2 of this report and is not subject to remediation as an operable unit waste site. Therefore, only limited information is provided in this section. Refer to DOE (1992) for additional information.

Figure 4-18. 111-B Solid Waste Burial Site (118-B-7).

The 42,500-ft^2 reactor building consists of the following:

- The reactor block, which includes the graphite moderator stack, biological shields, pressure tubes, and safety and control systems
- The irradiated fuel storage basin
- Contaminated and noncontaminated work areas, rod rooms, offices, sample rooms, and the Reactor Control Room.

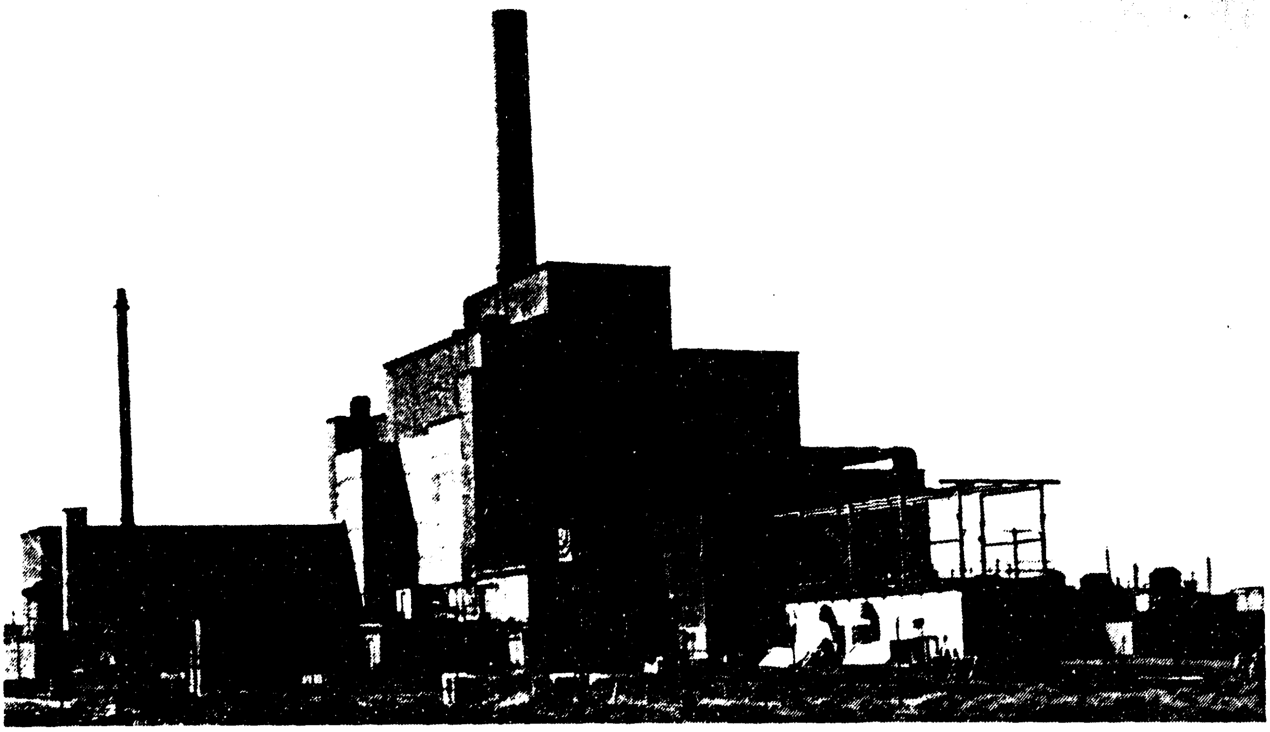
The reactor building contains an estimated 2.35×10^4 Ci of radionuclides, 8.8×10^1 tons of lead, 3.00×10^3 ft^3 of asbestos, and 5.00×10^2 lb of cadmium. More than 90% of the radionuclide inventory is bound in activated metals and graphite (Cramer 1987).

It is suspected that the fuel storage basin leaked for a number of years prior to deactivation, although the leak rate was small. The location of the leak or leaks has never been identified, if known (WHC 1991). As part of deactivation and decommissioning, the basin was drained and cleaned; surface contamination was fixed with an asphalt emulsion coating.

Several pieces of miscellaneous electrical switchgear have been removed from the facility for use elsewhere. Two 750-KVA transformers, building air compressors, and receivers have also been removed.

The 105-B Reactor Building is scheduled for decommissioning. Efforts are under way to preserve the reactor as a museum, and it is currently listed on the National Register of Historic Places. It has also been recognized as a historic place by the American Society of Mechanical Engineers, the American Nuclear Society, and the American Society of Civil Engineers. Refer to Figure 4-19 for a 1993 photograph of the 105-B Reactor Building.

Figure 4-19. 105-B Reactor Building.



4.22 118-B-9 (104-B2 STORAGE BUILDING)

118-B-9 is an inactive, low-level solid waste site located in the extreme northwest corner of the reactor exclusion area at Hanford coordinates N69700 W80750. The site is commonly known as the 104-B2 Storage Building. The building operated from 1948 to 1965 and housed an air sampling system for the 108-B Stack.

This 24-ft-long and 12-ft-wide storage building is a concrete structure about 10 ft high with special cells in the floor to store casks used in the Tritium Separations Project (WHC 1991).

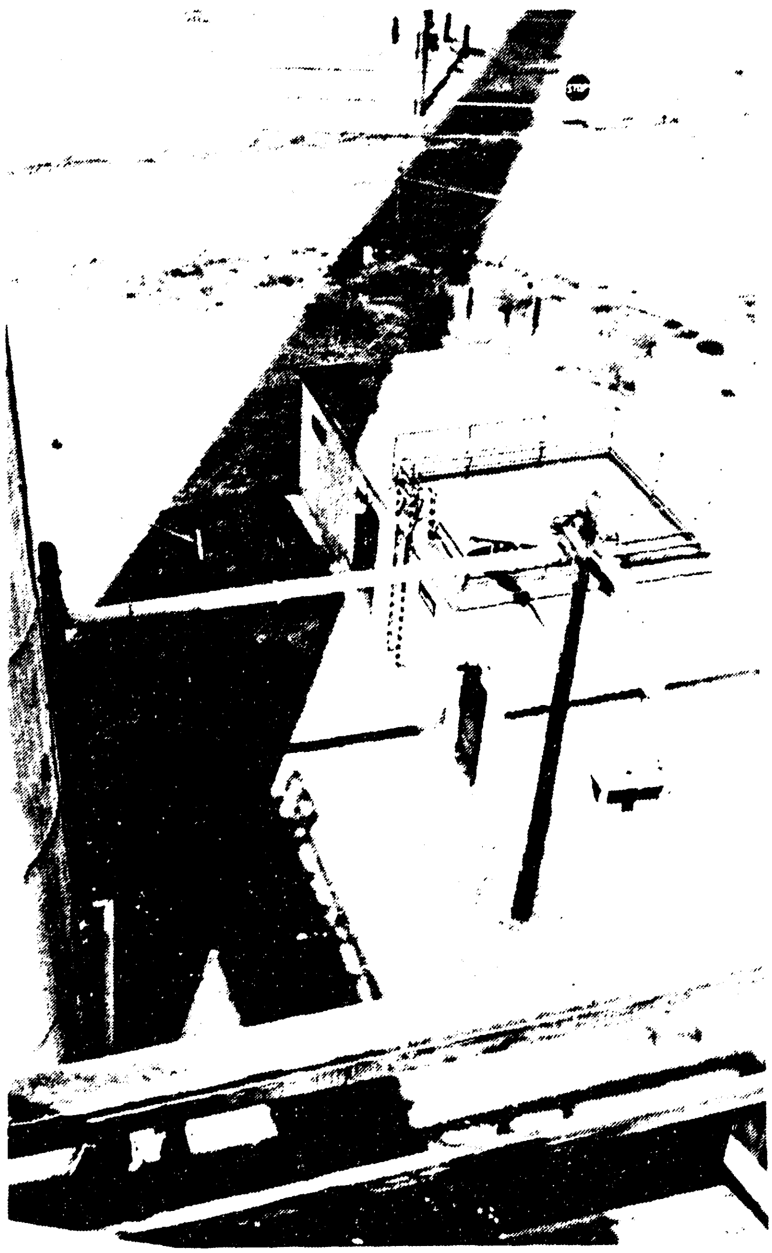
This site contains trace amounts of radioactive waste. Recently, it has been used to store some slightly contaminated components from the 100-B and 100-C Reactors.

A french drain, identified as the 116-B-9 French Drain, is associated with this structure and is discussed in Section 4.9 of this document.

No HRS migration score has been assigned to this waste site.

118-B-9 appears today as a small concrete building with an addition built onto the east side. The addition is metal framed and covered with transite. The structure is posted with "Surface Contamination" warning signs and is within the reactor exclusion area fence, which is posted with "Caution: Underground Radioactive Material" signs. The surrounding area is a vegetation-free, cobble-covered field. Refer to Figure 4-20 for a historical photograph of the 104-B2 Storage Facility.

Figure 4-20. Historical Photograph of the 104-B2 Storage Building (118-B-9).

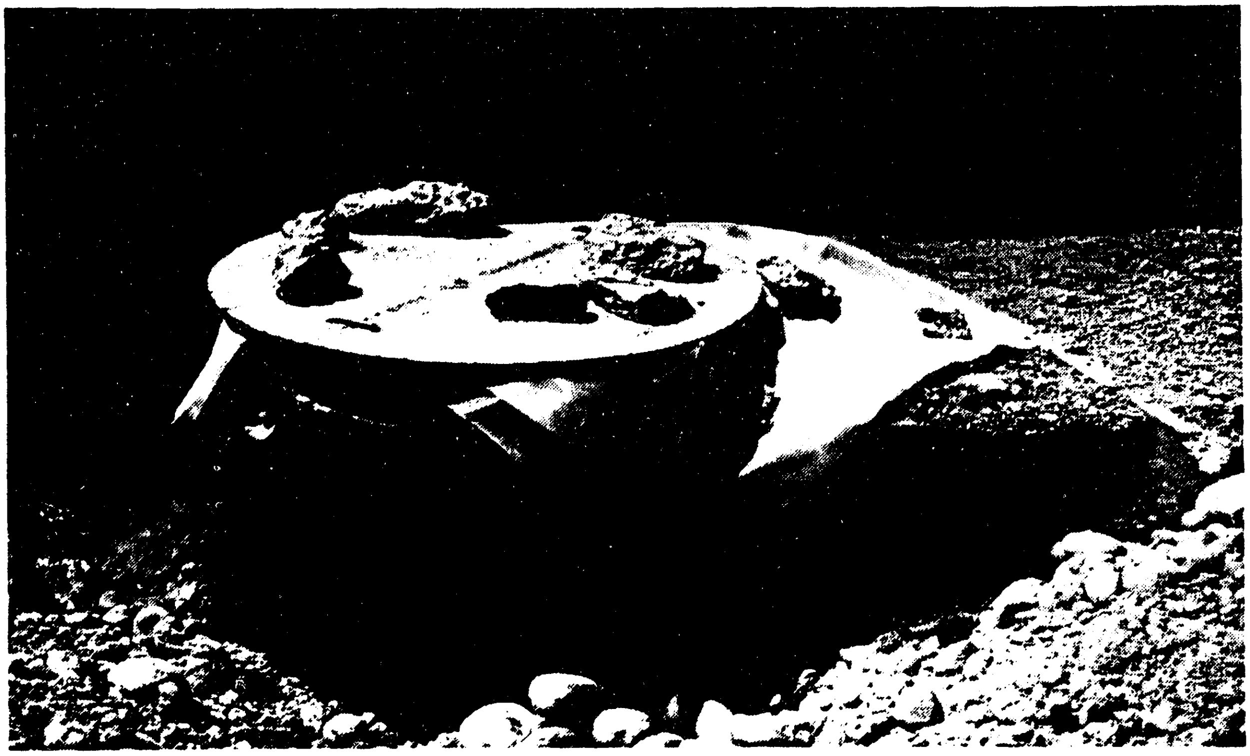


4.23 118-B-10 (115-B/C CAISSON SITE)

118-B-10 is an inactive solid waste site that is located approximately 75 ft north of the 115-B/C Gas Recirculation Facility and 80 ft south of the 105-B Reactor Building transfer bay. This site is the former location of the 115-B/C Caisson.

During the decommissioning of the 115-B/C Gas Recirculation Facility, a chromate-contaminated steel caisson was removed and packaged for offsite disposal as hazardous waste (WHC 1989a). The caisson had been located above the gas recirculation tunnel approximately 75 ft north of the 115-B/C Gas Recirculation Facility and 80 ft south of the 105-B Reactor Building transfer bay (WHC 1991). For a historical photograph showing the caisson before its removal, see Figure 4-21. Soils around and under the caisson site were sampled during the decommissioning work and were found to be below EP Toxicity Test levels of concern for heavy metals (WHC 1989a).

Figure 4-21. Historical Photograph of the 115-B/C Caisson Prior to Its Removal (118-B-10).

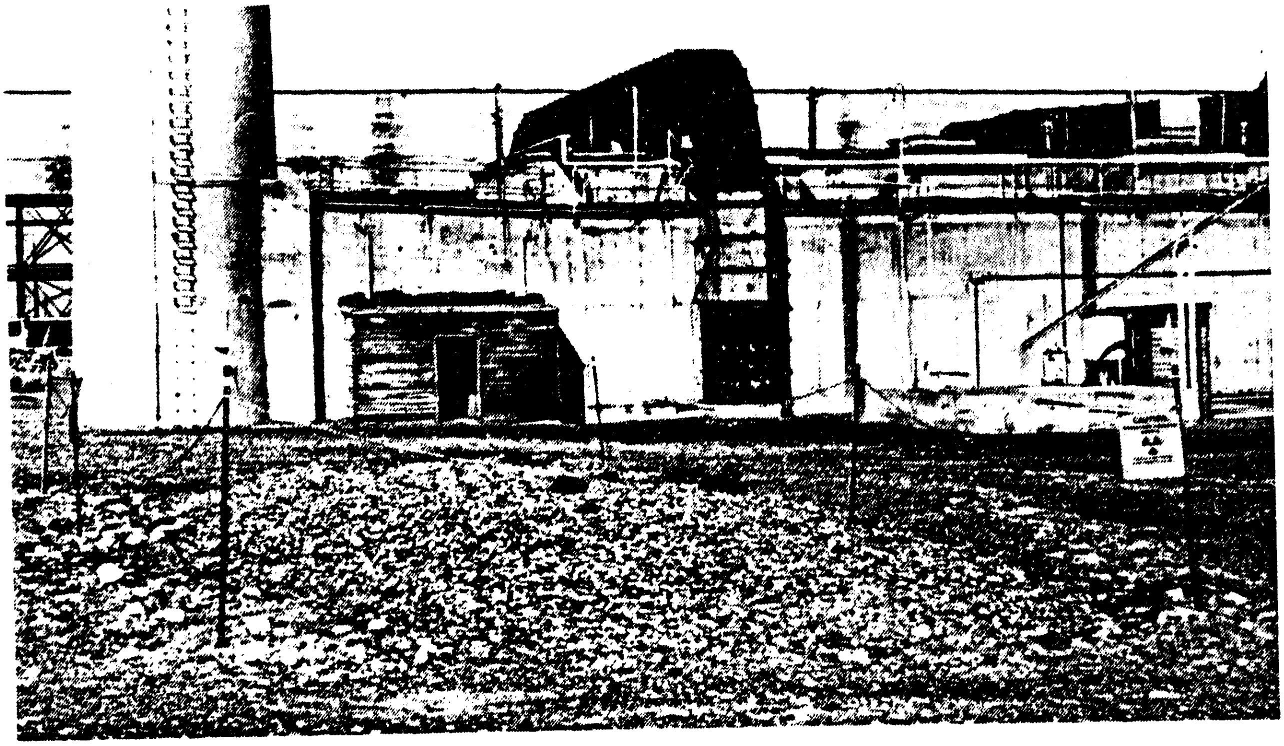


The former location of the caisson was reported as a suspect waste site in July 1990, and was named 118-B-10. The site reportedly measured 48 ft by 18 ft, and appeared as a mound that was 2 to 3 ft above grade. The suspect waste site information report states, "It is unknown what is buried at the site. The site is located on the 115-B gas recirculation tunnel. This tunnel was not demolished with the 115-B building because the excavation was contaminated . . . [Former site employees report that] no one is certain what is buried at the site. It is thought that reactor components from the P-10 project are buried there" (WHC 1991).

No HRS migration score has been assigned to this waste site.

118-B-10 currently appears as a vegetation-free area that has been covered with cobbles piled to 2 ft above grade. The site is surrounded by steel posts and light-duty barricade chain, and is posted with "Caution: Underground Radioactive Material" signs. Refer to Figure 4-22 for a 1993 photograph of the site.

Figure 4-22. 115-B/C Caisson Site (118-B-10).



4.24 120-B-1 (105-B BATTERY ACID SUMP)

120-B-1 is an inactive liquid waste site that operated from 1944 to 1969. The sump was located at Hanford coordinates N69200 W80800, just east of the 105-B Building adjacent to the main switchgear room (Cramer 1987). It is commonly known as the 105-B Battery Acid Sump.

The sump was used during the servicing of emergency power pack batteries and for the disposal of battery acid from the emergency lighting system. No records are known to exist concerning the volume of waste acid disposed of at this location.

The concrete-lined sump was cleaned in 1986. Prior to that cleaning, the residual sludge and liquids were analyzed for heavy metals using EP Toxicity Test; chromium was found (WHC 1991). The wastes were then neutralized and removed (Cramer 1987).

The site appears today as a rectangular concrete pit with a steel cover plate. Concrete repairs have apparently been performed at each of the four corners in the recent past, suggesting that the integrity of the original construction was at some time compromised. It is posted with a "Danger: Confined Space" warning sign. Refer to Figure 4-23 for a 1993 photograph of this site.

Figure 4-23. 105-B Battery Acid Sump (120-B-1).

4.25 126-B-1 (184-B POWER HOUSE ASH PIT)

126-B-1 is an inactive nonhazardous/nonradioactive solid waste site that operated from 1944 to 1969. The site is most commonly known as the 184-B Power House Ash Pit, but is also known as the 188-B Ash Disposal Area. It is located northwest of the 105-B Reactor Building at Hanford coordinates N70820 W81530 (WHC 1991).

Unknown amounts of coal ash were sluiced to this pit with raw river water from the coal-fired boilers. The ash has been analyzed using the EP Toxicity Test, in accordance with WAC 173-303, and no hazardous materials were found (WHC 1991, DOE-RL 1992).

No HRS migration score has been assigned to this waste site.

The ash pit appears today as a large depression, approximately 200 ft long, 200 ft wide, and 10 ft deep, with natural vegetation growing on the surface. A dike divides the pit into two separate sections. This waste site is bounded on the north, east, and west sides by three large ash piles that extend approximately 9 to 10 m high. On the west side of the site is a large wooden ramp that was used as a loading platform. The ramp is in a state of disrepair. No distinguishable markers or signs are present at the ash pit site. Refer to Figure 4-24 for a 1993 photograph of the site.

Figure 4-24. 184-B Power House Ash Pit (126-B-1).

4.26 126-B-2 (183-B CLEARWELLS)

126-B-2 is an inactive "demolition and inert landfill" located at the 183-B Water Treatment Facility, approximately 1,200 ft west of the 105-B Reactor Building, at Hanford coordinates N69075 W82000 (WHC 1991). The site is commonly known as the 183-B Clearwells, although it has also been known as the 126-B-2 Clearwells and as the 126-B-2 Landfill Site.

The clearwells are 751 ft long and 135 ft wide and have a total area of 101,385 ft^2 (WHC 1991). According to WIDS, the 126-B-2 site "is made up of two clearwells separated in the center by a pump room. The clearwells are covered, reinforced concrete and have a capacity of approximately 10 million gal. The pump room is constructed of reinforced concrete and is approximately 22 ft deep. The clearwells are intact, and the above-ground portion of the pump room has been demolished. . . . The pump room is the only portion of this unit currently containing waste. The waste consists of demolition waste from the above-ground portion of the pump room" (WHC 1991). Wastes at this site are expected to include steel, concrete, and asbestos transite.

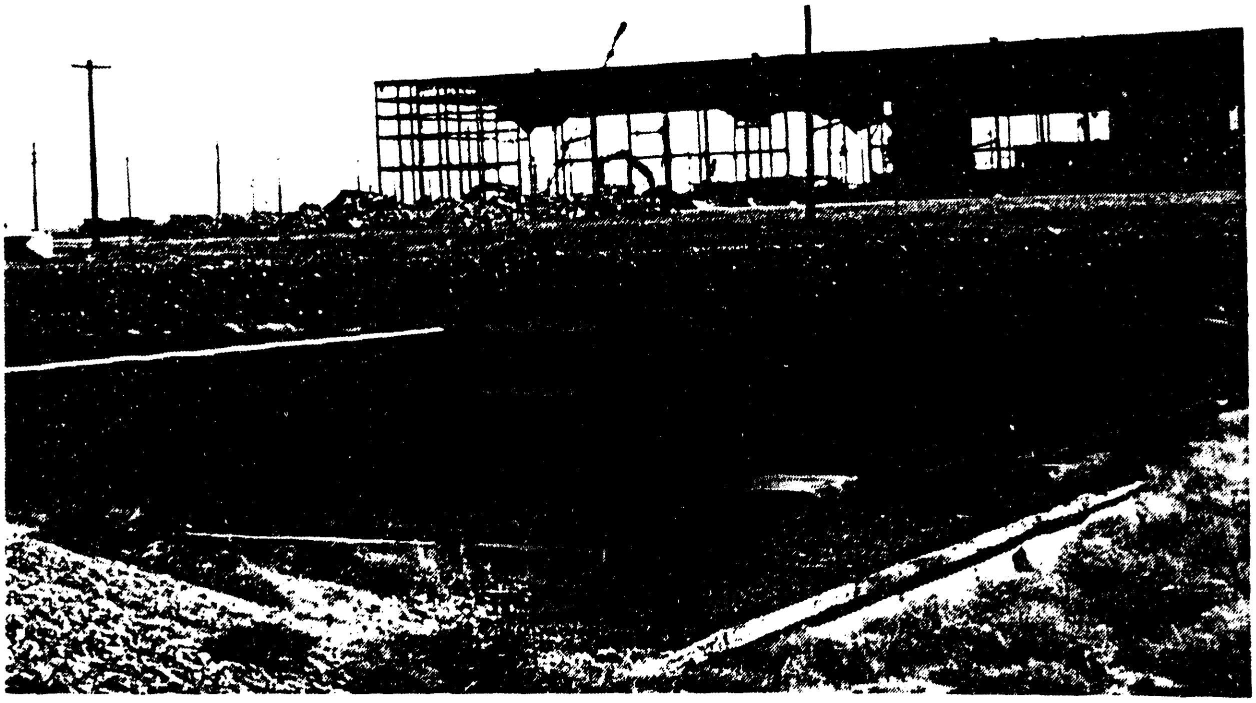
No wastes were deposited at the clearwells in the past; however, they are scheduled for future use as a disposal site for demolition and inert solid waste after the 126-B-3 coal pit and demolition landfill is closed (WHC 1991).

No HRS migration score has been assigned to this site.

126-B-2 currently appears as a depressed rectangular area that contains the below-grade portions of the clearwells and pump house. It is bounded with steel posts and light-duty barricade chain and is posted with signs reading "126-B-2 Clearwells" and "Danger: Keep Away." The black, paneled rooftops of the clearwell buildings are approximately 6 ft below grade. A concrete piping structure remains above ground at the southeast corner of the clearwell site. The site appears much as it did while the clearwells were operational, except that the pump house has been demolished. Refer to Figures 4-25 and 4-26 for 1993 photographs of the clearwell site.

Figure 4-25. 183-B Clearwells, Looking North (126-B-2).

Figure 4-26. 183-B Clearwells, Looking Northeast (126-B-2).



4.27 126-B-3 (184-B COAL PIT)

126-B-3 is an active solid waste site that is located at Hanford coordinates N70100 W82250, just west of the demolished 184-B Powerhouse and about 700 ft northeast of the 182-B Pumphouse and reservoir. The site is commonly known as the 184-B Coal Pit. It operated from 1943 to 1968 as a storage area for coal used in the 184-B Powerhouse. In the early 1970's, it began operation as a demolition and inert material landfill (WHC 1991).

Approximately 75% of the 400-ft-long and 225-ft-deep site has been used for waste disposal. These wastes consist mostly of demolition debris (concrete, metals, and roofing and siding materials, including asbestos transite) from the radiologically released portions of the 108-B, 117-B&C, 115-B/C, and 184-B Buildings (WHC 1991). An estimated 1,000 ft^3 of rubble from 108-B, or a total of 96 dump truck loads, was deposited in the coal pit (Kachele 1986).

Conversations with site employees indicate that this site is likely to contain lead acid batteries, which were once part of the emergency lighting system used throughout the 100-B Area, and heavy equipment batteries. Site employees also reported that, on a few occasions, radioactive wastes were found deposited at the site, and it is believed that those materials were all removed.

Several aluminum filter frames, likely to have come from the 117-B and 117-C filter buildings, are currently lying on the ground surface at the south end of 126-B-3. Several steel staircases are on the northwest side.

Refer to Figure 4-27 for a 1993 photograph of the site.

Figure 4-27. 184-B Coal Pit (126-B-3).

4.28 126-B-4 (B AREA BRINE AND SALT DILUTION PIT SITES)

126-B-4 is an inactive, nonhazardous/nonradioactive solid waste site that ceased operation prior to 1980. It is located north of the former 184-B Building, and just south of the railroad tracks, at Hanford coordinates N70371 W81908 (WHC 1991). The site is commonly known as the B Area Brine and Salt Dilution Pits, although it has also been known as the 126-B-4 Brine Pit Site.

This waste site consists of two pit sites: a salt-dissolving pit and a brine pit. Salt was offloaded from railroad cars into these pits. The brine solutions were used as part of the zeolite water treatment system in the 184-B Building. Both pits were below-grade concrete vaults with internal void spaces. The brine pit had a capacity of 500 ft^3, and the dissolving pit had a capacity of 900 ft^3 (DOE-RL 1992, Griffin 1988).

Because the pits were used in the Zeolite Water Treatment process, which was in use when the 184-B Powerhouse was in operation, it is presumed that the operating dates were 1944 to 1969.

The brine pits were demolished, in situ, in March 1988 and were sampled for radiation and EP toxic metals. Samples showed an NaCl concentration of less than 1%, and no reportable concentrations of heavy metals were found. The samples also showed no significant radiation above background. Northwest Environmental Services, Incorporated, removed all waste and salt cake from the pits and certified them clean before in situ demolition and final grading. Although not radioactive or hazardous, the release of large quantities of brine would have an effect on soil and groundwater quality, as well as a potential effect on groundwater flow directions. The pits were partially backfilled with rubble and leveled to grade with clean fill (DOE-RL 1992, Griffin 1988).

No HRS migration score has been assigned to this waste site.

The brine pit appears today as a cleared area covered by cobbles and coal ashes, with natural vegetation growing on the surface. No evidence of the site remains on the surface. The pit can be identified by the section of railroad ties that are missing. There are no other signs or markers.

4.29 128-B-1 (100-B BURNING PIT)

128-B-1 is an inactive solid waste site located in the northeast corner of the 100-B Area, just off the perimeter road, at Hanford coordinates N71500 W78500 (WHC 1991, Stenner et al. 1988). This site is most commonly known as the 100-B Burning Pit, but is also known as the 100 B/C Burning Pit and as the 128-B-1 Burning Pit. It operated from 1943 to 1950 (Stenner et al. 1988).

The burning pit is approximately 100 ft long, 100 ft wide, and 10 ft deep (Stenner et al. 1988).

It received nonradioactive, combustible wastes, including office wastes and hazardous wastes such as paint and chemical solvents (Stenner et al. 1988). Additionally, debris and soil may have been received from excavations performed during the construction of the 107-B and 107-C basins and overflow trenches. WIDS notes that the burning pit "is not known to have been used as a routine burning area" (WHC 1991).

Upon decommissioning in 1978, the burning pit was covered over with clean fill material (Stenner et al. 1988).

The burning pit has an HRS migration score of 0.21 (Stenner et al. 1988). No radioactive material is known to have been disposed of at this site (WHC 1991).

128-B-1 currently appears as a vegetation-covered field with no distinctive boundary or markings. As documented, the site "has evidence of disturbance but no evidence of burned material is present on the surface" (WHC 1991). Refer to Figure 4-28 for a photograph of the site.

Figure 4-28. 100-B Burning Pit (128-B-1).

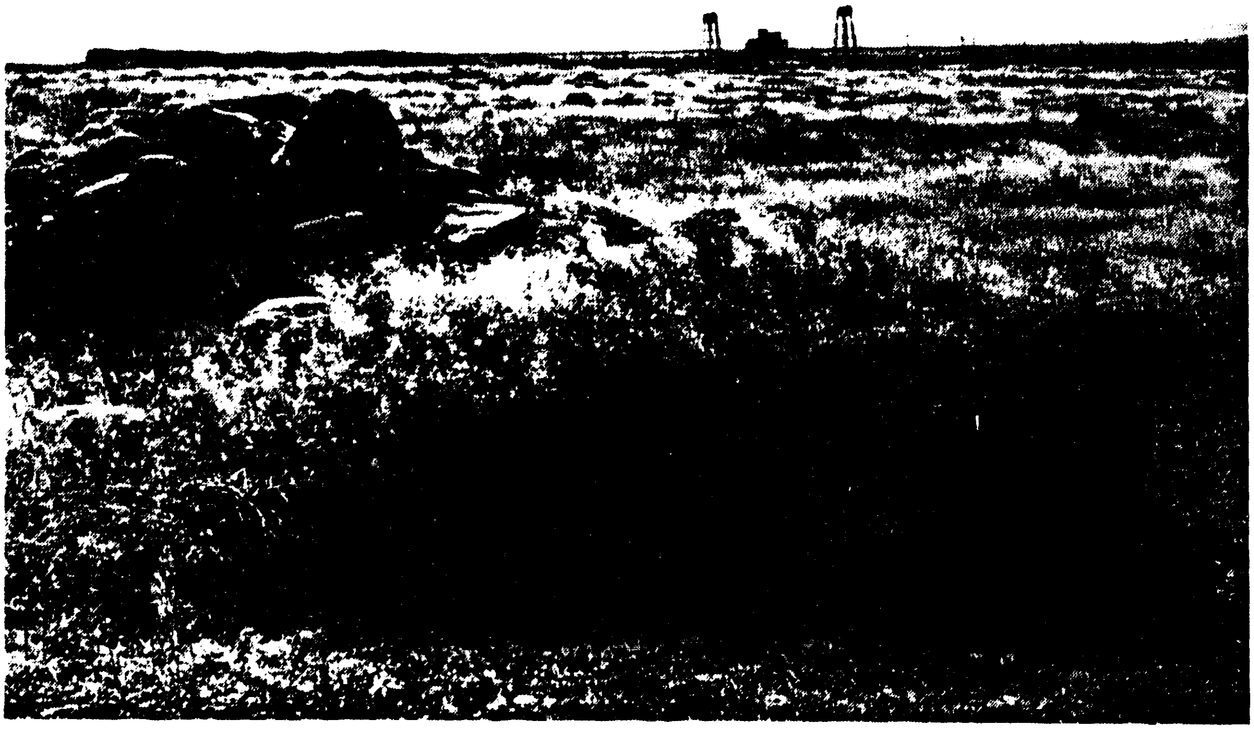
4.30 128-B-2 (100-B BURN PIT NO. 2)

1?3-B-2 is an inactive solid waste site that operated from 1948 to 1968. It is located at Hanford coordinates N71500 W76500, east of the 100-B Area. The site is located along a dirt road, apparently surfaced with coal ash, that extends to the railroad tracks and highway. It was used for the disposal of nonradioactive, combustible materials consisting of office wastes, paint wastes, chemicals, and solvents (WHC 1991). This site is commonly known as the 100-B Burn Pit No. 2.

The 450-ft-long and 30-ft-deep site is identifiable by a pile of large boulders. It ranges in width from 30 to 50 ft and has evidence of burning along with sand-blasting garnet and old paint cans (WHC 1991).

This waste site is nearly halfway to 100-K Area at an intersection of old road beds (one running north-south and the other east-west). It appears that there may have been some backfilling of the area with clean fill material that would indicate that some dumping occurred at the site. Materials apparent on the surface include asphalt, glass, steel scrap and components, wire, concrete, wood, garnet blast material, and cable. The east boundary of the site is a row of large boulders about 3 ft high and 50 ft long. Refer to Figure 4-29 for a 1993 photograph of the burn pit site.

Figure 4-29. 100-B Burn Pit No. 2 (128-B-2).



4.31 128-B-3 (128-B-3 COAL ASH AND DEMOLITION WASTE SITE)

128-B-3 is an inactive, hazardous solid waste site that operated from 1944 to 1968. The site is commonly known as the 128-B-3 Coal Ash and Demolition Waste Site, although it has also been known as the 100-B Dump Site and as the 128-B-3 Burning Pit Site. It is located approximately 600 ft northeast of the northeast corner of the 100-B Area perimeter road, and just above the riverbank, at Hanford coordinates N71500 W76500 (WHC 1991).

This 450-ft-long and 60-ft-wide area is identifiable by a pile of large boulders along its southern border (WHC 1991).

No HRS migration score has been assigned to this waste site.

128-B-3 appears today as a depression, just above the riverbank, that is covered with natural vegetation and sagebrush. There is a small, overgrown access road that leads down to the pit off the perimeter road. The surface is covered with natural vegetation and sagebrush, and there is a scattering of coal ash, demolition rubble, and other miscellaneous debris as well as charred remnants of unidentifiable material. No signs or markers are present to indicate the site location. Refer to Figure 4-30 for a 1993 photograph of the site.

Figure 4-30. 128-B-3 Coal Ash and Demolition Waste Site (128-B-3).

4.32 132-B-1 (108-B TRITIUM SEPARATION FACILITY SITE)

132-B-1 is an inactive solid waste site that operated from 1944 to the early 1970's (Kachele 1986). The site is commonly known as the 108-B Tritium Separation Facility. Its northeast corner is located at Hanford coordinates N69750 W80658, about 700 ft north of the 105-B Reactor Building (Kachele 1986). Decommissioning and in situ burial was completed in May 1985. The facility was originally used for water treatment associated with reactor operations, and was later used as a laboratory, as a tritium recovery processing facility (until 1954), and as a tube examinations facility.

The 148-ft by 32-ft building was a steel-frame and concrete-block structure with reinforced concrete foundation and floors. The original building extended 41 ft above grade and 12 ft below grade. It was 132 ft long, with a 16-ft extension for a ventilation supply fan. An additional extension, added to the southwest corner, was 60 ft long and 32 ft wide. This addition housed the tube examination cell and work area. The extension on the south end housed additional ventilation supply fans (Beckstrom 1986).

Upon decommissioning, all radiological wastes--lab equipment, cells, drains, and exhaust ducts--were packaged and disposed of in the 200 Area Burial Grounds. Clean portions, including asbestos transite siding materials, were disposed of in the 184-B Coal Pit. Structural steel was segregated and sectioned to enhance safe removal (Kachele 1986). The remaining contaminated portion was buried in situ. The facility site was covered with about 1 m of clean fill material and was graded to match the existing terrain. A section of concrete foundation remains, along with two teardrop-shaped steel plates that are between 20 and 26 in. in diameter (WHC 1991). This concrete foundation and teardrop-shaped section is not actually part of the 108-B Building, but is a burial site (118-B-6) for wastes generated in the 108-B Building. It is located to the southeast of the building site and is fully described in Section 5.10. The 108-B Dry Well (116-B-10), described in Section 4.10, was protected during demolition and remains undisturbed. The line to the 108-B Crib (116-B-5) was removed to a point south of the entrance road, and the remaining line was capped (Beckstrom 1986).

132-B-1 appears today as a vegetation-free, cobble-covered field that is included within the reactor exclusion area fence. There are no unique markings of any kind to indicate its location.

4.33 132-B-2 (116-B REACTOR EXHAUST STACK)

132-B-2 is an inactive low-level solid waste site located on the south side of the 100-B Reactor at Hanford coordinates N68950 W80680. This site is commonly known as the 116-B Reactor Exhaust Stack, although it is also known as the 132-B-2 Stack. The stack was in operation from 1944 to 1968 (PNL 1975).

The stack, which is part of the 100-B Reactor gas and exhaust air system, is constructed of reinforced concrete with a base diameter of about 16 ft and a height of 200 ft (Dorian and Richards 1978).

Following completion of the confinement project in 1960, air was diverted via an aboveground aluminum duct and an underground, reinforced concrete duct to the 117-B Filter Building. After flowing through the filters, the air went through a below-grade concrete duct and an above-grade aluminum duct into the exhaust stack (WHC 1991).

Until the 117-B Filter Building was built in 1960, air moving from the least contaminated zones through increasingly contaminated zones was discharged to the stack unfiltered (Harmon et al. 1975). The stack thus received low-level contamination from the reactor (WHC 1991).

Dose rates at the base of the stack were less than 1 mR/h. General background levels within the stack bottom were about 1,000 c/m with a GM probe. Low-level smearable alpha contamination was present, measuring up to 130 dpm/100 cm^2, averaging about 30 dpm/100^2. Smearable beta contamination ranged from 100 to 5,000 dpm/100^2 (Dorian and Richards 1978).

Radiocontaminants identified on the interior stack surfaces include ^{14}C up to 2.10E^{+06} pCi/100 cm^2 (averaging a few thousand pCi/100 cm^2) and ^3H ranging from 4.0E^{+00} to 1.30E^{+04} pCi/100 cm^2. Beta-gamma activity is primarily from ^{60}Co and ^{137}Cs with trace elements of ^{134}Cs and $^{152,154,155}Eu$ (Dorian and Richards 1978).

No HRS migration score has been assigned to this waste site.

132-B-2 remains intact today as a 200-ft-high concrete stack south of the 100-B Reactor. Metal rungs have been removed from the bottom 10 to 15 ft of the stack. The area surrounding the stack is covered with cobble and gravel. This site is within the reactor exclusion area fence, but has no unique markings or signs.

4.34 132-B-3 (108-B VENTILATION EXHAUST STACK BURIAL GROUND)

The 132-B-3 solid waste site was created when the 108-B Ventilation Exhaust Stack was demolished with explosives on September 9, 1983. It is commonly known as the 108-B Ventilation Exhaust Stack Burial Ground. The site consists of a trench, which was used to bury low-level contaminated rubble from the demolition of the 108-B Ventilation Exhaust Stack, which is also known as the 108-B Tritium Pilot Facility Ventilation Exhaust Stack. The trench was excavated north of Hanford Route 1, across the road from the stack foundation and west of the 108-B Crib; it was 30 ft wide, 18 ft deep, and 250 ft long. The stack foundation, found to be free of contamination, was destroyed separately and buried in place with clean fill material; it is also considered to be part of the 132-B-3 waste site (Beckstrom and Thurman 1986).

The stack had been located on the west side of the 108-B Building, the Tritium Separation Facility (Beckstrom and Thurman 1986), at Hanford coordinates N69704 W80720 (Hanford Site Drawing M-1600-B, Sheet 5).

Reports provide different measurements for the exhaust stack prior to its destruction. One report states that the stack was 300 ft long and 18 ft in diameter (Beckstrom and Thurman 1986). Dorian and Richards (1978) states that the exhaust stack was 200 ft tall and had a base diameter of approximately 16 ft. This discrepancy can be explained by the fact that two different stacks were built at the site. The initial 108-B Building exhaust stack, built in 1944, was believed to be of insufficient size to properly release airborne emissions to the atmosphere. In 1950, "a 300-ft stack, as tall as the tallest powerhouse stacks at the Hanford Site, was built to replace the smaller, previous stack that served the 108-B Building" (Gerber 1993). What happened to the 200-ft stack is unknown. The 300-ft stack was demolished in 1983 and buried at the 132-B-3 site (WHC 1991).

Exhaust air from the 108-B Building passed through ductwork and was discharged through the 300-ft ventilation exhaust stack. The stack was built of reinforced concrete and had a stainless steel liner, a feature that made the stack unique among the 100 Area reactor stacks. Its stainless steel liner was supported by concrete pillars and was located 6 ft above the base of the stack, extending up an additional 6 ft. The stack was atop a double-octagon base that extended to 10 ft, 3 in. below grade; the upper octagon measured 25 ft "across the flats" and was 3 ft, 3 in. thick, and the lower octagon measured 34 ft across and was 7 ft thick. The maximum thickness of the stack wall was 2-1/2 ft at the base (Beckstrom and Thurman 1986).

The stack had two openings. One, at ground level, provided access to the space beneath the stainless steel liner; the other, at the 12-ft level, allowed access to the stack for sampling and decontamination work. Additionally, an "original gravity drain line" led from the floor of the liner, through the side of the stack, to a valve. Both the valve and drain line had been removed by the time that the stack was demolished, and the stack penetration had been sealed (Beckstrom and Thurman 1986).

Samples taken from the stainless steel liner and the inner concrete surface of the exhaust stack prior to demolition showed the presence of ^{3}H, ^{152}Eu, ^{154}Eu, and ^{60}Co. Table 4-24 presents the estimated radiological inventory that was determined by sampling the intact stack. The amounts of radionuclides have not been calculated to account for decay that occurred after the samples were taken.

Table 4-24. 108-B Stack Dirt, Scale, and Concrete Samples.

Location	^{3}H (pCi/g)	^{152}Eu (pCi/g)	^{60}Co (pCi/g)	^{154}Eu (pCi/g)	^{134}Cs (pCi/g)	^{137}Cs (pCi/g)	^{155}Eu (pCi/g)
Oily dirt from main exhaust duct to stack	8.4×10^{5}	7.1×10^{3}	8.7×10^{1}	2.1×10^{3}	a	4.9×10^{1}	1.1×10^{2}
Steel liner approx. 15 ft above grade	2.4×10^{5}	1.2×10^{4}	4.0×10^{2}	2.8×10^{3}	a	a	a
Concrete, just above steel liner	2.8×10^{6}	2.9×10^{1}	a	a	a	a	a

[a]Less than analytical detection limit.

As mentioned previously, the stack was demolished with explosives in 1983. Some rubble from the stack fell across the perimeter road and was pushed into the 132-B-3 Trench with heavy earthmoving equipment. Most of the rubble, however, fell directly into the trench.

After the stack was destroyed and buried, and the foundation was demolished in place, the entire area was covered with clean fill material. A metal intake plenum for the stack was "disconnected from the stack and disposed of separately." The total radionuclide inventory of the buried stack rubble at the 132-B-3 site is 21 mCi (Beckstrom and Thurman 1986).

No HRS migration score has been assigned to this site.

132-B-3 currently appears as a vegetation-free, cobble-covered field that is west of the 108-B Crib. Permanent concrete markers surround the site, and "Caution: Underground Radioactive Material" signs are posted. The site is located north of the exclusion area fence and the access road.

4.35 132-B-4 (117-B FILTER BUILDING SITE)

132-B-4 is an inactive solid waste site that is located at Hanford coordinates N69975 W81560, approximately 100 ft south of the 105-B Reactor Building (Smoot 1989). This site is the location of the decommissioned 117-B Filter Building site, which operated from 1961 to 1968. The building received exhaust fan discharge through an inlet duct from the 105-B Reactor Building, and discharged through an outlet duct to the 116-B Exhaust Stack. It was decommissioned and buried in situ in 1987 and 1988.

The structure was 59 ft long, 39 ft wide, and 35 ft high, only 8 ft of which was above grade. A gunnite-and-earth berm surrounded the exterior walls. The inlet tunnel was about 110 ft long and the outlet tunnel about 80 ft. Exhaust air was routed from the reactor building via the inlet duct, where it passed through two filter banks, a HEPA filter, and a halogen (activated charcoal) filter. It then was ducted to the 116-B Exhaust Stack via the outlet duct. Both the inlet and outlet ducts were constructed of reinforced concrete and were typically 5 ft below grade.

Dorian and Richards (1978) reports the results of smear samples taken at the filter building site prior to decommissioning. Sampling of scale from the drains under the "A" and "B" filter frames indicated the presence of ^{152}Eu, ^{154}Eu, ^{60}Co, and ^{137}Cs. Samples collected from the inlet tunnel indicated the presence of ^{238}Pu, $^{239/240}$Pu, ^{90}Sr, ^{3}H, ^{152}Eu, ^{154}Eu, ^{60}Co, ^{137}Cs, and ^{14}C. Floor smear samples from the gas piping tunnel and gas dryer room were found to contain ^{238}Pu, $^{239/240}$Pu, ^{90}Sr, ^{3}H, ^{60}Co, ^{137}Cs, and ^{14}C, and a floor smear sample from dryer room number 5 also contained ^{155}Eu (Dorian and Richards 1978). Additionally, Issacson (1987) reports that ^{3}H, ^{14}C, ^{137}Cs, ^{90}Sr, and ^{239}Pu were found during a 1987 analysis of paint samples taken from the building.

Stenner et al. (1988) states that ^{3}H, ^{14}C, ^{60}Co, ^{90}Sr, ^{137}Cs, ^{152}Eu, ^{154}Eu, ^{155}Eu, and ^{239}Pu were found in this building prior to decommissioning.

Smoot (1989) estimates a radionuclide inventory of 92 nCi for this site and states that the radionuclides present are ^{3}H, ^{14}C, ^{137}Cs, ^{90}Sr, and $^{238/239}$Pu.

The site was decommissioned using ARCL methodology, with demolition and final site grading being completed in January 1988. The building and the ducts were excavated and demolished in situ. All contaminated rubble is buried under a minimum of 1 m of clean fill material (WHC 1991). Prior to demolition, the filters and other contaminated equipment was removed, packaged, and sent to the 200 Area Burial Grounds for disposal. The filter frames, inlet turning vanes, and outlet turning vanes were removed to the 184-B Coal Pit for disposal. The aboveground metal ducts were removed, decontaminated, and buried in the concrete portion of the outlet duct. The basement floor was fractured to allow the drainage of any collected water runoff, and the exterior walls were excavated to about 1 m below grade. The facility was then demolished and backfilled with clean fill material.

Prior to decontamination and decommissioning activities, contamination levels ranged from 2,000 c/m to over 20,000 c/m by direct GM readings. Contamination was greatest in the inlet tunnels near the turning vanes. Although every effort was made to "clean the facility," the potential exists for contaminants to be present (Dorian and Richards 1978). "Based on the total isotopic inventory and mass of the 117-B Building, the residual concentration of radionuclides in the rubble was calculated to be approximately 0.1% of the ARCL value" (Issacson 1987).

132-B-4 currently appears as a vegetation-free, gravel-covered field. Recently, a small subsidence area has developed at the facility site. The subsidence has been barricaded and identified with light-duty steel posts and light-duty barricade chain; it has also been posted with "Danger" warning signs.

4.36 132-B-5 (115-B/C GAS RECIRCULATION FACILITY SITE)

132-B-5 is an inactive, low-level solid waste site that operated from 1952 to 1968. It is located about 150 ft south of the 105-B Building at Hanford coordinates N68860 W80527 (WHC 1991). This site is the former location of the 115-B/C Gas Recirculation Facility that served both the 100-B and 100-C Reactors.

The gas recirculation facility was 20 ft above and 11 ft below grade, and had a width ranging from 72 ft to 98 ft. It was a single-story reinforced concrete structure with a basement and consisted of the vacuum and pressure seal pit and tunnels. The total site was 168 ft long, 98 ft wide, and 34 ft high (WHC 1991).

Prior to decontamination activities, direct GM readings on piping, condensate drains, valves, blowers, condensers, and silica towers were typically 10,000 to 15,000 c/m. Standard smears indicated beta contamination of 1,000 to 110,000 dpm/100 cm^2 and low-level alpha contamination of up to 800 dpm/100 cm^2 (Dorian and Richards 1978). Resident radionuclides at this site are ^{3}H, ^{14}C, ^{60}Co, ^{90}Sr, ^{137}Cs, ^{152}Eu, and ^{239}Pu (WHC 1991).

The building was demolished in situ using ARCL methodology. The facility was decontaminated, and excess equipment was removed. The at-grade and below-grade structures (floor slab, walls, footing pedestals, tunnel roof and walls, pipes, and other structures) were exposed by excavating and demolishing to at least 1 m below grade. The resulting rubble was placed in the basement and tunnels for in situ disposal. Tunnel demolition was restricted due to a suspected radioactive waste burial site, the 115-B/C Caisson, that was located directly over the tunnel about 75 ft north of the unit. The 115-B/C Caisson was removed and disposed of as hazardous waste. The ground around the caisson was sampled for metals and found to be below EP Toxic Metal limits (WHC 1991). Refer to Section 4.23 for more information about the caisson and its removal.

Heid (1956) noted that a highly contaminated thimble from the 105-B Reactor Building had been buried in a trench just west of this site. The thimble burial site is described more fully in Section 4.48.

No HRS migration score has been assigned to this waste site.

132-B-5 appears today as a level, vegetation-free, cobble-covered field that is within the reactor exclusion area fence. An identification sign was recently posted at the site, but no other markers or signs are present.

4.37 132-B-6 (1904-B2 OUTFALL)

132-B-6 is an inactive liquid waste site located at Hanford coordinates N71890 W80050, approximately 300 ft north of the northeast corner of the 107-B Retention Basin, directly north of the east end of 116-B-11, and downstream of 116-B-7 (WHC 1991). The decommissioned 1904-B2 Outfall, also known as 116-B-8, is also located at this site.

The 1904-B2 Outfall was built in 1954 to supplement the 116-B-7 Outfall, which was no longer adequate to receive 100-B Reactor effluents after the completion of Project CG-558. A new 66-in. effluent line was installed to discharge cooling water and process drainage from the 105-B Reactor Building. It ran from the downcomer to the 1904-B2 Outfall, then extended 450 ft into the river. The old 42-in. line continued to transport 100-B Area process sewer drainage to the 116-B-7 Outfall (Gerber 1993). Figure 4-31 shows a photograph taken in December 1954, during the construction of the new outfall line and the 1904-B2 Outfall structure.

Figure 4-31. Construction of the 190-B Outfall Line, Part of Project CG-558, in December 1954.

The outfall was 27 ft long and 14 ft wide (WHC 1991). It consisted of an open, reinforced concrete sump and an effluent line that ran from the sump to discharge at the bottom center of the Columbia River (Dorian and Richards 1978). It also included a concrete overflow spillway that led to the top of the riverbank and a basalt boulder riprap flume that passed from the concrete spillway to the edge of the river. If the main line were to plug, the effluent would overflow into the spillway, pass over the riprap flume, and be discharged to the river at the shoreline (WHC 1991). A steel pipe and chain-link fence was built above grade, as an aviary cover, to prevent birds and other animals from entering the outfall.

During decommissioning, the outfall fence and aviary cover were removed, and the concrete outfall structure was backfilled to grade with clean soil (Richards 1991). The area immediately around the outfall structure was also filled to grade with soil. The concrete spillway and the riprap flume were left intact, and a mound of backfill material was used to cover the spillway.

A recent report states that "surface contamination is known to be present at the 132-B-6 spillway" (DOE-RL 1992). Documents reviewed provided no other information about wastes or contaminants.

No HRS migration score has been assigned to this site.

Currently, the main portion of this outfall site appears as a vegetation-covered area bounded by light-duty steel posts and light-duty barricade chain. "Surface Contamination Area" warning signs are posted. A dirt road, sprayed with herbicide, leads to the outfall structure site. At a point near the bounded area, the road is crossed from east to west by a vegetation-free stripe of uniform thickness. The stripe is an outfall structure wall that was left intact when the structure was backfilled to grade. A mound covered with backfill material is located immediately adjacent to the bounded area, and a basalt boulder riprap spillway links that mound to the river. The concrete spillway that originally led from the sump to the riprap is beneath the mound and is no longer visible at the site. Refer to Figure 4-32 for a 1993 photograph of the outfall site.

Figure 4-32. 1904-B2 Outfall (132-B-6).

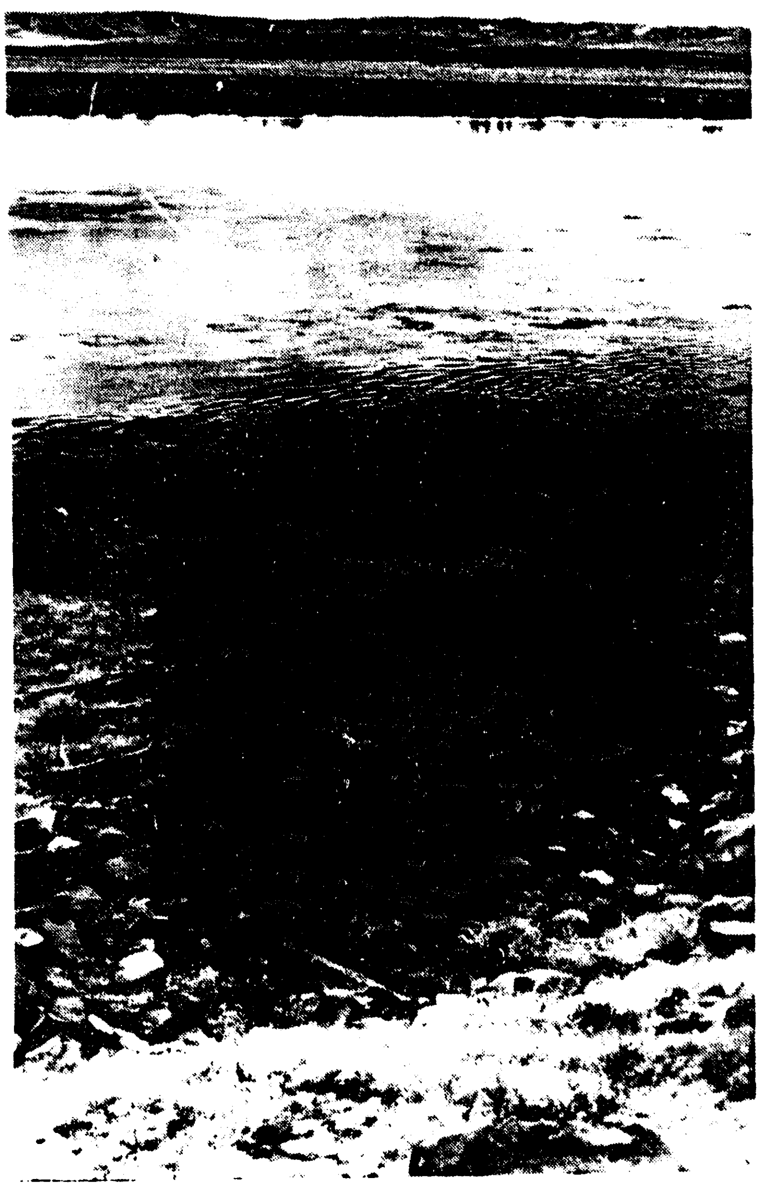
4.38 132-C-2 (1904-C OUTFALL)

132-C-2 is an inactive solid waste site that is located at Hanford coordinates N72000 W79255, just north of the 107-B Retention Basin and downstream of the 1904-B Outfalls (WHC 1991). The site was used for the disposal of effluents from the 107-C Retention basins. Additionally, it was used for the disposal of process sewer wastes from the 100-C Reactor water treatment facilities.

The outfall structure was 8.2 m wide, 16 m long, and 6.4 m deep (DOE-RL 1993a).

This outfall was fed by two 60-in. steel effluent pipes and two 54-in. concrete process sewer flumes. The discharge side of the outfall structure consisted of two 54-in. steel lines that discharged at the river center bottom, about 450 ft from the shoreline. The outfall included a concrete overflow flume that did not extend to the river shoreline, but instead spilled onto large basalt riprap and, ultimately, to the river.

Figure 4-33. 1904-C Outfall Riprap Flume (132-C-2).



The radionuclide inventory consists mainly of ^3H (WHC 1991).

Divers explored the two underwater outfall discharge lines prior to 1985 and determined that the lines emerge 25 to 30 ft offshore and are almost completely exposed to flowing river water. Two sections were found to be undermined and unsupported. No externally induced damage or corrosion was observed. However, because the lines are exposed, they are "subject to lateral loading, scouring, and undermining actions which may lead to a loss of structural continuity" (Miller and Steffes 1986).

The outfall was reduced to near-grade level and backfilled with clean fill material. A riprap overflow flume, consisting of large basalt boulders, leads from the outfall to the riverbank. Refer to Figure 4-33 for a

1993 photograph of the riprap flume. The area is surrounded by metal posts at the top, near the roadway, and concrete posts to the river waterline. It is posted with "Caution: Underground Radioactive Material" warning signs.

4.39 1607-B1 (1607-B1 SEPTIC TANK AND ASSOCIATED DRAIN FIELD)

1607-B1 is an inactive liquid waste site located approximately 300 ft north of the 1720-B Patrol Change Room at Hanford coordinates N69900 W78206. This site is commonly known as the 1607-B1 Septic Tank and Associated Drain Field, although it has also been known as the 1607-B1 Sanitary Sewer System and as 124-B-1.

The septic tank is 14 ft long, 7 ft wide, and 11 ft deep. It is constructed of reinforced concrete, and its walls are 10 in. thick. The tile field is constructed of "4-in. vitrified pipe, concrete pipe, or drain tile with a minimum of 8 linear feet per capita." Additionally, the laterals are open jointed and spaced 8 ft apart (Hanford Site Drawing W-71182 R31). The septic tank reportedly had the capacity to handle the wastes for 125 people at 35 gal per capita and had an average detention period of 24 h (Hanford Site Drawing W-71182 R31).

A gravel-covered field is located just west of the raised septic tank site. It may be the drain field for the 1607-B1 Septic Tank. The drawing mentioned above states that the tile field was "to be located in the field" adjacent to the septic tank (Hanford Site Drawing M-1904-B, Sheet 4), but does not show the exact location.

The septic tank is located across the road from, and due west of, the former site of the 1701-B Badgehouse. Additionally, a change room and the 1709-B Fire Station were located across the perimeter road from, and south of, the septic tank (Hanford Site Drawing M-1904-B, Sheet 4). Unknown amounts of nonhazardous and nonradioactive wastes were received from those buildings between 1944 and 1960 (WHC 1991).

No HRS migration score has been assigned to this site.

1607-B1 currently appears as a vegetation- and gravel-covered area that is raised approximately 4 ft above thesurrounding terrain. The exact location of the septic tank cannot be pinpointed, since no posts or other markings separate it from its surroundings. However, the septic tank is clearly marked on a historical drawing in the location of the raised mound (Hanford Site Drawing M-1904-B, Sheet 4). A historical photograph (Photograph No. 9626) appears to support that information by showing a small structure at the site.

4.40 1607-B2 (1607-B2 SEPTIC TANK AND ASSOCIATED DRAIN FIELD)

1607-B2 is an active liquid waste site located approximately 1,350 ft north of the 105-B Reactor Building at Hanford coordinates N70450 W80775 (Hanford Site Drawing M-1904-B, Sheet 5). This site is commonly known as the 1607-B2 Septic Tank and Associated Drain Field, although it has also been known as the 1607-B2 Sanitary Sewer System and as 124-B-2.

The septic tank is 25 ft long; 11 ft, 6 in. wide; and 13 ft deep. It is constructed of reinforced concrete, and its walls and floor are 10 in. thick. The tile field is constructed of "4-in. vitrified pipe, concrete pipe, or drain tile with a minimum of 8 linear feet per capita." Additionally, the laterals are open jointed and spaced 8 ft apart (Hanford Site Drawing W-71182 R31). The septic tank has the capacity to handle the wastes for 450 people at 35 gal per capita and has an average detention period of 24 h (Hanford Site Drawing W-71182 R31).

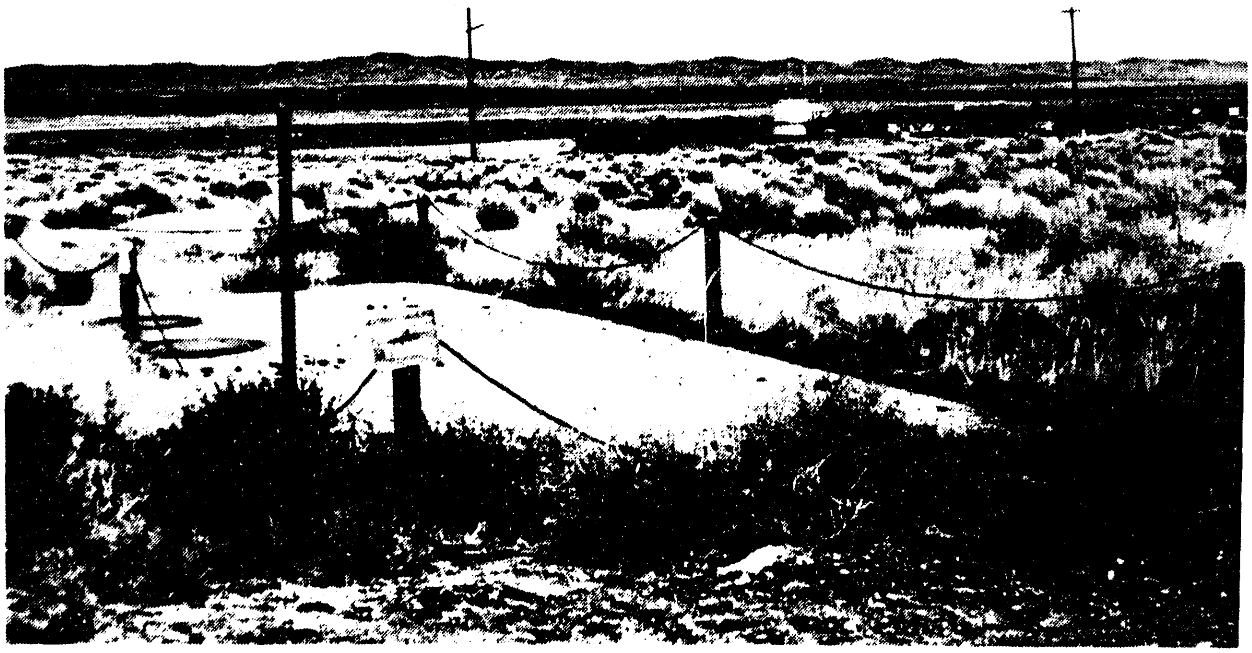
Since 1944, this septic tank has received sanitary sewage from the 105-B Reactor Building, the 190-B Pumphouse, and 100-B Area office buildings. The current flow to 1607-B2 is estimated at less than 35 gal/day. Waste at this site is considered nonhazardous and nonradioactive (WHC 1991).

Although the 100-B Area office buildings have been removed, their sewer lines to this septic tank remain in place (WHC 1991).

No HRS migration score has been assigned to this site.

The septic tank site currently appears as a concrete slab, approximately 30 ft long and 10 ft wide, that has two steel manhole covers. It is surrounded by six black-and-yellow striped posts, approximately 3 ft high, and light-duty barricade chain. The site is identified with a blue-and-white "Septic Tank" sign. Refer to Figure 4-34 for a 1993 photograph of the septic tank site.

Figure 4-34. 1607-B2 Septic Tank.



The drain field for 1607-B2 is located to the northwest of the septic tank, across the road and approximately 100 ft inside a fence. The drain field is a vegetation-covered area approximately 100 yd long and 25 yd wide. It is bounded with light-duty steel posts and light-duty barricade chain. A historical drawing states that the drain field was "to be located in [the] field" near the septic tank, but does not show an exact location (Hanford Site Drawing M-1904-B, Sheet 5). Figure 4-35 shows a 1993 photograph of the drain field site.

Figure 4-35. 1607-B2 Septic Tank Drain Field.

An underground pipe runs due south from the septic tank to the drain field. A cement junction box is located above ground at a point along that pipeline. The junction box has a manhole and is posted with "Danger: Keep Away" signs. It is bounded with four light-duty steel posts and light-duty barricade chain.

4.41 1607-B3 (1607-B3 SEPTIC TANK AND ASSOCIATED DRAIN FIELD SITE)

1607-B3 is an inactive sanitary waste site approximately 200 ft north of the 184-B Building at Hanford coordinates N70275 W81850 (Hanford Site Drawing M-1904-B, Sheet 5). The 1607-B3 Septic Tank and Associated Drain Field, also known as the 1607-B3 Sanitary Sewer System, was located at this site.

The septic tank was approximately 9 ft, 6 in. long; 4 ft, 6 in. wide; and 10 ft, 5 in. deep. It was constructed of reinforced concrete, and its walls and floor were 10 in. thick. The tile field was constructed of "4-in.

vitrified pipe, concrete pipe, or drain tile with a minimum of 8 linear feet per capita." Additionally, the laterals were open jointed and spaced 8 ft apart (Hanford Site Drawing W-71182 R31). The septic tank had the capacity to handle the wastes for 48 people at 35 gal per capita and had an average detention period of 24 h (Hanford Site Drawing W-71182 R31).

An unknown amount of sanitary sewage from the 184-B Powerhouse was received by this septic tank. The waste was considered nonhazardous and nonradioactive (WHC 1991).

The septic tank was reportedly pumped dry and demolished in December 1987. Its contents were taken to the 124-N-10 Sanitary Sewer System for disposal (WHC 1991).

No HRS migration score has been assigned to the former septic tank site.

The 1607-B3 site has been separated into two aboveground sections. The first section currently appears as a cobble-covered field, approximately 15 ft long and 5 ft wide, that is surrounded by four yellow posts. To the east, the second section appears as a brick manhole with a steel lid that is posted with a "Danger: Confined Space" sign; it is bounded by four yellow posts, two of which are marked with blue-and-white "Septic Tank" signs. The septic tank drain field is probably located to the west of the two aboveground sections; that area is currently cobble covered, with some vegetation, and is undifferentiated from the surrounding terrain. A historical drawing states that the tile field was "to be located in [the] field" near the septic tank, but does not show an exact location (Hanford Site Drawing M-1904-B, Sheet 5).

4.42 1607-B4 (1607-B4 SEPTIC TANK AND ASSOCIATED DRAIN FIELD)

1607-B4 is an active liquid waste site located approximately 25 ft north of the 151-B Substation's northwest corner at Hanford coordinates N68447 W81600 (Hanford Site Drawing M-1904-B, Sheet 5). This site is commonly known as the 1607-B4 Septic Tank and Associated Drain Field, although it has also been known as 1607-B6, 124-B-6, the 1607-B6 Sanitary Sewer System, the 1607-B6 Septic Tank, and the 1607-B6 Septic Tank and Associated Drain Field.

The discrepancy between the site name and aliases reflects the fact that an incorrect name was used to identify this site for several years. The 1607-B4, 1607-B5, and 1607-B6 septic tanks had all been misnamed. This problem was discovered through a thorough review of the M-1904-B drawings, and the site names were correctly reassigned in 1991 (WHC 1991).

The septic tank is 6 ft long; 3 ft wide; and 8 ft, 4 in. deep. It is constructed of reinforced concrete. Its walls are 8 in. thick, and its floor is 6 in. thick. The tile field is constructed of "4-in. vitrified pipe, concrete pipe, or drain tile with a minimum of 8 linear feet per capita." Additionally, the laterals are open jointed and spaced 8 ft apart (Hanford Site Drawing W-71182 R31). The septic tank has the capacity to handle the wastes for 10 people at 35 gal per capita and has an average detention period of 24 h.

Since 1944, the septic tank has received sanitary sewage from the 151-B Electrical Distribution Facility. The current flow to this septic tank is estimated at less than 35 gal/day. Waste at this site is considered non-hazardous and nonradioactive (WHC 1991).

No HRS migration score has been assigned to this site.

The 1607-B4 septic tank site currently appears as a vent pipe with a cap that has "Septic Tank" stamped repeatedly into it. The pipe is approximately 45 ft south of the southeast corner of the 181-B Building. It is surrounded by a vegetation-free, gravel-covered field and is approximately 20 ft north of a transformer station. The pipe has a diameter of 8 in. and is approximately 2-1/2 ft tall.

The drain field for this septic tank may be located to the east of the tank, either under the gravel field or under an area farther east that is covered with gravel, cobbles, dirt, and vegetation. A historical drawing states that the tile field was "to be located in [the] field" near the septic tank, but does not show an exact location (Hanford Site Drawing M-1904-B, Sheet 5).

4.43 1607-B5 (1607-B5 SEPTIC TANK AND ASSOCIATED DRAIN FIELD)

1607-B5 is an active liquid waste site located approximately 25 ft southeast of the 181-C River Pump House at Hanford coordinates N71428 W81980 (Hanford Site Drawing M-1904-B, Sheet 2). It is commonly known as the 1607-B5 Septic Tank and Associated Drain Field, although it has also been known as 1607-B4, 124-B-4, the 1607-B4 Sanitary Sewer System, and the 1607-B4 Septic Tank and Associated Drain Field.

The discrepancy between the site name and aliases reflects the fact that an incorrect name was used to identify this site for several years. The 1607-B4, 1607-B5, and 1607-B6 septic tanks had all been misnamed. This problem was discovered through a thorough review of the M-1904-B drawings, and the site names were correctly reassigned in 1991 (WHC 1991).

The septic tank is 4 ft long; 2 ft wide; and 8 ft, 4 in. deep (Hanford Site Drawing W-71182 R31). It is constructed of reinforced concrete and reportedly has a capacity of 350 gal (Hanford Site Drawing M-1904-B, Sheet 2). The tank walls are 8 in. thick, and the floor is 6 in. thick. The tile field is constructed of "4-in. vitrified pipe, concrete pipe, or drain tile with a minimum of 8 linear feet per capita." Additionally, the laterals are open jointed and spaced 8 ft apart (Hanford Site Drawing W-71182 R31). The septic tank has the capacity to handle the wastes for six people at 35 gal per capita, and has an average detention period of 24 h (Hanford Site Drawing W-71182 R31).

Since 1944, this septic tank has received sanitary sewage from the 181-B/C River Pumphouse. The current flow to this septic tank is estimated at less than 35 gal/day. Waste at this site is considered nonhazardous and nonradioactive (WHC 1991).

No HRS migration score has been assigned to this site.

The 1607-B5 septic tank site currently appears as concrete box, measuring 10 ft long and 3 ft wide, that has a square wooden lid. It is

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located approximately 10 ft from the settling basins. Four yellow steel posts mark the corners of the site. A "Danger: Confined Space" sign is posted on the wooden lid.

A yellow sign with a magenta radiation symbol and "Underground" on it had been laid atop the wooden lid but was not fastened down. Because no documentation mentioned the presence of radioactive material in the septic tank, History Office personnel contacted the 100 Area Health Physics Office. The 100 Area Health Physics Office conducted an investigation, found no radioactive material at the site, and removed the sign.

A cobble-, vegetation-, and sand-covered area surrounds the septic tank site. The drain field is probably in this area, somewhere to the west of the septic tank. A historical drawing states that the tile field was "to be located in [the] field" near the septic tank, but does not show an exact location (Hanford Site Drawing M-1904-B, Sheet 2).

4.44 1607-B6 (1607-B6 SEPTIC TANK AND ASSOCIATED DRAIN FIELD)

1607-B6 is an inactive liquid waste site located at Hanford coordinates N68081 W82680, approximately 100 ft south of the 182-B Reservoir and 300 ft west of the 183-B Filter Plant (Hanford Site Drawing M-1904-B, Sheet 5). It is commonly known as the 1607-B6 Septic Tank and Associated Drain Field, although it has also been known as 1607-B5, 124-B-5, the 1607-B5 Sanitary Sewer System, and the 1607-B5 Septic Tank and Associated Drain Field.

The discrepancy between the site name and aliases reflects the fact that an incorrect name was used to identify this site for several years. The 1607-B4, 1607-B5, and 1607-B6 septic tanks had all been misnamed. This problem was discovered through a thorough review of the M-1904-B drawings, and the site names were correctly reassigned in 1991 (WHC 1991).

The septic tank is 8 ft long; 4 ft wide; and 8 ft, 4 in. deep. It is constructed of reinforced concrete. Its walls are 8 in. thick, and its floor is 6 in. thick. The tile field is reportedly constructed of "4-in. vitrified pipe, concrete pipe, or drain tile with a minimum of 8 linear feet per capita." Additionally, the laterals are reportedly open jointed and spaced 8 ft apart (Hanford Site Drawing W-71182 R31). The septic tank had the capacity to handle the wastes for 25 people at 35 gal per capita and had an average detention period of 24 h (Hanford Site Drawing W-71182 R31).

During the septic tank's operation from 1944 to 1988, it received an unknown amount of sanitary sewage from the 182-B Pump Station and from the 183-B Headhouse. Waste at this site is considered nonhazardous and nonradioactive (WHC 1991).

No HRS migration score has been assigned to this site.

The 1607-B6 septic tank site currently appears as a concrete slab, measuring approximately 10 ft long and 4 ft wide, with a steel manhole cover in the northeast corner. The site is surrounded by eight yellow posts, and the middle posts on the north and south sides of the site are posted with blue-and-white "Septic Tank" signs. The manhole cover is posted with a "Danger: Confined Space" sign.

A cobble- and vegetation-covered area surrounds the septic tank site. The drain field for 1607-B6 is probably located in this area. A historical drawing states that the tile field was "to be located in [the] field" near the septic tank, but it does not show an exact location (Hanford Site Drawing M-1904-B, Sheet 5).

A junction box, appearing to be part of the 1607-B6 septic tank system, is located immediately south of the tank site. The junction box appears as a concrete slab, approximately 10 ft long and 5 ft wide, that is partially covered with rocks. Yellow posts have been placed at its four corners. The concrete slab has a steel access manhole cover that is posted with a "Danger: Confined Space" sign.

Another junction box is located approximately 400 ft south of the junction box mentioned above and 10 ft south of the railroad tracks. Eight yellow steel posts bound the site. The junction box appears as a concrete slab with a manhole cover in the northeast corner. The manhole cover is posted with a "Danger: Confined Space" sign. A vent pipe is located on the west side of the junction box site.

4.45 1607-B7 (1607-B7 SEPTIC TANK AND ASSOCIATED DRAIN FIELD)

1607-B7 is an inactive, nonhazardous/nonradioactive liquid waste site that operated from 1951 to 1969. The site is commonly known as the 1607-B7 Septic Tank and Associated Drain Field, although it has also been known as the 1607-B7 Sanitary Sewer System. It is located approximately 500 ft northeast of the former 183-B Filter Plant at Hanford coordinates N69700 W82000 (WHC 1991).

This unit, which is 6 ft long and 3 ft wide, includes a tile field (Gano and Hall 1987). The septic tank is 8 ft, 3 in. deep, constructed of reinforced concrete, and had a 12-person capacity (35 gal per capita) and an average detention period of 24 h. The walls and floor are 10 in. thick. The tile field is constructed of 4-in. vitrified pipe, concrete pipe, or drain tile with a minimum of 8 linear ft per capita. The laterals are open jointed and spaced 8 ft apart (WHC 1991).

The septic tank received an unknown amount of sanitary sewage from the 183-B Water Treatment Plant (WHC 1991).

No HRS migration score has been assigned to this waste site.

Today, the septic tank appears as a square, cobble-covered recess located northeast of the 183-B Filter Building site. Four 4-in. yellow posts mark the corners, and natural vegetation grows on the surface.

4.46 600-34 (100-B BALED TUMBLEWEED DISPOSAL SITE)

600-34 is an inactive, nonhazardous and nonradioactive solid waste site that is located approximately 1/2 mi west of the 181-B intake structure, 1,000 ft east of Pit #24, and 300 ft north of the 90-degree corner at which Route 6 changes from a north/south direction to an east/west direction. The site is commonly known as the 100-B Baled Tumbleweed Disposal Site. The dates of operation are unknown, although it is believed to have been a pre-Hanford farm waste site and was used for the disposal of baled tumbleweeds during the 1970's (WHC 1991).

This site consists of a barrow or gravel pit that is approximately 800 ft long, 300 ft wide, and 10 to 15 ft deep. These dimensions have been estimated based upon field investigation (WHC 1991).

The main concentration of waste is located in the eastern section of the pit. However, minor surface rubble is spread over the entire pit floor. Visible wastes include bales of tumbleweeds, wood timbers and ties, piles of a silty material, sheet metal, roofing material, concrete, material that appears to be cardboard, electrical insulators, and a 5-gal plastic bucket. Additionally, pre-Hanford waste is present at this site. Barbed wire; old pieces of farm equipment; and remnants of wire-wrapped, wooden irrigation pipe are visible on the surface (WHC 1991).

The baled tumbleweeds may be the result of an effort during the 1970's to determine a more effective method for handling nuisance noncontaminated tumbleweeds. The silty material may be sediment removed from the 182-B raw water reservoir and/or the 183-B water treatment basins during the 1970's and, possibly, during the 1980's. However, this site is considered to be a pre-1980 waste site (WHC 1991).

No HRS migration score has been assigned to this waste site. However, the potential for release at this site is considered negligible (WHC 1991).

4.47 UNDOCUMENTED LIQUID WASTE SITE: BACKWASH TRENCH

A 100- by 20- by 10-ft trench was installed in the 1970's to receive pumphouse backwash filter backflush, which had previously been returned to the river. It is located east of the 181-B Pumphouse Building, outside the exclusion area fence.

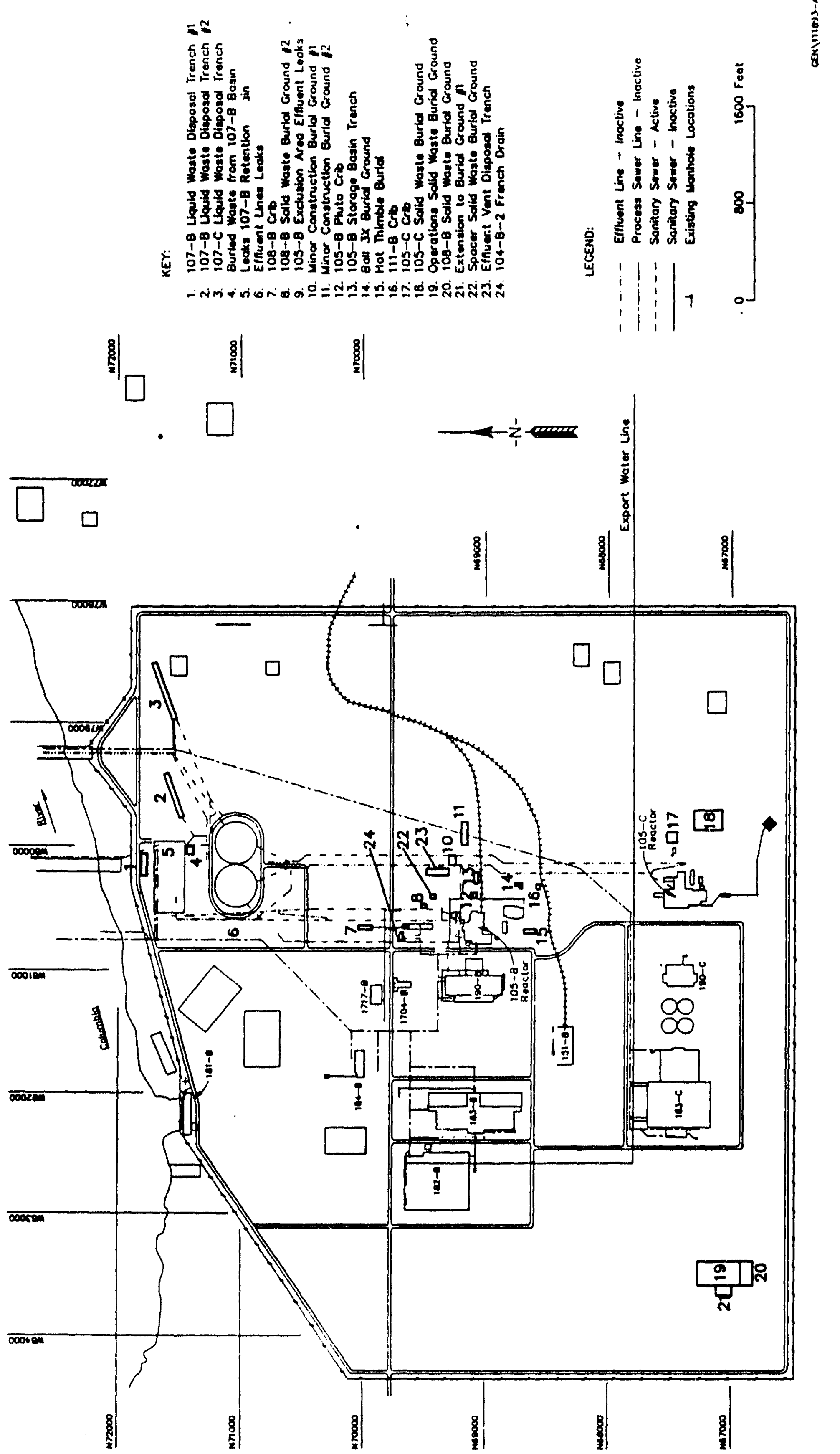
The trench is fed by a single 12-in. pipe that originated at the backwash filter. The pipe is approximately 3 ft below grade and enters the trench from the west.

The trench replaced a 12-in. backwash line, which discharged into the river approximately 100 to 200 ft from the bank. The 12-in. backwash line remains in place along the shoreline.

4.48 UNDOCUMENTED SOLID WASTE SITE: HOT THIMBLE BURIAL GROUND

A highly contaminated vertical thimble was removed from the 105-B Reactor Building in 1952 and temporarily buried in a trench about 100 ft west of the southwest corner of the 115-B Building. The thimble was later removed and taken to another burial ground. Heid (1956) states that some of the high-level contaminants remained in the original trench; no markers or barricades were placed above ground to mark the location. The hot thimble burial trench is identified as site number 15 on Hanford Site Drawing H-1-4049 (Heid 1956). See Figure 4-36 or Figure C-7 in Appendix C for an updated version of that drawing.

Figure 4-36. Historical Drawing of Waste Sites in the 100-B Area.



4.49 UNDOCUMENTED SOLID WASTE SITE: PRE-HANFORD FARM SITE

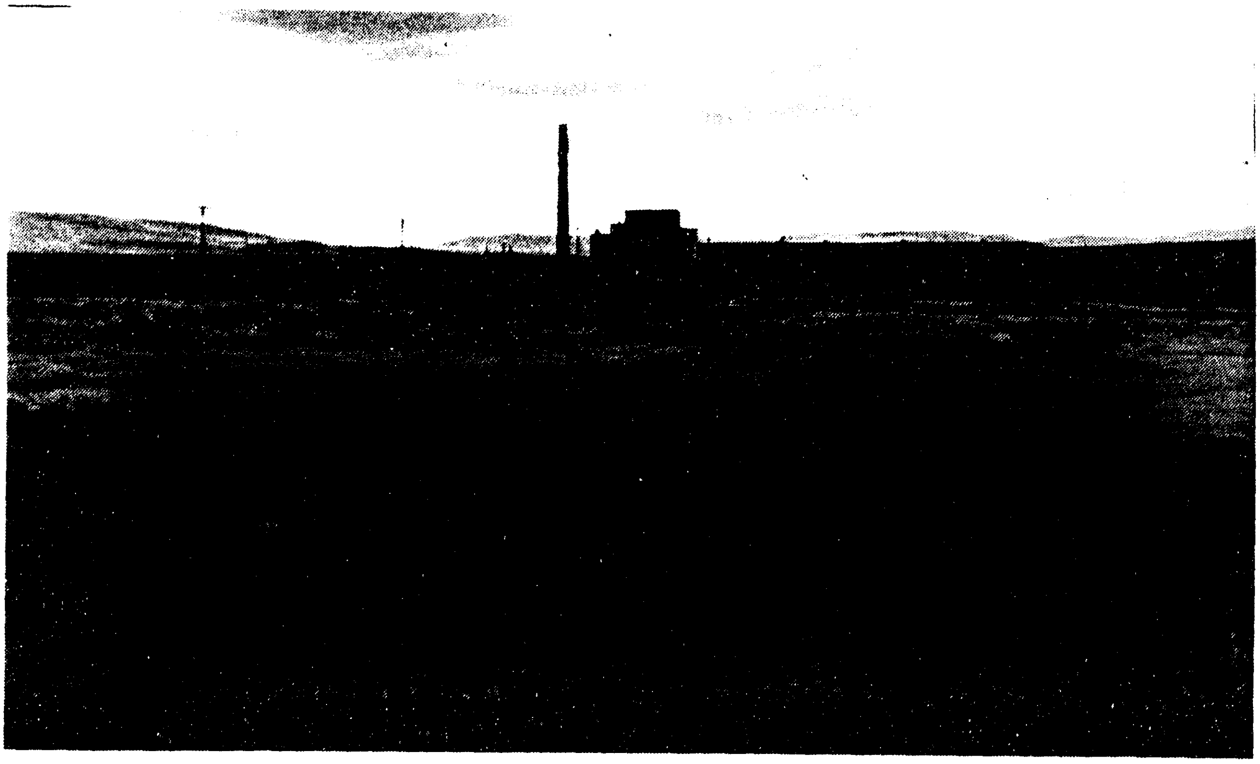
A farm site was apparently located to the southwest of the 128-B-2 Burn Pit, south of Well 71-77 near the gravel road to the burn pit. Farm wastes and an excavated pit are present in that location. Wastes at the site consist of metal buckets, cans, wire fencing, and several aging dry cell batteries. There are several piles of rock in the area. Refer to Figure 4-37 for a 1993 photograph of the farm site.

Figure 4-37. Undocumented Solid Waste Site: Pre-Hanford Farm Site.

4.50 UNDOCUMENTED SOLID WASTE SITE: BUILDING FOUNDATION

To the east of the 100-B Reactor, near the perimeter road, there is what may have been a building foundation. The site is a square area, covered with natural vegetation and bounded by large stones, that measures approximately 10 ft by 10 ft. A long line of similar rocks runs parallel to the perimeter road, between the unknown foundation site and the road. Refer to Figure 4-38 for a 1993 photograph of the site.

Figure 4-38. Undocumented Solid Waste Site: Building Foundation.



4.51 UNDOCUMENTED WASTE SITE: SUSPECTED CHEMICAL DUMPING AREA

A backfilled gravel area, which is vegetation- free and covered with what appears to be a white-colored chemical spray, is located near the 128-B-3 burn pit site. This undocumented waste site measures approximately 50 ft by 35 ft and has large boulders along its western edge. No markers or signs are present on the surface.

The 128-B-3 site is located approximately 600 ft northeast of the northeast corner of the 100-B Area perimeter road, and just above the riverbank, at Hanford coordinates N71500 W76500.

4.52 HAZARDOUS SITE: VALVE PIT

A valve pit is located on the export water line, to the east of the 100-B Reactor, between the old perimeter road and the 100-B Area access road. The valve pit is near, and on the opposite side of the perimeter road from, the 128-C-1 Burning Pit. The wooden valve pit cover is posted with a "Danger: Cave-In Potential" sign and is, in fact, caving in.

5.0 100-BC-2 OPERABLE UNIT

Three operable units are associated with the 100-B Area. 100-BC-1 and 100-BC-2 encompass source operable units that include liquid and solid waste sites. 100-BC-5 is a groundwater operable unit that includes the entire 100-B Area.

100-BC-1 covers the northern portion of the area and primarily includes the 100-B Reactor and associated liquid and sludge disposal sites. 100-BC-2 includes the southern portion of the area and primarily includes the 100-C Reactor, its associated water treatment facilities, solid waste sites associated with the operation of both 100-B and 100-C Reactors, and the 151-B Electrical Power Distribution Substation.

This chapter describes the 100-BC-2 Operable Unit, which encompasses the area to the south and east of the 100-BC-1 Operable Unit and is bounded on the south by the 100-B Area perimeter road. The eastern boundary generally follows the exclusion area fence just east of the 105-B Reactor Building. It includes the 100-C Reactor and water treatment facilities, as well as the main Electrical Substation (151-B). It encompasses 26 waste sites, 13 of which are included in the Tri-Party Agreement (Ecology et al. 1989). These include decommissioned and active facilities, trenches, cribs, french drains, septic tanks, burial grounds, and unplanned releases.

Appendix C provides several maps that show the locations of waste sites in the 100-B Area. The relative locations of 100-BC-1, 100-BC-2, and 100-BC-5 are shown in Figure C-1 of that appendix. A map of the 100-BC-2 Operable Unit is provided as Figure C-3. Additional figures are included to clarify the locations of waste sites.

Table 5-1 identifies the site(s) for which a PNL Hazardous Ranking System migration score (HRS migration score) has been established. Not all of the waste sites located within the 100-BC-2 Operable Unit have had an HRS migration score assigned to them.

Table 5-1. Hazardous Ranking System Migration Scores.

Waste site number	HRS migration score
116-C-2A	42.32
116-C-2C	0.00
118-B-1	4.56
118-B-2	3.04
118-B-3	3.04
118-B-4	3.04
118-B-6	6.05
118-C-1	4.56

Stenner et al. (1988).

The following brief outline describes past 100 Area solid waste burial practices (Dorian and Richards 1978).

1944 - 1954

- No intensive segregation program was in place.
- Combustibles and noncombustibles were buried in the same trenches.
- Burial records contain minimal information.

1955 - 1965

- Alternate disposal methods and sites were studied, documented, and, in some cases, implemented.
- Burning of combustibles in burial trenches began and ended.
- Records improved.

1966 - 1973

- Centralization of burial grounds was begun and completed.
- Measurements of burial materials improved.
- Burial records were much more complete.
- Some segregation of wastes by categories was practiced.

1973 - Present

- 100 Area radioactive solid wastes were transferred to the 200 Area burial grounds.

Miller and Wahlen (1987) also provides useful, if generic, information concerning the nature and volume of wastes placed in reactor site burial grounds. The following tables are derived from that data. Tables 5-2 and 5-3 provide estimates of volumes unique to each reactor. The Miller and Wahlen report notes that most of the volumes cited are buried in the "primary burial ground" which, for 100-B Area, includes both the 118-B-1 and 118-C-1 burial grounds. Tables 5-4 and 5-5 provide volumes of miscellaneous waste buried at 100-B Area.

Each waste site is described separately.

Table 5-2. Estimated Quantities of 100-B Reactor Solid Wastes Buried at 100-B Area.

Material type	Quantity at 100-B burial grounds (tons)
Spacers	55.25
Pb-Ca Poison pieces	210
Splines Aluminum Boron	 9.40 1.30
Graphite	.09
Desiccant	.86
Process tubes (4,271)	40.6
Lead	24.0

Miller and Wahlen (1987).

Table 5-3. Estimated Quantities of 100-C Reactor Solid Wastes Buried at 100-B Area.

Material type	Quantity at 100-C burial grounds (tons)
Spacers	51
Pb-Ca Poison pieces	110
Splines Aluminum Boron	 8.1 1.1
Graphite	.07
Dessicant	.66
Process tubes (2,096)	19.9
Lead	24.0

Miller and Wahlen (1987).

Table 5-4. Volumes of Miscellaneous 100-B Reactor Waste Buried at 100-B Area.

Type of material	Volume (tons)
Gun barrels	1.00
HCR/VSR thimbles	2.75
HCRs	.75
VSRs	1.50
Nozzles/pigtails	15.0
Reactor tools	0.50
Total	21.50

Miller and Wahlen (1987).

Table 5-5. Volumes of Miscellaneous 100-C Reactor Waste Buried at 100-B Area.

Type of material	Volume (tons)
Gun barrels	2.00
HCR/VSR thimbles	0
HCRs	1.20
VSRs	2.20
Nozzles/pigtails	15.0
Reactor tools	0.50
Total	20.9

Miller and Wahlen (1987).

5.1 116-C-2A (105-C PLUTO CRIB)

116-C-2A is an inactive liquid waste site located 275 ft east of the northeast corner of the 105-C Reactor Building (PNL 1975, DOE-RL 1993b) at Hanford coordinates N67501 W79962. It is commonly known as the 116-C-2A Pluto Crib, although it has also been known as the 105-C Pluto Crib, the 105-C Crib, and 116-C-2. This was the largest of the 100 Area pluto cribs and was unique in that effluents passed through a sump pump and a sand filter before being discharged to the crib (WHC 1991). Hanford Site Drawing P-8882 shows the pluto crib and its associated structures.

The pluto crib began operation in 1952 (DOE-RL 1993b). Several different documents provide differing closure dates for the pluto crib. One report states that the pluto crib ceased operation in 1969 (DOE-RL 1993b). Two other reports state that the crib's use was discontinued in 1968 (Stenner et al. 1988, DOE-RL 1992). Yet another report states that the pluto crib's use was discontinued in 1956 (PNL 1991). It seems likely that 1969 is the correct closure date for the pluto crib, since that date matches the closure date reported for two associated structures: the 116-C-2B pump station and the 116-C-2C sand filter.

Hanford Site Drawing P-8885 shows the pluto crib to be 22 ft, 3 in. long; 15 ft, 4 in. wide; and 16 ft, 8 in. deep. Although other documents (DOE-RL 1992, 1993b; PNL 1991; Clukey 1954, 1956; Stenner et al. 1988; WHC 1991) provide different sets of measurements for the pluto crib, it is believed that the drawing is correct.

The pluto crib was located in a pit that was approximately 100 ft long and 100 ft wide. The top of the crib was 20 ft below grade, and it was covered with approximately 2 ft of fill material during operation (Hanford Site Drawing P-8885).

The crib was constructed of concrete ties that were notched and stacked in a log cabin formation. Walls of concrete ties were constructed to divide the crib into 12 sections. Spaces between the ties were filled with sand. The crib was covered over by concrete roof slabs. An 8-in. well casing extends through the crib and ends 118 ft below grade (Hanford Site Drawing P-8885). Refer to Figure 5-1 for a drawing that shows top and side views of the pluto crib.

An 8-in. schedule 40 stainless steel pipe ran from the 105-C Reactor Building to the 116-C-2B Pump Station. From the pump station, wastes flowed through a 4-in. clay vitrified pipe that led to the 116-C-2C Sand Filter. The pipe was approximately 4 ft below grade at its junction with the pump station and 3 ft below grade at its junction with the sand filter. The pump station and sand filter were approximately 31 ft, 6 in. apart. An 8-in. clay vitrified pipe, located approximately 20 ft below grade, similarly led from the sand filter to the pluto crib. The sand filter and pluto crib were approximately 41 ft, 6 in. apart (DOE-RL 1993b). Wastes drained by gravity from the sand filter to the pluto crib. Figures 5-2 and 5-3 provide top and side views, respectively, of the pump station, sand filter, and pluto crib.

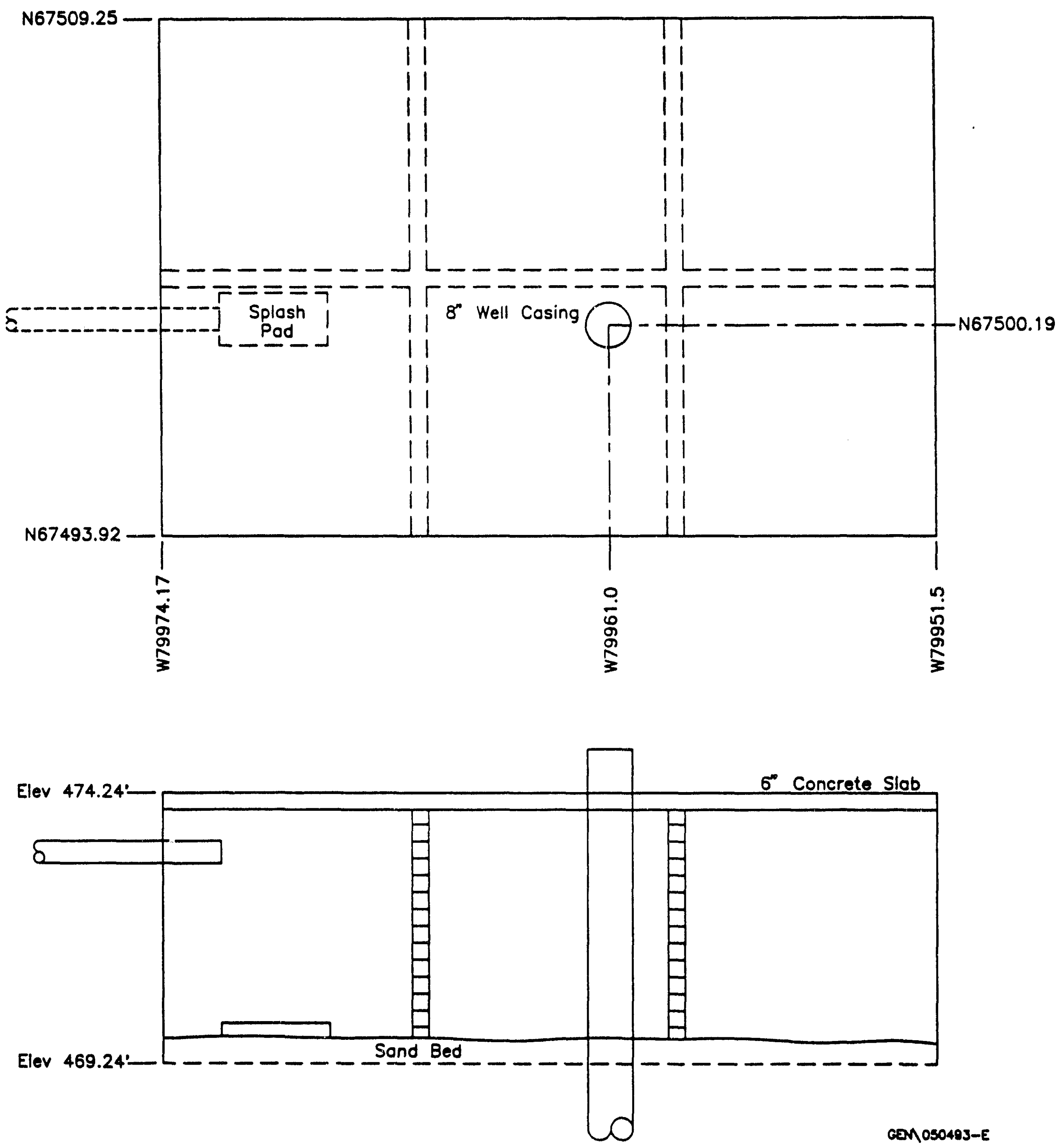
The pluto crib received approximately 7.5 x 10^6 L of mixed wastes during operation. It was initially used for the disposal of reactor cooling effluents after fuel cladding failures (DOE-RL 1993b). An unknown additional quantity of contaminated wastes was received from the decontamination of dummy fuel elements on the wash pad, contaminated water received from the 105-C Metal Examination Facility and the 105-C decontamination wash pad, and liquid wastes received from the 100-C Reactor rear face (Stenner et al. 1988, Heid 1956).

The radionuclide inventory for the pluto crib is estimated to be as follows. Data are presented in curies, with amounts calculated to account for decay through April 1, 1986.

^{60}Co:	1.320 E-002	^{152}Eu:	9.200 E-003	^{3}H:	3.150 E-001
^{134}Cs:	1.000 E-005	^{154}Eu:	4.900 E-004	^{90}Sr:	9.820 E-001
^{137}Cs:	8.300 E-004	^{155}Eu:	4.420 E-003	^{238}U:	9.900 E-004

(Stenner et al. 1988)

Figure 5-1. Top and Side Views of the 116-C-2A Pluto Crib.



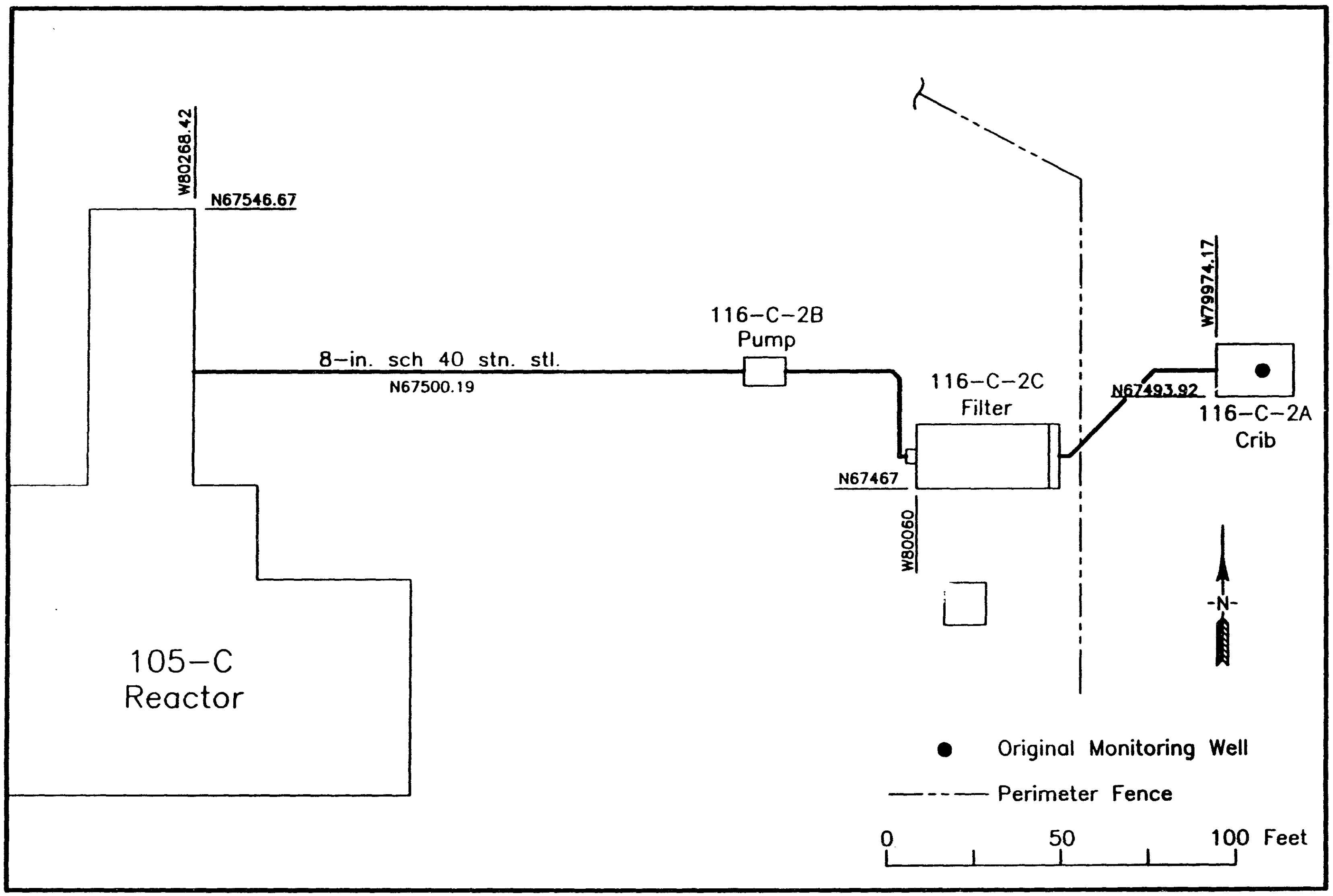


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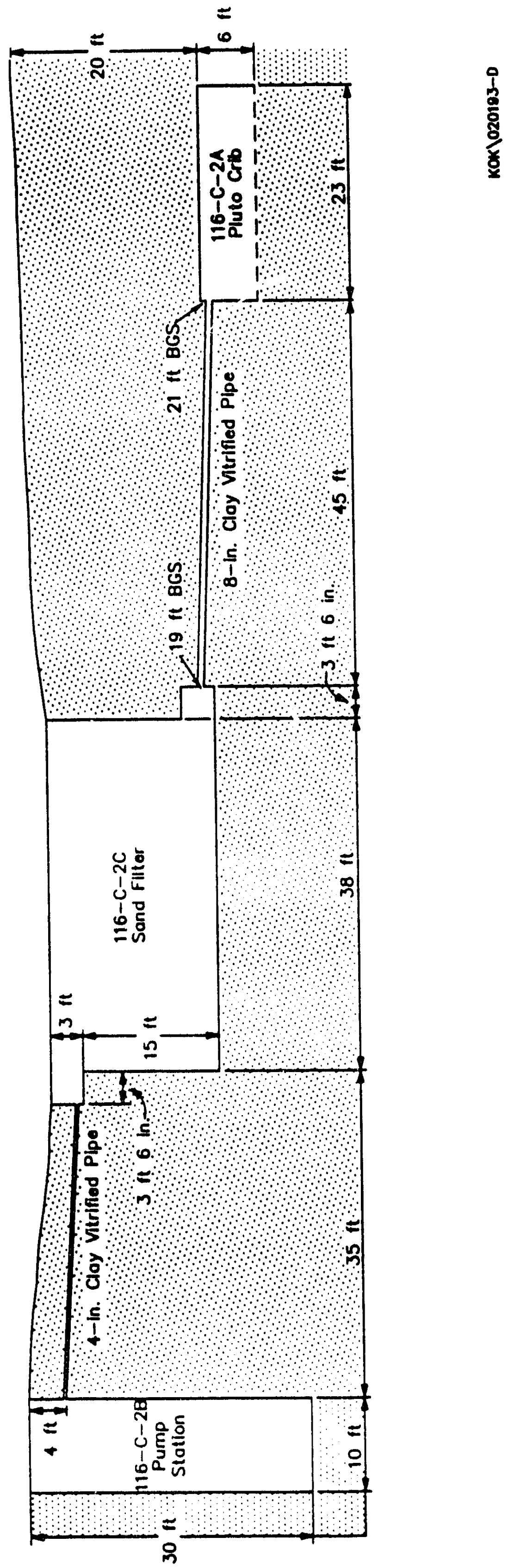
Figure 5-2. Top View of the 116-C-2 Pluto Crib System.

Figure 5-3. Side View of the 116-C-2 Pluto Crib System.



Reports vary as to the amounts of different chemicals disposed of at the pluto crib site. Two reports state that the crib contains 500 kg of sodium dichromate, 1,000 kg of sodium oxalate, and 1,000 kg of sodium sulfamate (WHC 1991, DOE-RL 1993b). Another report, however, states that the crib contains 990 kg of sodium dichromate, 2,100 kg of sodium oxalate, and 6,600 kg of sodium sulfamate; the total waste volume is listed as 7.5×10^6 L (Stenner et al. 1988). Sodium hydroxide and nitric acid are also believed to be present.

Soil samples were taken from a "potentially contaminated soil column" at the pluto crib site. The volume of contaminated soil at the site was estimated to be 1.4×10^5 ft^3, and the mass of that soil was estimated to be 9.5×10^9 g. Sampling also showed the average and maximum concentrations of ^{238}Pu and $^{239/240}$Pu at this crib to be below analytical detection limits (Dorian and Richards 1978). Tables 5-6 and 5-7 provide a summary of information from the soil sampling report.

Table 5-6. 116-C-2A Gross Radionuclide Inventory.

Radionuclide	Amount (pCi/g)
Avg. beta/gamma	1.90 E+02
Max. beta/gamma	2.80 E+02

Dorian and Richards (1978).

Table 5-7. 116-C-2A Radionuclide Inventory.

Radionuclide	Average pCi/g	Curies
^{238}Pu	a	0.0 E+00
^{239}Pu, ^{240}Pu	a	0.0 E+00
^{90}Sr	1.3 E+02	1.2 E+00
^{3}H	5.3 E+01	5.0 E-01
^{152}Eu	1.5 E+00	1.4 E-02
^{60}Co	4.1 E+00	3.9 E-02
^{154}Eu	1.0 E-01	9.5 E-04
^{134}Cs	2.1 E-02	2.0 E-04
^{137}Cs	1.1 E-01	1.0 E-03
^{155}Eu	1.5 E+00	1.4 E-02
Uranium	1.1 E-01	1.0 E-03
	Total Curies	1.8 E+00

[a] Less than analytical detection limit.
Dorian and Richards (1978).

Upon decommissioning, the crib and its surrounding depression were filled to grade with gravel and sand (Stenner et al. 1988, DOE-RL 1993b).

The pluto crib has an HRS migration score of 42.32 (Stenner et al. 1988).

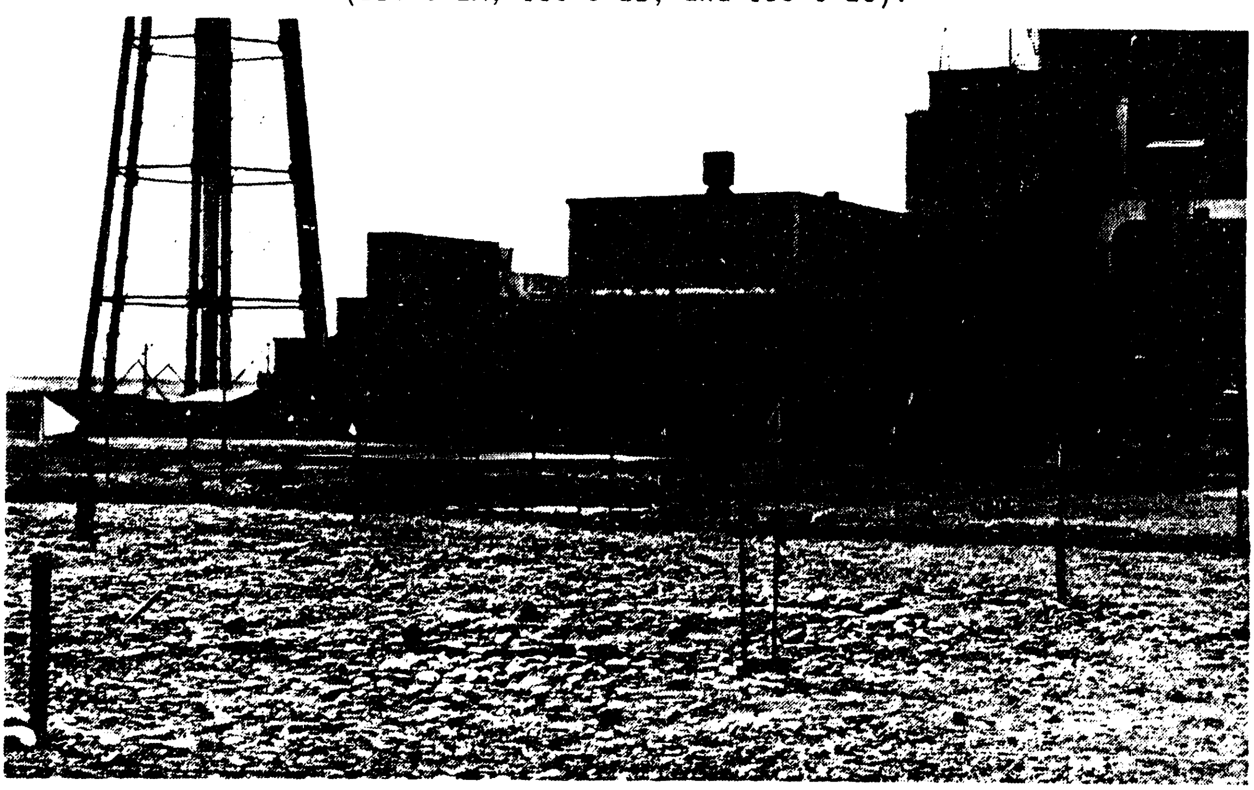
Currently, the crib appears as a vegetation-free, cobble-covered field. The waste site is bounded by 3-in. yellow steel posts. A capped well casing, approximately 3 ft tall, protrudes from the center of the pluto crib. See Figure 5-4 for a 1993 photograph of the pluto crib, sand filter, and pump station.

5.2 116-C-2B (105-C PLUTO CRIB PUMP STATION)

116-C-2B is an inactive liquid waste site located at Hanford coordinates N67474 W80052 (WHC 1989b), approximately 40 ft to the northwest of the 116-C-2C Sand Filter. The site is commonly known as the 116-C-2B Pump Station, although it has also been known as the 105-C Pluto Crib Pump Station and as 116-C-2-1. The sump pump operated from 1952 to 1969, receiving an unspecified quantity of mixed wastes from the 105-C Reactor Building and pumping the wastes into the sand filter (WHC 1991).

The pump station was approximately 10 ft long (DOE-RL 1993b); 9 ft, 8 in. wide; and 29 ft, 4 in. deep (Hanford Site Drawing P-8880).

Figure 5-4. 105-C Pluto Crib, Sand Filter, and Pump Station (116-C-2A, 116-C-2B, and 116-C-2C).



Refer to Figure 5-5 for a drawing that shows top and side views of the pump station. Additionally, the entire pluto crib system may be seen in Figures 5-2 and 5-3.

Contamination at the pump station site results from leaks that occurred there, and only a small amount should be present. Reportedly, "constituents present should be the same as those for the sand filter and the crib; therefore, contamination at the pump station can be considered similar to the other two sites" (DOE-RL 1993b). See Sections 5.1 and 5.3 for more information about wastes present at the 116-C-2A Pluto Crib and its associated sand filter.

No HRS migration score has been assigned to this waste site. A 1988 report by Stenner et al. states, "Although the site was used for waste disposal, no inventory was available; therefore, the site did not score. However, volume data for the site were sufficient to exceed release-to-the-environment criteria (i.e., 10% soil column volume); therefore, the site is recommended as having a significant priority for further characterization" (Stenner et al. 1988).

116-C-2B currently appears as a rectangular-shaped concrete sump. A diamond-plate steel access hole cover is located in the northwest corner, and a vent is located at the east end. The site is surrounded by four yellow steel posts and light-duty barricade chain. It is posted with signs reading "116-C-2B Pump Station" and "Caution: Underground Radioactive Material." Figure 5-6 shows a 1993 photograph of the pump station, with the sand filter and pluto crib in the background.

5.3 116-C-2C (105-C PLUTO CRIB SAND FILTER)

116-C-2C is an inactive liquid waste site located approximately 50 ft west of the 105-C Pluto Crib (WHC 1991, DOE-RL 1993b) at Hanford coordinates N67474 W80052. This site is commonly known as the 116-C-2C Sand Filter, although it has also been known as the 105-C Pluto Crib Sand Filter, 116-C-8, and the 116-C-2-2 Crib.

The sand filter operated from 1952 to 1969, receiving 7.5 x 10^6 L of mixed wastes (Stenner et al. 1988). Effluents were collected in the 116-C-2B Pump Station and transferred to 116-C-2C for filtration before draining, by gravity, to the 116-C-2A Pluto Crib. More detailed information about the makeup and sources of the waste stream is provided in Section 5.1.

The sand filter was a below-grade, sand-filled concrete box that was covered with removable concrete shielding covers (WHC 1991). Effluents were distributed over the surface of the sand filter media by the use of distribution trays placed just beneath the concrete lid panels (Stenner et al. 1988).

Hanford Site Drawing P-8884 shows that the sand filter is 41 ft, 6 in. long; 18 ft wide; and 18 ft, 3 in. deep. Although other documents (Stenner et al. 1988, DOE-RL 1993b) provide different sets of measurements for the sand filter, it is believed that the drawing is correct.

Figure 5-5. Top and Side Views of the 116-C-2B Pump Station.

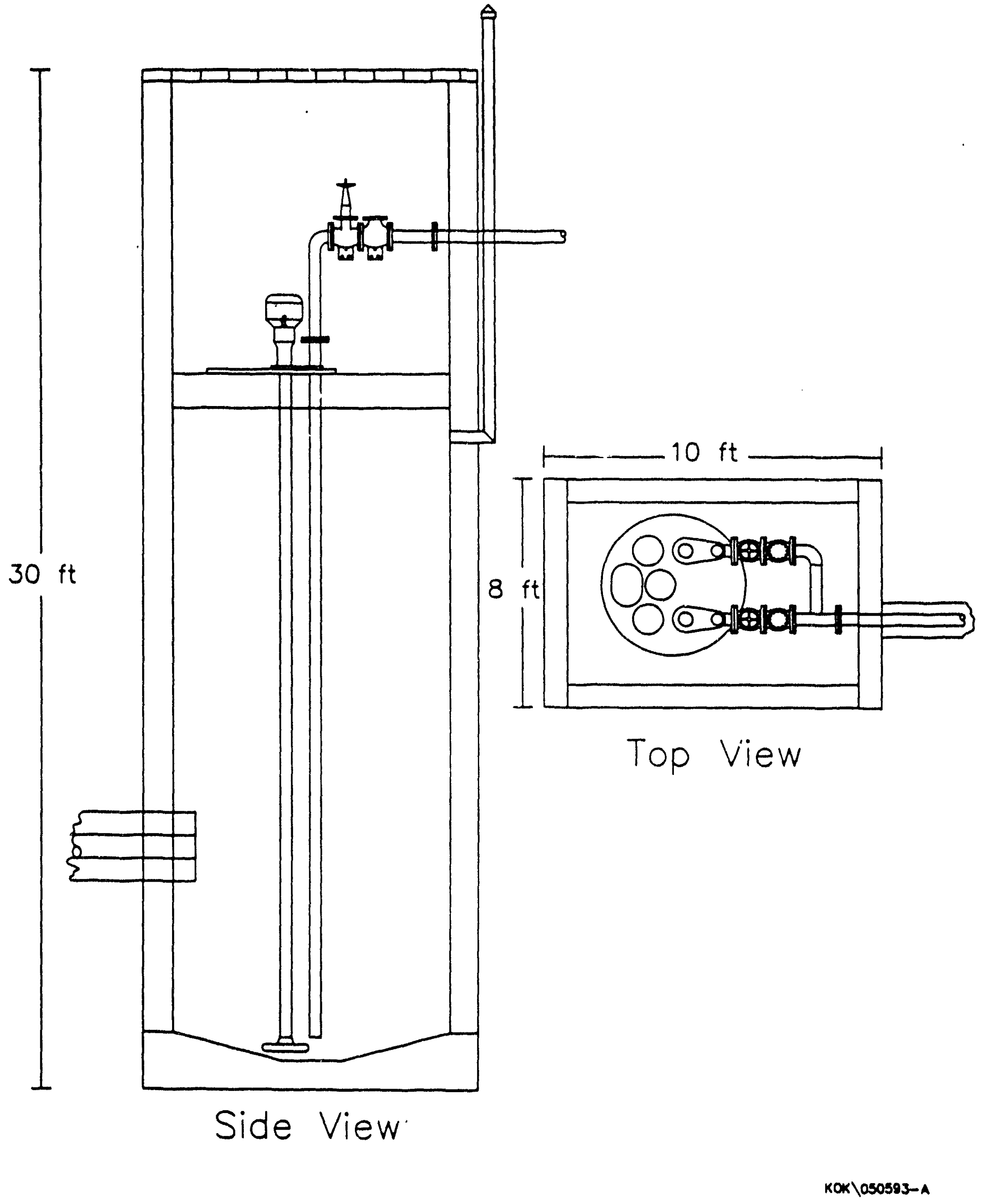
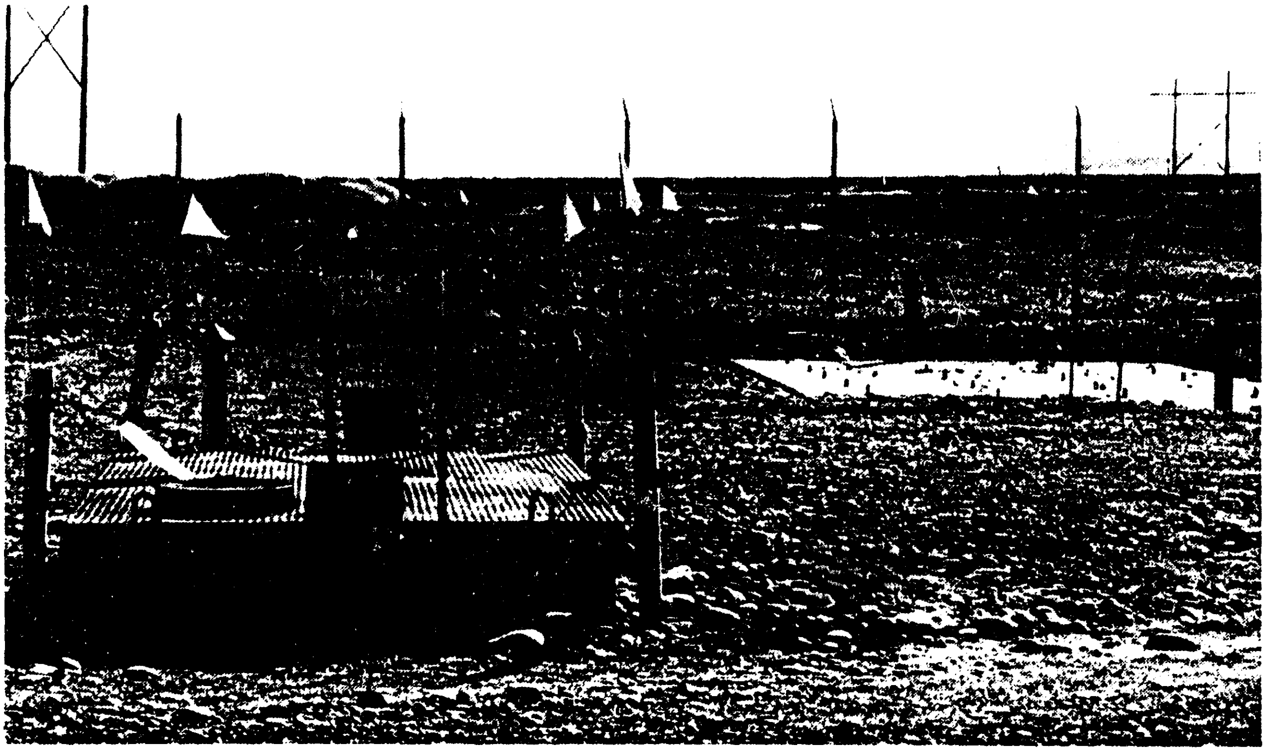


Figure 5-6. 105-C Pluto Crib, Sand Filter, and Pump Station (116-C-2A, 116-C-2B, and 116-C-2C).



An inflow tray approximately 3 ft wide and 3 ft deep projected 3 ft, 6 in. from the upper part of the sand filter structure's west end. Refer to Figures 5-1 and 5-2 for drawings of the pluto crib system that show the sand filter inflow tray.

Refer to Figure 5-7 for a drawing that shows top and side views of the sand filter. Additionally, the entire pluto crib system may be seen in Figures 5-2 and 5-3.

The estimated radionuclide inventory for the sand filter includes the following. Data are presented in curies, with amounts decayed through April 1, 1986.

^{60}Co:	7.760 E+001	^{154}Eu:	3.140 E-001	^{239}Pu:	1.080 E-001
^{134}Cs:	2.440 E-002	^{155}Eu:	2.120 E-000	^{240}Pu:	1.200 E-002
^{137}Cs:	8.270 E-000	^{3}H:	2.830 E-001	^{90}Sr:	1.800 E+000
^{152}Eu:	5.190 E-000	^{238}Pu:	1.120 E-001	^{238}U:	1.200 E-001

(Dorian and Richards 1978)

Soil sampling was conducted at the sand filter site. The volume of contaminated soil at that site was estimated to be 9.0×10^4 ft^3, and the mass of that soil was estimated to be 6.1×10^9 g. Tables 5-8 and 5-9 provide additional information about the radionuclide inventory of the 116-C-2C site.

Figure 5-7. Top and Side Views of the 116-C-2C Sand Filter.

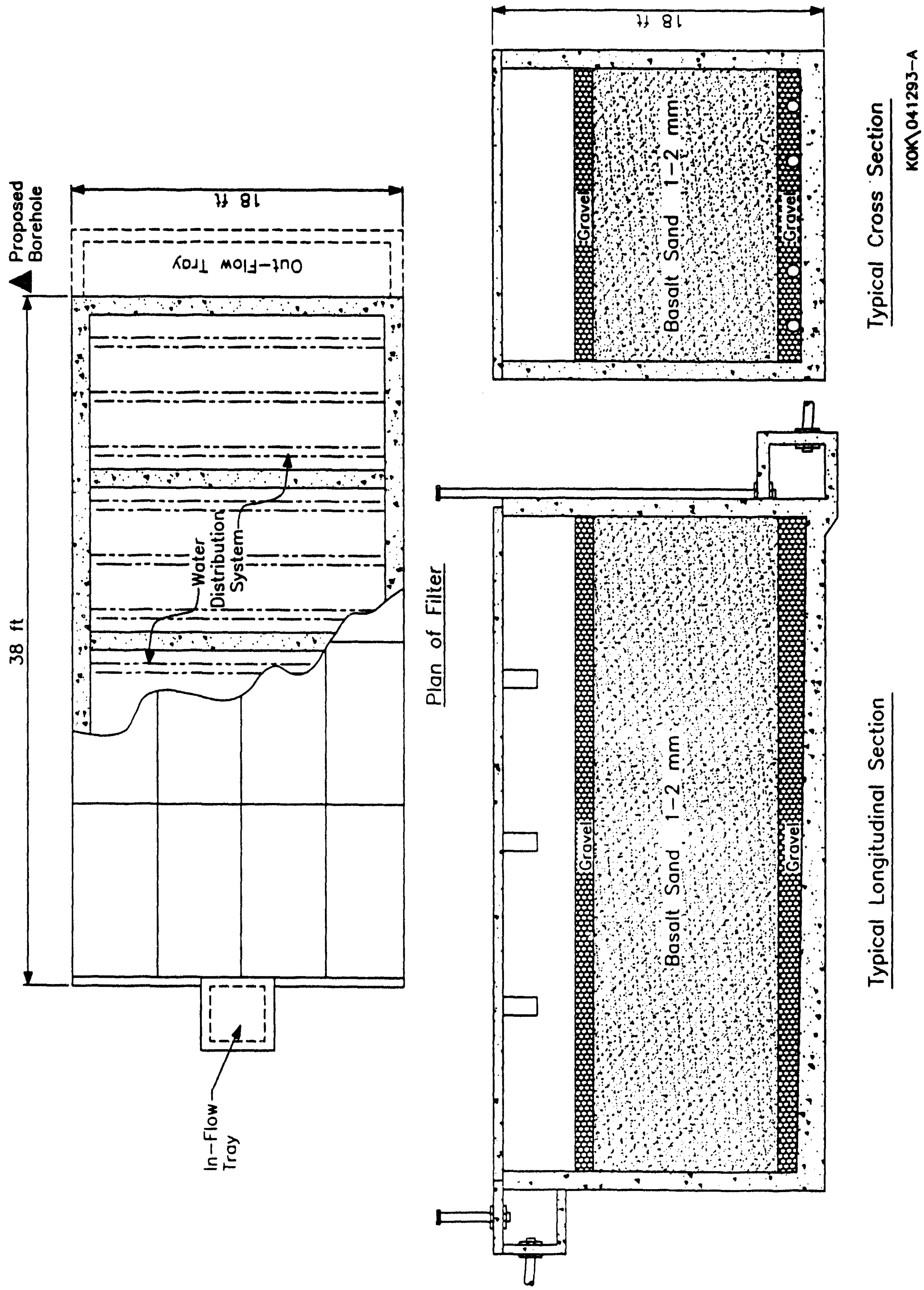


Table 5-8. 116-C-2C Gross Radionuclide Inventory.

Radionuclide	Amount (pCi/g)
Avg. beta/gamma	4.20 E+04
Max. beta/gamma	7.30 E+06
Avg. ^{238}Pu	1.90 E+01
Max. ^{238}Pu	1.60 E+03
Avg. $^{239/240}Pu$	1.90 E+01
Max. $^{239/240}Pu$	1.50 E+03

Dorian and Richards (1978).

Table 5-9. 116-C-2C Radionuclide Inventory.

Radionuclide	Average pCi/g	Curies
^{238}Pu	1.9 E+01	1.2 E-01
^{239}Pu, ^{240}Pu	1.9 E+01	1.2 E-01
^{90}Sr	3.6 E+02	2.2 E+00
^{3}H	7.3 E+01	4.5 E-01
^{152}Eu	1.3 E+03	7.9 E+00
^{60}Co	3.7 E+04	2.3 E+02
^{154}Eu	1.0 E+02	6.1 E-01
^{134}Cs	6.5 E+01	3.9 E-01
^{137}Cs	1.7 E+03	1.0 E+01
^{155}Eu	1.1 E+03	6.7 E+00
	Total Curies	2.0 E+02

Dorian and Richards (1978).

The sand filter has not been given an HRS migration score (Stenner et al. 1988).

116-C-2C currently appears as a rectangle of sectioned concrete pads with rows of metal lifting eyes protruding from the top. It is surrounded by yellow steel posts and light-duty barricade chain, and is posted with a "Caution: Underground Radioactive Material" sign and a sign identifying it as the sand filter. A vent pipe is located at the sand filter's east side, and another vent pipe is located at its west side. Additionally, a valve is located at the west end of the sand filter. Photographs that show the sand filter are included in Sections 5.1 and 5.2.

5.4 116-C-3 (105-C CHEMICAL WASTE TANKS)

116-C-3 is an inactive liquid waste site located approximately 300 ft northeast of the 105-C Reactor Building (AEC 1974, WHC 1991) at Hanford coordinates N67870 W80025 (WHC 1989b).

The site consists of two storage tanks, each of which is 12 ft in diameter and has a depth of 12 ft (WHC 1991). They had a combined capacity of 2.7×10^4 gal (WHC 1991, DOE-RL 1993b, AEC 1974).

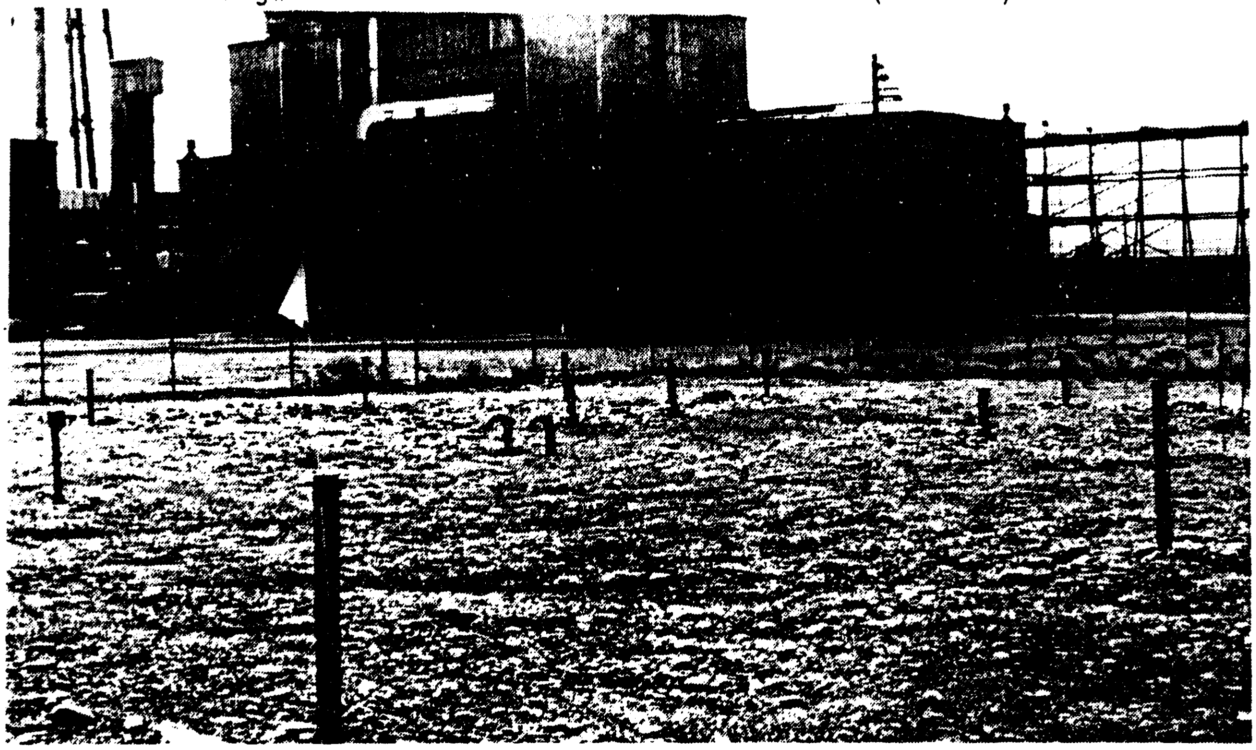
The tanks were originally installed to receive liquid wastes from the 105-C Metal Examination Facility. Reports vary as to whether the tanks were ever used. According to WHC (1991) and DOE-RL (1993b), the tanks were never used; liquid wastes from the metal examination facility were instead routed to the 116-C-2A Pluto Crib. This is verified by a former site employee who reports that the tanks were never used to receive wastes, although they were hydro tested and may have water in them. AEC (1974) states that the "two tanks of 27,000 gallon capacity were used to contain caustic waste from dejacketing and acid wastes from extruding of irradiated fuel elements in the metal examination facility" between 1964 and 1969. It seems probable that this document reports the original plan for use of the tanks rather than their actual use.

A valve bypass line connects the 105-C Metal Examination Facility to the chemical storage tanks. If the drainage system from the facilities were to become over-pressurized, effluents would bypass the valve and be released to the tanks. As a result, the potential exists for chemical contaminants to be present in the chemical storage tanks (Hanford Site Drawing P-9136).

No HRS migration score has been assigned to this site.

116-C-3 currently appears as a vegetation-free, cobble-covered field located approximately 20 ft away from the exclusion area fence, to the east of the 100-C Reactor. The tanks are below grade and are not visible. The site is bounded by 3-in. yellow steel posts. Three rust-colored valve handles approximately 3 ft tall protrude from the center of the west half of the waste site. A gray 2-in. conduit pipe protrudes from the center of the east half of the waste site; it is part of the cathodic protection system that was installed to protect storage tanks against corrosion. Two silver-colored, curved vent pipes approximately 2 ft tall emerge from the very center of the waste site. The site is posted with a sign identifying it as the "116-C-3 Chemical Waste Tanks." Figure 5-8 shows a 1993 photograph of the chemical waste tank site.

Figure 5-8. 105-C Chemical Waste Tanks (116-C-3).



5.5 116-C-6 (105-C FUEL STORAGE BASIN CLEANOUT PERCOLATION PIT)

116-C-6 is an inactive nonhazardous/nonradioactive liquid waste site that operated from December 1984 to August 1985 to receive 2,157,450 L of processed water from the 105-C Fuel Storage Basin cleanout activity. The site is commonly known as the 105-C Fuel Storage Basin Cleanout Percolation Pit, although it has also been known as the 105-C Pond. It is located approximately 400 ft east of the 105-C Reactor Building at Hanford coordinates N67548 W79749 (WHC 1991).

The unit is an unlined, "L"-shaped, open excavated pit. Soil was excavated from the center and used as a berm around its perimeter. The approximate side lengths are 100 ft, 100 ft, 45 ft, 55 ft, and 50 ft. The site area dimension is 7,250 ft^2 and the depth is 6 ft (WHC 1991, DOE-RL 1993b).

During operation, the radiologically contaminated shielding water in the basin was processed through an ion exchange column and filters, then discharged to the pit (Miller and Steffes 1986). Before the water was discharged, composite samples were taken to ensure that radionuclide concentrations were below release criteria in Table II of DOE Order 5480.1. No known hazardous substances were present in the water; however, chemical analysis during that period was not a standard practice, and there is no evidence that it was performed (WHC 1991).

No HRS migration score has been assigned to this waste site.

Today, 116-C-6 appears as a gravel-covered depression, bounded by a rock berm wall, that has natural vegetation growing on the surface. Four light-duty steel posts, with no signs or markers, section off a portion inside the "L"; their purpose is unknown. This waste site is located just outside a larger radiologically controlled area, which is marked by permanent concrete markers that are posted with "Caution: Underground Radioactive Material" signs.

5.6 118-B-1 (105-B BURIAL GROUND)

118-B-1 is an inactive solid waste site located 3,000 ft due west of the 105-C Reactor Building (WHC 1991) at Hanford coordinates N67000 W83500. The site is commonly known as the 118-B-1 Burial Ground, although it has also been known as the 105-B Burial Ground, the 105-B Solid Waste Burial Ground, and the Operations Solid Waste Burial Ground. Two other burial grounds, originally known as the 108-B Solid Waste Burial Ground and the Extension to Burial Ground No. 1, were added to 118-B-1 in the 1950's. Approximately 1 x 10^4 m^3 of mixed wastes was received by the site from 1944 to 1973 (Dorian and Richards 1978, Stenner et al. 1988, DOE-RL 1993b, Bergstrom 1993).

The original 118-B-1 burial ground was 1,000 ft long, 321 ft wide, and 20 ft deep (Stenner et al. 1988, DOE-RL 1993b) and ran in a north-south direction. It contained "21 trenches running east-west, 3 trenches running north-south, three spacer pits shored with railroad ties, and spline silos" (Stenner et al. 1988).

Trenches were typically 300 ft long, 20 ft wide, and 20 ft deep, and were separated by 20-ft spaces (Stenner et al. 1988). The burial ground received general reactor waste from the 100-B and 100-N Reactors, including the following: aluminum tubes, irradiated facilities, thermocouples, vertical and horizontal aluminum thimbles, stainless steel gun barrels and expandables, plastic, wood, and cardboard (Dorian and Richards 1978).

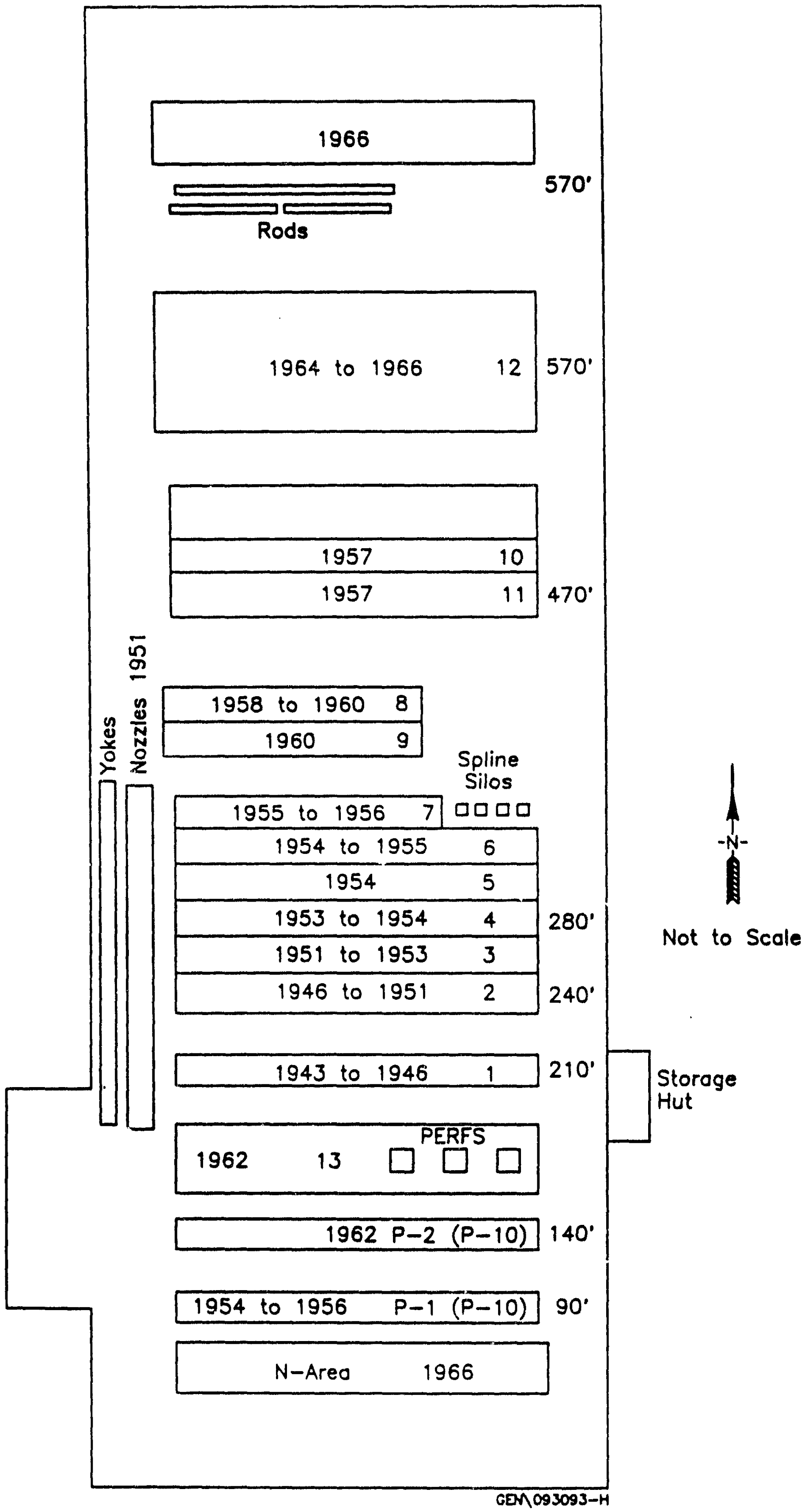
Spline silos were constructed at this burial ground. These were vertical metal "culverts" with 5 to 6 ft radii used, presumably, to receive reactor poison splines and other metallic wastes. Poison splines were about 30 ft long and the silos may be of similar length; however, it is possible that splines were cut into shorter pieces before burial, and a shorter silo would be possible.

Literature also mentions "perforated burials" but fails to describe them. It mentions that they "were generally located in excavations shored with railroad ties" (Stenner et al. 1988). This may refer to a burial vault construction technique used, at some other reactor site burial grounds, wherein wooden burial vaults were constructed of railroad ties.

Waste materials were typically buried 20 ft below grade and were covered with a minimum of 4 ft of clean soil; actual soil cover ranged from 2 ft to greater than 14 ft (Bergstrom 1993). Figure 5-9 provides the burial ground layout.

Limited additional descriptions of material deposited at the original 118-B-1 burial ground, as well as information about burial ground layout, is provided in Appendix E.

Figure 5-9. Historical Drawing of the 118-B-1 Burial Ground.



The 108-B burial ground extension was added adjacent to and south of the original 118-B-1 site in 1950 (Heid 1956, DOE-RL 1993b). It contained three trenches that are now covered with 6 ft of soil (DOE-RL 1993b). Solid tritium wastes and high-level liquid tritium wastes were sealed in 3-in.-diameter iron pipes and disposed of at this site. This burial ground also received contaminated tritium pots and irradiated process tubing in 1952, as well as contaminated fuel spacers (perfs) (Heid 1956, DOE-RL 1993b).

A second extension was added to 118-B-1 in 1956. It was 200 ft long and 50 ft wide, and was located adjacent to and at the midpoint of the burial ground's west side. This extension was used for the burial of contaminated yokes from the 100-B Reactor (Heid 1956, DOE-RL 1993b).

The estimated radionuclide inventory for the burial ground is as follows. Data are presented in curies, with amounts calculated to account for decay through April 1, 1986.

^{60}Co: 8.860 E+002	^{154}Eu: 3.020 E+001	^{90}Sr: 1.500 E+000
^{137}Cs: 1.500 E+000	^{63}Ni: 9.660 E+001	^{3}H: 3.800 E+003
^{152}Eu: 1.650 E+001	^{14}C: 6.600 E-001	

(Stenner et al. 1988)

Stenner et al. (1988) provides information about materials that were disposed of at this burial ground. The information is presented in Table 5-10.

Table 5-10. 118-B-1 Material Inventory Provided by Stenner et al. (1978).

Material	Quantity (kg)
Aluminum tubes	16,783
Aluminum spacers	41,730
Lead (from lead-cadmium poison slugs)	89,040
Cadmium (from lead-cadmium poison slugs)	3,719
Graphite	291
Desiccant	14
Aluminum poison slugs	6,395
Boron poison splines	862
Lead	18,143
Mercury	0.9
Miscellaneous metallic waste	15,422

Miller and Wahlen (1978) provides information about other materials that were deposited at the site. That information is provided in Table 5-11.

Table 5-11. 118-B-1 Material Inventory Provided by Miller and Wahlen (1978).

Material	Quantity (lb)
Spent lithium-aluminum alloy	37,500
Lead from pots	30,000
Mercury from disposal of glass line	2,000
Glass from glass line	2,500
Aluminum cladding	3,000
Palladium	Trace amount

118-B-1 was the only 100 Area burial ground sampled by Dorian and Richards for their 1978 report. In April 1986, 14 sample holes were drilled into trenches at the burial ground site. Samples were taken from six wells that had been drilled into several burial trenches used between 1943 and 1956. Those samples revealed little radioactivity. Samples from another trench, which had been used from 1958 to 1960, revealed "a piece of aluminum from a depth of 22 feet reading 15,000 c/m with a GM probe and pieces of reactor poison having contamination levels slightly above background" (Dorian and Richards 1978).

Additionally, five sample holes "were drilled into trenches used during and after 1966, including a trench used for disposal of wastes from 100-N Area. Contaminated samples generally ranged from a few hundred counts per minute up to 7,000 c/m with a GM probe and were taken from depths of 20-30 ft below grade. The maximum in situ dose rate measured inside sample holes drilled into these trenches was 300 mR/hr. Miscellaneous debris, including plastic, wood, cardboard, 1/2-in. steel tubing (possibly from past 100-N Reactor steam generator repair work), and cadmium were included in samples taken from these trenches" (Dorian and Richards 1978).

Dorian and Richards 1978 further reports the following.

- No measurable migration of radionuclides had occurred.
- ^{239}Pu and ^{240}Pu were normally not detectable in samples. The maximum amount of these isotopes found in a single sample was 1 pCi/g.
- ^{60}Co and ^{152}Eu were the primary isotopes detected in samples. Other radionuclides detected include ^{155}Eu, ^{134}Cs, ^{137}Cs, ^{90}Sr, and ^{63}Ni.
- ^{63}Ni was detected in concentrations of up to 7.5×10^1 pCi/g. The Dorian and Richards report indicates that, "based on sampling of the 105-DR Reactor core, considerably higher ^{63}Ni concentrations are probably present in metallic wastes within this burial ground."

- Beta-gamma concentrations of up to 1.8×10^5 were detected in the samples. The report states that 1.7×10^5 of the total beta-gamma concentration was ^{60}Co.

- "Specific activities of samples taken in older trenches used before reactor power upgrade modifications were made are considerably less than for trenches used after the reactor power operating levels were increased" (Dorian and Richards 1978).

A geophysical investigation of the 118-B-1 Burial Ground was performed in 1993 to locate primary concentrations of buried waste and to locate individual silos and trenches at the burial ground. Ground-penetrating radar and electromagnetic induction were used in the investigation. Anomalies found using these techniques at the burial ground site were usually interpreted as buried waste. Twenty-two "zones of concentrated anomalies" were found. Refer to Bergstrom (1993) for additional information about the investigation.

After the 118-B-1 Burial Ground was removed from use, it was covered with at least 4 ft of soil and stabilized with gravel (Dorian and Richards 1978).

The burial ground has been assigned an HRS migration score of 4.56 (Stenner et al. 1988).

118-B-1 currently appears as a vegetation-free mound of cobbles raised 2 to 3 ft above the surrounding terrain. Permanent concrete markers surround the site, and "Caution: Underground Radioactive Material" signs are posted. Blue and green survey stakes have been placed around the perimeter, and in lines crossing the 118-B-1 site, for a ground-penetrating radar survey that was recently performed. Part of the site is bounded by permanent yellow markers.

Approximately 50 yd north of the southeast corner, a vegetation-free, cobble-covered portion of the site measuring 40 ft long and 15 ft wide is bounded by steel posts and light-duty barricade chain; "Surface Contamination Area" warning signs are posted on that section. Refer to Figures 5-10 and 5-11 for 1993 photographs of the burial ground site.

An extension is located along the west side of the rectangular 118-B-1 Burial Ground. That extension, approximately 200 ft long and 40 ft wide, is a vegetation-covered area that is raised 3 to 4 ft above the surrounding terrain. It is located adjacent to the main burial ground, near the northwest corner.

5.7 118-B-2 (MINOR CONSTRUCTION BURIAL GROUND NO. 1)

118-B-2 is an inactive low-level solid waste site that operated from 1952 until the summer of 1956. The site is commonly known as the Minor Construction Burial Ground No. 1, although it has also been known as the 118-B-2 Burial Ground and as the Construction Burial Ground No. 1. It received 100 m^3 of dry waste from the 107-B Basin repairs and wastes from

Figure 5-10. 105-B Burial Ground, Looking Northeast (118-B-1).

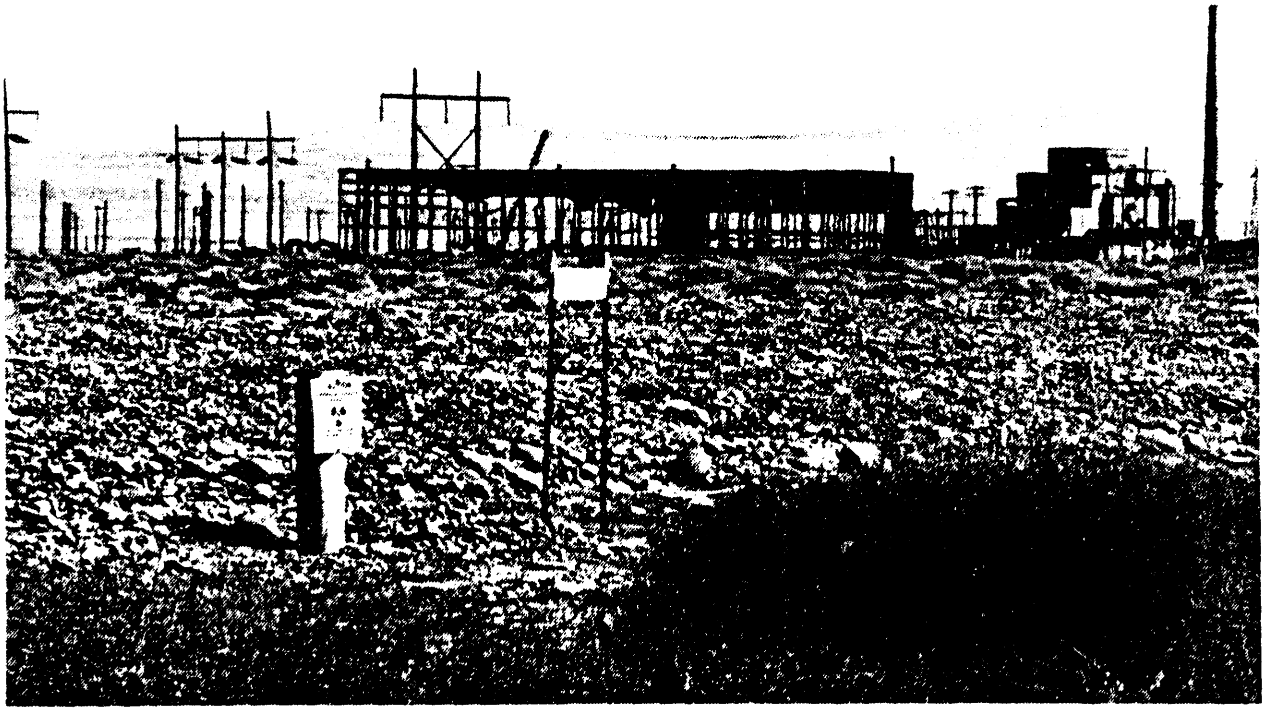


Figure 5-11. 105-B Burial Ground, Looking Northwest (118-B-1).

115-B alterations. This burial ground is located at Hanford coordinates N69300 W80050, approximately 450 ft directly east of the 105-B Reactor Building and immediately west of the 118-B-3 Burial Ground (Stenner et al. 1988).

The burial ground runs east to west (DOE-RL 1993b) and is 60 ft long, 30 ft wide, and 10 ft deep (Stenner et al. 1988).

The radionuclide inventory for this waste site includes 1.000 x 10^0 Ci of ^{60}Co, an amount calculated to account for radioactive decay through April 1, 1986 (Stenner et al. 1988).

The burial ground was covered with 6 ft of clean soil in the summer of 1956 (Heid 1956). The soil was stabilized with gravel to prevent wind erosion (WHC 1991).

The HRS migration score assigned to this waste site is 3.04 (Stenner et al. 1988).

Today, the burial ground appears as a vegetation-free, cobble-covered field just outside the reactor exclusion area fence and across a narrow road. It is bounded on the east side by the 100-B Area effluent lines, which are identified by the effluent line vents, and is posted with "Caution: Underground Radioactive Material" signs. An identification sign was recently posted at this site.

5.8 118-B-3 (MINOR CONSTRUCTION BURIAL GROUND NO. 2)

118-B-3 is an inactive solid waste site located at Hanford coordinates N69300 W79800, approximately 650 ft due east of the 105-B Reactor Building and due east of the 118-B-2 Burial Ground (WHC 1991). The site is commonly known as the Minor Construction Burial Ground No. 2, although it has also been known as the 118-B-3 Burial Ground and as the Construction Burial Ground No. 2. It operated from the summer of 1956 until 1960 (Stenner et al. 1988) and was used for the disposal of solid wastes generated by modifications to the effluent lines and by other reactor modification programs.

The burial ground was 350 ft long, 275 ft wide, and 20 ft deep, and contains many trenches running east and west. The site was covered with a minimum of 4 ft of clean fill material and stabilized with gravel to prevent wind erosion (WHC 1991). A 20-ft-wide section at the west side of the burial ground is built up about 2 ft above grade. The remaining area of the burial ground is graded to match the surrounding terrain.

The radionuclide inventory for this waste site includes 1.000 x 10^0 Ci of ^{60}Co, an amount that was calculated to account for radioactive decay through April 1, 1986 (Stenner et al. 1988).

Today, the burial ground appears as a vegetation-free, cobble-covered field. It is treated annually with defoliants.

5.9 118-B-4 (105-B SPACER BURIAL GROUND)

118-B-4 is an inactive, low-level solid waste site that operated from 1956 to 1958. The site is commonly known as the 105-B Spacer Burial Ground, although it has also been known as the 118-B-4 Burial Ground and as the 105-B Dummy Burial Ground. It is located at Hanford coordinates N69425 W80400, approximately 300 ft northeast of the 105-B Reactor Building and within the exclusion area fence (WHC 1991). The burial ground received 70 m^3 of fuel spacers during its operation (Stenner et al. 1988).

The site is 50 ft long and 30 ft wide and was 15 ft deep before backfilling (Stenner et al. 1988). It consists of six 6-ft-diameter and 15-ft-long metal culverts installed vertically below grade (DOE-RL 1993b, WHC 1991).

The radionuclide inventory for this waste site includes 1.000 x 10^0 Ci of ^{60}Co, an amount that was calculated to account for radioactive decay through April 1, 1986 (Stenner et al. 1988).

This site has been assigned an HRS migration score of 3.04 (Stenner et al. 1988).

The burial ground appears today as a 2- to 4-ft-high cobble-covered mound inside, and nearly extending to, the reactor exclusion area fence. It is clearly marked with signs that identify its location. This burial ground is located within a larger radiologically controlled area that is bounded by permanent concrete markers and posted with "Caution: Underground Radioactive Material" warning signs. Refer to Figure 5-12 for a 1993 photograph of the burial ground site.

Figure 5-12. 105-B Spacer Burial Ground (118-B-4).

5.10 118-B-6 (108-B SOLID WASTE BURIAL GROUND)

118-B-6 is an inactive solid waste site that is located at Hanford coordinates N69500 W80500, about 350 ft northeast of the 100-B Reactor (Stenner et al. 1988). The site is commonly known as the 108-B Solid Waste Burial Ground, although it has also been known as the 118-B-6 Burial Ground and as the 108-B Solid Waste Burial Ground No. 2. It operated from 1950 to 1953 and was used for the disposal of tritium wastes and tritium recovery process wastes, primarily aluminum target cans and lead target melting pots. Approximately 10 m^3 of mixed wastes was received at this site during its operation (WHC 1991).

The site consists of two concrete pipes, 18 ft long and 6 ft in diameter, that were buried vertically in the ground. The pipes are capped by a concrete pad measuring approximately 15 ft long and 10 ft wide, with two pear-shaped steel lids that provided access to the burial chambers.

Miller and Wahlen (1987) estimates that this waste site received the following types and amounts of wastes:

- 5.85×10^4 lb of spent lithium-aluminum alloy
- 4.70×10^4 lb of lead from pots
- 1.00×10^2 lb of mercury from manometers and Toepler pumps
- 3.8×10^3 lb of aluminum cladding
- 3.00×10^3 lb of palladium.

The report further estimates that this waste site contains a total of 23.4 tons of wastes generated as a result of the P-10 tritium production project in the 108-B facility.

The radionuclide inventory for this waste site includes 1.000×10^3 Ci of ^3H, an amount that was calculated to account for radioactive decay through April 1, 1986 (Stenner et al. 1988).

This waste site has been assigned an HRS migration score of 6.05 (Stenner et al. 1988).

One of the concrete pipes was filled with waste, then capped. The other pipe was partially filled with waste material, covered with a thin layer of concrete, and left for future use (Heid 1956). The site is surrounded by light-duty steel posts and light-duty barricade chain and is posted with "Caution: Underground Radioactive Material" signs. Refer to Figure 5-13 for a photograph of the burial ground site.

Figure 5-13. Solid Waste Burial Ground (118-B-6).

5.11 118-C-1 (105-C SOLID WASTE BURIAL GROUND)

118-C-1 is an inactive solid waste site that operated from the spring of 1953 to 1969 to receive 10,000 m^3 of miscellaneous mixed waste from the 105-C Reactor Building. The site is commonly known as the 105-C Solid Waste Burial Ground, although it has also been known as the 118-C-1 Burial Ground and as the 105-C Burial Ground. It is located at Hanford coordinates N67250 W79459, approximately 500 ft southeast of the 100-C Reactor (WHC 1991).

The burial ground is a trapezoid, measuring approximately 510 ft long and 400 ft wide (DOE-RL 1993b), that consists mostly of trenches running north and south and six 10- by 10-ft pits. Typically, the trenches were 300 ft long, 200 ft wide, and 20 ft deep, and were separated by 20-ft spaces (Stenner et al. 1988). The site boundaries are permanently marked with concrete posts numbered C-70-1 through C-70-20 (WHC 1991).

Waste received at this burial ground included process tubes, aluminum spacers, control rods, soft waste, and reactor hardware (Stenner et al. 1988).

The estimated radionuclide inventory for the burial ground is as follows. Amounts have been calculated to account for decay through April 1, 1986.

^{14}C: 3.640E+000 Ci	^{152}Eu: 1.420E+001 Ci	^{63}Ni: 6.260E+001 Ci
^{60}Co: 5.710E+002 Ci	^{154}Eu: 2.600E+001 Ci	^{90}Sr: 1.300E+000 Ci
^{137}Cs: 1.300E+000 Ci	^{3}H: 8.500E+000 Ci	

(Stenner et al. 1988)

The HRS migration score assigned to this waste site is 4.56 (Stenner et al. 1988).

Today, this waste site appears as a large, barren, vegetation-free, cobble-covered field. It has been posted with "Caution: Underground Radioactive Material" signs.

5.12 118-C-2 (105-C BALL STORAGE TANK)

118-C-2 is an inactive, mixed solid waste site located northeast of the 105-C Reactor Building at Hanford coordinates N67590 W80333 (WHC 1991). The tank is also known as the Ball 3X Storage Tank.

It is 5 ft deep and has a diameter of 6 ft (WHC 1991, DOE-RL 1993b).

In 1969, during Ball 3X project work with a prototype contaminated ball sorter, the tank received highly radioactive, irradiated, nickel-plated boron steel and carbon steel balls for temporary storage so that they would decay radiologically before burial (Stenner et al. 1988, AEC 1974, DOE-RL 1993b).

Approximately 9,070 kg of highly activated boron steel and carbon steel balls remains in the storage tank. Seventy percent of the balls remaining are boron steel, and thirty percent are carbon steel (DOE-RL 1993b). A 1987 evaluation of the tank waste estimated that 80 Ci of ^{60}Co and 1.6 Ci of ^{63}Ni are present (Miller and Wahlen 1987, Stenner et al. 1988).

The storage tank was buried under several feet of clean fill material and has a shielding mound about 2 ft above ground level (WHC 1991, DUN 1971).

An HRS migration score of 0.00 has been assigned to 118-C-2 because, "although the site was used for waste disposal, no inventory was available; therefore, the site did not score" (Stenner et al. 1988).

118-C-2 currently appears as a 7-ft-long, 7-ft-wide, vegetation-free, cobble-covered mound. Its upper surface is about 3 ft above grade. The site is posted with "Caution: Underground Radioactive Material" signs. Refer to Figure 5-14 for a 1993 photograph of this site.

A nearby site, approximately 100 ft east of the northeast corner of the 100-C Reactor, has been mislabeled with signs reading "118-C-2 Ball Storage." The incorrectly labeled site is believed to be the first junction box on the effluent water line, which is shown on Hanford Site Drawing P-5535.

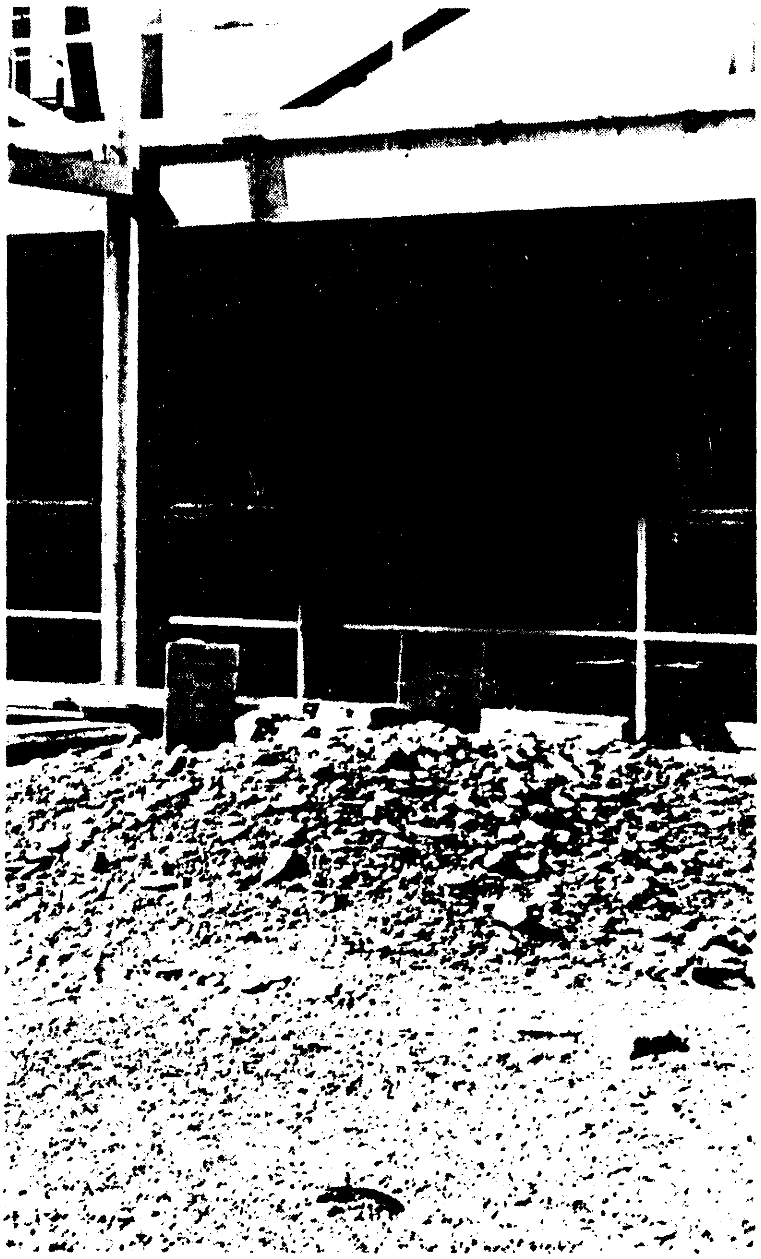


Figure 5-14. 105-C Ball Storage Tank (118-C-2).

5.13 118-C-3 (105-C REACTOR BUILDING)

118-C-3, the 105-C Reactor Building, is an inactive solid waste site that is located at Hanford coordinates N67415 W80400, at the south end of the reactor exclusion area. The reactor operated from 1952 to 1969 (Cramer 1987).

This building is described in Chapter 2 and is not subject to remediation as an operable unit waste site. Therefore, only limited information is provided in this section. Refer to DOE (1992) for additional information.

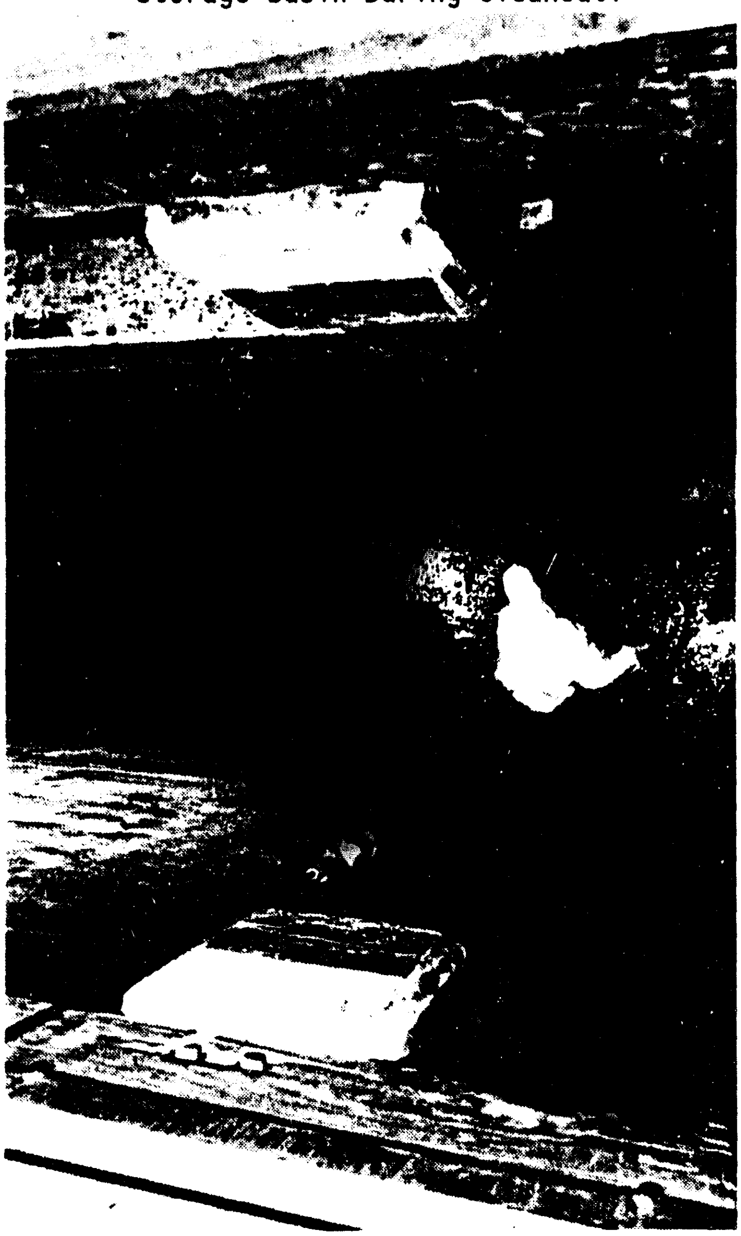
The 6,500-ft^2 reactor building consists of the following:

- A reactor block, which includes the graphite moderator stack, biological shields, pressure tubes, and safety and control systems
- An irradiated fuel storage basin
- Contaminated and non-contaminated work areas, rod rooms, offices, sample rooms, and the Reactor Control Room.

The building contains an estimated 2,500 Ci of radionuclides, 105 tons of lead, and 700 ft^3 of asbestos. More than 90% of the radionuclide inventory is bound in activated metals and graphite (Cramer 1987).

It is suspected that the fuel storage basin leaked prior to deactivation, although the leak rate was small. The location of the leak or leaks has not been identified (WHC 1991). As part of deactivation and decommissioning (D&D), the basin was drained and cleaned and surface contamination was fixed with an asphalt emulsion coating. It is estimated that the transfer pits in the fuel storage basin contain approximately 5.0×10^4 kg, or 55 tons, of contaminated sludge that was placed there as a result of the storage basin decontamination effort (DOE-RL 1993b). Figure 5-15 shows a photograph of a typical fuel storage basin during cleanout.

Figure 5-15. Photograph of a Typical Fuel Storage Basin During Cleanout.



Currently, the facility appears much the same as it did during operations. See Figure 5-16 for a 1993 photograph of the 105-C Reactor Building.

5.14 118-C-4 (105-C HORIZONTAL CONTROL ROD STORAGE CAVE)

118-C-4 is an inactive, mixed solid waste site that operated from 1950 to 1969. The site is commonly known as the 105-C Horizontal Control Rod Storage Cave. It is located south of the 105-C Reactor Building within the reactor exclusion area fence at Hanford coordinates N67100 W80120 (WHC 1991).

This storage facility is a 40-ft-long and 25-ft-wide concrete tunnel covered with a 4-ft-thick mound of earth (WHC 1991).

The tunnel was used for temporary storage of contaminated horizontal control rods for radioactive decay pending subsequent disposal. It is expected to contain miscellaneous reactor facility components. The radiation reading at the entrance to the tunnel with the door open is 5 mR/h. Contaminant inventories for the storage cave have not been estimated, but the principal radionuclides in irradiated control rods are ^{60}Co and ^{63}Ni (DOE-RL 1993b).

No HRS migration score has been assigned to this waste site.

The storage facility, which is approximately 35 ft north of the exclusion area fence, appears today as a large 8-ft-high mounded area with a concrete retaining wall at each end. Steel access doors on each end are posted with "Radioactive Surface Contamination" signs. Refer to Figure 5-17 for a 1993 photograph of the site.

Figure 5-16. 105-C Reactor Building.

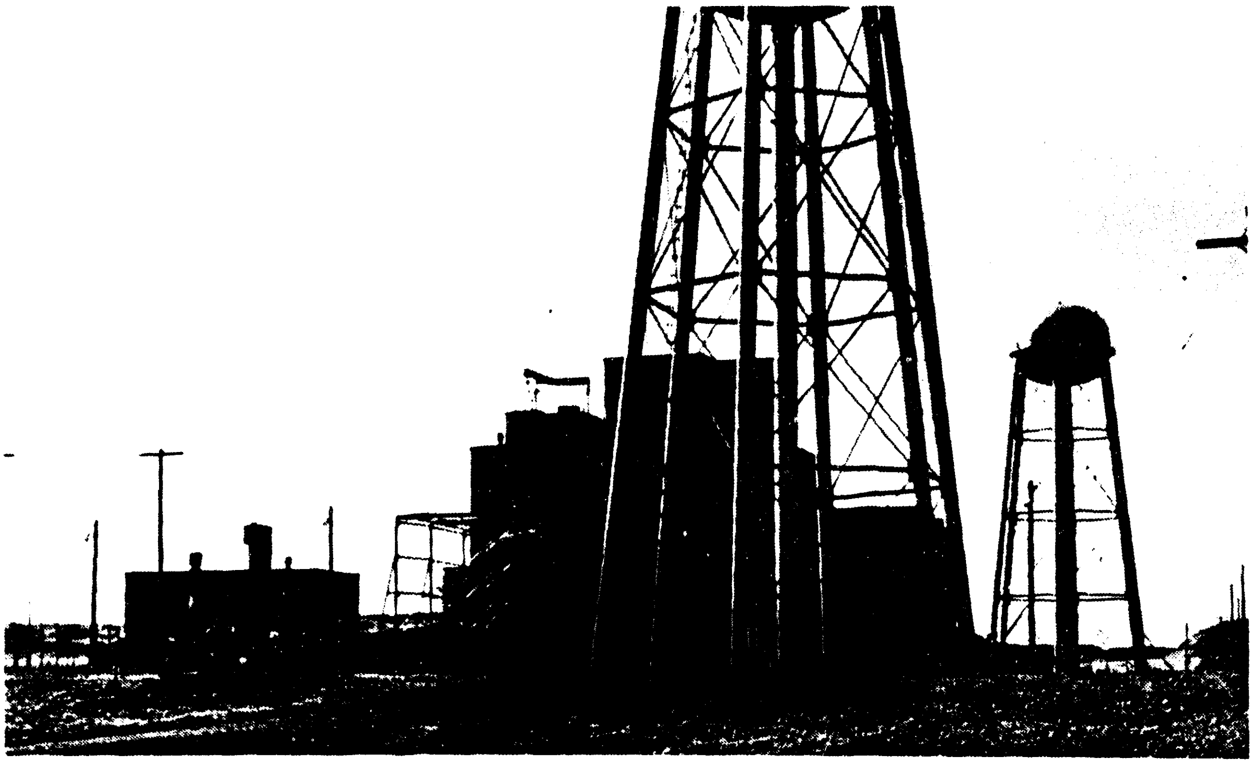
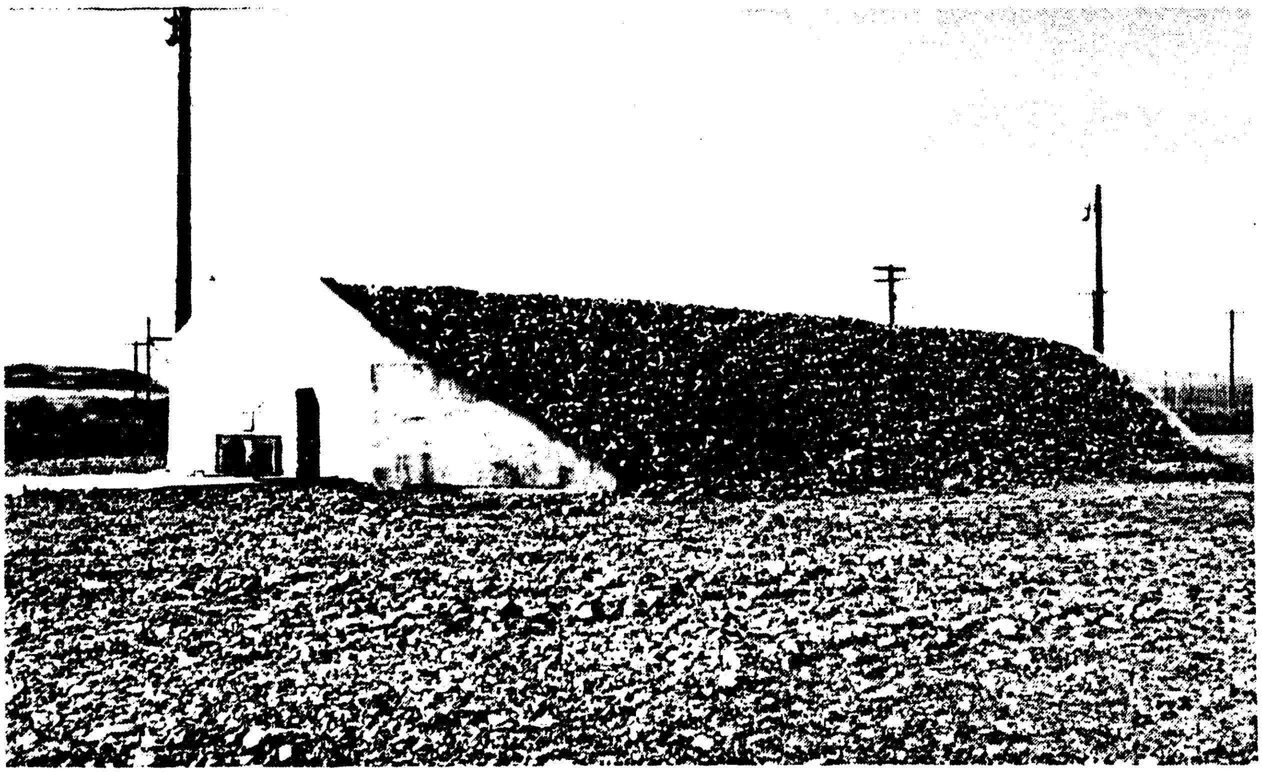


Figure 5-17. 105-C Horizontal Control Rod Storage Cave (118-C-4).



5.15 128-C-1 (100-C BURNING PIT)

128-C-1 is an inactive solid waste site located east of the 100-B Area, between the protected area fence and the perimeter road, at Hanford coordinates N67200 W78700. This site is commonly known as the 100-C Burning Pit, although it has also been known as the 128-C-1 Burning Pit. Service dates for the burning pit are unknown, but the site is no longer in use (DOE-RL 1993b).

The burning pit is 225 ft long and 125 ft wide.

Documents state that the area is covered with ash and broken glass, and that smaller areas near the burning pit show signs of surface burning and waste dumping (WHC 1991, DOE-RL 1993b). Ashes and debris can reportedly be seen "at the west end of a large disturbed area that is about 150 m square just off the perimeter road in the southeast corner of B/C Area" (WHC 1991).

Figure 5-18. 100-C Burning Pit (128-C-1).

The burning pit received combustible materials such as office wastes, paint wastes, vegetation, and chemical solvents; additionally, large metal materials such as hardware, machinery, and other noncontaminated equipment was deposited at the site. It is classified as a hazardous waste site (WHC 1991).

The burning pit does not have an HRS migration score (WHC 1991).

128-C-1 currently appears as a vegetation- and ash-covered field strewn with pieces of green, clear, and bright blue glass; small glass bottles; metallic wastes such as rusted cans, auto parts, and assorted scrap metal; chunks of concrete; and pieces of asbestos transite. The site is bounded on the north by the export water line, and is also bounded on the east by a soil berm. Large rocks and chunks of concrete are located to the east of the berm. The south side of the burning pit site is approximately 75 yd from railroad tracks. Refer to Figure 5-18 for a 1993 photograph of the site.

A gravel- and vegetation-covered roadway leads from the old perimeter road to the burning pit. Two yellow- and black-striped barricade posts are located on either side of the roadway, near its end. Additionally, two 7-ft-tall yellow poles are located just past and to the left of the barricade poles.

5.16 132-C-1 (105-C REACTOR STACK BURIAL GROUND)

132-C-1 is an inactive solid waste burial ground that is located between the former site of the 117-C Building and the 105-C Reactor Building at Hanford coordinates N67150 W80375 (WHC 1989b). The waste site, commonly known as the 105-C Reactor Stack Burial Ground, is approximately 200 ft long (PNL 1975). It contains rubble from the 105-C Reactor Stack, also known as the 116-C Reactor Exhaust Stack (WHC 1991).

The 105-C Reactor Stack was 16.6 ft in diameter and 200 ft high (DOE-RL 1993b). It operated from 1952 through 1969 (PNL 1975), exhausting confinement air from the work areas in the reactor.

The stack was connected to the 105-C Reactor Building by an aboveground concrete structure and was connected to the 117-C Building by two tunnels (DOE-RL 1993b). Initially, exhaust air flowed through concrete ducts and was released directly to theatmosphere through the stack. Unfiltered radioactive materials were thus allowed to pass through the reactor stack. After an exhaust confinement project was completed in the 1950's, the air flowed through the 117-C filter building and a maze of concrete ductwork before being released through the stack (WHC 1991).

Sampling of the stack inlet was performed in 1976, using standard smear techniques. Low-level beta and gamma radiation was detected in the stack (DOE-RL 1993b). Results from this sampling are presented in Table 5-12.

The reactor stack was demolished in 1985 and buried in situ (WHC 1991). At the time of demolition, the interior of the reactor stack contained approximately 2.8 mCi of radioactive materials (WHC 1991, DOE-RL 1993b) from its years of use without filtration.

No HRS migration score has been assigned to this site. The solid waste present at this site is believed to have a very small potential for migration (DOE-RL 1993b).

132-C-1 currently appears as a vegetation-free, cobble-covered field adjacent to the 100-C Reactor. There are no markings or posts to identify the waste site.

Table 5-12. Radiological Data from 132-C-1 Sampling.

Element	pCi/100 cm^2	pCi/g
^{3}H		4.9 E+001[a]
^{14}C		1.6 E+002[a]
^{60}Co	3.9 E+002[b]	1.3 E+001[a]
^{63}Ni		
^{90}Sr	6.2 E+002[b]	3.7 E+000[a]
^{137}Cs	1.0 E+003[b]	8.6 E+001[a]
^{132}Eu	c,b	
^{134}Eu	5.2 E+001b[b]	
^{238}Pu	1.1 E+000[b]	
$^{239/240}Pu$	2.1 E+001[b]	

[a]Data taken from Beckstrom (1986). Calculated average based on five sampling locations.
[b]Data taken from Dorian and Richards (1978).
[c]Below detection limits.
DOE-RL (1993b).

5.17 132-C-3 (117-C FILTER BUILDING SITE)

132-C-3 is an inactive solid waste site located at Hanford coordinates N67240 W80280, about 50 ft southeast of the 105-C Reactor Building. The 117-C Filter Building was located at this site and was demolished in situ. The building operated as an exhaust air filtration facility from 1961 to 1969, receiving exhaust fan discharge through an inlet duct from the 105-C Reactor Building and discharging through an outlet duct to the 116-C Exhaust Stack. It was decommissioned and buried in situ in 1988 (Smoot 1989).

The structure was 59 ft long, 39 ft wide, and 35 ft high, with a gunnite and earth berm surrounding the exterior walls. Only 8 ft of the structure was above grade. The inlet tunnel was about 40 ft long, and the outlet tunnel was about 60 ft long.

The radionuclide inventory at this site is estimated to be 0.84 mCi. This inventory includes ^{3}H, ^{14}C, ^{137}Cs, ^{90}Sr, ^{154}Eu, ^{152}Eu, and $^{238/239}Pu$ (Smoot 1989). Post-decontamination activities indicated that the residual activity of the rubble was less than the calculated ARCL values (Beckstrom 1985).

The building was decommissioned, using ARCL methodology, with demolition and final site grading completed in November 1988. Metal frames, filters, and pumps were decontaminated and removed. Contaminated wastes (2,060 ft^3) were packaged and removed to the 200 Area Burial Grounds. The floors and walls of the inlet, exhaust ducts, and filter cells were swept, mopped, vacuumed, or wiped as clean as possible. The filter frames that were successfully decontaminated were disposed of at the 184-B Coal Pit as clean waste. Deck gratings, piping, and electrical gear were either left in place or relocated within the facility. Holes were made in the lowest concrete floors to provide for drainage of any collected moisture (Griffin 1985). The building and ducts were excavated and demolished in situ. All contaminated rubble is buried under a minimum of 1 m of clean fill material (WHC 1991).

Prior to D&D activities, contamination levels at the building ranged from 2,000 c/m to over 20,000 c/m by direct GM instrument readings. Contamination was greatest in the inlet tunnels near the turning vanes. Although every effort was made to "clean the facility," the potential exists for these contaminants to be present (Dorian and Richards 1978).

The site appears today as a vegetation-free, gravel-covered, parking lot-sized field within the reactor exclusion area fence.

5.18 1607-B8 (1607-B8 SEPTIC TANK AND ASSOCIATED DRAIN FIELD)

1607-B8 is an inactive, nonhazardous/nonradioactive liquid waste site that operated from 1951 to 1969. This site is commonly known as the 1607-B8 Septic Tank and Associated Drain Field, although it has also been known as 124-C2, the 1607-B8 Sanitary Sewer System, and the Septic Tank and Disposal Field Process Pump House 190-C. It is located about 70 ft east of the southeast corner of the 190-C Process Pump House at Hanford coordinates N67450 W80880 (WHC 1991).

The unit includes a tile field oriented in a north/south direction from the septic tank. The vertical-type tank is constructed of steel and has a 350-gal capacity. The tile field is constructed of 8-in. vitrified clay pipe laid with open joints (WHC 1991).

The septic tank received unknown amounts of sanitary sewage from the 190-C Pump House (WHC 1991), an associated structure, which contains the electrically driven pumps that were used for providing the primary cooling water to the 100-C Reactor. The 190-C Pump House pumped cooling water from the water storage tanks to a valve pit in the 105-C Reactor Building (DOE-RL 1993b).

No HRS migration score has been assigned to this waste site.

Today, this waste site, which is just north of the south pipe tunnel, is bounded by nine 4-in. yellow posts and on the east side by a berm wall. There is an 8-in. covered vent in the center, and the surface is covered with natural vegetation. The site is marked with "Septic Tank" signs.

5.19 1607-B9 (1607-B9 SEPTIC TANK AND ASSOCIATED DRAIN FIELD)

The 1607-B9 Septic Tank is an inactive, nonhazardous/nonradioactive liquid waste site located south of the 118-C-1 Burial Ground, just off the terrace and approximately 75 yd north of the perimeter road, at Hanford coordinates N66300 W79800 (WHC 1991). The site is commonly known as the 1607-B9 Septic Tank and Associated Drain Field, although it has also been known as 124-C-3 and as the 1607-B9 Sanitary Sewer System.

This unit includes a tile field (Gano and Hall 1987) and is constructed of 8-in. vitrified clay pipe laid with open joints. The tank, which received unknown amounts of sanitary sewage from the 105-C Reactor Building, had a 2,400-gal capacity (WHC 1991).

No HRS migration score has been assigned to this waste site.

Today, the septic tank, located southeast of the 105-C Reactor Building, consists of two 3-ft by 3-ft concrete blocks, about 8 ft apart, with concrete slab access covers numbered 086 and 087. Both tanks are marked with "Danger, Confined Space" warning signs. The immediate and surrounding areas have abundant natural vegetation growing on the surface. Refer to Figure 5-19 for a 1993 photograph of the septic tank site.

Figure 5-19. 1607-B9 Septic Tank and Associated Drain Field.

5.20 1607-B10 (1607-B10 SEPTIC TANK AND ASSOCIATED DRAIN FIELD)

1607-B10 is an inactive, nonhazardous/nonradioactive liquid waste site that operated from 1952 to 1969 (DOE-RL 1993b) to receive only sanitary sewer wastes from the headhouse of the former 183-C Water Treatment Plant. This site is commonly known as the 1607-B10 Septic Tank and Associated Drain Field, although it has also been known as the Sewage Disposal Field. It is located about 33 ft south of the 183-C Head House site and about 80 ft east of the center line of the road that passes the former site of the 183-C Water Plant in a north/south direction. The head end tile field is at Hanford coordinates N67303 W82384, and the tank is at Hanford coordinates N67311 W82378 (WHC 1991).

The unit includes a tile field, which orients in a north/south direction from the tank, and also includes a drain field. The vertical-type tank is of steel construction and has a 350-gal capacity. The tile field is constructed of 8-in. vitrified clay pipe laid with open joints (WHC 1991).

No HRS migration score has been assigned to this waste site.

Today, this septic tank and the adjacent drain field are surrounded by eleven 4-in. yellow posts and a light-duty chain barricade, which outline the 15- by 30-ft perimeter. "Septic Tank" and "Drain Field" signs are posted. A steel pipe riser, 10 in. in diameter and 33 in. above grade, also marks the location of the tank. Abundant natural vegetation is growing on the surface. The area is posted as a confined space.

5.21 1607-B11 (1607-B11 SEPTIC TANK AND ASSOCIATED DRAIN FIELD)

1607-B11 is an inactive nonhazardous/nonradioactive liquid waste site that operated from 1952 to 1969 (DOE-RL 1993b). The site is commonly known as the 1607-B11 Septic Tank and Associated Drain Field, although it has also been known as the Septic Tank and Disposal Field and as the Filter Pump House 183-C. It is located about 40 ft north of the 183-C Filter Building site and 50 ft west of the former 183-C Filter Building entrance road, at Hanford coordinates N67628 W81668 (WHC 1991).

The septic tank unit includes a tile field, which is constructed of 8-in. vitrified clay pipe laid with open joints and a drain field. The vertical tank is constructed of steel and has a capacity of 350 gal (WHC 1991).

An associated structure, the 183-C Filter Building, was a water treatment facility that was partially demolished in 1988. The facility consisted of several sections: a 1,520-ft^2, reinforced concrete headhouse and chemical building for chemical makeup and addition; open-air flocculation and subsidence basins; and a 91,000-ft^2, reinforced concrete filter building to house filter beds. This structure had associated tanks for storage of concentrated sulfuric acid.

The septic tank received only sanitary sewer wastes from the Filter Building and Pump Room 183-C Water Treatment Plant. There were no known discharges of hazardous chemicals or radionuclides (WHC 1991).

No HRS migration score has been assigned to this waste site.

Today, the site is bounded on all sides by eight 4-in. yellow posts that outline its 15- by 30-ft perimeter. "Septic Tank" and "Drain Field" signs are attached to the posts. A ninth 4-in. yellow post is lying on the surface. An 8-in. abovegrade steel riser with a diameter of 10 in. marks the location of the tank. Sagebrush and other natural vegetation grows on the surface.

5.22 600-33 (105-C REACTOR TEST LOOP BURIAL SITE)

The 600-33 burial site is an inactive solid waste site that was used as a single use burial site in 1963. It is located at Hanford coordinates N66900 W80400, approximately 300 to 400 ft south of the 105-C Reactor Building Fan Room near two concrete markers with a wooden rail between them. The site is commonly known as the 105-C Reactor Test Loop Burial Site.

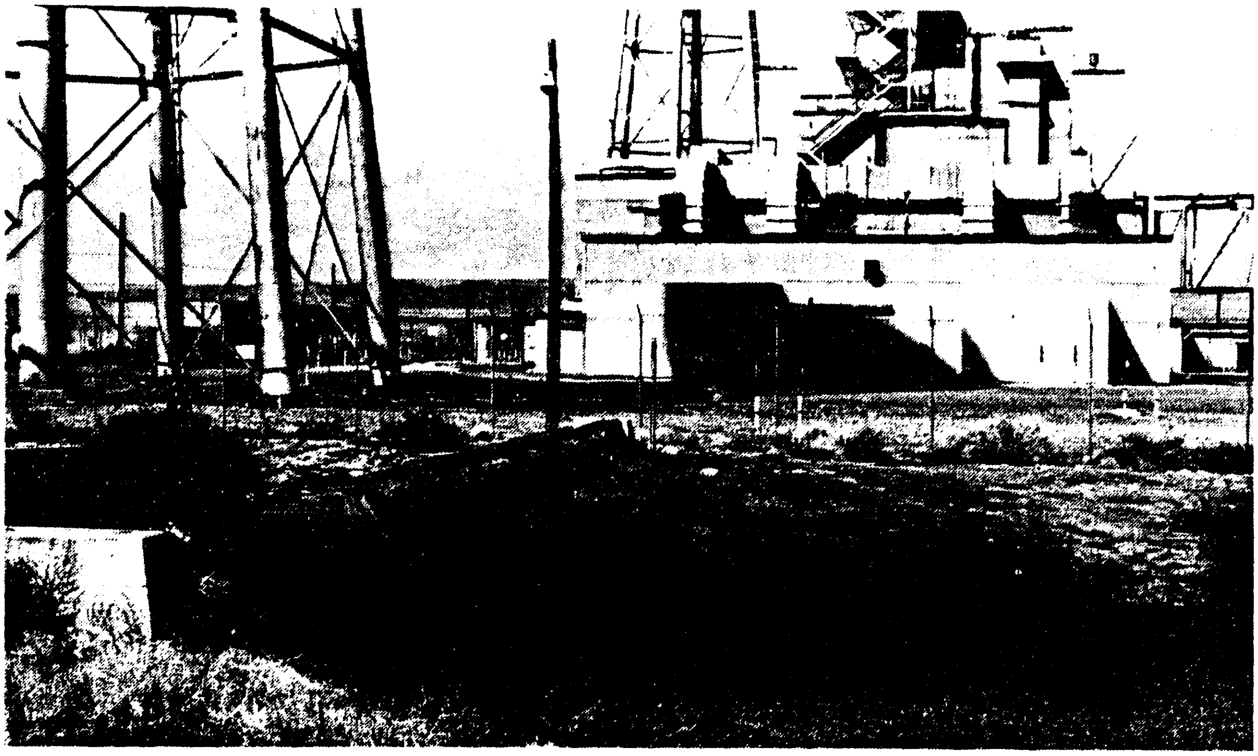
The site consists of a single test loop that is 18 to 20 ft long, a 40-ft carbon steel shielding tube, and about 1,000 ft of cable that was used to remove the test loop from the reactor. The test loop was a 1-in. stainless steel tube within a 1.5-in., schedule 160, stainless steel tube. This test loop was used to test the effects of ionizing radiation on chemicals used to decontaminate and clean reactor process tubing. The dose rate associated with this test loop at the time of burial may have been in excess of 100 R/h (WHC 1991).

Concrete markers at the site were apparently in place prior to the burial, since they appear in photos that were taken during the construction of the 100-C Reactor. Site drawings appear to indicate that the concrete marker barricade was to protect a sewage pipeline. This site was, however, separately identified as the approximate burial location by two former employees. The exact location of this burial ground is unknown, although it is believed to be very near the existing concrete markers and railing.

No HRS migration score has been assigned to this waste site.

The area near the site appears today much as it did during reactor operations, except that the wooden railing is broken and suffering dry rot. The area around the burial ground has recently been treated with defoliants, and dead vegetation covers the ground surface. Refer to Figure 5-20 for a 1993 photograph of the site.

Figure 5-20. 105-C Reactor Test Loop Burial Site (600-33).



5.23 UNDOCUMENTED SOLID WASTE SITE: POSSIBLE BUILDING FOUNDATION AND PARKING LOT

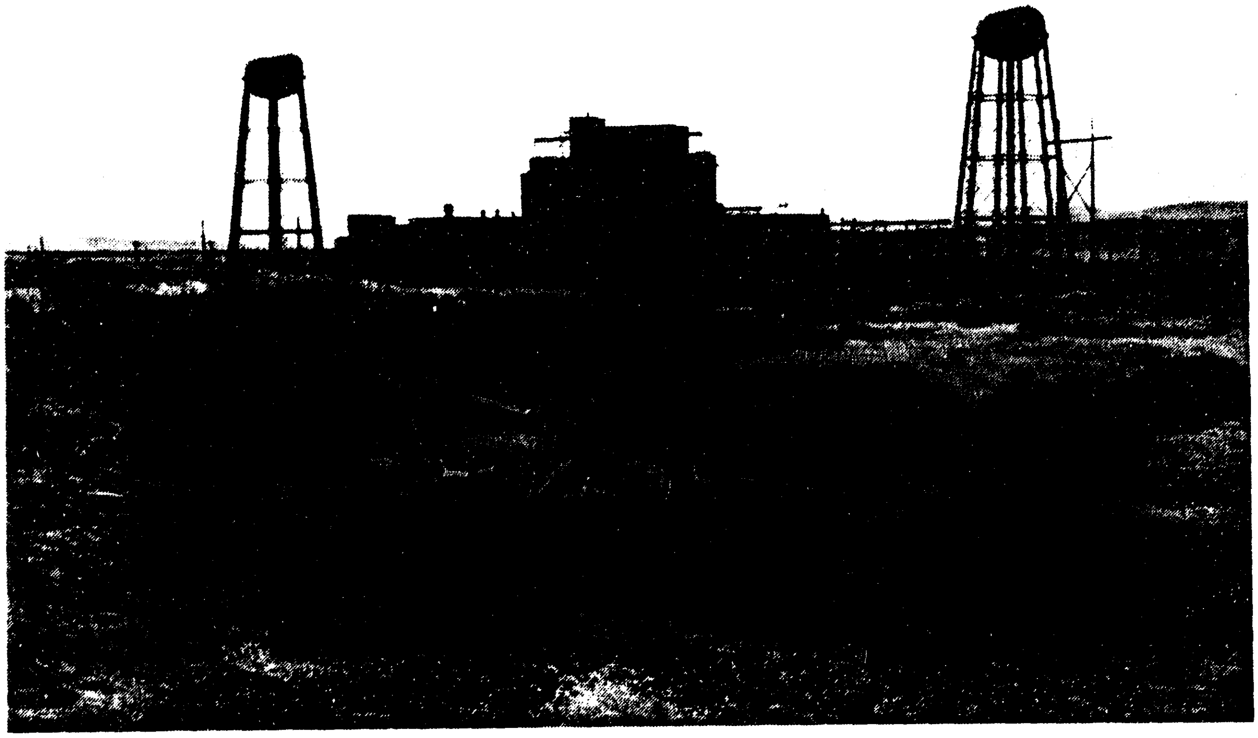
A concrete slab, measuring 6 ft by 6 ft, is located to the southeast and across the paved road from the 118-B-1 Burial Ground. Pieces of asbestos transite are also present at the site. The concrete slab is believed to be a former building foundation, but no documentation was found to support that belief.

Due west of the concrete building foundation is a gravel-covered area that appears to have been a parking lot. A gravel road separates the parking lot from the building foundation.

5.24 UNDOCUMENTED SOLID WASTE SITE: LAYDOWN YARD

This site lies about 1,500 ft east of the 105-C Building, just north of a gravel access road along the export water line. The solid wastes consist of wooden power poles, lighting fixtures, coils of wire, broken glass, small amounts of broken transite, a bottle of hand cream, and four 8-in. plexiglass filter columns. The plexiglass columns contain sand, cobbles, and anthracite coal or charcoal media. See Figure 5-21 for a 1993 photograph of the site.

Figure 5-21. Undocumented Solid Waste Site: Laydown Yard.



5.25 UNDOCUMENTED SOLID AND LIQUID WASTE SITE: SURFACE CHEMICAL DUMPING AREA

This waste site is located approximately 300 ft northeast of the undocumented laydown yard described in Section 5.23, about 1,500 ft east of the 105-C Building. There are several small dump sites within a 200-ft-long and 60-ft-wide area. Soil is covered with a tar-like material and has a reddish-gray or black tint. No vegetation survives at the site. Truck tire impressions are evident and appear to have been made during the dumping operation. The site smells of oil or other petrochemicals. Refer to Figure 5-22 for a 1993 photograph of the dumping site.

Some of the smaller dumping sites have 55-gal drum lids at, or near, the chemical dumping. One of the drum lids reads, "A-3 Deturbo Oil, Lubricating Oil, 53 Gals." Figure 5-23 shows a 1993 photograph of one of these lids. There are also solid wastes nearby, which consist of wooden rail ties, stainless steel or aluminum pipe, cinder block, and 3/4-in. stainless steel tubing.

Figure 5-22. Undocumented Solid and Liquid Waste Site: Surface Chemical Dumping Area.

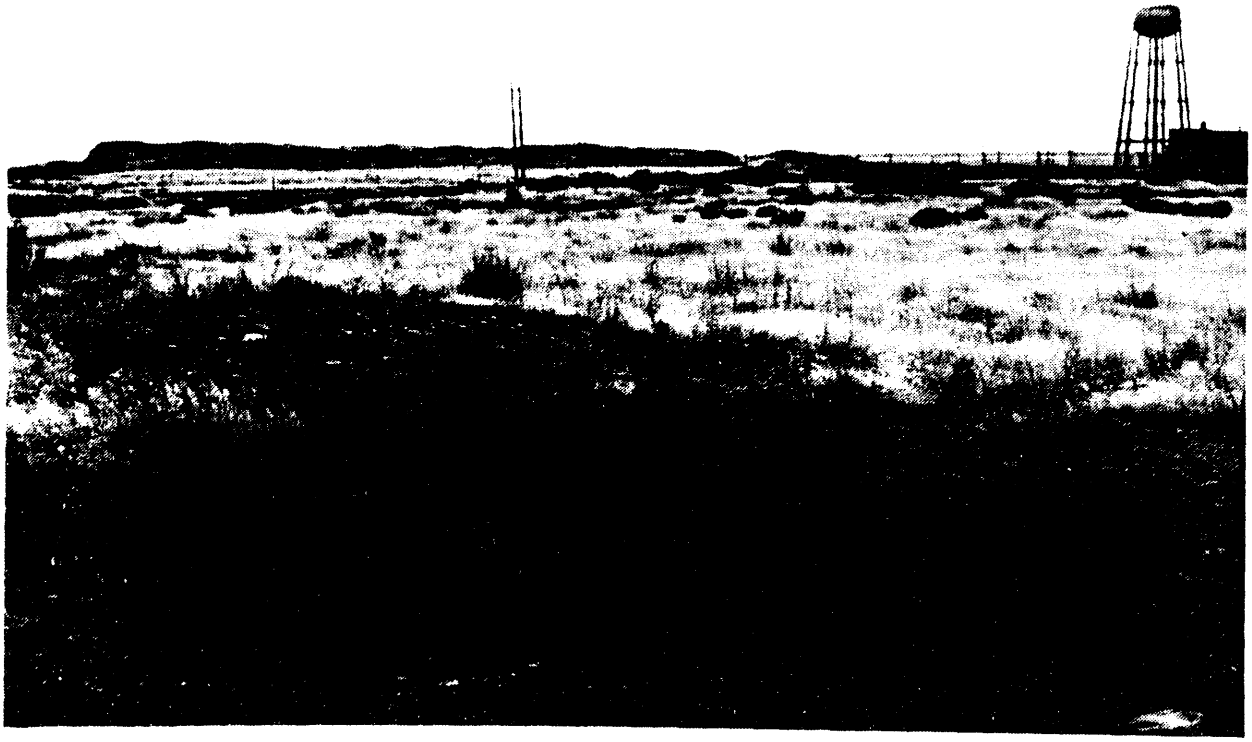
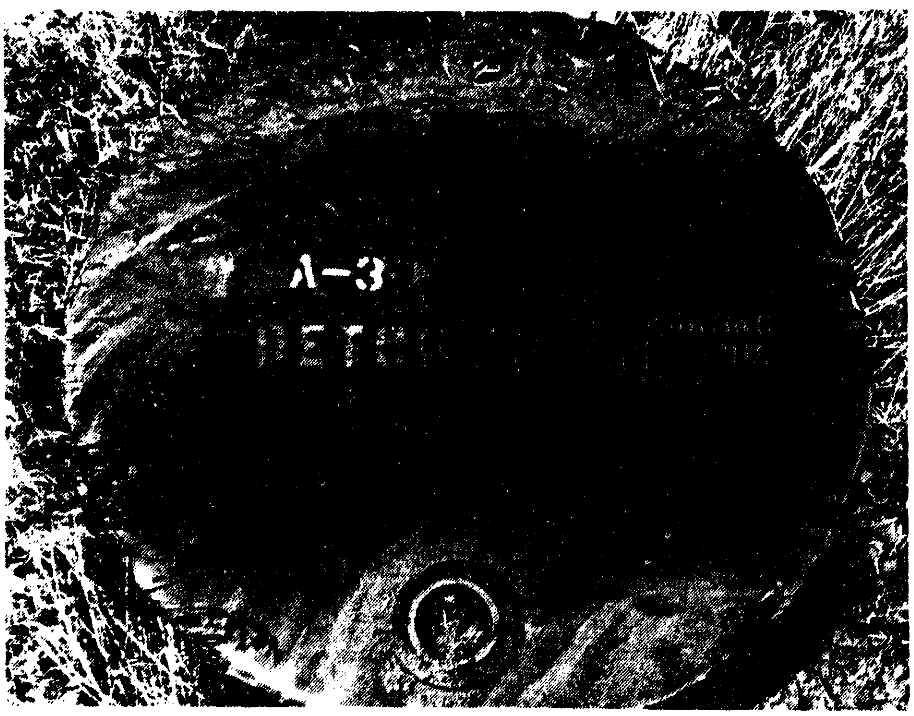


Figure 5-23. Drum Lid Found at the Chemical Dumping Area.



5.26 UNDOCUMENTED LIQUID WASTE SITE: 119-C SAMPLE BUILDING FRENCH DRAIN

There is a small french drain or dry well associated with the 119-C Sample Building. Hanford site drawings H-1-19806 and H-1-19809 show an "existing dry well," more commonly known as a french drain, that was used to receive sampling effluents from the 119-C Sample Building. The french drain was located just west of the 117-C Building and southwest of the 119-C Sample Building at Hanford coordinates N67245 W80322.

No record could be found to indicate the type or volume of wastes that were disposed of at this location. The french drain appears, from the drawings, to have been about 2 ft in diameter; its depth, and the construction materials used, are unknown.

The site now appears as a cobble-covered area. About 6 in. of clean fill material was used to cover the french drain. No postings of any kind indicate the location of this waste site.

5.27 UNDOCUMENTED SOLID WASTE SITE: EFFLUENT VENT DISPOSAL TRENCH

The Effluent Vent Disposal Trench is located just west of the 100-C Reactor effluent line and north of the 100-B Reactor effluent cross-tie. The trench is identified as site number 23 on Hanford Site Drawing H-1-4049 (Heid 1956). See Figure 5-24 or Figure C-7 in Appendix C for an updated version of that drawing.

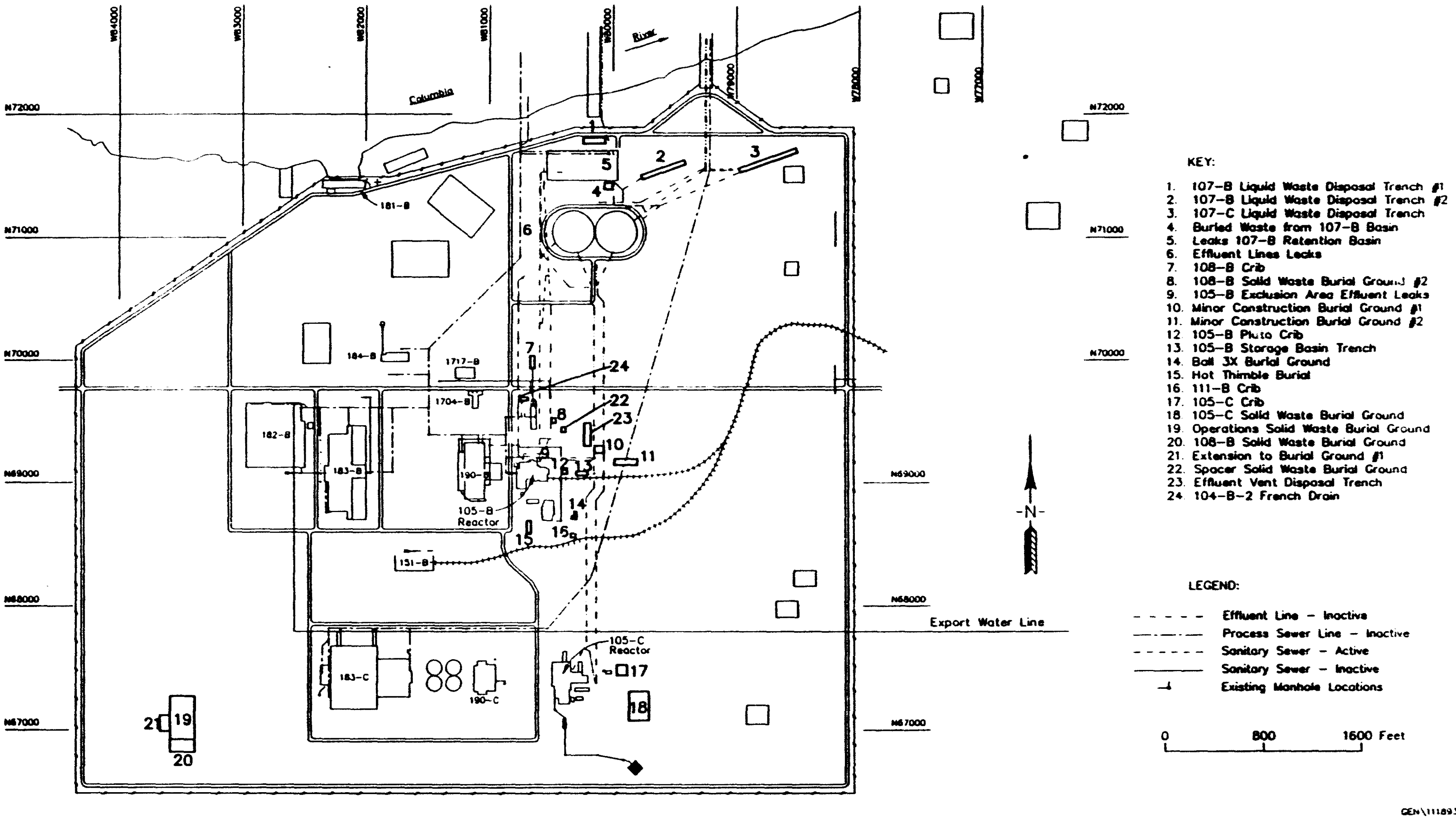


Figure 5-24. Historical Drawing of Waste Sites in the 100-B Area.

6.0 DIRECTORY OF 100-B AREA BUILDINGS, FACILITIES, AND STRUCTURES

Table 6-1 provides descriptions of many 100-B Area buildings, facilities, and structures. These buildings, facilities, and structures may or may not be important from a waste standpoint. Mobile office trailers and other temporary construction buildings have not been included.

All coordinates are to the center of the facility, except where noted, and were derived using standard measuring devices and Hanford Site Drawing M-1600-B, sheets 2, 4, 5, and 8. The exact coordinate location could not be determined for facilities that do not have coordinates listed.

Table 6-1. List of 100-B Area Facilities and Structures. (sheet 1 of 6)

Facility	Hanford location	Comments
103-B	N69400 W80645	Fresh Metal Storage Building, or Fuel Element Storage Building. Potentially contaminated. Provided pallet storage of fuel elements before their use in the reactor. It is a one-story, reinforced concrete and concrete block structure with a concrete foundation and floor, concrete block walls, and a concrete roof with a built-up tar and gravel surface. Measures 53 ft long, 27 ft wide, and 14 ft, 6 in. high. Currently used as a riggers' loft.
104-B1	N69470 W80640	Tritium Storage Facility, or 104-B-1 Tritium Vault. Potentially contaminated. It is a concrete block building approximately 130 ft^2 in size. Currently used to store absorbent materials.
104-B2	N69740 W80750	Irradiated Tritium Storage Facility, or 104-B-2 Tritium Laboratory. Built about 1950, it includes a contaminated french drain.
105-B	N69050 W80680	Reactor Building. Contaminated. Refer to Section 4.21 for additional information.
106-B		Contaminated Equipment Storage. Demolished.
107-B	N71660 W80560	Effluent Water Retention Basin. Contaminated. Provided transient retention of reactor cooling water before its return to the Columbia River. Refer to Section 4.11 for additional information.
108-B	N69674 W80722	Laboratory Building, or Tritium Separation Facility. Originally built to provide laboratory support for reactor operations. Later, was used for recovering tritium from irradiated lithium-aluminum target elements. Demolished.
110-B	N68590 W80460	Gas Storage Station. Consisted of large gas cylinders/storage tanks, concrete supports, piping, and a rail spur. Demolished in 1984.
111-B	N69580 W80305 SE Crn	Decontamination Station, or Fuel Examination Facility. Was contaminated. The building was demolished in 1984, but the concrete floor and foundation remain.
115-B		Gas Recirculation Facility. Housed gas circulating pumps and other equipment related to the reactor gas coolant system. Demolished. Refer to Section 4.37 for additional information.
116-B		Reactor Stack. Remains intact. Refer to Section 4.34 for additional information.

Table 6-1. List of 100-B Area Facilities and Structures. (sheet 2 of 6)

Facility	Hanford location	Comments
117-B		Exhaust Air Filter Building. Filtered ventilation air from the confinement zone of the 105-B Reactor Building before its discharge to atmosphere through the 105-B Stack. Demolished.
151-B	N68180 W81410	Primary Electrical Substation. Remains active.
181-B	N71470 W82256 NW Crn	River Pump House. Pumps raw river water to water treatment plants or to the area reservoir. Measures 245 ft long, 50 ft wide, and 20 ft high. The building is reinforced concrete and concrete block and has a slab roof with a built-up felt, tar, and gravel surface. Remains active as the main pumphouse for the Export Water System. The facility has been modified several times and includes an underground diesel storage tank for a single emergency diesel pump. A larger, aboveground diesel storage tank has been removed.
182-B	N69390 W82750	Reservoir and Pumphouse. Provided reserve water for reactor cooling and raw export water for the 100 Area and 200 Area intertie system. The reinforced concrete reservoir measures 482 ft long, 309 ft wide, and 18 ft deep; the reinforced concrete and concrete block pumphouse measures 373 ft long, 38 ft wide, and 22.5 ft deep. Remains active as a part of the Export Water System. There is a large aboveground diesel storage tank at the facility that supplies fuel to four emergency diesel pumps and one diesel-powered, emergency electrical generator. Also located within the facility is a small water filtration and chlorination system that supplies sanitary water to the facility.
183-B	N69070 W82145	Filter Plant, or Water Handling Facility. Housed water treatment and filtering facilities and served as a reservoir for treated water. Consisted of a head house and chemical building, flocculation and subsidance basins, a filter building, and clearwell storage with a pump room. In 1987 and 1988, the asbestos was removed, and the building and basins were demolished and buried in situ. Portions of the facility were removed by a salvage contractor. Some of the alum/bauxite system was found to be contaminated and was buried in the 200 Area Burial Grounds. The clearwells remain in place.

Table 6-1. List of 100-B Area Facilities and Structures. (sheet 3 of 6)

Facility	Hanford location	Comments
184-B	N70030 W81870	Powerhouse. Provided steam and emergency electric power. Was demolished in 1983, including the smoke stacks. In 1988, the foundation was demolished and buried in situ. The equipment and much of the building was removed by a salvage contractor in 1979. Two salvage contractors were involved with the demolition of the facility; the original contractor relinquished the contract for demolition because a caterpillar operator was killed when part of the structure fell over on him.
185-B	N69090 W81240	Water Treatment Plant, or Storage Building. Provided primary coolant water for the 100-B Reactor and was later used to store resin for the 100-N Reactor. Measures 307 ft long, 48 ft wide, and 60 ft high. It is a steel and concrete block structure with a reinforced concrete foundation and a precast concrete slab roof with built-up tar and gravel surfacing. Storage tanks and piping were removed. A sodium dichromate storage tank remains.
187-B 1&2		Emergency Cooling Water Storage Tanks. Demolished in 1979.
190-B	N69320 W81210 NW Crn	Process Water Pumphouse, or Main Pumphouse and Annex. Provided the primary coolant water for the 100-B Reactor. All metal piping and tanks were removed in 1979. The Annex portion of the facility was dismantled and sold. The remaining facility was demolished by conventional methods and explosives in late 1993.
1614-B		Airborne Emission Monitoring Stations. Three are located in the 100-B Area.
1621-B		Emergency Generator Building. It was small wood-frame building that housed a gasoline engine generator and a fuel storage tank. The facility was demolished, and the equipment was removed to excess.
1701-B	N69805 W78040 SW Crn	Gate House. Served as the area badgehouse and patrol headquarters. Was removed from the site.
1701-BA		Badgehouse. Provided entrance to the exclusion area, and later was used by salvage contractors as a lunchroom and restroom facility. It was a one-story concrete block structure on a concrete floor and foundation, and had a gable wooden roof covered with roll roofing. Demolished.

Table 6-1. List of 100-B Area Facilities and Structures. (sheet 4 of 6)

Facility	Hanford location	Comments
1702-B		105-B Area Badgehouse. Provided entrance to the exclusion area. Measures 20 ft long, 20 ft wide, and 12 ft high. It is a one-story, wooden-frame structure with a concrete floor and foundation, asbestos shake siding, and a gable wooden roof covered with roll roofing. Remains in place. The roof was recently repaired.
1703-B	N69700 W80550	Technical Office Building. Demolished or moved in the early 1970's.
1704-B	N69750 W81170 NW Crn	Supervisors' Office and Laboratory. Provided offices for area administrative and technical personnel. Was moved to the 200 Area in the mid-1970's.
1705-B		Change House. Demolished in 1980.
1707-B	N69730 W80950	Change House. Was used first as a change house, then for office space. Demolished.
1707A-B		Maintenance Change House. Provided lockers, shower facilities, and a lunch room. Demolished.
1709-B	N69705 W78340	Fire Headquarters. Was used first as the area headquarters for the fire department, then for office space. Demolished.
1713-B	N69890 W80950	Storeroom and Warehouse. Was used as a laboratory and for office space. Demolished.
1715-B	N70015 W81175	Oil and Paint Storage. Demolished.
1716-B	N69695 W81420 SW Crn	Automotive Repair. Provided garage and office facilities. Demolished. The underground gasoline tank was removed on December 22, 1992. No contamination was found in soil samples taken.
1717-B	N69890 W81210	Area Maintenance Shops. Demolished.
1719-B	N69740 W81300	First Aid. Demolished.
1720-B	N69720 W78200	Patrol Headquarters. Was used first as the headquarters for area patrol, and later for office space. Was removed from the site.
1722-B	N69860 W81070	Paint Shop and Riggers' Loft. Demolished.
1734-B	N70010 W81285	Gas Cylinder Storage. Demolished.
1736-B		Storage Building. Was used for storing maintenance tools and equipment. Was removed from the site.

Table 6-1. List of 100-B Area Facilities and Structures. (sheet 5 of 6)

Facility	Hanford location	Comments
1901-B		Soft Water Tank. Was an elevated steel tank. Demolished.
105-C	N67415 W80400	Reactor Building. Refer to Section 5.13 for additional information.
107-C	N71045 W79970	Effluent Water Retention Basin. Contaminated. Refer to Section 4.18 for additional information.
116-C	N67150 W80375	Reactor Exhaust Stack. Demolished. Refer to Section 5.15 for additional information.
117-C		Exhaust Air Filter Building. Filtered ventilation air before its discharge to atmosphere through the stack. It is a below-grade, bermed, earth and gunnite structure with large steel hatch covers that served as the roof. Refer to Section 5.16 for additional information.
183-C	N67186 W82295 SW Crn	Head House, or Filter Plant. Partially supplied treated water to the 100-B Reactor. All usable equipment in the sedimentation basins was removed. The end walls were buried in the basins. The building was demolished, and all that remains is the floor and foundation. Potential contaminants include hydrated calcium oxide, chlorine, sulfuric acid (DOE-RL 1993b), sodium dichromate, and asbestos. Refer to Section 5.19 for further information.
187-C		High Tanks, or the 105-C High Tanks. Two elevated water storage tanks, made of steel and mounted on 120-ft-high towers. Have a 300,000-gal capacity. Remain in place.
190-C	N67327 W81121	Process Water Pumphouse, or Main Pump House. Potentially contaminated due to 100-N Reactor maintenance activities. It is a one-story reinforced concrete structure with a concrete foundation, a steel frame, a concrete block superstructure, and a precast concrete roof covered with tar and gravel surfacing. Currently used for lead storage.
1702-C		105-C Area Badgehouse. It is a one-story, wooden-frame structure with a concrete floor and foundation, asbestos shake siding, and a flat wooden roof covered with roll roofing. Approximately 210 ft^2 in size. Remains in place.

Table 6-1. List of 100-B Area Facilities and Structures. (sheet 6 of 6)

Facility	Hanford location	Comments
1713-C		Solvent Storage Building. Was located on the east side of the 108-B Building. Removed from the site.
1714-C		Solvent Storage Building. Was used as an oil house. It is a steel-frame structure with a concrete foundation and transite siding. Remains in place and is located just east of the 105-C fan room.
1736-C		Storage Building. Demolished.

7.0 REFERENCES

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DRAWINGS:

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H-1-1478	Effluent Line 105-B to 107-B General Location Plan
H-1-1479	Building 105-B to 107-B Effluent Line Plan and Profile
H-1-1523	Piping Plan, Retention Basin Flushing Water and Diversionary Outlets to Trench
H-1-1595	P-10 Project, Location of Fence and Crib
H-1-2946	P-10-D Project, Storm Drain South of 108-B Building
H-1-10213	Reactivation of P-10 Facilities, Burial Well Plan and Section
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H-1-12753	108-B Metallurgical Laboratory Drainage Piping and Details, Project P-10-X
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P-5540	Process Sewer Retention Basin Area Details, Production Facility--Section "A"
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P-8883	Architectural Sump Plan and Details, Contaminated Waste Filter and Crib
W-71192	Hanford Engineer Works Septic Tanks, Plan and Sections
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W-72094	Hanford Engineer Works Process Sewers 1904-B Plan, Profile, and Concrete Discharge Structures, 100-B Area
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9.0 HANFORD SITE DRAWINGS REFERENCED IN TEXT

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H-1-4049	100 B and C Areas Process Waste System
H-1-10260	P-10 Reactivation Condensate Drain Relocation
H-1-19809	Civil Plan, Outside Lines Water Supply and Drain, Reactor Confinement
H-1-71728	107-C Effluent Disposal Test Site
M-1600-B Sheet 5	Topographic Map, 100-B Area, Hanford Works
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P-5535	Main Sewer Plan, Production Facility--Section "A"
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APPENDIX A

TABLE OF PHOTOGRAPHS USED

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2-3	3300 Box 2117 1-20-55	105-B Reactor Building and Support Facilities, January 1955
2-4	246 Box 2102 9-26-51	105-C Reactor Building Under Construction, September 1951
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2-6	402 Box 2102 4-21-52	105-C Reactor Building Graphite Layup, April 1952
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4-2	93080888-33	105-B Fuel Storage Basin Trench (116-B-2)
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4-4	93080888-31	105-B Dummy Decontamination French Drain (116-B-4)
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4-7	122440-404CN	Historical Photograph of the 116-B-6A Crib
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4-9	93080888-12	1904-B1 Outfall (116-B-7)
4-11	122440-299CN	Historical Photograph of the 117-B Crib (116-B-12)
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4-14	93090117-6CN	111-B Fuel Examination Tank Site (116-B-16)
4-15	45222-11CN	Historical Photograph of the 107-C Liquid Waste Disposal Trench (116-C-1)
4-16	93080888-2	107-C Liquid Waste Disposal Trench (116-C-1)
4-17	93080888-30	Ball 3X Burial Ground (118-B-5)
4-18	93090117-6CN	111-B Solid Waste Burial Site (118-B-7)
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4-20	83E170-58CN	Historical Photograph of the 104-B2 Storage Building (118-B-9)

Figure number in text	Photograph number	Photograph description
4-21	89050361-13CN	Historical Photograph of the 115-B/C Caisson Prior to Its Removal (118-B-10)
4-22	93090117-4CN	115-B/C Caisson Site (118-B-10)
4-23	93090117-3CN	105-B Battery Acid Sump (120-B-1)
4-24	93090117-17CN	184-B Power House Ash Pit (126-B-1)
4-25	93090117-16CN	183-B Clearwells, Looking North (126-B-2)
4-26	93090117-15CN	183-B Clearwells, Looking Northeast (126-B-2)
4-27	93090117-14CN	184-B Coal Pit (126-B-3)
4-28	122440-412CN	100-B Burning Pit (128-B-1)
4-29	93080888-26	100-B Burn Pit No. 2 (128-B-2)
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4-31	3219 Box 2117 12-24-54	Construction of the 190-B Outfall Line, Part of Project CG-558, in December 1954
4-32	93080888-7	1904-B2 Outfall (132-B-6)
4-33	93080888-5	1904-C Outfall Riprap Flume (132-C-2)
4-34	93080888-13	1607-B2 Septic Tank
4-35	93090117-18CN	1607-B2 Septic Tank Drain Field
4-37	93090117-22CN	Undocumented Solid Waste Site: Pre-Hanford Farm Site
4-38	93080888-1	Undocumented Solid Waste Site: Building Foundation
5-4	93080888-35	105-C Pluto Crib, Sand Filter, and Pump Station (116-C-2A, 116-C-2B, and 116-C-2C)
5-6	93090117-12CN	105-C Pluto Crib, Sand Filter, and Pump Station (116-C-2A, 116-C-2B, and 116-C-2C)
5-8	93080888-36	105-C Chemical Waste Tanks (116-C-3)
5-10	93090117-19CN	105-B Burial Ground, Looking Northeast (118-B-1)
5-11	93090117-20CN	105-B Burial Ground, Looking Northwest (118-B-1)
5-12	93080888-21	105-B Spacer Burial Ground (118-B-4)
5-13	93080888-20	108-B Solid Waste Burial Ground (118-B-6)

Figure number in text	Photograph number	Photograph description
5-14	93090117-13CN	105-C Ball Storage Tank (118-C-2)
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5-16	93090117-9CN	105-C Reactor Building
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5-18	93080888-17	100-C Burning Pit (128-C-1)
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5-22	93080888-40	Undocumented Solid and Liquid Waste Site: Surface Chemical Dumping Area
5-23	93080888-42	Drum Lid Found at the Chemical Dumping Area

APPENDIX B

TABLES OF SOIL AND VEGETATION SAMPLING RESULTS

Table B-1. Average Radionuclide Concentrations (pCi/g) Detected in the 100-B Area Surface Soil Samples from 1981 to 1991.

Year	^{60}Co	^{90}Sr	^{137}Cs	^{238}Pu	$^{239/240}Pu$
1981	5.70 E-01	NR	1.20 E+00	NR	NR
1982	8.20 E-01	NR	1.30 E+00	NR	NR
1983	4.20 E-01	NR	1.50 E+00	NR	NR
1984	5.40 E-01	3.20 E-01	1.90 E+00	1.00 E-03	2.40 E-02
1985	2.70 E-01	2.40 E-02	4.50 E-01	2.90 E-04	8.80 E-04
1986	1.80 E-01	1.20 E-01	6.40 E-01	5.50 E-04	8.30 E-03
1987	2.60 E-01	1.10 E-01	9.20 E-01	6.20 E-04	1.40 E-02
1988	2.70 E-01	3.90 E-01	9.50 E-01	6.20 E-04	3.00 E-02
1989	2.60 E-01	3.50 E-01	7.60 E-01	6.20 E-04	5.50 E-02
1990	1.10 E-01	1.70 E-01	7.40 E-01	6.20 E-04	2.90 E-02
1991	6.40 E-01	1.60 E-01	9.00 E-01	9.00 E-04	1.70 E-02

NR = not reported.
Schmidt et al. (1991).

Table B-2. Average Radionuclide Concentrations (pCi/g) Detected in the 100-B Area Vegetation Samples from 1981 to 1991.

Year	^{60}Co	^{90}Sr	^{137}Cs	^{238}Pu	$^{239/240}Pu$
1981	3.60 E+00	NR	3.60 E-01	NR	NR
1982	1.90 E-01	NR	1.10 E-01	NR	NR
1983	1.80 E-01	NR	8.00 E-02	NR	NR
1984	1.30 E-01	1.40 E+00	8.70 E-02	2.40 E-04	6.00 E-04
1985	4.60 E-01	1.40 E+00	1.20 E-01	2.50 E-04	1.00 E-03
1986	2.50 E-01	2.00 E-01	2.80 E+00	2.50 E-00	6.20 E-04
1987	1.50 E-01	2.30 E-01	1.00 E-01	4.60 E-04	6.50 E-04
1988	3.50 E-01	2.60 E-01	2.16 E-01	1.40 E-04	3.10 E-04
1989	3.20 E-01	1.60 E-01	1.80 E-01	6.50 E-05	2.40 E-04
1990	4.50 E-02	9.10 E-02	6.70 E-02	<2.50 E-05	3.00 E-04
1991	5.70 E-02	8.30 E-02	1.80 E-01	2.90 E-05	1.10 E-03

NR = not reported.
Schmidt et al. (1991).

Table B-3. 1992 Soil Results for the B-1 Site (pCi/g Dry Weight).

Isotope	Result	Overall Error
^{60}Co	2.88 E-02	± 1.60 E-02
^{137}Cs	5.56 E-01	± 6.64 E-02
^{134}Cs	3.20 E-03	± 1.10 E-02
^{106}Ru	1.11 E-01	± 1.13 E-02
^{125}Sb	2.30 E-02	± 3.35 E-02
^{155}Eu	5.60 E-02	± 3.93 E-02
^{154}Eu	5.89 E-02	± 4.83 E-02
^{90}Sr	6.50 E-02	± 1.44 E-02
$^{239/240}Pu$	1.50 E-02	± 1.94 E-03
^{238}Pu	2.02 E-04	± 2.20 E-04
^{234}U	8.25 E-01	± 9.52 E-02
^{235}U	2.60 E-02	± 1.09 E-02
$^{238DA}U$	7.89 E-01	± 9.12 E-02

Schmidt et al. (1993).

Table B-4. 1992 Soil Results for the B-2 Site (pCi/g Dry Weight).

Isotope	Result	Overall Error
Co-60	7.59 E-02	± 3.00 E-02
Cs-137	1.99 E+00	± 2.08 E-02
Cs-134	1.67 E-03	± 1.34 E-02
Ru-106	1.41 E-01	± 1.28 E-01
Sb-125	1.29 E-02	± 4.27 E-02
Eu-155	1.37 E-02	± 3.99 E-02
Eu-154	1.25 E-01	± 5.27 E-02
Sr-90	2.14 E-01	± 4.18 E-02
Pu-239/240	4.98 E-02	± 6.90 E-03
Pu-238	1.14 E-03	± 5.47 E-04
U-234	7.22 E-01	± 8.84 E-02
U-235	4.00 E-02	± 1.41 E-02
U-238DA	7.27 E-01	± 8.84 E-02

Schmidt et al. (1993).

Table B-5. 1992 Soil Results for the C-1 Site
(pCi/g Dry Weight).

Isotope	Result	Overall Error
Co-60	6.74 E-03	± 1.65 E-02
Cs-137	1.64 E-01	± 2.81 E-02
Cs-134	1.05 E-01	± 2.01 E-02
Ru-106	2.93 E-02	± 1.26 E-01
Sb-125	1.49 E-02	± 3.64 E-02
Eu-155	1.51 E-02	± 4.96 E-02
Eu-154	3.42 E-02	± 5.69 E-02
Sr-90	4.17 E-02	± 1.00 E-02
Pu-239/240	3.47 E-03	± 1.23 E-03
Pu-238	3.52 E-04	± 3.72 E-04
U-234	6.22 E-01	± 7.88 E-02
U-235	2.09 E-02	± 1.04 E-02
U-238DA	6.51 E-01	± 8.11 E-02

Schmidt et al. (1993).

Table B-6. 1992 Soil Results for the C-2 Site
(pCi/g Dry Weight).

Isotope	Result	Overall Error
Co-60	1.77 E-01	± 3.15 E-02
Cs-137	1.39 E+00	± 1.45 E-01
Cs-134	1.89 E-02	± 1.48 E-02
Ru-106	2.01 E-02	± 1.39 E-01
Sb-125	1.05 E-02	± 4.32 E-02
Eu-155	6.40 E-02	± 5.78 E-02
Eu-154	1.80 E-01	± 6.13 E-02
Sr-90	5.69 E-01	± 1.06 E-01
Pu-239/240	4.65 E-02	± 5.26 E-03
Pu-238	1.45 E-03	± 4.44 E-04
U-234	6.67 E-01	± 8.77 E-02
U-235	3.24 E-02	± 1.40 E-02
U-238DA	6.92 E-01	± 8.96 E-02

Schmidt et al. (1993).

Table B-7. 1992 Vegetation Results for the B-1 Site (pCi/g Dry Weight).

Isotope	Result	Overall Error
Co-60	3.03 E-02	± 7.88 E-02
Cs-137	1.58 E-02	± 7.13 E-02
Cs-134	-5.05 E-02	± 7.16 E-02
Ru-106	-4.15 E-01	± 5.69 E-01
Sb-125	-7.71 E-02	± 1.63 E-01
Eu-155	7.11 E-03	± 1.41 E-01
Eu-154	1.19 E-01	± 2.05 E-01
Sr-90	3.67 E-01	± 6.88 E-02
Pu-239/240	-2.99 E-05	± 3.03 E-04
Pu-238	-1.48 E-04	± 2.39 E-04
U-234	-1.64 E-03	± 4.15 E-03
U-235	-4.83 E-04	± 2.89 E-03
U-238	3.61 E-04	± 2.90 E-03

Schmidt et al. (1993).

Table B-8. 1992 Vegetation Results for the B-2 Site (pCi/g Dry Weight).

Isotope	Result	Overall Error
Co-60	4.57 E-02	± 7.89 E-02
Cs-137	5.65 E-04	± 7.23 E-02
Cs-134	2.18 E-02	± 7.05 E-02
Ru-106	-6.92 E-02	± 6.56 E-01
Sb-125	4.74 E-02	± 2.00 E-01
Eu-155	-4.16 E-02	± 2.00 E-01
Eu-154	-2.04 E-01	± 2.70 E-01
Sr-90	5.21 E-02	± 1.41 E-02
Pu-239/240	1.89 E-04	± 2.36 E-04
Pu-238	-2.33 E-05	± 1.30 E-04
U-234	1.43 E-03	± 4.59 E-03
U-235	-1.18 E-03	± 2.79 E-03
U-238	-8.88 E-04	± 2.77 E-03

Schmidt et al. (1993).

Table B-9. 1992 Vegetation Results for the C-1 Site (pCi/g Dry Weight).

Isotope	Result	Overall Error
Co-60	1.26 E-01	± 9.57 E-00
Cs-137	2.30 E-01	± 1.20 E-01
Cs-134	-6.13 E-00	± 9.86 E-02
Ru-106	-1.42 E-01	± 8.09 E-01
Sb-125	4.92 E-02	± 2.20 E-01
Eu-155	6.43 E-02	± 1.94 E-01
Eu-154	2.36 E-01	± 3.29 E-01
Sr-90	5.55 E-01	± 1.10 E-01
Pu-239/240	-1.23 E-04	± 2.07 E-04
Pu-238	-4.55 E-05	± 2.40 E-04
U-234	1.00 E-04	± 4.69 E-03
U-235	-2.23 E-03	± 2.52 E-03
U-238	2.57 E-03	± 3.50 E-03

Schmidt et al. (1993).

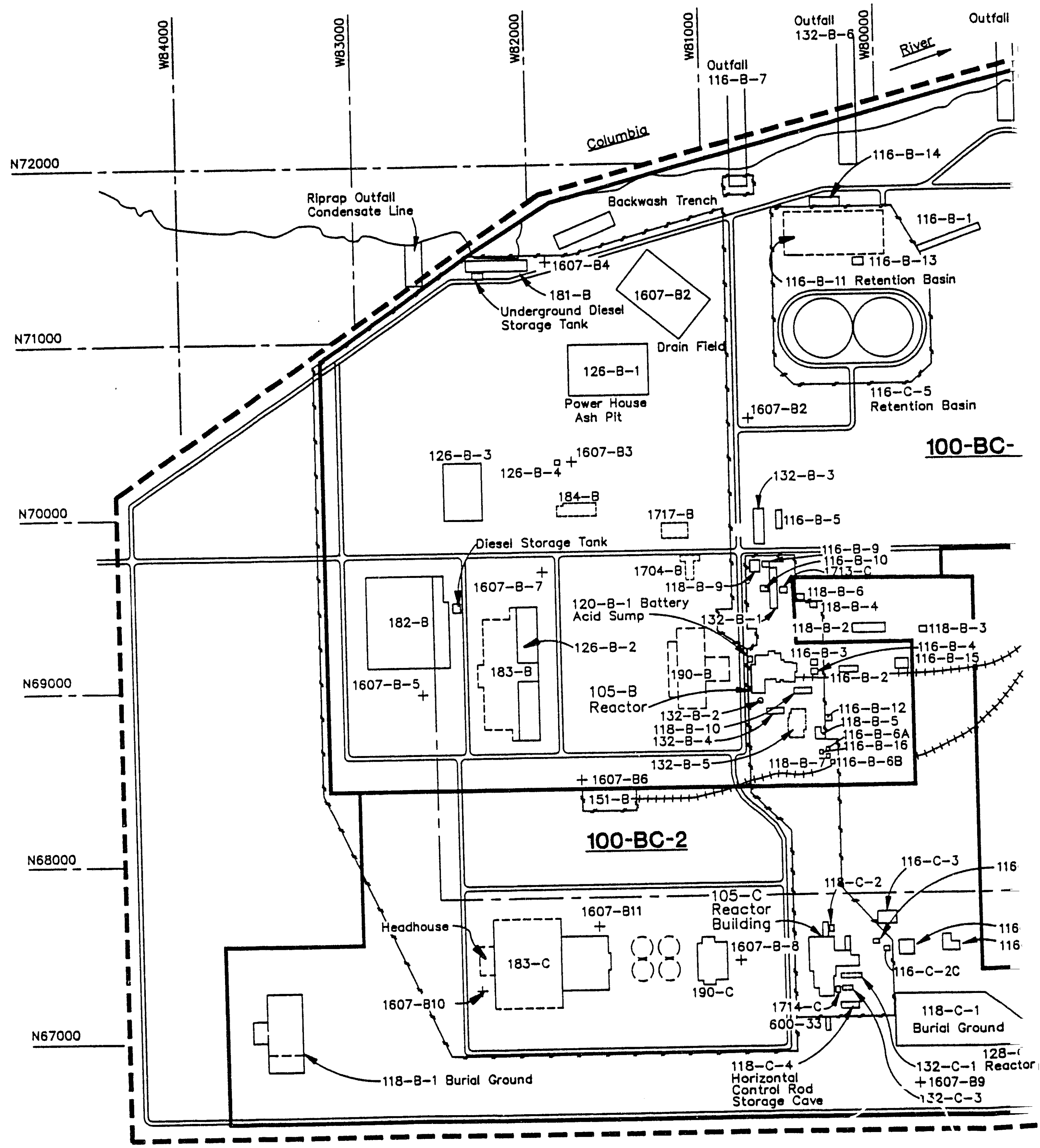
Table B-10. 1992 Vegetation Results for the C-2 Site (pCi/g Dry Weight).

Isotope	Result	Overall Error
Co-60	4.44 E-02	± 6.48 E-02
Cs-137	1.22 E-01	± 7.32 E-02
Cs-134	-2.46 E-02	± 7.98 E-02
Ru-106	5.15 E-01	± 6.64 E-01
Sb-125	-6.22 E-02	± 1.90 E-01
Eu-155	1.52 E-02	± 1.80 E-01
Eu-154	-2.67 E-02	± 2.17 E-01
Sr-90	1.94 E-02	± 8.56 E-03
Pu-239/240	1.38 E-04	± 1.72 E-04
Pu-238	-2.15 E-05	± 1.22 E-04
U-234	1.68 E-03	± 4.83 E-03
U-235	-1.21 E-03	± 2.73 E-03
U-238	3.84 E-04	± 3.11 E-03

Schmidt et al. (1993).

APPENDIX C

MAPS AND DRAWINGS



GEN\111893A2

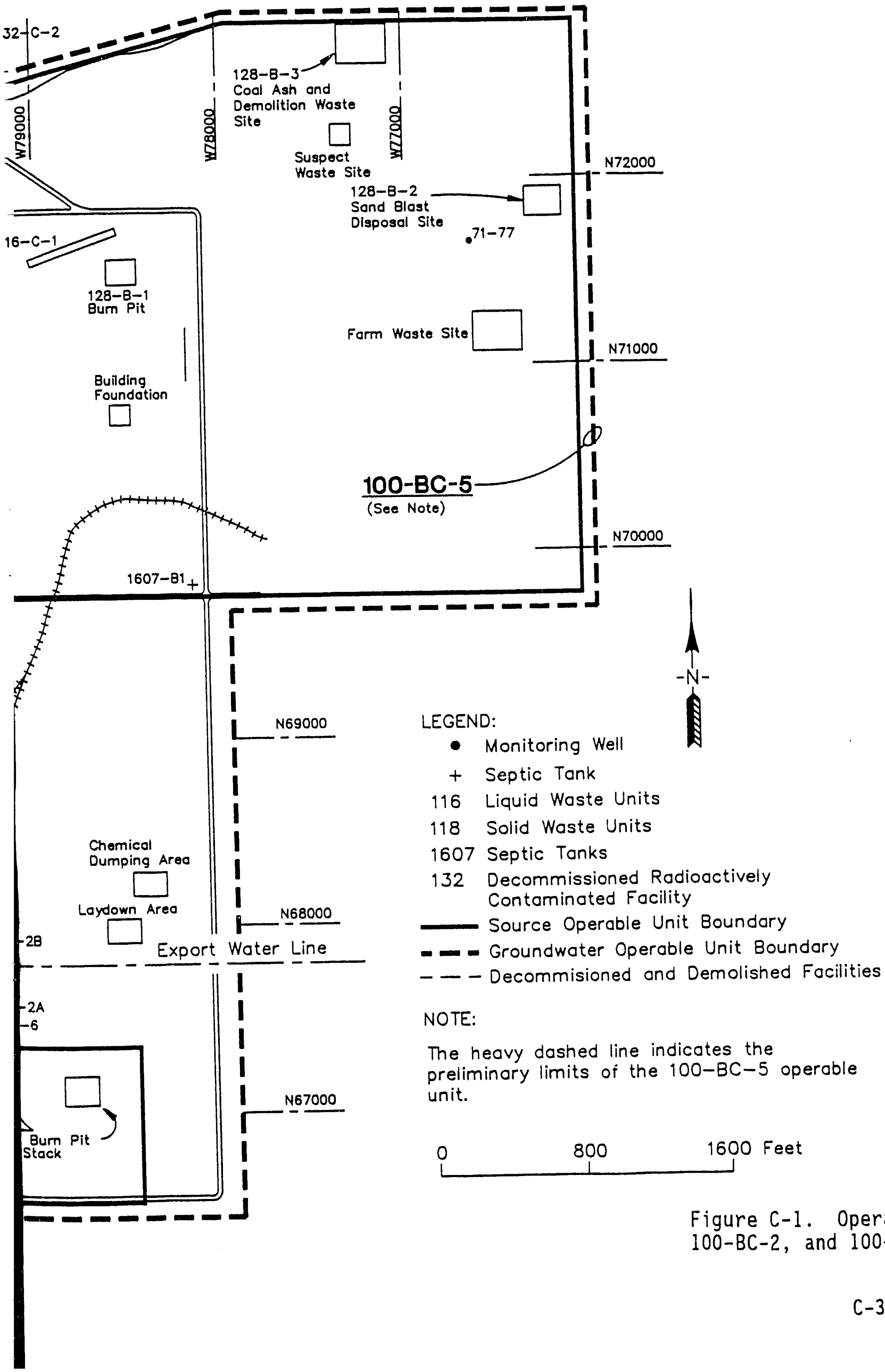
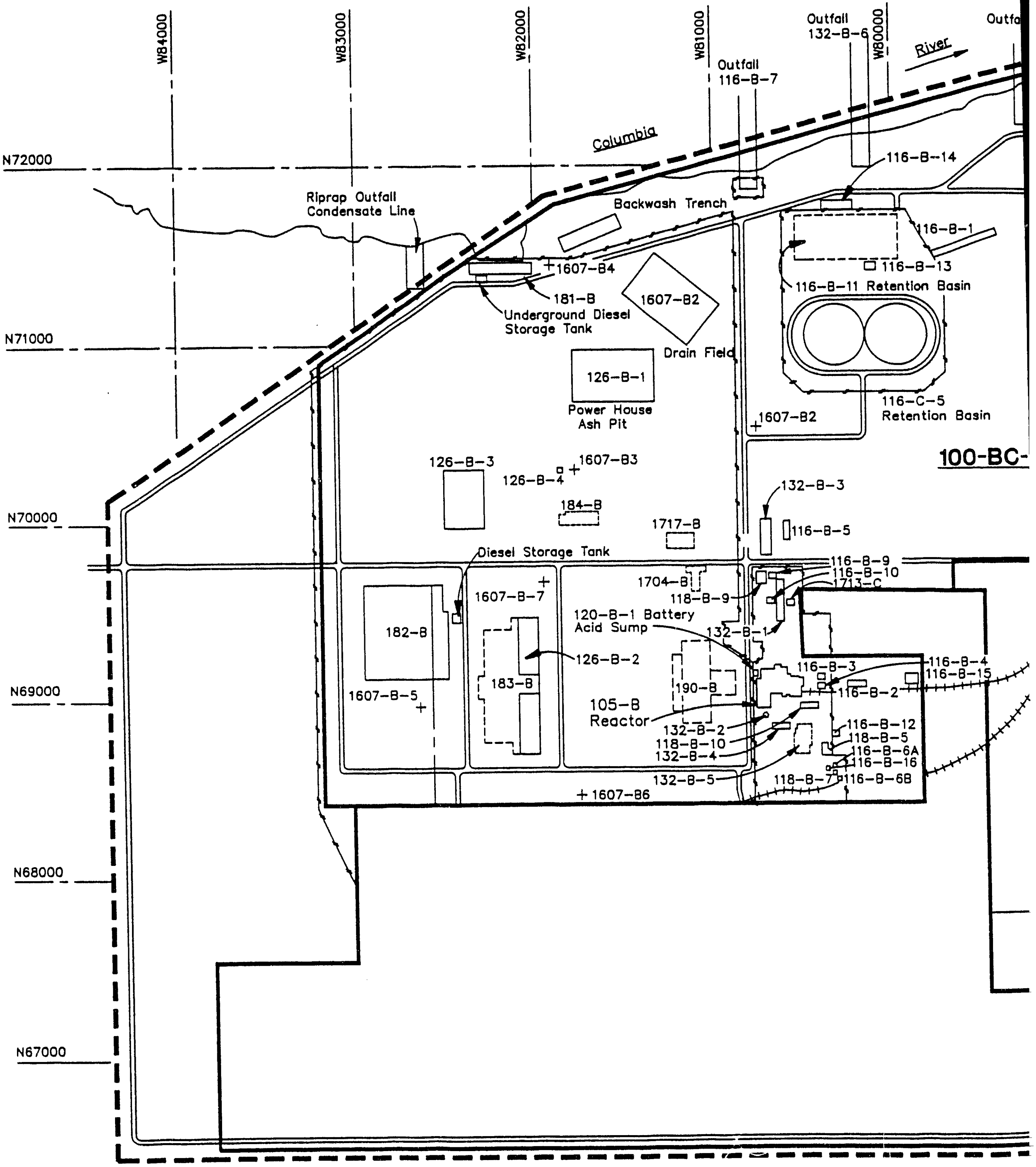


Figure C-1. Operable Units 100-BC-1, 100-BC-2, and 100-BC-5.



GEN\111893A1

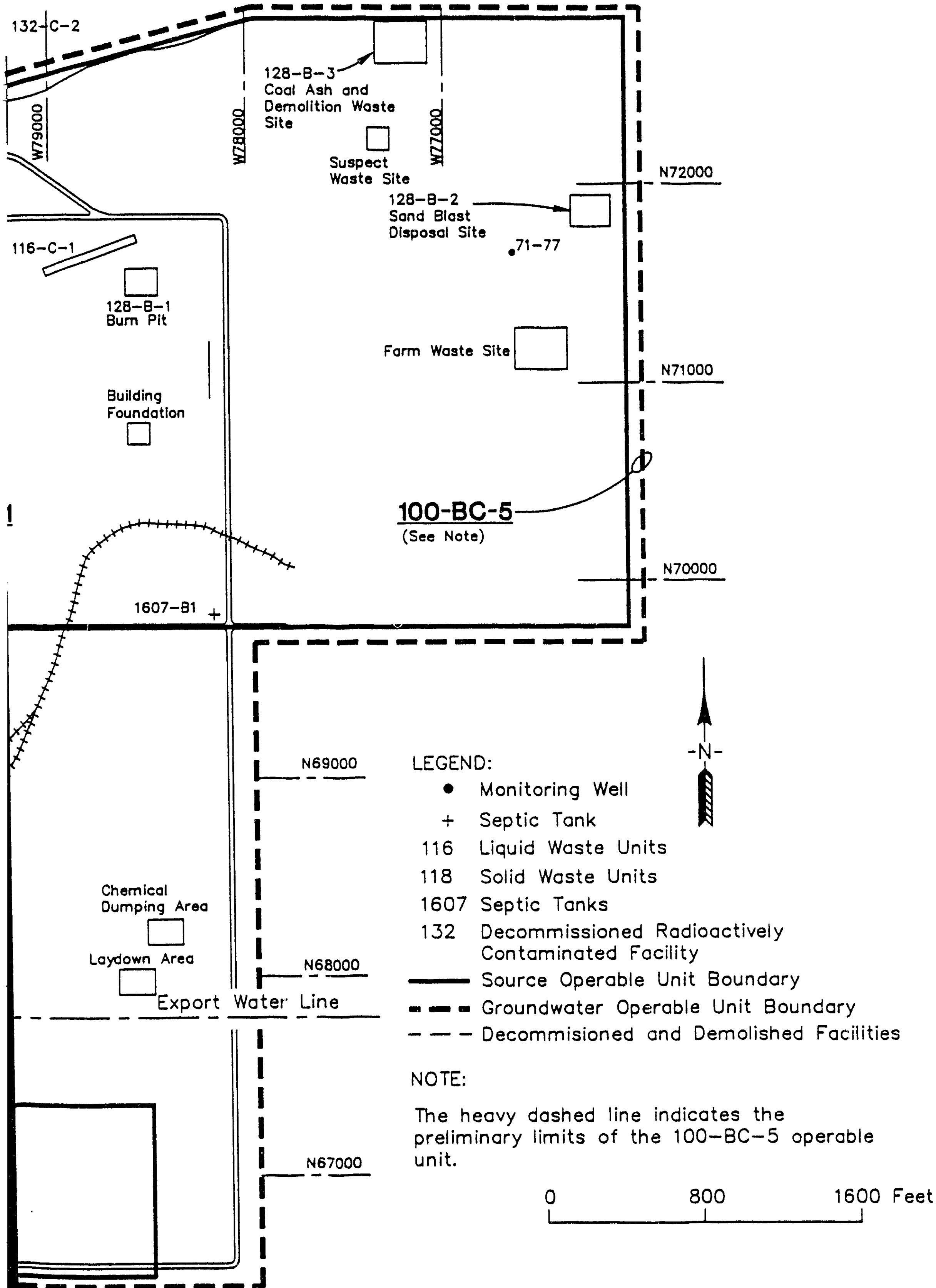
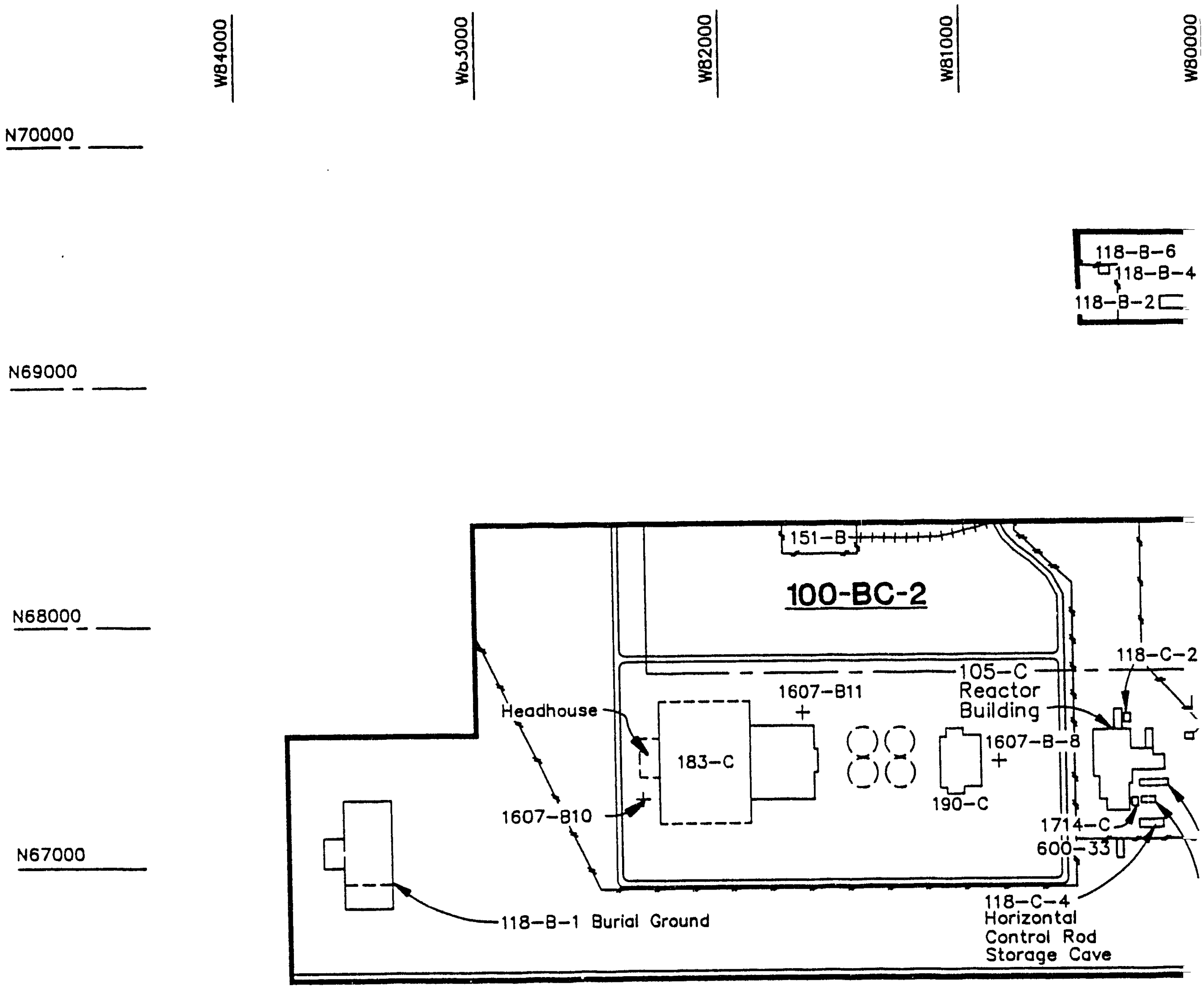


Figure C-2. Operable Units 100-BC-1 and 100-BC-5.


W84000
W83000
W82000
W81000
W80000
N70000
N69000
N68000
N67000
118-B-6
118-B-4
118-B-2
151-B
100-BC-2
118-C-2
105-C
Reactor
Building
1607-B11
Headhouse
183-C
190-C
1607-B-8
1607-B10
1714-C
600-33
118-B-1 Burial Ground
118-C-4
Horizontal
Control Rod
Storage Cave

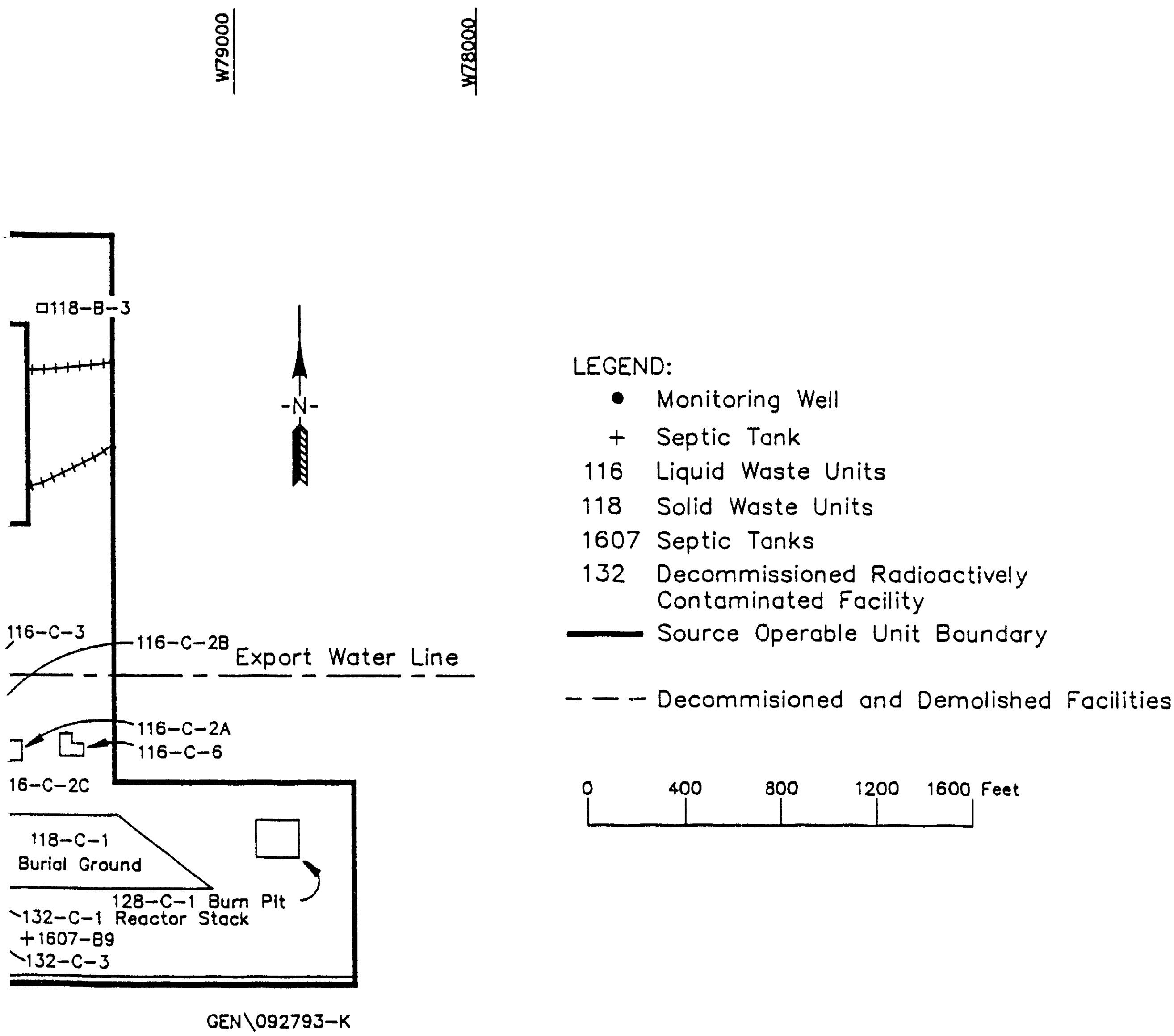
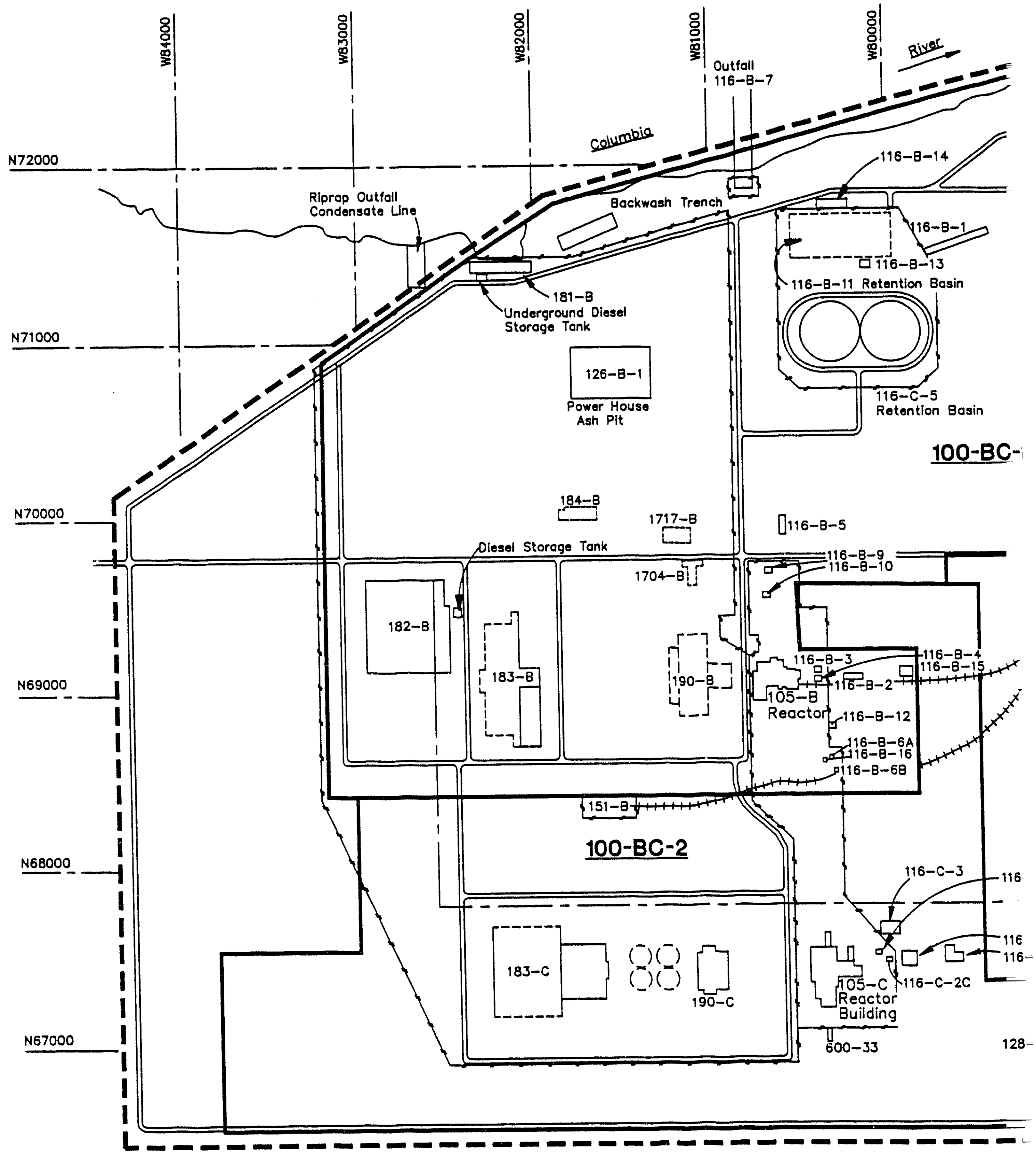


Figure C-3. Operable Unit 100-BC-2.



GEN\111893A3

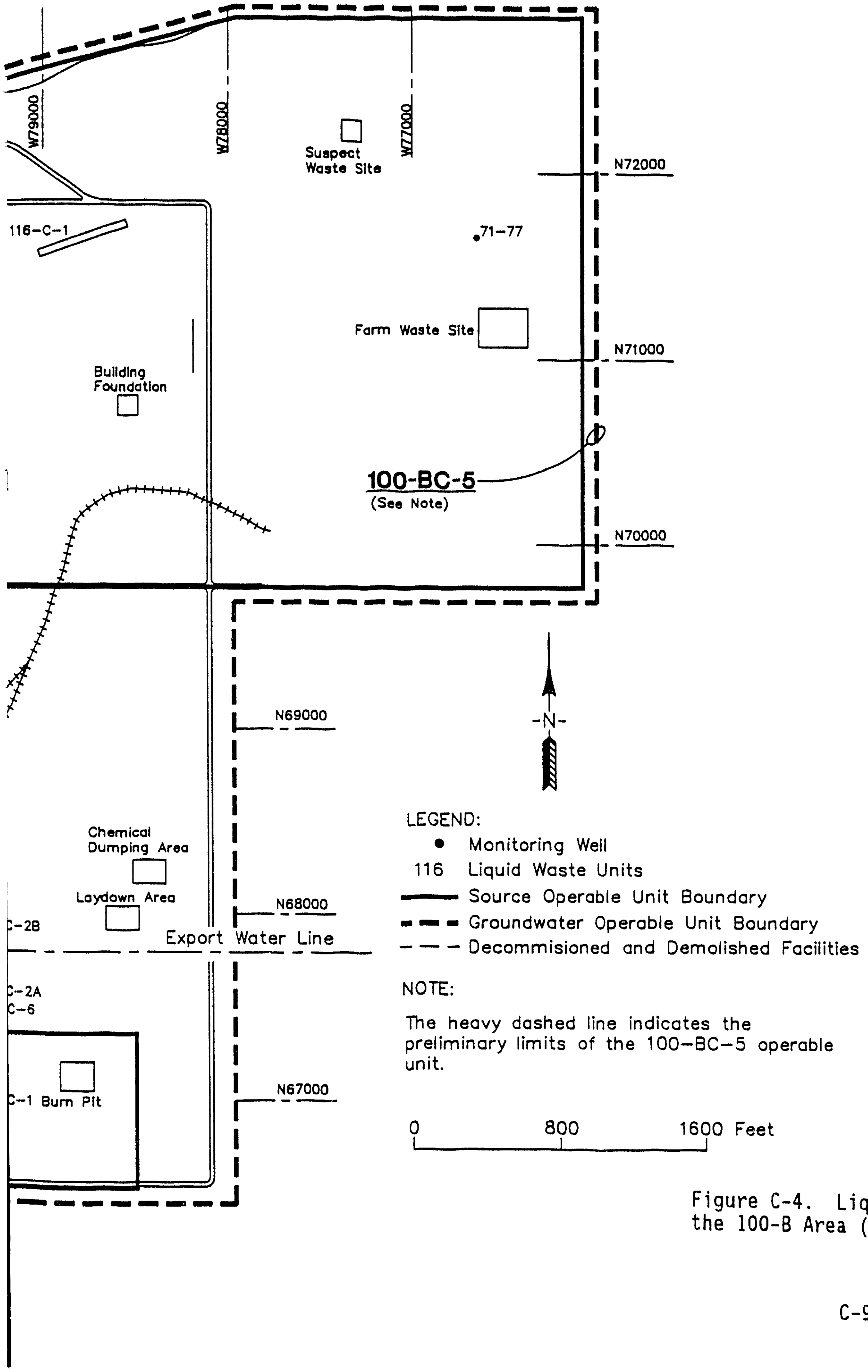
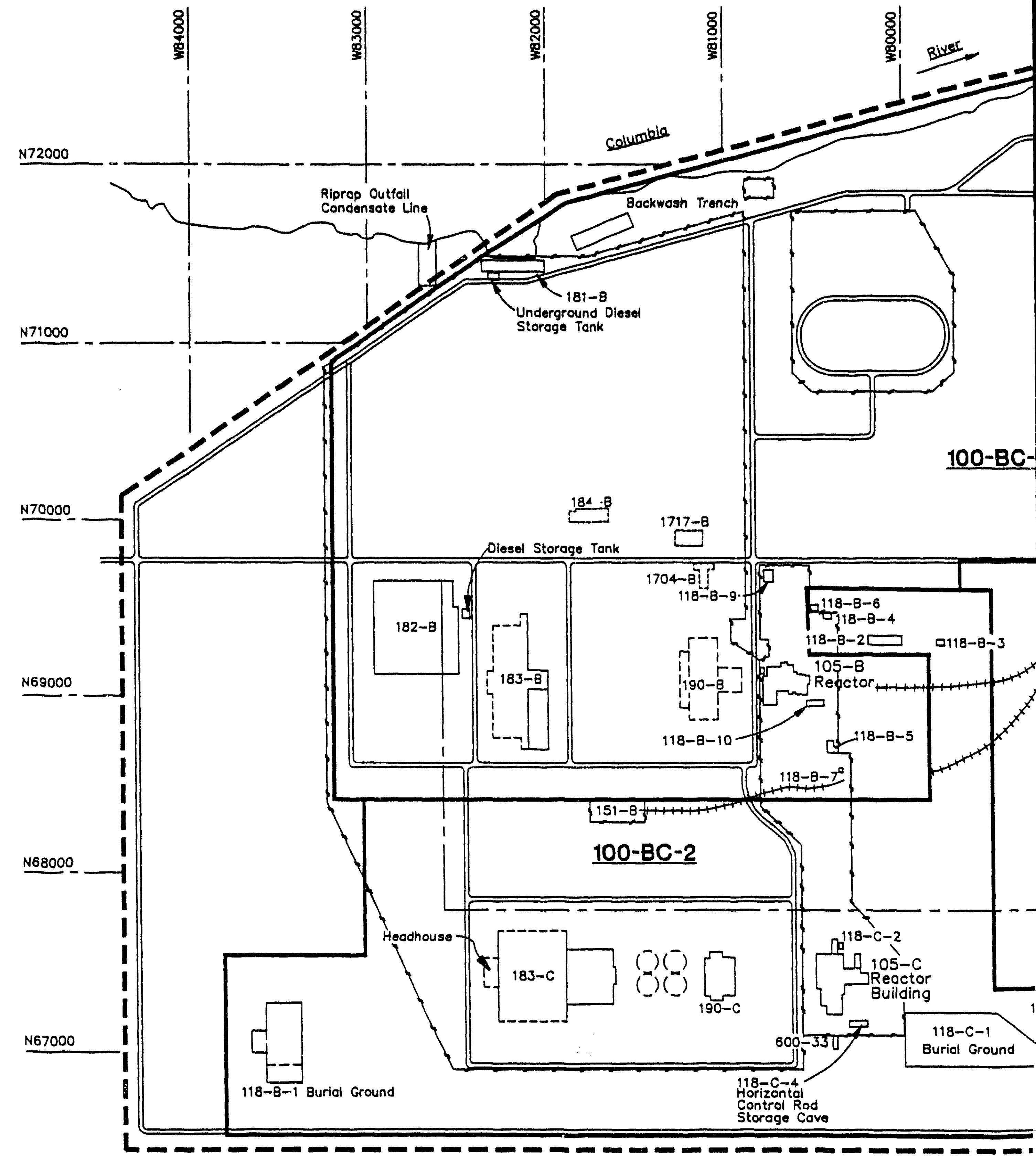


Figure C-4. Liquid Waste Sites in the 100-B Area (116- Prefixes).



GEN\111893A4

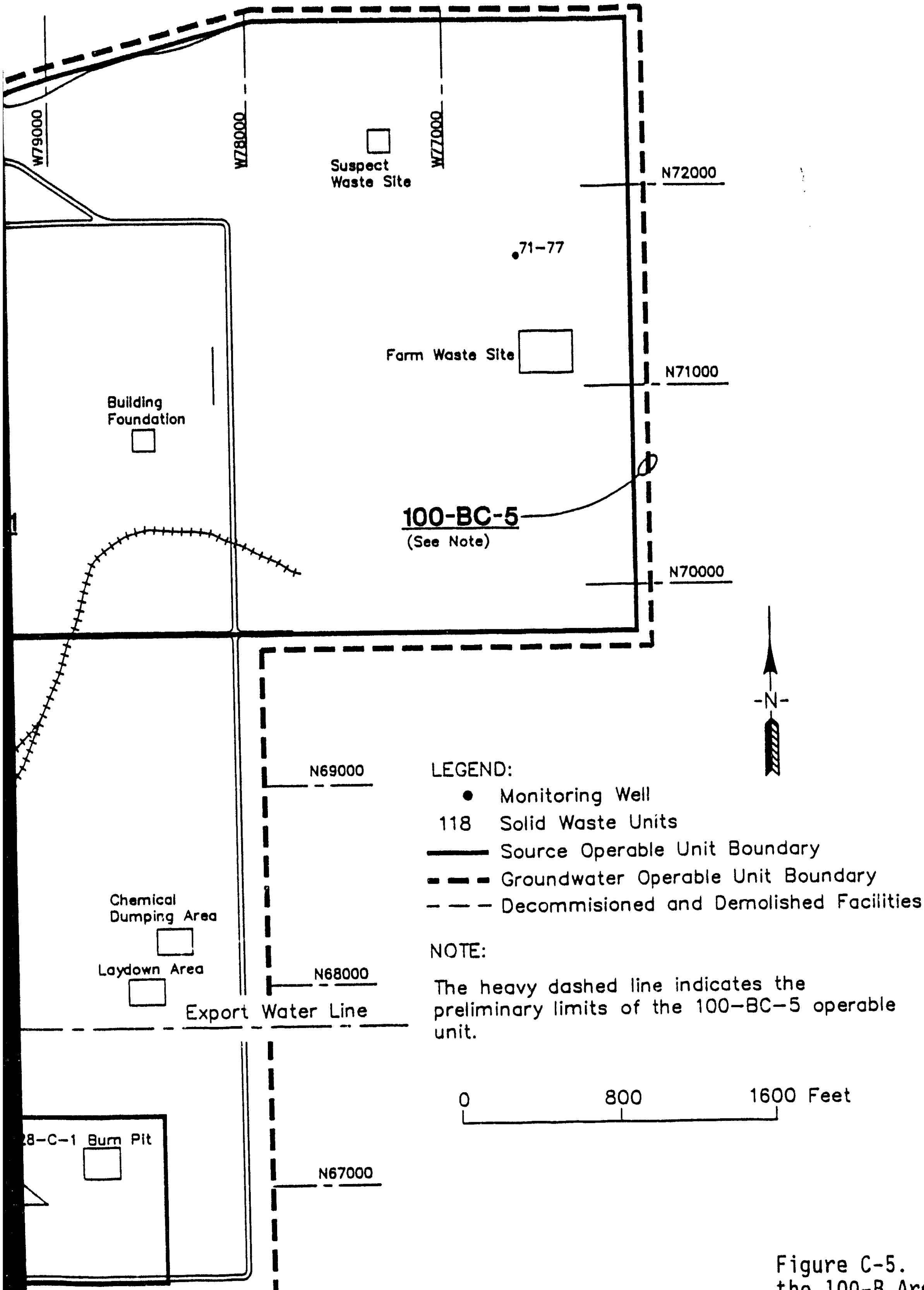
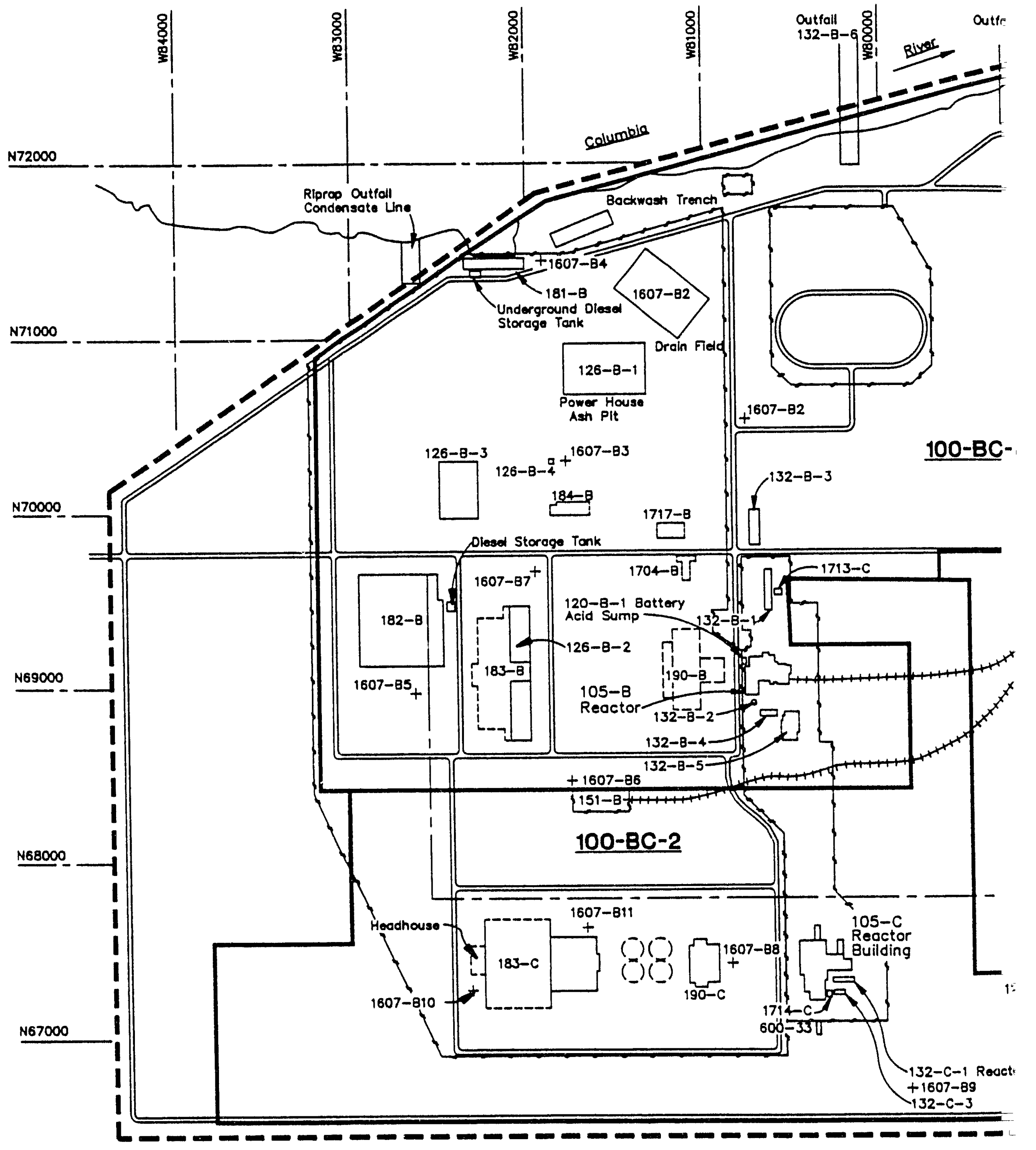


Figure C-5. Solid Waste Sites in the 100-B Area (118- Prefixes).



GEN\111893A5

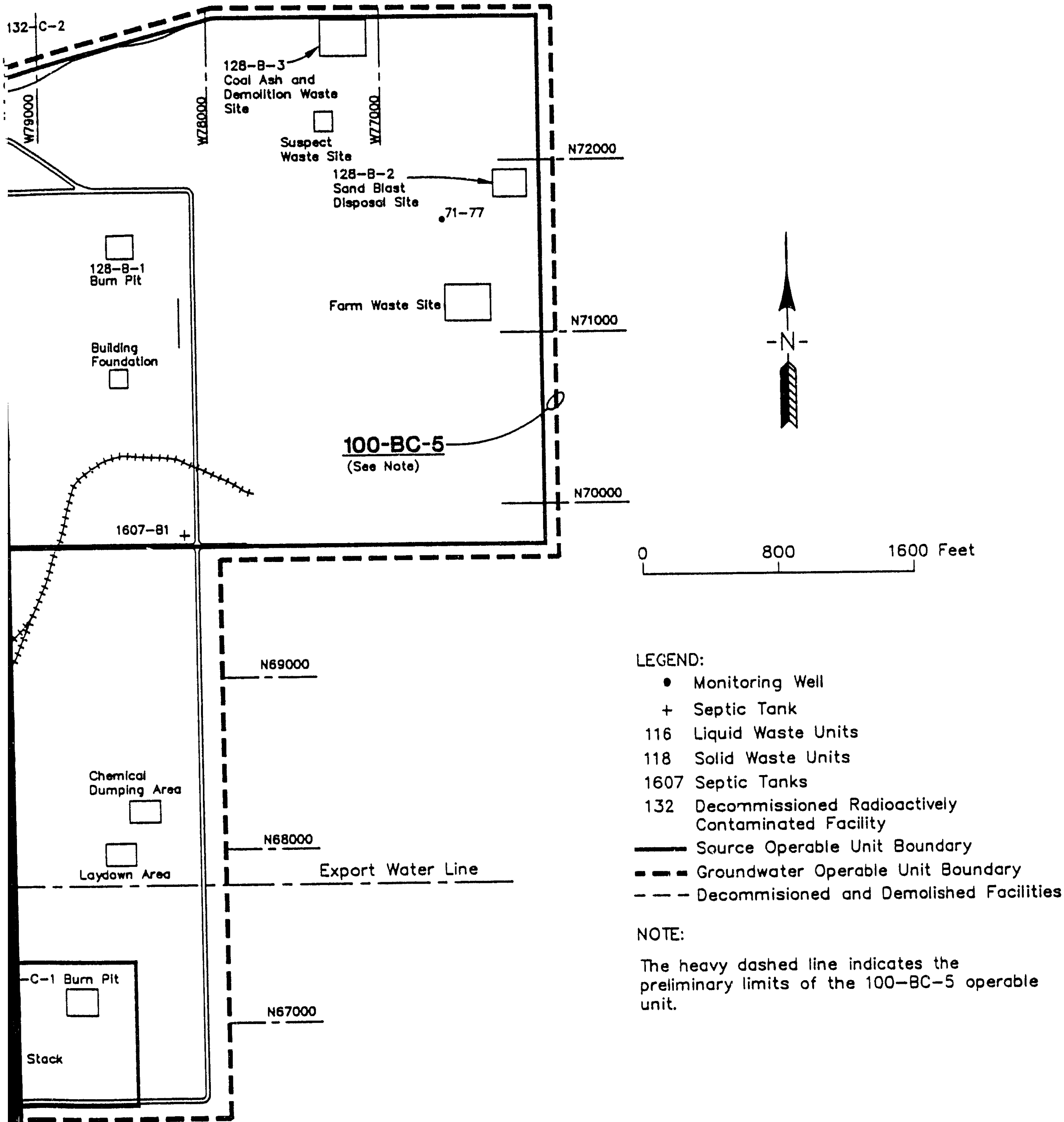
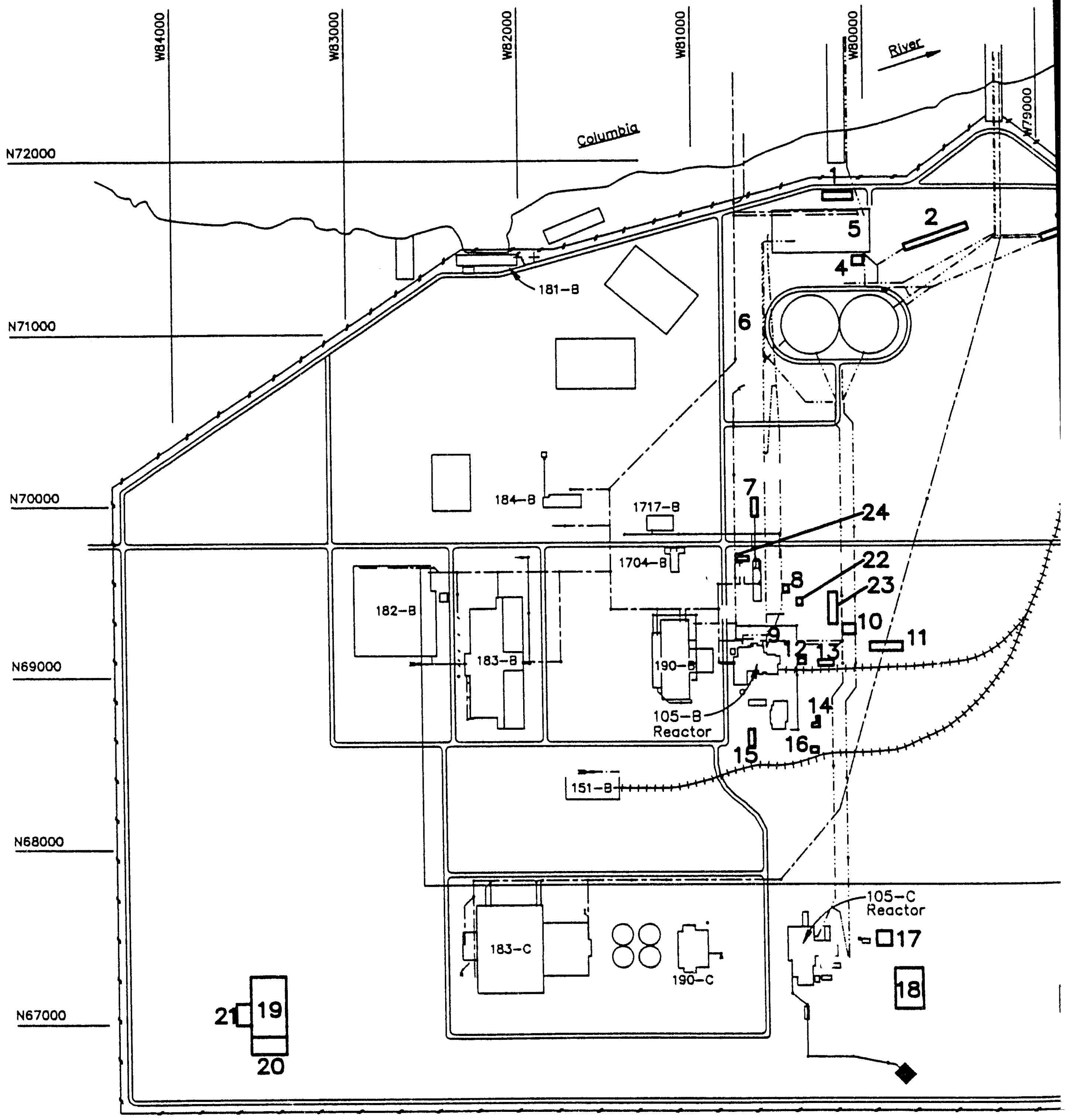
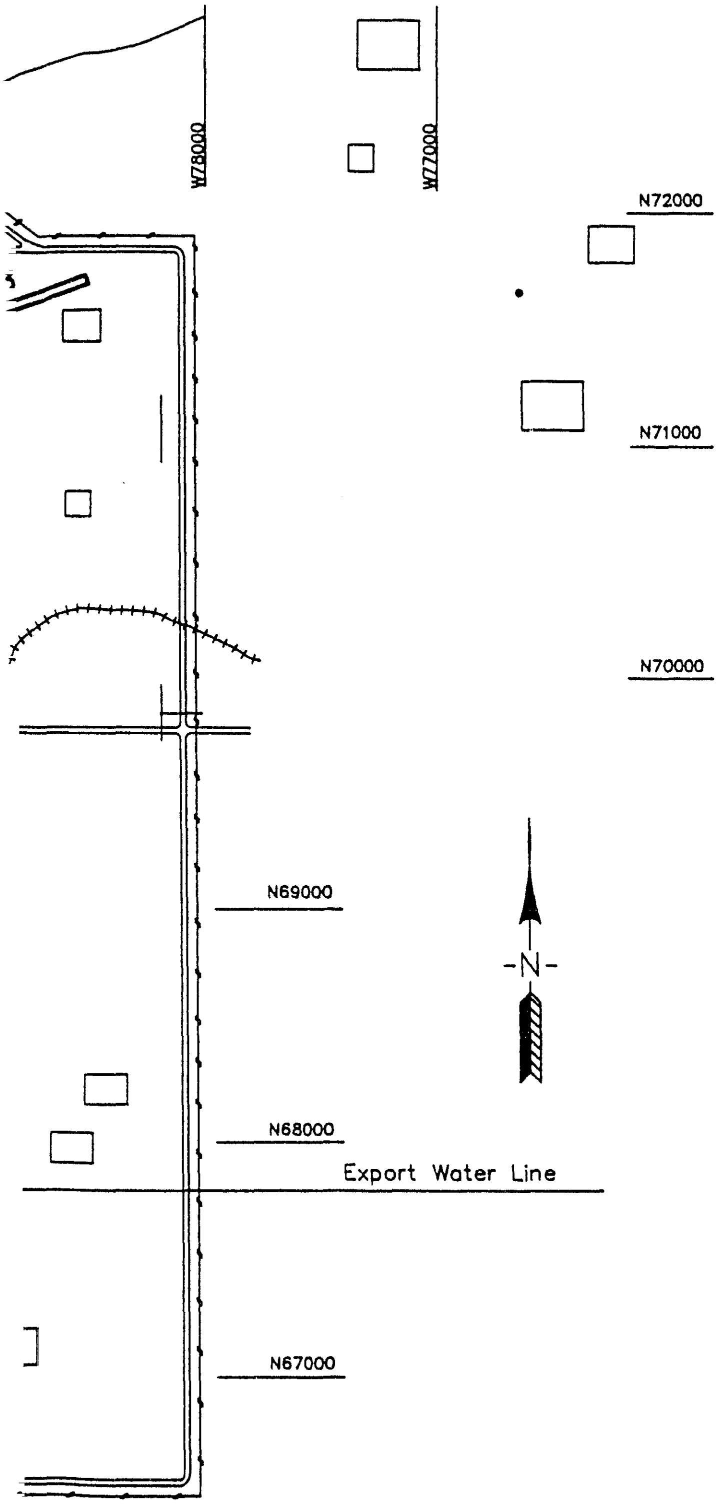


Figure C-6. Miscellaneous Waste Sites in the 100-B Area (120-, 126-, 130-, 132-, and Other Prefixes).



W84000
W83000
W82000
W81000
W80000
W79000
River
Columbia
N72000
N71000
N70000
N69000
N68000
N67000
181-B
184-B
1717-B
1704-B
182-B
183-B
190-B
105-B
Reactor
151-B
183-C
190-C
105-C
Reactor
1
2
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24



KEY:

1. 107–B Liquid Waste Disposal Trench #1
2. 107–B Liquid Waste Disposal Trench #2
3. 107–C Liquid Waste Disposal Trench
4. Buried Waste from 107–B Basin
5. Leaks 107–B Retention Basin
6. Effluent Lines Leaks
7. 108–B Crib
8. 108–B Solid Waste Burial Ground #2
9. 105–B Exclusion Area Effluent Leaks
10. Minor Construction Burial Ground #1
11. Minor Construction Burial Ground #2
12. 105–B Pluto Crib
13. 105–B Storage Basin Trench
14. Ball 3X Burial Ground
15. Hot Thimble Burial
16. 111–B Crib
17. 105–C Crib
18. 105–C Solid Waste Burial Ground
19. Operations Solid Waste Burial Ground
20. 108–B Solid Waste Burial Ground
21. Extension to Burial Ground #1
22. Spacer Solid Waste Burial Ground
23. Effluent Vent Disposal Trench
24. 104–B–2 French Drain

LEGEND:

Effluent Line – Inactive
Process Sewer Line – Inactive
Sanitary Sewer – Active
Sanitary Sewer – Inactive
Existing Manhole Locations

0 800 1600 Feet

GEN\111893–A

Figure C-7. Historical Drawing of Waste Sites in the 100-B Area.

APPENDIX D

RADIONUCLIDE INVENTORY TABLES

Reference: Dorian, J. J. and V. R. Richards, 1978, *Radiological Characterization of the Retired 100 Areas*, UNI-946, UNC Nuclear Industries, Richland, Washington.

TABLE 2.6-1

Radioactive Concentrations (pCi/g) In and Near the Retention Basins

	Beta-Gamma		Pu-238		Pu-239/240	
	Ave.	Max.	Ave.	Max.	Ave.	Max.
Sludge						
107-B	6.1×10^{4}	1.8×10^{5}	1.9×10^{0}	8.7×10^{0}	5.8×10^{1}	3.4×10^{2}
107-C	1.8×10^{4}	5.5×10^{4}	2.4×10^{0}	9.0×10^{0}	6.5×10^{1}	2.3×10^{2}
107-D	6.2×10^{4}	1.4×10^{5}	2.2×10^{0}	4.7×10^{0}	1.1×10^{2}	2.9×10^{2}
107-DR	2.8×10^{4}	7.1×10^{4}	7.1×10^{-1}	2.3×10^{0}	3.0×10^{1}	8.2×10^{1}
107-F	2.5×10^{4}	4.7×10^{4}	3.1×10^{-1}	1.1×10^{0}	1.1×10^{1}	4.5×10^{1}
107-H	3.1×10^{4}	1.0×10^{5}	2.1×10^{0}	7.7×10^{0}	5.7×10^{1}	2.0×10^{2}
107-KE	1.2×10^{3}	3.4×10^{3}	1.0×10^{-1}	6.2×10^{-1}	1.2×10^{0}	4.6×10^{0}
107-KW	2.6×10^{3}	3.2×10^{3}	*	*	2.0×10^{0}	8.3×10^{0}
Fill Less Sludge						
107-B	5.9×10^{2}	9.5×10^{3}	3.9×10^{-3}	3.9×10^{-2}	7.1×10^{-1}	1.0×10^{1}
107-C	2.7×10^{2}	1.2×10^{3}	5.4×10^{-2}	4.9×10^{-1}	7.8×10^{-1}	1.6×10^{1}
107-D	2.3×10^{2}	7.6×10^{2}	1.2×10^{-3}	7.2×10^{-3}	4.2×10^{-1}	1.6×10^{0}
107-DR	2.4×10^{2}	6.6×10^{3}	1.6×10^{-2}	1.1×10^{-1}	6.2×10^{-1}	4.0×10^{0}
107-F	9.8×10^{1}	4.5×10^{2}	*	*	7.5×10^{-2}	3.7×10^{-1}
107-H	4.0×10^{2}	7.2×10^{3}	*	1.0×10^{0}	1.5×10^{0}	2.2×10^{1}
107-KE	7.3×10^{0}	1.9×10^{1}	*	*	*	*
107-KW	2.4×10^{1}	4.8×10^{1}	*	*	*	*
Underneath						
107-B 0-20'	1.8×10^{3}	5.4×10^{3}	1.0×10^{-1}	5.8×10^{-1}	5.0×10^{0}	1.8×10^{1}
107-C 0-8'	1.5×10^{3}	4.3×10^{3}	*	*	2.0×10^{0}	5.4×10^{0}
107-C 8-20'	2.5×10^{2}	1.1×10^{3}	*	*	4.7×10^{-1}	1.9×10^{0}
107-D 0-6'	1.3×10^{2}	1.9×10^{2}	*	*	3.8×10^{-1}	6.0×10^{-1}
107-D 6-10'	2.8×10^{1}	3.2×10^{1}	*	*	*	*
107-DR 0-3'	3.7×10^{2}	1.3×10^{3}	*	*	3.1×10^{-1}	1.0×10^{0}
107-DR 3-10'	2.0×10^{1}	4.1×10^{1}	*	*	3.4×10^{-1}	2.4×10^{0}
107-F 0-5'	5.4×10^{2}	1.3×10^{3}	*	*	1.1×10^{0}	3.0×10^{0}
107-F 5-10'	4.3×10^{1}	8.8×10^{1}	*	*	*	*
107-H 0-3'	2.0×10^{2}	3.6×10^{2}	*	*	*	*
107-H 3-10'	3.1×10^{1}	4.8×10^{1}	*	*	9.0×10^{-2}	1.8×10^{-1}
Adjacent						
107-B surface	2.9×10^{3}	2.9×10^{3}	*	*	5.0×10^{-1}	5.0×10^{-1}
107-B underground	7.4×10^{-1}	5.6×10^{2}	*	*	2.2×10^{-1}	3.3×10^{0}
107-C surface	9.8×10^{1}	2.2×10^{2}	*	*	5.1×10^{-1}	7.3×10^{-1}
107-C underground	1.2×10^{1}	2.2×10^{1}	*	*	1.4×10^{-2}	4.1×10^{-2}
107-D underground	2.7×10^{2}	2.1×10^{3}	1.1×10^{-2}	4.8×10^{-1}	5.3×10^{-1}	1.3×10^{1}
107-DR underground	5.3×10^{1}	1.3×10^{3}	*	*	6.9×10^{-2}	1.5×10^{0}
107-F underground	2.2×10^{2}	2.0×10^{3}	*	5.2×10^{-3}	2.4×10^{-1}	2.1×10^{0}
107-H underground	1.2×10^{2}	8.8×10^{2}	1.2×10^{-2}	3.0×10^{-1}	3.5×10^{-1}	3.2×10^{0}
107-KE surface	4.8×10^{1}	1.7×10^{2}	*	*	3.0×10^{-2}	2.1×10^{-1}
107-KE underground	1.4×10^{1}	4.8×10^{1}	*	*	*	*
107-KW surface	2.8×10^{2}	1.6×10^{3}	*	*	3.2×10^{-1}	3.2×10^{0}
107-KW underground	2.8×10^{0}	5.9×10^{0}	*	*	*	*
Concrete						
Ave of all basins	1.4×10^{3}		3.1×10^{-2}		1.8×10^{0}	

TABLE 2.6-2

Beta-Gamma Inventories In and Near the Retention Basins

107 Basin Beta-Gamma Inventories

Basin	Sludge	Fill Less Sludge	Concrete	Underneath	Adjacent	Total Curies
107-B	92	16	8	280	24	420
107-C	9	4		170	4	187
107-D	75	4.1	8	6.6	27	121
107-DR	54	7.3	13	15	3.5	93
107-F	45	2.9	8	22	15	93
107-H	60	18	13	9.6	17	118
107-KE	0.35	0.15			6.2	6.7
107-KW	0.51	0.48			3.9	4.9

Percentage of Total Basin Inventory

Basin	Sludge	Fill Less Sludge	Concrete	Underneath	Adjacent	Inside	Outside
107-B	22	4	2	66	6	28	72
107-C	5	2		91	2	7	93
107-D	62	3	7	6	22	72	28
107-DR	58	8	14	10	4	80	20
107-F	48	3	9	24	16	60	40
107-H	51	15	11	8	15	77	23
107-KE	5	2			93	7	93
107-KW	10	10			80	20	80
					Average	44	56

TABLE 2.6-3

Pu-238, Pu-239/240 Inventories In and Near the Retention Basins

107 Basin Pu-238, Pu-239/240 Inventories

Basin	Sludge	Fill Less Sludge	Concrete	Underneath	Adjacent	Total Curies
107-B	9.0×10^{-2}	1.8×10^{-2}	1.0×10^{-2}	7.7×10^{-1}	6.0×10^{-2}	9.5×10^{-1}
107-C	3.3×10^{-2}	1.3×10^{-2}	--	2.5×10^{-1}	8.0×10^{-3}	3.0×10^{-1}
107-D	1.4×10^{-1}	7.6×10^{-3}	1.0×10^{-2}	1.7×10^{-2}	5.4×10^{-2}	2.3×10^{-1}
107-DR	5.8×10^{-2}	2.5×10^{-2}	1.6×10^{-2}	3.9×10^{-2}	4.5×10^{-3}	1.4×10^{-1}
107-F	2.0×10^{-2}	2.2×10^{-3}	1.0×10^{-2}	4.1×10^{-2}	1.6×10^{-2}	8.9×10^{-2}
107-H	1.1×10^{-1}	6.8×10^{-2}	1.6×10^{-2}	7.4×10^{-3}	5.0×10^{-2}	2.5×10^{-1}
107-KE	2.6×10^{-4}	0.0	--	--	3.0×10^{-4}	5.6×10^{-4}
107-KW	4.2×10^{-4}	0.0	--	--	3.2×10^{-3}	3.6×10^{-3}

Percentage of Pu Inventory

Basin	Sludge	Fill Less Sludge	Concrete	Underneath	Adjacent	Inside	Outside
107-B	10	2	1	81	6	13	87
107-C	11	4	--	82	3	15	85
107-D	61	3	5	7	24	69	31
107-DR	40	18	11	28	3	69	31
107-F	23	2	11	46	18	36	64
107-H	44	27	6	3	20	77	23
107-KE	46	0.0	--		54	46	54
107-KW	11	0.0	--		89	11	89
					Average	42	58

TABLE 2.7-11

CONTAMINATED SOIL COLUMN ADJACENT TO THE 107-B RETENTION BASIN

Description - Total Curies calculation based on:

1) surface contamination extending 50' away from the north wall and 10' away from all other walls x 1/2' deep,
2) underground contamination extending 200' away from the north wall and 25' away from other walls x 30' deep.

Surface - $3.4\times10^{4}\ ft^{2} \times 1/2' = 1.7\times10^{4}\ ft^{3}$
Mass = 1.2×10^{9} g

Underground - $1.3\times10^{5}\ ft^{2} \times 30' = 3.9\times10^{6}\ ft^{3}$
Mass = 2.7×10^{11} g

Radionuclide	Surface Contamination[1] Ave. pCi/g	Underground Contamination Ave. pCi/g	Curies
Pu-238	0.0	0.0	0.0
Pu-239/240	5.0×10^{-1}	2.2×10^{-1}	6.0×10^{-2}
Sr-90	1.7×10^{1}	1.7×10^{0}	4.8×10^{-1}
H-3	3.8×10^{0}	4.5×10^{0}	1.2
Eu-152	1.1×10^{3}	1.4×10^{1}	5.1
Co-60	1.1×10^{3}	2.1×10^{1}	7.0
Eu-154	3.3×10^{2}	4.2×10^{0}	1.6
Cs-134	7.1×10^{0}	7.7×10^{-2}	2.9×10^{-2}
Cs-137	2.7×10^{2}	2.7×10^{1}	7.6
Eu-155	4.6x10[illegible]	1.3×10^{0}	4.1×10^{-1}
U	9.2×10^{-1}	2.1×10^{-1}	5.8×10^{-2}

Total Curies = 24

[1]The Sr-90/Cs-137 concentration ratio for the underground contamination analytical results was used to establish the Sr-90 concentration for the surface contamination.

TABLE 2.7-12

CONTAMINATED SOIL COLUMN UNDERNEATH 107-B RETENTION BASIN

0-20' Below Basin 1.1×10^5 ft^2 x 20' = 2.2×10^6 ft^3

Mass = 1.5×10^{11}g

Radionuclide	Ave pCi/g	Curies
Pu-238	1.0×10^{-1}	1.5×10^{-2}
Pu-239/240	5.0×10^{0}	7.5×10^{-1}
Sr-90	3.6×10^{0}	5.4×10^{-1}
H-3	3.1×10^{1}	4.7
Eu-152	7.0×10^{2}	1.1×10^{2}
Co-60	6.0×10^{2}	9.0×10^{1}
Eu-154	2.8×10^{2}	4.2×10^{1}
Cs-134	4.4×10^{0}	6.6×10^{-1}
Cs-137	2.1×10^{2}	3.2×10^{1}
Eu-155	2.4×10^{1}	3.6
U	1.7×10^{-1}	2.6×10^{-2}

Total Curies = 280

TABLE 2.7-15

CONTAMINATED SOIL COLUMN ADJACENT TO THE 107-C RETENTION BASINS

Description - Includes area adjacent to 107-C extending 100' to the north and 50' in the other directions. Total curies calculation based on surface contamination 1/2' deep and underground contamination of 20' deep.

Surface - $2.2\text{x}10^{5}\ ft^{2} \times 1/2' = 1.1\text{x}10^{5}\ ft^{3}$
Mass = $7.5\text{x}10^{9}$g

Underground - $2.2\text{x}10^{5}\ ft^{2} \times 20' = 4.4\text{x}10^{6}\ ft^{3}$
Mass = $3.0\text{x}10^{11}$g

Radionuclide	Surface Contamination Ave. pCi/g	Underground Contamination Ave. pCi/g	Curies
Pu-238	*	*	0.0
Pu-239/240	$5.1\text{x}10^{-1}$	$1.4\text{x}10^{-2}$	$8.0\text{x}10^{-3}$
Sr-90	$3.5\text{x}10^{0}$	$6.6\text{x}10^{-1}$	$2.3\text{x}10^{-1}$
H-3	$1.7\text{x}10^{0}$	NA[1]	$5.2\text{x}10^{-1}$
Eu-152	$3.3\text{x}10^{1}$	$9.0\text{x}10^{-1}$	$5.2\text{x}10^{-1}$
Co-60	$1.7\text{x}10^{1}$	$2.8\text{x}10^{0}$	$9.7\text{x}10^{-1}$
Eu-154	$1.1\text{x}10^{1}$	$3.0\text{x}10^{-1}$	$1.7\text{x}10^{-1}$
Cs-134	$1.9\text{x}10^{-1}$	$5.0\text{x}10^{-2}$	$1.6\text{x}10^{-2}$
Cs-137	$1.2\text{x}10^{1}$	$5.7\text{x}10^{0}$	$1.8\text{x}10^{0}$
Eu-155	$2.0\text{x}10^{1}$	$9.6\text{x}10^{-2}$	$1.8\text{x}10^{-1}$

Total Curies = 4.4

[1]Concentrations conservatively assumed to be equivalent to surface contamination for total Curies calculation of H-3.

TABLE 2.7-16

CONTAMINATED SOIL COLUMN UNDERNEATH 107-C RETENTION BASINS

<u>0-8' Below Basin</u> 1.7×10^5 ft^2 x 8' = 1.4×10^6 ft^3

Mass = 9.3×10^{10}g

<u>8'-20' Below Basin</u> 1.7×10^5 ft^2 x 12' = 2.0×10^6 ft^3

Mass = 1.4×10^{11}g

Radionuclide	0-8' Ave pCi/g	8'-20' Ave pCi/g	Curies
Pu-238	*	*	0.0
Pu-239/240	2.0×10^{0}	4.7×10^{-1}	2.5×10^{-1}
Sr-90	1.[illegible]x10^{1}	4.7×10^{0}	2.4
H-3	5.2×10^{0}	5.1×10^{-1}	5.6×10^{-1}
Eu-152	5.3×10^{2}	8.1×10^{1}	6.1×10^{1}
Co-60	5.1×10^{2}	8.9×10^{1}	6.0×10^{1}
Eu-154	2.4×10^{2}	3.6×10^{1}	2.7×10^{1}
Cs-134	3.2×10^{0}	2.3×10^{-1}	3.3×10^{-1}
Cs-137	1.5×10^{2}	3.3×10^{1}	1.9×10^{1}
Eu-155	3.7×10^{1}	7.0×10^{0}	4.4
U	1.8×10^{-1}	NA[1]	4.2×10^{-2}

Total Curies = 170

[1]Concentration conservatively assumed to be the same as 0-8' interval for total Curies calculation.

TABLE 2.7-17

116-B-1

107-B LIQUID WASTE DISPOSAL TRENCH

Potentially Contaminated Soil Column

Volume = 350' x 100' x 20' - 7.0 x 10^5 ft^3

Mass = 4.8 x 10^{10}g

Radionuclide	Ave. pCi/g	Curies
Pu-238	2.1×10^{-3}	1.0×10^{-4}
Pu-239/240	1.7×10^{-1}	8.2×10^{-3}
Sr-90	1.8×10^{0}	8.6×10^{-2}
H-3	1.9×10^{0}	9.1×10^{-2}
Eu-152	3.7×10^{1}	1.8
Co-60	6.1×10^{0}	2.9×10^{-1}
Eu-154	7.7×10^{0}	3.7×10^{-1}
Cs-134	1.3×10^{-1}	6.2×10^{-3}
Cs-137	7.8×10^{0}	3.7×10^{-1}
Eu-155	1.6×10^{0}	7.7×10^{-2}
U	2.7×10^{-1}	1.3×10^{-2}

Total Curies = 3.1

TABLE 2.7-18

116-C-1

107-C LIQUID WASTE DISPOSAL TRENCH

Potentially Contaminated Soil Column

Volume = 600' x 150' x 30' = 2.7×10^6 ft^3

Mass = 1.8×10^{11}g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	7.4×10^{-1}	1.3×10^{-1}
Sr-90	1.1×10^{1}	2.0
H-3	7.5×10^{0}	1.4
Eu-152	1.3×10^{2}	2.3×10^{1}
Co-60	1.8×10^{2}	3.2×10^{1}
Eu-154	6.7×10^{1}	1.2×10^{1}
Cs-134	2.2×10^{0}	4.0×10^{-1}
Cs-137	3.9×10^{1}	7.0
Eu-155	6.8×10^{0}	1.2
U	2.0×10^{-1}	3.6×10^{-2}
C-14	*	

Total Curies = 79

TABLE 2.7-21

100-B

B/C EFFLUENT LINE JUNCTION BOX LEAKAGE

Potentially Contaminated Soil Column

Description - Leakage area along the 105-C effluent line where a 54-inch crosstie line from the 105-B effluent line ties into a junction box.

Volume = 200' x 50' x 20' = 2.0×10^{5} ft^{3}

Mass = 1.4×10^{10} g

Radionuclide	Ave. pCi/g	Curies
Pu-238	5.2×10^{-2}	7.3×10^{-4}
Pu-239/240	1.9×10^{0}	2.7×10^{-2}
Sr-90	1.0×10^{1}	1.4×10^{-1}
H-3	8.6×10^{1}	1.2
Eu-152	1.2×10^{2}	1.7
Co-60	1.7×10^{2}	2.4
Eu-154	2.6×10^{1}	3.6×10^{-1}
Cs-134	1.1×10^{1}	1.5×10^{-1}
Cs-137	4.2×10^{2}	5.9
Eu-155	1.6×10^{3}	22
U	5.2×10^{-1}	7.3×10^{-3}

Total Curies = 34

TABLE 2.7-22

116-B-2-1

100-B EFFLUENT LINE LEAKAGE

Potentially Contaminated Soil Column

Volume = 200' x 40' x 20' = 1.6×10^5 ft^3

Mass = 1.1×10^{10}g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	1.2×10^0	1.3×10^{-2}
Sr-90	2.8×10^1	3.1×10^{-1}
H-3	2.7×10^1	3.0×10^{-1}
Eu-152	1.7×10^2	1.9
Co-60	1.5×10^2	1.7
Eu-154	4.7×10^1	5.2×10^{-1}
Cs-134	1.5×10^1	1.7×10^{-1}
Cs-137	7.9×10^2	8.7
Eu-155	3.0×10^3	33
U	4.2×10^{-1}	4.6×10^{-3}
	Total Curies =	47

TABLE 2.7-23

SOIL COLUMN ALONG EFFLUENT LINES TO 107-B BASIN

Radionuclide	Ave. pCi/g	Max. pCi/g
Pu-238	*	*
Pu-239/240	*	*
Sr-90	9.6×10^{-1}	1.7×10^{0}
H-3	NA	
Eu-152	9.7×10^{-2}	2.9×10^{-1}
Co-60	5.0×10^{-2}	1.5×10^{-1}
Eu-154	*	*
Cs-134	1.0×10^{-2}	3.0×10^{-2}
Cs-137	4.9×10^{0}	1.1×10^{1}
Eu-155	7.3×10^{-2}	2.2×10^{-1}
U	9.2×10^{-1}	9.2×10^{-1}

TABLE 3.3-1

BETA-GAMMA CONCENTRATIONS WITHIN THE 100 AREA MISCELLANEOUS CRIBS AND TRENCHES

Crib No.	Designation	Ave. Beta-Gamma (pCi/g)	Max. Beta-Gamma (pCi/g)
116-B-2	105-B Storage Basin Trench	9.0×10^{1}	1.6×10^{2}
116-B-3	105-B Pluto Crib	1.7×10^{3}	4.0×10^{3}
116-B-5	108-B Crib	1.6×10^{4} (H-3)	7.3×10^{4} (H-3)
116-B-6-1	111-B Crib #1	1.4×10^{3}	2.6×10^{3}
116-B-6-2	111-B Crib #2	1.6×10^{1}	1.6×10^{1}
116-C-2	105-C Pluto Crib	1.9×10^{2}	2.8×10^{2}
116-C-2-2	105-C Pluto Crib Sand Filter	4.2×10^{4}	7.3×10^{5}
116-D-1A	105-D Storage Basin Trench #1	3.3×10^{2}	9.0×10^{2}
116-D-1B	105-D Storage Basin Trench #2	2.0×10^{2}	1.1×10^{3}
116-D-2	105-D Pluto Crib[1]	NA	NA
116-D-3&4	108-D Cribs #1&2[2]	$<3.6 \times 10^{-1}$	$<3.6 \times 10^{-1}$
116-DR-3	105-DR Storage Basin Trench	1.7×10^{2}	3.1×10^{2}
116-DR-4	105-DR Pluto Crib	3.8×10^{1}	7.0×10^{1}
	117-DR Crib	$<1.7 \times 10^{-1}$ (H-3,C-14)	$<1.7 \times 10^{-1}$ (H-3,C-14)
116-KE-1	115-KE Crib	4.5×10^{5}	8.6×10^{5}
116-KE-2	1706-KER Crib	4.3×10^{3}	1.1×10^{4}
116-KW-1	115-KW Crib	4.5×10^{5} (H-3,C-14)	8.6×10^{5} (H-3,C-14)
116-F-1	Lewis Canal	3.4×10^{1}	6.4×10^{2}
116-F-3	105-F Storage Basin Trench	3.9×10^{-1}	5.8×10^{-1}
116-F-4	105-F Pluto Crib	2.9×10^{3}	9.0×10^{3}
116-F-5	Ball Washer Crib	7.7×10^{-1}	7.7×10^{-1}
116-F-6	1608-F Liquid Waste Disposal Trench	1.6×10^{2}	5.3×10^{2}

TABLE 3.3-2

PLUTONIUM CONCENTRATIONS WITHIN THE 100 AREA
MISCELLANEOUS CRIBS AND TRENCHES

Crib No.	Designation	Ave. Pu-238 (pCi/g)	Max. Pu-238 (pCi/g)	Ave. Pu-239/240 (pCi/g)	Max. Pu-239/240 (pCi/g)
116-B-2	105-B Storage Basin Trench	*	*	6.4×10^{-1}	1.4×10^{0}
116-B-3	105-B Pluto Crib	1.1×10^{-1}	3.3×10^{-1}	5.6×10^{0}	8.6×10^{0}
116-B-5	108-B Crib	*	*	*	*
116-B-6-1	111-B Crib #1	*	*	2.3×10^{0}	3.6×10^{0}
116-B-6-2	111-B Crib #2	*	*	*	*
116-C-2	105-C Pluto Crib	*	*	*	*
116-C-2-2	105-C Pluto Crib Sand Filter	1.9×10^{1}	1.6×10^{3}	1.9×10^{1}	1.5×10^{3}
116-D-1A	105-D Storage Basin Trench #1	*	*	1.4×10^{0}	6.1×10^{0}
116-D-1B	105-D Storage Basin Trench #2	*	*	4.8×10^{-1}	2.3×10^{0}
116-D-2	105-D Pluto Crib	NA		NA	
116-D-3&4	108-D Cribs #1&2	*	*	3.3×10^{-1}	3.3×10^{-1}
116-DR-3	105-DR Storage Basin Trench	*	*	1.3×10^{0}	3.8×10^{0}
116-DR-4	105-DR Pluto Crib	*	*	6.3×10^{-2}	1.9×10^{-1}
	117-DR Crib	*	*	*	*
116-KE-1	115-KE Crib	NA		NA	
116-KE-2	1706-KER Crib	*	*	2.1×10^{0}	6.1×10^{0}
116-KW-1	115-KW Crib	*	*	*	*
116-F-1	Lewis Canal	*	*	6.2×10^{-2}	9.9×10^{-1}
116-F-3	105-F Storage Basin Trench	*	*	*	*

TABLE 3.3-3

RADIOACTIVE INVENTORIES WITHIN THE 100 AREA MISCELLANEOUS CRIBS AND TRENCHES

Crib No.	Designation	Total Curies
116-B-2	105-B Storage Basin Trench	3.7×10^{-1}
116-B-3	105-B Pluto Crib	2.0
116-B-5	108-B Crib	3.0×10^{2} (Tritium)
116-B-6-1	111-B Crib #1	1.3
116-B-6-2	111-B Crib #2	1.2×10^{-2}
116-C-2	105-C Pluto Crib	1.8
116-C-2-2	105-C Pluto Crib Sand Filter	260
116-D-1A	105-D Storage Basin Trench #1	4.7
116-D-1B	105-D Storage Basin Trench #2	2.6
116-D-2	105-D Pluto Crib	<0.1
116-D-3&4	108-D Cribs #1&2	<0.1
116-DR-3	105-DR Storage Basin Trench	5.1×10^{-1}
116-DR-4	105-DR Pluto Crib	6.0×10^{-2}
117-DR Crib		<1 mCi
116-KE-1	115-KE Crib	<240 (H-3,C-14)
116-KE-2	1706-KER Crib	38
116-KW-1	115-KW Crib	240 (H-3,C-14)
116-F-1	Lewis Canal	3.4
116-F-3	105-F Storage Basin	2.1×10^{-3}
116-F-4	105-F Pluto Crib	3.5
116-F-5	Ball Washer Crib	9.2×10^{-4}
116-F-6	1608-F Liquid Waste Disposal Trench	6.5

Table 3.4-2

116-B-2

105-B STORAGE BASIN TRENCH

Potentially Contaminated Soil Column

Volume = 100' x 60' x 10' = 6.0×10^4 ft^3

Mass = 4.1×10^9 g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	6.4×10^{-1}	2.6×10^{-3}
Sr-90	3.5×10^{1}	1.4×10^{-1}
H-3	3.2×10^{1}	1.3×10^{-1}
Eu-152	2.0×10^{0}	8.2×10^{-3}
Co-60	2.2×10^{-1}	9.0×10^{-4}
Eu-154	2.6×10^{-1}	1.1×10^{-3}
Cs-134	3.3×10^{-4}	1.4×10^{-6}
Cs-137	1.9×10^{1}	7.8×10^{-2}
Eu-155	1.1×10^{0}	4.5×10^{-3}
U	2.2×10^{-1}	9.0×10^{-4}
		Total Curies = 3.7×10^{-1}

Table 3.4-3

116-B-3

105-B PLUTO CRIB

Potentially Contaminated Soil Column

Volumn = 30' x 30' x 20' = 1.8×10^4 ft^3

Mass = 1.2×10^9g

Radionuclide	Ave. pCi/g	Curies
Pu-238	1.1×10^{-1}	1.3×10^{-4}
Pu-239/240	5.6×10^{0}	6.7×10^{-3}
Sr-90	2.0×10^{1}	2.4×10^{-2}
H-3	3.0×10^{2}	3.6×10^{-1}
Eu-152	3.5×10^{2}	4.2×10^{-1}
Co-60	7.8×10^{2}	9.4×10^{-1}
Eu-154	6.1×10^{1}	7.3×10^{-2}
Cs-134	1.3×10^{-2}	1.6×10^{-5}
Cs-137	1.4×10^{2}	1.7×10^{-1}
Eu-155	2.1×10^{1}	2.5×10^{-2}
U	2.8×10^{-1}	3.4×10^{-4}

Total Curies = 2.0

Table 3.4-4

116-B-5

108-B CRIB

Potentially Contaminated Soil Column

Volume = 100' x 50' x 30' = 1.5×10^5 ft^3

Mass = 1.0×10^{10}g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	*	0.0
Sr-90	1.4×10^{-1}	1.4×10^{-3}
H-3	1.6×10^{4}	3.0×10^{2}
Eu-152	1.4×10^{1}	1.4×10^{-1}
Co-60	1.1×10^{1}	1.1×10^{-1}
Eu-154	4.5×10^{0}	4.5×10^{-2}
Cs-134	1.5×10^{-2}	1.5×10^{-2}
Cs-137	2.5×10^{-1}	2.5×10^{-3}
Eu-155	7.0×10^{-2}	7.0×10^{-4}
U	2.8×10^{-1}	2.8×10^{-3}
		Total Curies = 300

The soil column contaminated with Tritium is assumed to be 56' deep which is equivalent to the distance below grade where contamination is first detected down to the water table.

Table 3.4-5

116-B-6-1

111-B CRIB #1

Potentially Contaminated Soil Column

Volume = 25' x 25' x 20' = 1.3 x 10^4 ft^3

Mass = 8.9 x 10^8g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	2.3×10^0	2.0×10^{-3}
Sr-90	1.2×10^3	1.1
H-3	*	0.0
Eu-152	9.7×10^{-2}	8.6×10^{-5}
Co-60	7.3×10^0	6.5×10^{-3}
Eu-154	2.9×10^{-1}	2.6×10^{-4}
Cs-134	*	0.0
Cs-137	2.0×10^2	1.8×10^{-1}
Eu-155	8.2×10^0	7.3×10^{-3}
U	1.0×10^0	8.9×10^{-4}
		Total Curies = 1.3

Table 3.4-6

116-B-6-2

111-B CRIB #2

Potentially Contaminated Soil Column

Volume = 20' x 20' x 30' = 1.2×10^4 ft^3

Mass = 8.2×10^8g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	*	0.0
Sr-90	2.8×10^{-1}	2.3×10^{-4}
H-3	1.5×10^{1}	1.2×10^{-2}
Eu-252	2.9×10^{-1}	2.4×10^{-4}
Co-60	5.3×10^{-2}	4.4×10^{-5}
Eu-154	0.0	0.0
Cs-134	4.1×10^{-2}	3.4×10^{-5}
Cs-137	3.1×10^{-1}	2.5×10^{-4}
Eu-155	1.7×10^{-1}	1.4×10^{-4}
U	7.7×10^{-2}	1.1×10^{-5}
C-14	No data	

Total Curies = 1.2×10^{-2}

Table 3.4-8

116-C-2

105-C PLUTO CRIB

Potentially Contaminated Soil Column

Volume = 50' x 90' x 30' = 1.4×10^5 ft^3

Mass = 9.5×10^9g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	*	0.0
Sr-90	1.3×10^2	1.2
H-3	5.3×10^1	5.0×10^{-1}
Eu-152	1.5×10^0	1.4×10^{-2}
Co-60	4.1×10^0	3.9×10^{-2}
Eu-154	1.0×10^{-1}	9.5×10^{-4}
Cs-134	2.1×10^{-2}	2.0×10^{-4}
Cs-137	1.1×10^{-1}	1.0×10^{-3}
Eu-155	1.5×10^0	1.4×10^{-2}
U	1.1×10^{-1}	1.0×10^{-3}
	Total Curies =	1.8

Table 3.4-9

116-C-2-2

105-C PLUTO CRIB SAND FILTER

Potentially Contaminated Soil Column

Volume = 50' x 60' x 30' = 9.0×10^{4} ft^3

Mass = 6.1×10^{9} g

Radionuclide	Ave. pCi/g	Curies
Pu-238	1.9×10^{1}	1.2×10^{-1}
Pu-239/240	1.9×10^{1}	1.2×10^{-1}
Sr-90	3.6×10^{2}	2.2
H-3	7.3×10^{1}	4.5×10^{-1}
Eu-152	1.3×10^{3}	7.9
Co-60	3.7×10^{4}	230
Eu-154	1.0×10^{2}	6.1×10^{-1}
Cs-134	6.5×10^{1}	3.9×10^{-1}
Cs-137	1.7×10^{3}	10
Eu-155	1.1×10^{3}	6.7
	Total Curies =	260

NOTE: Average concentrations are based on samples A-25, A-30, C-22-1/2, and 3 & 4.

TABLE 4.1-2

100 AREAS APPROXIMATE SOLID WASTE BURIAL GROUND INVENTORIES THROUGH 1971

Location	Inventory (Ci) Half-Life > 1 Year
100-B	3,500 (Co-60)
100-D	4,000 (Co-60)
100-F	
Solid Waste (Production Reactors)	1,900 (Co-60)
Solid Waste (Research)	15 (Sr-90)
Sawdust Repository (Research)	15 (Sr-90)
	0.3 (Pu-239)
100-H	3,500 (Co-60)
100-K	14,000

TOTAL		Ci
	Co-60	26,900
	Sr-90	34
	Pu-239	0.38

TABLE 6.2-1

105 METAL STORAGE BASIN SLUDGE SAMPLES

Area	Location	Concentration (pCi/g) Pu-238	Pu-239/240	Sr-90	H-3	Eu-155	Cs-137	Eu-154	Co-60	Eu-152	U	Ni-63
105B	Techview Pit	$8.0x10^2$	$1.7x10^4$	$4.3x10^4$	$1.2x10^2$	$5.7x10^4$	$3.6x10^5$	$2.6x10^5$	$8.7x10^5$	$4.1x10^3$	$1.3x10^2$	
105B	Dummy Ele. Chute	$5.0x10^1$	$1.3x10^4$	$6.2x10^5$	$1.1x10^2$	$4.5x10^4$	$2.9x10^5$	$2.4x10^5$	$8.6x10^5$	$4.0x10^4$	$1.3x10^2$	
105B	Pickup Chute	$5.0x10^3$	$9.5x10^4$	$7.3x10^5$	$2.1x10^3$	$4.4x10^4$	$7.9x10^5$	$9.2x10^4$	$5.0x10^5$	$6.5x10^4$	$3.6x10^2$	
105B	Transfer Area	$1.9x10^2$	$4.0x10^3$	$2.2x10^4$	$6.1x10^1$	$1.8x10^4$	$1.1x10^5$	$1.6x10^5$	$9.5x10^5$	$7.8x10^4$	$9.4x10^1$	$1.2x10^6$
Ave.		$1.5x10^3$	$3.2x10^4$	$3.5x10^5$	$6.0x10^2$	$4.1x10^4$	$3.9x10^5$	$1.9x10^5$	$8.0x10^5$	$4.7x10^4$	$1.8x10^2$	
105C	Dummy Ele. Chute	$1.7x10^3$	$6.8x10^4$	$2.3x10^4$	$1.1x10^2$	$7.5x10^4$	$1.4x10^5$	$3.4x10^5$	$1.2x10^6$	$1.8x10^5$	$1.9x10^2$	
105C	Techview Pit	$7.9x10^2$	$3.3x10^4$	$1.8x10^4$	$2.0x10^2$	$2.1x10^4$	$2.5x10^5$	$1.0x10^5$	$6.4x10^5$	$4.8x10^4$	$4.6x10^1$	
105C	Transfer Area	$6.6x10^2$	$1.6x10^4$	$1.0x10^4$	$5.4x10^1$	$1.4x10^5$	$1.3x10^5$	$5.8x10^5$	$1.4x10^6$	$3.0x10^5$	$9.4x10^1$	
105C	Pickup Chute	$2.5x10^2$	$3.6x10^3$	$1.8x10^4$	$7.2x10^1$	$2.4x10^4$	$1.4x10^5$	$1.8x10^5$	$1.5x10^6$	$1.1x10^4$	$2.2x10^1$	$3.1x10^5$
Ave.		$8.5x10^2$	$3.0x10^4$	$1.7x10^4$	$1.1x10^2$	$6.5x10^4$	$1.6x10^5$	$3.0x10^5$	$1.2x10^6$	$1.4x10^5$	$8.8x10^1$	
105D	Pickup Chute	$9.0x10^1$	$2.1x10^3$	$4.6x10^3$	$3.1x10^2$	$1.4x10^5$	$5.4x10^4$	$3.7x10^5$	$1.0x10^6$	$2.8x10^5$	$4.3x10^1$	
105D	Transfer Pit	$1.8x10^2$	$1.1x10^3$	$2.2x10^4$	$3.6x10^2$	$5.1x10^4$	$6.3x10^4$	$2.6x10^5$	$1.0x10^6$	$1.9x10^5$	$3.0x10^1$	
105D	Northwall	$8.8x10^1$	$4.9x10^2$	$7.5x10^3$	$4.9x10^2$	$6.4x10^4$	$2.1x10^4$	$2.2x10^5$	$1.1x10^6$	$1.5x10^4$	$1.9x10^1$	$2.0x10^5$
105D	Techview Pit	$5.0x10^1$	$9.4x10^2$	$6.4x10^3$	$5.4x10^2$	$3.5x10^4$	$3.1x10^4$	$1.7x10^5$	$5.3x10^5$	$1.7x10^5$	$2.2x10^1$	
Ave.		$1.0x10^2$	$1.2x10^3$	$1.0x10^4$	$4.2x10^2$	$7.2x10^4$	$4.2x10^4$	$2.6x10^5$	$9.1x10^5$	$1.6x10^5$	$2.8x10^1$	
105DR	Techview Pit	$1.0x10^2$	$1.4x10^3$	$8.5x10^3$	$7.6x10^2$	$4.2x10^4$	$6.4x10^4$	$2.8x10^5$	$1.3x10^6$	$2.2x10^5$	$4.2x10^1$	$4.3x10^5$
105DR	Wash Pad	$3.6x10^1$	$7.1x10^2$	$3.1x10^0$	$4.5x10^2$	$1.3x10^4$	$5.0x10^4$	$6.7x10^4$	$4.8x10^5$	$3.6x10^4$	$1.3x10^1$	
105DR	Pickup Chute	$1.0x10^2$	$3.0x10^3$	$6.3x10^4$	$3.2x10^2$	$2.3x10^4$	$3.1x10^5$	$1.3x10^5$	$6.4x10^5$	$5.5x10^3$	$4.2x10^1$	
105DR	Transfer Area	$5.3x10^1$	$1.1x10^3$	$1.8x10^4$	$2.0x10^2$	$3.3x10^4$	$5.3x10^4$	$2.2x10^5$	$9.9x10^5$	$5.3x10^4$	$1.3x10^1$	
Ave.		$7.2x10^1$	$1.6x10^3$	$2.2x10^4$	$4.3x10^2$	$2.8x10^4$	$1.2x10^5$	$1.7x10^5$	$8.5x10^5$	$7.9x10^4$	$2.8x10^1$	

TABLE 6.2-2

105 METAL STORAGE BASIN - WATER SAMPLES

Area	Location	Concentration (pCi/L)									
		Pu-238	Pu-239/240	Sr-90	H-3	Eu-155	Cs-137	Eu-154	Co-60	Eu-152	U
105DR	Storage Basin	$5.3x10^0$	$2.7x10^1$	$8.7x10^3$	$4.1x10^4$	$4.3x10^2$	$8.0x10^3$	*	$2.0x10^2$	*	$6.3x10^0$
105D	Storage Basin	*	$1.8x10^1$	$3.7x10^3$	$4.0x10^4$	$9.2x10^2$	$1.3x10^4$	*	$4.7x10^2$	*	$7.0x10^0$
105B	Storage Basin	$9.7x10^0$	$8.6x10^1$	$1.4x10^5$	$6.7x10^3$	$5.0x10^2$	$5.5x10^5$	*	$6.3x10^3$	*	$6.4x10^1$
105C	Storage Basin	$1.0x10^0$	$1.5x10^1$	$3.0x10^4$	$6.8x10^3$	$7.8x10^2$	$1.2x10^4$	*	$5.3x10^2$	*	$4.4x10^1$

TABLE 6.2-3

Radionuclide Inventories of 105 Basin Sludge

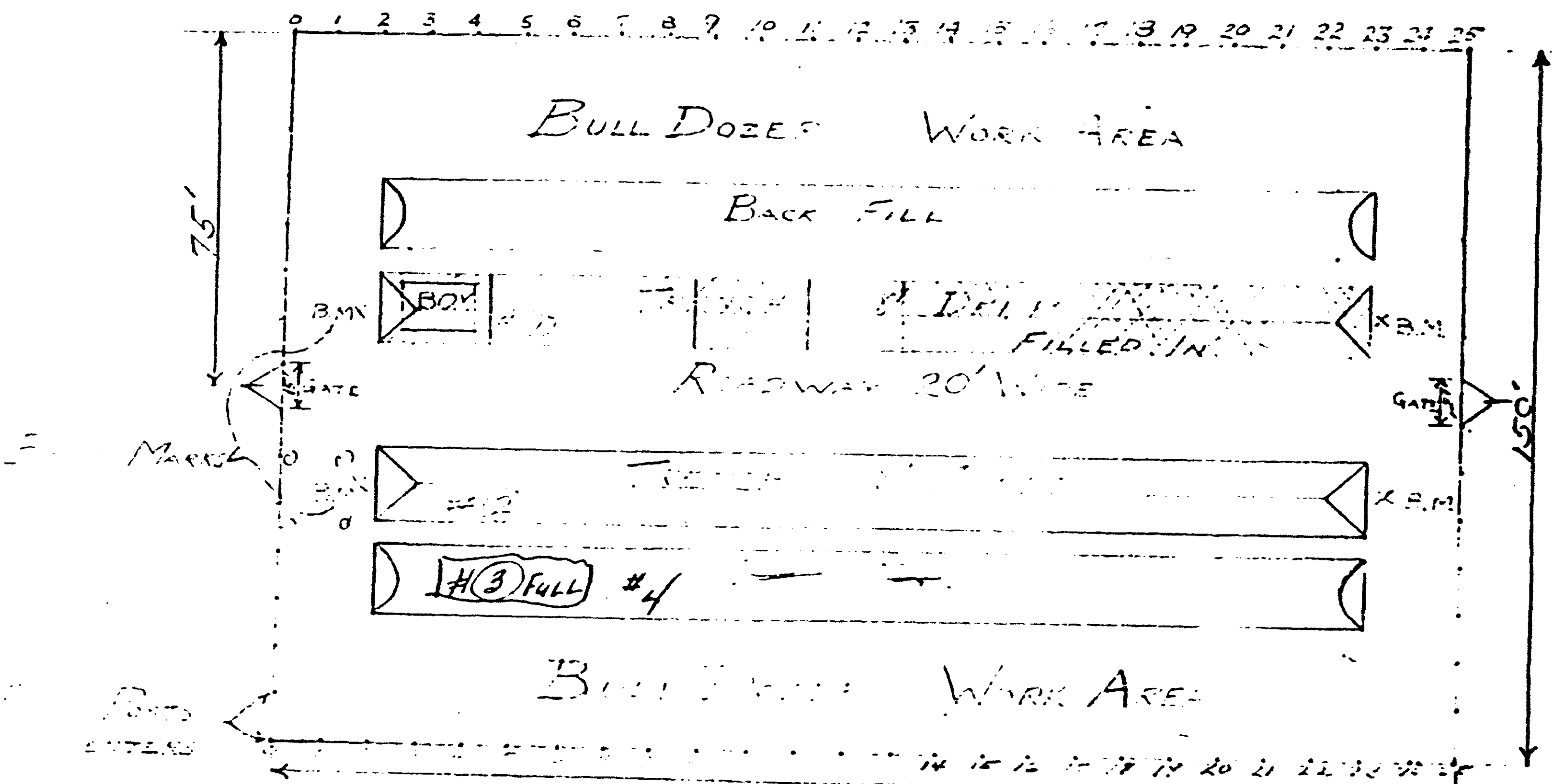
Sludge Radionuclide Inventory (Curies)

Basin	Pu-238	Pu-239/240	Sr-90	H-3	Eu-155	Cs-137	Eu-154	Co-60	Eu-152	U	Ni-63	Total (Ci)
105-B	0.075	1.6	18	0.0030	2.0	20	9.5	40	2.4	0.0090	60	150
105-C	0.042	1.5	0.85	0.0055	3.2	8.0	15	60	7.0	0.0044	16	110
105-D	0.0050	0.060	0.50	0.021	3.6	2.1	13	46	8.0	0.0014	21	94
105-DR	0.0036	0.080	1.1	0.022	1.4	6.0	8.5	42	4.0	0.0014	32	95

APPENDIX E

105-B BURIAL GROUND LOG

BURIAL GROUND 100-B PLAN



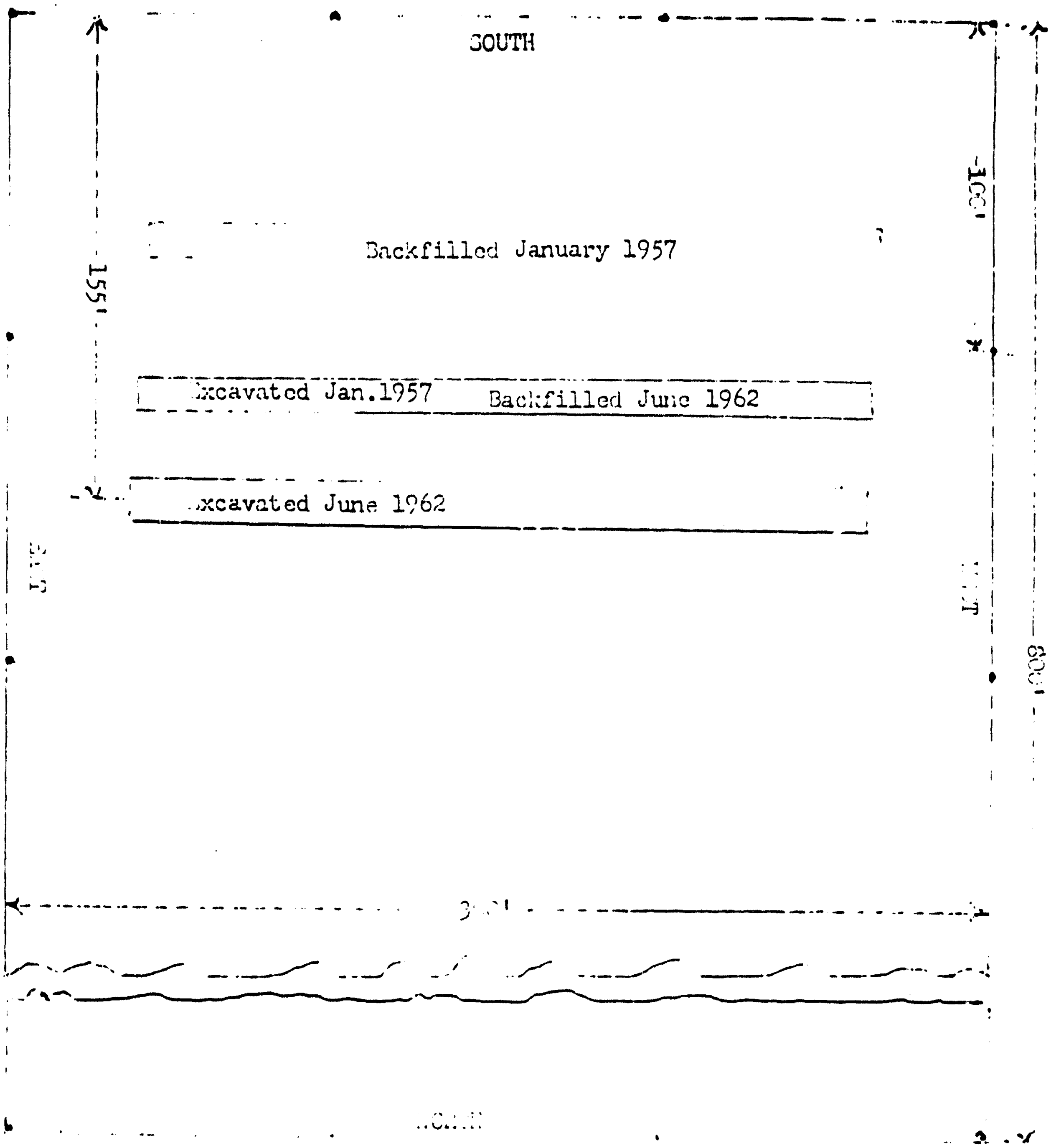
[illegible] BENCHMARKS ON [illegible] [illegible] NUMBER [illegible] POSTS (0-25) AS SHOWN FOR POSITIONING MATERIAL IN TRENCH [illegible] FOR RECORD - MAKE SO TRENCH ONLY, NO. TRENCH FOR FUTURE EXPANSION - BENCHMARKS TO BE CONCRETE 12" SQUARE, 6" ABOVE GROUND LEVEL & 4' IN GROUND, INSERT 6" SQUARE BRASS PLATE ON TOP & MARK.

100-B

BURIAL TRENCH

A new burial trench for burial of tubing,dummies,gunbarrels and other "Hot" materials is expected to be excavated the last week in June,1962.

Cribs fabricated from used railroad ties will be installed. The cribs will be about twenty feet deep,the width, eight feet outside dimensions. Three cribs will be fabricated.

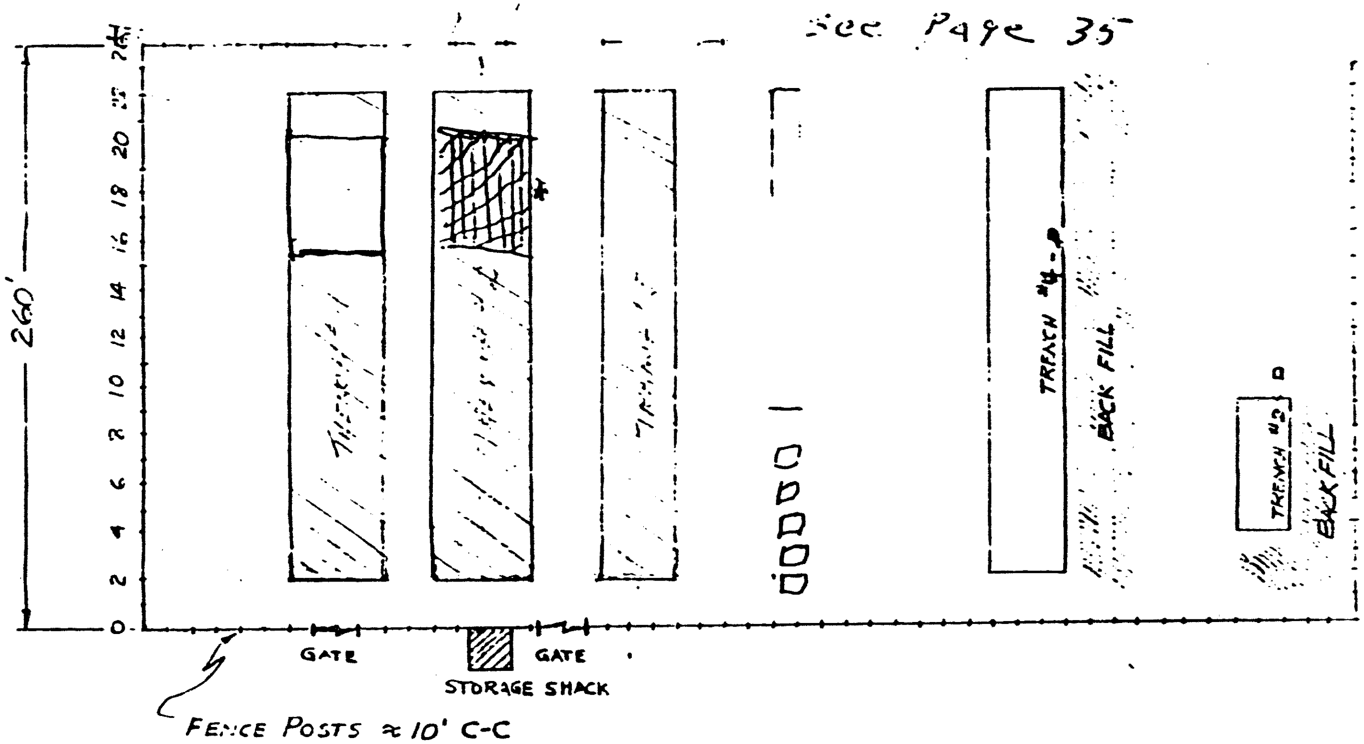


..L.Chubb June 26,1962

53

During parts of Sept.and Cctober 1957,sections 17 thru 22 of #2 trench were excavated and the Dummy material removed for reclamation. The trench was then backfilled.The work was carried on under the direction G.A. Peterson,Day Supv.

See Page 35



* Dummy material reclaimed 1957

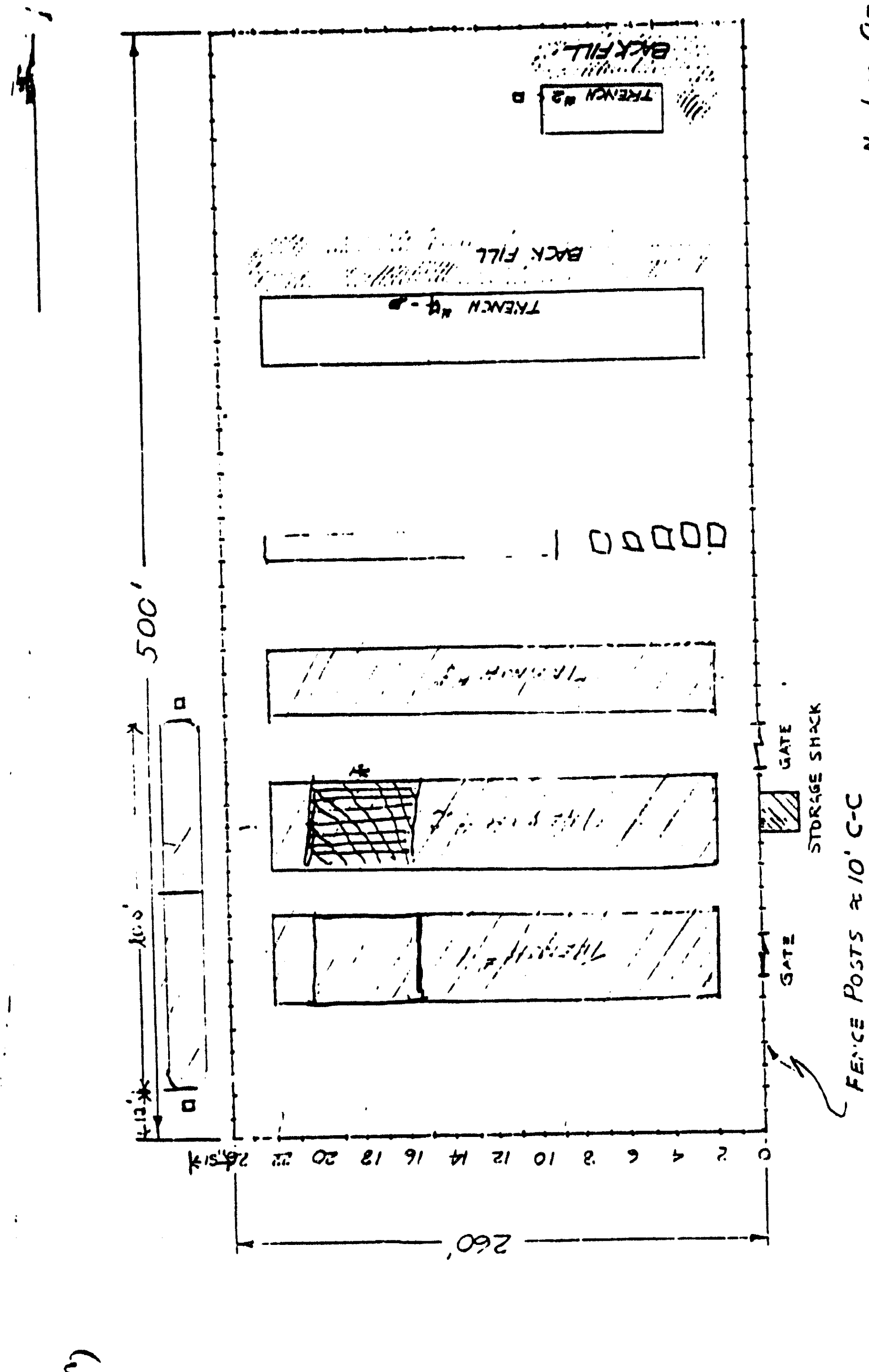
105-B BURIAL GROUND

Numbers 0-26 represent Fence posts. To be used for recording position of material buried in trenches.

Scale: 1/4" = 20'
8-8-53
RHL

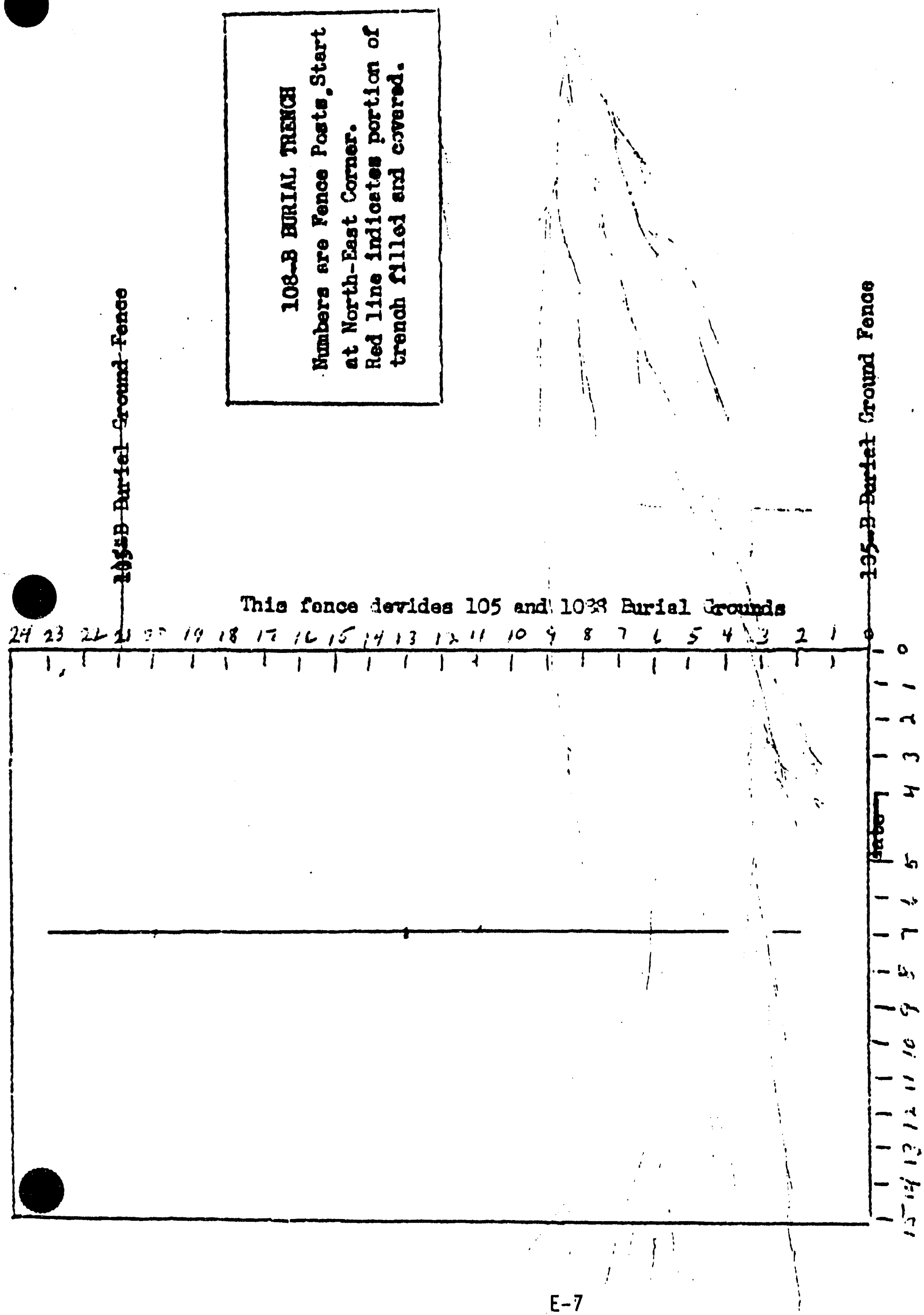
Numbers 0-26 represent fence posts. To be used for recording position of material buried in trenches.

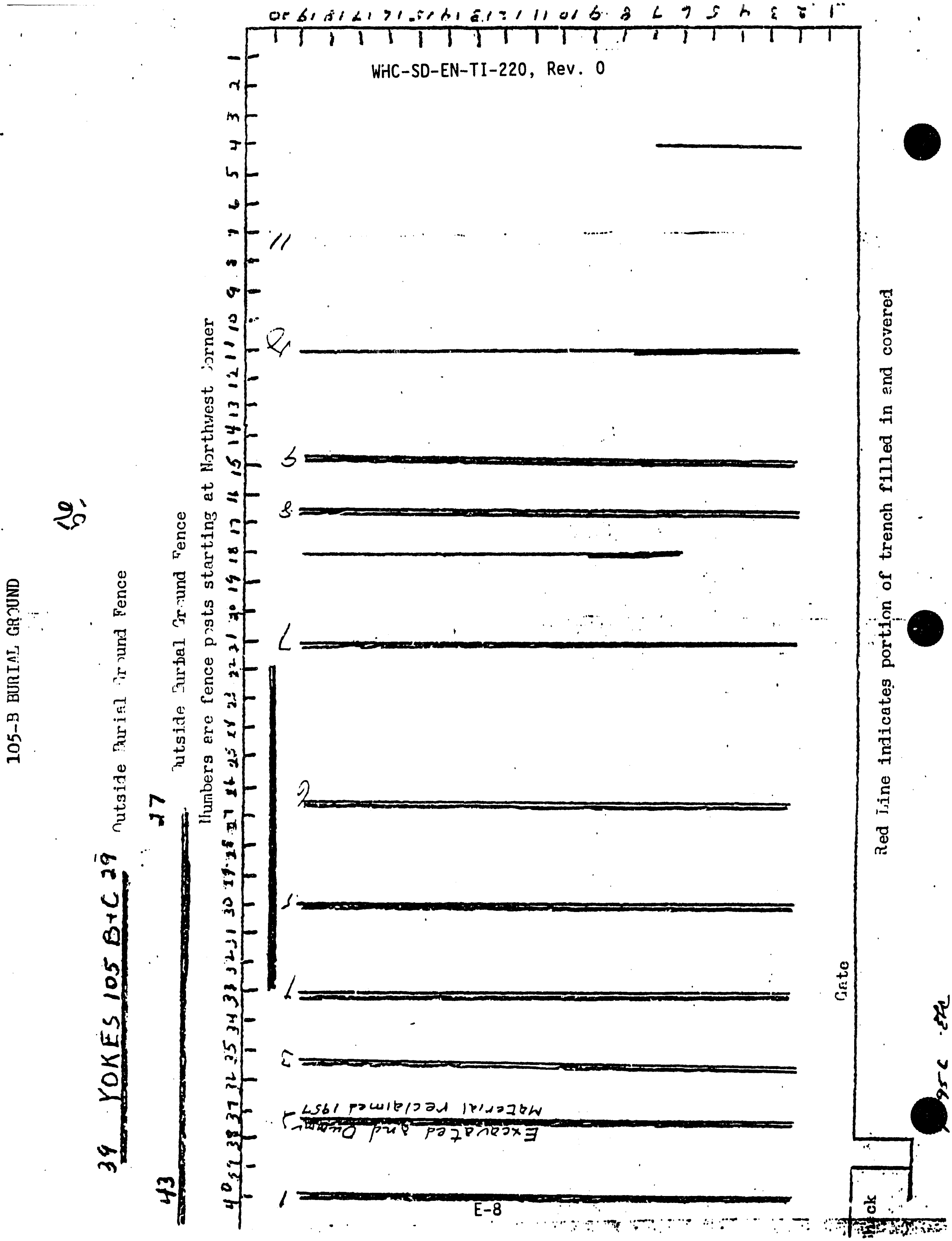
105-B BURIAL GROUND



* Dummy material reclaimed 1957

Scale: 1/4" = 20'
8-8-53
RHL


108-B BURIAL TRENCH
Numbers are Fence Posts, Start at North-East Corner.
Red line indicates portion of trench filled and covered.
105-B Burial Ground Fence
135-B Burial Ground Fence
This fence devides 105 and 108B Burial Grounds
Gate


105-B BURIAL GROUND
Outside Burial Ground Fence
Outside Burial Ground Fence
Numbers are fence posts starting at Northwest Corner
Red Line indicates portion of trench filled in and covered
Gate
YOKES 105 B+C 39
Excavated and Dump
Material reclaimed 1957

TITLE: SPECIAL LOG OF MATERIAL TAKEN TO BURIAL GROUNDS

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BOOK #1

April 4, 1949

To: J. C. Chatten

From: D. S. Lewis DSL

Subject: TECHNICAL USE OF BURIAL GROUND

Burial of scrap from the Technical operations in the 105-B area will be made according to the following procedure:

1. The operation will be covered by a Special Work Permit issued by the Technical Division.

2. All scrap will be buried at a predesignated section of the burial trench.

3. A "P" Division representative will open the burial ground gates and will witness the burial from outside the fence.

4. The Technical representative in charge of the burial will supply the "P" Division representative with readings at the edge of the trench before and after the burial.

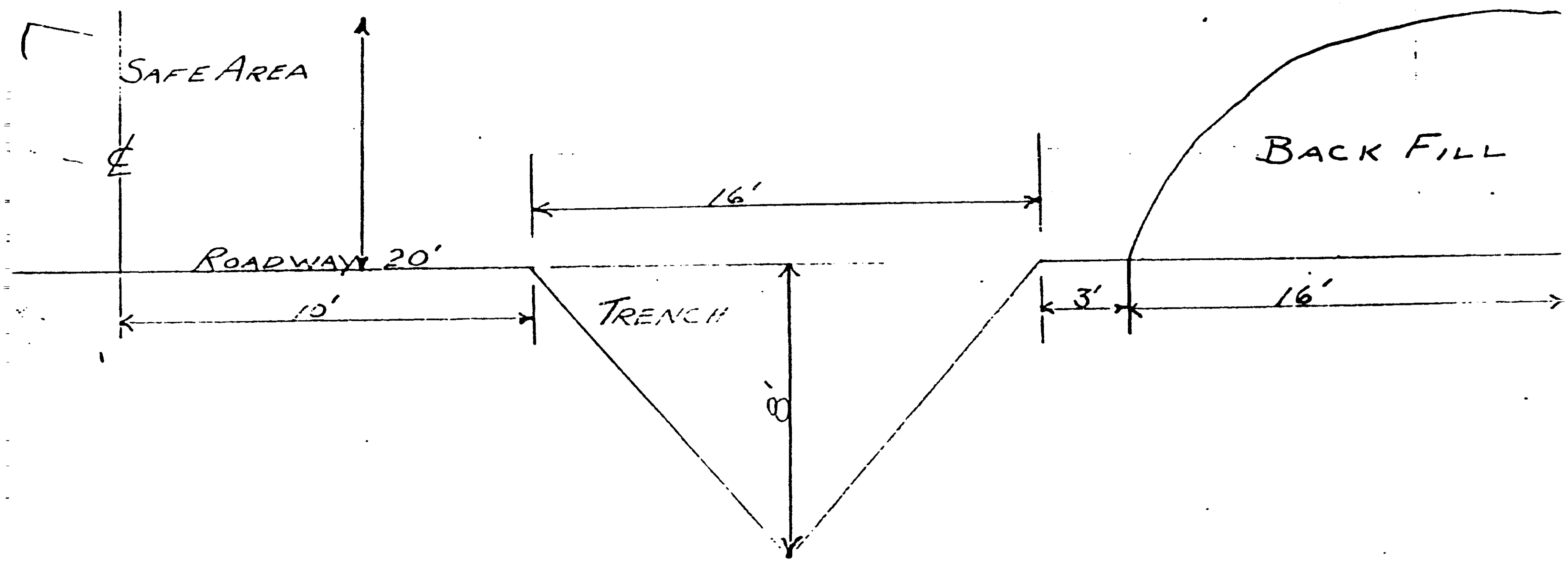
5. Arrangements for burial should be made with the "P" Division Area Supervisor by 4:00 P.M. the previous day.

DSL:ges

cc: Area Supervisors
L. D. Turner
~~File~~

DSL

BURIAL GROUND 100-B
ELEVATION



Date	Shift	Trench #	Section # in Trench	Kind of Material & No. of Pieces	Amt. Covered	Reading After Cover	Reading 105	Reading Trench Gnd Level	Supv.	Supv.
9/30/46		1	8-11	Misc. short length						[illegible]
		–	..	of pipe, papers, rope	0	2 1/2			K.P.	RDM
10/1/46		1	8-11	35 Rcfs, 15 lead.						RDM
		..	..	2 tube section						RBJ
				1 hook						
		..	..	1 ~~pr. tongs~~			500	30	K.P.	F.S.
10/1/46		1	8-11	15 Rcfs, 3 lead.						
				1 tube section			200	44	K.P.	
		B.D.Z.		1 pr. tongs						
		..		1 underwater mirror						
10/2/46		1	9-10	5 wood dummies						
				1 lead bottom tray						
				1 steel plate			1500 MR 750 MR	55	K.P.	
				1 weighing tray						
				1 special attachment						
				for manipulator						
				1 spacing rack (wood)						

10/24/46 Filled in approximately 25 lineal feet of south trench and reduced maximum reading in enclosure to 22 M.R. Readings up to 130 M Reps were found where contaminated material from storage area was dumped.

Date	Shift	Trench #	Section # in Trench	Kind of Material & No. of Pieces	Amt. Covered	Reading After Cover	Reading 105	Reading Trench Gnd Level	Supv.	Supv.
9/30/46		B.D.Z.		1 pr. tongs						
		..		1 underwater scoop						
		..		1 underwater chamber			500			
		..		2 underwater lights						

2

DATE	SHIFT	TRENCH #	SECTION # IN TRENCH	KIND OF MATERIAL & # OF PIECES	AMT. COVERED	READING AFTER COVER	READINGS 105	READINGS TRENCH GND. LEVEL	SUPV.	D.
11/14/46	D	2	12-13	1 Viewer	0	10	125 mr/hr 12.5 Mr	25	J.M.	~~#~~9
11/15/46	A	2	12-13	Scrap from basin 2 pr tongs some 6" hose Misc. conduit wrapped in paper	0	40	52 Mr		HEB	9 12 12
11/21/46		1	6	10 Cords and chains from sub. lights	0	15	150	15	K.P.	
11/21/46		B.D.Z.		2 Sub. lights complete						
11/14/46	D	2	12-13	50 perf alum pieces brooms, boards 100 wood dummies	0	15	125 mr/hr 12.5 Mr	25	JM	
12/13/46	A	1	12-13	10 lead bricks 1 Concrete block Misc. trash	0	2	150 mr/hr	<3	H.E.B.	
7-7-47	D/4	1	10-11	2 Pieces of Process tube 4 plates/18 bolts from Storage area scales	0	15	15		ESW	
12/16/47		2	17-18	Process tubing from Basin.	0		50 (at working distance)	50	RC	
10/16/47		2	15-16	Process Tubing from Basin.	0		35	100	RC	

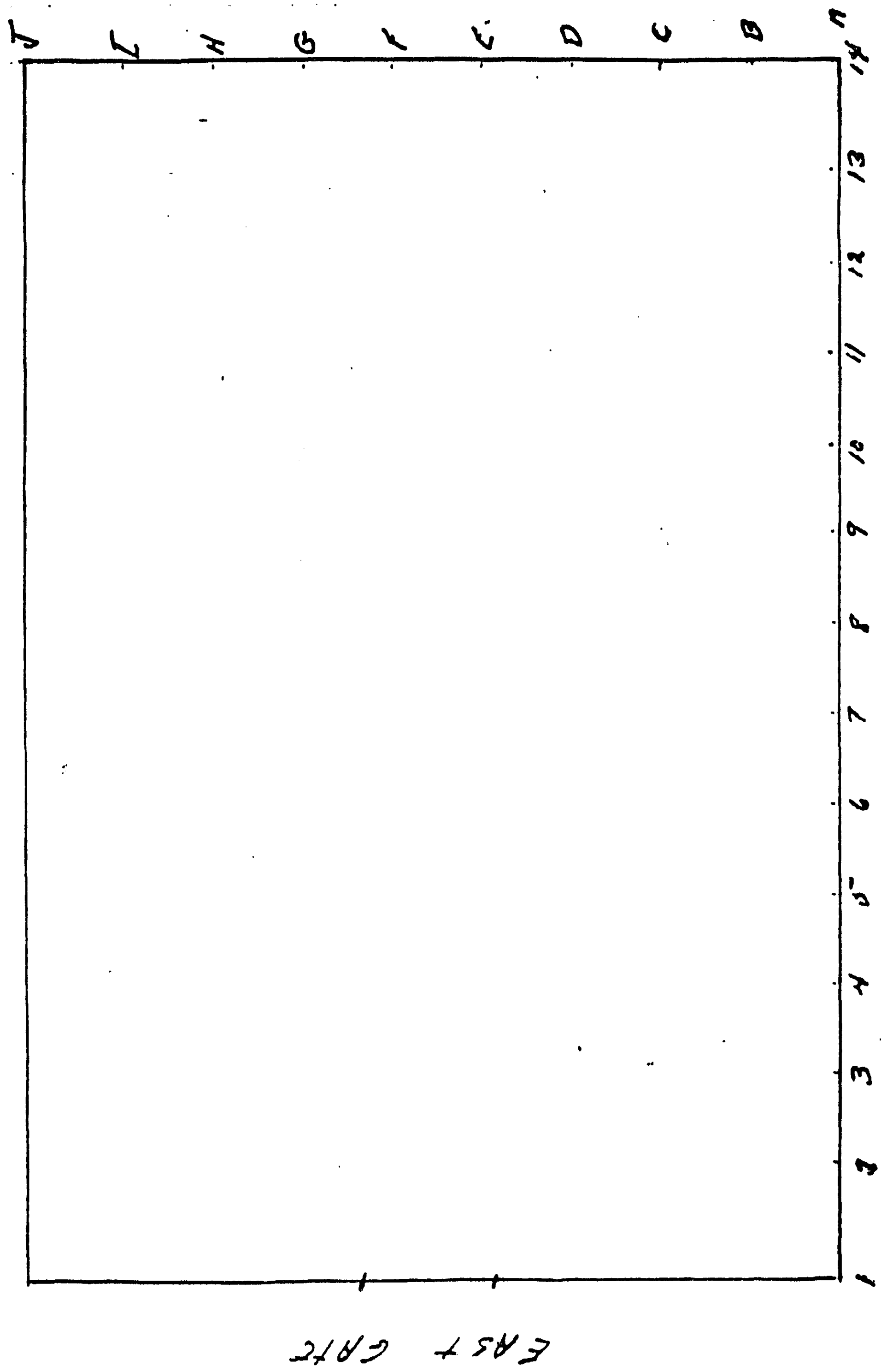
DATE	SHIFT	TRENCH #	SECTION # IN TRENCH	KIND OF MATERIAL & No. OF PIECES	AMT. COVERED	READING AFTER COVER	READINGS 105	READINGS TRENCH GND LEVEL	SUPV.
~~#~~ 7-16-48	B	#2	18	air Driven Popover Cutter	None	~~#~~	6	15	Ed.
9-9-48	D	2	3-10	A Hole Thimble (1 piece)	~~#~~	~~#~~	500	10	RDM
"	"	"	"	B Hole Thimble (2 Sections)	3"	25	4000	40	RDM
12/11/48	C	2	10	1356 pcs. 6" Lead	None	—	210	37	RBJ.
12-26-48	B	2	6	534 pcs lead, 5600 pcs. PERFS	None		20	20	F.S.

SEE PAGE 4, 5, 6, 9

4

LOCATION DIAGRAM FOR BURIAL GROUND 6-23-49

7-3-



BURIAL GROUND INVENTORY	LOCATION
7-3-49 1) FENCE POSTS	1 B
2) PLYWOOD 4'X8'X½"	1E
3) ELECTRIC PUMP	1 F
4) DANGER ZONE SIGNS	2 J
5) CONT. WASTE CAN	3 J
6) PINCH BAR	1 G
7) SHOVEL	1 H
8) LEAD BRICKS (446)	1 J
9) SAW HORSES (10)	2 G
10) TUBE BOX	2 I
11) BUCKETS (6)	3 H
12) COIL OF ROPE	4 H
13) CHUTE BOXES	8 I
14) PAPOOSE BREAKER	11 J
15) BOX OF FLANGES	12 J
16) ROLL OF CABLE	13 F
17) PIG TAILS	12 J
18) SHIELDING PLUG	13 J
19) TARP & UNDERWATER LIGHTS	14 J
20) CHARGE MACHINE CARRIAGE	14 I
21) Iron gates stored sec. 15	

6

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blank in log book.
ALL 2/24/92

9/15/51 stored 7 Iron gates sec. 15

8

7-12-49	50 Pb. brick to Tech, 300 area
~~7-10-49~~	~~1690#~~
	stored in Burial ground
2-10-50	1 pipe
	1 Elbow
	2 saw horses
	railings from top of Unit from around V.S.R.s
2-14-50	3 pipes & Connections 20' long from basin pump
"	H_2O pumps Gas #H₂O 49-3475
	Elec #H.E.W. 14775
	Elec. #H.E.W. 80859
	Lumber, Ropes, scaffolds, stored on lumber rack section 7 & 8
2-27-50	pumps # H 0 847 and # H.E.W. 14775 Delivered to 200 west area
2-27-50	stored Burial gd.
	Metal scaffolding South end B.G.
	placed on wooden platform.
5-26-50	Tube plate stored South east Corner belongs to tech.
6-6-50	stored Water pump & Elec motor from 1904 USA HEW 46109 P.H. Chamber & pipe (S W Corner)
6-22-50	2nd section of thimble stored in Cool and Reading 5000 M.Rs at 15" thru can (for tech)
8-31-50	removed (2 Coil of Rope 1 lg. 1 small) (2 Rods) (4 angle irons braces) (4 scaffolds) (11 Boards)

Date	Shift	Trench No.	Section No. in Trench	Kind of Material & no. of pieces	Amt Covered	Reading after Cover	Reading 105	Reading Trench ground level	Super.
7/13/49	A	2	10	52-PA's. - 53 S.A. 151 Lead	-	-	2509	280	
7/28/49	B	2	10	250 PA's. 505 LEAD	-	-		290	
10/2/49	B	2	5	155-PA 307-LEAD	-	-	100	300	JES
10-2	D	2	5	251 Pb; 121 S.Al 244 T. Al Pieces of tubing	-	-	250	300	MJL
10/3/49	B	2	5	585 perfs 18 lead-	-	-	250	300	JES
10-10	D	2	11	282 - PB. 179 - SA 136 - PERFS.	-	-	200	125	MJL
10/11/49	D	2	19	108 - PB 155 - SA 552 - PERFS.		-	700	250	WC
10/11/49	D	2	9	5 VSR Guides 5 " TIPS 5 " RODS				500	WC
11/1/49	Day	2	9	1 VSR guide				200	E.K.
11/11/49	DAY	2	20	8" perfs 569 pcs 4" lead 753 "	-	-	400	190	ac
11-17-49	DAY	2	1	6 Boxes of Trash			2	2	
11-25/49	DAY	2	12	Rod guide	-	-	2000	170	ac
11/25/49	DAY	2	12	Rods	-	-	7600	170	ac
11/25/49	DAY	2	1	trash.	-	-	76	170	ac
12/9/49	DAY	2	1	trash	-	-	0	1	ac
12/20/49	DAY	2	1	6 Boxes of trash	-	-	2	1	ac
12/30/49	DAY	2	19	364 pcs lead 2,307 pcs perfs	-	-	12	300	ac
1/3/49	DAY	2	19	1 LOAD DIRT.	480	200	-		
1/13/50	A	2	1	Trash & HM Chambers	—	—	50		WC
11	A	2	22	1 Quadrant Chamber	—	—		70	WC
2/10	B	2	9	2 guides + 5 rod tips	-	-	-	-	ac
2/10	B	2	1	Boxes of trash	-	-	2	120	ac
2/17/50	DAY	2	19	8" perfs 1887 pcs 4" lead 1,528 pcs	-	-	12	180	ac
3/3/50	DAY	2	19	Process tube	-	-	43	330	ac
3/3/50	DAY	2	19	8" Perfs 1X6 pcs 4" lead 3,676 pcs	-	-	45	330	ac
4/7/50	DAY	2	19		-	-	12	750	ac

DATE	SHIFT	Trench No.	Section No of Trench	Kind of Material No of pcs	Amount Covered	Reading after Cover	truck cab 105	Ground level Trench	Supv
4/13/50	DAY	2	19	8" perfs 3,568 pcs 4" lead 931 pcs	NONE	–	20	170-600	
5/6 5/6/50	B	2	19	8" S.A. 294 Pcs. 6" LEAD 574 Pcs 3 PROCESS TUBES	NONE	–	80	300	DAR
5/8/50	DAY	2	19	1 PROCESS TUBE 8" perfs 774 pcs 6" lead 365 pcs 1 process tube	NONE " " "	–	20 " " "	300 " "	ac.
5/9/50	DAY	2	19	2 PROCESS TUBES 1663 1 SPRACKAT Chain 8" perfs 114 pcs. 6" lead 105 pcs.	" " "		35 35 35 35	150 900 150 900 150 900	ac ac ac
5/26/50	DAY	2	19	1 Process Tube 8" perfs 625 pcs 6" lead 110 pcs	" "		20 20	350 490 350 490	ac
6/1/50	DAY	2	WEST END	5 - 6' foot section of thimble	all	400		300 400	ac
7/14/50	DAY	2	19	6" lead 2,012# - 658 pcs	NONE		6¼ 2"	400-450	ac.
7/19/50	D	2	7	Ionization chamber 494 A.D.	NONE		40 MR	450	J.F.
7/21	DAY	2	3	SCRAP ALUMINUM PERFS FROM MAINT. SHOP	NONE		0	26	J.F.
7/21	DAY	2	15	OXIDE FROM 111 SLUG RUPTURED IN 100-D	ALL		25 R	100	J.F.
8/9/50	DAY	2	19	2 PROCESS TUBES 8" perfs - 477 pcs 6" lead - 333 pcs	NONE NONE		10	400-400	Dar
8/18/50	DAY	1	19	8" perfs - 191 pcs 6" lead - 94 pcs	NONE		7	100-390	ac
8/30/51	DAY	2	1	15 loads of dirt to fill Cave 43 feet to trench end	NONE.		NONE	" "	ac
9/15/51	DAY	2	19	1991# lead 497 pcs 546# perfs 1400 pcs	NONE		10	380-450	ac.
11/3/50	DAY	2	19	1635 perfs. 817# 515 lead pcs. 1729#	NONE		6	25	E.B.
11/6/50	DAY	2	19	1900 Perf pcs 951# 468 lead pcs. 1571#	NONE		4	800	E.B.
11/13/50	DAY	2	21 ~~7~~	1223# lead dummies 364 R 596# SOL. AL. 1175 Pcs.	NONE		26	400	E.B.
1/18/51	DAY	2	7	3 SHIM STOCK CHAMBERS #1-484 AD, #2-484 AD, #3-484 AD	NONE		NONE		DAR.
1/25/51	DAY	2	7	1375# lead dummies 364 589# solid dummies 745	NONE		26	500	E.B.

See page (13)

Oct 9 to 22 inclusive.
Buried #025 Nozzles, 1500 Double Diameter steel, 7000 5" steel, 4000 4" steel, & 1500 lead pcs. This Material buried in seperate trench Maximum reading at edge of Trench 4 MR/hr.

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ALL 2/24/92

Date	Shift	Trench	Section of Trench		Amount covered	reading after covered	Truck cap	Ground level Trench	
2-5-51	DAYS	2	19	lead dummies #263 - 78 pcs solid alum 684 - 872 pcs Perfs 23 - 54 pcs	NONE	–	6	250	E.B.
2-15-51	Days	2	8	2 loads of dirt Reading before covered 400		50		50	E.K
2-23-51	DAYS	2	20	474 lead, 881 Sol Al.	NONE		8	300	E.B.
3-23-51	DAYS	2	20	830 LBs SOL. AL. 605 LBs Lead 1050 SOL. AL. 180 Lead 343 Pcs lead. 25 PERFS.	NONE		15	1000	
4-17-51	DAYS	2	20	737 Pcs. S.A. 258 Pcs. LEAD- 103 PERFS.	NONE			400	Dek
4-18-51	DAYS	2	20	456 Pcs. SOL AL. Tube Sections	NONE			500	Dek
4-28-51	8-4	2	20	H.M. Chamber - EP#12 - 48 YARD	NONE			400	C.D
4-28-51	8-4	2	20	H.M. Chamber #. NONE	NONE			400	C.D
5-4-51	8-4	2	21	52 # solids 65 Pcs. tube sections	NONE			1000	E.B.
6-8-51	8-4	2	21	Solid A.L. #388 491 pcs Poison #525 166 Pcs Lead #168 50 Pcs	None		<6	150	E.B.
6-8-51	8-4	2	21	1 bucket Process tubing	NONE		<6	150	E.B.
6-29-51	8-4	2	15	lead 117# 35 pcs Solid alum 200# 250 pcs	NONE		<6	320	E.B.
6-29-51	8-4	2	15	Tube sections	NONE		<6	320	E.B.
12-14-51	8-4	3	22	LEAD - #1403 - 417 pc. S-A - #1179 - 1481 pc. Poison #1881 - 560 pc.					R.S.
12-21-51	8-4	3	22	LEAD - #7010 - 300 pc - Poison S.A - #1070 - 1354 pc - #1974 - 557 pc	None	–	<6		R.S.
2-1-52	8-4	3	22	LEAD - #258 - 76 pc. Poison S-A. 984 pc. #778 #1830 - 395 pc	NONE	–	10	1000	R.S.
3-7-52	8-4	3	21 22	LEAD # 695 - 204 pc. Poison - 600# 118 pc. S-A # 240 - 329 pc. 1 - PROCESS TUBE	NONE	–	10	1850	R.S.
3-14-52 3-21-52	8-4	3	21 22	PERFS - 1602 pc - S.A 4447 pc. LEAD - 545 pc - 2 - PROCESS TUBE	NONE	–			R.S.
9-15-52	8-4	3	21	PERFS - 962 pc - POISON 470 pc.	None		2-R	1200	R.S.
10-13-52	"	3	22	S.A - 2860 pc - PROCESS TUBING	"		2-R	1700	R.S.
* 11-3-52 ~~10-28-52~~	8-4	P-10	all	#9 HSR Thimble	all but TIP	–	<6 at time	–	R.C.
* 10-28-52	8-4	3	22	3692 - 1392 - 4378 - 3764 tube sections (5 buckets)	None	–			
* "	"	"	22	1 Westinghouse dummie train	None				
* "	"	"	22	(9d) (1025) 2 buckets Sol. A & PERFS 475#					
* 11-28-52	"	"	22	3 buckets process tubing	None	–	25	1R	JH

* - RFP FORM SENT

	SHIFT	TRENCH	AMOUNT	
7-7-53	DAY	SPECIAL TRENCH North & South	3	Water Sampling pumps
				Stainless steel piping from Ball X
				Duct Work from 108 Bldg.
				Scrap metal
				Scrap lumber
				Scrap Waterhose
				Fire hose - damaged & Contaminated
				Front face gun barrel
				(Above all Covered & trench marked)

DATE
* 12-3-
* 12-3-
* 12-5-
* 12-9-
* 12-9-
* 12-10-
* 12-10-
* 12-10-
* 12-11-
* 3/13/5
* 3/16/5
* 4/5/5
* 4/5/5
* 5/16/5
* 5/15/5
* 5/18/5
* 5/20/5
7/22/5
7/22/5
7/22/5
7/30/53
8/24/5
7/31/5
7/31/5
8/7/5
10-16-
*

DATE	SHIFT	TRENCH	SECTION OF TRENCH	BURIED	AMOUNT COVERED	READING AFTER COVERED	TRUCK CAB	TRENCH READINGS	BY
*12-5-52	DAY	3	22	S.A. - 912 pc's PERFS - 37 pc's LEAD - 13 pc's	None	-	10	800	J.H.
*12-3-52	DAY	3	22	S.A. - 1045 pc's PERFS - 13 pcs 1 "PIGTAIL"	None	-	25	600	JH
*12-5-52	DAY	3	22	PERFS - 17 pcs	None	-	6	450	JH
*12-9-52	DAY	3	22	So. AL. - 79 pcs PERFS - 579 pcs	None		15	-	
*12-9-52	DAY	3	22	1 process tube	None		-	500	JH
*12-10-52	DAY	3	22	2 ROD TIPPS					
*12-10-52	DAY	3	22	70 PERFS 84 So. AL.					
*12-10-52	DAY	3	22	1 process tubing	None		25	600	JH
*12-11-52	DAY	3	22	1 Rod tip	ALL TIPS		15	100	JH
*3/13/53	DAY	4	16	225 S.A. 850 Perfs	None				JH
*3/16/53	DAY	4	16	1145 S.A. 1061 perfs	None				JH
*4/5/53	DAY	4	16	4 ruptured ~~tube~~ slug Cans	None				JH
*4/5/53	DAY	4	16	332 perfs 346 S.A.	None				JH
5/16/53	D	4	16	segmental disch. equipment - D.Z. signs trash	NONE				RA
*5/15/53	DAY	3	22	514 SA - 887 PERFS - 179 POISON	None			100	
*5/18/53	DAY	3	22	1337 SA - 731 PERFS - 1 process tube	none			500	
*5/20/53	DAY	3	22	980-SA - 30 PERFS	none			1R	
7/22/53	DAY	4	21	846 perfs	"				
7/22/53	DAY	4	21	726 S.A.	"				
7/22/53	DAY	4	21	1 Process tube	"				
7/30/53	DAY	4	21	Segmental discharge equip. (Tuba - 2986)	"				
7/24/53	DAY	4	21	KAPL-109 - Discharged 9-10-52	"				
7/31/53	DAY	4	21	324 Solid Al.	"				
7/31/53	DAY	4	21	950 Perfs	"				
8/7/53	DAY	4	21	10 Buckets DUMMIES 699(SA) - 940 perfs	"				
10-16-53	"	4	21	419 SA & 863 perfs.					

* R.F.R. FORM SENT IN

Use with page 17.
(page following this one)
ALL 2/24/92

DATE
10-29-53
10-29-5
R.F.R IN 10-30-5
11-5-53
12-8-53
12-31-5
1-8-54
2-5-54
2-19-5
R.F.R - IN thru 2-19-54
3-7-5
4-23-5
4-23-5
4-23-54
5-6-54
5-6-54
5-7-54
5-7-54
5-7-5
5-10-5
6-1-5
6-1-5
PDR. form is thru 9-7-54
9-7-54
9-17-5
9-17-54
9-17-5

DATE	Shift	Trench	Section of Trench	Buried	Amount Covered	Truck Cab Reading	Trench Before	Trench After
10-29-53	DAY	20	center	4 - Mason Neilon Valves.	None	-	-	
10-29-53	Day	20	center	9 - Quick Opening Valve	none	10	-	
R.F.R IN 10-30-53	Day	4	21	1119 pcs - perfs 694 pcs - Sol. AL.	None	10	500	750
11-5-53	Day	4	20	287 - perfs 395 - S.A.	None	10	800	850
12-8-53	Day	4	18	225 perfs. 3 buckets of tubing	None	20	200	450
12-31-53	Day	4	18	400 Perf / 100 SA 5 buckets, tubing, [illegible] funnels & misc trash	None	10	1R	1R
1-8-54	Day	4	21	310 PERF 41-SA. 1 bucket of trash from basin floor.	None	12	600	600
2-5-54	Day	4	21	1858 [illegible] perfs 269-SA 1. 3" Screw type can.	None	20	700	800
2-19-54	Day	4	21	993 reg & tap-perfs. 75-S.A. 2 buckets of trash & 1 [illegible] drum [illegible]	None	25	1-R	1-R
R.F.R - IN thru 2-19-54								
3-7-54	C	4	14	2 Truck loads of trash. From shutdown	None	26	125	125
4-23-54	Day	4	18	1 load of trash from W.P. & #1 & #3 dryers.	NONE	-	700	750
4-23-54	Day	4	18	4 buckets of S-A - 441 pieces	NONE	10	700	750
4-23-54	Day	4	18	13 buckets of Perf. 1348 pieces	NONE	10	700	750
5-6-54	Day	4	18	18 buckets of perfs. 1890 pieces	NONE	25	100	100
5-6-54	Day	4	18	2 buckets of S-A- 160 pieces	NONE	25	100	100
5-7-54	Day	4	18	34 buckets of perfs. 3638 pieces	NONE	35	100	500
5-7-54	Day	4	18	11 buckets of S. Al. 1177 pieces	NONE	35	100	500
5-7-54	Day	4	18	3 buckets of trash	NONE	35	100	500
5-10-54	Day	4	18	tubing	NONE	20	500	2.2R
6-1-54	Day	4	18	12½ buckets of perfs. 2000	NONE	7	N.R	N.R
6-1-54	Day	4	18	1 bucket of S.A 160	NONE	7	N.R	N.R
PDR. fam in thru 9-7-54								
9-7-54	C	5	18	8 buckets of perfs. 974	NONE		100	500
9-17-54	Day	5	18	2 gun barrels. 2 dummie gun barrels.	NONE	26		200
9-17-54	Day	5	18	under water light & misc trash.	NONE	26		200
9-17-54	Day	5	18	1 load of tubing	NONE	26		200

Date	Shift	Trench	Section of Trench	Buries	Amount Covered	Track cab Reading	Trench Before	Trench After	Date S
3-18-54	C	5		1000 perf. alu.	none	12	100	430	5-6-[illegible]
3-18-54	C	5		254 Solid alu.	none	12	100	430	5-19-
3-19-54	C	5		1250 perfs.	none	20	130	250	8-26
11-11-54	Day A	108	30' treated	50 bucket of perfs. 8,120 pcs.	none	15	170		12-10-[illegible]
11-11-54	Day	108	"	1 bucket of tools	none	15	170		
11-11-54	Day	108	"	V an Stanb collar	none	13	170		2-28-[illegible]
11-11-54	Day	108	"	tubing from tube 3178	none	15	170		2-10-[illegible]
11-11-54	Day	108	"	2 buckets of Solid al. 196 pcs.	none	13	170	4.R.	3-22-[illegible]
11-12-54	Day	#5		1 table No USA-HEW-798	None	none	130	250	5-3-[illegible]
11-12-54	Day	5		36 Galv nozzels.					6-1[illegible]
[illegible]-54	Day	5		1 mason Nielan Valve					11-24-[illegible]
11-12-54	Day	5		1 Capun Blower Has been burned					11-[illegible]
11-12-54	Day	5		1-10-' Iron stairs		P.D.R. report Sent 11-12-54			
11-12-54	Day	5		60' of Storage area flooring.					2-57
11-12-54	Day	5		assorted piping.					2-57
11-12-54	Day	5		1 Shaper HEW. 353901					2-57
11-12-54	Day	5		1-carter pump. HEW. 80858					3-15-[illegible]
11-12-54	Day	5		1 Jet pump. No HEW No.					3-57
11-12-54	Day	108	30' forward	160 perf. and tube. 1 ~~[illegible]~~ 1 dummy train.	None	150	170	4.R.	4-57
1-14-55	Day	108	30' forward	1800 exp Perf 2 tubes 1 Dummy train	None	150	170	200	4-57
1-21-55	Day	108	30' forward	1000 exp Perfs 350 Perfs 2 tubes	None	75	200	200	6-57
1-28-55	Day	108	30' forward	675 exp Perfs 336 perfs 338 S.A.	None	75	200	170	6-57
4-1-55	DAY	108	30' FORWARD	2200 EX. PERF 600 PERF. 2 TUBES	NONE	75	200	1R.	8-[illegible]57
[illegible]-55	DAY	108	"	2600 EX. PERF 200 S.A. 100 POISON	NONE				8-1-57
4-15-55	DAY	108	"	1000 EX. PERF. 400 PERF. 3 TUBES	NONE	30	1-R	3-R	
4-24-55	DAY	108	"	1000 EX. PERF. 1000 S.A.	NONE	30	1-R	3½R	

After	DATE	SHIFT	TRENCH	SECTION OF TRENCH	AMOUNT BURIED	CAB READING	TRENCH READING BEFORE	TRENCH AFTER	AMOUNT COVERED
430	5-6-55	DAY	108	40' FROM EAST END	200 POISON 400 S.A. 400 EX. PERF	10	1½R	3½R	NONE
430	5-19	DAY	108	"	10 PROCESS TUBES	50	1.R.	3R	"
250	8-26	DAY	108	"	2400 EX. PERF. 400 SA- 200 PERF.				
	12-10-55	DAY	108	"	3000 EX. PERF 200 S.A-	10	1.R.	5 1R.	NONE
			12-30-55		P.D.R. No.-55-1232				
	2-28-56	DAY	108	50'	2200 EX. PERF. 1200 PERF. 100 SA	10	2.R	2.R	NONE
	2-10-56	DAY	108	50	2000 S.A.	10	2.R	2.R	NONE
	3-22-56	DAY	108	50	1600 S.A. 800 EX PERF- 400 PERF.	5	2.R	2.R	NONE
4.R.	5-3-56	DAY	108	50	1600 PERF.	15	1½R	2.R.	NONE
250	6-1 to 11-1-56	DAY	108	60'	350 PROCESS TUBES.	MAX 50.	1R	3-R	ALL
	11-24-56	DAY	108	60'	2400 EX. PERF. 400 S.A. 400-PERF-	15	300/MR	500/MR	NONE
	11-56	DAY	105	—	15 GUN BARRELS			5R	ALL
			1-4-57-		P.D.R. No IP-57-5				
	2-57	DAY	108-2	10'	4000 EX. PERF	100	10	3R	ALL
	2-57	DAY	108-2	10'	1000 PERF-1000 SA	100	10	3R	ALL
	2-57	DAY	108-2	10	100 PROCESS TUBES	100	10	3½R	ALL
	3-15-57	DAY	105	30"	ALL NOZZELS FROM 558 OUTAGE		P.D. R-FORM-IN		
	3-57	DAY	108-2	15'	89-PROCESS TUBES	50 MR	15	300MR	ALL
4½R	4-57	DAY	108-2	15'	2000-EX. PERF. 2000 THIN WALL PERF	10	15	300MR	NONE
200	4-57	DAY	108-2	15"	67 PROCESS TUBES.	80	15	1500MR	ALL
200	6-57	DAY	108-2	20'	111 PROCESS TUBES	50	100MR	1-R	NONE
201	6-57	DAY	108-2	20'	6000 EX. PERF. 300 S.A.	10	100MR	1-R	NONE
R.	8-1-57	DAY	108-2	25'	37 PROCESS TUBES.	10	1R	3-R	ALL
	8-1-57	DAY	108-2	25	5400 EX PERF. 1000 PERF. 400 SA.	10	1 MR	100MR	NONE
3.R									
3½R			12-27-57-		P.D.R #57-247				

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Date	Shift	Trench No	Section of Trench	Material Burried	Reading Before	Reading After	Amount Covered	Date
1-58	Day	108	25	2400 Ex. Perf.	25	150 MR	None	6-1-61
1-58	Day	108	"	1800 Ex Perf	25	300	None	7-14-61
1-58	Day	108	"	89 Process Tubes	300	2 R.	All	7-20-61
6-59	Day	108	30	6000 Ex. Perf.	50	300	None	8-8-61
7-59	Day	108	30	4000 Ex. Perf. 2000 SA.	50	300	All	8-11-61
7-59	Day	108	30	Misc. Equip. From Basin	—	—	—	10-31-61
7-59	Day	108	35	7000 Ex. Perf.	100	400	None	[illegible]
8-59	Day	108	35	4000 Ex Perf	150	250	"	1-5-62
8-59	Day	108	35	4000 Ex Perf.	100	250	"	2-7-62
7-59	Day	108	35	15 Mattress Plates - 6 Gun Barrels.			"	3-5-62
2-[illegible]	Day	108	40	10000 Ex. Perf.	100	250	None	3-7-62
3-25-60	Day	108	40	Process Tubeing	200	1-R	All	3-23-62
4-1-60	Day	108	40	Process Tubeing 2000-Ex-Perf 600-SA-	150	1-R	None	3-23-62
4-18-60	Day	108	40	10,000 Ex. Perf-	400	1-R	None	5-22-62
4-24-60	Day	108	40	4000 Ex. Perf 400-SA- 400 Perf	1-R	4-R.	None	6-6-62
5-28-60	Day	108	40	10 Process Tubes	1-R	4-R	All	7-17-62
5-15-60	Day	108	50	3600 Ex. Perf - 200 SA 200 Perf	50	1R	None	7-27-62
7-18-60	Day	108	50	1800 Ex. Perf - 200 Perf	—	250	None	8-3-62
8-21-60	Day	108	50	20 Process Tubes	1-R	1R	None	8-3-62
9-21-60	Day	108	50	2400-SA & 4000 Perf. Ex	1-R	2-R	None	~~8-21-62~~
9-23-60	Day	108	50	20 Process Tubes- 2000 ~~SA~~ Perf.	2 R	2-½	None	
9-30-60	Day	108	50	4000 Ex Perf. 2000 Tubular Perf.	2½ R	3½ R	"	8-21-62
12-8-60	Day	108	60	50 Process Tubes.	2-R	3 R	"	8-21-62
1-61	Day	108	60	8000 Ex. Perf 3000 S.A. 1000 Perf 1000 Poison	3. R	4R	All	9-26-62
								10-8-62
5-4-61	Day	108	60	3150 Ex Perf- 2- Strinbek 3- Buckets of Basin Trash	1-R	3-R	All	10-26-62
								12-28-62

Amount Covered	Date	Shift	Trench	Sec. of Trench	Material Burried	Before Reading	After	Amount Covered
None	6-1-61	Day	108	70'	5000 Experf 200 Pc. "P" 800 SA-	200	500	None
None	7-14-61	Day	108	70'	6000 Ex Perf - 3000 SA Perf - "P"	500	1500	None
All	7-20-61	Day	108	70'	100 - Process - Tubes	1500	5 R	All
None	8-8-61	Day	108	70'	4000 Ex Perf -	~~0~~	1500	All
All	8-11-61	Day	108	70'	1600 SA. 400 Perf - 4600 Ex. Perf	0	2500	All
—	10-31-61	Day	108	75'	100 Process Tubes 10,000 Ex. Perf. 4,000 SA.	0	5 R	All
None								
	1-5-62	Day	108	100'	100 Process Tubes	0	5 R	All
	2-7-62	Day	108	120'	200 Process Tubes - 5000 Ex. Perf	0	5 R	All
	3-5-62	Day	108	130'	100 Pc. "P" 9000 - Ex. Perf. 1000 SA-	0	5 R	None
None	3-7-62	Day	108	150'	190 Process Tubes	5 R	??	All
All	3-28-62	Day	108	140'	100 - Process Tubes	5 R	0	All
None	3-28-62	Day	108	140'	3000 SA - 4000 Perf Ex - 100 "P"	5 R	0	All
None	5-22-62	Day	108	120'	200 Process Tubes -	5 R	None	All
None	6-6-62	Day	108	160'	200 Process Tubes	5 R		All
All	7-17-62	Days	108	170'	4000 Ex Perf - 300 Perf	75 MR		75 MR
None	7-27-62	Days	108	170'	4000 Ex Perf 800 SA 400 Perf	80 MR		80 MR
None	8-3-62	Days	108	180'	50 ~~B~~ Tubes	5 R	—	All
None	8-3-62	Days	108	190'	2000 Ex Perf 500 SA 600 Perf -	~~400~~		400
None	~~8-21-62~~	~~D~~						
None					New Trench - #5.			
	8-21-62	Day	#5	10'	2 - Graphite Stringers	0	1 R	1 R
	8-21-62	"	#5	10'	600 "P" 6000 Ex Perf - 1000 - SA ~~3000~~ - Perf	1 R	1 R	1 R
All	9-26-62	"	#5	10'	6000 Ex Perf -			
	10-8-62	"	#5	10'	3000 - Ex Perf - 50 Process Tubes	1 R	5 R	—
All	10-26-62	"	#5	10'	1500 - SA - Ex Perf -			
	10-28-62	"	#5	10'	280 Process Tubes 2 - Stringers 1000 Perf	1 R	5 R	—

22 DATE	SHIFT	TRENCH NO	SECTION OF TRENCH	METERIAL BURRIED	READING BEFORE	READING AFTER	AMOUNT COVERED
1-7-63	Days	#5	190'	280 PROCESS TUBES.	0	5R	ALL
1-16-63	"	#5	10'	1000 Ex. Perf - 2000 Perf 500 SA	100mr	5R	ALL
2-27-63	"	#5	190	200 PROCESS TUBES	500mr	<5R	ALL
3-18	"	#5	190	100 PROCESS TUBES	5R	5R	
3-18	"	#5	190	2000 Ex. Perf - 500 SA -	5R	5R	ALL.

First Recovery of Dummy Material.
#1 Burial trench Sections 17-22

Excavation started Sept. 23, 1957. Top soil placed on one side of trench to be used to backfill after all material not salvaged had been returned to the trench.

All material to be sorted was placed on the other side of the trench.

The dragline used for excavation work was also used to scatter the dirt that contained the dummy material to be reclaimed. The equipment was to bulky to spread the dirt in a satisfactory manner to reclaim the maximum number of pieces; this method was abandoned. The dragline was used for a total of three days.

A Fordson tractor back-hoe was then used to ~~scatter~~ the dirt. This method was satisfactory. A bucket of dirt would be removed from the pile and scattered along the lip of the trench. Operators with three foot length tongs would pick up the exposed dummy material and put the pieces in tough buckets, when the bucket was filled, they would be dumped into fifty gallon drums.

A water tank with a booster pump was on hand at all times to keep everything wet to prevent spread of contamination.

Later a dozer was used to spread out the dirt to expose the wanted material and to backfill the trench.

Sand was washed from the material by use of the pressurized water tank. The drums of recovered dummies were dumped on a steel grating, flushed with a hose then washed by hand. They were sorted out as to type and returned to the drums that had been plased on pallets to be moved to 105 bldg. for decontamination.

The project was completed Oct 15, 1957.

Total cost as charged by transportain for use of dragline, backhoe, dozer, water tank and operators for the equipment amounted to $1,043.73. A forklift truck was used to move the loaded pallets inside the Burial ground, the charges for it is also included in the above amount.

An Radiation Monitor was present at all times

E L Chubb

Transportain charges including use of equipment and operators for equipment.	\$1,043.73
R.M. monitor 92 hrs at \$6.00 per hr.	\$552.00
Utility Operators 284 hrs @ \$3.31 pr hr.* * Base pay plus 20% (\$110.22 base)	\$940.04
Chief Operator 42 hrs @ \$3.88 pr hr.* * Base pay plus 20% (\$129.41 base)	162.96
Tomp	31.25
total	\$2,729.98

P Recovery.

549 pcs @ \$2.41	\$1,323.09
101 pcs rejected to be recanned valued at \$1.00 each	101.00
total	1,424.09
Cost of Analysis	168.00
	\$1,256.09
2nd Analysis for Cadmium only.	100.00
	1,156.09

Perfs:
Estimated number recovered. 16,250

Perfs decontaminated and placed in use 561
Oct. 28, 1957 at 61¢ each. $342.21
11/1 Perfs used in Probalog tubes 500 @ 61¢ $305.00
11/9 Perfs used in Probalog tubes 500 @ 305.00
11/22 "P" used 544 @ 2.41 = $1311.04

12/28/57 - Survey results.
A survey was made of 100 burial ground dummies with the following results;
56% on surface read 8 B/4 G (individuals) Mrads/hr
on a tray at 5" read 14 Gamma. Mrads/hr
44% on Surface individuals 26 B/22 G Mrads/hr
on Trays at Surf 60 B/32 G Mrads/hr
on Trays at 4" 38 B/30 G
Rewash of 44 resulted in same reading
Mrads/hr
SCP

Lead

Estimated number recovered: 6,300

12/28 – Released 56 perfs. for use @ 61¢ $34.16

12/29 Sorted 258 acceptable perfs and placed in service. Value $157.38

Exposure – 1.5 hrs = 38 MR.

Had about same no of rejects

12/30 150 perfs recovered $91.50
80 Solids $64.80

Good [illegible]

Had about 65% Good

12/30/57 862 perfs 8" recovered $525.82
12/31/57 236 perfs 8" recovered 143.96
12/31/57 80 perfs recovered
9/12/58 350 Perfs " ~~183.00~~ 213.50
9/19/58 300 Perfs " ~~183.00~~
9/19/58 900 Perfs " ~~549.00~~
9/19/58 600 perfs

9/22 Salvage 1000 Perf $9.00
Cold Bury 800 perf
9/[illegible] Salvaged [illegible] perf.
9/24 Salvage 390 perf.

11-5-58 Salvaged by sorting with Juno 1610 Perfs.
1610 Perfs @ 90¢ $1,449

11/6/58 Salvaged by Sorting
at 90¢

620 C
300 H
920
$828.00

8" thinwall exp	714
8" split tube exp	25
8" expendable	76
8" sol al	82
8" reg perf	105
P pieces	2,41
5" perf	494

MATERIAL RECOVERED FROM BURIAL TRENCHES
RETURNED TO OPERATIONS FOR USE IN REACTOR
PRICES QUOTED ARE COST OF REPLACEMENT.

Date	Type	Amount	Unit Cost	Total ~~For Month~~	Total For Month	Grand Total
12-1-57	"P"	549	2.41	1,323.09	1,323.09	1,323.09
10-28-57	Perfs	561	.61	342.21	342.21	1,665.30
12-[illegible]/57	Perfs	500	.61	305.00		
12 19/57	Perfs	500	.61	305.00		
~~12/21/57~~	~~Perfs~~	~~544~~	~~.61~~	~~331.84~~		
12/28/57	Perfs	56	.61	34.16		
12/29/57	B shift Perfs	258	.61	157.38	$1667.62	
12/30/57	Perfs	150	.61	91.50		
[illegible]/30/57	Solid	80	.81	64.80		
12/30/57	B shift Perfs	862	.61	525.82		
12/31/57	B shift Perfs	236	.61	143.96		
12/31/57	5" Perfs	80	.49 ~~.61~~	40.00		
					TOTAL	$3332.92
1/2/58						
1/5						
		81[illegible]				
		[illegible]				
5/19	Lead 6"	100				
9/12	350 Perf	350	.90	315.00		
18	1000			900.00		
23	150			135.00		
24	390			351.00	3159.00	
25	150			135.00		
26	300			270.00		Hot 225
27	1170			1053.00		

29	Type	Amount	Unit Cost	Total/mo This item	For Mo.	Grand Total
29	~~300~~					Hot 360
	PurfsR	300 ~~40~~	90	270		
	Hot perfs	280	90	262		
30	perfs	300	90	270		~~Hot 400~~
10-3	Purfs	400		360		To Prod.
10-6	Purfs	276		248.40		5-5-6 Hot.
	Purfs	556		500.40		PCCF
10-7	Hot purfs	1300				
10-23	Hot Purfs	700				

COMBINED TOTAL FROM 11-1-37 TO 10-6-38 $10,610.14

			Hot 840			
11-5	perfs	1610	Hot 640	1449		12059.14
11-6	"	920		828		12887.14
11-7	Hot		150			

nd
11
3.09
5.30
292
25

Total hot ~~$7084~~

Inventory at B.G. 11-1-53

600 lead brick
1 mason neilan valve
1 quick opening valve
14 pcs. Storage Area floor sections
4 sheets 1/2" lead
Scaffolding plank
misc. scaffolding pipe
24 Storage Buckets
1 small milling machine (atlas)
1 positive displacement pump w/engine
1 HSR thimble carrier
2 Extension ladders
3 step ladders
misc. planking
Stack of Yokes
100 ft. 1/2" cable (hanging on fence)
1 4" foot valve
1 $2\frac{1}{2}$" carter pump with Elect. motor
1 Elect. space heater (wall type)
1 sect. Transfer Area Stairway
1 small lead cask 10" square

Inventory B.G. shack 11-27-53

1 Safety belt
1 tool box (portable
1 broken desk lamp fixture
1 pipe bender
1 length 1/2" spline
3 gear pullers - screw type
3 Screw type cap jacks
2 chain falls
misc chokers, chains, pneumatic drill bits
1 5' step ladder
1 8' step ladder
1 special stand
1 sect. SS vent pipe 4' long
1 sect SS stack (Round 4' long
1 25' length 3/4" rope
1 roll 1/4" cable
1 rope falls
1 puddling hammer (pneumatic)
3 bars (crow)
3 unnamed metal frames with snap fasteners
1 welding torch
50' heavy elect. cable
1 drop cord (3 sockets)
1 box 3/4" hose (50')
1 box assorted soft rubber tubing (1/2"-3/8")

)
gine

B. G. Shack 11/27/53

3 Disposable vacuum filters.
1 pail with 2 trowels
1 pr. underwater Binoculars w/box
5 C elev. ceiling hoses
5 drilled 1/4" plates 8" dia.
2 flow-meters
3 old dig. machine traps
1 1/4 hp. motor with pulley
1 small electrical reelite
1 portable drill motor 1/2 hp.
1 wrapped package-(may be Rod sleeves)
1 VSR thimble insert (wood slats on O.D.
20 misc. shovels, rakes, picks
2 large air hose reelites.
1 small compresser with Elect. motor
1 chain driven hoist with elect motor
4 sections 4" fire hose
2 hand Trucks (2 wheel)
1 hand charger.

Burial Grounds Shack 7/19/56

1 6 shelf cabinet with doors.
2 Plywood storage chests.
1 Table 2'×5' with doors.
1 Work Bench 3'×5"
1 4 step plywood stile.
6 wood saw horses.
3 Odd Charging machines
8 Sample Room Chambers.
5 G M Chambers.
15 Pigtails
1 Welded Pigtail
2 4'×8' asbestos cloth drops.
2 [illegible]
1 [illegible] tube cutting torch
1 Electric Pump. HEW 5-157
1 Compressed Air Water Pump.
3 Jack Hammers (Air)
1 Tamper (Air)
1 Small Jack Hammer (Air)
15 Jack Hammer drills
10 Shovels
3 Rakes
6 Picks
4 Axes
2 Mauls
1 2 Man Saw
over

Burial Ground Shack July 19, 1956

3	Pinch Bars
200 ft	Riggers cable
20	Riggers clevises.
1	1½ ton Chain Hoist
3	1 Ton Chain Hoist.
4	¼ hp. Electric Motors
500'	Rubber covered Extension cords
1	Variac
1	Small Electric cord reel
1	Variable speed Electric Hoist
4	Reelite Electric cable reels
1	Meteor Remote Control Electric Hoist
1	Century 3/4 hp. Electric Blower.
1	Electric Vacum cleaner Sniffer
1	440V Transformer
1	50' Heavy duty extension cord
1	Allen Bradley Relay + transformer
1	Under-water Periscope
2	Sample Room Rotameters
1	Sample Room Water Sample device
300'	3/8 copper tube.
36'	3" Plastic hose
2	4" Gas Sampling Pumps
3	12'x14' brown tarps
50'	5" steel flexible tubing
1	20' Spline

1956

Burial Ground Shack July 19, 1956

3	Stock Air Filters
500 ft	1½" Air - Steam hose
500 ft.	1½ Water Hose
500 ft	Welders cable
50'	2" Red Hose
5	misc. Valves
1	Fire Hose Nozzle
1	V.S.R. Auger
100 ft.	Welders hose
11	assorted size step-ladders.
1	pr. special Tongs
1	Chute Repair platform.
1	Cushion Chamber plug guard
1	4 Wheel dolly.
1	Water pressure test gauge
1	4 wheel hand cart
1	G.I. can of old Danger Zone signs
1	2' x 5' 4 wheel T cart.
4	Elevator chain guards?
5	Window screens
10'	H P Hose for leak testing
1	Experimental Ball Valve changer
2	25' lengths fresh air hose.
1	pr special Tongs
6	Mont. loading tools
100	1½" Hose

Burial Ground Outside Storage 7/19/56

1	10' Aluminum Ladder
2	20' Extension Ladders
3,000	Lead brick
350	Cement Blocks
4	Steel 50 gal drums
3	20 gal G.I. Cans
3	Lengths Fire Hose
300'	1" & 1½" Hose
3	3' sections of RR rails
1	30' RR rail
1	Oil [illegible] Tank
2	Buffalo steam heater coils
1	Steel balcony from transfer area
2	10' sections of 4" pipe
1	4" Valve
3	portable RZ standards
6	Sections of Riggers scafold
25	8' riggers platform boards
30	2"x4" 20' long
5	4 wheel P/O carts
6 pcs	10" pipe & welded on elbows
10 sections	4" angle iron and plates
8	SWP Clothes Hampers

4-24-60
Perf Cost-
Reg. .773-
S.A .78
Tubular .40

A.E.C. representative
C. D. Griswold
Ph. 48131

Lead - 3.36# Per ea. - 150 pcs. full
Perf - .39 " " - 160 pcs - full
Solids .790 " " - 160 pcs - full

Ash. J.W. - 6-5341

4411

Elip Perf. $0.68
Reg " .90
Solid al. 1.06

DOUGLAS UNITED NUCLEAR, INC.

DISTRIBUTION:
JT Baker
JL Goodenow
GA Peterson
WG Westover
File

DATE September 20, 1967

TO R. E. Slater, Engineer
Radiation Practices Engineering

FROM T. P. Ross, Assignment Supervisor
B Processing Operation

SUBJECT BURIAL HISTORY, 105-B
1945 - 1967 (First Half)

A study of 105-B Processing contaminated waste burial records has been completed and a history of items buried by two year periods and amount was compiled. The items selected for study were those non-fissionable reactor materials and hardware subject to in-reactor neutron activation, and subsequently buried.

It should be noticed that Item 12 lists burial pit locations in the 105-B burial ground. A detailed, up-dated map showing these locations is presently being prepared, and a copy will be forwarded to you upon completion.

T. P. Ross
Assignment Supervisor
B Processing Operation

TPR:mjm

Attachment 1

54-5000-236 (12-65)
AEC-GLOO RICHLAND, WASH.

BURIAL HISTORY 105-B 1945-1967(½) INCLUSIVE	VSR'S	HCR'S	VSR & HCR THIMBLES	STRINGERS	GUNBARRELS	TUBING	ALUMINUM DUMMIES ALL TYPES	LEAD DUMMIES	STEEL DUMMIES	POISON (Pb-Cd)	RUPTURE CANS (OXIDES, ETC.)	READING	BURIAL PIT LOCATIONS 105-B BURIAL GROUND
Pre 1950	31		10	3		30	73,588	26,335	40		7	1250 MR	1, 2
1950-1951	1		6			25	23,748	14,172	6,500	1,273	1	25 R	2
1952-1953	1		3			44	32,264	840		1,242	4	NA	3, 4
1954-1955	1	11	7		2	60	46,475			300			P-1, 4, 5, 6, 7
1956-1957					15	741	36,100						P-1, 7, 10, 11
1958-1959					6	326	31,200						P-1, 9
1960-1961				2		643	109,850			2,700			P-1, 9
1962-1963	2	1		7		1,553	69,650			1,700			P-2, 13
1964-1967½		5		6		601	94,100						12, 14, 15, 16
TOTALS	36	17	26	18	23	4,023	516,975	41,347	6,540	7,215	12		

Date	Position in Trench	Trench #	Sec	# Pcs.	Amt. Cover	Kind of Metal or Material	Reading After Cover	Reading 10.5	Reading Trench	Supv.
3/2	C	1	20-23	4230		S.A.		150	5	[illegible]
3/3	D	1	20-23	486		S.A.		75	5	[illegible]
3/4	A	1	20-23	1680		S.A.			3	F.B.S.
3-5-41	C	1	20-23	1100		SA		180	8	[illegible]
3/5/45	D	1	20-23	1350		SA		70	5	G.J.
3/5	A	1	20-23	489		Pb		0	1	F.B.S.
3/6	C	1	19-22	~~4800~~ 5000		S.A. (includes Boosters)		44	10	[illegible]
3/8	D	1	19-22	652		SA		60	5	G.J.
3/8	D	1	19-22	53		Pb.		40	5	G.J.
3/9	D	1	19-22	9		Pb		0	0	G.J.
3/9	D	1	19-22	7834		SA				G.J.
3/14	B	1	18-20	789		SA-738 Pb-51		24	2	WGM
3/15	B	1	18-20	1068		SA-876 Pb-192		12	2.5	WRD
3/16	A	1	18-20	2099		SA-1864 Pb-235		12	2	DSL
3/16	C	1	18-20	3500		S.A. include 500 Pb		450	5	[illegible]
3/17	B	1	18-20	2701		SA-2687 Pb-14		400	9	WRD
3/18	A	1	18-20	588		SA				AAJ
3/19	C	1	20-23	16		4' sections BAIT tubing		0	No Check	F.G.M.
3/20	B	1	18-19	250		SA-240 Pb-10		5	20	WRD
3/26	C	1	20-23	1		Galv Chamber		2000	10	FGM.
3/28	D	1	19-23			SA		70		PR
3/31	B	1	16-19	1181		SA-1146 Pb-34 B3-1		130	9	WRD
4/1	CD	1	20-23	2		thermocouple Wire		300	9½	FGM.
4/4	B	1	17-18	1148		SA-1124 Pb-24		130	10	WRD
4/5	A	1	~~16-17~~ 17-18	4200		S.A.		6	3½	A.A.J.
4/5	A	1	14-15	6420		SA		6	2	A.A.J.
4/5	A	1	15-16	1713		SA-1520 Pb-193		5	3½	A.A.J.
4/5	B	1	17-18	697		SA-676 Pb-21		110	10	WRD
4/9	B	1	16-17	1134		SA-1117 Pb-17		120	7	WRD
4/13	D	1	20-22	Bund		Contaminated Paper		5	0	G.J.
4/18	C	1	20-23	2		Galv Tubes		700	5	F.G.M.
4/18	C	1	20-23	1 Can Trash		Trash		5	5	[illegible]

2

Date	S/Sk	Position in Trench: Trench No	Sections	No pcs	Amt Cover	Kind of Material	Reading after Covering	Reading	Supv
4/25/45	C	1	20-23	2	–	Oil wipers	–	– –	F.E.M.
4/26/45	C	1	20-23	1	–	Paper		5.5	JEM
5-10/45	A	1	"	60		Wooden Pcs.		7-5	F.
5-11-45	A	1	"	50		"		7.5	S
5-11-45	A	1	"	Material from		2		7.5	S
5-26-45	B	1	15-16	212	–	Pb.	–	4.	ADM
5/27/45	C	1	10-11	312		pb.		6.0	JSS
5/27/45	A	1	9-10	527		Pb	–	23 2-1/2	K.P.
5/27/45	A	1	14-15	351		Pb	–	20 2-3	E.P.
6/9/45	B	1	13-14	14	–	6 Grooved steel 1 solid aluminum 3-Pb	–	20 3-3	ADM
7/26/45	A	1	12	33	–	26 Pb 3 Wood 4 Grooved St.		20 2-3	ADM
7/30	A	1	10	One	1'	Plug	10		F.
7/31	A	1	6	One	1'	Plug	8	–	ADM
7/31	A	1	8	One	8"	T/C Wire	5	—	ADM
8/3	A	1	15	61	—	Lead	—	35-2-2	ADM
8/3	A	1	8	3	1'	chamber	–	—	F.B.F.
8/3	A	1	10	Trash	0	Trash	—	—	F.
8/4	C	1	17-19	814	0	Pb.	✓	20 5	JSS
8/6	C	1	20-23	375	0	Pb.	✓	15- 5	JSS
8/14	C	1	13	70	6	Wood	✓	2- 5	JKR
8/17	C	1	20	398	0	Pb	✓	6.5 mr.	NKR
9/10	C	1	5	2 #5-484-AY #6-484-AY	0	Inst. Tubes		100 12	R.S.
9/13	D	1	10-11	20	0	Pb	–	<1	AA
9/13	D	1	10-11	Hot trash from 100-D	0	1 Can	–	4 <1	AA
9/25	A	1	10-11	300	0	Pb wood	–	4.5 3	E.J.
10-10-45	C	1	14	130 wood 30 Lead	0	Pb	—	2.0 1.1	ADM
10-19-45	C	1	20	375 P.A.	0	Pb	—	10- 6.5	HP
10/20/45	A	1	10-11	252 Filings	0	Pb	—	2.5-2.5	K.
10/23/45	B	1	12-13	480	0	Pb	–	3.0 - 3.0	JEJ
10/25/45	A	1	12-13	215	0	Pb	–	250 -3.0	WB

Date	Shift	Position in Trench: Trench No.	Section	No. Pieces	Amt. Cover	Kind of Material	Reading After Covering	105 Meter	Readings Trench Ground Level (Before / After)	Supv.
11/6/45	C	1	10-13	4	0	4 [illegible] [illegible] F	[illegible]	20	<1	HP
11/6/45	C	1	11	2	0	[illegible] from A+C [illegible]	—	15	<1	RDM
11/11/45	C	1	15	154	0	Pb	—	15	2-4	RDM
11/12/45	D	1	14	Trash	0	gloves, scrap from D area		14	no change	[illegible]
11/24/45	C	1	15	412	0	Pb	—	15	5-5	RDM
11/25/45	B	1	7-8	6	0	Rags, 1 Pb piece 1-Damaged RC Tube 2-Wood - 1-Box		40	∠1 ∠1	[illegible]
11/26/45	B	1	8-9	7	0	Old rubber mats from B & C chutes 2 trash from basin		6	∠1 1	[illegible]
11/27/45	B	1	7-8	1	0	Box of trash from basin	—	2½	∠1 ∠1	[illegible]
11/28/45	B	1	7-8	Trash		Trash	—	2	[illegible]	[illegible]
11/30/45	C	1	15	336	0	Pb	—	30	4-5	RDM
12/3/45	C	1	15	426	0	Pb	—	12	5-5	RDM
12/18/45	A	1	12	360	0	Pb	—	28	~~70~~ 4-5	OR
12/18/45	A	1	12	132 + Samples	0	Pb	—	28	5-5	OR
12/19/45	D	1	15-22	16	0	#15 Al. Rod thimble	—	750 W.C.	1-14	Entry made by [illegible]
12/20/45	D	1	12-21	4	0	#35 Al Rod Thimble	—	750 W.C.	14-30	Entry made by [illegible]
12/21/45	B	1	21-22	4	0	#34 Al Rod Thimble	—	750 W.C.	30-50	Entry made [illegible]
"	B	1	21-22	2	0	#38 Al Rod Thimble		650 W.C.	50-100	[illegible]
12/22/45	B	1	21-22	2	0	"		1000 W.C.	130-190	[illegible]
"	B	1	19-21	2	0	#37 Al Rod Thimble		1500 W.C.	200-240	[illegible]
"	B	1	19-21	2	0	"		2000 + W.C.	200-250	[illegible]
"	B	1	18-21	2	0	#29 Al Rod Thimble		750 + W.C.	160-170	[illegible]
"	B	1	18-21	4 Pcs Scrap	0	Al Scrap		10 W.C.	160-170	[illegible]
12-23-45	B	1	18-21	4	0	Thimbles Al Scrap	1300		170-175	[illegible]
"	B	1	16-20	2	0	Thimble	1100		81-140	[illegible]
"	B	1	18-20	2	0	#36 Thimble	1 Pc = [illegible] 1 Pc = 1050 WC		50-160	[illegible]
"	B	1	18-20	2	0	#21 Thimble	1 Pc = 650 WC 1 Pc = 875 WC		160-170	[illegible]
"	C	1	15-16	2	0	Thimble & Al scrap	1 Pc - 500 1 Pc - 400		100-150	HP
"	C	1	16	6	0	~~Rod~~ [illegible]	3		↗	HP
12-23	B	1	13-15	6	0	~~2 Thimbles~~ & Al. [illegible]			160	W. [illegible]
12-24	B	1	15-16	2	0	"	—	750	150-160	[illegible]
~~12-26~~	~~B~~	~~1~~	~~19-21~~	~~1~~	0	~~2 [illegible]~~				

DATE	SHIFT	POSITION IN TRENCH: TRENCH NO.	SECTION	NO PIECES	AMT COVER	KIND OF MATERIAL	READING AFTER COVERING	READINGS 105	TRENCH Gallery	Supr.
12-26-45	B	1	19-21	7	0	Can oxide Can-oxide Tips Dished rod Rope, Boxes Misc Trash	— — — — — —	1250 750 75 7200 <6.5	250 300	JHB
12-27-45		1	12	4	0	1 Can Trash from top 1 Can from offset glove 1 H Can (Rd.) 1 Can dust		7	1	AAG
12-30-45	C	1	12	0	0	3 cans Trash from 100-F 1 mop bucket 2 Cans Trash	—	3 Truck	1	RDM
1-4-46	D	1	12		0	plywood from "D" (100-D)		<1	<1	AAJ
1-5-46	C	1	12	1	0	Dirt and metal alum	—	500	<1	HP
1-7-46	A	1	6-8	1	0	YSR section 1st above tip	—	<1	7.5	PEL
—	—	—	—	1	0	Can from from top	—	7.5	7.5	PEL
—	—	—	—		0	Rope, boards, mops, brooms, smoked [illegible]	—	2	7.5	PEL
1-11-46	A	1	10-11	3	0	Dirt, chrome [illegible] graphite pieces		25	2	DSh
1-14-46	A	1	6	15 Pb	1 ft.	Cutting tools, [illegible] gloves, [illegible] lead work		<1	2.5	WPN
1-25-46	C	1	8-9	4	0	3 Cans trash 1 mop bucket		9	20	DSh
1-26-46	C	1	11	579	0	Al covered Lead	—	12½	½ / 2	RDM
1-27-46	C	1	11	1000	0	Al covered Lead	—	40	2 / 4	RDM
1-28-46	C	1	11	200	0	"	—	80	4 / 4	RDM
1-29-46	C	1	11	162	0	"	—	40	9 / 1	RDM
1-28-46	D	1	11	220	0	Pb	—	40	3	PR
2-1-46	D	1	12	250	0	Pb	-	12	2	PR
2-5-46	A	1	11	Can of Bricks & Rags	0		—	100	2½ / 2½	dR
2-8-46	A	ON TOP OF FILL	13	1 LATHE FROM VIEWING PIT	0	EXCEPT PLYWOOD BOX	—	60	2½ / 2½	PEL
2-9-46	A	1	11	1 BOX GLOVES				2	2½	PEL
—	—	1	11	1 CAN BRICKS, RAGS, ETC. FROM [illegible]			—	40	½	
—	—	1	11	BUCKET & COVERALLS FROM LATHE CLEANING				2	2½	
2-9-46	A	ON TOP OF FILL	19	3		LARGE CATCH BOXES	—	16	2½ / 2½	PEL
2-10-46	A	1	12	24	0	can & brick from [illegible]	—	6	½	PEL
—	—	1	12	2	0	[illegible]		2	½	"
—	—	1	12	1		can trash				
—	—	1	12	1		chicle	—	30	2	"
PEL	—	1	12	1 10		Box gloves ¼" nipples		1 1	2 2	PEL
2-11-46	Day	1	9	2	0	pigtail	—	<1	2	DSh

* Record of final shutdown burial

Date	Shift	Trench No.	Section	No. Pcs & Kind of Material	Amt Cover	Reading After Cover	Readings (Background) 10-5	Readings Trench [illegible]	Supr.
2-13-46	A	1	6-10	Junk	0	⊖	20	2.5	WJR
2-27-46	C	1	20	Lathe from Viewing P[illegible]	0	+	50	1.0	HP
3-10-46	A	1	12	300 Used Pins	0	—	2.5	2.5	REL
"		1	12	Trash from Exp[illegible]	0	—	1	2.5	"
"		1	12	Trash from [illegible]	0	-	1	2.5	"
3/26/46	C	1	4-10	4 pcs. thimble	0	-	400	50	HP
3/30/46	A	1	20	Trash (Top of Unit)	0	—	1.5	5	dP
* 4/3/46	D	2	22	P.A.s - 293 pieces	0	-	[illegible]	20	W.P.n.
4/3/46	D	2	20	Leads - 2437 pieces	0		—	10	W.P.n.
4/4/46	D	2	20	Leads - 4780 pieces	0		—	30	W.P.n.
4/5/46	A	2	18	Leads - 1455 pieces	0		—	30	W.P.n.
4/5/46	A	2	18	P.A.s - 98 pieces	0		—	30	W.P.n.
4/8/46	A	2	18	Leads - 1476 pieces	1 foot over all material			60 from 4/3/46 on	W.P.n.
4/9/46	A	2	17	PAs - 7861 pieces	0		—		W.P.n.
4/[illegible]/46	A	1	12	waste paper - wooden [illegible]	0		—		W.P.n.
4/10/46	A	2	16-17	P.A.s - 6,237 Pb - 16 Solid Al. - 23	0		—		W.P.n.
4/11/46	—	2	All	P.A.s - 6717	0		—		W.P.n.
4/12/46	B	2	All	P.A.s - 1736 Solid Al - 1031 Pb 202	0			140	HBC
4/16/46	B	1	8	4 pcs. Al Rod Junk	0		14	20	HBC
4/17/46	B	1	8	Contaminated gloves, broom, wire, floor dust	0		>5 <15	20	HBC
4/23/46	C	1	8	Contaminated floor sweeping from wood dynamite 1'	0		15	20	W.P.n.
3-18-46			8	Chamber from D-hole EP No. 2-484CM					WAW
5-8-46	C	2	25	contaminated clothing - HKG	0		<1	<1	DCM
7-10-46	B	1	8	Perf. alum. filing Tefl. from 111 Bldg.	0			10	W.P.n.
8-27-46		2	12	Solid Al. - 8" - 75	6"			42 after	W.P.n.
"		"	"	Perf. al. - 200	"			42 covering	"
"		"	"	Pb. pcs - 60	"			42	"
"		"	"	Grooved steel - 25	"			42	"
8-27-46		"	"	1 pr. coveralls	"				W.P.n.
"		"	"	1 " shoe covers					W.P.n.
8-30-46	Covered section 12 trench 2 to reduce reading to [illegible]							710	DCM
9/30/46		1	8-11	misc. short lengths of pipe, paper, rope	0	2½			[illegible]

9/30/46 (con't) S.D.Z. 1 pr tongs, 1 underwater ocsop, 1 " chamber, 2 " lights 500

Date	Shift	Trench No., Section, No. pieces	Amt. Cover	Kind of Material	Read. at Top Cover	Read. max. Trench Grad.	Supv.
10/1/46		1 8-11 35 perfs, ~~15~~ lead, ~~2~~ sections of tube, 1 hook	0		~~50~~	500 30	T.P.
10/1/46		1 8-11 15 perfs, 3 lead, 1 tube action	0			200 44	T.P.
		S.D.Z. 1 pr tongs, 1 underwater mirror					T.P.
10/3/46		~~E~~ 0 1 8-10 5 wood dummies, 1 lead bottom tray, 1 steel plate, 1 weighing tray, 1 spec. attachment for slug manipulator, 1 spacing rack (wood)	0			2500 on 150 mrep 55	T.P.
10/?/46		Filled in approximately 25 cubic feet of north trench and reduced maximum reading in enclosure to 22 mR. Readings up to 130 mreps were found where contaminated material from storage area was dumped.					
11/14/46	8-4 D	Trench #2 Section 12-13 (one viewer)	0	Viewer	10	125 mrep 125 mr 25	JM
11/15/46		Trench #2 Section 12-13 Two pr tongs some 6" hose misc conduit wrapped in paper	0	Scrap from basin	50	52 m.r.	HB
11/21/46		Trench #1 Sect. 6 10 cords and chains from sub. lights Two sub. lights (complete) stored in S.D.Z.	0		15	150 15	T.P.
11/14/46	8-4-D	Trench #2 Section 12-13 ~~#~~50 pcs alum pcs. - broom - boards. 100 wood dummies	0	P.H. & trash	15	125 mrep 125 mr 25	JM
12/13/46	8-4 A	Trench #1 Section 12-13 10 lead bricks, 1 camera stand misc trash.	0	Lead bricks trash	2	150 mrep ~~max~~ Trench 23	HB

PETE - REMOVED FROM OLD BURIAL BK REUSE KEEP FOR FUTURE PETE.

1000 [illegible]

1

SEPTEMBER

DATE	[illegible]	[illegible]	CONTAINER	AMOUNT	CUBIC FEET	[illegible]
9-3	TRASH ([illegible])	[illegible]	[illegible]	8	[illegible]	
[illegible]	TRASH ([illegible])	[illegible]	[illegible]	[illegible]	[illegible]	—
9-13	TRASH ([illegible])	[illegible]	[illegible]	10	45	—
9-14	TRASH (PAPER SWABS)	105 B	BOX	10	45	—
9-15	TRASH (PAPER [illegible])	[illegible]	[illegible]	12	54	—
9-18	TRASH ([illegible])	[illegible]	[illegible]	10	45	—
9-21	PROCESS [illegible]	105 B	[illegible]	4400	141	1R
9-23	PROCESS [illegible]	105 B	[illegible]	20	[illegible]	1R
[illegible]	[illegible] DUMMIES	[illegible] B	[illegible]	[illegible]	30	1R
9-23	TRASH ([illegible])	[illegible]	BOX	10	45	50 m/R
9-25	TRASH (SWABS PAPER)	105-B	Box	7	31.5	10 m/R [illegible]
9-26	Dummies	105 B	None	6000	90	300 m/R at 20'
9-30	Trash	105-B	Box	9	41	Neg <10

OCTOBER

DATE	[illegible]	[illegible]	CONTAINER	AMOUNT	CUBIC FEET	[illegible]
10-9-60	Trash [illegible]	105 B	Boxes	16	72	<10
10-12-60	TRASH	105-B	BOXES	5	22.5	<10
10-16	Trash (3 High tank - [illegible] 2 Paper [illegible] floor sweeping)	105 B	Box	~~5~~	22.5	<10
10-20	TRASH (PAPER [illegible] RAGS)	105-B	BOX	20	90	50 mR @ 2"
10-28-60	Trash.	105-B	Box	17	76.5	5 mR 15 @ 2"
10-31-60	3X BALLS	105-B	[illegible] DRUM	1	7.2	90 R/[illegible]

NOVEMBER

DATE	[illegible]	[illegible]	CONTAINER	AMOUNT	CUBIC FEET	[illegible]
11-1-60	TRASH.	105-B	BOXES	20	90	<10.
11-10-60	Trash	105-B	Box	13	58	<10
11-15-60	PROCESS TUBES	105-B	N	100	100	1R
11-18-60	TRASH	105 B	BOX	10	45	<10
11-20-60	Trash	105 B	box	8	36	<10
11-28-60	Trash [illegible]	105-B	Box	14	63	<10
11-28-60	Pipe [illegible]	105-B	None		2.	<10
11-28	[illegible] Steel [illegible]	115-B	[illegible]	16	64	<10
12-10-60	trash-pipe misc	W.P. W.A. 105 B	Boxes	27	121.5	<10
12-12-60	trash-pipe, paper, wood	115 + 105 B	Boxes	18	81.0	<10

JANUARY 1961

DATE	MATERIAL	WHERE FROM	CONTAINER	AMOUNT	CUBIC FEET	RADIATION LEVEL
1-4-61	Process Tubes	105-B	None	50	50	3-R
1-4-61	Yokes	105-B	"	9	18	—
1-5-61	Gun Barrells	105-B	None	19	19	3 R
1-15-61	Trash ([illegible])	105-B	Boxes	8	36	~~<10~~
1-24-61	Dummies	105-B	None	5	15	
1-25-61	Dummies	105-B	None	55	165	
~~2-1-61~~	~~T.~~					
		FEBRUARY 1961				
2-1-61	Trash Boxed	105-B	Boxes	20	~~60~~ 90	~~10~~ 2 MR
2-3-61	Trash	105-B	Boxes	6	27	<10
2-11-61	Trash	105-B	Boxes	12	54	≤50
2-14-61	Process Tubes	105-B	None	60	60	4-R
2-15-61	~~Trash~~ Filters	105-B	Boxes	7	31.5	<5
2-15-61	Filters	105-B	Boxes	5	~~30~~ 22.5	<5
2-15-61	Trash	105-B	Boxes	11	49.5	≤1
2-19-61	Trash	105-B	Boxes	3	18	<1
2-19-61	Gun Splines	105-B	Box	2	9	150 mrad
2-27-61	Trash	105-B	Box	5	36	<1
2-27-61	Trash	Work Area 105-B	Box	11	49.5	<1
2-27-61	Trash	Wash Pad 105-B	Box	8	[illegible]	<1
		MARCH 1961				
3-5-61	Boxed Trash	105 B	Boxed	7	31.0	<1
3-8-61	Boxed Trash	105 B	"	13	58.5	<1
3-13-61	Boxed Trash	105 B	"	11	49.5	<1
3-20-61	Boxed Trash	105 B	"	5	22.5	<10
3/23/61	" "	105 B	Boxed	15	68	<10
	Broken Ladder	105 B	Loose	1	2 cu. ft.	
	Old Pipe	105 B	Loose			
3-24-61	Trash	105 B	Boxed	5	22.5	<10
3-27-61	Trash	105 B	"	5	23	<10
3-30-61	Trash	105 B	Boxed	12	54	<10
		APRIL 1961				
4/8/61	Boxed Trash	105-B	Boxes	15	68	≤15 mr/hr
	Paper	105-B	Loose	[illegible]	7½	<1 MR
4/11/61	Box Trash	105-B	Boxes	14	63	<1 MR
4-14-61	Bbl Splines	105 B	Loose	1	7	<1 MR
4-15-61	Box Trash	105 B	[illegible] Box	1	4.5	<1 MR
4-20-61	Misc Trash	105 B	Loose	25	136	<10 MR
4-21-61	Dummies	105 B	None	7250 pcs.	13.5	<
4-26-61	Box Trash	105 B	Boxes	14	63	<10
4-27-61	Box Trash	105 B	Boxes	6	27.0	<10
4-28-61	Box Trash	105 B	Boxes	17	76.5	<10

Date	Material	Where From	Container	Amt	Cu ft	Rad level
5/4/61	Box Trash	WP/105 B	Box	2 ✓	9 ft	[illegible]
5/10/61	Box Trash	WA/105B	Box	4 ✓	18	≤10 MR
5/10/61	Box trash	WP/105B	Box	1	15	≤1 MR
5/11/61	Dummies & Basin Trash	Basin 105-B	None	21-Bucket	63	3-R
5-19-61	Box trash	105 B	Box	12 ✓	40½	10 M.R.
5-26-61	Box trash	105-B	Box	8 ✓	36 ft	10 M.R.
		JUNE 1961				
6/1/61	Box Trash	105-B	Box	4 ✓	18	<10 MR
6/1/61	" "	105-B	"	8 ✓	36	<10 MR
6/1/61	DUMMIES	105-B	NONE	32 BUCKETS	96	3R.
6/3/61	BOX TRASH	105-B	BOX	7 ✓	31.5	<10 MR
6/3/61	BARREL	105-B	NONE	1	7.0	<10 MR.
6/13	Box trash	105 B	~~Box~~ box	10 ✓	45	<10 MR
6/22	Box Trash	105 B	box	3 ✓	13.5	≤10 MR
6/26	Box Trash	105 B	box	6 ✓	27	<10 MR
6/26	BOX TRASH	105-B	BOX	16 ✓	72	<10 MR
		JULY 1961				
7/5/61	Boxes of Trash	105-B	Box	12 ✓	54	≤10 MR
7/10/61	Dummies	105-B	None	20 buckets	63	3R
7/10/61	Boxes Trash	105-B	Box	15	67	<10
7-11-61	Dummies	105-B	None	27 Buckets	81	[illegible]
7/13/61	Boxes of Trash	105-B	Box	5 ✓	18	<10 MR
7/16/61	Boxes of Trash	105-B	Box	11 boxes	49.5	<2 MR
7-20-61	TUBING	105-B	None	100 TUBES	100	100 MR
7-21-61	Boxes Trash	105-B	Boxes	16 Boxes ✓	64	<6 Mr.
7-29-61	BOXED TRASH	105-B	BOX	4 ✓	18	<6 MR
		AUGUST 1961				
8-8-61	Dummies	105-B	None	20 buckets	60	1R
8-11-61	Dummies	105-B	None	33 buckets	100	100 MR
8-20-61	Trash	105-B	Boxes	10 Boxes ✓	45	≤10 MR
8-25-61	Trash	105-B	Boxes	4 Boxes ✓	18	<5 MR
8-26-61	"	"	"	5 Boxes ✓	22.5	<5 MR
8-26-61	Trash	105-B	Boxes	5 Boxes ✓	23	<10
		SEPT. 1961				
9-3-61	Trash	105 B	Boxes	8 Boxes	36	<10
9-5-61	Trash	105 B	Boxes	11 " ✓	49.5	<5 MR/Hr
9-14-61	"	"	"	6 ✓	27.0	<5 MR/Hr
9-22-61	"	"	"	7 ✓	31.5	<5 MR/Hr

8

Oct

DATE	Material	WHERE FROM	CONTAINER	AMT	CU FT.	RAD LEVEL
10/12/61	Trash	105-B	Boxes	9	✓ 40.5	<5 mr/hr
10/14/61	Filter	105-B	✓	4	✓ 12.0	—
10/16/61	Bails	105-B	Boxes	8	24.	—
10-21-61	Trash	105-B	BOXES	14	✓ 58	<10 MR/HR
10-30-61	Dummies - Tubes -	105-B	None	14000 Pkg / 100 Tubes	310	5 R AT Top
11-26-61	TRASH	105-B	Boxes	6	✓ 18	
12-3-61	Trash	105 B	Boxes	12	✓ 52	<10 MR
12-13-61	Trash	105-B	Boxes	31	✓ 93	<10 mr/h
12-18-61	Trash	105-B	Boxes	10	✓ 40	<10 mr/hr.
1-5-62	PROCESS TUBING -	105-B-	NONE	100 TUBES.	100	5 R/HR
1-12-62	Process Tubing	105.B	None	50 tubes	50	
1-18-62	Trash	105-B	Boxed	9.	✓ 40.5	<10 mr/hr
1-19-62	Boxed Trash	105-B	Boxes	15	✓ 67	<10 mr/hr
1-21-62	"	"	"	14	✓ 63	<10
1-26-62	"	"	"	20	✓ 70	<10 mr/hr
2-2-62	"	"	"	33	148	<10 mr/hr
2-7-62	PROCESS TUBING	105-B-	NONE	3000 Pkg / 250 Tubes	300	5 R/hr
2-5-62	Dummies	105-B	NONE	10000 Pkg.	171	1 R
2-7-62	~~[illegible]~~ TUBING	105-B	NONE	140 TUBES	140	15 R
2-23-62	TUBING & DUMMIES	105-B	NONE	17000 Pkg / 100 TUBES	205	2 R
3-10-62	Trash	105-B	Boxes	8	2.6	50 mr/hr
4-20-62	Trash	105-B	Boxes	26	94	<5/mr
4-24-62	Trash	105-B	Boxes	15	45	<5/MR
4-25-62	Trash + Tubing	100-B	Boxes	4	12.0	25 MR
4-30-62	trash	100-B	Boxes	31	96.0	10 MR
5-7-62	Trash	100-B	Boxes	20	60.0	10 MR
5-9-62	Dummies & tubing	100-B	None	48 bu.	312	15 mr/hr
5-20-62		100 B	BOXES	14	45	<10 mr
5-22-62	TUBING	100-B	NONE	200 TUBES	200	5 R/hr
6-6-62	Tubing	100-B	None	~100 tubes	200	
6-21-62	TRASH	100-B	BOXES	15	60.	<5 M
6-25-62	5+6 Filters	100-B	Boxes	7	2.3	<5 M
REPORTED 6-29-62	TRASH	100-B	BOXES	12	60	<5 M
7-18-62	Trash	105-B	BOXES	14	45	<5 M
7-17-62	DUMMIES	105-B	NONE	4300	75	8 <5
7-20-62	TRASH	105-B	BOXES	20	100	2 <5
7-25-62	TRASH	105-B	BOXES	6	28	1 <5
7-27-62	DUMMIES	105-B	NONE	5250	90	10
7-30-62	TRASH	105-B	BOXES	16	72	2 <5

AIIM

Association for Information and Image Management

1100 Wayne Avenue, Suite 1100
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301/587-8202

Centimeter

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 mm

1 2 3 4 5

Inches

4 of 4

8-1-62 TRASH 105-B BOXES - 10 - 45 CU.F. <5 1
8-3-62 TUBING 105-B 5 BUNDLES 50 CU F 400 MR 12
8-3-62 DUMMIES 105-B NONE 6075 40 CU.FT. 400 MR 10
8-10-62 TRASH 105-B BOXES 20 100 CU.F. 1
8-10-62 CHARGING TRAY CRATES 5 500 CU.FT. 2
8-21-62 DUMMIES 105-B NONE 8500 pieces 147 1 R 12
8-21-62 Graphite Stringers 2 6 1 R 1

	DATE	MATERIAL	FROM	CONTAINER	AMOUNT	CU FT	RAD LEVEL	
	8-24-62	TRASH	105-B	BOXED	24	264	25MR	2
	8-24-62	PIPE FROM TOP OF UNIT	105-B	NONE	100'	IN-MAINT TRENCH		1
	8-31-62	POISON DUMMIES	105-B	NONE	6600	96'	1 R	10
	8-31-62	TRASH	105-B	BOXED				
	9-23-62	Trash	105-B	Boxed	2	9	<10MR	0
	9-26-62	DUMMIES	105-B	NONE	6000	110	1 R	10
	10-8-62	DUMMIES	105-B	NONE	3000	60	1 R	5
	10-8-62	TRASH	105-B	BOXED	15	65	<10MR	2
	10-15-62	TRASH	105-B	"	12	50	<10MR	1
	10-20-62	Trash	105-B	BOXED	11	33	<10MR	1
	10-21-62	"	105-B	"	3	12	<10MR	1
	10-22-62	TRASH	105-B	"	10	40	<10MR	1
	10-26-62	TUBING	105-B	NONE	2 BUNDLES	20	2 R	1
	10-26-62	DUMMIES	105-B	NONE	1500	45	2 R	10
	12-3-62	Trash	105-B	BOXED	12	36	<5MR	1
	11-28	trash	105-B	Boxed	20	90	<5mR	2
	12-8	trash	105-B	Boxed	10	45	<5mr	1
	12-17	trash	105-B	Boxed	25	100	<5mr	2
	12-18	trash	Hutment	— ?	100	400	<5mr	1
	12-28	Tubing	105-B	BUNDLES	21	210	400mr	2
	12-31	DUMMIES	105-B	BUCKETS	35 (6000)	105		12
	12-31	2 Gr Stringers	105B	2 Cans	2	7		2
1-2-63	1-2-63	TUBING	105B	BUNDLES	26 tubes	260	D. Raine	
	1-16-63	DUMMIES + TUBING	105	NONE	36 (6000)	108	(34) ~~12~~	
	1-28-63	Trash	105 B	Boxed	3	9	1	
	1-30	Trash	105 B	Boxed	26 box	117	2	
	1-30	Trash	105-B	Boxed	10 Box	45	1	
2-7-63	2-7-63	Tear split tubing	105-B	Wrapped	3	18	1	
	2-7-63	trash	105-B	Boxed	6 Boxes	18	1	
	2-14-63	Trash	105-B	BOXED	20	90	2	
	2-15-63	Barrel of trash	105 B	Barrel	1	5	1	
	2-21-63	trash	105-B	boxes	20 boxes	60	2 <5mr	
	2-27-63	Tubing	105B	Bundles	20	200	2 300MR	

TRIPS MADE	MAN HRS USED	DATE	MATERIAL	FROM	CONTAINER	AMOUNT	CU. FT.	RAD. LEVEL
		7-22-63	TRASH	105	BOXED	30	135	<10
		7-23-63	TRASH	105	BOXED	17	77	<10
		7-23-63	TRASH	105	BOXED	7	30	
		7-25-63	DUMMIES	105	NONE	6000	90	2-R
2	3	7-31-63	TRASH	105	BOXED	15	67	
1	1	7-31-63	COPPER TUBING	105	BUNDLED	2	5	
1	1	8-9-63	Trash	105	Baled & Bundled	5+1	12	
1	1	8-16-63	TRASH	105	BOXED	15	67	
1	1	9-12-63	TRASH	105	BOXED	20	90	
1	2	9-17-63	TRASH	105	BOXED	9	38	
1	2	9-20-63	TRASH	108	BOXED	20	90	
1	2	9-25-63	TRASH	105	BOXED	12	53	
1	1	10-1-63	TRASH	105	BOXED	6	25	
1	1	10-8-63	TRASH	105	BOXED	10	45	
1	.5	10-8-63	"	105	"	2	9	<1
1	1	10-14-63	"	105	"	12	54	<10
1	1	10-16-63	Trash	105	"	10	45	<10
2	8	10-17-63	Gunbarrels	105	None	5	5	100
4	2	10-17-63	Dummies	105	None	525	6	2R
	1	10-17-63	Tubing	105	None	1 bdl	4	10R
1	1	10-22-63	TRASH	105	BOXED	5	23	
10	20	10-23-63	Dummies	105	None	6000 pcs	90	5-R
1	1	10-31	TRASH	105	BOXED	16	72	
1	.5	11-10-63	Trash	105	Boxed	6	27	
	2	11-13	ELECTRICAL TRASH	105	BOXED	6	27	
	—	11-13	& CONDUIT	105	NONE	—	150	
	.5	11-17	Trash and grating	105	Roped	4	24	
	1	11-18	TRASH	105	BOXED	7	32	
	10	11-20	TUBING DUMMIES	105	NONE BUNDLE	5000	78 90	
	2	11-26	TRASH	108	BOXED	21	95	
	2	11-27	Trash	105	Boxed	9	36	<10mr
	1	12-29	TRASH	105	"	10	45	
1	1	12-31	TRASH	105	BOXED	16	45	

TRIPS MADE	HOURS USED	MAT.	FROM	CONTAINER	AMOUNT	CU FT.	DATE	RAD LEVEL
1	1	TRASH	105	BOXED	15	68	1-6-64	
2	2	"	105	"	22	99	1-14-64	
1	2	"	105	BOXED	8	36	1-20-64	
12	42	DUMMIES	115	NONE	8750 BOXES	150	1-21-64	
1	2	TRASH	105	BOXED	10	45	1-23-64	
2	2	trash	105	Boxed	14	47½	1-28-64	
19	51	T				445.7		
1	2	TRASH	105-115	BOXED	12	54	2-5-64	
1	1	Trash	105	Boxed	8	34	2-19-64	
1	2	TRASH	105	BOXED	12	54	3-2-64	
1	1½	Mattress plates gun barrel	105	Cannon wagon	5 M.P. 2 G.B.	15 2	3-3-64	
5	4	Dummies	105	None	5000 26 bucket	78	3-4-64	
1	2	TRASH	105	BOXED	10	45	3-11-64	
1	2	TRASH	105	BOXED	4	20	3-16-64	
1	2	TRASH	105	BOXED	12	54	3-17-64	
1	3	TRASH	105	BOXED	12	54	3-26-64	SORTED
3	3	Trash	105	Boxed	26	117	3-29-64	Sorted
1	1	Split Tubing	Workman 105	Wrapped	bundles 12	36	3-29-64	
2	3	PIG TAIL NOZZLES	105	BOXED	12	54	3-31-64	
1	20	TRASH	105	BOXED	20	90	3-31-64	
2	2	Trash	105	Boxed	28	126	4-7-64	
4	2	Trash	105	Boxed	40	180	4-14-64	
1	.25	Trash	105	Boxed	4	20	5-1-64	
1	1	Trash	105	Boxed	8	40	5-10-64	
16	16	Tubing	105	Bundled	16	160	5-11-64	
1	1	TRASH	105	BOXED	10	45	5-11-64	
8	25	DUMMIES	105	NONE	7000	120	5-08-64	
1	.5	TRASH	100	Boxed	4	20	5-12-64	
1	2	Trash	105	Boxed	7	30	5-16-64	
20	19	Tubing	105	Bundled	20	200	5-22-64	
1	1	Trash	105	Boxed	10	36	5/04/64	
19	12	TUBING	115	BUNDLES	19	190	5-25-64	
~~16~~	~~16~~	~~Tubing~~	~~105~~	~~Bundled~~				
1	1	TRASH	105	BOXED	4	18	5-26	
1	1	TRASH	108	BOXED	10	45	5-26	
1	1	TRASH	105	BOXED	6	30	5-30	
1	½	Trash	105	Boxed	5	30	6-7	
1	1	TRASH	105	"	6	28	6-9-64	
1	4	TRASH	105	BOXED	6	28	6-11-64	
1	1	TRASH	105	"	10	45	6-19-64	

AL. DUMMIES SOLID 8"

DATE	STARTING INVENTORY	RECIEPTS	FROM	TRANSFERS	TO	CHARGED TO REACTOR	ENDING INVENTORY			REMARKS
6-26-64										
6-27-64										

16

TRASH - TRENCH

TRIPS MADE	MAN HOURS	MAT	FROM	CONTAINER	AMOUNT	CU. FT.	DATE	RAD. LEVEL
1	1	TRASH	105	BOXED	10	45	6-27-64	
10	36	Dummie	105	None	7500	150 cuf.	6-28-64	1R
1	1	TRASH	105	BOXED	10	45	6-30-64	
1	1	Trash	105	Boxed	4	18	7-30-64	
4	8	Dummy	105	Loose	2000	50	8/7/64	
1	1	Trash	105	Boxed	12 box	120	8/7/64	
6	16	Dummies	105	NONE	3000#	105 cuft	8-10/64	
1	.3	Trash	105	Boxed	18	81 cu.ft	8-14-64	
1	2	Trash	105	Boxed	10	45	8-17-64	
1	.5	Trash	105	Boxed	3	13.5	8-18-64	
1	1.0	Trash	105	Loose	1/4 ton	6	8-19-64	
1	2.0	Trash	105	Boxed	12	120	8-19-64	
2	2.0	Trash	105	Boxes	16	72	8-20-64	cold
1	1.0	TRASH	105	BOXED	8	35	8-31-64	
1	1.0	CLOTHES	105	BOXED	4	15	9-3-64	lot clothes
2	2.0	TRASH	105	BOXED	18	81	9-8-64	
1	1.0	Trash	105	Boxed	7	31.5	9-13-64	
2	1.0	TRASH	105	BOXED	14	73	9-15-64	
1	1.0	TRASH	105	BOXED	8	36	9-18-64	

September 16, 1964

J. T. Baker
J. W. Baker
C. R. Barker
R. G. Clough
E. J. Filip
G. Fiorelli
R. C. Haynes
G. L. Madsen

RADIOACTIVE WASTE
FY 1965

On an annual basis we have been requested by RLOO-AEC to supply cost information related to our radioactive waste management program.

Because of a somewhat similar request two years ago, we initiated a monthly report form to be completed by each processing operation. Since we understand this information is logged and readily available, we are discontinuing the monthly request and ask that this data be furnished only at fiscal year end.

The basic information needed to compile this report will be:

1. Labor hours
   a. Processing
   b. Maintenance
   c. RM
   d. Other

2. Equipment hours and mileage
   a. Pickup
   b. Truck
   c. Crane
   d. Cat

3. Materials used
   a. Cartons, tape, etc.

4. Trench costs if performed by outside labor

5. Equipment fabricated during reporting fiscal year
   a. Carts
   b. Casks

TRASH ONLY LOW LEVEL

1964 DATE	TRIPS	LABOR HOURS PRO.	MAINT	RM	OTHER	EQUIP HOURS + MILEAGE PICK UP	TRUCK	CRANE	CAT	MATERIAL USED TAPE	CARTONS	ETC	TRENCH COST	EQUIPMENT FABRICATED TRASH	CU FT
9-23	2	1				✓					20			✓	90
9-23	1	1/2				✓					4			CONT CLOTHS	20
9-28	1	2				✓					8			Trash	36
10-1	1	1				✓					7			"	32
10-6	1	1				✓					8			Trash	36
10-7	1	1				✓					6			Trash	26
10-15-64	1	2				✓					12			trash	52
10-18-64	1	1				✓					9			trash	40
10-20-64	2	2	From 108			✓					21			TRASH	945
10-23-64	1	1				✓					26			TRASH	26
10-29-64	1	1	From 105B			✓					8			Trash	36
11/5/64	1	1	1			✓					16			Trash	72
11-8-64	1	1	From 105-B			✓					7			Trash	31
11-11-64	1	1	105-B			✓					6			TRASH	26
11-13-64	1	.5	105-B			✓					9			"	40
11-19-64	1	1		1		✓					9			Trash	40
11-20-64	2	4									30			TRASH	135
12-6-64	1	2				✓					14			Trash	63
12-29-64	1	2				✓					14			TRASH	63
1-2-65	1	2				✓					9			trash	40
1-6-65	1	2				✓					12			trash	52
1-12-65	1	2				✓					8			trash	36
1-14-65	2	2				✓					16			"	76
1-21-65	1	1				✓					14			"	63
1-22-65	1	1				✓					10			"	45
1-25-65	1	1				✓					10			"	45
1-26-65	8			8							9				36
1-27-65	1	1				✓					14			"	63
2-4-65	3	3				✓					28			"	126
2-6	1	1				✓					5			"	22
2-9	1	1				✓					8			"	34
2-9	1		8				✓ TRASH FROM 111 BUILDING								1000
2-13	1	1				✓					10			✓	45
2-16	1	1				✓					7			"	31
2-19	1	1				✓					10				45
2-28	1	2				✓					12			Trash	52
3-5-65	2	2				✓					20				90
3-9-65	1	1				✓					6			Trash	27
3-16-	1	1									10				45
3-18	2	2				✓					18			TRASH	81
3-21	1	1				✓					8			Trash	36
3-24	1	1				1					4			"	18

HIGH LEVEL ONLY

18

DATE	LABOR HOURS: TRIPS	PRO	MAINT	RM	OTHER	EQUIPMENT HOURS: PICK UP	TRUCK	CRANE	CAT	TYPE MATERIAL: # PERF	GUN BARREL #	G' STRINGERS	TUBING	TRENCH COST	EQUIP MADE
1-12-65	7	26		12						6000					
1-12-65	2	1		1								2			
~~[illegible]~~	~~2~~	~~2~~		~~1/2~~											
1-26-65	8	32		8		8				9000					
1-6	1	1				1									
2-10	5	15		6		✓				4500					
3-10	5	10		5						3500					
3.10	6	10		5						7600	From 105-C				
3-31	1	3	2	1		✓				Splines 20				w	
4-9-65	5	76	-	6		✓				500					
~~5-13-65~~	~~1~~	~~1~~		~~-~~		~~1~~									
6-2-65										splines 20					
6-15-65	8	32		16		8				7000					
7-30-65	6	16		8		✓				4550					
8-1-65	1	3		1		1							4 CF.		
9-2-65	8	16		8		2				5000		dummies.			
9-7-65	1	2		1			1			T/C wire & Duct				20 Cu ft	Low level
9-21-65	1	0		0		1				Sample Tubes			2 Cartons 9 Cu ft.		
10-8-65										8800		dummies.			

Date	Trips	Prec Rm	Moin	Other	P.U	Crane	other	cot	Tape	Cartons		Trash	c.ft
LABOR HOURS					Equip Hr - Mileage				Material			TRENCH / Equipment	
3-20-65	1	2-1			2					5		yes	20
3-24			6			4					misc trash	yes	250
		3-1									Scrap Metal		250
											dummies		10 (500)
~~3-26~~													
3-26			8					8	Leveling				
3-29			4					4	Leveling				
3-29	4	5	1						Sort & Equip				
3-31	1	1-1			1					9	Trash 105	yes.	45
3-31	3	6			3				Trash + Old Tools				250
4-2			8			1					Wood	yes	1000
4-8											Steel	yes	500
4-10	1	1			1 ✓					8		Yes	36
4-12	2	2								12		✓	52
4-16-65	1	2							6	Dry Filters (105)		✓	27
4-19	1	1			1					6		✓	30
	2	12	32		1			4	misc	Trash	+ Waste	✓	500
4-24-65	1	2							Trash	6		✓	20
5-3-65	1								✓	19	Trash	✓	86
5-6-65	1									3	"	✓	14
5-7-65	1	2			From 108					16			72
5-10-65	1	[illegible]			From 105				Trash	8	"	✓	36
5-13-65	1	1			1					5	Trash	✓	20
5-14-65	1				1				✓	8	Trash	✓	10
5-29-65	2				2	105			Trash	33		—	148.5
6-1-65	1				1					8		—	36
~~6-2-65~~	‡				~~[illegible]~~								
6-5-65	1				From 105-B					9	Trash		45
6-7-65	1	2			✓					7	Filters		37
6-12-65	1				✓					5		✓	27
6-18-65	1	1-1			2					8	TRASH		36
7-7-65	1				2					4	"		18
7-8-65	1	1			2					2	"		10
7-14-65	2	1			2					14			65
7-16-6	2	1		2	2					10	"	✓	45
8-8-65	1	1			1					10	"	✓	45
8-21-65	1	2			1				✓	9	"	✓	40
8-25-65	1				1					8	"	✓	40
8-27-65	1		3			1				8	Trash Cap	✓	36
8-27-65	1	2			1					8	"	✓	36
9-9-65	1	1			1					8	"	✓	36

9-10-65 [illegible]

Dug a 4 foot ... trench at burial ground at West end of 105 Pit #1. Pit 50 ft long and 4 ft deep. S. End 15 ft from S. Fence and parallel West fence 20 ft in.
Rod placed in the trench & covered.
[illegible]

Low Level Burial

1 box = 4.5 cc

Date	Trips	Proc hours	Manhours	Shift	Comment	Cartons	Material	Vol
9-17	1	2	1	A		10	Trash	45
9-21	1	2	1	Days		4	Tube sample	18
9-25	1	2	1	A		6	TRASH	26
9-29	1	2	1	Days		6	"	26
9-30	1	1	1	Days		6	"	26
10-3	1	3	1	A		10	"	45
10-4	1	4	1	A		6	"	26
10-4	1	1	1	C		10	"	45
10-11								
10-17	1	1		D		4	Trash	18
10-25	1	1	½	D		6	TRASH	26
10-25	1	1	0	Days			Clay	15
10-25	2	3	3	"			Piping	20
10-27	1	2	0	A			Piping	40
11-1	1	2	0	A			TRASH	45

"TRANSFER TO DOUGLAS - UNITED NUCLEAR NOV. 1, 1965"

TRANSFER TO DOUGLAS UNITED NUCLEAR, INC., NOV. 1, 1965

2.33 (8") THORIA .15
2.82 (8") THORIA .727
2.00 (6") THORIA .264

DATE FILMED

9/28/94

END