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- ✓ 100 Area all Reactors
- ____ 1100 Area
- ____ 200 East Area
- ____ 200 West Area
- ____ 300 Area
- ____ 3000 Area
- ____ 600 Area
- ____ 700 Area
- ____ Aviation and Space Technology
- ____ B Plant/WESF
- ____ B Reactor
- ____ C Reactor
- ____ Casting
- ____ Columbia River
- ____ Cost/Budget
- ____ D Reactor
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A SUBSIDIARY OF UNITED NUCLEAR CORPORATION

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ABBREVIATIONS USED IN DATA TABLES

Two abbreviations are used extensively in the tables included in this report. The abbreviations are not defined on each of the individual tables to avoid unnecessary repetition. The abbreviations are as follows:

* - Less than analytical detection limit

NA - No analysis performed.

A. INTRODUCTION

The purpose of this study is to establish radionuclide inventories and concentrations in the retired 100 Area radioactive solid and liquid waste disposal facilities, leakage areas, reactors, and associated facilities. The data presented in this document are intended to aid in establishing the long-term disposition and control procedures for these facilities. Short-term radiological control of the deactivated contaminated facilities and disposal sites has been established; however, with curtailment of Hanford production operations, long-term control of contaminated facilities must be established. The purpose of the long-term controls would be to place all facilities in a stable condition such that the possibility of polluting the environs with radioactive material or of affecting the local ecology through radiation exposure is minimized.

Initial operation of the original 100 Area facilities at Hanford began in 1944. A total of eight graphite moderated reactors using the Columbia River for once-through cooling, and a new type of dual-purpose reactor (N Reactor), using a recirculating water coolant, were eventually built along the Columbia River. Currently, N Reactor is the only one of the plutonium production reactors at Hanford in operation. The by-product steam is used for electrical generation at the adjacent Hanford Generating Project, which is owned and operated by the Washington Public Power Supply System.

The 100 Areas border directly on the Columbia River in the northern most portion of the Hanford Reservation. Figure A-1 is a map of the Hanford Reservation showing the location of the 100 Areas and other features.

By January, 1971, the eight single-pass cooling production reactors had been shut down. Short term measures to control residual activity were established. Four Hanford production reactor facilities, 100-B, C, KE, and KW are presently in standby status. Four other production reactors, 100-D, DR, F, and H have been retired.

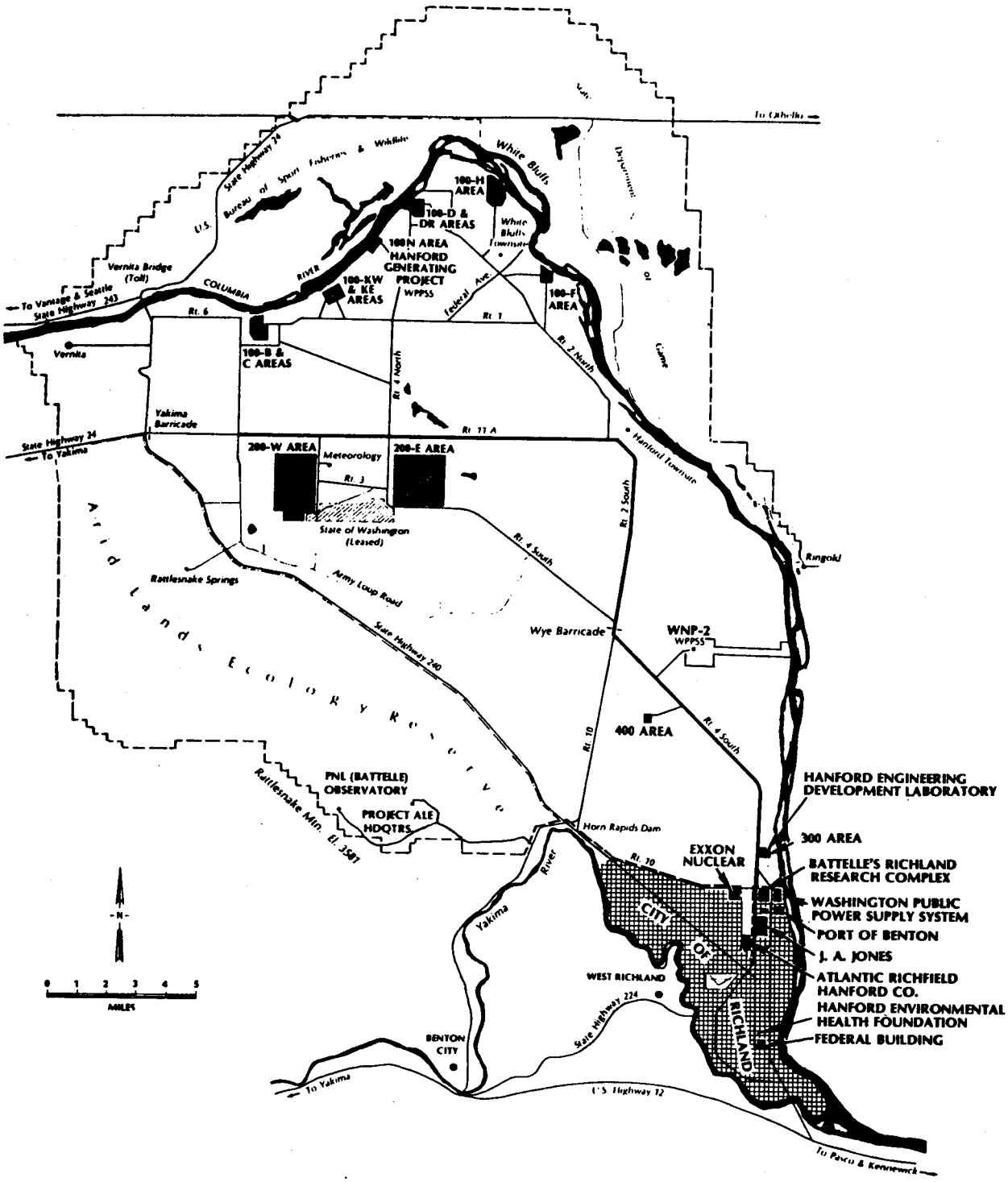


FIGURE A-1

MAP OF HANFORD RESERVATION

During the course of reactor production work, approximately 50 radioactive liquid waste disposal sites, 23 solid waste burial grounds, 35 contaminated facilities, and 20 liquid waste leakage areas which are now deactivated, were established in the 100 Areas. Due to incomplete or missing records and inadequacies in early radioanalytical techniques, the types and quantities of radionuclides placed in disposal sites are not known. This study attempted to characterize the remaining radioactivity in these facilities.

For purposes of this study, contaminated facilities are broken down into the following facility classes: Retention Basin Systems, Miscellaneous Cribs and Trenches, Burial Grounds, Reactors, Fuel Storage Basins, and Contaminated Reactor Ancillary Facilities.

The Retention Basin Systems include the 107 retention basins themselves, the 107 liquid waste trenches, effluent lines, and outfall structures. After primary coolant passed through the reactor and effluent pipes it was contained in retention basins. The purpose of a retention basin was to provide a short holdup time to allow for temperature decay and the decay of short half-life isotopes contained in the coolant prior to discharging to the Columbia River. During their use, radioactively contaminated sludge collected on the bottom of these basins. After deactivation, the retention basins were partially covered with fill dirt to stabilize this contamination. In addition, some contamination was deposited in the soil around leaks in the retention basins and effluent lines.

Effluents containing debris from fuel cladding failures were diverted to a 107 liquid waste trench located within a couple hundred feet of the basin.

The Miscellaneous Cribs and Trenches designation includes facilities, usually within a few hundred feet of the reactor buildings, which were used for the ground disposal of liquid wastes resulting from fuel failures, decontamination facilities, and liquid and sludge from the irradiated fuel storage basins. This category includes all of the cribs and trenches except for the 107 retention basin diversion trenches which are included under Retention Basin Systems.

The 100 Area burial grounds were used for burial of miscellaneous radioactive solid waste from the 105 reactor buildings and support facilities. These wastes include contaminated paper, rags, structural concrete, wood, and a variety of activated metals such as aluminum, steel, iron, and Zircaloy. Most of the metallic wastes were reactor hardware removed during maintenance projects.

The reactor thermal and biological shields, and graphite moderators account for the major portion of radioactivity remaining in the deactivated reactors. The Reactor Section of this study, therefore, is directed primarily at the characterization of the radioactivity remaining in the thermal and biological shields, and the graphite stacks.

A fuel storage basin is contained in each of the 105 reactor buildings. This storage facility is a large concrete basin which contained 20-foot deep water to act as a coolant as well as shielding of the irradiated fuel. Over the years, considerable sludge collected on the bottom of the basin. The sludge contains transuranics and fission products as well as activated coolant materials.

The major contaminated ancillary structures for the reactors are the 115 and 117 buildings. The reactor moderator (graphite) had a helium and carbon dioxide cover gas. The gas was recirculated at low pressures to minimize gas losses. Driers, injection and circulating equipment are located in the 115 building. All reactor building exhaust gases (primarily ventilation) were filtered and, subsequently, exhausted through a 200-foot high stack. This equipment is located in the 117 building. Underground ventilation and gas piping tunnels running from the reactor building to the 115 & 117 buildings, and in the case of the ventilation tunnels, from the 117 building to the stack, are also contaminated.

It should be noted that characterization of the contaminated 100-F biology facilities formerly used by Battelle-Northwest Laboratories were not included in the scope of this study. Also, all solid waste burial grounds, cribs and trenches, retention basin systems, and contaminated reactor ancillary facilities in the deactivated reactor areas are considered as retired for

purposes of this study, irregardless of whether the reactor is officially considered as being on standby or retired.

B. SUMMARY

Progress Overview

The radiological characterization program was initiated during February 1975. During FY 1975 a literature search was performed which located and reviewed historical records of past solid and liquid waste disposal activities in the 100 Areas. Sampling patterns and techniques for the liquid waste disposal sites were selected and implemented.

During FY 1976 sampling of all of the retired 100 Area radioactive liquid waste disposal sites was completed. All of the retired 107 retention basin systems and associated diversion trenches were sampled. Samples were taken of the contaminated fill inside of the basins. Sample holes were drilled along the effluent lines, along the outside of the retention basin walls, and through the basin floors to characterize the remaining contamination from past leakage. Samples were taken of the scale and sludge contained in the effluent lines and junction boxes.

The sampling of the miscellaneous liquid waste disposal cribs and trenches in the retired 100 Areas was completed April 5, 1976. These waste disposal facilities included the Lewis Canal, 105 pluto cribs, 105 metal storage basin trenches, etc. Sample hole drilling was performed using standard well drilling techniques.

Drilling of selected burial trenches in the 118-B-1 radioactive solid waste burial ground was completed on April 29, 1976. Techniques studied by Battelle-Northwest in a separately funded program did not develop to the point of providing a usable method for surface mapping of buried materials in the solid waste burial grounds. Complete characterization of the retired 100 Area burial grounds in the future will depend upon the demonstration of suitable mapping techniques for buried materials.

Radiation surveys of contaminated buildings other than the reactor buildings (115, 117, 1608 buildings, etc.) were initiated in August 1976. Detailed radioanalytical analyses were performed for selected smears.

Upon completion of the soil sampling program in April of 1976, UNI planned to initiate sampling of the retired 100 Area reactors. Labor disputes in the Hanford area, however, resulted in a delay of over 6 months in initiating the reactor sampling program.

During November 1976 construction employees returned to work and started gathering, modifying, and setting up the necessary core boring equipment to initiate the reactor sampling program. Reactor core sampling at the X-levels of the 105-DR Reactor was initiated on December 28, 1976. Four test holes were drilled at 105-DR. Sampling of the reactor core required drilling sample holes through a 1-inch steel plate which encloses the biological shield, through the biological and thermal shields, and into the graphite stack.

Sampling of the first test hole, A, was completed on January 28, 1977. Drill shavings samples were taken of the biological shield, and a continuous core sample of the thermal shield was taken and segmented into sections for radionuclide analyses. Two graphite core samples were taken in the reflector area, and five graphite samples were taken in the active portion of the reactor to a total distance of 33 feet, which is 6 feet from the reflector area at the opposite side of the reactor. The indicated dose rate on the 33-foot sample was 20 mR/hr. All other graphite samples were less than 2 mR/hr.

By March 14, 1977, a second test hole, B, had been completed; and the biological and thermal shield samples of test hole C had been taken. At this point the sampling was temporarily terminated and the drilling equipment placed on standby until additional funding could be obtained to complete the

work. Additional funding became available in late August 1977. The sampling work was restarted on August 29 and completed on September 22, 1977. A total of four test holes were drilled into the DR Reactor core. Selected samples were submitted for radioisotopic analyses.

Results

The radioactive liquid waste disposal facilities and leakage areas in the deactivated 100 Areas contain a total estimated radioactive inventory of 4,400 curies. These facilities include the 107 retention basin systems and their associated diversion trenches and leakage areas, and the other miscellaneous cribs and trenches in the deactivated 100 Areas. Almost 50% of this inventory (2,100 curies) is contained within the mile long K-Trench, designated as 116-K-2. The remaining radioactivity is almost equally split between the retention basin systems, and the miscellaneous cribs and trenches. The total radioactivity in, underneath, and adjacent to a retention basin is typically the order of 10^2 curies. Individual crib and trench inventories range from less than 1 mCi up to 300 curies.

The deactivated 100 Area reactors have been shutdown from 7 to 13 years depending upon the particular reactor. Short-lived radionuclides which were of primary concern during operating periods such as Zn-65, Cr-51, Mn-56, etc. have decayed away to below detection levels. The principal radionuclides remaining in these facilities include Eu-152, Eu-154, Eu-155, Co-60, Cs-137, Sr-90, and Ni-63. C-14 and H-3 are dominant radionuclides in a few cribs, viz, the 115-KE and KW cribs, and H-3 in the 108-B crib. Maximum beta-gamma concentrations for the various radioactive liquid waste disposal facilities range from 10^{-1} to 10^6 pCi/g, and are generally less than 10^4 pCi/g. Soil contamination usually drops off to essentially background levels within 5 to 20 feet below the crib, trench or retention basin bottoms.

Low-level Pu-238, Pu-239/240 contamination is also present within the liquid waste disposal facilities. Plutonium will be the most significant

radionuclide in determining the ultimate disposition of the individual facilities. The highest plutonium concentrations are primarily in sludge along the 107 retention basin floors, typically being about 10^2 pCi/g. Plutonium concentrations up to 130 pCi/g are present in the K-Trench, and average 8.5 pCi/g. The K-Trench contains the highest plutonium inventory of the deactivated radioactive liquid waste disposal facilities, with approximately 5 curies of plutonium. A retention basin contains less than 1 curie of plutonium, generally the order of 10^{-1} curies.

Average plutonium concentrations are a few pCi/g in most of the 105 metal storage basin trenches and pluto cribs. The 105-C pluto crib sand filter, however, has plutonium up to 3.1×10^3 pCi/g and averaging 38 pCi/g. About 0.2 curies of plutonium are contained in the 105-C pluto crib sand filter. Average plutonium concentrations in the majority of the other cribs and trenches are usually less than or equal to 1 pCi/g.

Radioactive inventories within the 100 Area radioactive solid waste disposal facilities were not established as part of this study. Estimated inventories in the burial grounds, however, are reported in PWM-530, Rev 1, Hanford Waste Management Plans. The PWM-530 inventory estimates are based upon a review of past burial records and a limited sampling of the different types of discarded reactor hardware and wastes that went to the burial grounds. The 100 Area burial grounds contained 30,000 curies through 1971, primarily Co-60. Decay correcting through 1977 gives an estimated inventory of 14,000 curies.

Sampling of the 100 Area radioactive solid waste burial grounds was limited to the 118-B-1 burial ground. This sampling was not directed at establishing a refined estimate of the radioactive inventory which would require retrieving metallic wastes such as control rods, thimbles, gun barrels, etc. that contain the majority of the remaining radioactivity. Fourteen sample holes were drilled into the miscellaneous trash burial trenches in the 118-B-1 burial ground. The primary radionuclide identified is Co-60 (up to approximately

2×10^5 pCi/g), though Eu-152, Eu-154, Eu-155, Cs-134, Cs-137, Sr-90 and Ni-63 are also present. The maximum Pu-239/240 concentration detected in samples is 1 pCi/g. Plutonium is generally not detectable. No measurable migration of radionuclides from the burial trenches is indicated by the sampling data.

The highest concentrations and inventories of radioactivity remaining in the deactivated 100 Areas are in the reactor blocks. Based on core sampling, approximately 17,000 curies are estimated to be contained in the thermal shields of the 105-DR reactor. Approximately 98 percent of the inventory is Co-60, and the remaining activity is from Ni-63. Direct in situ dose rates of selected process tubes at 105-DR range from 30 to 80 R/hr in the vicinity of the thermal shield and gun barrels. Similar measurements taken at the other retired reactors ranged from approximately 30 to 300 R/hr.

An estimated 18,000 curies of radioactivity are contained in the 105-DR reactor graphite, approximately 67 percent of the inventory is from H-3 and 27 percent from C-14. Other mixed fission and activation products are also present (primarily Sr-90, Ni-63 and Co-60) and account for the remaining portion of the inventory. Pu-238 and Pu-239/240 are present with inventories of 7 and 4 curies and average concentrations of 4.1×10^3 and 2.6×10^3 pCi/g, respectively. For the radionuclide concentrations and inventories in the 105-DR reactor graphite, calculations indicate plutonium and Sr-90 to have the highest radiotoxicity. Because of the long half-lives of plutonium, Sr-90, Ni-63 and C-14, these radionuclides will be instrumental in establishing the ultimate disposition strategy to be used for the reactors.

Significant Pu-238, Pu-239/240 concentrations are present in sludge along the floors of the 105 metal storage basins. Average Pu-239/240 concentrations for the 105-B and C basin sludge are approximately 3.0×10^4 pCi/g. Federal regulations require retrievable storage of waste materials containing average

TRU concentrations above 1.0×10^4 pCi/g. Sludge in the 105-B and C basins, therefore, must be treated as transuranic waste. Average Pu-239/240 concentrations in the other 105 metal storage basins are about 10^3 pCi/g, or an order of magnitude less than retrievable storage levels. Sludge in a metal storage basin typically contains 100 curies of mixed fission and activation products. Plutonium inventories range from 0.07 to 1.7 curies.

Background doserates within contaminated sections of the reactor ancillary facilities are generally less than 1 mR/hr. Direct dose rate readings of piping and other equipment in sections of the 115 and 117 buildings range up to a maximum of 30 mR/hr. Smearable beta contamination ranges up to a maximum of 200,000 dpm/100 cm^2 using a proportional counter and is generally less than 10,000 dpm/100 cm^2. Smearable alpha contamination is present up to a maximum of approximately 1,000 dpm/100 cm^2, but is usually less than 20 dpm/100 cm^2. The primary contributor of radioactivity with high enough energies to be detected with a GM probe are Co-60 and Cs-137, though lower concentrations of Sr-90, Cs-134, Eu-152, Eu-154, and Eu-155 are also present. C-14 and H-3 (both low-energy beta emitters) are present within sections of the 115 and 117 buildings associated tunnels. Standard smears have C-14 contamination up to a maximum of 2.1×10^6 pCi/100 cm^2 and H-3 up to a maximum of 1.3×10^4 pCi/100 cm^2.

Adequate short-term control of the contaminated deactivated 100 Area facilities and disposal sites has been established. Maintaining this radiological control requires an ongoing maintenance/surveillance program. Costs associated with this maintenance/surveillance program are expected to increase due to facility deterioration.

Future stabilization and/or removal attempts to establish long-term contamination controls will be dependent upon the definition of radiological release criteria for future decommissioning activities at Hanford. Guidance on acceptable levels of surface contamination is provided in AEC Regulatory Guide 1.86 "Termination of Operating Licenses for Nuclear Reactor." Materials

having surface contamination below these levels may be granted unrestricted release from radiological controls. No definite guidelines or regulations currently exist on acceptable levels of radiological contamination for various classifications of nuclear facilities or for potential uses after decontamination. Only limited guidance has been provided on acceptable activity levels when radionuclides are uniformly distributed in some matrix. Battelle Northwest is establishing radiological release criteria for future decommissioning activities at Hanford as part of the "Disposition of Retired Contaminated Facilities at Hanford" study. Based on dose calculations, radiological release criteria are being derived that will provide long-term public protection from any residual contamination remaining in decontaminated facilities.

2.0 RETENTION BASIN SYSTEMS

2.1 General Description of the 107 Retention Basin Systems

Cooling water discharged from the rear face of a reactor returned back to the Columbia River via a 107 retention basin system. The retention basin system for a reactor consisted of a 20-foot deep concrete or steel reservoir, and associated effluent lines which ran from the reactor to the basin and then to the middle of the river through an outfall structure. An outfall structure consisted of an open concrete sump and the effluent lines which ran from the sump to approximately mid-channel of the Columbia River. Each outfall structure also included a concrete overflow spillway which terminated at the river shoreline.

During reactor operation the intense neutron flux in the core of the reactor caused a number of the macro and trace constituents of the cooling water to become radioactive. The retention basin held the cooling water up long enough to allow decay of many of the short-lived activation products before the water was released to the river. Some of the activity was deposited with sludge which settled in the basin and effluent lines. In addition, some contamination was deposited in the soil around leaks in the retention basin and effluent lines. After deactivation, the retention basins were partially covered with fill dirt to stabilize this contamination.

Figure 2.1-1 is a recent photograph of the inside of the 107-F basin. Figure 2.1-2 shows an effluent line running to the 107-F basin. F Area is the only area with a large section of the effluent lines exposed rather than being underground.

Effluents containing debris from fuel cladding failures were diverted to a 107 liquid waste trench usually located within a couple of hundred feet of a retention basin. The 107 liquid waste trenches were also used during deactivation of the 107 retention basins. During deactivation, water was pumped out of a retention basin to its adjacent

FIGURE 2.1-1

107-F RETENTION BASIN

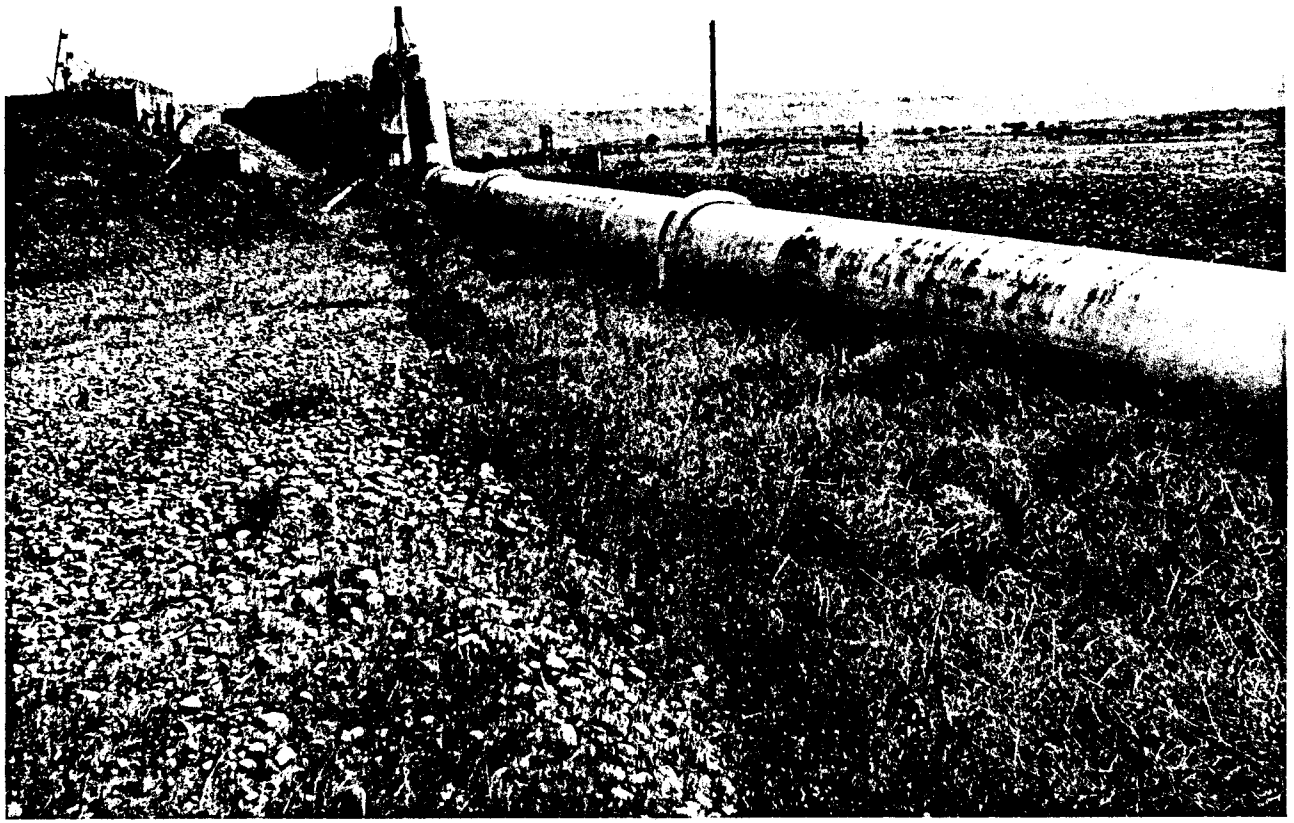


FIGURE 2.1-2

EFFLUENT LINE TO 107-F

diversion trench. As the water level in the basin was lowered, the walls were washed down by hosing with water. These 107 liquid waste trenches are also included in this section on Retention Basin Systems.

2.2 Operating History of the 107 Retention Basin Systems and Associated Diversion Trenches

B, D, DR, F, and H Reactor Areas

Radioactively-contaminated coolant effluent disposal procedures and facilities varied considerably with time and from area to area. Prior to 1948, the year the first fuel cladding failures occurred, there was no capability for releasing effluent to ground. That year diversion trenches were excavated in the vicinity of the original reactor 107 retention basins (107-B, D, F) making it possible, with the modification of pumps and the installation of piping, to empty one side of a retention basin at a time to the new trenches. The concrete retention basins installed for DR and H Reactors were similar to the original basins except they could be drained to the trench by gravity, eliminating the need for pumps. The same trench was shared by DR and D Reactors. From all reactors the flow was directed to one side of a retention basin during normal operation while the other side remained empty. When a reactor was shut down because of a fuel cladding failure, the effluent flow was switched to the empty basin and the full basin containing the fuel cladding failure effluent was drained to the trench. The effluent contained fission products resulting from the reaction of bare irradiated uranium with hot water following the fuel element cladding failure.

Records indicate the practice of diverting fuel cladding failure effluent to ground was followed quite regularly until about 1954. By that time coolant flows had increased to the point of concern that further increases would cause the concrete basins to overflow. This coupled with a leakage problem from the full side into the empty side, causing deterioration of the structure, brought about a change in operating procedure whereby the 107-B, D, DR, F, and H basins were operated in parallel; i.e., the effluent flow was split into both sides of the retention basins. Keeping both sides of concrete basins full

became recognized as an important factor in curbing basin deterioration. Consequently, the change to parallel operation in 1954 virtually marked the end of cribbing rupture effluent from any of the five above mentioned reactors with concrete basins inasmuch as there was no facility to accept diverted flow.

C Reactor

Effluent following fuel cladding failures at C Reactor was cribbed regularly from startup in 1952 until about 1958. The retention system consisted of two 10-million gallon tanks and a separate trench from the one used by B Reactor. The entire coolant flow was normally directed to one tank, but after reactor shutdown because of a fuel cladding failure, the effluent flow was switched to the empty tank and the full tank containing the fuel cladding failure effluent was drained to the diversion trench. An incident in which wind action caused spread of contamination from the trench prompted partial fill of the trench with rock to prevent recurrence. Cracking of the welded seams of the tank resulted from the addition of hot water to the cold tank. After a series of repair efforts extending into 1958, parallel operation of the tanks became common and with this, the cribbing practice ceased. The cribbing practice was not revived even after extensive modifications of the B and C effluent systems made in 1961.

KE-KW Reactors

The effluent system originally installed for the K Reactors included two sets of three 9-million gallon steel tanks, one set for each reactor, and a square drainage pond or crib (116-K-1). The tanks were designed to operate on a cycle system whereby one tank would be filling with effluent, a second tank holding the effluent for decay, and the third tank draining either the normal effluent to the river outfall or the effluent containing radioactivity from a fuel cladding failure to the pond. This batch disposal scheme was regulated by automatic valving. The cycling practice, however, was abandoned shortly after startup of the KE Reactor when this method of operation caused an outfall line to float and break. The lines were anchored and the flow through the tanks changed. The effluent was sent to one tank and

overflowed to the outfall system. Within a relatively short time the practice of sending the coolant effluent to two tanks in parallel became routine. The third tank was usually empty and ready to receive effluent soon after the reactor was shut down because of a fuel cladding failure. The effluent containing debris from the fuel cladding failure in the two full tanks was drained to a trench (116-K-2) excavated following failure of the square drainage pond. This practice later (about 1960) degenerated into the practice of draining only one of the tanks containing fuel cladding failure products to the trench. The second tank was rarely drained. This partial cribbing practice continued to degenerate because of leaking and difficult to operate valves. The effluent water in the tanks leaked through valves into the lines which drained to the trench, causing the trench to fill and sometimes overflow. By 1965 attempts to crib effluent following a fuel cladding failure were rarely successful.

Because of the 116-K-2 (K trench) trench's large size, the large volumes of contaminated water it received, and the fairly high inventory of radioactivity remaining in the facility, a discussion of the K trench (or mile-long trench as it was sometimes called) is included below.

The K trench extends eastward, parallel to the river for about 4100 feet from the northeast corner of K Area. It served both K Reactors. During operation of the trench water was about 14 feet deep varying with inlet flow. The side slope of the trench was gradual resulting in about a 50-foot width at upper water line edge.

Normal flow to the K trench included the following:

- All contaminated floor drains in 105 buildings, low volume.
- About 500 gpm per K Reactor metal storage basin overflow.
- Up until KE and KW shutdown about February 1, 1970, an undetermined amount of 107 effluent basin leakage through 42-inch butterfly valves in tank bottoms. Leakage was variously estimated between 10,000-20,000 gpm. The valve leakage showed a history of increase until 1968 valve and tank renovation work. Leakage gradually increased again, however, after these repairs.

Other periodic sources of flow to the K trench included:

- Low volume neutralized dummy decontamination waste.
- Process cooling water during charge-discharge via metal storage basin and cross-under line.
- Approximately 700 gpm metal storage basin flow during charge-discharge to aid in keeping basin water clear for visibility purposes.
- Occasional (about one per year per reactor) rear face decontamination wastes automatically diluted with metal storage basin flow.
- Occasional "special" disposal such as waste from a single cross header through-reactor decontamination experiment.
- Occasional tank of process cooling water collected after a fuel cladding failure.

2.3 Leaks from the 107 Retention Basin Systems

The retention basins and their approximately 5-foot diameter effluent lines developed leaks during the operating life of the facilities. Some of the retention basin systems had leak rates which were said to be as high as 5,000 or 10,000 gpm.

Several years after operations started in each of the Hanford reactor areas, the temperature of the groundwater beneath those sites increased noticeably. It was found that the temperature increase in most cases was caused by thermally hot reactor effluent cooling water percolating downward into the ground through cracks and joints in the bottom of the 107 retention basin structures and leaking effluent lines carrying the water to these basins. As a result of this leakage, groundwater mounds were formed beneath the retention basins which greatly increased the hydraulic gradients between the basins and the Columbia River. The gradients thus formed were sufficient to produce riverbank thermal springs in the proximity of the retention basins at each reactor area. A perspective drawing of the water table underlying the 100-D and 100-H Areas in 1967 is given in Figure 2.3-1.

A summary of what is known about the locations of these leaks is given in the following few paragraphs.

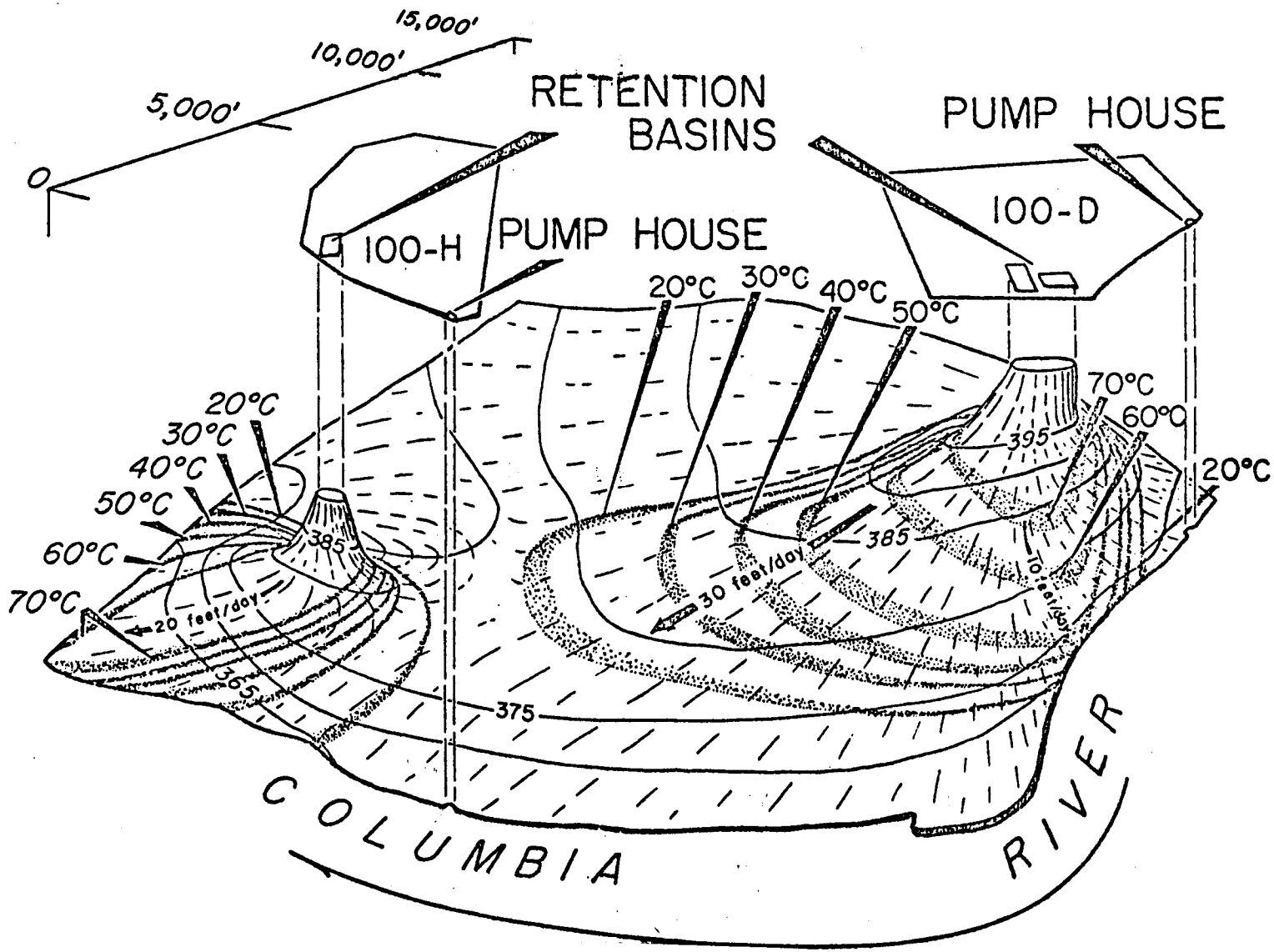


FIGURE 2.3-1

PERSPECTIVE DRAWING OF THE WATER TABLE UNDERLYING THE 100-D AND 100-H AREAS DURING 1962

2.3.1 107-B Retention Basin

The leaks from the 107-B retention basin were greatest on the northeast side of the basin. There were also several leaks in the pipe on the outlet end of the basin. The leaks were not covered. For more detailed information, see Figure 2.3-2.

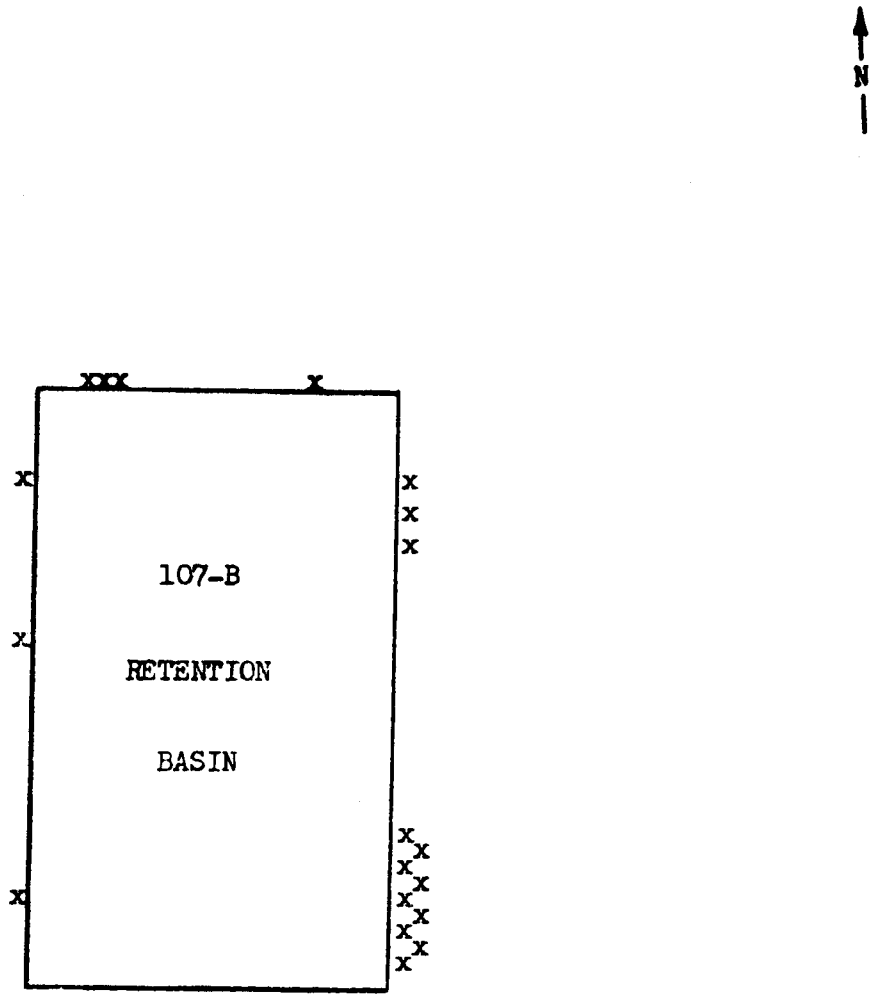
Gross leaks in the basin area from the effluent line from 105-B to 107-B were first observed early in 1952, and they steadily increased in volume. There were also two known leaks near 105-B in the effluent line from 105-B to 107-B. These leaks occurred during the last half of 1952: one was near the #2 diversion box for the 30" line and the other was around the 8-inch riser for a temporary by-pass line northeast of the 105-B building. In both places, the contaminated area was covered with at least 3 feet of soil. For more detailed information on the effluent line leaks, see Figures 2.3-3 and 2.3-4.

During February, 1954, a break occurred in the 107-B basin. A survey on February 25, of the area around the basin covered with water, disclosed a variation in readings from several hundred c/m to 13 mrad/hr. The amount of radioactive material in the water was comparable to that in normal reactor effluent water; beta radioactivity of the mud was 10^{-4} to 10^{-2} μCi/g. The contamination was confined to the immediate vicinity of the 107-B basin.

2.3.2 107-D Area

Effluent leakage areas in the 107-D/DR retention basin vicinity are shown in Figure 2.3-5. The greatest leakage of the 107-D retention basin occurred in the spring of 1950 on the north side between the basin and the river. Effluent water had drained under the road to the section between the road and the perimeter fence. GM readings up to 10,000 c/m at surface were detected.

As a result of excessive leakage being detected above ground about 150 feet southeast of the 107-D retention basin, two



(Approximate location of leaks shown by a small "x".)

FIGURE 2.3-2

107-B BASIN LEAKAGE

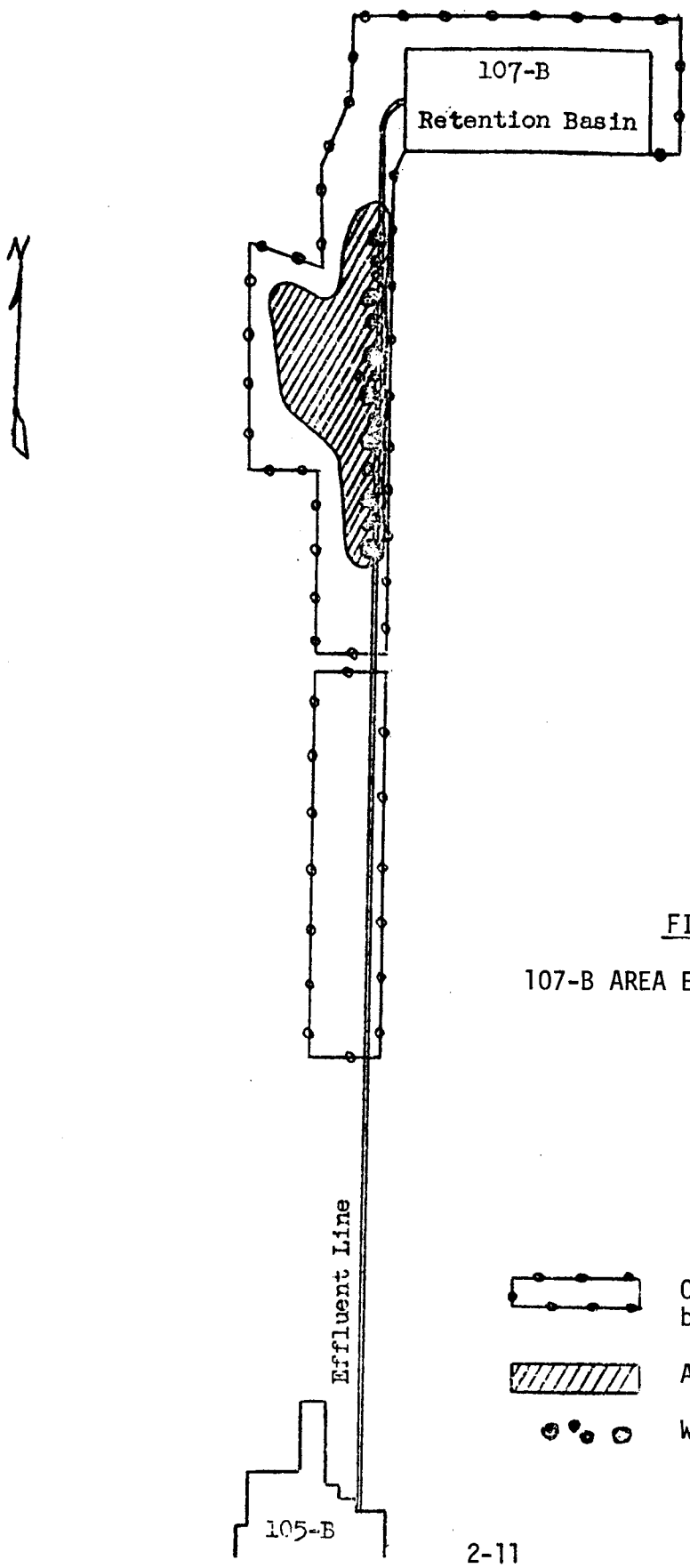


FIGURE 2.3-3

107-B AREA EFFLUENT LINE LEAKAGE

Original Radiation Zone boundaries

Area covered with water

Water bubbling up here

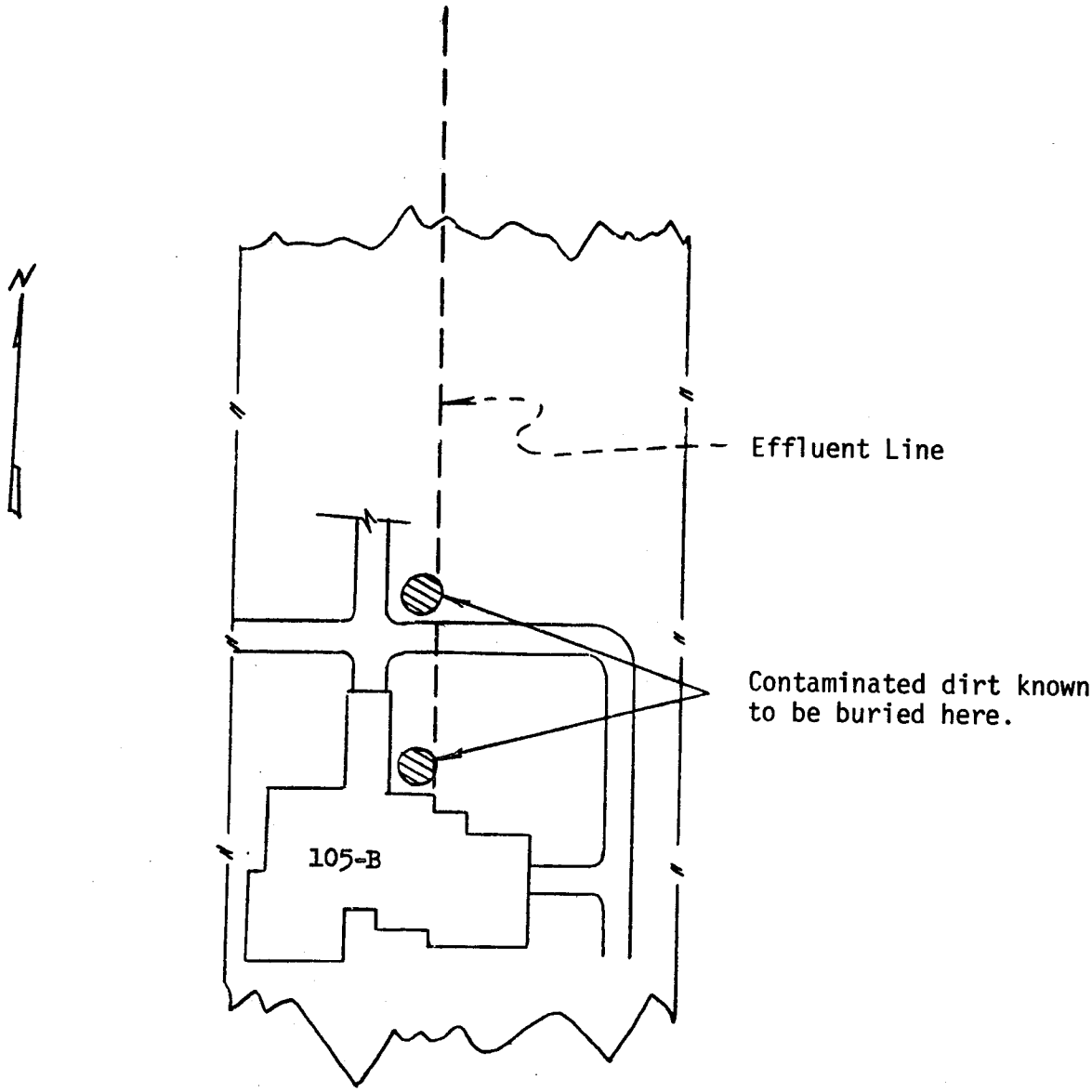


FIGURE 2.3-4

100-B AREA EFFLUENT LINE LEAKAGE

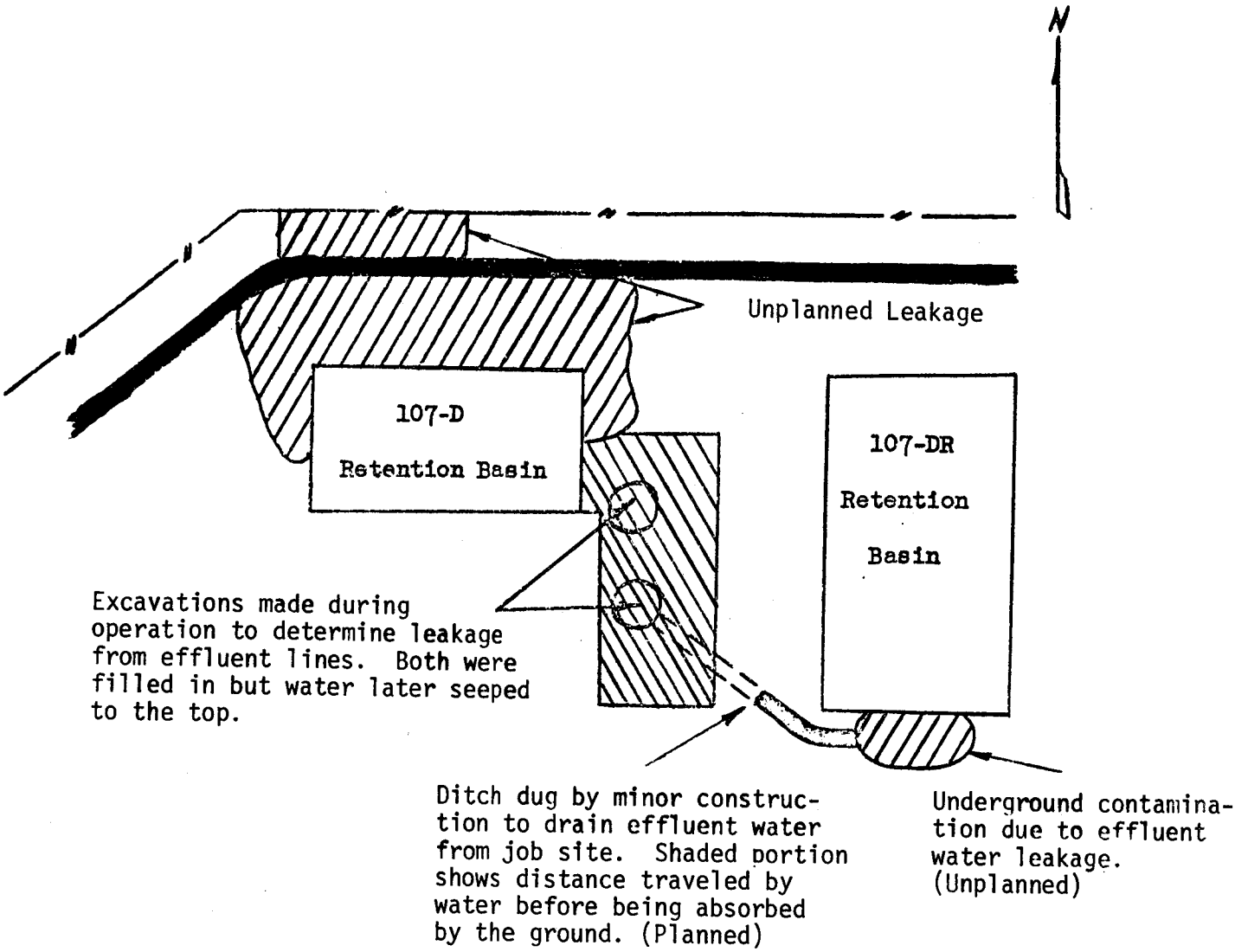


FIGURE 2.3-5

107-D AREA LEAKAGE

excavations were made, going down to pipe level, late in 1951. Maximum dose rate reading observed at that time was 50 mrad/hr at surface. The holes were then covered, but effluent water later seeped to the surface.

Extensive leakage of effluent water at the inlet end of the 107-DR retention basin was caused by the pipes pulling loose from the basin wall. Readings up to 100 mrad/hr were detected at the surface of the mud. Part of this contaminated soil was used in the fall of 1952 as backfill for the excavation around the anchor blocks south of the 107-DR basin. All contaminated soil was then covered with approximately 2 feet of clean soil.

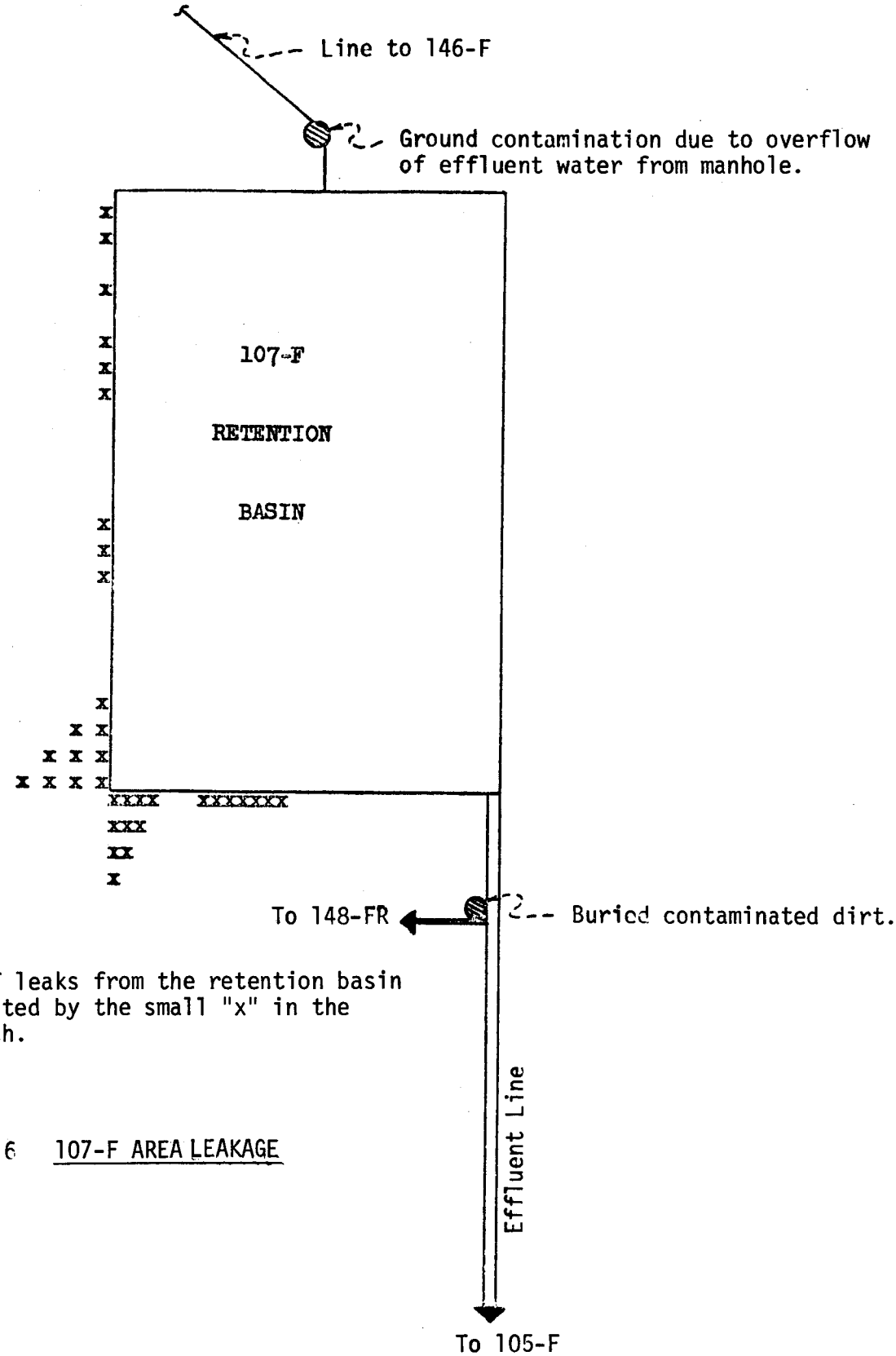
During the repair of the leakage at the inlet end of the 107-DR basin in the fall of 1952, it was necessary to drain the effluent water from the job site. Accordingly a trench was dug from the southwest end of the DR basin towards the southeast corner of the D basin. Upon completion of the job the trench was backfilled with approximately 4 feet of soil.

2.3.3 107-F

The largest known leak from the 107-F basin extended roughly 25 feet from the foot of the basin wall.

A leak in the effluent lines going to the 148-F pumphouse was discovered in the summer of 1952 when enough water had escaped to cause the ground level to become saturated over an extended area. After the pipes were repaired the contaminated soil was returned to the hole up to a foot of the ground level and then covered with clean soil.

Another source of contamination was a large manhole at the outlet end of the basin. Effluent water overflowed intermittently for an extended period before it was stopped. Figure 2.3-6 shows the approximate locations of these leakage areas near the 107-F retention basin.



Location of leaks from the retention basin are designated by the small "x" in the above sketch.

FIGURE 2.3-6 107-F AREA LEAKAGE

Baffles in the 107-F basin broke loose and plugged the basin outlet on May 23, 1955. The overflow of the 107 water contaminated the immediate vicinity of the basin and a narrow path between the basin and the river (Figure 2.3-7). There was general contamination from 20,000 to 60,000 c/m, with a maximum of 350 mrad/hr. One of the baffle boards carried out by the water read 14 rad/hr. Gamma spectrometer analysis of a chip from this board showed a high percentage of Sc-46, with some Cr-51.

During deactivation of the basin in 1965, the bottom of a narrow ditch which originated near the northeast corner of the basin and ran to the river was contaminated to about 3000 c/m along its length. One spot measured 30 mR/hr at contact. The ditch was covered with about 2 feet of soil cover. The source of this contamination was the incidents discussed in the two previous paragraphs.

2.4 107 Basin Sludge Burial Trenches

Several small burial trenches were dug near the concrete 107 retention basins for the purpose of burying sludge that had accumulated in the bottom of the basins. The approximate locations of these basin sludge burial trenches were documented. A summary of these sludge burial trenches follows.

2.4.1 107-B

A 120' x 10' sludge burial trench is located immediately north of the 107-B retention basin. The trench was dug in the spring of 1948. After use, it was covered over with approximately 6 feet of soil.

In late 1952 a second sludge burial trench was dug near the 107-B basin. The waste was covered with about 6 feet of clean soil. The locations of the above sludge burial trenches are indicated in Figure 2.4-1.

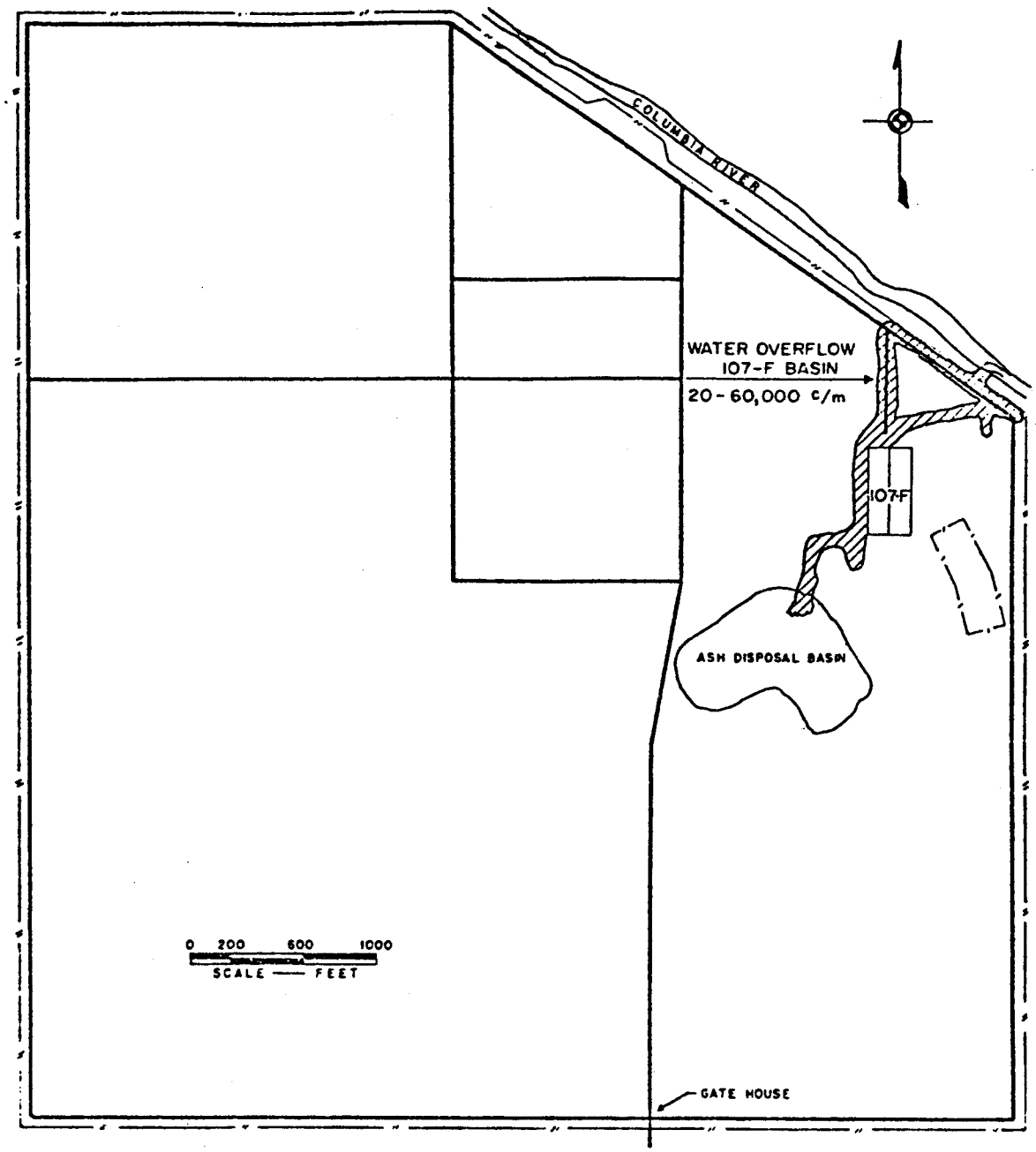


FIGURE 2.3-7

GROUND CONTAMINATION PATTERN,
100-F - MAY 23, 1955

2.4.2 107-D/DR

Four trenches were dug in the 107-D/DR retention basin area for the disposal of sludge that had accumulated at the bottom of these basins. These trenches were all dug in the spring of 1953 to facilitate repair of the basins by minor construction forces and were covered after use with approximately 6 feet of clean soil. See Figure 2.4-2 for the locations of these sludge burial trenches.

Fill dirt used to cover sludge along the 107-D/DR retention basin floors during deactivation was obtained from the immediate vicinity of the basins. It is believed that some of the fill dirt was removed from the sludge disposal trenches.

2.4.3 107-H

Sludge and waste removed from the 107-H retention basin during repair work in the spring of 1953 were buried in a trench east of the basin. The trench was originally covered to grade with 5 feet of soil. In May, 1965, the location was excavated to a depth of approximately 6 feet to obtain fill material for the 107-H basin. There was no indication of remaining radioactivity and consequently the site was released from radiological controls. The location is indicated in Figure 2.4-3.

No sludge burial trenches are documented for the 107-C, F, KE, and KW retention basins.

FIGURE 2.4-1

107-B SLUDGE BURIAL TRENCHES

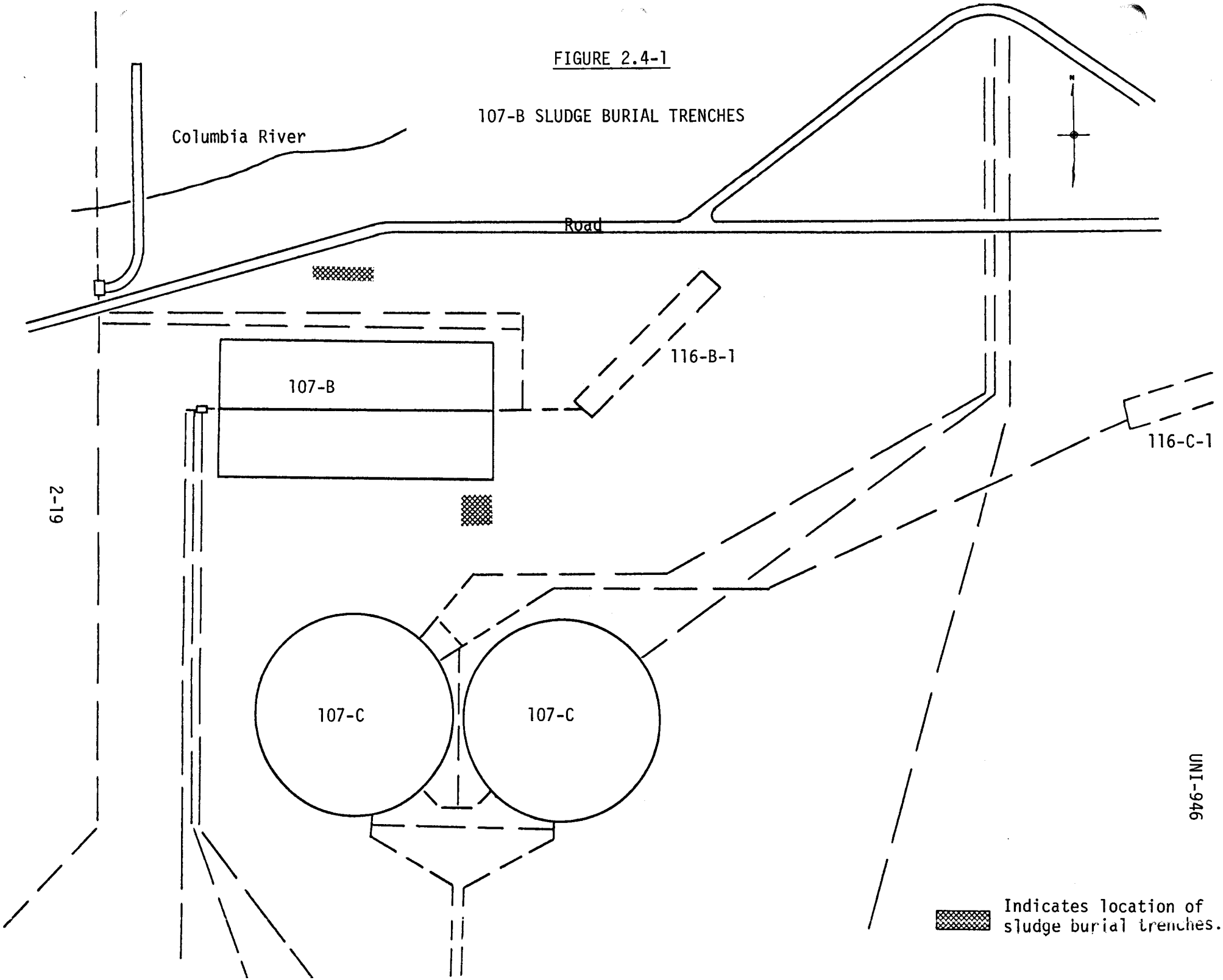


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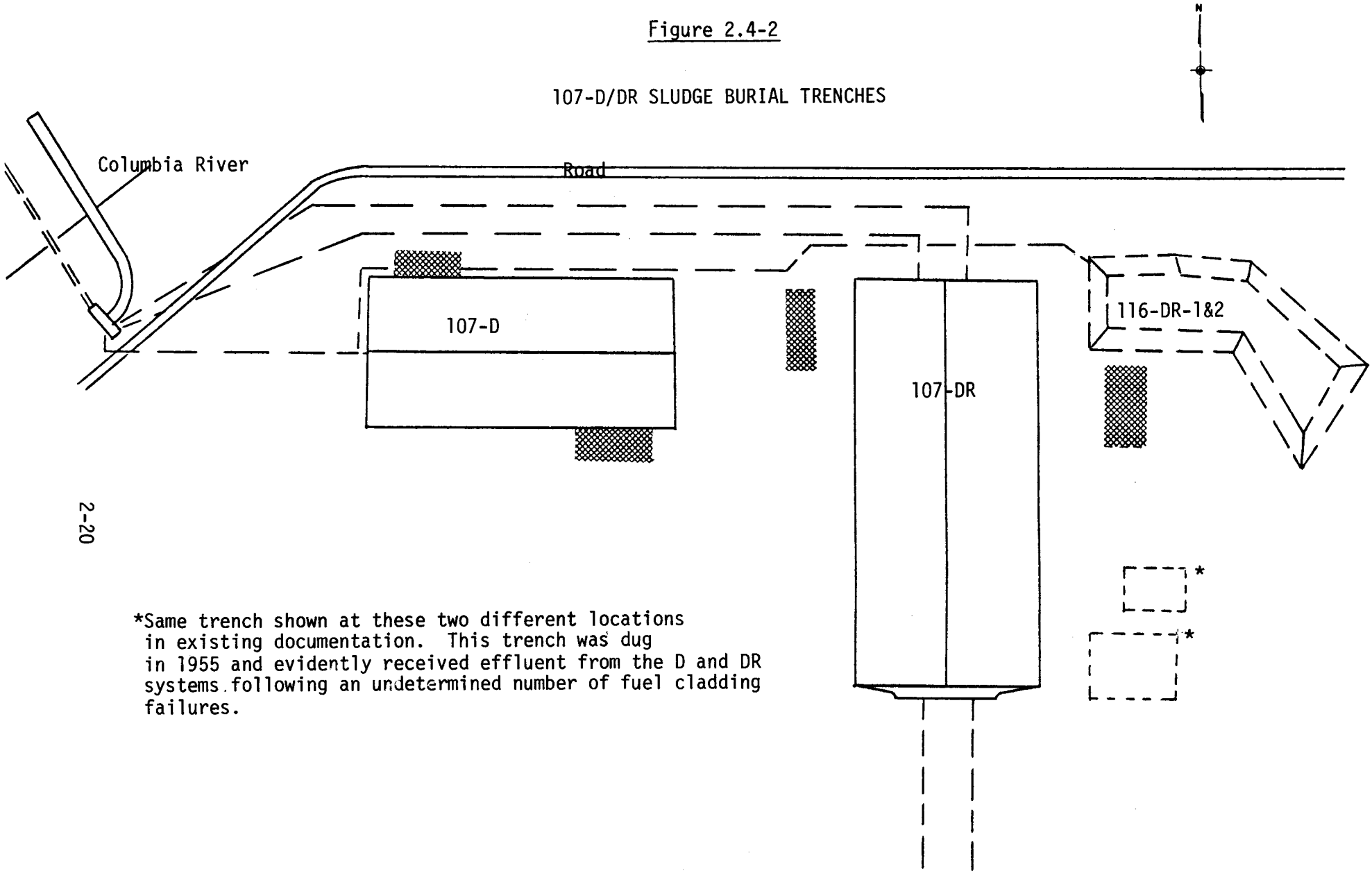
Figure 2.4-2

107-D/DR SLUDGE BURIAL TRENCHES



*Same trench shown at these two different locations in existing documentation. This trench was dug in 1955 and evidently received effluent from the D and DR systems following an undetermined number of fuel cladding failures.

Indicates location of sludge burial trenches.

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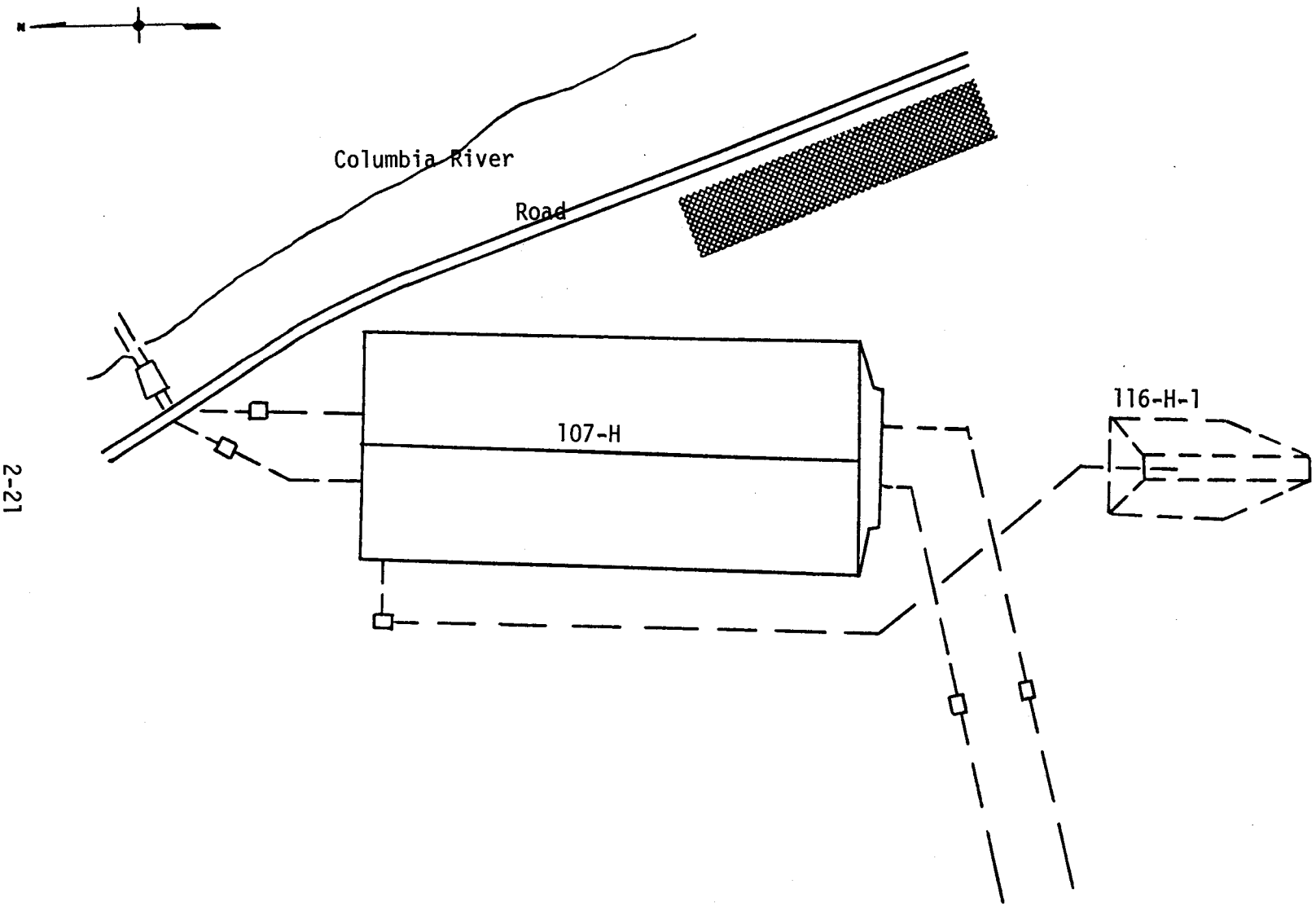
Figure 2.4-3

107-H SLUDGE BURIAL TRENCH



Indicates location of sludge burial trench.

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2.5 Characterization of the Radioactivity Remaining in the 107 Retention Basin Systems

2.5.1 107 Basin Sampling

Sampling of the 107 retention basin systems was designed to establish the following parameters:

- Identification of radionuclides present.
- Concentration of radionuclides present.
- Horizontal and vertical distribution of radionuclides.
- Volume of the fill dirt inside the retention basins.
- Depth of sludge along retention basin floors.
- Estimates of total activity present.

Sampling of the deactivated 107 retention basins and their associated diversion trenches was initiated during February 1975 and completed December 1975. Samples were taken of the contaminated fill within the basins. Sample holes were drilled along the effluent lines, along the outside of the retention basin walls, and through the basin floors to characterize the remaining contamination from past leakage. Samples of the 107 retention basin concrete floors were taken as well as scale and sludge contained in the effluent lines and junction boxes.

Procedures used for the 107 retention basin sampling are discussed in Section 1.

2.5.2 Estimates of Total Activity Present

Total curies of each radionuclide have been calculated for each of the following locations:

- Concentrated sludge along the basin floors.
- Fill dirt covering the basin sludge.
- Inlet distribution chamber sludge (107-DR and H are the only basins with inlet distribution chambers).
- Structural concrete of basins.

- Leakage areas underneath and adjacent to the basins.
- 107 liquid waste trenches.

The calculation of the total activity in any contaminated volume (soil column, sludge, concrete) uses the relationship:

Curies = Width of contaminated volume x length x depth x density of material x average concentration.

In instances where significant radionuclide concentration discontinuities occur, a contaminated soil column is broken down into smaller depth intervals for which inventory calculations are performed separately. One obvious example is the fill material inside of the retention basins which is broken down into two depth intervals - the sludge along the basin floor and the fill dirt covering the sludge. Contaminated surface areas adjacent to some of the retention basins are another example. Surface radionuclide concentrations in these areas can be significantly higher than underground concentrations in the soil column resulting from past basin leakage.

The following assumptions are also used:

- Soil density -- 150 lb/cu ft.
- Concrete density -- 144 lb/cu ft.
- Volume of concrete -- DR, H = 7000 yd^3
  -- B, D, F = 4200 yd^3.
- Basin dimensions -- 107-B, D, F = 230' x 467'
  -- DR, H = 273' x 600'
  -- C Basins (2) = 330' diameter
  -- K Basins (6) = 250' diameter.
- Depth of soil fill inside basins -- 107-B = 3-1/2'
  -- D = 2-1/2'
  -- F, H = 4'
  -- DR, C Basins = 3'
  -- K Basins = 2'.
- Depth of sludge along basin floors -- 107-B = 2-1/2"
  -- D, DR, H = 2"
  -- F = 3"
  -- C Basins = 1/2"
  -- K Basins = 1/4".

- Inlet distribution chambers at 107-DR, H -- 150' x 20'.
- Sludge in inlet distribution chambers -- depth = 1"
  -- density = 100 lb/cu ft

Sampling of the concrete basin floors showed that contamination has leached all the way into the concrete. Seventy-five percent of the entire mass of a concrete basin (floors and walls) is assumed to be contaminated in calculating the radionuclide inventories in the concrete.

The average depth of sludge and soil fill within the basins was established during the basin sampling. Descriptions of the size of contaminated soil columns in basin leakage areas and in the 107 liquid waste trenches are included on the radionuclide inventory calculation sheets for each facility.

2.6 Summary

The total radionuclide inventories in the vicinity of the retention basins ranged from 5 to over 400 curies. For the 107-D, DR, F, and H basins, an average of 70% of the inventories are contained within the basins, primarily in the contaminated sludge along the bottom of the basin floors. The soil columns underneath the 107-B and C retention basins contain approximately 80% of the total radionuclide inventory for these basins. At the K basins, more than 80% of the total radionuclide inventory is in the soil adjacent to the basins. Considered collectively, the average beta-gamma and Pu-239/240 inventories within the retention basins (including the concrete) are approximately the same as the inventories in the surrounding soil from former basin leakage. For individual basins, however, the inventories inside the basins range from approximately 10% to 80% of the total radionuclide inventories.

Approximately 10 curies of the total basin radionuclide inventories have leached into the concrete floors and walls of each of the basins. Isolated areas of surface contamination were occasionally located during

radiological surveys, but these areas contribute little to the overall inventory.

The principle radionuclides identified include Eu-152, Eu-154, Eu-155, Co-60, Cs-137, Sr-90, and Ni-63. Short half-lifed radionuclides, such as Cr-51, Zn-65, Sc-46 which were of primary interest during operating periods for the reactors, have decayed away.

Low concentrations of transuranics are in the sludge along the bottom of the basin floors. Average Pu-239/240 concentrations in the sludge range from 1 to 110 pCi/g. The maximum Pu-239/240 concentration detected in basin sludge is 340 pCi/g. Plutonium accounts for only 0.2% of the reported radionuclide inventories.

Some general conclusions with respect to radioactivity in the 107 retention basins are as follows:

- The total inventory of radioactivity in, underneath, and adjacent to a retention basin - B, C, D, DR, F, H $\sim 10^2$ curies
  KE, KW $< 10^1$ curies.
- Principle radionuclides - Eu-152, Eu-154, Eu-155, Co-60, Cs-137, Sr-90, and Ni-63.
- Average beta-gamma concentrations of basin sludge -
  B, C, D, DR, F, H $\sim 10^4$ pCi/g
  KE, KW $\sim 10^3$ pCi/g.
- Average beta-gamma concentrations of soil fill covering the sludge -
  B, C, D, DR, F, H $\sim 10^2$ pCi/g
  KE, KW $\sim 10^1$ pCi/g.
- Average Pu concentrations of sludge - B, C, D, DR, F, H $\sim 10^1$-10^2 pCi/g
  KE, KW $\sim 10^0$ pCi/g.
- Average Pu concentrations of soil fill covering the sludge -
  B, C, D, DR, F, H $\sim 10^{-1}$ pCi/g
  KE, KW - not detected.
- Average beta-gamma and Pu concentrations in the sludge are 10^1 to 10^2 times the average concentrations in the contaminated soil columns from past basin leakage.

Table 2.6-1 summarizes the average and maximum radionuclide concentrations of the sludge, soil fill less the sludge, underneath, adjacent, and in the concrete for each of the 107 retention basins. Radioactive inventories for each of the basins are given in Table 2.6-2. A percentage breakdown of the distribution of the inventory is also included. Similar data for Pu-238, Pu-239/240 inventories are included in Table 2.6-3. Table 2.6-4 gives the relative percentages of radionuclide concentrations found in the fill less sludge, concrete, underground, and adjacent to each of the 107 basins as compared to the sludge concentrations.

Samples were taken of the effluent line scale and sludge at the 107-B, C, DR, F, and H Areas. Direct GM readings of the scale are approximately 50,000 c/m. Pu-239/240 concentrations ranged from 10 to 300 pCi/g. Beta-gamma concentrations ranged from 10^3 to 10^5 pCi/g.

A sample of mud taken from a diversion box at 107-B, C Area had Pu-239/240 concentrations of 2.8×10^3 pCi/g. This was the highest Pu-239/240 concentration detected as part of the 107 retention basin sampling.

The majority of radioactivity in the 107 liquid waste trenches is in the immediate vicinity of the trenches and is within 10 feet of the trench bottoms. Inventories in the 107 liquid waste trenches range from 15 to 79 curies for the B, C, D, DR, F, and H Areas. The 116-K-2 trench (K trench) at 100-K Area, however, has an estimated inventory of 2100 curies. The 116-K-2 trench has the highest radionuclide inventory of all the deactivated 100 Area liquid waste disposal facilities. The K trench is also the largest trench in the 100 Areas, extending over 4000 feet in length. Eu-152 comprises approximately one-half of the total radionuclide inventory of the trench. The average Pu-239/240 concentration in the contaminated soil column of the trench is 8.5×10^0 pCi/g. The maximum Pu-239/240 concentration detected was 130 pCi/g.

A summary of the 107 liquid waste trench radionuclide concentrations and inventories is given in Table 2.6-5.

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 2.6-4

Relative Percentages of Various Basin Materials Compared to Sludge Concentrations

Percentage of Basin Sludge Beta-Gamma Concentrations

Basin	Fill Less Sludge	Concrete	Underneath <10'	Underneath >10'	Adjacent Surface	Adjacent Underground
107-B	1	2	3	3	5	0.001
107-C	1	--	8	1	0.5	0.07
107-D	0.4	2	0.2	0.05	--	0.4
107-DR	0.9	5	1	0.07	--	0.2
107-F	0.4	6	2	0.2	--	0.9
107-H	1	5	0.7	0.1	--	0.4
107-KE	0.6	--	--	--	4	1
107-KW	0.9	--	--	--	11	0.1
Average	0.8	4	2	0.7	3	0.4

Percentage of Basin Sludge Pu-238, Pu-239/240 Concentrations

Basin	Fill Less Sludge	Concrete	Underneath <10'	Underneath >10'	Adjacent Surface	Adjacent Underground
107-B	1	3	8	8	0.8	0.4
107-C	1	--	3	0.7	0.8	0.02
107-D	0.4	2	0.4	0.0	--	0.5
107-DR	2	6	1	1	--	0.2
107-F	0.7	16	10	0.0	--	2
107-H	2	3	0.0	0.1	--	0.6
107-KE	0.0	--	--	--	2	0.0
107-KW	0.0	--	--	--	16	0.0
Average	0.9	6	4	2	2	0.5

TABLE 2.6-5

107 Liquid Waste Trenches

Trench	Total Curies	Concentrations (pCi/g)					
		Beta-Gamma		Pu-238		Pu-239/240	
		Ave.	Max.	Ave.	Max.	Ave.	Max.
116-B-1	3.1	6.4×10^{1}	3.6×10^{2}	2.1×10^{-3}	1.7×10^{-2}	1.7×10^{-1}	9.9×10^{-1}
116-C-1	79	4.4×10^{2}	3.2×10^{3}	*	*	7.4×10^{-1}	5.3×10^{0}
116-K-1	46	3.8×10^{2}	1.7×10^{3}	1.2×10^{-1}	4.8×10^{-1}	1.2×10^{0}	4.4×10^{0}
116-K-2	2100	3.6×10^{3}	7.0×10^{4}	3.3×10^{-1}	4.0×10^{0}	8.5×10^{0}	1.3×10^{2}
116-DR-1&2	31	2.5×10^{2}	1.7×10^{3}	*	*	2.9×10^{-1}	3.2×10^{0}
116-F-2	15	1.8×10^{2}	8.2×10^{2}	*	*	8.6×10^{-2}	3.6×10^{-1}
116-H-1	33	5.3×10^{2}	5.3×10^{3}	5.4×10^{-2}	3.5×10^{-1}	1.1×10^{0}	1.1×10^{1}

2.7 Discussion of 107 Retention Basin Sampling and Results

2.7.1 107-B, C Retention Basins and Liquid Waste Trenches

Drilling in the 107-B and C retention basin and liquid waste trench area was completed on November 19, 1975. Fifty-four sample holes were drilled in the 107-B and C Area. The locations of these sample holes are indicated in Figure 2.7-1. Figure 2.7-2 shows the approximate locations where samples of the soil fill and sludge inside the basins were taken.

Samples holes drilled through the floors of the 107-B and C retention basins indicate that contamination from past leakage under the basins is considerably more extensive than found under the 107-F, H, and DR basins. The majority of contamination under the 107-F, H, and DR basins is confined within a few feet of the basin floor. Thirty-five hundred c/m with a GM probe was detected in a sample taken 13 feet below the 107-B retention basin floor, and 2000 c/m from a sample taken 15 feet below the 107-C retention basin floor.

Radionuclide concentrations of selected samples from test holes drilled at the 107-B, C Areas are given in Tables 2.7-1 through 2.7-6. Radionuclide concentrations for selected samples taken of the soil fill and sludge inside the 107-B, C basins at the backhoe sampling locations are given in Tables 2.7-7 and 2.7-8.

Beta-gamma concentrations in the sludge along the 107-B basin floor average 6.1×10^4 pCi/g and range up to a maximum of 1.8×10^5 pCi/g. The average and maximum Pu-239/240 concentrations are 58 and 340 pCi/g, respectively.

In agreement with historical records, underground contamination (samples up to 1500 c/m) along the outside of the 107-B retention

basin is greatest along its river side (north). General surface contamination from 2000 to 6000 c/m extended 50 feet away from the north wall of the basin, and 10 feet away from the other walls. (This surface contamination was covered with soil in 1977.) Underground contamination extends to approximately 200 feet away from the north wall, but is confined within 25 feet from the other walls. An estimated 24 curies are contained in the contaminated soil column adjacent to the 107-B basin.

The 107-B basin has the highest radionuclide inventory of the 100 Area retention basins. A total of 422 curies are inside the 107-B basin and its surrounding contaminated soil column. The distribution of this radioactivity is as follows:

Sludge - 92 Ci
Soil fill less sludge - 16 Ci
Concrete - 8 Ci
Soil underneath basin - 280 Ci
Soil adjacent to basin - 24 Ci

Sixty-six percent of the total radionuclide inventory of 107-B is in a contaminated soil column approximately 20 feet deep under the basin.

Ninety-one percent of the 107-C basin's 187 Ci inventory is in the 20-foot deep contaminated soil column directly underneath the basin. Beta-gamma concentrations in the soil column underneath the basin average 7.5×10^4 pCi/g. Pu-239/240 is present up to 5.4 pCi/g and averages 1.1 pCi/g.

As in all the retention basins, the sludge along the 107-C basin floor has the highest radionuclide concentrations. Maximum beta-gamma concentrations are 5.5×10^4 pCi/g. Pu-239/240 is present up to 2.3×10^2 pCi/g. The average concentrations are 1.8×10^4 and 6.5×10^1 pCi/g, respectively. The sludge along the 107-C basin floors (two basins) is only 1/4" deep and is covered with 3 feet of soil having radionuclide concentrations two orders of magnitude less than the sludge. Tables 2.7-9 through 2.7-16 give a more detailed summary of the radionuclide inventories and average concentrations within and outside of the 107-B, C basins.

Underground contamination in the 107-B liquid waste trench (116-B-1) is significantly less than that of the 107-C trench. A maximum of 400 c/m was detected in a sample taken near the center of the trench at a depth of 17 feet below grade. Analytical results for selected samples taken from the 116-B-1 trench are given in Table 2.7-3. The maximum Pu-239/240 concentration detected is 9.9×10^{-1} pCi/g. Beta-gamma concentrations average 6.4×10^{1} up to a maximum of 3.6×10^{2} pCi/g. The radionuclide inventory of the 116-B-1 trench is approximately 3.1 Ci, as shown in Table 2.7-17.

Sample holes drilled into the 107-C liquid waste disposal trench (116-C-1) indicate that underground contamination extends along its entire length. Maximum contamination levels for these sample holes are at approximately 20 feet below grade and range from 750 to 2000 c/m with a GM probe. Beta-gamma concentrations in the contaminated soil column average 4.2×10^{2} pCi/g up to a maximum of 3.2×10^{3} pCi/g. Average Pu-239/240 concentrations are 1.7×10^{-1} pCi/g. The maximum Pu-239/240 concentration is 5.3×10^{0} pCi/g.

The 116-C-1 trench contains an estimated radionuclide inventory of 79 curies (see Tables 2.7-6 and 2.7-18).

Effluent Line Leakage

Significant underground contamination evidently from past effluent line leakage was identified in the 100-B/C Area. The leakage area is along the 105-B & C effluent lines where a 54-inch cross-tie line from the 105-B effluent line ties into a junction box. Sample holes drilled in this effluent line leakage area are designated as 100-B-A through 100-B-H and 116-B-2-1E. The locations of the sample holes are given in Figure 3.4-1 in Section 3.4 of this report. Tables 2.7-19 and 2.7-20 list the radionuclide concentrations of selected samples from these test holes.

Samples reading up to 2500 c/m with a GM probe were taken at depths of 20 to 30 feet below grade in the immediate vicinity of the junction box. Underground soil contamination from past effluent line leakage extends 25 feet away from the lines with samples have GM readings of approximately 1000 c/m at depths of 20-30 feet below grade. Pu-239/240 was detected up to 10 pCi/g and averaged 2 pCi/g. The estimated radionuclide inventory in this leakage area is approximately 49 curies. Table 2.7-20 gives a more detailed summary of the radionuclide inventory.

Surface and underground soil contamination was also detected in an effluent line leakage area near the diversion box to the 107-C retention basins. Direct GM readings from four sunken areas in this vicinity were 10,000 to 20,000 c/m. An 8,000 c/m reading was detected in a soil sample taken from one of these former effluent leakage spring locations. Radioanalytical results for selected samples taken from a test hole (107-C-BB) drilled approximately 10 feet from the diversion box are given in Table 2.7-4. The total extent of this leakage area was not established. Assuming the contaminated soil column is similar to that of the 100-B/C junction box leakage area discussed in the previous paragraph, results in an estimated radionuclide inventory of approximately 5 curies. It should be emphasized that visible surface depressions were observed in this leakage area and the leakage discussed in the previous paragraph.

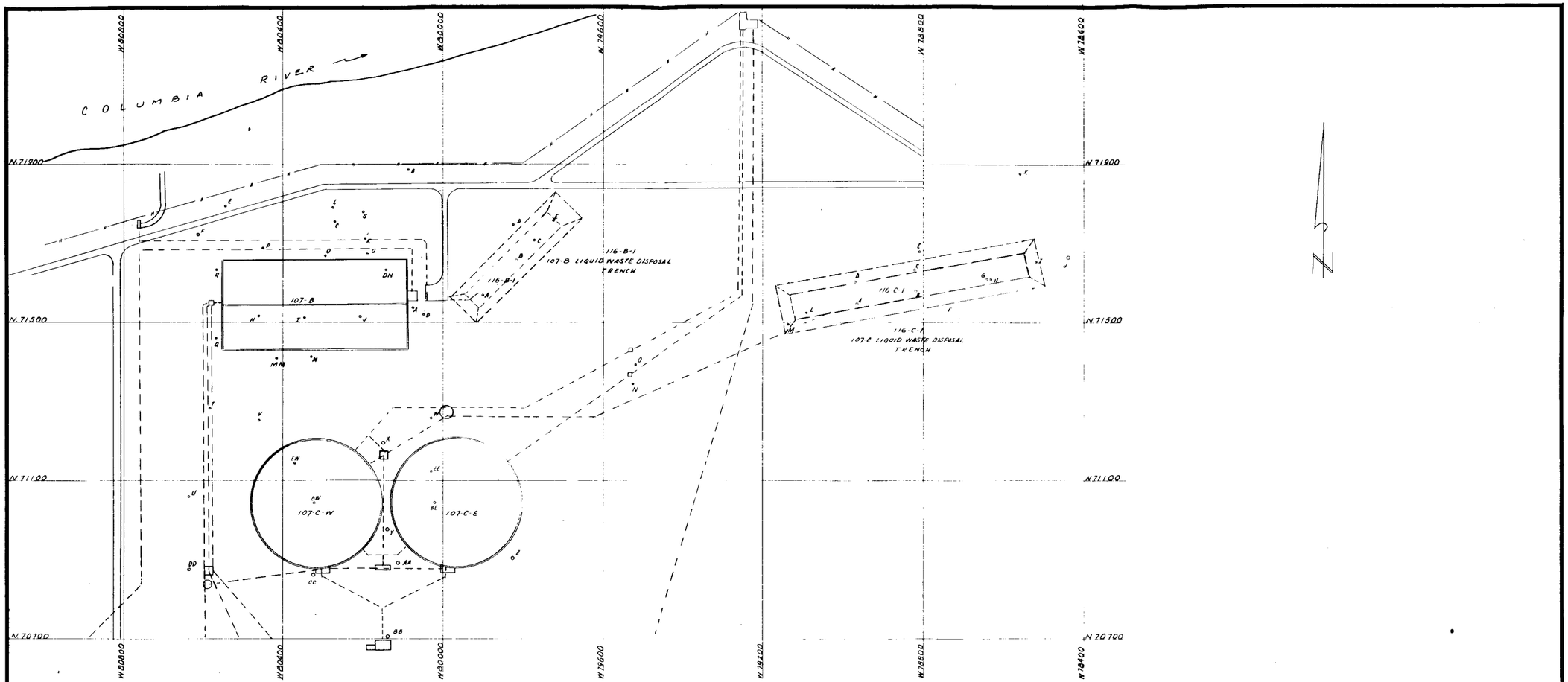
Records indicate that the effluent lines from the 105-B building to the 107-B retention basin leaked extensively near the retention basin vicinity. Drilling in this location (sample holes 107-T, V, and DD) revealed only minimal contamination remaining. Table 2.7-23 summarizes the average and maximum radionuclide concentrations observed in this location.

107-B Sludge Burial Trench

Based on sample hole C, the 120' x 10' sludge burial trench located immediately north of the 107-B basin contains an estimated radioactive inventory of 0.8 Ci. Beta-gamma concentrations range up to a maximum of 6.8×10^2 pCi/g and average 2.4×10^2 pCi/g. The maximum Pu-239/240 concentration detected is 2.2 pCi/g. Pu-239/240 concentrations average 0.7 pCi/g. The radioactive inventory in this sludge burial trench is negligible compared to the 300 Ci inventory contained in the contaminated soil column outside of 107-B from past basin leakage.

Sludge and Scale Inside of Effluent Lines and Junction Boxes

In addition to the drilling operation and sampling of the fill material within the 107-B and C basins, surveys of contamination levels inside the junction boxes and effluent lines to the 107-B and C basins were made. Radionuclide concentrations of rust flakes and sludge samples taken inside the lines and junction boxes are given in Table 2.7-24. Average beta-gamma concentrations for the effluent line scale and junction/diversion boxes are 8.3×10^4 and 1.2×10^5 pCi/g, respectively. Average Pu-239/240 concentrations are 6.6×10^1 pCi/g for the effluent line scale and 7.2×10^2 pCi/g for the sludge at the bottom of the diversion and junction boxes. (See Table 2.7-25.) Direct readings of the bottom of effluent lines averaged approximately 40,000 c/m with a GM probe.



107-B BASIN			
TEST HOLE	NORTH	WEST	ELEV.
J	71,514.39	80,207.82	425.67
I	71,512.90	80,346.38	425.45
H	71,518.31	80,459.86	426.06
DN	71,633.60	80,143.85	427.87
A	71,558.72	80,074.37	436.75
B	71,890.66	80,086.00	436.01
C	71,757.82	80,270.69	434.76
D	71,524.66	80,049.07	436.72
E	71,795.79	80,543.06	434.37
F	71,724.23	80,613.09	432.99
G	71,674.22	80,187.32	434.51
K	71,714.82	80,194.51	432.01
L	71,790.62	80,275.42	432.75
M	71,416.60	80,330.59	438.36
MM	71,410.83	80,414.06	426.52
O	71,671.69	80,796.60	435.49
P	71,689.31	80,450.08	428.58
Q	71,674.22	80,187.32	434.51
R			
S	71,779.56	80,199.53	432.42

107-C BASINS			
TEST HOLE	NORTH	WEST	ELEV.
BE	71,044.72	80,020.14	435.18
EE	71,126.85	80,028.48	432.96
BW	71,044.39	80,331.23	433.23
EW	71,146.73	80,370.36	432.07
AA	71,890.02	80,112.27	431.1
X	71,192.18	80,150.00	430.81
Y	70,973.11	80,140.13	430.05
Z	70,902.90	79,825.33	434.89
CC	70,861.29	80,323.50	431.0
BB	70,705.11	80,179.20	448.51
DD	70,948.50	80,621.50	433.65

MISC. LOCATIONS			
TEST HOLE	NORTH	WEST	ELEV.
R	71,657.65	80,565.27	435.97
Q	71,862.05	80,367.04	437.05
T	71,283.47	80,587.81	439.40
U	71,060.92	80,634.08	432.59
V	71,253.54	80,459.34	433.85
W	71,261.18	80,030.96	433.91

CRIB "A"			
TEST HOLE	NORTH	WEST	ELEV
A	71,548.59	78,965.57	435.01
B	71,582.85	78,818.44	436.01
C	71,635.25	78,821.58	434.64
D	71,602.63	78,970.31	436.70
E	71,682.00	78,808.42	435.17
F	71,528.68	78,744.33	436.66
G	71,610.28	78,639.66	436.24
H	71,610.63	78,631.91	436.22
I	71,653.89	78,519.26	437.26
J	71,665.99	78,441.09	444.70
K	71,676.43	78,558.26	439.40
L	71,523.60	78,081.24	441.07
M	71,496.07	78,138.39	442.85
N	71,544.38	79,525.58	444.31
O	71,395.20	79,530.91	444.23

CRIB "B"			
TEST HOLE	NORTH	WEST	ELEV
A	71,571.17	79,901.00	435.01
B	71,659.31	79,814.39	437.15
C	71,710.52	79,771.47	437.06
D	71,765.76	79,823.63	435.85
E	71,759.48	79,724.54	438.03

FIGURE 2.7-1

107-B&C SAMPLE HOLES

Figure 2.7-2

BACKHOE SAMPLING LOCATIONS WITHIN 107-B & C

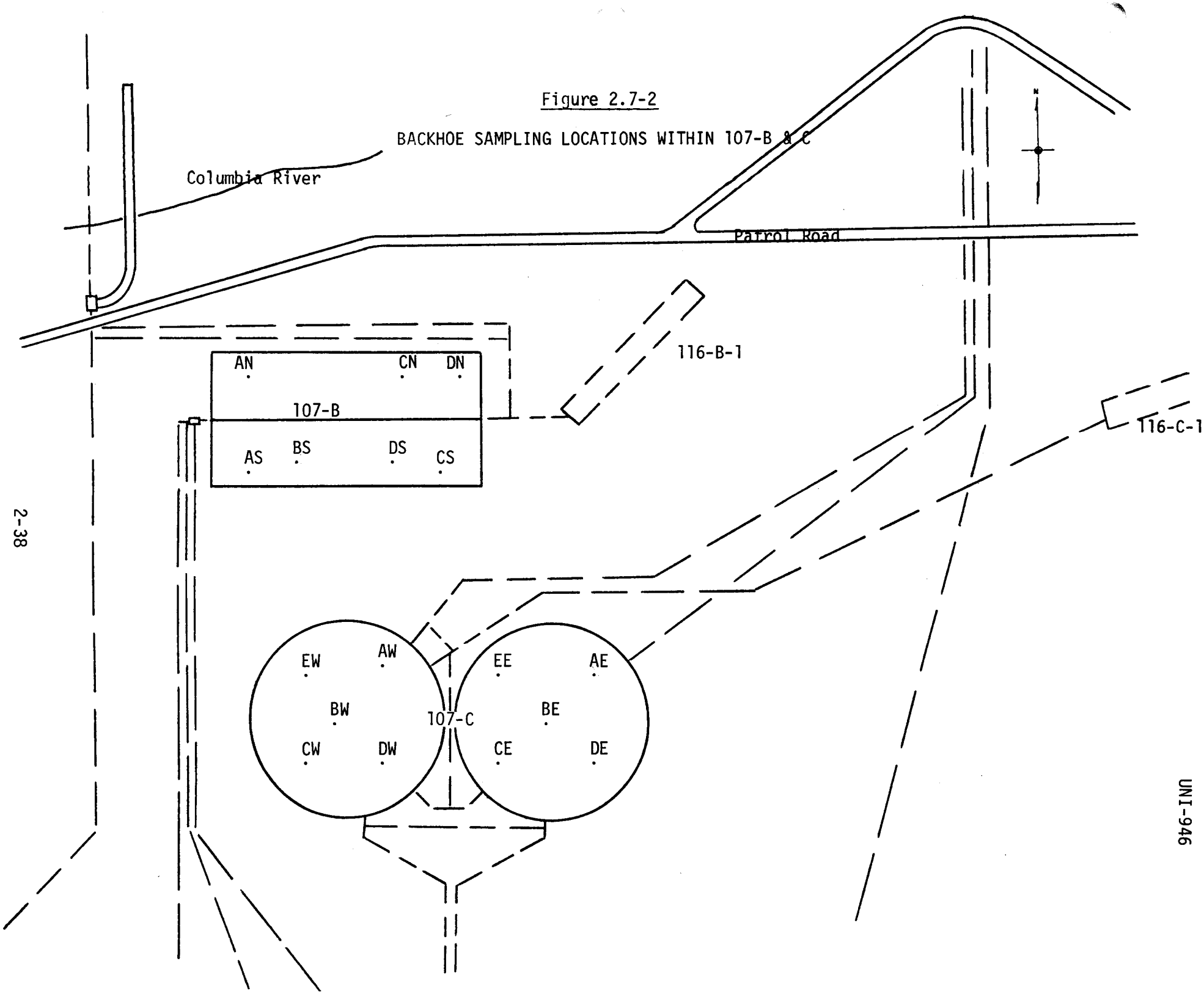


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TABLE 2.7-1

107-B RETENTION BASIN

SAMPLE HOLES DRILLED OUTSIDE OF BASIN

Concentration (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
A 5	*	*	*		<200/10	2.6×10^{-1}	*	*	*	5.2×10^{-2}	2.3×10^{-1}	
10	*	2.7×10^{-1}	4.6×10^{-1}		<200/100	4.2×10^{1}	4.5×10^{1}	7.7×10^{0}	*	3.0×10^{1}	7.5×10^{-1}	
25	*	7.5×10^{-2}	1.4×10^{0}	1.9×10^{0}	<200/100	4.3×10^{0}	2.1×10^{0}	5.8×10^{0}	6.4×10^{-1}	7.2×10^{0}	3.3×10^{0}	2.2×10^{-1}
B 10	*	*	*		<200/10	*	*	*	4.7×10^{-2}	*	1.4×10^{-1}	
20	*	*	2.4×10^{-2}	3.0×10^{0}	<200/10	*	5.5×10^{-2}	*	2.9×10^{-2}	1.0×10^{-1}	*	4.2×10^{-1}
C 0	*	2.2×10^{0}	2.3×10^{0}	1.7×10^{1}	1000	5.5×10^{2}	2.4×10^{1}	7.9×10^{1}	*	4.1×10^{0}	4.5×10^{0}	2.3×10^{-1}
10		2.2×10^{-2}	4.5×10^{0}		<200/30	1.4×10^{0}	8.2×10^{-2}	*	*	1.8×10^{-1}	6.7×10^{-2}	
22	*	*	*		<200/15	*	*	*	*	*	1.0×10^{-1}	
D 10	*	*	*		<200/10	*	1.7×10^{-1}	*	4.4×10^{-2}	*	2.2×10^{-1}	
25	*	*	2.1×10^{-2}	2.7×10^{0}	<200/10	5.5×10^{-1}	2.4×10^{-1}	*	*	3.3×10^{-2}	*	1.9×10^{-1}
E 15	*	2.0×10^{-2}	4.7×10^{-2}		<200/20	*	*	*	5.6×10^{-2}	*	*	
22	*	*	*		<200/Bkg	*	*	*	*	*	9.4×10^{-2}	
F 20	*	*	1.6×10^{-1}		<200/10	*	1.2×10^{-1}	*	6.9×10^{-2}	7.0×10^{-2}	*	
G 10	*	2.8×10^{-1}	3.6×10^{0}		450	3.1×10^{1}	5.4×10^{1}	1.1×10^{1}	2.8×10^{-1}	1.3×10^{2}	2.0×10^{0}	
15	*	3.3×10^{0}	4.9×10^{0}	1.7×10^{0}	750	1.5×10^{0}	2.6×10^{1}	4.7×10^{0}	1.5×10^{-1}	9.0×10^{1}	4.1×10^{0}	3.9×10^{-1}
20	*	3.4×10^{-1}	2.3×10^{0}		300	7.1×10^{0}	1.0×10^{1}	4.2×10^{0}	2.7×10^{-1}	3.9×10^{0}	1.3×10^{0}	
K 20	*	1.4×10^{-1}	1.9×10^{-1}	2.4×10^{0}	<200/30	6.4×10^{-1}	1.4×10^{0}	3.0×10^{-1}	*	4.8×10^{-1}	1.3×10^{-1}	
M 17	*	1.8×10^{-1}	2.2×10^{-1}		<200/25	5.1×10^{-1}	9.0×10^{-1}	5.1×10^{-1}	*	3.8×10^{0}	*	
MM 20	*	*	6.3×10^{-1}		<200/25	*	4.6×10^{-2}	*	*	4.2×10^{0}	2.6×10^{-1}	
30	*	1.4×10^{-1}	9.8×10^{-1}	5.6×10^{0}	<200/60	1.1×10^{1}	3.5×10^{0}	3.5×10^{0}	3.1×10^{-1}	4.4×10^{0}	1.3×10^{0}	
O 9	*	7.7×10^{-1}	3.6×10^{-1}	2.2×10^{1}	1500	9.9×10^{1}	1.6×10^{2}	2.4×10^{1}	*	8.1×10^{1}	8.5×10^{-1}	2.7×10^{-1}
12	*	6.1×10^{-1}	3.9×10^{-1}		400	2.7×10^{1}	3.8×10^{1}	5.9×10^{0}	*	4.7×10^{1}	5.8×10^{-1}	
18	*	*	3.1×10^{-1}		<200/25	1.3×10^{1}	1.2×10^{1}	4.0×10^{0}	*	3.0×10^{1}	8.5×10^{-2}	
P 5	*	*	1.2×10^{0}	*	450	2.6×10^{0}	2.1×10^{0}	7.2×10^{-1}	*	1.4×10^{0}	*	1.1×10^{-1}
15	*	*	4.5×10^{-1}		400	1.2×10^{0}	4.4×10^{-1}	8.9×10^{-2}	*	2.1×10^{1}	4.5×10^{-1}	
25	*	*	7.8×10^{-1}		<200	*	8.7×10^{-2}	2.9×10^{-1}	5.9×10^{-2}	1.8×10^{1}	1.8×10^{-1}	

TABLE 2.7-1 (Cont'd)

107-B RETENTION BASIN (Cont'd)

SAMPLE HOLES DRILLED OUTSIDE OF BASIN

	Concentration (pCi/g)											
Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
Q 4	*	*	$3.1x10^{-2}$		<200/20	*	*	*	*	*	*	
25	*	*	$2.9x10^{0}$	$3.8x10^{0}$	<200/40	$4.9x10^{-1}$	$2.2x10^{-1}$	*	$7.5x10^{-2}$	$3.4x10^{1}$	$2.4x10^{-1}$	$5.7x10^{-2}$
R 5	*	*	$2.0x10^{0}$	$2.0x10^{0}$	<200/100	$2.0x10^{0}$	$2.9x10^{0}$	$1.2x10^{0}$	$1.3x10^{-1}$	$1.0x10^{2}$	$9.1x10^{-1}$	$6.0x10^{-2}$
25	*	*	$5.4x10^{-1}$		<200/50	$2.8x10^{-1}$	$8.6x10^{-2}$	*	*	$3.6x10^{0}$	$3.7x10^{0}$	
S 25	*	*	$9.2x10^{-1}$		<200/60	$2.8x10^{-1}$	$1.6x10^{-1}$	*	*	$1.3x10^{1}$	$1.6x10^{1}$	
T 30	*	*	$8.2x10^{-1}$		<200/20	*	*	*	*	$3.6x10^{0}$	*	
U 38	*	*	$1.7x10^{0}$		<200/30	*	*	*	*	$1.1x10^{1}$	$2.2x10^{-1}$	
DD 10	*	*	$3.6x10^{-1}$		<200/30	$2.9x10^{-1}$	$1.5x10^{-1}$	*	$3.0x10^{-2}$	$9.9x10^{-2}$	*	
(107-B) North 3	*	$5.0x10^{-1}$		$3.8x10^{0}$	3000	$1.1x10^{3}$	$1.1x10^{3}$	$3.8x10^{2}$	$7.1x10^{0}$	$2.7x10^{2}$	$4.6x10^{1}$	$9.2x10^{-1}$

TABLE 2.7-2

107-B RETENTION BASIN

SAMPLE HOLES DRILLED INSIDE OF BASIN

Concentration (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
H 2	*	*	$1.4x10^{-1}$		<200/30	$1.1x10^{0}$	$1.4x10^{0}$	*	*	$2.1x10^{-1}$	*			
3	*	$1.6x10^{-1}$	$2.0x10^{-1}$		400	$1.1x10^{4}$	$1.3x10^{4}$	$4.2x10^{-1}$	*	$5.3x10^{-1}$	*			
4	$2.0x10^{0}$	$5.9x10^{1}$	$2.9x10^{1}$		20,000	$3.0x10^{4}$	$3.3x10^{4}$	$1.6x10^{4}$	$4.0x10^{0}$	$7.2x10^{2}$	$2.1x10^{3}$			
4-1/2	$8.7x10^{0}$	$3.4x10^{2}$	$8.0x10^{1}$	$1.0x10^{1}$	60,000	$6.4x10^{2}$	$3.6x10^{4}$	$2.9x10^{2}$	$1.0x10^{2}$	$1.2x10^{3}$	$4.7x10^{2}$	$9.0x10^{0}$	$4.2x10^{4}$	$2.6x10^{2}$
10	*	$6.4x10^{0}$	$8.0x10^{0}$		2,500	$8.4x10^{1}$	$8.4x10^{2}$	$3.2x10^{2}$	$1.6x10^{0}$	$4.2x10^{1}$	$3.3x10^{1}$			
18	*	$1.2x10^{-1}$	$7.1x10^{0}$		500	$1.0x10^{1}$	$1.8x10^{1}$	$3.5x10^{0}$	$7.1x10^{-1}$	$8.2x10^{1}$	$2.1x10^{-1}$			
I 0	*	*	$2.0x10^{-1}$		300	$1.3x10^{1}$	$1.9x10^{1}$	$5.4x10^{0}$	*	$5.2x10^{0}$	$1.1x10^{0}$			
2	*	$1.0x10^{1}$	$1.5x10^{-2}$	$4.5x10^{1}$	8,000	$4.1x10^{0}$	$2.8x10^{3}$	$2.1x10^{3}$	$1.9x10^{1}$	$1.6x10^{2}$	$2.1x10^{2}$	$4.5x10^{-1}$		
4	*	*	$3.0x10^{-2}$		400	$1.6x10^{0}$	$9.3x10^{-1}$	$5.6x10^{-1}$	$5.7x10^{-2}$	$4.0x10^{-1}$	*			
10	*	*	$2.5x10^{0}$		<200/160	$4.6x10^{1}$	$5.8x10^{1}$	$1.5x10^{-1}$	$6.5x10^{-1}$	$2.2x10^{2}$	$2.0x10^{0}$			
J 0	*	*	$3.3x10^{-2}$		<200/80	$7.5x10^{0}$	$4.7x10^{0}$	$1.4x10^{0}$	$3.4x10^{-2}$	$3.9x10^{-1}$	$2.6x10^{-1}$			
3	$4.7x10^{0}$	$1.7x10^{2}$	$2.0x10^{1}$	$2.8x10^{1}$	80,000	$1.4x10^{4}$	$4.2x10^{3}$	$5.3x10^{3}$	$1.3x10^{1}$	$1.3x10^{2}$	$1.9x10^{2}$	$9.1x10^{-1}$	$1.0x10^{4}$	
8	$5.8x10^{-1}$	$1.8x10^{1}$	$3.8x10^{0}$		7,500	$2.3x10^{3}$	$1.7x10^{3}$	$7.8x10^{2}$	$1.0x10^{0}$	$2.9x10^{2}$	$5.5x10^{1}$			
12	$3.2x10^{-1}$	$1.1x10^{1}$	$2.6x10^{0}$		8,500	$2.2x10^{2}$	$1.7x10^{2}$	$1.0x10^{2}$	$2.4x10^{1}$	$3.9x10^{2}$	$4.8x10^{1}$			
18	*	$7.6x10^{0}$	$5.6x10^{-1}$	$1.9x10^{1}$	3,500	$6.5x10^{2}$	$7.6x10^{2}$	$3.2x10^{2}$	$1.1x10^{1}$	$2.1x10^{2}$	$7.2x10^{1}$	$2.6x10^{-1}$		
DN 2	*	$1.7x10^{-1}$	$3.5x10^{0}$	$2.7x10^{0}$	300	$4.0x10^{1}$	$3.6x10^{1}$	$1.5x10^{1}$	$3.8x10^{-1}$	$1.8x10^{1}$	$1.3x10^{0}$			
4	*	$6.3x10^{1}$	$4.0x10^{1}$		2,500	$3.2x10^{4}$	$1.1x10^{3}$	$1.2x10^{4}$	$1.5x10^{1}$	$7.0x10^{2}$	$1.5x10^{2}$			
4-1/2	$2.1x10^{0}$	$8.6x10^{1}$	$4.1x10^{0}$	$7.9x10^{1}$	50,000	$3.2x10^{0}$	$9.8x10^{1}$	$1.2x10^{0}$	$9.5x10^{-1}$	$3.7x10^{1}$	$1.3x10^{0}$	$1.1x10^{0}$		$2.6x10^{2}$
5	*	$2.1x10^{-1}$	$2.5x10^{0}$		<200/130	$9.4x10^{2}$	$1.2x10^{2}$	$5.0x10^{1}$	$1.4x10^{-1}$	$9.3x10^{2}$	$1.1x10^{0}$			
10	*	$1.1x10^{0}$		$4.2x10^{1}$	1,000	$2.1x10^{0}$	$2.8x10^{1}$	$6.7x10^{0}$	*	$1.4x10^{1}$	$7.4x10^{0}$	$7.9x10^{-2}$		
12-1/2	*	$1.3x10^{-1}$	$1.4x10^{0}$		<200/100	$7.8x10^{0}$	$1.4x10^{1}$	$4.8x10^{0}$	$7.4x10^{-1}$	$4.3x10^{1}$	$1.4x10^{0}$			

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TABLE 2.7-3

116-B-1

107-B LIQUID WASTE DISPOSAL TRENCH

	Concentration (pCi/g)											
Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
B 5	*	*	$1.3x10^{-2}$		<200/30	$1.0x10^{0}$	$2.2x10^{-1}$	*	$6.8x10^{-2}$	$1.2x10^{-1}$	$1.7x10^{-1}$	
B 15	*	*	$3.8x10^{-2}$		<200/80	$1.6x10^{0}$	$2.8x10^{-1}$	$5.9x10^{-1}$	*	$2.6x10^{-1}$	$6.0x10^{-2}$	
B 17	$1.7x10^{-2}$	$9.9x10^{-1}$	$3.3x10^{0}$	$1.1x10^{0}$	400	$2.2x10^{2}$	$3.9x10^{1}$	$4.8x10^{1}$	$7.2x10^{-1}$	$3.6x10^{1}$	$1.2x10^{1}$	$2.8x10^{-1}$
B 20	*	$1.1x10^{-1}$	$6.2x10^{0}$		300	$2.5x10^{1}$	$1.3x10^{0}$	$3.4x10^{0}$	$2.2x10^{-1}$	$1.1x10^{1}$	$5.0x10^{-1}$	$2.5x10^{-1}$
C 10	*	*	$7.0x10^{-2}$		<200/20	$7.8x10^{-1}$	$1.1x10^{-1}$	*	*	*	$1.2x10^{-1}$	
C 20	*	$2.2x10^{-1}$	$4.6x10^{0}$	$2.7x10^{0}$	<200/60	$4.6x10^{1}$	$7.8x10^{0}$	$1.0x10^{1}$	*	$1.5x10^{1}$	*	
D 20	*	*	$1.9x10^{-1}$		<200/20	*	$5.7x10^{-2}$	*	*	*	*	
E 20	*	*	$9.1x10^{-2}$		<200/20	$3.0x10^{-1}$	*	*	$3.8x10^{-2}$	*	$2.3x10^{-1}$	

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TABLE 2.7-4

107-C RETENTION BASIN

SAMPLE HOLES DRILLED OUTSIDE OF BASIN

Concentration (pCi/g)

SAMPLE NO. (107-C)	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155
V-25	*	*	$9.2x10^{-1}$		<200/40	*	$6.4x10^{-2}$	*	*	$1.8x10^{1}$	$1.8x10^{-1}$
W-5	*	*	$8.7x10^{-2}$		<200/30	$1.1x10^{0}$	$1.2x10^{-1}$	*	*	$2.4x10^{-1}$	*
X-0	*	$3.8x10^{-1}$	$5.0x10^{-2}$	$3.3x10^{0}$	<200/50	$1.7x10^{1}$	$4.5x10^{0}$	$5.2x10^{0}$	$2.4x10^{-1}$	$5.7x10^{0}$	$7.5x10^{-1}$
Y-0	*	$5.7x10^{-1}$	$3.1x10^{0}$	$2.3x10^{0}$	<200/150	$2.4x10^{0}$	$2.3x10^{0}$	$6.7x10^{-1}$	*	$1.4x10^{0}$	*
20	*		$7.2x10^{-1}$		<200/30	$1.6x10^{0}$	$1.9x10^{0}$	$7.5x10^{-1}$	$1.5x10^{-1}$	$1.1x10^{1}$	$3.1x10^{-1}$
Z-0	*	$7.0x10^{-1}$	$9.8x10^{0}$	$9.7x10^{-1}$	<200/160	$4.8x10^{1}$	$1.1x10^{1}$	$1.5x10^{1}$	$3.5x10^{-1}$	$1.3x10^{1}$	*
AA-0	*	$7.3x10^{-1}$	$4.0x10^{0}$	*	<200/120	$6.3x10^{1}$	$1.4x10^{1}$	$1.8x10^{1}$	*	$2.0x10^{1}$	$9.9x10^{1}$
5			$3.2x10^{-1}$		<200/20	$8.9x10^{-1}$	$2.1x10^{-1}$	$6.4x10^{-1}$	$4.1x10^{-2}$	$5.9x10^{-1}$	*
BB-01	$1.8x10^{0}$	$5.1x10^{1}$	$4.1x10^{0}$	$3.2x10^{0}$	8000	$4.2x10^{3}$	$2.9x10^{3}$	$1.5x10^{3}$	*	$1.5x10^{2}$	$9.1x10^{1}$
0	*	$1.0x10^{0}$	$4.4x10^{0}$	$3.5x10^{0}$	1000	$3.0x10^{2}$	$3.6x10^{2}$	$1.0x10^{2}$	$6.5x10^{-1}$	$4.9x10^{1}$	$1.4x10^{1}$
5	*	$2.5x10^{-1}$	$1.8x10^{0}$		500	$3.8x10^{1}$	$3.0x10^{1}$	$1.4x10^{1}$	$1.3x10^{-1}$	$2.6x10^{1}$	$1.5x10^{0}$
15	*	$4.9x10^{-1}$	$1.4x10^{0}$		<200/100	$2.7x10^{1}$	$2.5x10^{1}$	$8.2x10^{0}$	$1.7x10^{-1}$	$9.9x10^{0}$	$8.9x10^{-1}$
CC-0	*	$1.8x10^{-1}$	$5.9x10^{-1}$	$1.7x10^{0}$	<200/160	$3.3x10^{1}$	$5.1x10^{1}$	$1.5x10^{1}$	$3.6x10^{-1}$	$2.0x10^{1}$	$2.4x10^{0}$
5	*	$4.1x10^{-2}$	$9.0x10^{-1}$		<200/60	$1.4x10^{0}$	$1.3x10^{1}$	$4.2x10^{-1}$	$1.1x10^{-1}$	$4.6x10^{0}$	*
10			$9.9x10^{-1}$		<200/20	$4.3x10^{-1}$	$1.5x10^{0}$	*	*	*	$8.3x10^{-2}$

TABLE 2.7-5

107-C RETENTION BASIN

SAMPLE HOLES DRILLED INSIDE OF BASIN

	Concentration (pCi/g)											
Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
BE-1	*	4.3×10^{-2}	2.1×10^{-1}		<200/20	1.1×10^{0}	4.3×10^{-1}	2.7×10^{-1}	5.1×10^{-2}	5.4×10^{-2}	2.0×10^{-1}	
2	*	1.5×10^{0}	7.2×10^{0}	1.1×10^{1}	1000	3.6×10^{2}	4.5×10^{2}	1.8×10^{2}	*	7.8×10^{1}	1.4×10^{1}	3.5×10^{-1}
3-1/2	*	5.4×10^{0}	2.3×10^{0}	9.4×10^{0}	7000	1.7×10^{3}	1.4×10^{3}	7.6×10^{2}	6.0×10^{0}	3.2×10^{2}	9.2×10^{1}	5.5×10^{-1}
18-1/2	*	1.9×10^{0}	8.0×10^{0}		2000	3.9×10^{2}	4.1×10^{2}	1.7×10^{2}	9.8×10^{-2}	1.2×10^{2}	3.1×10^{1}	
23	*	*	6.2×10^{0}		300	1.1×10^{1}	2.3×10^{1}	4.5×10^{0}	1.5×10^{-1}	2.0×10^{1}	3.5×10^{-1}	
EE-3-1/2	*	7.9×10^{0}	2.6×10^{0}	4.4×10^{0}	2500	1.1×10^{3}	3.5×10^{2}	4.4×10^{2}	2.6×10^{0}	3.4×10^{1}	8.0×10^{1}	6.3×10^{-1}
4-1/2	*	*	1.6×10^{0}	1.9×10^{0}	400	5.0×10^{1}	6.1×10^{1}	2.6×10^{1}	9.1×10^{-1}	1.6×10^{1}	6.5×10^{0}	4.5×10^{-2}
12	*	1.8×10^{-0}	5.1×10^{-1}	5.1×10^{-1}	<200/60	1.5×10^{1}	2.7×10^{1}	7.1×10^{0}	1.3×10^{-1}	6.9×10^{0}	1.6×10^{1}	
BW-0	*	2.9×10^{-1}	4.8×10^{-1}		<200/70	1.8×10^{0}	5.6×10^{-1}	*	1.0×10^{-1}	5.3×10^{0}	4.5×10^{-1}	
2	*	3.4×10^{-1}	1.1×10^{0}		500	6.6×10^{1}	6.9×10^{-1}	3.3×10^{1}	1.3×10^{0}	2.4×10^{2}	9.3×10^{0}	
3	*	1.8×10^{0}	1.4×10^{1}	3.6×10^{1}	750	1.8×10^{2}	1.5×10^{2}	1.0×10^{2}	1.7×10^{0}	8.5×10^{1}	3.4×10^{1}	2.6×10^{-1}
6	*	4.4×10^{0}	9.3×10^{1}	7.7×10^{0}	4000	9.9×10^{2}	1.1×10^{3}	4.8×10^{2}	1.2×10^{1}	3.1×10^{2}	1.1×10^{2}	9.3×10^{-2}
11	*	1.5×10^{0}	1.0×10^{1}		1500	3.7×10^{1}	2.6×10^{1}	1.6×10^{1}	*	1.5×10^{1}	1.1×10^{1}	
21	*	2.9×10^{-1}	4.2×10^{0}		550	5.9×10^{1}	4.8×10^{1}	2.9×10^{1}	8.5×10^{-1}	3.2×10^{1}	8.6×10^{0}	
23						1.1×10^{1}	2.3×10^{1}	4.5×10^{0}	1.5×10^{-1}	2.0×10^{1}	3.5×10^{-1}	
EW-0	4.9×10^{-1}	1.6×10^{1}	1.9×10^{1}		300	7.5×10^{-1}	2.2×10^{-1}	3.1×10^{-1}	*	1.5×10^{-1}	1.2×10^{-1}	
3	*	6.7×10^{-1}	4.5×10^{0}		800	1.8×10^{2}	1.4×10^{2}	8.3×10^{1}	2.1×10^{0}	3.2×10^{2}	1.6×10^{1}	
3-1/2	*	1.2×10^{0}	4.4×10^{2}	4.9×10^{0}	15000	3.1×10^{3}	2.5×10^{3}	2.5×10^{3}	1.2×10^{2}	3.1×10^{3}	6.9×10^{2}	9.9×10^{-1}
4-1/2	*	2.5×10^{-1}	1.5×10^{0}	1.7×10^{0}	600	3.4×10^{1}	1.6×10^{2}	6.7×10^{0}	*	9.2×10^{1}	1.8×10^{0}	4.6×10^{-2}
7	*	2.4×10^{-1}	4.6×10^{0}		<200/180	1.3×10^{1}	5.1×10^{1}	4.1×10^{0}	2.5×10^{-1}	4.0×10^{1}	1.0×10^{0}	
12	*	*	4.6×10^{0}		<200/25	5.5×10^{-1}	1.6×10^{0}	*	*	1.6×10^{0}	1.5×10^{-1}	

TABLE 2.7-6

116-C-1

107-C LIQUID WASTE DISPOSAL TRENCH

Concentration (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
A 22-1/2	*	$1.8x10^{0}$	$9.8x10^{1}$	$8.4x10^{0}$	750	$7.2x10^{1}$	$4.7x10^{2}$	$9.7x10^{-1}$	*	$4.8x10^{2}$	*	$2.5x10^{-1}$
A 30	*	$5.3x10^{0}$	$6.6x10^{0}$		250	$6.6x10^{-1}$	$2.3x10^{-1}$	$3.7x10^{-1}$	*	$2.9x10^{1}$	$3.6x10^{-1}$	
B 5	*	*	$2.5x10^{-2}$		<200/20	*	*	*	$5.8x10^{-2}$	$6.5x10^{-2}$	$7.9x10^{-2}$	
B 12	*	*	$6.1x10^{-2}$		300	$7.3x10^{0}$	$1.2x10^{1}$	$2.6x10^{0}$	$1.1x10^{-1}$	$1.9x10^{-1}$	*	
B 30	*	$5.3x10^{0}$	$8.4x10^{0}$	$4.0x10^{1}$	2000	$6.4x10^{2}$	$3.9x10^{2}$	$2.1x10^{2}$	*	$2.1x10^{2}$	$2.8x10^{1}$	$1.6x10^{-1}$
C 5	*	*	$1.7x10^{-1}$		<200/20	$8.4x10^{-1}$	$1.3x10^{-1}$	*	$5.1x10^{-2}$	$2.4x10^{-1}$	*	
C 12	*	$7.0x10^{-1}$	$5.2x10^{-1}$	$1.1x10^{0}$	1000	$2.7x10^{2}$	$5.2x10^{2}$	$1.0x10^{2}$	$3.5x10^{-1}$	$3.1x10^{1}$	$2.1x10^{1}$	$2.2x10^{-1}$
D 7-1/2	*	*	$2.2x10^{-1}$	$5.5x10^{-1}$	300	$1.5x10^{1}$	$2.2x10^{1}$	$7.5x10^{0}$	$1.8x10^{-1}$	$1.7x10^{1}$	$1.7x10^{0}$	$2.8x10^{-1}$
D 10	*	*	$4.1x10^{-1}$		<200/40	$2.9x10^{0}$	$2.3x10^{0}$	$1.3x10^{1}$	$6.1x10^{-2}$	$8.9x10^{0}$	$3.5x10^{-1}$	
D 30	*	*	$9.0x10^{-1}$		<200/20	$1.7x10^{-1}$	$3.0x10^{-1}$	*	*	$5.6x10^{-1}$	*	
E 15	*	*	$1.8x10^{-1}$	$5.1x10^{-1}$	<200/15	$2.7x10^{-1}$	$3.4x10^{-1}$	*	*	$8.7x10^{-2}$	*	$9.8x10^{-2}$
F 20	*	*	$2.8x10^{-1}$	$2.9x10^{-1}$	<200/30	$1.1x10^{0}$	$9.7x10^{-1}$	$7.8x10^{-1}$	$4.5x10^{-2}$	$1.0x10^{1}$	$2.8x10^{-1}$	$1.2x10^{-1}$
G 20	*	$2.1x10^{0}$	$3.1x10^{-1}$		1000	$3.9x10^{2}$	$5.0x10^{2}$	$1.5x10^{2}$	$3.3x10^{0}$	$8.0x10^{1}$	$2.1x10^{1}$	
G 23	*	$1.5x10^{0}$	$4.1x10^{-1}$		750	$2.2x10^{2}$	$3.7x10^{2}$	$7.7x10^{1}$	$2.7x10^{-1}$	$6.2x10^{1}$	$9.6x10^{0}$	
H 5			$6.7x10^{-2}$		<200/30	*	*	*	$5.3x10^{-2}$	*	$2.8x10^{-1}$	
H 12	*	$2.5x10^{-1}$	$3.5x10^{-1}$	*	1000	$3.0x10^{2}$	$4.8x10^{2}$	$1.1x10^{2}$	$7.3x10^{-2}$	$5.8x10^{0}$	$2.1x10^{1}$	$9.9x10^{-2}$
H 20	*	$1.3x10^{-1}$	$2.8x10^{-2}$		500	$4.3x10^{1}$	$8.3x10^{1}$	$2.1x10^{1}$	$4.6x10^{-1}$	$1.5x10^{1}$	$3.1x10^{0}$	
I 5	*	*	$3.9x10^{-1}$		<200	$1.1x10^{0}$	$3.0x10^{-1}$	$5.5x10^{-1}$	$3.1x10^{-2}$	$3.5x10^{-1}$	*	
I 11	*	$7.5x10^{-1}$	$7.9x10^{-1}$		2000	$4.8x10^{2}$	$9.5x10^{1}$	$6.0x10^{2}$	$2.1x10^{0}$	$5.2x10^{1}$	*	
I 17	*	$1.5x10^{0}$	$7.7x10^{-1}$	$7.5x10^{-1}$	5500	$9.1x10^{2}$	$1.8x10^{3}$	$3.7x10^{2}$	$6.8x10^{0}$	$2.7x10^{1}$	$6.1x10^{1}$	$3.2x10^{-1}$
I 25	*	$2.7x10^{-1}$	$5.4x10^{-1}$		850	$1.0x10^{2}$	$2.2x10^{2}$	$3.2x10^{1}$	$2.4x10^{0}$	$1.1x10^{1}$	$7.0x10^{0}$	
J 15	*	*	$2.3x10^{-2}$		<200/15	*	$1.7x10^{-1}$	*	*	$9.5x10^{-2}$	$2.3x10^{-1}$	
J 36	*	*	$5.0x10^{-1}$	$2.1x10^{1}$	<200/50	$2.3x10^{1}$	$9.6x10^{0}$	$1.2x10^{1}$	$4.5x10^{1}$	$2.0x10^{1}$	$5.2x10^{0}$	$2.1x10^{-1}$
K 15	*	*	$2.4x10^{-2}$		<200/10	$1.9x10^{-1}$	*	*	*	*	*	
K 25	*	*	$3.1x10^{-1}$		<200/20	$1.7x10^{-1}$	$8.4x10^{-2}$	*	*	$8.7x10^{-2}$	$1.1x10^{-1}$	
K 35	*	*	$3.1x10^{-1}$		<200/Bkg	$1.8x10^{-1}$	*	*	*	*	*	
L 18	*	$2.7x10^{-1}$	$2.8x10^{-1}$	$2.4x10^{0}$	600	$1.0x10^{2}$	$2.0x10^{2}$	$4.2x10^{1}$	$8.9x10^{-1}$	$3.4x10^{1}$	$9.5x10^{0}$	$2.8x10^{-1}$
L 22	*	*	$4.6x10^{-1}$		<200/15	*	$1.9x10^{-1}$	*	*	*	*	

TABLE 2.7-6 (Cont'd)

116-C-1

107-C LIQUID WASTE DISPOSAL TRENCH (CONT'D)

	Concentration (pCi/g)											
Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
M 10	*	*	$2.1x10^{-2}$		<200/20	*	$4.7x10^{-2}$	$3.8x10^{-1}$	*	*	*	$3.1x10^{-1}$
M 20	*	*	$2.2x10^{-1}$		<200/5	*	*	*	*	*	*	
N 10	*	*	$9.4x10^{-2}$	$4.2x10^{0}$	<200/20	$1.7x10^{-1}$	$4.7x10^{-2}$	*	*	*	*	$9.7x10^{-2}$
N 20	*	*	*		<200/10	*	*	*	$3.6x10^{-2}$	*	*	
O 5	*	*	$1.0x10^{-1}$	$8.2x10^{-1}$	<200/20	$8.5x10^{-1}$	$4.0x10^{-2}$	$3.0x10^{-1}$	*	$1.5x10^{-1}$	*	$7.5x10^{-2}$
O 20	*	*	*		<200/10	*	*	*	*	*	$1.1x10^{-1}$	

Test holes N and O are between 107-C and 116-Cl and are around expansion boxes in effluent discharge lines to 1904-C.

For sample debris inside of boxes (See 107-B data).

TABLE 2.7-7

107-B RETENTION BASIN

SAMPLING OF BASIN FILL

Concentration (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
AS 0	*	2.2×10^{-2}	4.6×10^{-2}		<200/100	2.7×10^{0}	3.5×10^{0}	2.0×10^{0}	4.0×10^{-2}	1.9×10^{-1}	1.2×10^{-1}			
3	3.0×10^{0}	6.6×10^{1}	1.6×10^{1}	9.1×10^{1}	75,000	1.1×10^{4}	2.6×10^{4}	1.1×10^{4}	1.1×10^{2}	3.0×10^{2}	8.8×10^{2}	9.9×10^{-1}	5.7×10^{4}	2.2×10^{1}
BS 0	*	*	*		<200/60	1.4×10^{0}	1.9×10^{0}	6.0×10^{-1}	*	2.6×10^{-1}	*			
3	4.1×10^{-1}	1.2×10^{1}	9.0×10^{0}	9.3×10^{0}	20,000	2.4×10^{3}	3.7×10^{3}	2.1×10^{3}	4.4×10^{1}	1.2×10^{2}	3.6×10^{2}	3.0×10^{-1}	8.7×10^{3}	*
Core	*	8.7×10^{0}	1.7×10^{1}		2,000	2.0×10^{2}	1.3×10^{2}	7.5×10^{2}	7.9×10^{1}	1.5×10^{2}	1.6×10^{2}			
CS 3-1/2	3.9×10^{-1}	1.3×10^{1}	1.6×10^{0}	7.1×10^{0}	6,500	3.1×10^{3}	2.4×10^{3}	1.7×10^{3}	*	9.0×10^{1}	1.7×10^{2}	5.3×10^{-1}		
DS 0	*	*	6.0×10^{-1}		300	1.3×10^{1}	1.1×10^{1}	5.0×10^{0}	4.2×10^{-2}	6.0×10^{-1}	9.4×10^{-1}			
3	2.9×10^{0}	8.9×10^{1}	3.1×10^{2}	9.6×10^{0}	45,000	2.3×10^{4}	1.2×10^{4}	1.1×10^{4}	5.2×10^{1}	5.4×10^{2}	7.8×10^{2}	9.0×10^{-1}	9.3×10^{3}	1.8×10^{2}
AN 0	*	1.5×10^{-1}	1.8×10^{0}		200	4.1×10^{1}	4.5×10^{1}	1.3×10^{1}	1.9×10^{-1}	2.1×10^{1}	2.1×10^{0}			
1	*	1.7×10^{-1}	1.1×10^{0}		300	2.3×10^{1}	2.8×10^{1}	9.7×10^{0}	4.6×10^{-2}	2.6×10^{1}	2.0×10^{1}			
3-1/2	4.7×10^{-2}	1.4×10^{0}	1.8×10^{0}	5.2×10^{0}	2,500	2.8×10^{2}	6.2×10^{2}	2.3×10^{2}	1.0×10^{0}	1.7×10^{1}	5.7×10^{1}	4.4×10^{-1}		
BN 2	*	4.5×10^{-1}	2.9×10^{0}		300	8.9×10^{1}	5.8×10^{1}	2.8×10^{1}	1.8×10^{-2}	3.1×10^{1}	2.0×10^{0}			
3-1/2	6.2×10^{-1}	1.4×10^{-1}	7.3×10^{0}	1.0×10^{1}	20,000	4.9×10^{3}	6.9×10^{3}	3.3×10^{3}	1.4×10^{0}	1.2×10^{2}	3.9×10^{2}	4.8×10^{-1}		
CN 1	3.9×10^{-2}	1.2×10^{0}	6.1×10^{0}		700	1.6×10^{2}	1.5×10^{2}	6.0×10^{1}	1.3×10^{-1}	5.1×10^{1}	5.0×10^{0}			
3	*	1.9×10^{1}	5.8×10^{0}		2,000	4.8×10^{4}	3.4×10^{4}	2.2×10^{4}	*	4.4×10^{1}	3.5×10^{1}			
3-1/2	1.2×10^{0}	4.0×10^{1}	1.6×10^{1}	2.5×10^{2}	70,000	3.2×10^{4}	1.7×10^{4}	1.6×10^{4}	7.5×10^{1}	8.1×10^{2}	3.7×10^{2}	2.1×10^{0}		
Cement Flakes S. Basin	*	8.5×10^{0}	1.3×10^{-1}		10,000	1.3×10^{3}	6.1×10^{3}	4.3×10^{2}	*	4.7×10^{2}	7.6×10^{2}			
Wall Scraping	6.4×10^{-1}	1.6×10^{1}	8.9×10^{0}		8,000	1.5×10^{4}	1.3×10^{4}	4.8×10^{3}	5.8×10^{1}	4.6×10^{2}	2.8×10^{2}			

BS Core is loose contamination scraped and brushed from concrete core sample of basin floor.

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TABLE 2.7-8

107-C RETENTION BASIN

SAMPLING OF BASIN FILL

Concentration (pCi/g)

Sample No.	P-11/Scaler c/m	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
AW-2	<200/50	*	*	$1.2x10^{-1}$		$1.1x10^{0}$	$6.4x10^{-1}$	$4.5x10^{-1}$	$5.1x10^{-2}$	$1.2x10^{0}$	$1.1x10^{1}$			
3	1500	*	$3.4x10^{0}$	$6.4x10^{0}$	$1.1x10^{1}$	$8.2x10^{2}$	$2.7x10^{2}$	$2.9x10^{2}$	$1.4x10^{0}$	$3.9x10^{2}$	$8.0x10^{0}$	$3.0x10^{0}$		
CW-2	350	*	*	$3.5x10^{-1}$		$3.9x10^{0}$	$2.6x10^{0}$	$1.2x10^{0}$	$1.3x10^{-1}$	$1.7x10^{0}$	$4.2x10^{-1}$			
3	10000	$3.0x10^{0}$	$7.4x10^{1}$	$3.2x10^{2}$		$2.9x10^{3}$	$1.7x10^{3}$	$1.7x10^{3}$	$2.5x10^{-1}$	$1.6x10^{3}$	$2.6x10^{2}$	$6.2x10^{-1}$		
DW-2	1000	*	$9.4x10^{-1}$	$7.1x10^{0}$		$4.9x10^{2}$	$2.8x10^{2}$	$2.7x10^{2}$	$1.3x10^{0}$	$1.5x10^{2}$	$2.2x10^{1}$			
3	35000	$3.9x10^{0}$	$1.1x10^{2}$	$1.1x10^{2}$	$6.1x10^{1}$	$1.3x10^{4}$	$7.4x10^{3}$	$7.4x10^{3}$	$7.1x10^{1}$	$2.5x10^{3}$	$8.0x10^{2}$	$6.4x10^{-1}$	$3.5x10^{2}$	$1.6x10^{2}$
AE-2	<200/50	*	*	$2.4x10^{-1}$		$2.7x10^{0}$	$1.4x10^{0}$	$1.3x10^{0}$	$3.4x10^{-2}$	$2.3x10^{-1}$	$1.5x10^{-1}$			
2-1/2	35000	$6.4x10^{0}$	$1.9x10^{2}$	$5.3x10^{2}$	$9.6x10^{0}$	$1.3x10^{4}$	$4.4x10^{3}$	$5.2x10^{3}$	$1.0x10^{1}$	$2.0x10^{2}$	$2.8x10^{2}$	$1.9x10^{0}$	$5.1x10^{3}$	$1.3x10^{2}$
CE-1	<200/50	*	$1.1x10^{-1}$	$1.2x10^{0}$		$3.5x10^{0}$	$1.5x10^{0}$	$1.1x10^{0}$	$5.8x10^{-2}$	$5.8x10^{-1}$	$1.2x10^{-1}$			
2	10000	$1.4x10^{0}$	$2.9x10^{1}$	$6.4x10^{2}$	$3.5x10^{1}$	$2.3x10^{3}$	$4.9x10^{3}$	$2.1x10^{3}$	*	$9.1x10^{2}$	$3.8x10^{2}$	$9.0x10^{-1}$		
DE-1	<200/80	*	$2.7x10^{-1}$	$6.7x10^{1}$		$3.7x10^{1}$	$1.1x10^{1}$	$1.3x10^{1}$	$2.5x10^{-1}$	$9.5x10^{-1}$	$1.5x10^{0}$			
2	85000	$9.0x10^{0}$	$2.3x10^{2}$	$7.8x10^{2}$	$3.1x10^{1}$	$5.9x10^{3}$	$1.6x10^{4}$	$2.3x10^{4}$	$1.7x10^{3}$	$2.1x10^{3}$	$5.0x10^{3}$	$1.6x10^{0}$		$2.6x10^{2}$

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TABLE 2.7-9

107-B RETENTION BASIN FILL
BASIN SLUDGE
Ave. Depth = 2-1/2" Mass = 1.5×10^9g
Concentrations (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
AS 3	3.0×10^{0}	6.6×10^{1}	1.6×10^{1}	9.1×10^{1}	1.1×10^{4}	2.6×10^{4}	1.1×10^{4}	1.1×10^{2}	3.0×10^{2}	8.8×10^{2}	9.9×10^{-1}	5.7×10^{4}	2.2×10^{1}
BS 3	4.1×10^{-1}	1.2×10^{1}	9.0×10^{0}	9.3×10^{0}	2.4×10^{3}	3.7×10^{3}	2.1×10^{3}	4.4×10^{1}	1.2×10^{2}	3.6×10^{2}	3.0×10^{-1}	8.7×10^{3}	
CS 3-1/2	3.9×10^{-1}	1.3×10^{1}	1.6×10^{0}	7.1×10^{0}	3.1×10^{3}	2.4×10^{3}	1.7×10^{3}	*	9.0×10^{1}	1.7×10^{2}	5.3×10^{-1}		
DS 3	2.9×10^{0}	1.3×10^{1}	3.1×10^{2}	9.6×10^{0}	2.3×10^{4}	1.2×10^{4}	1.1×10^{4}	5.2×10^{1}	5.4×10^{2}	7.8×10^{2}	9.0×10^{-1}	9.3×10^{3}	1.8×10^{2}
H 4	2.0×10^{0}	5.9×10^{1}	2.9×10^{1}		3.0×10^{4}	3.3×10^{4}	1.6×10^{4}	4.0×10^{0}	7.2×10^{2}	2.1×10^{3}			
H 4-1/2	8.7×10^{0}	3.4×10^{2}	8.0×10^{1}	1.0×10^{1}	6.4×10^{4}	3.6×10^{4}	2.9×10^{4}	1.0×10^{2}	1.2×10^{3}	4.7×10^{3}	9.0×10^{0}	4.2×10^{4}	2.6×10^{2}
I 4	*	*	3.0×10^{-2}		1.6×10^{0}	9.3×10^{-1}	5.6×10^{-1}	5.7×10^{-2}	4.0×10^{-1}	*			
J 3	4.7×10^{0}	1.7×10^{2}	2.0×10^{1}	2.8×10^{1}	1.4×10^{4}	4.2×10^{3}	5.3×10^{3}	1.3×10^{1}	1.3×10^{2}	1.9×10^{2}	9.1×10^{-1}	1.0×10^{4}	
AN 3-1/2	4.7×10^{-2}	1.4×10^{0}	1.8×10^{0}	5.2×10^{0}	2.8×10^{2}	6.2×10^{2}	2.3×10^{2}	1.0×10^{0}	1.7×10^{1}	5.7×10^{1}	4.4×10^{-1}		
BN 3-1/2	6.2×10^{-1}	1.4×10^{-1}	7.3×10^{0}	1.0×10^{1}	4.9×10^{3}	6.9×10^{3}	3.3×10^{3}	1.4×10^{0}	1.2×10^{2}	3.9×10^{2}	4.8×10^{-1}		
CN 3	*	1.9×10^{0}	5.8×10^{0}		4.8×10^{2}	3.4×10^{2}	2.2×10^{2}	*	4.4×10^{1}	3.5×10^{1}			
CN 3-1/2	1.2×10^{0}	4.0×10^{1}	1.6×10^{1}	2.5×10^{2}	3.2×10^{4}	1.7×10^{4}	1.6×10^{4}	7.5×10^{1}	8.1×10^{2}	3.7×10^{2}	2.1×10^{0}		
DN 4	*	6.3×10^{0}	4.0×10^{0}		3.2×10^{3}	1.1×10^{3}	1.2×10^{3}	1.5×10^{1}	7.0×10^{1}	1.5×10^{2}			
DN 4-1/2	2.1×10^{0}	8.6×10^{1}	4.1×10^{1}	7.9×10^{1}	3.2×10^{4}	9.8×10^{3}	1.2×10^{4}	9.5×10^{1}	3.7×10^{2}	1.3×10^{2}	1.1×10^{0}		2.6×10^{2}
Ave. pCi/g	1.9×10^{0}	5.8×10^{1}	3.9×10^{1}	5.0×10^{1}	1.6×10^{4}	1.1×10^{4}	7.8×10^{3}	3.6×10^{1}	3.2×10^{2}	7.4×10^{2}	1.7×10^{0}	2.5×10^{4}	1.8×10^{2}
Curies	2.8×10^{-3}	8.7×10^{-2}	5.8×10^{-2}	7.5×10^{-2}	24	16	12	5.5×10^{-2}	4.9×10^{-1}	1.1	2.5×10^{-3}	38	2.7×10^{-1}

Total Curies in Sludge = 92

TABLE 2.7-10

107-B RETENTION BASIN FILL

BASIN FILL (EXCLUDING SLUDGE)

Ave. Depth = 3.5' Mass = 2.6×10^{10}g

Ave. Concentrations (pCi/g)

Sample Hole	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
AS	*	2.2×10^{-2}	4.6×10^{-2}		2.7×10^{0}	3.5×10^{0}	2.0×10^{0}	4.0×10^{-2}	1.9×10^{-1}	1.2×10^{-1}			
BS	*	*	*		1.4×10^{0}	1.9×10^{0}	6.0×10^{-1}	*	2.6×10^{-1}	*			
CS													
DS	*	*	6.0×10^{-1}		1.3×10^{1}	1.1×10^{1}	5.0×10^{0}	4.2×10^{-2}	6.0×10^{-1}	9.4×10^{-1}			
AN	*	1.6×10^{-1}	1.5×10^{0}		3.2×10^{1}	3.7×10^{1}	1.1×10^{1}	1.2×10^{-1}	2.4×10^{1}	2.1×10^{0}			
BN	*	4.5×10^{-1}	2.9×10^{0}		8.9×10^{1}	5.8×10^{1}	2.8×10^{1}	1.8×10^{-2}	3.1×10^{1}	2.0×10^{0}			
CN	3.9×10^{-2}	1.2×10^{0}	6.1×10^{0}		1.6×10^{2}	1.5×10^{2}	6.0×10^{1}	1.3×10^{-1}	5.1×10^{1}	5.0×10^{0}			
DN	*	1.7×10^{-1}	3.5×10^{0}	2.7×10^{0}	4.0×10^{1}	3.6×10^{1}	1.5×10^{1}	3.8×10^{-1}	1.8×10^{1}	1.3×10^{0}			
H	*	8.0×10^{-2}	1.7×10^{-1}		1.1×10^{0}	1.4×10^{0}	2.1×10^{-1}	*	3.7×10^{-1}	*			
I	*	5.0×10^{0}	7.6×10^{0}	4.5×10^{1}	2.1×10^{3}	1.4×10^{3}	1.1×10^{3}	9.5×10^{0}	8.3×10^{1}	1.1×10^{2}	4.5×10^{-1}		
J	*	*	3.3×10^{-2}		7.5×10^{0}	4.7×10^{0}	1.4×10^{0}	3.4×10^{-2}	3.9×10^{-1}	2.6×10^{-1}			
Ave. pCi/g	3.9×10^{-3}	7.1×10^{-1}	2.2×10^{0}	2.4×10^{1}	2.4×10^{2}	1.7×10^{2}	1.2×10^{2}	1.0×10^{0}	2.1×10^{1}	1.2×10^{1}	4.5×10^{-1}		
Curies	1.0×10^{-4}	1.8×10^{-2}	5.8×10^{-2}	6.2×10^{-1}	6.4	4.4	3.2	2.7×10^{-2}	5.4×10^{-1}	3.2×10^{-1}	1.2×10^{-2}		

Total Curies in Fill Less Sludge = 16

Sludge = 92

Total Curies in Basin Fill = 110

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 - $3.4 \times 10^4 ft^2 \times 1/2' = 1.7 \times 10^4 ft^3$
Mass = $1.2 \times 10^9 g$

Underground - $1.3 \times 10^5 ft^2 \times 30' = 3.9 \times 10^6 ft^3$
Mass = $2.7 \times 10^{11} g$

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	3.8×10^{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	4.6×10^{1}	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 2.7-13

107-C RETENTION BASIN FILL

BASIN SLUDGE

Ave. Depth = 1/2" Mass = 4.8×10^8g

Concentrations (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
AW 3	*	3.4×10^{0}	6.4×10^{0}	1.1×10^{1}	8.2×10^{2}	2.7×10^{2}	2.9×10^{2}	1.4×10^{0}	3.9×10^{2}	8.0×10^{0}	3.0×10^{0}		
BW 3	*	1.8×10^{0}	1.4×10^{1}	3.6×10^{1}	1.8×10^{2}	1.5×10^{2}	1.0×10^{2}	1.7×10^{0}	8.5×10^{1}	3.4×10^{1}	2.6×10^{-1}		
CW 3	3.0×10^{0}	7.4×10^{1}	3.2×10^{2}		2.9×10^{3}	1.7×10^{3}	1.7×10^{3}	2.5×10^{-1}	1.6×10^{3}	2.6×10^{2}	6.2×10^{-1}		
DW 3	3.9×10^{0}	1.1×10^{2}	1.1×10^{2}	6.1×10^{1}	1.3×10^{4}	7.4×10^{3}	7.4×10^{3}	7.1×10^{1}	2.5×10^{3}	8.0×10^{2}	6.4×10^{-1}	3.5×10^{2}	1.6×10^{2}
AE 2-1/2	6.4×10^{0}	1.9×10^{2}	5.3×10^{2}	9.6×10^{0}	1.3×10^{4}	4.4×10^{3}	5.2×10^{3}	1.0×10^{1}	2.0×10^{2}	2.8×10^{2}	1.9×10^{0}	5.1×10^{3}	1.3×10^{2}
BE 2	*	1.5×10^{0}	7.2×10^{0}	1.1×10^{1}	3.6×10^{2}	4.5×10^{2}	1.8×10^{2}	*	7.8×10^{1}	1.4×10^{1}	3.5×10^{-1}		
CE 2	1.4×10^{0}	2.9×10^{1}	6.4×10^{2}	3.5×10^{1}	2.3×10^{3}	4.9×10^{3}	2.1×10^{3}	*	9.1×10^{2}	3.8×10^{2}	9.0×10^{-1}		
DE 2	9.0×10^{0}	2.3×10^{2}	7.8×10^{2}	3.1×10^{1}	5.9×10^{3}	1.6×10^{4}	2.3×10^{4}	1.7×10^{3}	2.1×10^{3}	5.0×10^{3}	1.6×10^{0}		
EE 3-1/2	*	7.9×10^{0}	2.6×10^{0}	4.4×10^{3}	1.1×10^{3}	3.5×10^{2}	4.4×10^{2}	2.6×10^{0}	3.4×10^{1}	8.0×10^{1}	6.3×10^{-1}		2.6×10^{2}
EW 3-1/2	*	1.2×10^{0}	4.4×10^{2}	4.9×10^{0}	3.1×10^{3}	2.5×10^{3}	2.5×10^{3}	1.2×10^{2}	3.1×10^{3}	6.9×10^{2}	9.9×10^{-1}		
Ave. pCi/g	2.4	6.5×10^{1}	2.9×10^{2}	5.1×10^{2}	4.3×10^{3}	3.8×10^{3}	4.3×10^{3}	2.4×10^{2}	1.1×10^{3}	7.6×10^{2}	1.1	2.7×10^{3}	1.8×10^{2}
Curies	1.2×10^{-3}	3.2×10^{-2}	1.4×10^{-1}	2.5×10^{-1}	2.1	1.9	2.1	1.2×10^{-1}	5.4×10^{-1}	3.7×10^{-1}	5.4×10^{-4}	1.3	8.8×10^{-2}

Total Curies in Sludge = 9

TABLE 2.7-14

107-C RETENTION BASIN FILL
BASIN FILL (EXCLUDING SLUDGE)
Ave. Depth = 3' Mass = 3.6×10^{10}g
Ave. Concentrations (pCi/g)

Sample Hole	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
AE	*	*	2.4×10^{-1}		2.7×10^{0}	1.4×10^{0}	1.3×10^{0}	3.4×10^{-2}	2.3×10^{-1}	1.5×10^{-1}			
BE	*	4.3×10^{-2}	2.1×10^{-1}		1.1×10^{0}	4.3×10^{-1}	2.7×10^{-1}	5.1×10^{-2}	5.4×10^{-2}	2.0×10^{-1}			
CE	*	1.1×10^{-1}	1.2×10^{0}		3.5×10^{0}	1.5×10^{0}	1.1×10^{0}	5.8×10^{-2}	5.8×10^{-1}	1.2×10^{-1}			
DE	*	2.7×10^{-1}	6.7×10^{1}		3.7×10^{1}	1.1×10^{1}	1.3×10^{1}	2.5×10^{-1}	9.5×10^{-1}	1.5×10^{0}			
EE	(No samples analyzed)												
AW	*	*	1.2×10^{-1}		1.1×10^{0}	6.4×10^{-1}	4.5×10^{-1}	5.1×10^{-2}	1.2×10^{0}	1.1×10^{1}			
BW	*	3.1×10^{-1}	1.1×10^{0}		3.4×10^{1}	6.3×10^{-1}	3.3×10^{1}	7.0×10^{-1}	1.2×10^{2}	4.9×10^{0}			
CW	*	*	3.5×10^{-1}		3.9×10^{0}	2.6×10^{0}	1.2×10^{0}	1.3×10^{-1}	1.7×10^{0}	4.2×10^{-1}			
DW	*	9.4×10^{-1}	7.1×10^{0}		4.9×10^{2}	2.8×10^{2}	2.7×10^{2}	1.3×10^{0}	1.5×10^{2}	2.2×10^{1}			
EW	4.9×10^{-1}	5.3×10^{0}	1.2×10^{1}		9.0×10^{1}	7.0×10^{1}	4.2×10^{1}	2.1×10^{0}	1.6×10^{2}	8.1×10^{0}			
Ave. pCi/g	5.4×10^{-2}	7.8×10^{-1}	9.9×10^{0}		7.4×10^{1}	4.1×10^{1}	4.0×10^{1}	5.2×10^{-1}	4.8×10^{1}	5.4×10^{1}			
Curies	8.6×10^{-4}	1.3×10^{-2}	1.6×10^{-1}		1.2	6.6×10^{-1}	6.4×10^{-1}	8.3×10^{-3}	7.7×10^{-1}	6.6×10^{-1}			

Total Curies in Fill less Sludge = 4
Sludge = 9
Total Curies in Basin Fill = 13

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 - 2.2×10^5 ft^2 x 1/2' = 1.1×10^5 ft^3
Mass = 7.5×10^9 g

Underground - 2.2×10^5 ft^2 x 20' = 4.4×10^6 ft^3
Mass = 3.0×10^{11} g

Radionuclide	Surface Contamination Ave. pCi/g	Underground Contamination Ave. pCi/g	Curies
Pu-238	*	*	0.0
Pu-239/240	5.1×10^{-1}	1.4×10^{-2}	8.0×10^{-3}
Sr-90	3.5×10^{0}	6.6×10^{-1}	2.3×10^{-1}
H-3	1.7×10^{0}	NA[1]	5.2×10^{-1}
Eu-152	3.3×10^{1}	9.0×10^{-1}	5.2×10^{-1}
Co-60	1.7×10^{1}	2.8×10^{0}	9.7×10^{-1}
Eu-154	1.1×10^{1}	3.0×10^{-1}	1.7×10^{-1}
Cs-134	1.9×10^{-1}	5.0×10^{-2}	1.6×10^{-2}
Cs-137	1.2×10^{1}	5.7×10^{0}	1.8×10^{0}
Eu-155	2.0×10^{1}	9.6×10^{-2}	1.8×10^{-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

0-8' Below Basin 1.7×10^5 ft^2 x 8' = 1.4×10^6 ft^3

Mass = 9.3×10^{10}g

8'-20' Below Basin 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	1.9×10^1	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' - 7.0×10^5 ft^3

Mass = 4.8×10^{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 2.7-19

100-B

B/C EFFLUENT LINE JUNCTION BOX LEAKAGE

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
	Concentration (pCi/g)											
B 15	*	$2.2x10^{-1}$	$2.3x10^{0}$		<200/80	$1.3x10^{1}$	$1.8x10^{1}$	$3.1x10^{0}$	*	$5.3x10^{0}$	$2.3x10^{-1}$	
20	*	$2.7x10^{0}$	$5.2x10^{0}$	$9.9x10^{1}$	1,500	$1.9x10^{2}$	$3.5x10^{2}$	$1.8x10^{1}$	$2.1x10^{1}$	$1.8x10^{3}$	$7.5x10^{3}$	
27-1/2	$3.2x10^{-1}$	$6.4x10^{0}$	$1.0x10^{2}$	$9.4x10^{1}$	2,500	$2.5x10^{2}$	$6.7x10^{2}$	$6.4x10^{0}$	$5.3x10^{1}$	$3.7x10^{3}$	$1.5x10^{4}$	$5.2x10^{-1}$
C 10	*	$2.9x10^{-1}$	$5.7x10^{-1}$		<200/30	$1.8x10^{0}$	$1.9x10^{0}$	$6.5x10^{-1}$	$8.6x10^{-2}$	$6.3x10^{0}$	$8.3x10^{-2}$	
D 15	*	$1.3x10^{-1}$	$2.3x10^{-1}$		<200/90	$7.7x10^{0}$	$1.6x10^{1}$	$2.9x10^{0}$	*	$1.7x10^{0}$	$2.4x10^{-1}$	
20	*	$2.3x10^{0}$	$5.1x10^{-1}$	$2.4x10^{1}$	1,000	$4.5x10^{2}$	$4.3x10^{2}$	$6.2x10^{1}$	*	$2.0x10^{1}$	$2.3x10^{2}$	
27-1/2	$4.1x10^{-1}$	$1.0x10^{1}$	$2.4x10^{1}$		850	$2.4x10^{2}$	$3.1x10^{2}$	$9.7x10^{1}$	*	$2.4x10^{2}$	$1.4x10^{0}$	
E 20	*	$1.5x10^{0}$	$1.4x10^{0}$	$1.1x10^{2}$	800	$1.7x10^{2}$	$1.9x10^{2}$	$7.0x10^{1}$	*	$7.9x10^{1}$	$2.9x10^{0}$	
27-1/2	*	$1.8x10^{-1}$	$2.0x10^{0}$		400	$3.2x10^{1}$	$5.1x10^{1}$	$8.8x10^{0}$	$1.0x10^{-1}$	$4.9x10^{0}$	$1.1x10^{0}$	
30	*	*	$2.2x10^{0}$		<200/15	*	$4.7x10^{-1}$	$2.4x10^{-1}$	*	$4.2x10^{-1}$	$1.7x10^{-1}$	
F 15	*	*	$2.1x10^{-1}$		<200/40	$3.9x10^{0}$	$4.3x10^{0}$	$1.0x10^{0}$	$9.4x10^{-2}$	$5.1x10^{-1}$	$1.0x10^{-1}$	
17-1/2	*	$1.4x10^{0}$	$1.4x10^{-1}$	$7.1x10^{1}$	550	$1.6x10^{2}$	$2.3x10^{2}$	$6.4x10^{1}$	*	$1.7x10^{1}$	$5.8x10^{0}$	
25	*	$5.4x10^{-1}$	$5.4x10^{-1}$		300	$7.6x10^{1}$	$1.3x10^{2}$	$2.0x10^{1}$	*	$9.0x10^{0}$	$2.7x10^{0}$	
H 20	*	$2.0x10^{-1}$	$1.6x10^{0}$	$1.2x10^{2}$	<200/60	$9.8x10^{0}$	$1.9x10^{1}$	$3.2x10^{0}$	*	$3.3x10^{0}$	*	

TABLE 2.7-20

100-B

EFFLUENT LINE LEAKAGE

Concentrations (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
116-B-2-1												
B 15	*	*	$1.6x10^{-1}$		<200/50	$1.7x10^{0}$	$1.9x10^{0}$	$3.7x10^{-1}$	*	$5.5x10^{-1}$	*	
20	*	$5.2x10^{-1}$	$1.3x10^{0}$	$3.6x10^{0}$	1,000	$1.4x10^{2}$	$3.9x10^{2}$	$2.2x10^{1}$	$1.8x10^{0}$	$2.3x10^{2}$	*	$4.2x10^{-1}$
22-1/2	*	$1.3x10^{-1}$	$1.1x10^{1}$		<200/150	$8.0x10^{0}$	$8.2x10^{0}$	$2.1x10^{0}$	$2.0x10^{-1}$	$3.4x10^{1}$	$3.9x10^{-1}$	
D 20	*	$6.4x10^{0}$	$1.2x10^{1}$	$2.8x10^{1}$	4,000	$1.3x10^{3}$	$8.4x10^{2}$	$3.6x10^{2}$	$1.4x10^{2}$	$6.7x10^{3}$	$3.0x10^{4}$	
30	*	$1.6x10^{0}$	$6.7x10^{0}$		300	$1.9x10^{1}$	$4.3x10^{1}$	$3.3x10^{1}$	$4.7x10^{0}$	$3.5x10^{2}$	$2.6x10^{1}$	
35	*	$1.4x10^{-1}$	$1.3x10^{1}$		<200/50	$4.5x10^{0}$	$3.1x10^{0}$	$1.6x10^{0}$	$1.4x10^{-1}$	$5.8x10^{1}$	$8.1x10^{-1}$	
E 20	*	$4.4x10^{-1}$	$9.5x10^{-1}$	$4.9x10^{1}$	300	$7.2x10^{1}$	$1.0x10^{2}$	$2.2x10^{1}$	$7.3x10^{-1}$	$2.2x10^{2}$	$2.3x10^{0}$	
25	*	$2.2x10^{0}$	$2.0x10^{2}$		600	$5.1x10^{1}$	$9.3x10^{1}$	$1.6x10^{1}$	*	$2.1x10^{2}$	$1.0x10^{0}$	
30	*	*	$3.1x10^{1}$		200	$2.5x10^{1}$	$1.5x10^{-1}$	*	*	$5.7x10^{1}$	$2.1x10^{0}$	
F 25	*	$2.9x10^{-1}$	$7.0x10^{-1}$		<200/40	$3.3x10^{1}$	$1.5x10^{1}$	$7.4x10^{0}$	$8.4x10^{-2}$	$1.4x10^{1}$	$1.1x10^{0}$	

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 2.7-24

INSIDE 107-B/C DIVERSION & JUNCTION BOXES

Concentration (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
BC-1	5.6×10^{0}	1.4×10^{2}	1.3×10^{2}		15,000	5.3×10^{3}	6.4×10^{3}	2.8×10^{3}	3.3×10^{2}	2.1×10^{4}	8.8×10^{4}	2.3×10^{-1}	2.9×10^{3}	*
2	8.2×10^{-1}	2.6×10^{1}	2.2×10^{1}		40,000	3.8×10^{4}	3.3×10^{3}	1.2×10^{4}	4.8×10^{2}	8.2×10^{2}	3.4×10^{4}	8.4×10^{-2}	1.7×10^{3}	1.2×10^{1}
3	2.8×10^{0}	7.1×10^{1}	7.4×10^{1}		25,000	2.1×10^{3}	5.3×10^{4}	5.7×10^{4}	2.5×10^{3}	6.7×10^{3}	4.0×10^{4}		2.5×10^{4}	*
5	1.6×10^{2}	2.8×10^{3}	3.0×10^{3}	6.1×10^{0}	5,000	8.5×10^{3}	2.3×10^{4}	2.8×10^{4}	3.6×10^{3}	1.6×10^{5}	5.8×10^{3}		6.9×10^{4}	
CC-1	1.0×10^{0}	3.2×10^{1}	7.4×10^{0}		50,000	2.1×10^{4}	1.7×10^{3}	5.9×10^{3}	1.1×10^{2}	3.6×10^{2}	1.4×10^{2}	1.7×10^{-1}		9.1×10^{0}
4	3.6×10^{-1}	1.1×10^{1}	4.4×10^{0}		30 mrad/hr	2.4×10^{3}	2.1×10^{3}	9.4×10^{2}	6.6×10^{0}	2.4×10^{2}	4.0×10^{3}	1.4×10^{-1}		*
107-C N Pit-1	*	4.5×10^{0}	2.6×10^{1}	1.1×10^{1}	800	4.4×10^{2}	3.9×10^{2}	1.7×10^{2}	7.2×10^{0}	8.5×10^{1}	1.5×10^{1}	6.5×10^{-1}		

Sample No. Descriptions: Inside B to C Diversion Box, Metal Tank

BC-1 Rust flakes and powder from inlet line to tank from 105-B.
-2 Rust flakes and powder from inside line to 107-C west basin.
-3 Crud from floor of tank.
-5 Mud from south end - 2" to 6" of mud on floor.

Inside Main Diversion Box from 105-C

CC-1 Rustand scale from inlet line to east diversion chamber.
CC-4 Main east chamber rust, scale, and crud from center of floor.

North Pipe Pit Between 107-C and 116-C-1

N Pit - 1 Small amount of moist sandy dirt at bottom of pit.

TABLE 2.7-25

Inside 107-B/C Diversion and Junction Boxes

	Radionuclide	Ave. pCi/g	Max. pCi/g
Effluent Line Scale	Pu-238	2.5×10^{0}	5.6×10^{0}
	Pu-239/240	6.6×10^{1}	1.4×10^{2}
	Sr-90	5.3×10^{1}	1.3×10^{2}
	H-3	NA	
	Eu-152	2.1×10^{4}	3.8×10^{4}
	Co-60	3.8×10^{3}	6.4×10^{3}
	Eu-154	6.9×10^{3}	1.2×10^{4}
	Cs-134	3.1×10^{2}	4.8×10^{2}
	Cs-137	7.4×10^{3}	2.1×10^{4}
	Eu-155	4.1×10^{4}	8.8×10^{4}
	U	1.6×10^{-1}	2.3×10^{-1}
	Ni-63	2.3×10^{3}	2.9×10^{3}
	C-14	7.0×10^{0}	1.2×10^{1}
	Total pCi/g B-γ =	8.3×10^{4}	
Diversion and Junction Boxes	Pu-238	4.1×10^{1}	1.6×10^{2}
	Pu-239	7.2×10^{2}	2.8×10^{3}
	Sr-90	7.8×10^{2}	3.0×10^{3}
	H-3	6.1×10^{0}	6.1×10^{0}
	Eu-152	8.1×10^{3}	2.1×10^{4}
	Co-60	7.7×10^{3}	2.3×10^{4}
	Eu-154	8.7×10^{3}	2.8×10^{4}
	Cs-134	9.7×10^{2}	3.6×10^{3}
	Cs-137	4.2×10^{4}	1.6×10^{5}
	Eu-155	1.2×10^{4}	4.0×10^{4}
	U	4.0×10^{-1}	6.5×10^{-1}
	Ni-63	3.6×10^{4}	6.9×10^{4}
	C-14	*	*
	Total B-γ =	1.2×10^{5}	

2.7.2 107-KW and KE Retention Basins

Drilling in the 107-KW and KE retention basin area was initiated on November 20 and completed on December 18, 1975. Twenty-eight sample holes were drilled in the 107-KW and KE Area. The locations of these sample holes are indicated in Figure 2.7-3. Figure 2.7-4 shows the approximate locations where samples of the soil fill and sludge within the basins were taken.

The 107-KE and KW retention basin vicinities have total radionuclide inventories of 6.7 and 4.9 curies, respectively. Average radionuclide concentrations in the sludge and fill inside of the K basins are an order of magnitude less than the other 100 Area retention basins. Though radionuclide concentrations are highest in the basin sludge, over 80% of the radioactive inventory of the K basins is contained in contaminated leakage areas adjacent to the basins.

Surface contamination in the general area surrounding the 107-K basins has direct GM readings from 500 to 1500 c/m. Former drainage areas from the 107-KW basin leakage (culvert areas) have direct GM readings up to 2000 c/m.

Underground contamination of sample holes drilled along effluent lines and directly outside of the retention basin walls is minimal. All underground soil samples taken in this area had GM readings of less than 200 c/m. Counts taken with the scaler installed in the carryall and radionuclide analyses of selected samples showed some occasional slight activity above background for some of these samples. Radionuclide concentrations of selected samples from test holes drilled at the 107-KE, KW Areas are given in Tables 2.7-26 and 2.7-27.

The 107-K retention basins are 250-foot diameter steel tanks with their floors at approximately ground level. The walls of the tanks are 20 feet high.

No sample holes were drilled through floors of the 107-K retention basins, therefore, due to the difficulty and expense of providing equipment access into the insides of the basins. The average GM readings of soil samples taken along the bottom of the fill material of the 107-K basins is 2000 c/m. This can be compared to a range of 9000 to over 30,000 c/m for the average GM readings of the 107 basins in the other deactivated 100 Areas.

Radionuclide concentrations for selected samples taken of the soil fill and sludge inside the K basins at the backhoe sampling locations are given in Tables 2.7-28 and 2.7-29. A summary of the distribution of the K basins' radioactive inventories is below:

	107-KE (3 tanks)	107-KW (3 tanks)
• Sludge	0.35 Ci	0.51 Ci
• Soil fill less sludge	0.15 Ci	0.48 Ci
• Soil adjacent to basin	6.2 Ci	3.9 Ci

Tables 2.7-30 through 2.7-35 give a more detailed summary of the radionuclide inventories and average concentrations within and outside of the 107-KE, KW basins.

Loose scale has dropped off the inside walls of the 107-K retention basins (metal tanks) and lies around the base of the inside walls. This scale reads 3000 to 10,000 c/m with a GM probe. Scale at the base of the inlet chutes to the tanks reads up to 90,000 c/m and averages 60,000 c/m. Over 90% of the scale has dropped off of the side walls. Radioanalytical results for a sample of this scale is given in Table 2.7-28.

K Crib and Trench

Drilling in the vicinity of the K crib and trench, 116-K-1 and 116-K-2, respectively, was initiated on June 27, 1975, and completed on August 22, 1975. Rough terrain and rocky soil adjacent to the trench made drilling in this area difficult. A backhoe was used to remove boulders near the ground surface at some of the sample hole locations along the river side of the trench. Thirty-five sample holes were drilled in the K crib

and trench area. The locations of these sample holes are indicated in Figure 2.7-5. Radionuclide concentrations of selected samples from test holes drilled in the K crib and trench area are given in Tables 2.7-36 through 2.7-38.

The 116-K-1 crib is a square-diked drainage pond 200 feet x 200 feet at the bottom and 400 feet x 400 feet at the top of its diked sides. The top of the dike is approximately 22 feet higher than the bottom of the pond. As-built drawings show that the 200 feet x 200 feet section of the pond is comprised of an 11-foot deep special fill of gravel and sand.

The general background along the contaminated bottom of the pond is approximately 1000 c/m with a GM probe. Localized contamination (hot spots) is present up to 10,000 c/m. Contamination on the lower half of the sloped banks of the dike ranges from 1000 to 7500 c/m and averages 3000 c/m. A maximum of 15,000 c/m was detected at a spot halfway up the south bank.

Beta-gamma concentrations in the contaminated soil column of the K crib average 3.8×10^2. The maximum beta-gamma contamination detected is 1.7×10^3 pCi/g. The average and maximum Pu-239/240 concentrations are 1.2 and 4.4 pCi/g, respectively. An estimated 46 curies of radioactivity are in the K crib. The majority of the radioactive inventory is in the upper 10 feet of the soil column.

Radioanalytical results for selected samples taken from the 116-K-1 crib are given in Table 2.7-36. Tables 2.7-39 and 2.7-40 give a detailed breakdown of the crib inventory by individual radionuclides.

Maximum contamination levels at the 116-K-2 trench (K trench) were measured at approximately 22 feet below grade at the west end of the trench (closest to reactor) and sloped up to 15 feet below grade at the east end. Maximum contamination levels of these sample holes ranged from 1000 to 12,000 c/m per sample with a GM probe. Contamination measurable with a GM probe was detected down to 30 feet below grade.

Maximum beta-gamma and Pu-239/240 concentrations detected in the K trench are 7.0×10^4 and 1.3×10^2 pCi/g, respectively. The corresponding average concentrations are 3.6×10^3 and 8.5 pCi/g. Radioanalytical results for selected samples taken from test holes drilled along the K trench are given in Table 2.7-37.

As shown in Table 2.7-41, the K trench has an estimated inventory of 2100 curies. This trench has the highest radionuclide inventory of all the deactivated 100 Area liquid waste disposal facilities. Extending over 4000 feet in length, the K trench is also the largest radioactive liquid waste trench in the 100 Areas. Eu-152 comprises approximately one-half of the total radionuclide inventory of the trench.

Sample holes drilled to the sides of the K trench revealed minimal (but higher than background) underground soil contamination. Radioanalytical results for these samples are given in Table 2.7-38. A summary of the average and maximum underground radionuclide concentrations in the soil column adjacent to the K trench is given in Table 2.7-42.

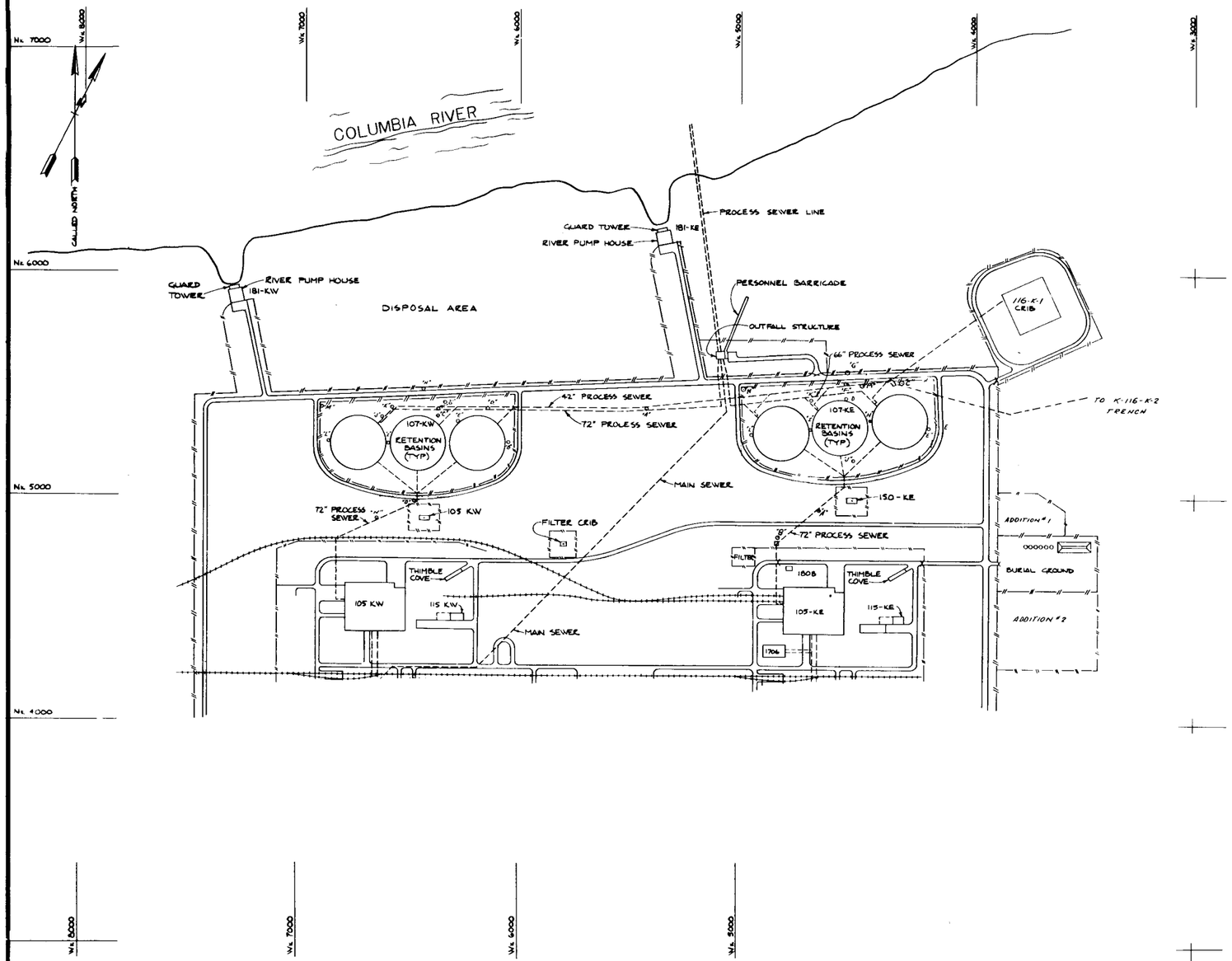
Prior to 1977, surface contamination extended several hundred feet along the river side of the K trench. This surface contamination was covered with up to a few feet of soil and gravel during the summer of 1977, and posted with concrete markers as per Hanford Standard AC-5-40. The concrete post locations have been surveyed. A drawing showing the locations of these posts will be available in the near future.

Four distinct areas of surface contamination were present adjacent to the north side of the K trench, all in former washout areas. Sample holes U and Q are in the general vicinity of two washout areas near the east end of the trench. These two areas are included in one larger posted area. Samples holes V and Z are in the third and fourth washout areas, respectively, from the east end of the trench.

During reactor operational periods several washout areas were created along the river side of the K trench. The K trench is at a much higher elevation than the area between the trench and the Columbia River. The washout areas resulted from extensive seepage through the north side of the trench which ran along the surface of the ground until reaching the river.

Surface contamination present in these washout areas had direct GM readings from 500 to 3000 c/m prior to being covered. Sample VØ-2 is a surface sample taken in an undisturbed area near sample hole V. Direct GM readings at this sampling location were 2000 c/m. Radionuclide concentrations for sample VØ-2 are given in Table 2.7-38. Beta-gamma concentrations in this sample are 3.6×10^2 pCi/g. No Pu-239/240 contamination was detected in sample VØ-2 or in sample VØ-1 which is a surface sample taken from the area which had been cleared of grass in the immediate vicinity of sample hole V. (Sample hole locations adjacent to the K trench were cleared of grass with a bulldozer to reduce fire hazards from welding which was necessary as part of the drilling work.)

The estimated radionuclide inventory in the soil column adjacent to the K trench is less than 50 curies which is negligible in comparison to the 2100-curie inventory within the trench itself.



107-KE TEST HOLES			
HOLE NO	NORTH	WEST	ELEVATION
A	4945.28	4606.12	459.27
B	4866.19	4866.63	462.30
C	5530.43	4315.61	439.81
D	5457.59	4562.73	440.17
E	5325.87	4140.68	446.19
F	5528.47	4567.47	439.19
G	5596.85	4569.10	441.98
H	5358.12	4407.82	441.98
I	5319.18	4673.70	440.46
J	5177.36	4530.82	440.71
K	5451.03	4716.43	439.84
L	5294.56	4938.18	440.46
M	5518.30	4692.68	438.90
N	5496.67	5035.79	438.58
O			
P			
Q			
R			
S			
T			
U			
V			
W			
X			
Y			
Z			

107-KW TEST HOLES			
HOLE NO	NORTH	WEST	ELEVATION
A	5402.48	5464.59	440.16
B	5259.34	6058.88	440.38
C	5374.30	6405.28	440.41
D	5404.20	6177.77	439.98
E	5323.42	6299.62	440.21
F	5370.31	6389.69	440.39
G	5403.42	6372.77	440.46
H	5448.14	6447.86	437.90
I	5249.27	6591.83	440.25
J	5367.14	6655.69	440.39
K	5402.42	6609.90	439.19
L	5253.03	6861.47	440.50
M	5412.66	6945.05	434.81
N	4888.66	6665.39	463.10
O	4997.43	6474.61	462.46
P			
Q			
R			
S			
T			
U			
V			
W			
X			
Y			
Z			

FIGURE 2.7-3

107-KE & KW SAMPLE HOLES

TABLE 2.7-4

SAMPLING LOCATIONS OF FILL DIRT WITHIN 107-KE & KW

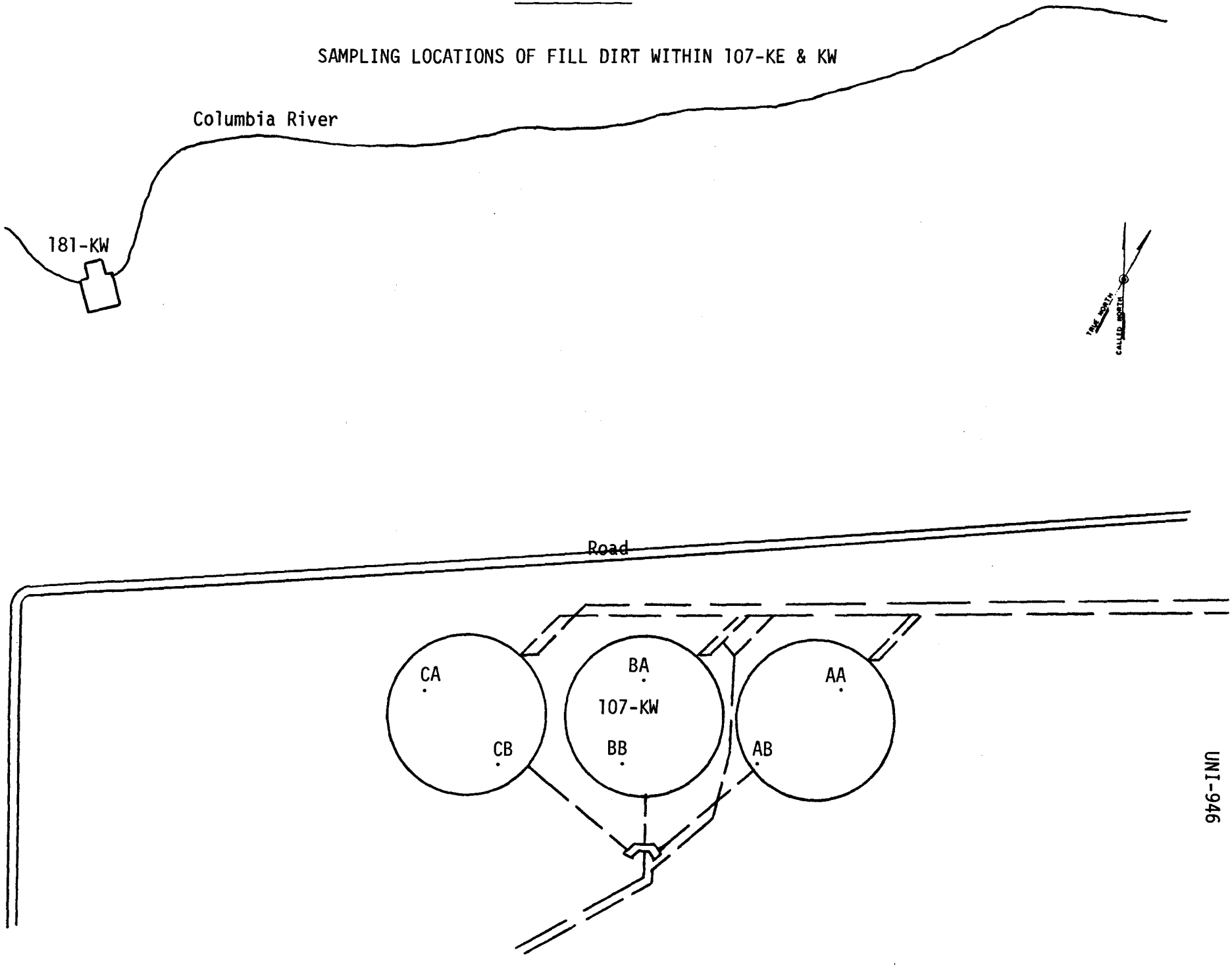


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Figure 2.7-4 (Cont'd)

SAMPLING LOCATIONS OF FILL DIRT WITHIN 107-KE & KW

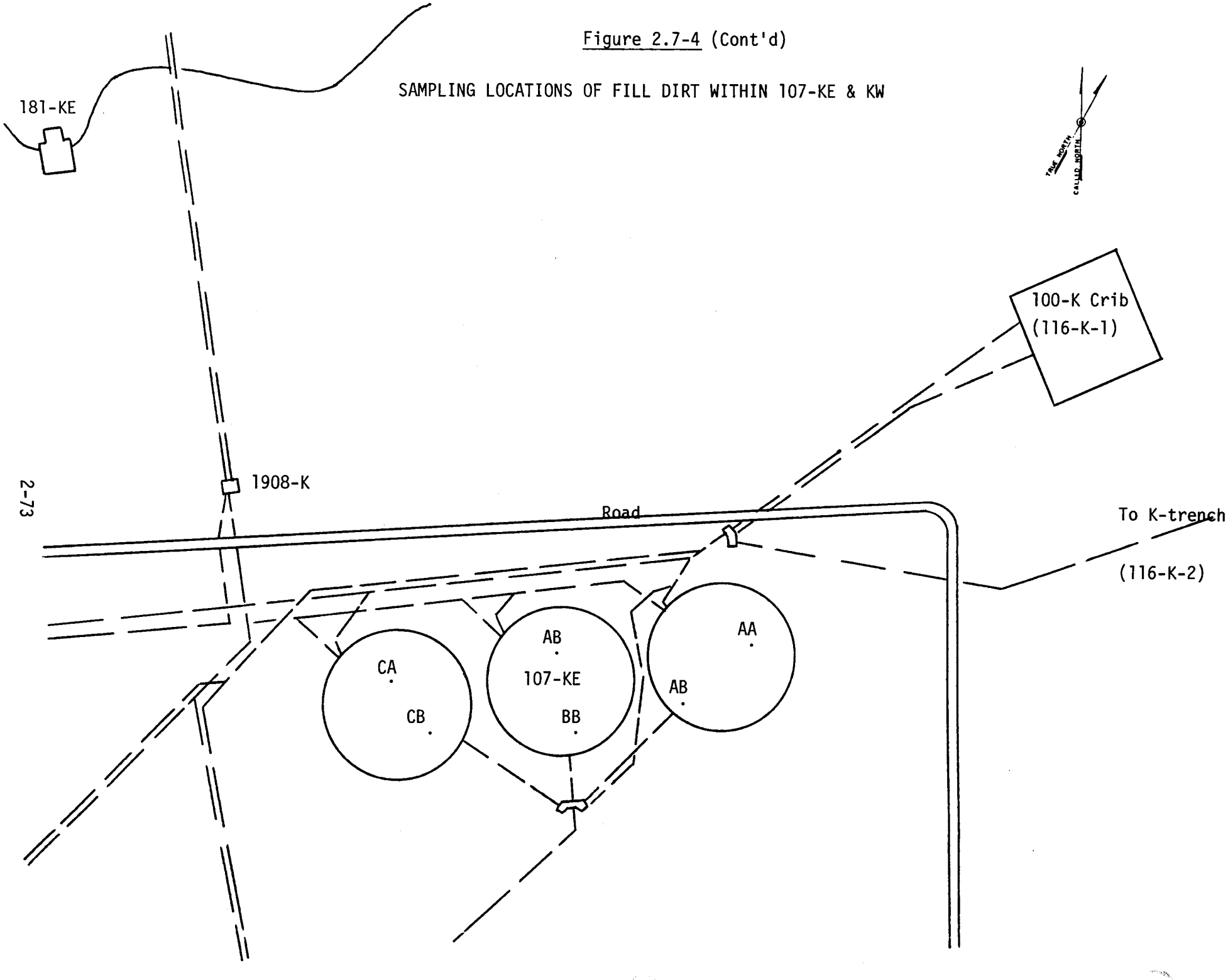

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TABLE 2.7-26

107-KE RETENTION BASIN

SAMPLE HOLES DRILLED OUTSIDE OF BASIN

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155
	Concentration (pCi/g)										
C 0	*	*	$3.9x10^{-1}$		<200/70	$1.2x10^{1}$	$5.5x10^{0}$	$5.2x10^{0}$	*	$5.2x10^{-1}$	$4.7x10^{-1}$
D 0	*	*	$1.2x10^{0}$		<200/80	$1.4x10^{1}$	$8.8x10^{0}$	$5.2x10^{0}$	*	$2.4x10^{1}$	$1.3x10^{0}$
E 5	*	*	$3.0x10^{-1}$		<200/50	$2.3x10^{1}$	$1.2x10^{1}$	$7.8x10^{0}$	$2.0x10^{-1}$	$1.3x10^{0}$	$2.7x10^{0}$
F 0	*	*	$8.8x10^{-1}$		<200/40	$9.4x10^{0}$	$7.9x10^{0}$	$4.3x10^{0}$	*	$3.9x10^{0}$	$6.0x10^{-1}$
5	*	*	$4.5x10^{-1}$		<200/30	$3.5x10^{0}$	$3.3x10^{0}$	$1.3x10^{0}$	*	$2.3x10^{0}$	$1.4x10^{-1}$
G 15			$1.2x10^{-1}$		<200/25	$3.6x10^{-1}$	$1.4x10^{-1}$	*	*	$3.7x10^{-2}$	$2.0x10^{-1}$
H 0	*	*	$4.4x10^{-1}$	*	<200/50	$2.5x10^{1}$	$8.4x10^{0}$	$8.3x10^{0}$	*	$1.4x10^{0}$	$2.1x10^{0}$
5			$4.3x10^{-1}$		<200/25	$1.9x10^{0}$	$8.6x10^{-1}$	$8.1x10^{-1}$	*	$4.1x10^{-1}$	$2.7x10^{-1}$
I 0	*	*	$2.8x10^{-1}$	$5.3x10^{-1}$	<200/30	$5.5x10^{0}$	$6.5x10^{-1}$	$2.0x10^{0}$	$8.2x10^{-2}$	$1.9x10^{-1}$	$4.6x10^{-1}$
J 0	*	*	$1.6x10^{0}$	$1.3x10^{0}$	<200/100	$2.9x10^{1}$	$1.7x10^{1}$	$1.2x10^{1}$	*	$3.6x10^{0}$	$6.8x10^{-1}$
15			$1.8x10^{-1}$		<200/15	$1.1x10^{-1}$	$1.0x10^{-1}$	*	*	$3.4x10^{-2}$	$1.1x10^{-1}$
K 0	*	*	$7.4x10^{-1}$		<200/25	$5.9x10^{0}$	$2.7x10^{0}$	$2.4x10^{0}$	$6.9x10^{-2}$	$7.4x10^{-1}$	$1.5x10^{0}$
L 0	*	*	$3.2x10^{-1}$	*	<200/30	$2.2x10^{0}$	$3.7x10^{-1}$	$9.6x10^{-1}$	$6.8x10^{-2}$	$3.4x10^{-1}$	$2.8x10^{-1}$
M 1	*	*	$4.3x10^{-1}$		400	$2.8x10^{1}$	$3.3x10^{1}$	$1.1x10^{1}$	*	$9.2x10^{0}$	$1.1x10^{1}$
0	*	$2.1x10^{-1}$	$2.3x10^{0}$	*	400	$6.2x10^{1}$	$4.1x10^{1}$	$2.5x10^{1}$	$5.2x10^{-2}$	$4.0x10^{1}$	$1.3x10^{0}$
20	*	*	$1.1x10^{0}$		<200/50	$1.3x10^{0}$	$6.6x10^{-1}$	$1.1x10^{0}$	$1.0x10^{-1}$	$2.3x10^{1}$	$7.5x10^{-1}$
N 0	*	$1.2x10^{-1}$	$1.9x10^{0}$	*	<200/60	$3.8x10^{1}$	$1.3x10^{1}$	$1.3x10^{1}$	*	$1.2x10^{1}$	$2.2x10^{0}$
15			$1.8x10^{-2}$		<200/30	$5.6x10^{-1}$	$2.3x10^{-1}$	$2.0x10^{-1}$	*	$1.5x10^{-1}$	$1.0x10^{0}$

TABLE 2.7-27

107-KW RETENTION BASIN

SAMPLE HOLES DRILLED OUTSIDE OF BASIN

	Concentration (pCi/g)										
Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155
B 0	*	*	$6.9x10^{-1}$	$4.9x10^{-1}$	<200/50	$2.0x10^{1}$	$1.1x10^{1}$	$1.0x10^{1}$	$5.0x10^{-1}$	$2.0x10^{0}$	$4.3x10^{0}$
25	*	*	$2.6x10^{-1}$		<200/25	*	*	*	*	$4.3x10^{-2}$	*
C 0	*	*	$2.1x10^{-1}$	*	<200/50	$1.5x10^{1}$	$2.4x10^{0}$	$4.3x10^{0}$	*	$5.3x10^{-1}$	$9.6x10^{-1}$
20			*		<200/30	*	*	*	*	*	*
D 0	*	*	$6.9x10^{-1}$	*	<200/80	$2.2x10^{1}$	$1.2x10^{1}$	$1.1x10^{1}$	$2.1x10^{-1}$	$3.8x10^{0}$	$4.5x10^{0}$
10			$1.8x10^{-1}$		<200/25	$2.2x10^{0}$	$1.0x10^{0}$	$5.1x10^{-1}$	$4.1x10^{-2}$	$7.6x10^{-1}$	$2.8x10^{-1}$
E 0	*	$3.5x10^{-1}$	$1.4x10^{-1}$	$4.3x10^{-1}$	<200/40	$6.8x10^{0}$	$3.6x10^{0}$	$3.2x10^{0}$	$5.9x10^{-2}$	$2.0x10^{0}$	$1.3x10^{0}$
20			*		<200/20	$4.8x10^{-1}$	$4.1x10^{-2}$	*	*	*	*
F 0	*	*	$3.0x10^{-2}$		<200/40	$3.5x10^{0}$	$2.6x10^{0}$	$4.3x10^{0}$	$5.9x10^{-2}$	$3.7x10^{-1}$	$1.5x10^{0}$
15			*		<200/15	*	$3.7x10^{-2}$	*	*	*	$1.7x10^{-1}$
G 0	*	*	$4.0x10^{-1}$	*	<200/50	$1.1x10^{1}$	$6.0x10^{0}$	$4.9x10^{0}$	*	$1.1x10^{0}$	$1.8x10^{0}$
8			$5.4x10^{-2}$		<200/30	$1.1x10^{0}$	$4.8x10^{-1}$	$7.0x10^{-1}$	*	$1.6x10^{-1}$	$2.9x10^{-1}$
H 0	*	*	$9.8x10^{-1}$	*	<200/50	$6.3x10^{0}$	$1.1x10^{1}$	$1.3x10^{1}$	$1.5x10^{-1}$	$2.8x10^{0}$	$6.9x10^{0}$
20			$3.9x10^{-2}$		<200/25	*	$4.4x10^{-2}$	*	$4.3x10^{-2}$	*	$1.0x10^{-1}$
I 0	*	*	$1.3x10^{-1}$		<200/25	$3.4x10^{0}$	$1.2x10^{0}$	$1.3x10^{0}$	*	$7.3x10^{-1}$	$2.8x10^{-1}$
J 0	*	$1.4x10^{-1}$	$1.5x10^{0}$	*	<200/60	$2.1x10^{1}$	$8.9x10^{0}$	$6.4x10^{0}$	*	$3.1x10^{0}$	$2.7x10^{-1}$
K 01	*	*	$1.8x10^{0}$		5,000	$8.1x10^{2}$	$1.0x10^{1}$	$1.8x10^{2}$	$1.9x10^{0}$	$6.9x10^{0}$	$5.7x10^{2}$
0	*	$1.0x10^{-1}$	$1.9x10^{0}$	*	<200/50	$1.6x10^{1}$	$7.6x10^{0}$	$7.1x10^{0}$	$2.5x10^{-1}$	$5.3x10^{0}$	$2.3x10^{0}$
L 01	*	$5.2x10^{-1}$	$7.8x10^{0}$	$4.3x10^{-1}$	600	$1.3x10^{2}$	$5.0x10^{1}$	$3.3x10^{1}$	*	$2.8x10^{1}$	$2.6x10^{2}$
0	*	$2.3x10^{-1}$	$2.7x10^{0}$	$1.1x10^{0}$	<200/140	$5.4x10^{1}$	$2.2x10^{1}$	$1.8x10^{1}$	*	$1.5x10^{1}$	$1.2x10^{0}$
M 0	*	$3.2x10^{0}$	$3.8x10^{1}$	$7.8x10^{0}$	800	$5.6x10^{2}$	$2.6x10^{2}$	$2.4x10^{2}$	$3.9x10^{0}$	$2.4x10^{2}$	$2.4x10^{1}$
N 0			$1.1x10^{0}$		<200/15	$1.3x10^{0}$	$3.6x10^{-1}$	$3.0x10^{-1}$	*	$2.6x10^{0}$	$1.2x10^{-1}$
15	*	*	$1.1x10^{0}$	$3.2x10^{1}$	<200/25	$9.4x10^{-1}$	$2.1x10^{-1}$	$2.1x10^{-1}$	*	$4.3x10^{0}$	$1.7x10^{-1}$

TABLE 2.7-28

107-KE RETENTION BASIN

SAMPLING OF BASIN FILL

Concentration (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63
AA 0	*	*	$6.7x10^{-2}$		<200/40	$6.9x10^{-1}$	$1.1x10^{0}$	$4.9x10^{-1}$	$9.7x10^{-2}$	$1.6x10^{-1}$	$1.6x10^{0}$		
3	*	$1.9x10^{-1}$	$6.0x10^{0}$	$2.1x10^{0}$	<200/160	$6.6x10^{1}$	$2.0x10^{1}$	$2.4x10^{1}$	*	$1.6x10^{0}$	$5.3x10^{0}$		
AB 0			$7.6x10^{-2}$		<200/20	$4.2x10^{0}$	$1.8x10^{-1}$	$1.3x10^{0}$	$3.1x10^{-2}$	$1.3x10^{-1}$	$3.4x10^{-1}$		
2	*	$1.8x10^{-1}$	$6.9x10^{-1}$	$7.6x10^{-1}$	<200/200	$1.0x10^{2}$	$8.4x10^{0}$	$3.7x10^{1}$	*	$1.9x10^{-1}$	$4.4x10^{0}$		
BA 1			$1.6x10^{-1}$		<200/30	$3.4x10^{-1}$	$1.2x10^{-1}$	*	$8.8x10^{-2}$	$1.4x10^{-1}$	$1.7x10^{0}$		
1-1/2	$6.2x10^{-1}$	$4.6x10^{0}$	$1.6x10^{-1}$	*	<200/150	$6.5x10^{1}$	$8.0x10^{0}$	$3.2x10^{1}$	$7.3x10^{-1}$	$1.7x10^{0}$	$1.5x10^{1}$		
BB 1-1/2	*	*	$1.9x10^{-1}$	*	<200/150	$6.4x10^{1}$	$5.2x10^{0}$	$2.5x10^{1}$	*	$3.3x10^{-1}$	$3.9x10^{0}$		
CA 0	*	*	$3.7x10^{-2}$		<200/20	$1.6x10^{0}$	$1.4x10^{-1}$	$8.5x10^{-1}$	*	$1.4x10^{-1}$	$1.6x10^{0}$		
2	*	$9.8x10^{-1}$	$1.3x10^{1}$	$6.0x10^{0}$	800	$1.8x10^{2}$	$1.8x10^{2}$	$7.7x10^{1}$	*	$6.2x10^{0}$	$1.1x10^{1}$		
CB 0			$3.6x10^{-2}$		400	$1.2x10^{1}$	$3.9x10^{-1}$	$4.8x10^{0}$	*	$9.4x10^{-2}$	$1.5x10^{0}$		
1	*	*	$3.2x10^{-1}$		400	$3.5x10^{0}$	$2.6x10^{0}$	$2.3x10^{0}$	*	$7.8x10^{-2}$	$6.3x10^{-1}$		
2			$9.2x10^{-2}$		<200/20	$3.8x10^{0}$	$3.8x10^{2}$	$2.7x10^{3}$	*	$1.5x10^{-1}$	$2.7x10^{0}$		
2-1/2	*	$1.1x10^{0}$	$7.9x10^{0}$	$1.7x10^{1}$	5,000	$6.4x10^{2}$	$1.2x10^{3}$	$5.8x10^{2}$	$1.3x10^{1}$	$2.7x10^{1}$	$2.7x10^{2}$	$4.2x10^{-2}$	$6.1x10^{2}$
Scale from bottom of inlet chute 107-KE	$9.4x10^{-1}$	$1.2x10^{1}$	$4.8x10^{0}$	$1.1x10^{2}$		$5.0x10^{4}$	$7.7x10^{3}$	$1.7x10^{4}$	$1.8x10^{2}$	$7.9x10^{3}$		$1.6x10^{0}$	

TABLE 2.7-29

107-KW RETENTION BASIN

SAMPLING OF BASIN FILL

Concentration (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	Ni-63
AA 1-1/2	*	*	$1.8x10^{-2}$	$5.7x10^{0}$	200	$1.1x10^{1}$	$2.3x10^{1}$	$6.1x10^{0}$	$1.3x10^{-1}$	$3.0x10^{-1}$	$2.1x10^{0}$	
2	*	$2.1x10^{-1}$	$2.9x10^{-1}$	$5.5x10^{-1}$	5,000	$5.6x10^{2}$	$1.3x10^{3}$	$3.4x10^{2}$	$8.2x10^{0}$	$8.8x10^{0}$	$5.0x10^{1}$	$8.8x10^{2}$
AB 1			*		<200/40	$2.7x10^{0}$	$1.8x10^{0}$	$1.4x10^{0}$	$4.6x10^{-2}$	$7.0x10^{-2}$	$5.4x10^{-1}$	
2	*	$4.3x10^{-1}$	$1.8x10^{-1}$	$1.5x10^{0}$	1,000	$2.1x10^{2}$	$1.9x10^{2}$	$3.9x10^{1}$	*	$9.7x10^{-1}$	$3.5x10^{2}$	
BA 1-1/2	*	*	$9.2x10^{-1}$		<200/60	$5.4x10^{0}$	$1.4x10^{1}$	$7.2x10^{-1}$	*	$1.9x10^{-1}$	$4.0x10^{-1}$	
2	*	$8.3x10^{0}$	$7.9x10^{1}$	$1.7x10^{0}$	3,000	$6.7x10^{2}$	$5.3x10^{2}$	$2.0x10^{2}$	*	$3.0x10^{1}$	$1.6x10^{1}$	
BB 1-1/2			*		<200/40	$1.5x10^{0}$	$1.1x10^{0}$	$5.5x10^{-1}$	*	$1.5x10^{-1}$	*	
2	*	$1.2x10^{0}$	$3.3x10^{0}$	$1.3x10^{0}$	3,000	$5.3x10^{2}$	$9.0x10^{2}$	$3.1x10^{2}$	*	$4.1x10^{0}$	$2.8x10^{1}$	
CA 1-1/2	*	$6.7x10^{-1}$	$1.2x10^{0}$	$6.0x10^{-1}$	600	$1.3x10^{2}$	$9.9x10^{1}$	$1.3x10^{2}$	*	$7.3x10^{-1}$	*	
CB 2	*	$1.1x10^{0}$	$1.2x10^{1}$			$1.1x10^{3}$	$1.0x10^{3}$	$6.6x10^{2}$	$5.3x10^{0}$	$1.8x10^{1}$	$3.6x10^{2}$	

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TABLE 2.7-30

107-KE RETENTION BASIN FILL
BASIN SLUDGE
Ave. Depth = 1/4" Mass = 2.1×10^8g
Concentrations (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
AA 3	*	1.9×10^{-1}	6.0×10^{0}	2.1×10^{0}	6.6×10^{1}	2.0×10^{1}	2.4×10^{1}	*	1.6×10^{0}	5.3×10^{0}			
AB 2	*	1.8×10^{-1}	6.9×10^{-1}	7.6×10^{-1}	1.0×10^{2}	8.4×10^{0}	3.7×10^{1}	*	1.9×10^{-1}	4.4×10^{0}			
BA 1-1/2	6.2×10^{-1}	4.6×10^{0}	1.6×10^{-1}	*	6.5×10^{1}	8.0×10^{0}	3.2×10^{1}	7.3×10^{-1}	1.7×10^{0}	1.5×10^{1}			
BB 1-1/2	*	*	1.9×10^{-1}	*	6.4×10^{1}	5.2×10^{0}	2.5×10^{1}	*	3.3×10^{-1}	3.9×10^{0}			
CA 2	*	9.8×10^{-1}	1.3×10^{1}	6.0×10^{0}	1.8×10^{2}	1.8×10^{2}	7.7×10^{1}	*	6.2×10^{0}	1.1×10^{1}			
CB 2-1/2	*	1.1×10^{0}	7.9×10^{0}	1.7×10^{1}	6.4×10^{2}	1.2×10^{3}	5.8×10^{2}	1.3×10^{1}	2.7×10^{1}	2.7×10^{2}	4.2×10^{2}	6.1×10^{2}	
Ave. pCi/g	1.0×10^{-1}	1.2	4.7	4.3	1.9×10^{2}	2.4×10^{2}	1.3×10^{2}	6.9	6.2	5.2×10^{1}	4.2×10^{2}	6.1×10^{2}	
Curies	2.1×10^{-5}	2.4×10^{-4}	9.9×10^{-4}	9.0×10^{-4}	4.0×10^{-2}	5.0×10^{-2}	2.7×10^{-2}	1.5×10^{-3}	1.3×10^{-3}	1.1×10^{-2}	8.8×10^{-2}	1.3×10^{-1}	

Total Curies in Sludge = .35

TABLE 2.7-31

107-KE RETENTION BASIN FILL
BASIN FILL (EXCLUDING SLUDGE)
Ave. Depth = 2' Mass = 2.0×10^{10}g
Ave. Concentrations (pCi/g)

Sample Hole	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
AA	*	*	6.7×10^{-2}		6.9×10^{-1}	1.1×10^{0}	4.9×10^{-1}	9.7×10^{-2}	1.6×10^{-1}	1.6×10^{0}			
AB			7.6×10^{-2}		4.2×10^{0}	1.8×10^{-1}	1.3×10^{0}	3.1×10^{-2}	1.3×10^{-1}	3.4×10^{-1}			
BA			1.6×10^{-1}		3.4×10^{-1}	1.2×10^{-1}	*	8.8×10^{-2}	1.4×10^{-1}	1.7×10^{0}			
BB	No samples analyzed.												
CA	*	*	3.7×10^{-2}		1.6×10^{0}	1.4×10^{-1}	8.5×10^{-1}	*	1.4×10^{-1}	1.6×10^{0}			
CB			3.6×10^{-2}		1.2×10^{1}	3.9×10^{-1}	4.8×10^{0}		9.4×10^{-2}	1.5×10^{0}			
Ave. pCi/g	*	*	7.5×10^{-2}		3.8×10^{0}	3.5×10^{-1}	1.5×10^{0}	5.4×10^{-2}	1.3×10^{-1}	1.4×10^{0}			
Curies	0.0	0.0	1.5×10^{-3}		7.6×10^{-2}	7.0×10^{-3}	3.0×10^{-2}	1.1×10^{-3}	2.6×10^{-3}	2.8×10^{-2}			

Total Curies in Fill Less Sludge = .15
Sludge = .35
Total Curies in Basin Fill = .5

TABLE 2.7-32

CONTAMINATED SOIL COLUMN ADJACENT TO THE 107-KE RETENTION BASINS

Description - Includes area adjacent to the 107-KE basins within a fenced Radiation Zone. (Fence shown in Figure 2.7-3.) Total curies calculation based on surface contamination 1/2' deep and underground contamination of 20' deep.

Surface - 3.0×10^5 ft^2 x 1/2' = 1.5×10^5 ft^3
Mass = 1.0×10^{10}g

Underground - 3.0×10^5 ft^2 x 20' = 6.0×10^6 ft^3
Mass = 4.1×10^{11}g

Radionuclide	Surface Contamination Ave. pCi/g	Underground Contamination Ave. pCi/g	Curies
Pu-238	*	*	0.0
Pu-239/240	3.0×10^{-2}	*	3.0×10^{-4}
Sr-90	9.5×10^{-1}	3.7×10^{-1}	1.6×10^{-1}
H-3	3.1×10^{-1}	NA[1]	1.3×10^{-1}
Eu-152	1.5×10^{1}	4.4×10^{0}	2.0
Co-60	1.3×10^{1}	2.5×10^{0}	1.1
Eu-154	8.1×10^{0}	1.6×10^{0}	7.4×10^{-1}
Cs-134	2.5×10^{-2}	4.3×10^{-2}	1.8×10^{-2}
Cs-137	8.7×10^{0}	3.9×10^{0}	1.7
Eu-155	2.0×10^{0}	7.4×10^{-1}	3.2×10^{-1}
		Total Curies =	6.2

[1]Concentration assumed to be equivalent to surface contamination for total Curies calculation for H-3.

TABLE 2.7-33

107-KW RETENTION BASIN FILL

BASIN SLUDGE

Ave. Depth = 1/4" Mass = 2.1×10^8g

Concentrations (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
AA 2	*	2.1×10^{-1}	2.9×10^{-1}	5.5×10^{-1}	5.6×10^{2}	1.3×10^{3}	3.4×10^{2}	8.2×10^{0}	8.8×10^{0}	5.0×10^{1}		8.8×10^{2}	
AB 2	*	4.3×10^{-1}	1.8×10^{-1}	1.5×10^{0}	2.1×10^{2}	1.9×10^{2}	3.9×10^{1}	*	9.7×10^{-1}	3.5×10^{2}			
BA 2	*	8.3×10^{0}	7.9×10^{1}	1.7×10^{0}	6.7×10^{2}	5.3×10^{2}	2.0×10^{2}	*	3.0×10^{1}	1.6×10^{1}			
BB 2	*	1.2×10^{0}	3.3×10^{0}	1.3×10^{0}	5.3×10^{2}	9.0×10^{2}	3.1×10^{2}	*	4.1×10^{0}	2.8×10^{1}			
CA 1-1/2	*	6.7×10^{-1}	1.2×10^{0}	6.0×10^{-1}	1.3×10^{2}	9.9×10^{1}	1.3×10^{2}	*	7.3×10^{-1}	*			
CB 2	*	1.1×10^{0}	1.2×10^{1}		1.1×10^{3}	1.0×10^{3}	6.6×10^{2}	5.3×10^{0}	1.8×10^{1}	3.6×10^{2}			
Ave. pCi/g		2.0	1.6×10^{1}	1.1	5.3×10^{2}	6.7×10^{2}	2.8×10^{2}	4.5	1.0×10^{1}	1.6×10^{2}		8.8×10^{2}	
Curies		4.2×10^{-4}	3.4×10^{-3}	2.4×10^{-4}	1.1×10^{-1}	1.4×10^{-1}	5.9×10^{-2}	9.5×10^{-4}	2.2×10^{-3}	2.1×10^{-4}		1.9×10^{-1}	

Total Curies in Sludge = .51

TABLE 2.7-34

107-KW RETENTION BASIN FILL
BASIN FILL (EXCLUDING SLUDGE)
Ave. Depth = 2' Mass = 2.0×10^{10}g
Ave. Concentrations (pCi/g)

Sample Hole	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
AA	*	*	1.8×10^{-2}	5.7×10^{0}	1.1×10^{1}	2.3×10^{1}	6.1×10^{0}	1.3×10^{-1}	3.0×10^{-1}	2.1×10^{0}			
AB			*		2.7×10^{0}	1.8×10^{0}	1.4×10^{0}	4.6×10^{-2}	7.0×10^{-2}	5.4×10^{-1}			
BA	*	*	9.2×10^{-1}		5.4×10^{0}	1.4×10^{1}	7.2×10^{-1}		1.9×10^{-1}	4.0×10^{-1}			
BB			*		1.5×10^{0}	1.1×10^{0}	5.5×10^{-1}	*	1.5×10^{-1}	*			
CA	No samples analyzed.												
CB	No samples analyzed.												
Ave. pCi/g	*	*	2.4×10^{-1}	5.7×10^{0}	5.2×10^{0}	1.0×10^{1}	2.2×10^{0}	5.9×10^{-2}	1.8×10^{-1}	7.6×10^{-1}			
Curies	0.0	0.0	4.8×10^{-3}	1.1×10^{-1}	1.0×10^{-1}	2.0×10^{-1}	4.4×10^{-2}	1.2×10^{-3}	3.6×10^{-3}	1.5×10^{-2}			

Total Curies in Fill Less Sludge = .48
Sludge = .51
Total Curies in Basin Fill = 1.

TABLE 2.7-35

CONTAMINATED SOIL COLUMN ADJACENT TO 107-KW RETENTION BASINS

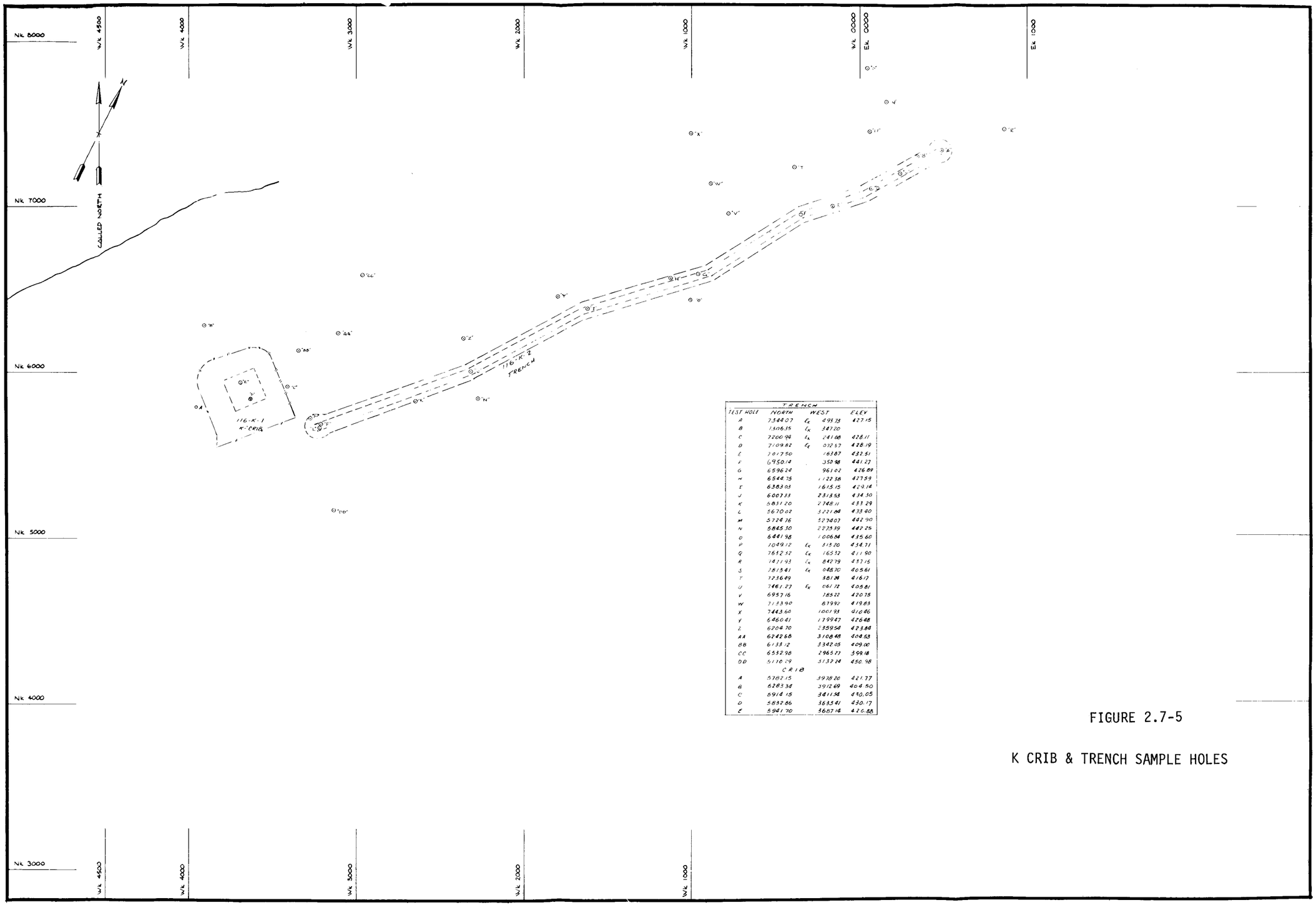
Description - Includes area adjacent to the 107-KW basins within a fenced Radiation Zone. (Fence shown in Figure 2.7-3.) Total curies calculation based on surface contamination 1/2' deep and underground contamination of 20' deep.

Surface - 3.0×10^5 ft^2 x 1/2' = 1.5×10^5 ft^3
Mass = 1.0×10^{10} g

Underground - 3.0×10^5 ft^2 x 20' = 6.0×10^6 ft^3
Mass = 4.1×10^{11} g

Radionuclide	Surface Contamination Ave. pCi/g	Underground Contamination Ave. pCi/g	Curies
Pu-238	*	*	0.0
Pu-239/240	3.2×10^{-1}	*	3.2×10^{-3}
Sr-90	4.1×10^{0}	7.6×10^{-2}	7.2×10^{-2}
H-3	9.3×10^{-1}	NA[1]	3.9×10^{-1}
Eu-152	1.2×10^{2}	5.4×10^{-1}	1.4×10^{0}
Co-60	2.9×10^{1}	2.3×10^{-1}	3.8×10^{-1}
Eu-154	3.8×10^{1}	1.7×10^{-1}	4.5×10^{-1}
Cs-134	5.0×10^{-1}	1.2×10^{-2}	9.9×10^{-3}
Cs-137	2.2×10^{1}	7.1×10^{-1}	5.1×10^{-1}
Eu-155	6.3×10^{1}	1.2×10^{-1}	6.8×10^{-1}
		Total Curies =	3.9

[1]Concentration assumed to be equivalent to surface contamination for total Curies calculation of H-3.



TEST HOLE	NORTH		WEST	ELEV
	TRENCH			
A	7344.07	E_K	49.73	427.15
B	7306.35	E_K	34.20	
C	7200.94	E_K	24.06	428.11
D	7109.82	E_K	032.57	428.19
E	7017.50		163.87	432.51
F	6950.14		350.98	441.27
G	6596.24		961.02	426.89
H	6544.75		1122.38	427.59
I	6383.03		1615.15	429.14
J	6007.33		2313.53	434.30
K	5831.20		2748.11	433.29
L	5670.02		3221.04	433.40
M	5724.76		3274.07	482.90
N	5845.30		2773.39	482.25
O	6441.98		1006.84	435.60
P	1049.12	E_K	513.20	434.71
Q	7612.32	E_K	165.32	411.90
R	7411.93	E_K	842.79	437.15
S	7813.41	E_K	048.70	405.61
T	7236.49		381.24	416.17
U	7461.27	E_K	061.12	405.81
V	6957.16		785.22	420.75
W	7133.90		679.92	419.83
X	7443.60		1001.93	410.46
Y	6460.41		1799.47	428.48
Z	6204.70		2359.54	423.88
AA	6242.68		3108.48	408.53
BB	6133.12		3342.05	409.00
CC	6532.98		2965.27	359.18
DD	5110.29		5132.24	450.98
	CRIB			
A	5782.15		3928.20	421.77
B	6283.34		3912.69	404.50
C	5914.15		3411.34	430.05
D	5832.86		3633.41	430.17
E	5941.70		3687.14	426.88

FIGURE 2.7-5

K CRIB & TRENCH SAMPLE HOLES

TABLE 2.7-36

116-K-1

100-K-CRIB

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
	Concentration (pCi/g)											
116-K-1 100-K CRIB												
A 0			*		<200/5	*	*	*	*	*	*	
5			$9.1x10^{-2}$		<200/20	*	$1.5x10^{-1}$	*	*	$1.7x10^{-1}$	*	$2.2x10^{-1}$
15			$5.6x10^{-1}$		<200/Bkg	$9.7x10^{-1}$	$6.4x10^{-1}$	$6.4x10^{-1}$	$4.5x10^{-2}$	*	*	
B 5			$3.7x10^{-2}$		<200/30	*	$5.8x10^{-2}$	*	*	$3.9x10^{-2}$	*	
15			$2.5x10^{-2}$		<200/10	*	*	*	*	*	*	
25	*	$3.2x10^{-3}$	*		<200/30	*	$5.4x10^{-2}$	*	*	$4.5x10^{-2}$	*	$1.4x10^{-1}$
C 0	*	*	$1.3x10^{-1}$		<200/25	$4.3x10^{-1}$	$9.1x10^{-1}$	$2.4x10^{-1}$	*	$6.5x10^{-1}$	$1.6x10^{-1}$	$1.1x10^{-1}$
15			$2.9x10^{-2}$		<200/20	*	*	*	*	$4.6x10^{-2}$	$1.7x10^{-1}$	
25			$2.6x10^{-2}$		<200/5	*	*	*	$3.3x10^{-2}$	$5.2x10^{-2}$	*	
D 0	$4.8x10^{-1}$	$4.4x10^{0}$	$1.0x10^{1}$		2,500	$4.2x10^{2}$	$3.1x10^{2}$	$1.7x10^{2}$	$6.4x10^{0}$	$7.7x10^{2}$	$1.4x10^{1}$	
5			$6.3x10^{0}$		1,000	$1.3x10^{2}$	$1.5x10^{2}$	$5.2x10^{1}$	$4.0x10^{0}$	$4.4x10^{2}$	$4.4x10^{0}$	
10			$7.2x10^{0}$		<200/90	$3.0x10^{-1}$	$3.6x10^{-1}$	*	*	$6.6x10^{-1}$	$1.5x10^{-1}$	
16			$7.9x10^{0}$		<200/30	*	*	*	*	*	$1.8x10^{-1}$	
E 0	*	$2.5x10^{-1}$	$2.8x10^{0}$		300	$3.7x10^{1}$	$3.0x10^{1}$	$1.3x10^{1}$	$2.3x10^{-1}$	$3.4x10^{1}$	$5.7x10^{-1}$	
2-1/2	*	$1.8x10^{-1}$	$5.9x10^{0}$		<200/40	$1.1x10^{0}$	$9.7x10^{-1}$	$4.1x10^{-1}$	*	$5.9x10^{-1}$	*	
24	*	*	$1.0x10^{0}$		<200/Bkg.	*	*	*	*	$3.8x10^{-2}$	*	

TABLE 2.7-37

116-K-2

K-TRENCH

SAMPLE HOLES DRILLED ALONG TRENCH

Sample No.		Concentration (pCi/g) Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Ni-63	Eu-155	U	C-14
A	5	3.1×10^{-1}	7.6×10^{0}	2.5×10^{1}		1,500	*	*	*	*	*				
2A	5	*	*			<200/30	9.7×10^{-1}	2.4×10^{-1}	2.5×10^{-1}	*	1.1×10^{-1}		*		
	15	2.4×10^{-1}	2.1×10^{0}	1.8×10^{1}	1.5×10^{1}	1,000	5.8×10^{2}	1.8×10^{2}	1.7×10^{2}	1.3×10^{0}	1.1×10^{2}		9.3×10^{0}	2.5×10^{-1}	
	20	*	3.0×10^{-1}	5.7×10^{0}		<200/100	4.9×10^{0}	8.6×10^{-1}	9.3×10^{-1}	*	2.6×10^{1}		5.2×10^{-1}		
B	0	1.9×10^{-1}	2.5×10^{0}	6.2×10^{0}	2.7×10^{2}	1,500	6.0×10^{2}	2.7×10^{2}	2.5×10^{2}	5.6×10^{0}	1.2×10^{2}		6.5×10^{1}	3.1×10^{-1}	
	5	*	*	1.6×10^{-1}		<200/15	2.2×10^{-1}	1.0×10^{-1}	*	*	*		*		
	10	*	*	2.7×10^{-1}		<200/25	3.4×10^{0}	1.5×10^{0}	1.1×10^{0}	*	5.9×10^{-1}		1.4×10^{-1}	2.4×10^{-1}	
C	15	4.0×10^{0}	1.3×10^{2}	2.3×10^{2}	1.4×10^{1}	12,000	4.4×10^{4}	1.3×10^{3}	1.7×10^{4}	5.3×10^{2}	4.8×10^{2}	5.1×10^{3}	9.5×10^{2}	2.1×10^{0}	3.2×10^{1}
	17-1/2	2.8×10^{-1}	1.1×10^{1}	4.4×10^{1}		2,000	5.8×10^{2}	3.1×10^{2}	1.4×10^{2}	2.8×10^{0}	4.5×10^{2}		3.7×10^{0}		
	20	*	1.6×10^{0}	1.4×10^{1}		400	1.6×10^{2}	9.9×10^{1}	6.1×10^{1}	9.7×10^{-1}	5.7×10^{1}		1.3×10^{1}		
	25	3.0×10^{-1}	4.9×10^{0}	3.7×10^{1}		2,500	1.2×10^{3}	2.7×10^{2}	4.5×10^{2}	2.3×10^{0}	2.3×10^{2}		5.7×10^{1}		
	28	*	5.4×10^{-1}	1.4×10^{1}		600	1.4×10^{2}	5.0×10^{1}	4.7×10^{1}	5.5×10^{-1}	6.5×10^{1}		2.1×10^{1}		
D	5	1.4×10^{-2}	1.2×10^{-1}	6.8×10^{-1}		<200/10	6.6×10^{0}	4.6×10^{0}	2.8×10^{0}	6.7×10^{-2}	2.8×10^{0}		3.8×10^{-1}		
	15	4.3×10^{-1}	1.3×10^{1}	5.7×10^{1}	2.7×10^{1}	2,000	1.6×10^{3}	7.3×10^{2}	6.6×10^{2}	2.1×10^{1}	3.9×10^{2}		1.8×10^{2}	4.1×10^{-1}	
	20	*	8.1×10^{0}	1.1×10^{1}		300	1.5×10^{1}	4.1×10^{0}	7.7×10^{-1}	8.6×10^{-2}	7.2×10^{0}		9.3×10^{-1}		
	28	*	*	6.3×10^{0}		<200/10	9.0×10^{-1}	3.3×10^{-1}	*	*	2.5×10^{-1}		*		
E	0	*	*	4.8×10^{-1}		<200/40	2.9×10^{0}	2.2×10^{2}	1.5×10^{0}	*	1.2×10^{0}		2.8×10^{-1}		
	12	1.2×10^{0}	2.1×10^{1}	3.0×10^{1}	8.1×10^{1}	5,000	2.2×10^{3}	7.4×10^{2}	7.4×10^{2}	2.8×10^{1}	9.2×10^{2}		2.3×10^{2}	5.5×10^{-1}	
	16	3.0×10^{-1}	4.0×10^{0}	6.7×10^{0}		900	3.5×10^{2}	1.1×10^{2}	1.2×10^{2}	1.1×10^{0}	1.9×10^{2}		4.0×10^{0}		
	20	*	3.7×10^{-1}	4.4×10^{0}		250	2.9×10^{1}	3.8×10^{1}	1.1×10^{1}	6.5×10^{-1}	6.9×10^{1}		*		
	25	*	2.6×10^{-1}	6.2×10^{0}		<200/50	6.9×10^{0}	4.6×10^{0}	2.0×10^{0}	1.3×10^{-1}	1.3×10^{1}		9.6×10^{-1}		
F	0	*	2.0×10^{-1}	2.3×10^{-1}		<200/80	4.7×10^{0}	2.5×10^{0}	*	*	1.6×10^{0}		*		
	12	*	2.0×10^{0}	4.7×10^{0}	2.2×10^{0}	800	2.8×10^{2}	1.8×10^{2}	8.2×10^{1}	9.0×10^{-1}	3.4×10^{2}		5.6×10^{0}	2.6×10^{-1}	
	20	*	6.1×10^{-1}	7.4×10^{0}		<200/100	5.8×10^{1}	4.1×10^{1}	1.8×10^{1}	5.3×10^{-1}	1.7×10^{2}		8.2×10^{-1}		
G	0	1.6×10^{-2}	*	7.6×10^{-2}		<200/55	*	1.5×10^{-1}	*	6.2×10^{-2}	6.4×10^{-1}		2.7×10^{-1}		

TABLE 2.7-37 (Cont'd)

116-K-2

K-TRENCH

SAMPLE HOLES DRILLED ALONG TRENCH (Cont'd)

Sample No.		Concentration (pCi/g) Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Ni-63	Eu-155	U	C-14
3G	19	$3.7x10^{-1}$	$7.1x10^{0}$	$1.5x10^{1}$	$5.5x10^{1}$	1,500	$1.1x10^{3}$	$5.0x10^{2}$	$3.4x10^{2}$	$3.4x10^{0}$	$7.1x10^{2}$		$2.6x10^{1}$	$5.8x10^{-1}$	
	25	*	$2.4x10^{0}$	$4.8x10^{0}$		650	$2.8x10^{2}$	$1.3x10^{2}$	$1.1x10^{2}$	$9.0x10^{0}$	$6.2x10^{2}$		$2.9x10^{1}$		
	29	*	$7.8x10^{-1}$	$4.2x10^{0}$		500	$9.3x10^{1}$	$7.2x10^{1}$	$3.2x10^{1}$	$1.1x10^{0}$	$1.0x10^{2}$		$5.5x10^{0}$		
H	0	*	*	$3.3x10^{-1}$		<200/85	$7.8x10^{0}$	$5.1x10^{0}$	$4.0x10^{0}$	$1.7x10^{-1}$	$3.1x10^{0}$		$1.0x10^{0}$		
	13	$2.1x10^{0}$	$2.8x10^{1}$	$2.0x10^{1}$	$2.5x10^{1}$	2,000	$1.7x10^{3}$	$5.4x10^{2}$	$5.3x10^{2}$	$1.7x10^{1}$	$7.2x10^{2}$		$1.9x10^{2}$	$7.1x10^{-1}$	
	15	*	$4.2x10^{0}$	$7.6x10^{0}$		500	$8.7x10^{1}$	$4.8x10^{1}$	$2.9x10^{1}$	$2.9x10^{-1}$	$9.3x10^{1}$		$1.1x10^{0}$		
	18	*	$9.4x10^{-1}$	$1.6x10^{0}$		400	$1.2x10^{2}$	$1.2x10^{2}$	$3.9x10^{1}$	$1.6x10^{0}$	$1.2x10^{2}$		$6.3x10^{0}$		
	21	*	*	$1.9x10^{0}$		<200/15	$5.8x10^{-1}$	$7.8x10^{-1}$	$4.4x10^{-1}$	*	$8.2x10^{0}$		$3.1x10^{-1}$		
I	15	*	*	$3.5x10^{-2}$		<200/20	$2.7x10^{-1}$	$9.0x10^{-2}$	*	*	$1.5x10^{-1}$		$8.8x10^{-2}$		
	17	$8.7x10^{-1}$	$2.0x10^{1}$	$3.3x10^{1}$	$1.3x10^{2}$	3,000	$3.0x10^{3}$	$8.4x10^{2}$	$9.9x10^{2}$	$1.1x10^{1}$	$9.5x10^{2}$		$3.8x10^{1}$	$1.2x10^{-1}$	
	19	*	*	$3.0x10^{0}$		500	$2.9x10^{1}$	$2.1x10^{2}$	$1.1x10^{1}$	*	*		$3.6x10^{-1}$		
	23	*	*	$3.4x10^{0}$		<200/20	$3.3x10^{0}$	$2.0x10^{0}$	$1.4x10^{0}$	$4.2x10^{-2}$	$1.7x10^{0}$		$3.1x10^{-1}$		
K	0	*	*	$3.5x10^{-2}$		<200/40	*	*	*	*	$7.1x10^{-2}$		$2.0x10^{-1}$		
	22	$6.4x10^{-1}$	$1.3x10^{1}$	$1.9x10^{1}$	$9.1x10^{1}$	3,000	$3.8x10^{3}$	$2.2x10^{3}$	$1.4x10^{3}$	$1.5x10^{1}$	$3.0x10^{3}$		$1.4x10^{2}$	$4.5x10^{-1}$	
	27	$9.0x10^{-2}$	$1.4x10^{0}$	$2.6x10^{0}$		1,000	$2.2x10^{2}$	$1.7x10^{2}$	$8.3x10^{1}$	$1.0x10^{0}$	$1.0x10^{2}$		$1.1x10^{1}$		
	30	*	$1.9x10^{-1}$	$2.0x10^{0}$		<200	$6.1x10^{0}$	$4.4x10^{1}$	*	*	$2.6x10^{0}$		*		
L	0	*	*	$2.1x10^{-1}$		<200/30	*	*	$3.1x10^{-1}$	$4.9x10^{-2}$	*		$1.2x10^{-1}$		
	17	*	$1.1x10^{0}$	$3.5x10^{0}$	$2.2x10^{1}$	<200/130	$2.3x10^{1}$	$1.1x10^{2}$	$1.2x10^{1}$	$1.7x10^{-1}$	$2.4x10^{1}$		$3.7x10^{0}$	$4.2x10^{-1}$	
M	0	*	$3.6x10^{-1}$	$5.5x10^{-2}$		<200/40	*	$1.4x10^{-1}$	$5.6x10^{-1}$	*	$1.3x10^{-1}$		*		
	17	*	*	$1.3x10^{0}$	$2.8x10^{0}$	<200/150	$4.0x10^{-1}$	$1.1x10^{-1}$	*	$4.7x10^{-2}$	$5.7x10^{-2}$		$1.8x10^{-1}$	$1.9x10^{-1}$	
	20	*	$6.3x10^{-1}$	$9.3x10^{-1}$		<200/25	$3.7x10^{-1}$	$9.3x10^{-2}$	$4.4x10^{-1}$	*	$2.9x10^{-2}$		*		

TABLE 2.7-38

116-K-2

K-TRENCH

SAMPLE HOLES DRILLED OUTSIDE OF TRENCH

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
	Concentration (pCi/g)											
N 10	*	*	*	$5.7x10^{-1}$	<200/10	$4.0x10^{-1}$	$8.2x10^{-2}$	*	*	$7.3x10^{-2}$	*	$1.9x10^{-1}$
P 5	*	*	$5.5x10^{-2}$	$2.9x10^{0}$	<200/20	$7.9x10^{-1}$	$2.9x10^{-1}$	*	$7.5x10^{-2}$	$1.8x10^{-1}$	$3.6x10^{-1}$	$2.6x10^{-1}$
15	*	*	$2.2x10^{-2}$		<200/10	*	*	*	*	$4.0x10^{-2}$	$2.5x10^{-1}$	
30	*	*	$5.8x10^{-1}$		<200/10	*	*	$1.9x10^{-1}$	*	*	$5.8x10^{-2}$	
Q 0	*	*	$3.1x10^{-1}$		<200/25	$5.1x10^{0}$	$1.9x10^{0}$	$1.9x10^{0}$	*	$8.8x10^{-1}$	$3.5x10^{-1}$	
20	*	*	*	$1.0x10^{0}$	<200/10	$1.7x10^{-1}$	$7.8x10^{-2}$	*	$7.0x10^{-2}$	$5.6x10^{-2}$	*	$3.0x10^{-1}$
R 5	*	*	$2.5x10^{-1}$	$9.1x10^{-1}$	<200/25	$5.6x10^{-1}$	$1.0x10^{-1}$	*	$4.9x10^{-2}$	$7.8x10^{-1}$	*	$3.6x10^{-1}$
15	*	*	*		<200/10	$2.3x10^{-1}$	$7.2x10^{-2}$	*	*	$3.9x10^{-2}$	*	
S 0	*	*	$4.6x10^{-1}$	$1.0x10^{0}$	<200/25	$2.1x10^{-1}$	$5.1x10^{-2}$	*	*	*	$2.0x10^{-1}$	$2.2x10^{-1}$
18	*	*	$1.6x10^{-1}$		<200/10	*	*	*	$4.0x10^{-2}$	$3.6x10^{-2}$	$1.8x10^{-1}$	
T 15	*	$1.9x10^{-1}$	$1.6x10^{-1}$	$1.7x10^{0}$	<200/10	$5.7x10^{-1}$	*	*	$5.3x10^{-2}$	*	*	$1.6x10^{-1}$
U 0	*	*	$9.7x10^{-2}$	$5.5x10^{-1}$	<200/20	*	$5.1x10^{-2}$	*	*	$6.9x10^{-2}$	*	$2.7x10^{-1}$
V 0-1	*	*	$2.0x10^{0}$	$2.7x10^{-1}$	250	$1.6x10^{1}$	$3.5x10^{0}$	$5.9x10^{0}$	$5.1x10^{-2}$	$2.8x10^{0}$	$4.9x10^{-1}$	$1.7x10^{-1}$
0-2	*	*	$2.2x10^{0}$	$2.3x10^{0}$	600	$1.3x10^{2}$	$6.1x10^{1}$	$5.3x10^{1}$	$2.1x10^{0}$	$9.7x10^{1}$	$1.5x10^{1}$	$2.8x10^{-1}$
5	*	*	$1.9x10^{0}$		<200/15	$4.7x10^{-1}$	$1.4x10^{-1}$	*	*	$3.5x10^{-2}$	$1.5x10^{-1}$	
15	*	*	$6.7x10^{-1}$		<200/20	$3.1x10^{-1}$	$5.8x10^{-2}$	*	*	*	*	
Y 0	*	*	$2.1x10^{-1}$	$1.9x10^{0}$	<200/25	*	$1.2x10^{-1}$	*	$3.3x10^{-2}$	$5.4x10^{-1}$	*	$2.1x10^{-1}$
15	*	*	$1.9x10^{0}$		<200/20	*	*	*	*	*	*	
25	*	*	$2.8x10^{0}$		<200/10	$3.1x10^{-1}$	$1.1x10^{-1}$	*	*	$1.1x10^{0}$	$2.2x10^{-1}$	
Z 0	*	*	$7.0x10^{-1}$		<200/20	$1.3x10^{0}$	$1.3x10^{0}$	$1.2x10^{0}$	$5.0x10^{-2}$	$6.5x10^{-1}$	*	
20	*	*	$4.5x10^{0}$		<200/30	*	$4.3x10^{-2}$	*	*	*	$3.4x10^{-1}$	$1.3x10^{-1}$
25	*	*	$4.2x10^{0}$		<200/15	*	*	*	*	*	$2.8x10^{-1}$	
AA 18	*	*	$5.1x10^{-1}$	*	<200/20	*	*	*	*	*	*	$1.2x10^{-1}$
BB 20	*	*	$2.2x10^{-2}$	$2.4x10^{0}$	<200/10	*	*	*	*	*	*	$1.5x10^{-1}$
CC 15	*	*	$3.1x10^{-1}$	$3.9x10^{0}$	<200/10	*	*	*	*	$6.8x10^{-2}$	*	$1.8x10^{-1}$
20	*	*	$2.6x10^{-2}$	$1.4x10^{1}$	<200/15	$7.2x10^{-1}$	*	*	*	$8.4x10^{-2}$	*	$1.2x10^{-1}$

V 0-1 surface sample from cleared area around sample hole.
V 0-2 surface sample from outside cleared area.

TABLE 2.7-38 (Cont'd)

116-K-2

K-TRENCH

SAMPLE HOLES DRILLED OUTSIDE OF TRENCH (Cont'd)

	Concentration (pCi/g)											
Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
DD 0	*	*	$2.7x10^{-1}$	$8.5x10^{-1}$	<200/20	$1.5x10^{0}$	$1.6x10^{0}$	$3.3x10^{-1}$	*	$9.3x10^{-1}$	*	$3.1x10^{-1}$
10	*	*	*		<200/15	*	*	*	*	$5.8x10^{-2}$	$3.3x10^{-1}$	
20	*	*	$2.8x10^{-2}$		<200/5	*	$3.5x10^{-2}$	*	*	$2.7x10^{-2}$	*	

TABLE 2.7-39

116-K-1

100-K CRIB

Potentially Contaminated Soil Column

Volume = 300' x 300' x 20' = 1.8×10^6 ft^3

Mass = 1.2×10^{11}g

Radionuclide	Ave. pCi/g	Curies
Pu-238	1.2×10^{-1}	1.4×10^{-2}
Pu-239/240	1.2×10^{0}	1.4×10^{-1}
Sr-90	5.9×10^{0}	7.1×10^{-1}
Eu-152	8.4×10^{1}	10
Co-60	7.0×10^{1}	8.4
Eu-154	3.4×10^{1}	4.1
Cs-134	1.5×10^{0}	1.8×10^{-1}
Cs-137	1.8×10^{2}	22
Eu-155	2.8×10^{0}	3.4×10^{-1}

Total Curies = 46

TABLE 2.7-40

CONTAMINATED SOIL COLUMN ADJACENT TO 116-K-1 CRIB

Potentially Contaminated Soil Column

Description - Includes area 100' from east and west sides of crib, 200' from north end, and 0' from south end.

Volume = 600' x 600' x 20' = 7.2×10^6 ft^3

Mass = 4.9×10^{11}g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	1.6×10^{-3}	7.8×10^{-4}
Sr-90	1.0×10^{-1}	4.9×10^{-2}
Eu-152	1.6×10^{-1}	7.8×10^{-2}
Co-60	2.0×10^{-1}	9.8×10^{-2}
Eu-154	9.8×10^{-2}	4.8×10^{-2}
Cs-134	8.7×10^{-3}	4.3×10^{-3}
Cs-137	1.1×10^{-1}	5.4×10^{-2}
Eu-155	3.7×10^{-2}	1.8×10^{-2}
U	1.6×10^{-1}	7.8×10^{-2}
	Total Curies =	4.3×10^{-1}

TABLE 2.7-41

116-K-2

K-TRENCH

Potentially Contaminated Soil Column

Volume = 4300' x 100' x 20' = 8.6×10^7 ft^3

Mass = 5.9×10^{11}g

Radionuclide	Ave. pCi/g	Curies
Pu-238	3.3×10^{-1}	1.9×10^{-1}
Pu-239/240	8.5×10^{0}	5.0
Sr-90	1.9×10^{1}	1.1×10^{1}
H-3	4.2×10^{1}	2.5×10^{1}
Eu-152	1.9×10^{3}	1.1×10^{3}
Co-60	2.7×10^{2}	1.6×10^{2}
Eu-154	7.0×10^{2}	4.1×10^{2}
Cs-134	2.0×10^{1}	1.2×10^{1}
Cs-137	3.0×10^{2}	1.8×10^{2}
Eu-155	5.8×10^{1}	3.4×10^{1}
U	5.5×10^{-1}	3.2×10^{-1}
C-14*	1.6×10^{0}	9.4×10^{-1}
Ni-63*	2.6×10^{2}	1.5×10^{2}

Total Curies = 2100

*Ave. Ni-63 & C-14 concentrations established by adjusting the results of sample C-15 by the ratio of ave. gamma concentration in trench to gamma concentration sample C-15.

Did not attempt to calculate three small areas of surface contamination which are now covered with 2 to 3' of added cover.

TABLE 2.7-42

UNDERGROUND SOIL COLUMN ADJACENT TO 116-K-2 TRENCH

Potentially Contaminated Soil Column

Volume = 5,000' x 1,000' x 25' = 1.3×10^8 ft^3

Mass = 8.9×10^{12}g

Radionuclide	Ave. pCi/g	Max. pCi/g
Pu-238	*	*
Pu-239/240	*	1.9×10^{-1}
Sr-90	8.6×10^{-1}	4.5×10^{0}
H-3	3.0×10^{0}	3.9×10^{0}
Eu-152	2.2×10^{-1}	7.9×10^{-1}
Co-60	4.8×10^{-2}	2.9×10^{-1}
Eu-154	*	1.9×10^{-1}
Cs-134	1.4×10^{-2}	7.5×10^{-2}
Cs-137	1.2×10^{-1}	1.1×10^{0}
Eu-155	1.0×10^{-1}	3.6×10^{-1}
U	2.0×10^{-1}	3.6×10^{-1}

2.7.3 107-D,DR Retention Basins and Liquid Waste Trench

Drilling in the 107-D,DR retention basin and liquid waste trench vicinity was started on May 20, 1975, and completed on June 25, 1975. Forty-seven sample holes with an average depth of 26 feet were drilled in the 107-D,DR area. The sample hole locations for 107-D,DR area are indicated on Figure 2.7-6.

Figure 2.7-7 shows the approximate locations where samples of the soil fill and sludge inside the basins were taken.

Underground contamination from past basin leakage is greatest at the 107-D retention basin's north and west sides. A reading of 850 c/m with a GM probe was detected on a sample taken 50 feet away from the 107-D basin's north wall. Contamination measurable with a GM probe is confined within 100 feet of the north wall and 25 feet of the other walls. Contamination from past basin leakage from the 107-DR retention basin is also greatest at its north wall, but is confined within 25 feet of the basin walls.

The sample holes drilled through the floors of the 107-D and DR retention basins indicate that the majority of contamination underneath the basins is within a few feet of the floors - 6 and 3 feet, respectively.

Radionuclide concentrations of selected samples from test holes drilled at the 107-D,DR area are given in Tables 2.7-43 through 2.7-47. Radionuclide concentrations for selected samples taken of the soil fill and sludge inside of the 107-D,DR basins at the backhoe sampling locations are given in Tables 2.7-48 and 2.7-49.

The average and maximum beta-gamma concentrations in the sludge along the 107-D basin floor are 6.2×10^4 and 1.4×10^5 pCi/g, respectively. Pu-239/240 concentrations in the 107-D basin sludge range up to 2.9×10^2 pCi/g and average 1.1×10^2 pCi/g. The average radioactive concentrations in the sludge of the 107-D

basin are the highest of the 100 Area retention basins. Average concentrations in the 107-B basin sludge, however, are very close to being the same as 107-D. Maximum radioactive concentrations observed in the 107-B basin sludge are slightly higher than those in the 107-D basin.

Corresponding average and maximum concentrations within the 107-DR retention basin sludge are about one-half those of the 107-D basin. Average radionuclide concentrations in the soil fill covering the sludge, and in the contaminated soil underneath and adjacent to the 107-D,DR basins, are two orders of magnitude less than the basin sludge concentrations.

Sampling of the soil fill and sludge along the 107-DR basin floor and inlet distribution chamber was originally performed and documented in 1974 - UNI-208 "Characterization of Radioactive Contamination within the 107-DR Retention Basins." Sampling within the 107-DR basin was also performed as part of this program; i.e., "Radiological Characterization of the Retired 100 Areas," and analyses for H-3, Ni-63, and C-14 performed in addition to radionuclide analyses previously reported in UNI-208. The data reported in Tables 2.7-54 and 2.7-58 are a combination of those obtained as the result of these two different sampling periods.

Over 70% of the 107-D,DR retention basin inventories are within the basins, primarily in the sludge along the basin floors. A total of 121 curies is inside the 107-D basin and its surrounding contaminated soil column. The 107-DR retention basin area contains an estimated inventory of 93 curies. (See Tables 2.7-50 through 2.7-57.) This radioactivity is distributed as follows:

	107-D (Ci)	107-DR (Ci)
• Sludge	75	54
• Fill Less Sludge	4.1	7.3
• Concrete	8	13
• Underneath	6.6	15
• Adjacent	27	3.5

In addition to the radioactive inventories given above, sludge along the 107-DR inlet distribution chamber floor has an estimated inventory of 2.8 curies as shown in Table 2.7-58. No cover dirt has been placed in this chamber and the original sludge remains as an undisturbed and relatively uniform 1-inch deep layer on the floor.

The 107-D,DR basins shared the same trench for the diversion of liquid effluents to ground following fuel cladding failures. Sample holes drilled into the 107-D,DR liquid waste trench indicate that underground contamination extends along its entire length and is confined to the trench area. A maximum of 2000 c/m with a GM probe was detected for a sample taken along the center of the trench at a depth of 23 feet.

The trench contains an estimated radionuclide inventory of 31 curies. Radioanalytical results for selected samples taken from the 107-D,DR liquid waste trench are given in Table 2.7-47. Table 2.7-59 gives a breakdown by radionuclide of the average radioactive concentrations and inventory with the 107-DR liquid waste trench.

107-D,DR Sludge Burial Trenches

Contamination levels in sample holes drilled into the sludge burial trenches adjacent to the 107-D,DR retention basins are indistinguishable from contamination in the surrounding soil from basin leakage.

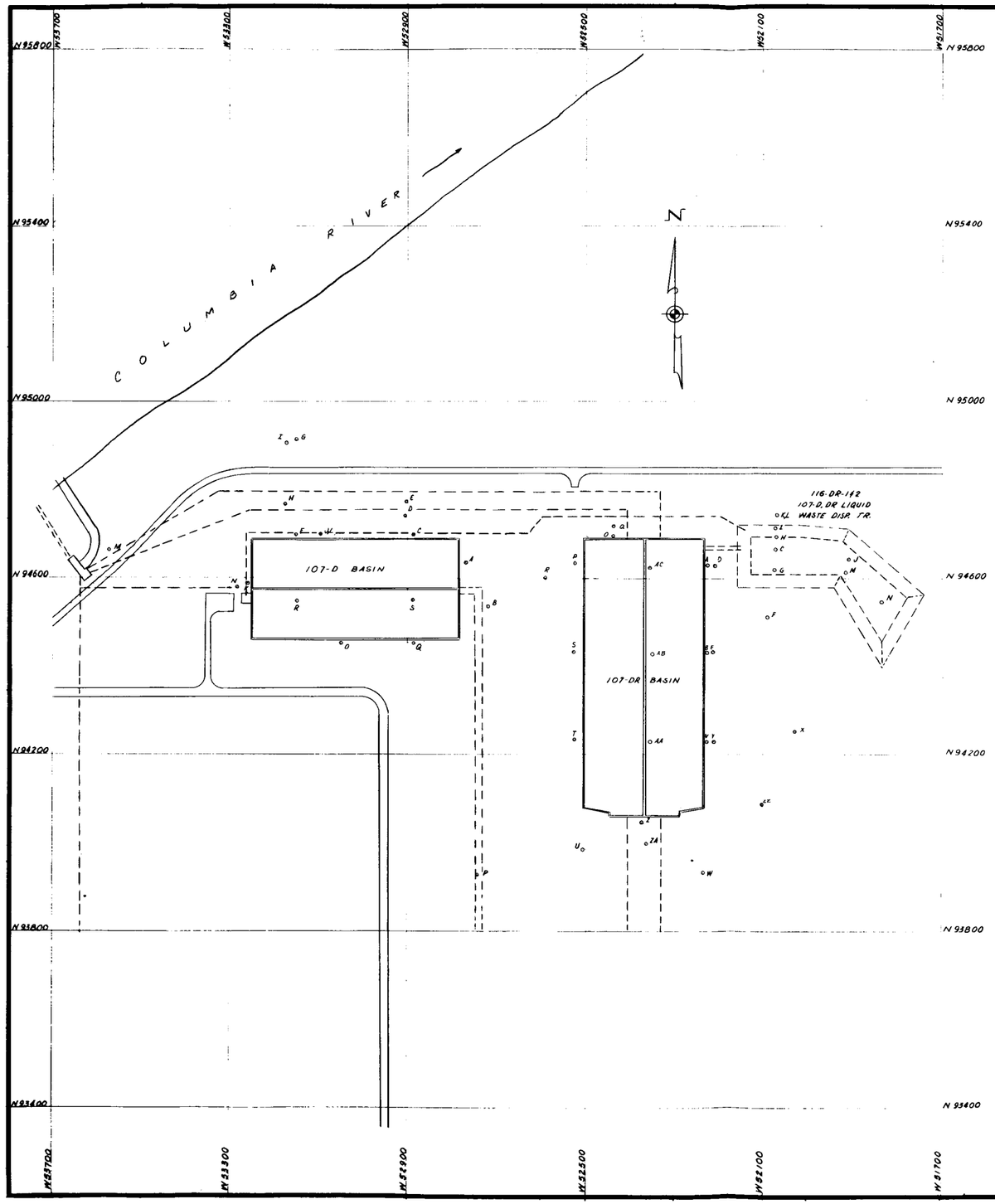
1904-D SUPPORT FACILITIES OUTFALL
(116-D-6)

The reactor support facilities used this structure to discharge nonradioactive process effluent back to the river. This outfall structure consisted of an open concrete sump and the effluent line which runs from the sump to the Columbia River.

A radiation survey and sampling effort was completed in September of 1978 and the structure was found to be contaminated. Several small pockets of crud have collected in cracks and depressions in the concrete floor, and account for the major portion of the activity present. A summary of results is as follows:

Direct GM readings taken of the concrete floor indicated 600 to 1,200 c/m. A sample of the crud scraped from the concrete and counted using an NMC gas proportional counter indicated 400 to 800 d/m beta-gamma with no detectable alpha activity. The radionuclides involved and their activities are:

Cs-137	-	1.1×10^2 pCi/gram
Co-60	-	4.4×10^2 pCi/gram
Eu-152	-	1.1×10^3 pCi/gram
Eu-154	-	3.0×10^2 pCi/gram
Total Activity	-	2.0×10^3 pCi/gram



TEST HOLE DATA

107-D BASIN			
TEST HOLE	N	W	ELEV
A	94683.08	52770.90	444.68
B	94534.58	52721.96	446.23
C	94697.56	52887.98	447.18
D	94742.35	52906.10	439.33
E	94777.35	52902.89	438.02
F	94698.25	53149.61	446.55
G	94914.85	53146.63	434.93
H	94763.70	53174.67	435.26
I	94907.71	53168.79	434.36
J	94698.56	53097.67	446.26
K	94589.64	53261.61	449.92
L	94698.36	53100.67	446.30
M	94664.83	53577.54	451.83
N	94581.10	53283.99	444.28
O	94452.49	53149.26	449.56
P	93929.53	52745.24	449.90
Q	94453.33	52886.03	449.12
R	94546.79	53150.51	433.71
S	94548.35	52889.87	430.10

107-DR BASIN			
TEST HOLE	N	W	ELEV
AA	94329.76	52355.35	435.83
AB	94429.33	52350.45	435.89
AC	94625.97	52359.16	435.94
A	94630.63	52221.78	449.20
B	94432.34	52220.91	449.22
C	94666.46	52073.31	440.45
D	94629.84	52210.29	448.48
E	94434.36	52212.02	448.81
F	94511.70	52092.08	443.47
G	94618.23	52075.83	441.69
H	94695.13	52071.63	440.58
I	94713.94	52073.80	440.98
J	94642.05	51910.77	442.02
K	94744.42	52068.16	440.80
L	94741.40	52068.20	440.80
M	94613.88	51918.92	440.94
N	94545.35	51836.24	447.52
O	94696.22	52441.55	446.86
P	94635.91	52527.23	448.02
Q	94720.11	52439.70	447.29
R	94600.41	52391.32	444.35
S	94431.83	52530.96	445.09
T	94232.22	52529.48	444.55
U	93906.68	52506.64	449.97
V	94229.84	52229.08	448.91
W	93935.65	52234.06	446.72
X	94252.51	52039.31	445.29
Y	94230.77	52210.64	448.89
Z	94043.00	52367.59	449.01
ZA	93998.19	52364.52	448.78
ZZ	94087.16	52100.49	448.00

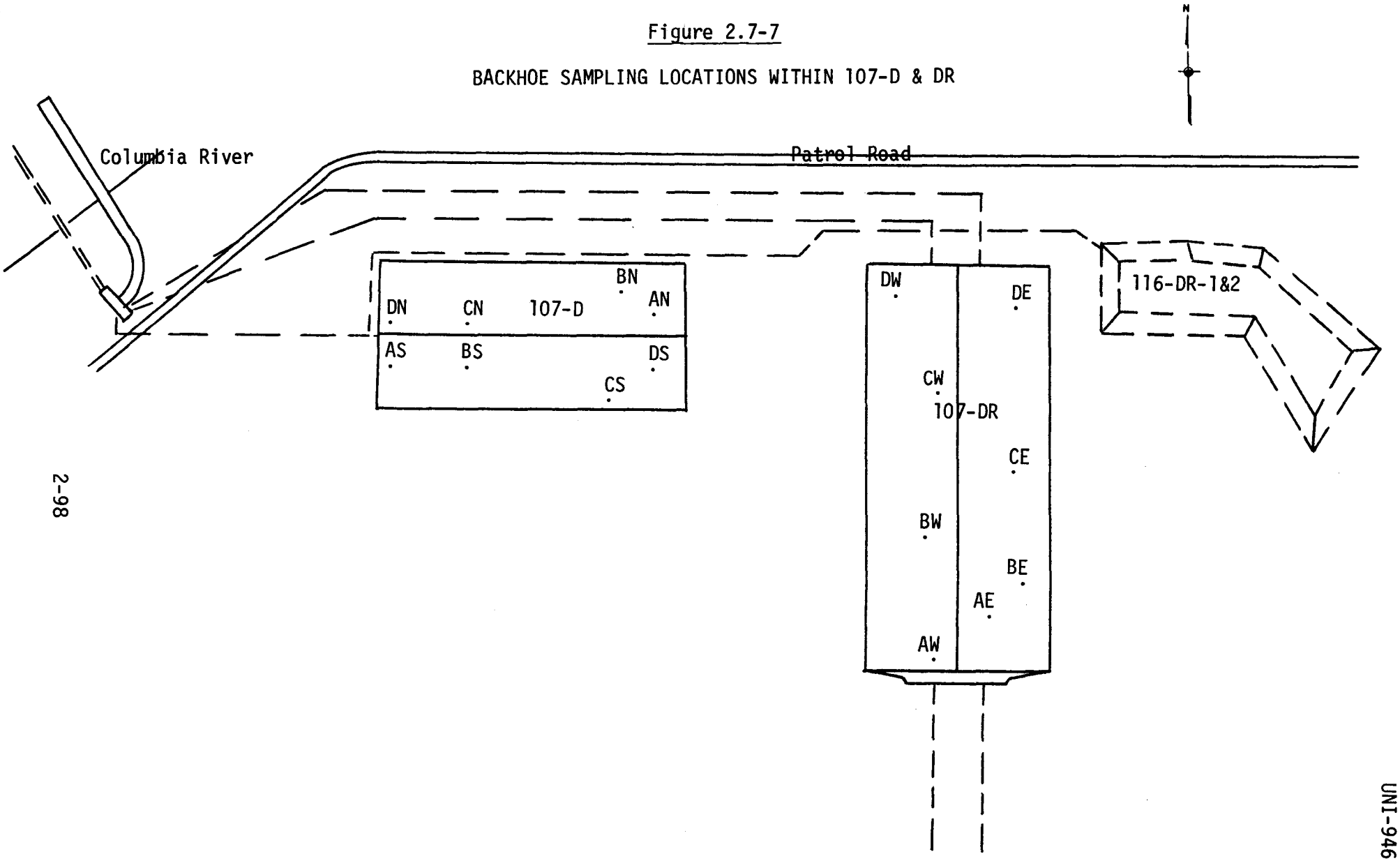
NOTE:
COORDINATES AND ELEVATIONS ARE FROM A FIELD SURVEY OF 6-27-75.

FIGURE 2.7-6

107-D&DR SAMPLE HOLES

Figure 2.7-7

BACKHOE SAMPLING LOCATIONS WITHIN 107-D & DR



UNI-946

TABLE 2.7-43

107-D RETENTION BASIN

SAMPLE HOLES DRILLED OUTSIDE OF BASIN

Concentration (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
A 10	*	$2.6x10^{-1}$	$4.5x10^{-1}$	$2.6x10^{-1}$	<200/15	$1.1x10^{1}$	$3.1x10^{0}$	$3.8x10^{0}$	$1.5x10^{-1}$	$3.2x10^{0}$	$6.7x10^{-1}$	$2.5x10^{-1}$
20	*	*	$1.0x10^{-1}$		<200/10	*	*	*	$3.8x10^{-2}$	*	*	
28	*	*	$3.6x10^{-1}$		<200/5	*	*	*	*	*	*	
B 0	*	*	$2.6x10^{-2}$		<200/30	*	*	*	*	$3.0x10^{-2}$	$1.1x10^{-1}$	
10	*	$6.0x10^{-1}$	$1.0x10^{-1}$	$7.4x10^{-1}$	<200/25	$4.3x10^{0}$	$1.1x10^{0}$	$7.6x10^{-1}$	*	$2.4x10^{-1}$	*	$1.5x10^{-1}$
17	*	*	*		<200/15	*	*	*	*	$3.0x10^{-2}$	*	
C 0	*	*	$1.8x10^{-1}$		<200/15	$2.9x10^{0}$	$2.3x10^{0}$	$1.0x10^{0}$	*	$4.2x10^{-1}$	*	
5	*	*	$4.9x10^{0}$	$1.4x10^{1}$	1,000	$3.9x10^{2}$	$4.5x10^{2}$	$1.2x10^{2}$	*	$1.7x10^{1}$	$7.8x10^{0}$	$6.3x10^{-1}$
7-1/2	*	*	$6.2x10^{-1}$		<200/20	$7.3x10^{-1}$	$4.3x10^{-1}$	$3.3x10^{-1}$	*	*	*	
22	*	$6.0x10^{-1}$	$2.8x10^{0}$		850	$1.6x10^{2}$	$3.2x10^{2}$	$4.5x10^{1}$	*	$4.0x10^{1}$	$4.1x10^{0}$	
27	*	*	$1.7x10^{0}$	$5.1x10^{0}$	1,000	$1.3x10^{2}$	$1.5x10^{2}$	$4.5x10^{1}$	*	$2.2x10^{1}$	$6.7x10^{0}$	$2.7x10^{-1}$
31	$4.8x10^{-1}$	$1.3x10^{1}$	$1.6x10^{0}$	$4.7x10^{0}$	500	$6.2x10^{1}$	$8.8x10^{1}$	$1.9x10^{1}$	*	$2.0x10^{1}$	$9.3x10^{-1}$	$1.4x10^{-1}$
D 10	*	*	$1.9x10^{-1}$		<200/10	*	$9.5x10^{-2}$	*	*	*	*	
19	*	*	$1.7x10^{0}$	$5.4x10^{0}$	850	$2.2x10^{2}$	$2.1x10^{2}$	$8.1x10^{1}$	$3.4x10^{-2}$	$2.7x10^{1}$	*	$2.4x10^{-1}$
20	*	$3.5x10^{-1}$	$2.4x10^{0}$		600	$6.5x10^{1}$	$1.7x10^{2}$	$2.0x10^{1}$	*	$2.7x10^{1}$	$3.8x10^{0}$	
E 5	*	*	$1.2x10^{-2}$		<200/5	*	*	*	*	*	*	
15	*	*	$1.4x10^{-1}$	$2.1x10^{0}$	<200/15	$1.6x10^{0}$	$1.4x10^{0}$	$6.2x10^{-1}$	$5.2x10^{-2}$	$1.7x10^{-1}$	*	$1.8x10^{-1}$
25	*	*	$5.8x10^{-1}$		<200/10	$1.6x10^{-1}$	*	*	$4.1x10^{-2}$	$1.6x10^{0}$	$9.7x10^{-2}$	
F 10	*	*	$3.9x10^{-1}$	$2.6x10^{0}$	<200/20	$4.0x10^{0}$	$3.2x10^{0}$	$1.2x10^{0}$	*	$4.1x10^{0}$	*	$3.2x10^{-1}$
20	*	*	$5.2x10^{-1}$		<200/10	$1.4x10^{0}$	$1.9x10^{0}$	$5.1x10^{-1}$	*	$2.8x10^{-1}$	$8.1x10^{-2}$	
21	*	$4.3x10^{-1}$	$8.0x10^{-1}$	$6.2x10^{0}$	750	$1.6x10^{2}$	$9.3x10^{1}$	$6.3x10^{1}$	$5.3x10^{-1}$	$5.0x10^{1}$	$1.7x10^{1}$	$1.7x10^{-1}$
28	*	$7.7x10^{-1}$	$2.8x10^{0}$	$1.5x10^{1}$	2,000	$2.8x10^{2}$	$7.4x10^{2}$	$8.3x10^{1}$	$3.7x10^{-1}$	$4.5x10^{1}$	*	$9.2x10^{-2}$
30	*	$1.1x10^{-1}$	$1.5x10^{0}$	$7.3x10^{0}$	300	$2.0x10^{1}$	$7.3x10^{0}$	$7.6x10^{0}$	$1.4x10^{-1}$	$2.7x10^{1}$	$9.3x10^{-1}$	$3.6x10^{-1}$
G 5	*	$1.5x10^{-1}$	$2.5x10^{-2}$		<200/15	*	*	*	*	*	*	
20	*	*	$1.4x10^{-1}$	$2.6x10^{0}$	<200/15	*	*	*	*	$4.3x10^{-2}$	*	$1.7x10^{-1}$
H 5	*	*	$4.2x10^{-1}$		<200/10	$3.3x10^{-1}$	$3.8x10^{-2}$	*	*	$5.4x10^{-2}$	*	
15	*	$1.2x10^{-1}$	$4.1x10^{-1}$	$2.9x10^{0}$	<200/10	$5.4x10^{0}$	$2.5x10^{0}$	$1.7x10^{0}$	*	$3.0x10^{1}$	$7.2x10^{-1}$	$1.4x10^{-1}$
30	*	*	$4.3x10^{-1}$		<200/10	*	*	*	*	$1.5x10^{0}$	$1.4x10^{-1}$	

TABLE 2.7-43 (Cont'd)

107-D RETENTION BASIN (Cont'd)

SAMPLE HOLES DRILLED OUTSIDE OF BASIN

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
	Concentration (pCi/g)											
I 20	*	$1.3x10^{-1}$	$2.7x10^{-1}$	$2.6x10^{0}$	<200/25	$3.9x10^{-1}$	$2.7x10^{-1}$	*	*	$9.7x10^{-2}$	*	$1.2x10^{-1}$
30	*	*	*		<200/20	$1.8x10^{-1}$	*	*	*	*	*	
J 5	*	$8.3x10^{-1}$	$1.9x10^{0}$		400	$1.6x10^{2}$	$1.4x10^{2}$	$4.3x10^{1}$	*	$2.0x10^{1}$	$4.5x10^{0}$	
10	*	$8.3x10^{-1}$	$4.3x10^{-1}$	$1.5x10^{1}$	1,500	$6.6x10^{1}$	$5.7x10^{2}$	$2.3x10^{2}$	$3.9x10^{0}$	$4.8x10^{1}$	$2.9x10^{1}$	$7.4x10^{-1}$
15	*	$1.6x10^{-1}$	$2.9x10^{-1}$		300	$1.9x10^{1}$	$3.8x10^{1}$	$7.1x10^{0}$	$1.3x10^{-1}$	$1.5x10^{1}$	$3.3x10^{0}$	
20	*	*	$6.4x10^{-1}$		<200/25	$2.2x10^{1}$	$1.8x10^{1}$	$6.4x10^{0}$	*	$2.2x10^{0}$	$1.0x10^{0}$	
K 5	*	*	$7.4x10^{-1}$		<200/15	$8.7x10^{-1}$	$1.5x10^{-1}$	$2.2x10^{-1}$	$4.5x10^{-2}$	$1.4x10^{-1}$	*	
12-1/2	*	$1.2x10^{0}$	$2.0x10^{0}$	$1.8x10^{1}$	2,000	$6.3x10^{2}$	$6.7x10^{2}$	$2.5x10^{2}$	$4.3x10^{0}$	$2.9x10^{1}$	$5.1x10^{1}$	$4.3x10^{-1}$
15	*	$5.2x10^{-1}$	$1.0x10^{-1}$		800	$3.0x10^{0}$	$4.1x10^{0}$	$1.0x10^{2}$	*	$1.6x10^{1}$	$1.7x10^{-1}$	
25	*	$5.5x10^{-1}$	$7.6x10^{-1}$		<200/20	$2.7x10^{0}$	$2.5x10^{0}$	$7.8x10^{-1}$	*	$1.0x10^{1}$	$1.7x10^{-1}$	
L 25	*	$2.3x10^{0}$	$3.4x10^{0}$	$2.5x10^{1}$	2,000	$5.9x10^{2}$	$1.2x10^{3}$	$2.0x10^{2}$	$5.0x10^{-1}$	$4.7x10^{1}$	$2.7x10^{1}$	$5.7x10^{-1}$
27-1/2	*	$2.5x10^{-1}$	$3.1x10^{-1}$		<200/25	$1.8x10^{1}$	$7.2x10^{0}$	$6.0x10^{0}$	*	$2.6x10^{1}$	$5.0x10^{-1}$	
34	*	*	$4.1x10^{-1}$		<200	$5.4x10^{0}$	$6.1x10^{0}$	$2.2x10^{0}$	$3.1x10^{-2}$	$1.4x10^{1}$	$4.2x10^{-1}$	
M 5	*	*	*	$2.1x10^{0}$	<200/25	$3.2x10^{-1}$	$1.6x10^{-1}$	*	*	$9.1x10^{-2}$	*	$2.3x10^{-1}$
10	*	*	$6.7x10^{-2}$	$8.4x10^{-1}$	<200/10	*	$3.9x10^{-2}$	*	*	*	$9.3x10^{-2}$	$1.3x10^{-1}$
N 15	*	*	$1.1x10^{-1}$		<200/15	$6.4x10^{0}$	$1.3x10^{0}$	$3.8x10^{-1}$	*	$1.0x10^{0}$	*	
20	*	*	$5.6x10^{-2}$		<200/15	$3.3x10^{0}$	$2.8x10^{0}$	$4.4x10^{-1}$	*	$2.9x10^{-1}$	*	
30	*	*	$4.6x10^{-1}$		<200/15	*	*	*	*	$2.9x10^{-2}$	*	
O 10	*	*	$6.3x10^{-1}$		<200/Bkg	$5.2x10^{-1}$	$4.4x10^{-2}$	*	*	$4.7x10^{-1}$	*	
20	*	*	$8.1x10^{-1}$	$1.4x10^{0}$	<200/10	$8.3x10^{-1}$	$3.4x10^{-1}$	*	*	$7.4x10^{-2}$	*	$1.8x10^{-1}$
30	*	*	$5.7x10^{-1}$		<200/20	$4.5x10^{-1}$	$6.1x10^{-2}$	*	$3.5x10^{-2}$	$1.5x10^{0}$	$1.0x10^{-1}$	
P 10	*	*	$3.3x10^{-1}$	$8.6x10^{-1}$	<200/30	*	$9.3x10^{-2}$	*	*	$6.9x10^{-1}$	*	$1.2x10^{-1}$
20	*	*	*		<200/5	$1.8x10^{-1}$	*	*	*	*	*	
Q 5	*	*	*		<200	$9.5x10^{-1}$	$2.8x10^{-1}$	*	*	$1.4x10^{-1}$	$1.5x10^{-2}$	
10	*	$1.3x10^{-1}$	$1.2x10^{0}$	$4.5x10^{0}$	500	$4.7x10^{1}$	$1.3x10^{2}$	$1.0x10^{1}$	*	$6.7x10^{0}$	*	$2.2x10^{-1}$
15	$4.0x10^{-3}$	$1.1x10^{-1}$	$1.4x10^{0}$		<200/50	$2.6x10^{1}$	$3.5x10^{1}$	$9.0x10^{0}$	*	$3.1x10^{0}$	$6.6x10^{-1}$	
25	$2.5x10^{-3}$	$1.5x10^{-1}$	$2.7x10^{0}$		<200/10	$9.8x10^{-1}$	$9.7x10^{-2}$	*	$3.4x10^{-2}$	$3.2x10^{-1}$	*	

TABLE 2.7-44

107-D RETENTION BASIN

SAMPLE HOLES DRILLED INSIDE OF BASIN

Concentration (pCi/g)

Sample No.		Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
R	1	$7.2x10^{-3}$	$1.9x10^{-1}$	$2.3x10^{-1}$		<200/70	$2.4x10^{1}$	$2.8x10^{1}$	$8.3x10^{0}$	$9.2x10^{-2}$	$4.3x10^{0}$	$6.4x10^{-1}$			
	3	*	$3.2x10^{-1}$	$3.8x10^{1}$		700	$2.9x10^{2}$	$9.1x10^{4}$	$1.1x10^{3}$	$7.7x10^{4}$	$6.4x10^{3}$	$1.4x10^{3}$			
	3-1/2	$4.2x10^{0}$	$2.4x10^{2}$	$3.3x10^{-1}$	$4.6x10^{1}$	60,000	$1.8x10^{4}$	$6.8x10^{3}$	$2.0x10^{4}$	$1.7x10^{0}$	$1.5x10^{3}$	$6.2x10^{3}$	$3.2x10^{0}$	$1.6x10^{4}$	$4.3x10^{2}$
	6	*	$1.5x10^{-1}$	$4.1x10^{-1}$		<200/60	$7.5x10^{0}$	$5.8x10^{0}$	$1.5x10^{0}$	$7.1x10^{-2}$	$3.2x10^{-1}$	$3.4x10^{-1}$			
	14			$8.8x10^{-1}$		<200/40	$2.1x10^{-1}$	$1.3x10^{-1}$	*	$5.9x10^{-2}$	$1.2x10^{1}$	$3.4x10^{-1}$			
S	3	*	$1.4x10^{-1}$	$1.7x10^{-1}$		<200/50	$1.3x10^{1}$	$6.2x10^{0}$	$6.5x10^{0}$	*	$5.2x10^{-1}$	$6.3x10^{-1}$			
	3-1/2	$4.7x10^{0}$	$2.9x10^{2}$	$3.1x10^{1}$	$4.9x10^{4}$	45,000	$9.0x10^{3}$	$6.5x10^{3}$	$1.4x10^{4}$	$7.5x10^{2}$	$7.3x10^{2}$	$3.7x10^{3}$	$1.1x10^{0}$	$5.7x10^{3}$	$4.3x10^{1}$
	9	*	$6.0x10^{-1}$	$1.8x10^{0}$	$8.8x10^{0}$	<200/200	$3.6x10^{1}$	$8.3x10^{1}$	$1.4x10^{1}$	*	$4.9x10^{0}$	$1.2x10^{0}$	$3.2x10^{-1}$		
	14	*	*	$1.3x10^{0}$		<200/40	$2.2x10^{-1}$	$8.2x10^{-2}$	*	$4.6x10^{-2}$	$2.1x10^{1}$	$2.0x10^{-1}$			

TABLE 2.7-45

107-DR RETENTION BASIN

SAMPLE HOLES DRILLED OUTSIDE OF BASIN

Sample No.		Concentration (pCi/g)											
		Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
A	10	*	$5.6x10^{-1}$	$1.2x10^{0}$	$5.0x10^{0}$	200	$2.2x10^{1}$	$2.1x10^{1}$	$7.4x10^{0}$	*	$7.6x10^{1}$	$6.8x10^{-1}$	$2.6x10^{-1}$
	20	*	*	$5.9x10^{-1}$		<200/15	$2.5x10^{-1}$	$5.8x10^{-2}$	*	*	*	$1.7x10^{-1}$	
	30	*	*	$1.6x10^{0}$		<200/10	$4.0x10^{-2}$	*	*	*	$4.0x10^{-2}$	$2.3x10^{-1}$	
B	15	*	$1.6x10^{-1}$	$7.6x10^{-1}$	$9.4x10^{-1}$	<200/80	$2.1x10^{1}$	$5.6x10^{1}$	$7.8x10^{0}$	*	$1.6x10^{1}$	$1.1x10^{0}$	$2.3x10^{-1}$
	20	*	*	$3.1x10^{-1}$		<200/5	$3.6x10^{-1}$	$4.5x10^{-1}$	$2.1x10^{-1}$	*	$1.6x10^{0}$	*	
	30	*	*	$6.5x10^{-1}$		<200	*	*	*	$3.7x10^{-2}$	*	$9.7x10^{-2}$	
D	15	*	*	$4.0x10^{-1}$		<200/25	$8.8x10^{0}$	$1.6x10^{1}$	$2.8x10^{0}$	*	$5.8x10^{0}$	*	$2.8x10^{-1}$
	20	*	*	$1.1x10^{0}$		<200/10	$3.8x10^{-1}$	$1.1x10^{-1}$	*	$3.1x10^{-2}$	$1.3x10^{-1}$	*	
E	15	*	*	$6.4x10^{-2}$	$1.6x10^{-1}$	<200	$1.0x10^{0}$	$4.9x10^{-1}$	*	*	$4.1x10^{-1}$	*	$1.6x10^{-1}$
	20	*	*	$2.1x10^{-1}$		<200/Bkg	*	*	*	*	*	$1.2x10^{-1}$	
	30	*	*	$5.6x10^{-1}$		<200/10	*	*	*	*	*	*	
F	15	*	*	$2.3x10^{-2}$	$3.2x10^{-1}$	<200/10	*	*	*	*	$7.4x10^{-2}$	*	$1.8x10^{-1}$
O	10	*	$1.5x10^{0}$	$2.1x10^{0}$	$8.2x10^{0}$	1,700	$5.9x10^{2}$	$3.3x10^{2}$	$2.1x10^{2}$	*	$1.3x10^{2}$	$3.0x10^{1}$	$3.9x10^{-1}$
	20	*	*	$4.9x10^{-1}$		<200/20	$9.4x10^{-1}$	$2.5x10^{-1}$	*	*	$3.7x10^{0}$	*	
	30	*	*	$4.9x10^{-1}$		<200/10	*	*	*	*	*	*	
P	15	*	*	*	$5.7x10^{0}$	<200/15	$1.8x10^{-1}$	$6.5x10^{-2}$	*	*	$8.0x10^{-2}$	*	$2.2x10^{-1}$
	25	*	*	$2.4x10^{-2}$		<200/15	*	*	*	*	*	*	
	30	*	*	*		<200/10	*	*	*	*	*	*	
Q	10	*	*	$2.6x10^{-2}$	$1.4x10^{0}$	<200	*	$4.0x10^{-2}$	*	$3.9x10^{-2}$	$5.9x10^{-2}$	*	$1.9x10^{-1}$
	20	*	*	*		<200/5	*	*	*	*	*	$1.5x10^{-1}$	
	30	*	*	$1.6x10^{-2}$		<200/5	*	*	*	*	*	*	
R	10	*	*	*		<200/5	*	*	*	*	*	$8.6x10^{-2}$	
	15	*	*	$2.0x10^{-2}$	$6.6x10^{-1}$	<200/15	*	*	*	$5.9x10^{-2}$	$3.2x10^{-2}$	$1.9x10^{-1}$	$1.9x10^{-1}$
	20	*	*	*		<200/10	*	*	*	*	*	*	
S	15	*	*	$1.7x10^{-1}$		<200/10	*	*	*	*	$3.1x10^{-2}$	*	
T	10	*	*	$3.0x10^{-2}$		<200	*	*	*	*	*	$2.0x10^{-1}$	
	20	*	*	$4.7x10^{-2}$	$5.7x10^{-1}$	<200/5	*	*	*	*	*	*	$4.2x10^{-2}$
	30	*	*	$8.5x10^{-2}$		<200/5	$1.6x10^{-1}$	$7.9x10^{-2}$	*	*	$4.1x10^{-2}$	*	

TABLE 2.7-45 (Cont'd)

107-DR RETENTION BASIN (Cont'd)

SAMPLE HOLES DRILLED OUTSIDE OF BASIN

Concentration (pCi/g)

Sample No.		Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
U	10	*	*	$3.4x10^{-2}$	$1.8x10^{-1}$	<200/15	$3.7x10^{-1}$	*	*	*	*	*	$2.0x10^{-1}$
	20	*	*	*		<200/Bkg	*	*	*	*	*	*	
V	10	*	*	$5.1x10^{-1}$		<200/10	*	*	*	$4.6x10^{-2}$	$5.0x10^{-2}$	$1.0x10^{-1}$	
	20	*	*	$1.2x10^{0}$	$5.7x10^{0}$	<200/10	$3.5x10^{-1}$	$9.3x10^{-2}$	*	*	$3.6x10^{-2}$	*	$2.0x10^{-1}$
	30	*	*	$7.8x10^{-1}$		<200	$1.7x10^{-1}$	*	*	*	*	*	
W	15	*	*	*	$2.4x10^{0}$	<200/20	*	*	*	$4.0x10^{-2}$	$3.6x10^{-2}$	*	$1.8x10^{-1}$
	25	*	*	$1.0x10^{-1}$		<200/10	*	*	*	*	*	*	
	30	*	*	$6.3x10^{-2}$		<200/Bkg	*	$4.0x10^{-2}$	*	*	$3.8x10^{-2}$	*	
X	10	*	*	*		<200/10	*	*	*	*	$4.2x10^{-2}$	*	
	20	*	*	$1.9x10^{-2}$	$5.0x10^{-1}$	<200	*	*	*	*	*	$2.1x10^{-1}$	$2.0x10^{-1}$
	25	*	*	$2.6x10^{-2}$		<200	*	*	*	*	*	*	
Y	10	*	*	$3.7x10^{-2}$	$1.3x10^{0}$	<200/20	*	*	*	*	*	*	$1.8x10^{-1}$
	20	*	*	*		<200/Bkg	*	*	*	*	*	*	
	30	*	*	$7.9x10^{-2}$		<200	*	*	*	$6.8x10^{-2}$	*	*	
Z	5	*	$5.3x10^{-1}$	$1.7x10^{0}$	$2.9x10^{0}$	400	$7.1x10^{1}$	$1.4x10^{2}$	$2.7x10^{1}$	$1.2x10^{-1}$	$1.4x10^{2}$	$3.2x10^{0}$	$2.4x10^{-1}$
	10	*	*	$1.4x10^{0}$		<200/40	$7.2x10^{-1}$	$3.9x10^{-1}$	*	$4.8x10^{-2}$	$1.6x10^{-1}$	*	
	20	*	*	$7.8x10^{-1}$		<200/10	*	$1.5x10^{-1}$	*	*	$2.5x10^{-1}$	*	
	30			$3.8x10^{-1}$		<200/5	*	*	$2.6x10^{-1}$	*	*	*	
ZA	5	*	*	*		<200/10	$2.2x10^{-1}$	*	*	$5.8x10^{-2}$	*	*	
	15	*	*	*	$1.3x10^{0}$	<200/20	*	$4.8x10^{-2}$	*	*	*	*	$1.1x10^{-1}$
	20	*	*	$1.1x10^{-1}$		<200/5	*	*	*	*	$4.1x10^{-2}$	*	

TABLE 2.7-46

107-DR RETENTION BASIN

SAMPLE HOLES DRILLED INSIDE OF BASIN

Concentration (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Ni-63	Eu-155	U	C-14
AA 3	$1.1x10^{0}$	$6.5x10^{1}$	$2.5x10^{2}$	$1.4x10^{1}$	25,000	$2.5x10^{4}$	$1.7x10^{4}$	$1.4x10^{4}$	$2.7x10^{2}$	$4.7x10^{3}$	$9.5x10^{3}$	$2.0x10^{1}$	$9.0x10^{-1}$	$1.8x10^{2}$
C2	*	*	$1.2x10^{1}$		800	$1.1x10^{2}$	$7.5x10^{1}$	$4.7x10^{1}$	*	$1.8x10^{2}$		$7.0x10^{0}$	$2.6x10^{-1}$	
C8	*	$2.1x10^{0}$	$8.8x10^{0}$	$2.5x10^{0}$	2,000	$5.2x10^{-1}$	$5.1x10^{-1}$	$1.9x10^{2}$	$5.9x10^{0}$	$1.4x10^{3}$		$2.0x10^{1}$	$5.2x10^{-1}$	
5	*	*	$2.9x10^{0}$		<200/20	$2.0x10^{0}$	$1.1x10^{0}$	*	*	$6.0x10^{-1}$		*		
7-1/2	*	*	$9.9x10^{0}$		<200/30	$8.1x10^{0}$	$3.5x10^{0}$	$2.9x10^{0}$	*	$1.3x10^{1}$		$4.7x10^{-1}$		
12	*	*	$1.8x10^{0}$		<200/10	$2.2x10^{0}$	$4.0x10^{-1}$	$4.7x10^{-1}$	*	$2.8x10^{1}$		$6.0x10^{-1}$		
AB 3	$5.3x10^{-1}$	$1.4x10^{1}$	$2.3x10^{2}$	$1.4x10^{1}$	10,000	$6.9x10^{3}$	$1.7x10^{3}$	$2.5x10^{3}$	$4.4x10^{0}$	$1.3x10^{3}$		$2.3x10^{2}$	$8.3x10^{-1}$	
C10	*	$2.5x10^{-1}$	$6.5x10^{-3}$	$3.9x10^{0}$	300	$1.4x10^{1}$	$9.9x10^{-1}$	$4.4x10^{-1}$	*	$5.9x10^{-1}$		$5.2x10^{-1}$	$3.6x10^{-1}$	
5	*	$9.2x10^{-3}$	$1.4x10^{0}$	$5.0x10^{0}$	<200/15	$6.9x10^{-1}$	$4.7x10^{-2}$	$3.1x10^{-1}$	*	$8.2x10^{-1}$		$2.8x10^{-1}$	$1.5x10^{-1}$	
12-1/2	*	*	$1.6x10^{0}$	$5.0x10^{0}$	<200/15	$2.2x10^{-1}$	$9.8x10^{-2}$	*	*	$1.2x10^{-2}$		*	$1.2x10^{-1}$	
15	*	*	$1.1x10^{0}$		<200/Bkg	$2.6x10^{-1}$	*	*	*	$5.0x10^{-2}$		$1.1x10^{-1}$		
AC 3	*	$9.5x10^{-1}$	$1.2x10^{1}$	$3.5x10^{0}$	1,000	$3.3x10^{2}$	$7.5x10^{1}$	$1.1x10^{2}$	$2.1x10^{0}$	$1.5x10^{2}$		$3.1x10^{1}$	$1.2x10^{-1}$	
C4	*	*	$6.1x10^{-1}$	$4.8x10^{0}$	<200/40	$4.5x10^{2}$	$4.9x10^{2}$	*	*	$9.7x10^{2}$		*	$5.1x10^{-1}$	
C8	*	$9.7x10^{-1}$	$3.3x10^{0}$	$3.1x10^{0}$	600	$3.1x10^{2}$	$4.2x10^{2}$	$1.1x10^{2}$	$7.8x10^{-1}$	$2.3x10^{2}$		$7.2x10^{0}$	$6.6x10^{-1}$	
5	*	$1.0x10^{0}$	$4.9x10^{0}$	$3.7x10^{-1}$	1,500	$3.7x10^{2}$	$3.5x10^{2}$	$1.3x10^{2}$	*	$4.3x10^{2}$		$1.6x10^{1}$	$3.8x10^{-1}$	
7-1/2	*	*	$3.1x10^{0}$	$3.2x10^{0}$	<200/40	$6.2x10^{0}$	$5.5x10^{0}$	$1.8x10^{0}$	*	$1.9x10^{1}$		*	$1.5x10^{-1}$	
10	*	*	$1.9x10^{0}$	$1.7x10^{0}$	<200/25	*	*	*	*	$2.2x10^{-2}$		$1.6x10^{-1}$	$1.1x10^{-1}$	
15	*	$2.4x10^{0}$	$3.2x10^{0}$		<200/10	*	*	*	*	$2.5x10^{-1}$		*		

TABLE 2.7-47

116-DR-1 & 2

107-DR LIQUID WASTE DISPOSAL TRENCHES 1 & 2

Sample No.		Concentration (pCi/g) Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
C	15	*	2.5×10^{-1}	2.3×10^{0}		400	9.4×10^{1}	5.1×10^{1}	2.0×10^{1}	1.4×10^{-1}	1.5×10^{2}	2.5×10^{0}	
	22-1/2	*	3.2×10^{0}	1.4×10^{1}	1.4×10^{1}	2,000	6.3×10^{2}	3.2×10^{2}	1.5×10^{2}	2.4×10^{0}	5.5×10^{2}	9.2×10^{0}	3.8×10^{-1}
	25	*	*	3.6×10^{0}		<200/50	4.0×10^{0}	1.8×10^{0}	1.4×10^{0}	*	8.8×10^{1}	1.4×10^{0}	
	30	*	*	2.5×10^{0}		<200/10	5.0×10^{-1}	4.5×10^{-2}	*	*	*	1.7×10^{-1}	
G	12-1/2	*	*	2.9×10^{-1}		<200/15	3.5×10^{0}	1.4×10^{-1}	3.2×10^{-1}	*	1.9×10^{-1}	*	
	25	*	*	2.3×10^{0}	3.5×10^{0}	<200/40	4.6×10^{0}	5.2×10^{-1}	5.3×10^{-1}	*	2.3×10^{1}	3.4×10^{-1}	2.2×10^{-1}
	30	*	*	1.7×10^{0}		<200/30	1.5×10^{1}	7.8×10^{0}	3.9×10^{0}	1.3×10^{-1}	5.1×10^{1}	8.6×10^{-1}	
H	10	*	1.8×10^{-1}	2.4×10^{0}	2.5×10^{0}	<200/80	4.7×10^{1}	9.8×10^{0}	8.9×10^{0}	*	3.6×10^{1}	2.2×10^{-1}	1.8×10^{-1}
I	10	*	5.1×10^{-1}	4.7×10^{0}		<200/150	1.0×10^{2}	1.6×10^{1}	2.1×10^{1}	4.5×10^{-1}	8.1×10^{1}	5.2×10^{0}	
	11	*	1.8×10^{0}	7.5×10^{0}	1.5×10^{1}	1,000	4.6×10^{2}	1.1×10^{2}	9.9×10^{1}	2.6×10^{0}	1.7×10^{2}	2.9×10^{1}	1.8×10^{-1}
	15	*	*	3.2×10^{0}		<200/20	1.0×10^{1}	1.1×10^{0}	1.6×10^{0}	1.0×10^{-1}	7.5×10^{-1}	5.9×10^{-1}	
J	10	*	*	4.1×10^{-2}		<200/10	2.0×10^{-1}	*	*	*	7.3×10^{-2}	*	
	25	*	1.1×10^{-1}	2.2×10^{0}	3.5×10^{-1}	<200/80	1.9×10^{1}	2.0×10^{0}	4.4×10^{0}	*	1.6×10^{1}	7.1×10^{-1}	1.5×10^{-1}
	30	*	*	1.1×10^{0}		<200/10	2.8×10^{-1}	1.1×10^{-1}	*	*	5.0×10^{-2}	*	
L	15	*	*	9.5×10^{-1}	3.6×10^{0}	<200/30	3.8×10^{0}	3.7×10^{-1}	7.5×10^{-1}	1.6×10^{-1}	1.5×10^{0}	2.2×10^{0}	1.8×10^{-1}
	25	*	*	2.0×10^{0}		<200/10	4.4×10^{0}	5.1×10^{-1}	1.1×10^{0}	*	8.9×10^{-2}	1.5×10^{-1}	
M	20	*	*	*		<200/20	3.7×10^{0}	1.9×10^{0}	1.1×10^{0}	8.3×10^{-2}	2.6×10^{1}	1.0×10^{-1}	
	25	*	2.2×10^{-1}	1.0×10^{0}	8.7×10^{-1}	300	3.8×10^{0}	2.1×10^{-1}	8.6×10^{0}	5.8×10^{-1}	3.7×10^{0}	6.3×10^{-1}	2.7×10^{-1}
	30	*	*	1.6×10^{0}		<200/15	3.0×10^{0}	3.3×10^{-1}	1.1×10^{0}	*	6.6×10^{0}	1.3×10^{-1}	
N	10	*	*	5.7×10^{-2}		<200/15	1.1×10^{0}	2.6×10^{-1}	*	*	2.2×10^{0}	8.8×10^{-2}	
	17	*	1.8×10^{-1}	3.4×10^{-1}		1,000	4.0×10^{1}	4.7×10^{1}	8.8×10^{0}	3.1×10^{-1}	1.2×10^{2}	2.0×10^{-1}	
	25	*	1.2×10^{-1}	1.0×10^{1}	7.0×10^{0}	1,200	6.3×10^{1}	6.3×10^{0}	1.5×10^{1}	*	1.2×10^{3}	3.1×10^{0}	2.4×10^{-1}
	30	*	*	6.7×10^{0}		<200/25	2.2×10^{1}	2.0×10^{1}	1.0×10^{1}	*	3.6×10^{0}	2.1×10^{0}	

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TABLE 2.7-48

107-D RETENTION BASIN

SAMPLING OF BASIN FILL

Concentration (pCi/g)

Sample No.		Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
BN	0	*	$1.1x10^{-1}$	*		<200/60	$1.5x10^{1}$	$2.3x10^{1}$	$4.7x10^{0}$	*	$1.1x10^{0}$	$5.0x10^{0}$			
	1	*	$6.7x10^{-1}$	$1.3x10^{0}$		1,200	$2.3x10^{2}$	$9.6x10^{1}$	$1.2x10^{2}$	$2.9x10^{0}$	$4.6x10^{0}$	$3.7x10^{1}$			
	2	$4.7x10^{0}$	$1.9x10^{2}$	$3.3x10^{1}$	$4.3x10^{1}$	85,000	$6.7x10^{4}$	$1.8x10^{4}$	$3.5x10^{4}$	$2.9x10^{2}$	$1.0x10^{3}$	$5.9x10^{1}$	$1.5x10^{0}$	$2.2x10^{4}$	$5.9x10^{1}$
DN	2	*	*	$4.1x10^{-1}$		<200/30	$1.6x10^{1}$	$8.6x10^{0}$	$5.4x10^{0}$	$9.0x10^{-2}$	$9.8x10^{-1}$	$5.4x10^{1}$			
	2-1/2	$4.4x10^{0}$	$2.1x10^{2}$	$5.5x10^{2}$	$2.8x10^{1}$	60,000	$6.5x10^{4}$	$2.5x10^{4}$	$3.2x10^{4}$	$1.2x10^{2}$	$1.2x10^{3}$	$3.0x10^{2}$	$1.9x10^{0}$		
AS	0	*	$1.6x10^{0}$	$4.4x10^{0}$		600	$3.3x10^{2}$	$1.2x10^{2}$	$6.7x10^{1}$	$1.3x10^{0}$	$1.5x10^{1}$	$1.2x10^{1}$			
	2	*	$7.1x10^{0}$	$1.8x10^{1}$		6,000	$3.6x10^{3}$	$1.1x10^{3}$	$1.3x10^{3}$	$6.5x10^{1}$	$5.9x10^{1}$	$2.0x10^{3}$			
	2-1/2	$2.3x10^{0}$	$8.6x10^{1}$	$2.4x10^{1}$	$2.5x10^{1}$	40,000	$3.4x10^{4}$	$1.1x10^{4}$	$1.3x10^{4}$	$8.7x10^{1}$	$4.8x10^{2}$	$1.7x10^{3}$	$1.2x10^{0}$	$1.3x10^{4}$	
BS	2	*	$1.1x10^{-1}$	$1.2x10^{-1}$		<200/100	$2.2x10^{1}$	$6.5x10^{0}$	$6.9x10^{0}$	$3.4x10^{-2}$	$4.3x10^{-1}$	$4.6x10^{-1}$			
	2-1/2	$3.9x10^{-1}$	$1.9x10^{1}$	$2.6x10^{1}$	$2.1x10^{1}$	10,000	$5.0x10^{3}$	$1.6x10^{3}$	$1.7x10^{3}$	$9.1x10^{0}$	$6.4x10^{1}$	$8.5x10^{1}$	$5.8x10^{-1}$		
CS	0	*	$1.3x10^{0}$	$4.0x10^{-1}$		800	$3.6x10^{2}$	$2.1x10^{2}$	$1.3x10^{2}$	$2.9x10^{0}$	$9.3x10^{0}$	$4.6x10^{1}$			
	1	*	$1.3x10^{-1}$	$2.6x10^{-1}$		<200/80	$5.8x10^{3}$	$2.2x10^{3}$	$1.7x10^{3}$	*	$9.4x10^{1}$	$8.9x10^{3}$			
	2	*	$5.3x10^{0}$	$1.1x10^{1}$		7,000	$4.3x10^{4}$	$1.5x10^{3}$	$2.0x10^{4}$	$1.8x10^{1}$	$5.7x10^{1}$	$1.9x10^{3}$			
	2-1/2	$1.3x10^{0}$	$6.5x10^{1}$	$5.2x10^{0}$	$9.9x10^{0}$	30,000	$3.5x10^{4}$	$8.2x10^{3}$	$1.3x10^{4}$	$2.5x10^{1}$	$2.8x10^{2}$	$3.6x10^{2}$	$1.3x10^{0}$		
DS	2	$5.9x10^{-3}$	$1.4x10^{-1}$	$6.7x10^{-2}$		<200/50	$2.9x10^{1}$	$7.2x10^{0}$	$8.7x10^{0}$	$2.7x10^{-1}$	$1.9x10^{-1}$	$2.8x10^{0}$			
	2-1/2	$4.8x10^{-1}$	$2.6x10^{1}$	$1.8x10^{2}$	$1.3x10^{1}$	4,000	$1.4x10^{3}$	$1.4x10^{3}$	$6.6x10^{2}$	$5.4x10^{0}$	$1.9x10^{3}$	$6.1x10^{1}$	$1.6x10^{0}$		

TABLE 2.7-49

107-DR RETENTION BASIN

SAMPLING OF BASIN FILL

Concentration (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63
AE 3-1/2	$5.6x10^{-2}$	$2.6x10^{0}$	$1.8x10^{1}$	$4.8x10^{0}$	3,500	$6.9x10^{2}$	$6.6x10^{2}$	$3.9x10^{2}$	$3.7x10^{0}$	$1.1x10^{3}$	$4.6x10^{1}$	$1.4x10^{-1}$	
AW 3-1/2	$4.9x10^{-1}$	$2.2x10^{1}$	$1.7x10^{2}$	$1.8x10^{1}$	10,000	$5.9x10^{3}$	$6.6x10^{3}$	$3.1x10^{3}$	$2.3x10^{0}$	$2.8x10^{2}$	$1.2x10^{2}$	$3.7x10^{-1}$	$2.7x10^{3}$
CW 3-1/2	$4.7x10^{-1}$	$1.9x10^{1}$	$5.0x10^{0}$	$5.8x10^{1}$	1,000	$4.0x10^{2}$	$1.1x10^{2}$	$1.4x10^{2}$	$3.4x10^{0}$	$7.4x10^{1}$	$3.2x10^{1}$	$9.0x10^{-2}$	
DW 3-1/2	$2.3x10^{0}$	$8.2x10^{1}$	$9.3x10^{0}$	$1.3x10^{1}$	30,000	$2.3x10^{4}$	$4.5x10^{3}$	$8.8x10^{3}$	$1.8x10^{2}$	$1.2x10^{3}$	$8.4x10^{2}$	$1.6x10^{0}$	$5.4x10^{3}$

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TABLE 2.7-50

107-D RETENTION BASIN FILL

BASIN SLUDGE

Ave. Depth = 2" Mass ≈1.2 x 10^9g

Concentrations (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
BN 2	$4.7x10^0$	$1.9x10^2$	$3.3x10^1$	$4.3x10^1$	$6.7x10^4$	$1.8x10^4$	$3.5x10^4$	$2.9x10^2$	$1.0x10^3$	$5.9x10^1$	$1.5x10^0$	$2.2x10^4$	$5.9x10^1$
DN 2-1/2	$4.4x10^0$	$2.1x10^2$	$5.5x10^2$	$2.8x10^1$	$6.5x10^4$	$2.5x10^4$	$3.2x10^4$	$1.2x10^2$	$1.2x10^3$	$3.0x10^2$	$1.9x10^0$		
EN 3-1/2	$4.2x10^0$	$2.4x10^2$	$3.3x10^1$	$4.6x10^1$	$1.8x10^4$	$6.8x10^3$	$2.0x10^4$	$1.7x10^3$	$1.5x10^3$	$6.2x10^3$	$3.2x10^0$	$1.6x10^4$	$4.3x10^2$
FN 3-1/2	$4.7x10^0$	$2.9x10^2$	$3.1x10^1$		$9.0x10^3$	$6.5x10^3$	$1.4x10^4$	$7.5x10^2$	$7.3x10^2$	$3.7x10^3$	$1.1x10^0$	$5.7x10^3$	$4.3x10^1$
AS 2	*	$7.1x10^0$	$1.8x10^1$		$3.6x10^3$	$1.1x10^3$	$1.3x10^3$	$6.5x10^0$	$5.9x10^1$	$2.0x10^1$			
AS 2-1/2	$2.3x10^0$	$8.6x10^1$	$2.4x10^1$	$2.5x10^1$	$3.4x10^4$	$1.1x10^4$	$1.3x10^4$	$8.7x10^1$	$4.8x10^2$	$1.7x10^3$	$1.2x10^0$	$1.3x10^4$	
BS 2-1/2	$3.9x10^{-1}$	$1.9x10^1$	$2.6x10^1$	$2.1x10^1$	$5.0x10^3$	$1.6x10^3$	$1.7x10^3$	$9.1x10^0$	$6.4x10^1$	$8.5x10^1$	$5.8x10^{-1}$		
CS 2	*	$5.3x10^0$	$1.1x10^1$		$4.3x10^3$	$1.5x10^3$	$2.0x10^3$	$1.8x10^1$	$5.7x10^1$	$1.9x10^3$			
CS 2-1/2	$1.3x10^0$	$6.5x10^1$	$5.2x10^0$	$9.9x10^0$	$3.5x10^4$	$8.2x10^3$	$1.3x10^4$	$2.5x10^1$	$2.8x10^2$	$3.6x10^2$	$1.3x10^0$		
DS 2-1/2	$4.8x10^{-1}$	$2.6x10^1$	$1.8x10^2$	$1.3x10^1$	$1.4x10^3$	$1.4x10^3$	$6.6x10^2$	$5.4x10^0$	$1.9x10^3$	$6.1x10^1$	$1.6x10^0$		
Ave. pCi/g	$2.2x10^0$	$1.1x10^2$	$9.1x10^1$	$1.9x10^1$	$2.4x10^4$	$8.1x10^3$	$1.3x10^4$	$3.0x10^2$	$7.3x10^2$	$1.4x10^3$	1.6	$1.4x10^4$	$1.8x10^2$
Curies	$2.7x10^{-3}$	$1.4x10^{-1}$	$1.1x10^{-1}$	$2.2x10^{-2}$	29	9.7	16	$3.6x10^{-1}$	$8.7x10^{-1}$	1.7	$1.9x10^{-3}$	17	$2.1x10^{-1}$

Total Curies in Sludge = 75

TABLE 2.7-51

107-D RETENTION BASIN FILL
BASIN FILL (EXCLUDING SLUDGE)
Ave Depth = 2-1/2' Mass =1.8×10^{10}g
Ave Concentrations (pCi/g)

Sample Hole	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
BN	*	3.9×10^{-1}	6.5×10^{-1}		1.3×10^{2}	6.0×10^{1}	6.3×10^{1}	1.5×10^{0}	2.9×10^{0}	2.1×10^{1}			
DN	*	*	4.1×10^{-1}		1.6×10^{1}	8.6×10^{0}	5.4×10^{0}	9.0×10^{-2}	9.8×10^{-1}	5.4×10^{1}			
EN	3.6×10^{-3}	2.6×10^{-1}	3.1×10^{-1}		1.6×10^{2}	6.0×10^{1}	5.9×10^{1}	4.3×10^{-1}	5.4×10^{0}	3.9×10^{-1}			
FN	*	1.4×10^{-1}	1.7×10^{-1}		1.3×10^{1}	6.2×10^{0}	6.5×10^{0}	*	5.2×10^{-1}	6.3×10^{-1}			
AS	*	1.6×10^{0}	4.4×10^{0}		3.3×10^{2}	1.2×10^{2}	6.7×10^{1}	1.3×10^{0}	1.5×10^{1}	1.2×10^{1}			
BS	*	1.1×10^{-1}	1.2×10^{-1}		2.2×10^{1}	6.5×10^{0}	6.9×10^{0}	3.4×10^{-2}	4.3×10^{-1}	4.6×10^{-1}			
CS	*	7.2×10^{-1}	3.3×10^{-1}		2.1×10^{2}	1.2×10^{2}	7.4×10^{1}	1.5×10^{0}	5.2×10^{1}	6.8×10^{1}			
DS	5.9×10^{-3}	1.4×10^{-1}	6.7×10^{-2}		2.9×10^{1}	7.2×10^{0}	8.7×10^{0}	2.7×10^{-1}	1.8×10^{-1}	2.8×10^{0}			
Ave. pCi/g	1.2×10^{-3}	4.2×10^{-1}	8.1×10^{-1}		1.1×10^{2}	4.9×10^{1}	3.6×10^{1}	6.4×10^{-1}	9.7×10^{0}	2.0×10^{1}			
Curies	2.2×10^{-5}	7.6×10^{-3}	1.5×10^{-2}		2.0	8.8×10^{-1}	6.5×10^{-1}	1.2×10^{-2}	1.7×10^{-1}	3.6×10^{-1}			

Total Curies in Fill Less Sludge = 4.1
Sludge = 75
Total Curies in Basin Fill = 79

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TABLE 2.7-52

CONTAMINATED SOIL COLUMN ADJACENT TO THE 107-D RETENTION BASIN

Description - Includes area 100' to the north of basin and 25' on all other directions x 20' average depth.

7.6×10^4 ft^2 x 20' = 1.5×10^6 ft^3
Mass = 1.0×10^{11}g

Radionuclide	Ave. pCi/g	Curies
Pu-238	1.1×10^{-2}	1.1×10^{-3}
Pu-239/240	5.3×10^{-1}	5.3×10^{-2}
Sr-90	1.1×10^{0}	1.1×10^{-1}
H-3	8.1×10^{0}	8.1×10^{-1}
Eu-152	9.3×10^{1}	9.3
Co-60	1.2×10^{2}	12
Eu-154	3.1×10^{1}	3.1
Cs-134	2.3×10^{-1}	2.3×10^{-2}
Cs-137	1.3×10^{1}	1.3
Eu-155	4.0×10^{0}	4.0×10^{-1}
U	3.1×10^{-1}	2.8×10^{-2}
		Total Curies = 27

TABLE 2.7-33

CONTAMINATED SOIL COLUMN UNDERNEATH 107-D RETENTION BASIN

0-6' Below Basin 1.1×10^5 ft^2 x 6' = 6.6×10^5 ft^3

Mass = 4.5×10^{10}g

6'-10' Below Basin 1.1×10^5 ft^2 x 4' = 4.4×10^5 ft^3

Mass = 3.0×10^{10}g

Radionuclide	0-6' Ave pCi/g	6'-10' Ave pCi/g	Curies
Pu-238	*	*	0.0
Pu-239/240	3.8×10^{-1}	*	1.7×10^{-2}
Sr-90	1.1×10^{0}	1.1×10^{0}	8.3×10^{-2}
H-3	8.8×10^{0}	NA[1]	6.6×10^{-1}
Eu-152	2.2×10^{1}	2.2×10^{-1}	1.0
Co-60	4.4×10^{1}	1.1×10^{-1}	2.0
Eu-154	7.8×10^{0}	*	3.5×10^{-1}
Cs-134	3.6×10^{-2}	5.3×10^{-2}	3.2×10^{-3}
Cs-137	4.1×10^{1}	1.7×10^{1}	2.4
Eu-155	7.7×10^{-1}	2.7×10^{-1}	4.3×10^{-2}
U	3.2×10^{-1}	NA[1]	2.4×10^{-2}

Total Curies = 6.6

[1]Concentration conservatively assumed to be the same as 0-6' interval for total Curies calculation.

TABLE 2.7-54

107-DR RETENTION BASIN FILL
BASIN SLUDGE
Ave. Depth = 2" Mass = 1.9×10^9g
Concentrations (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
AA 3	1.1×10^{0}	6.5×10^{1}	2.5×10^{2}	1.4×10^{1}	2.5×10^{4}	1.7×10^{4}	1.4×10^{4}	2.7×10^{2}	4.7×10^{3}	2.0×10^{1}	9.0×10^{-1}	9.5×10^{3}	1.8×10^{2}
AB 3	5.3×10^{-1}	1.4×10^{1}	2.3×10^{2}	1.4×10^{1}	6.9×10^{3}	1.7×10^{3}	2.5×10^{3}	4.4×10^{0}	1.3×10^{3}	2.3×10^{2}	8.3×10^{-1}		
AC 3	*	9.5×10^{-1}	1.2×10^{1}	3.5×10^{0}	3.3×10^{2}	7.5×10^{1}	1.1×10^{2}	2.1×10^{0}	1.5×10^{2}	3.1×10^{1}	1.2×10^{-1}		
AE 3-1/2	5.6×10^{-2}	2.6×10^{0}	1.8×10^{1}	4.8×10^{0}	6.9×10^{2}	6.6×10^{2}	3.9×10^{2}	3.7×10^{0}	1.1×10^{3}	4.6×10^{1}	1.4×10^{-1}		
AW 3-1/2	4.9×10^{-1}	2.2×10^{1}	1.7×10^{2}	1.8×10^{1}	5.9×10^{3}	6.6×10^{3}	3.1×10^{3}	2.3×10^{0}	2.8×10^{2}	1.2×10^{2}	3.7×10^{-1}	2.7×10^{3}	
CW 3-1/2	4.7×10^{-1}	1.9×10^{1}	5.0×10^{0}	5.8×10^{1}	4.0×10^{2}	1.1×10^{2}	1.4×10^{2}	3.4×10^{0}	7.4×10^{1}	3.2×10^{1}	9.0×10^{-2}		
DW 3-1/2	2.3×10^{0}	8.2×10^{1}	9.3×10^{0}	1.3×10^{1}	2.3×10^{4}	4.5×10^{3}	8.8×10^{3}	1.8×10^{2}	1.2×10^{3}	8.4×10^{2}	1.6×10^{0}	5.4×10^{3}	
Ave. pCi/g	7.1×10^{-1}	3.0×10^{1}	9.9×10^{1}	1.8×10^{1}	8.9×10^{3}	4.4×10^{3}	4.2×10^{3}	6.7×10^{1}	1.3×10^{3}	1.8×10^{2}	5.8×10^{-1}	8.9×10^{3}	1.8×10^{2}
Curies	1.3×10^{-3}	5.7×10^{-2}	1.9×10^{-1}	3.4×10^{-2}	17	8.4	8.0	1.3×10^{-1}	2.5	3.4×10^{-1}	1.1×10^{-3}	17	3.4×10^{-1}

Total Curies in Sludge = 54

TABLE 2.7-55

107-DR RETENTION BASIN FILL

BASIN FILL (EXCLUDING SLUDGE)

Ave. Depth = 3' Mass = 3.3×10^{10}g

Ave Concentrations (pCi/g)

	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155
2' to 6" Above Basin Floor										
Mass = 3.7×10^{9}g										
Ave. pCi/g	2.7×10^{-2}	1.5×10^{0}	5.4×10^{0}		9.6×10^{2}	1.9×10^{2}	2.5×10^{2}	*	1.2×10^{2}	2.2×10^{1}
Curies	1.0×10^{-4}	5.6×10^{-3}	2.0×10^{-2}		3.6	7.0×10^{-1}	9.3×10^{-1}	0.0	4.4×10^{-1}	8.1×10^{-2}
								Number Curies 2"-6" Above Floor		= 5.8
6" Above Basin Floor to Surface										
Mass = 2.8×10^{10}g										
Ave. pCi/g	2.0×10^{-3}	1.7×10^{-1}	4.8×10^{-1}		3.1×10^{1}	9.0	1.6×10^{1}	*	8.6	1.4
Curies	5.6×10^{-5}	4.8×10^{-3}	1.3×10^{-2}		8.7×10^{-1}	2.5×10^{-1}	4.5×10^{-2}	0.0	2.4×10^{-1}	3.9×10^{-2}
								Number Curies 6" to Surface		= 1.5
Total Curies	1.6×10^{-4}	1.0×10^{-2}	3.3×10^{-2}		4.5×10^{0}	9.5×10^{-1}	9.8×10^{-1}		6.8×10^{-1}	1.2×10^{-1}

Total Curies in Fill Less Sludge = 7.3

Sludge = 54

Total Curies in Basin Fill = 61

TABLE 2.7-56

CONTAMINATED SOIL COLUMN ADJACENT TO 107-DR RETENTION BASIN

Description - Includes area 25' from basin walls on all sides x 20' average depth.

4.8×10^4 ft^2 x 20' = 9.6×10^5 ft^3
Mass = 6.5×10^{10} g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	6.9×10^{-2}	4.5×10^{-3}
Sr-90	4.4×10^{-1}	2.9×10^{-2}
H-3	2.6×10^{0}	1.7×10^{-1}
Eu-152	1.8×10^{1}	1.2
Co-60	1.4×10^{1}	9.1×10^{-1}
Eu-154	6.2×10^{0}	4.0×10^{-1}
Cs-134	1.1×10^{-2}	7.2×10^{-4}
Cs-137	1.1×10^{1}	7.2×10^{-1}
Eu-155	8.8×10^{-1}	5.7×10^{-2}
U	2.1×10^{-1}	1.4×10^{-2}
	Total Curies =	3.5

TABLE 2.7-57

CONTAMINATED SOIL COLUMN UNDERNEATH 107-DR RETENTION BASIN

0-3' Below Basin 1.7×10^5 ft^2 x 3' = 5.2×10^5 ft^3

Mass = 3.5×10^{10}g

3'-10' Below Basin 1.7×10^5 ft^2 x 7' = 1.2×10^6 ft^3

Mass = 8.2×10^{10}g

Radionuclide	0-3' Ave pCi/g	3'-10' Ave pCi/g	Curies
Pu-238	*	*	0.0
Pu-239/240	3.1×10^{-1}	3.4×10^{-1}	3.9×10^{-2}
Sr-90	2.5×10^{0}	3.2×10^{0}	3.5×10^{-1}
H-3	3.1×10^{0}	3.3×10^{0}	3.8×10^{-1}
Eu-152	9.6×10^{1}	2.4×10^{0}	3.6
Co-60	1.1×10^{2}	1.4×10^{0}	4.0
Eu-154	3.3×10^{1}	7.4×10^{-1}	1.2
Cs-134	*	*	0.0
Cs-137	1.2×10^{2}	8.6×10^{0}	4.9
Eu-155	4.2×10^{0}	1.9×10^{-1}	1.6×10^{-1}
U	3.0×10^{-1}	1.3×10^{-1}	2.1×10^{-2}

Total Curies = 15

TABLE 2.7-58

107-DR Inlet Distribution Chamber Sludge

Volume = 150'x20'x1" = 2.5×10^2 ft^3

Mass = 1.1×10^7 g

Radionuclide	Concentration (pCi/g)	Curies
Pu-238	7.1×10^0	7.8×10^{-5}
Pu-239/240	1.5×10^2	1.7×10^{-3}
Sr-90	2.2×10^3	2.4×10^{-2}
Eu-152	2.9×10^4	3.2×10^{-1}
Co-60	2.8×10^4	3.1×10^{-1}
Eu-154	8.3×10^3	9.1×10^{-2}
Cs-137	1.3×10^5	1.4×10^0
Eu-155	Not Reported	
Ni-63[1]	5.6×10^4	6.2×10^{-1}
	Total Curies	2.8

[1]Ni-63 concentration estimated by multiplying the Co-60 concentration in the inlet distribution chamber sludge by the Ni-63/Co-60 ratio of the sludge along the 107-DR basin floor.

TABLE 2.7-59

116-DR-1 & 2

107-D/DR LIQUID WASTE DISPOSAL TRENCH

Potentially Contaminated Soil Column

Volume = 600' x 150' x 20' = 1.8×10^6 ft^3

Mass = 1.2×10^{11} g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	2.9×10^{-1}	3.5×10^{-2}
Sr-90	3.1×10^{0}	3.7×10^{-1}
H-3	5.9×10^{0}	7.1×10^{-1}
Eu-252	6.8×10^{1}	8.2
Co-60	2.7×10^{1}	3.2
Eu-154	1.6×10^{1}	1.9
Cs-134	3.0×10^{-1}	3.6×10^{-2}
Cs-137	1.3×10^{2}	16
Eu-155	2.8×10^{0}	3.4×10^{-1}
U	2.3×10^{-1}	2.8×10^{-2}
C-14	No data	

Total Curies = 3.1

2.7.4 107-F Retention Basin and Liquid Waste Trench

Sample hole drilling in the 107-F area was initiated on April 4 and completed on May 12, 1975. Thirty-two sample holes were drilled in the 107-F retention basin and liquid waste trench vicinity. The sample hole locations in the 107-F vicinity are included in Figure 2.7-8.

Figure 2.7-9 shows the approximate locations where samples of the soil fill and sludge inside of the 107-F basin were taken.

Surface contamination of 1000 c/m with a GM probe is present in the immediate vicinity of the south end of the basin. Underground contamination measurable with a GM probe (>200 c/m) was detected as far away as 50 feet from the 107-F basin's west wall but appears to be confined within 25 feet of the other basin walls. This was expected since the majority of the reported leakage from the 107-F basin was along its west wall.

Three sample holes drilled through the floor of the 107-F retention basin indicate that the majority of contamination from past leakage under the basin is confined within 5 feet below the basin floor. Sludge taken from the basin floor reads up to 15,000 c/m with a GM probe.

Radionuclide concentrations of selected samples from test holes drilled at the 107-F area, and of samples taken of the soil fill and sludge at the backhoe sampling locations are given in Tables 2.7-60 through 2.7-65.

Average and maximum beta-gamma concentrations in the sludge along the 107-F basin floor are 2.5×10^4 and 4.7×10^4 pCi/g, respectively. Pu-239/240 concentrations in the 107-F basin sludge are the lowest of the 100 Area concrete retention basins. The

107-F basin sludge has Pu-239/240 concentrations ranging up to 45 pCi/g and averaging 11 pCi/g.

Average beta-gamma concentrations in the fill dirt covering the basin sludge and in the soil adjacent to the 107-F basin are less than 1% of the sludge concentrations. Soil within 5 feet of the bottom of the 107-F basin has average beta-gamma concentrations about 2% of the sludge concentrations.

Even though the sludge radioactive concentrations are considerably higher, the basin sludge accounts only for about 50% of the total radionuclide inventory of the 107-F basin because of the relatively large volumes of contaminated soil other than the sludge. The 107-F retention basin contains an estimated radioactive inventory of 93 curies distributed as follows:

Sludge	- 45 Ci
Soil Fill Less Sludge	- 2.9 Ci
Concrete	- 8 Ci
Soil Underneath Basin	- 22 Ci
Soil Adjacent to Basin	- 15 Ci

Tables 2.7-66 through 2.7-69 give a more detailed breakdown of the 107-F basin radionuclide inventories and average concentrations.

Sampling in the 107-F liquid waste disposal trench (116-F-2) showed that the majority of the contamination in this trench is in its northern half. The maximum contamination in the 107-F liquid waste trench was 600 c/m in a sample taken 20 feet below grade and approximately 100 feet north of the trench's center point.

A covered ditch running from the 42-inch effluent line to the 107-F liquid waste trench is also contaminated. A reading of

1000 c/m was detected in a sample taken at 10 feet below grade from this ditch. Analytical results for samples taken from the 116-F-2 trench, and the ditch running to the trench, are given in Tables 2.7-62 and 2.7-63, respectively.

The 116-F-2 trench contains an estimated radionuclide inventory of 15 curies. (See Table 2.7-70.) The average and maximum Pu-239/240 concentrations observed in the trench are 8.6×10^{-2} and 3.6×10^{-1} pCi/g, respectively, and are the lowest concentrations observed in any of the 107 liquid waste trenches. The ditch running from the 42-inch effluent line to the 116-F-2 trench contains an estimated radioactive inventory of 2.6 curies as indicated in Table 2.7-71.

Effluent Line Leakage

No soil contamination measurable with a GM probe was detected in a former swamp area approximately 800 feet southwest of the 107-F basin along the exposed effluent lines (sample locations M, N, O, P). Radioanalytical results for selected samples taken from these test holes revealed radionuclide concentrations to be essentially at background levels.

Table 2.7-72 gives the average and maximum radionuclide concentrations of these samples.

Contamination measurable with field instrumentation was detected in samples taken from a narrow ditch which originates near the northeast corner of the 107-F basin and extends to the river shoreline. This ditch evidently received reactor effluent from leakage and overflow of lines at the north end of the basin. (See Section 2.3.3 for a more detailed discussion of this ditch.) A maximum of 1000 c/m was detected in a sample taken at a depth of 2 feet below grade along this ditch. A reading of 200 c/m was detected in a sample taken at 8.5 feet below grade at sampling location 107-F-CC.

The maximum Pu-239/240 concentration detected in this ditch is 6.1×10^{-1} pCi/g. The maximum beta-gamma activity is 7.0×10^{2} pCi/g. Radionuclide concentrations of selected samples taken from this drainage ditch are given in Table 2.7-64. An estimated 1.4 curies of radioactivity are contained in this ditch, as shown in Table 2.7-73.

Low level contamination was detected in two sample holes drilled along effluent lines near the 105-F reactor building. The sample holes are designated as 1608-F-A and 105-F-A and are shown in Figure 3.4-5 in Section 3 "Miscellaneous Cribs and Trenches." Sample hole 1608-F-A is 32 feet deep, drilled near a valve box adjacent to the 1608-F building. Low level contamination measurable with the scaler installed in the carryall was first detected at 25 feet below grade and dropped down to background levels at 32 feet below grade. Sample hole 105-F-A was drilled at the rear side of the 105-F building in the old effluent line cushion corridor area. Sample hole 105-F-A was only drilled to a depth of 8 feet when concrete was hit on two separate attempts. Contamination levels were slightly above background levels using the scaler and remained fairly constant with depths below the ground surface. Radioanalytical results of selected samples taken from these two test holes are given below, where the number following the sample hole designation is the depth in feet below grade.

Radionuclide	1608-F-A-25 (pCi/g)	1608-F-A-30 (pCi/g)	105-F-A-5 (pCi/g)
Pu-238	*	*	*
Pu-239/240	1.7×10^{-1}	*	*
Sr-90	1.9×10^{0}	8.2×10^{-1}	3.9×10^{-1}
H-3	3.2×10^{1}	No Analysis	3.9×10^{-1}
Eu-152	9.2×10^{1}	3.1×10^{1}	5.6×10^{0}
Co-60	1.2×10^{1}	4.1×10^{0}	8.8×10^{-1}
Eu-154	1.9×10^{1}	6.2×10^{0}	1.2×10^{0}
Cs-134	4.0×10^{-1}	1.4×10^{-1}	*
Cs-137	6.2×10^{0}	1.6×10^{0}	1.5×10^{0}
Eu-155	4.9×10^{0}	1.5×10^{0}	1.1×10^{-2}

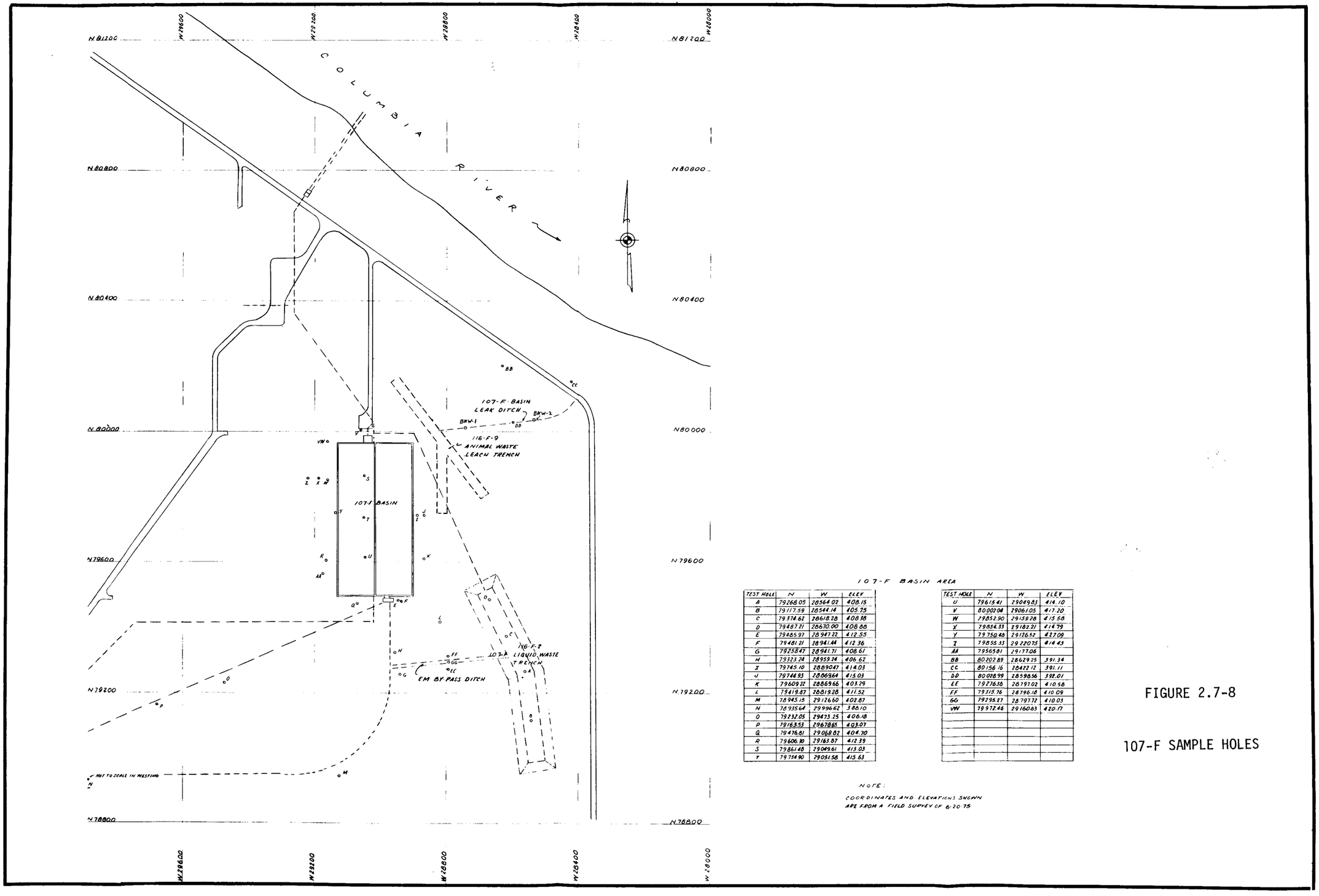
*Less than detection limits.

The total extent of soil contamination in these two areas was not established; however, less than 1 curie of radioactivity is believed to be present.

Scale Inside of 107-F Effluent Line

A scale sample taken from inside of the 42-inch effluent line indicated the following concentrations:

Radionuclide	Concentration (pCi/gm)
Eu-152	< detection limits
Co-60	1.7×10^{2}
Eu-154	< detection limits
Cs-137	2.5×10^{2}
Eu-155	4.9×10^{2}



107-F BASIN AREA

TEST HOLE	N	W	ELEV
A	79268.05	28564.02	408.15
B	79117.59	28544.14	405.75
C	79374.62	28618.28	408.38
D	79487.21	28670.00	408.88
E	79485.97	28947.22	412.55
F	79481.21	28941.44	412.36
G	79258.47	28941.71	408.61
H	79323.24	28959.24	406.62
I	79745.10	28889.047	414.03
J	79744.93	28866.964	415.03
K	79609.22	28866.966	403.29
L	79419.87	28819.28	411.52
M	78945.15	29126.60	402.87
N	78935.64	29996.62	386.10
O	79232.05	29473.25	406.18
P	79163.53	29678.65	403.07
Q	79476.81	29068.82	404.70
R	79606.30	29163.87	412.39
S	79861.48	29049.61	413.03
T	79734.90	29051.58	415.63

TEST HOLE	N	W	ELEV
U	79615.41	29049.83	414.10
V	80020.08	29026.05	417.20
W	79252.90	29159.28	415.58
X	79854.33	29182.21	414.79
Y	79750.48	29126.52	427.09
Z	79855.33	29220.75	414.43
AA	79565.81	29177.06	
BB	80202.89	28629.25	391.34
CC	80156.16	28422.12	391.11
DD	80028.99	28598.56	398.01
EE	79276.38	28797.02	410.58
FF	79315.76	28796.18	410.09
GG	79295.27	28797.72	410.03
VW	79972.46	29160.83	420.17

NOTE:
COORDINATES AND ELEVATIONS SHOWN ARE FROM A FIELD SURVEY OF 6-20-75

FIGURE 2.7-8

107-F SAMPLE HOLES

FIGURE 2.7-9

BACKHOE SAMPLING LOCATIONS WITHIN 107-F

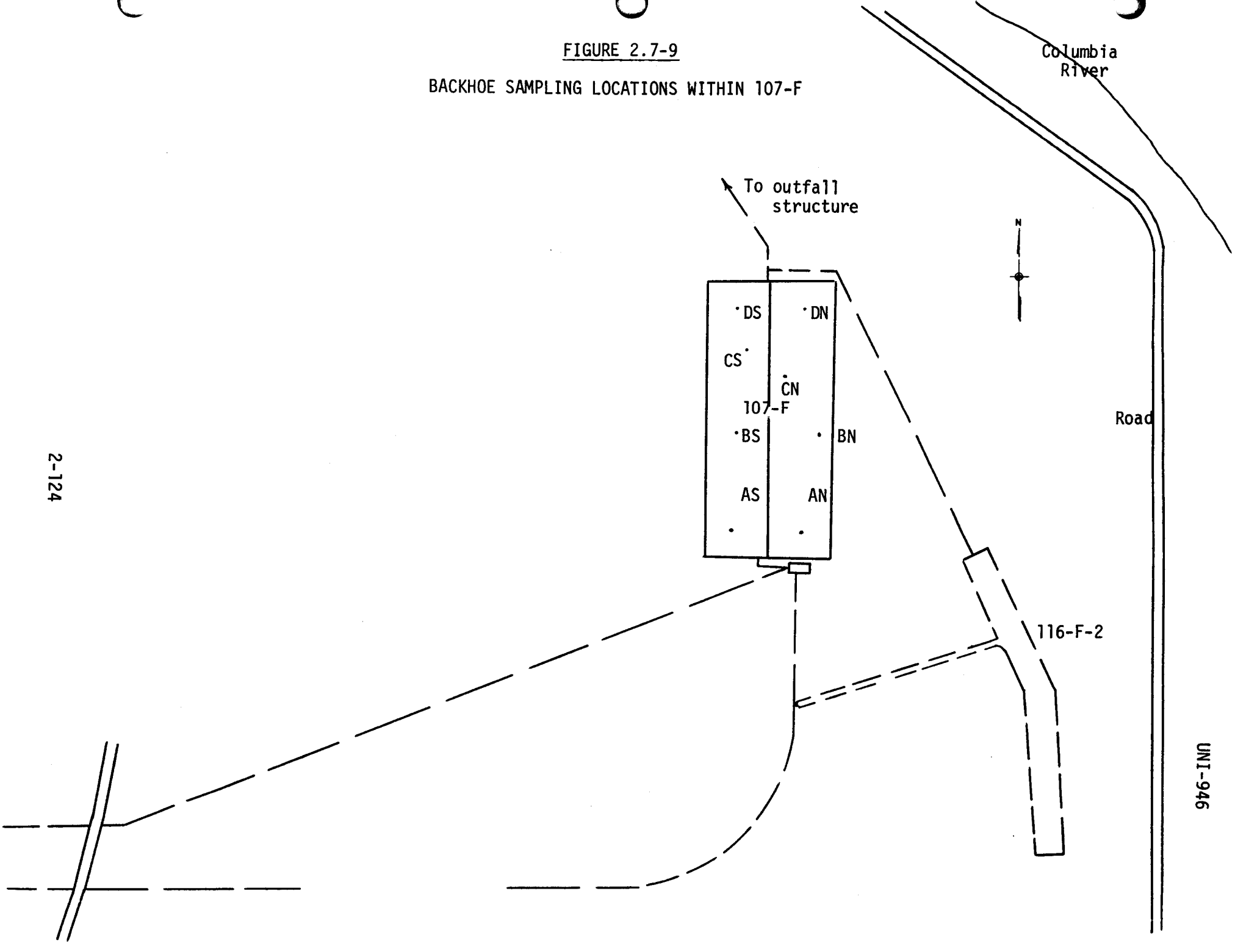


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TABLE 2.7-60

107-F RETENTION BASIN

SAMPLE HOLES DRILLED OUTSIDE OF BASIN

Concentration (pCi/g)

Sample No.		Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	C-14
E	5	*	$1.2x10^{0}$	$8.8x10^{0}$	$5.7x10^{0}$	3,000	$7.4x10^{2}$	$4.9x10^{2}$	$2.9x10^{2}$	*	$5.1x10^{1}$	$3.3x10^{1}$	$3.9x10^{-1}$	*
F	0	*	$2.8x10^{-1}$	$9.1x10^{-1}$		1,000	$6.2x10^{1}$	$1.0x10^{2}$	$2.5x10^{1}$	*	$3.4x10^{0}$	$9.9x10^{-1}$	$1.1x10^{-1}$	*
H	15	*	*	$3.0x10^{-1}$	$1.0x10^{0}$	<200/40	$2.1x10^{1}$	$6.4x10^{0}$	$5.9x10^{0}$	*	$2.0x10^{0}$	$2.7x10^{0}$	$5.7x10^{-2}$	*
	20	*	*	$4.0x10^{-1}$		<200/20	$1.1x10^{1}$	$8.6x10^{0}$	$2.8x10^{0}$	*	$9.2x10^{-1}$	$1.6x10^{0}$		
I	15	*	*	$2.2x10^{-1}$		<200/20	$1.5x10^{-1}$	*	*	*	$6.9x10^{-2}$	$3.8x10^{-1}$		
	22-1/5	*	*	$1.4x10^{0}$		200	$4.0x10^{1}$	$4.6x10^{1}$	$1.3x10^{1}$	*	$2.3x10^{0}$	$1.5x10^{0}$		
	25	*	$2.1x10^{-1}$	$4.9x10^{0}$	$3.2x10^{0}$	700	$1.7x10^{2}$	$9.9x10^{1}$	$6.2x10^{1}$	*	$2.6x10^{0}$	$5.4x10^{0}$	$1.2x10^{-1}$	*
	30	$5.2x10^{-3}$	*	$2.9x10^{0}$		<200/20	$1.3x10^{1}$	$3.2x10^{0}$	$2.0x10^{0}$	*	$1.4x10^{0}$	$2.5x10^{-1}$		
J	25	*	*	$5.4x10^{0}$	$6.7x10^{-1}$	<200/80	$9.2x10^{0}$	$2.9x10^{1}$	$3.0x10^{0}$	*	$5.9x10^{0}$	$3.4x10^{-1}$	$1.4x10^{-1}$	*
	30	*	*	$1.7x10^{0}$		<200/40	$1.4x10^{1}$	$2.2x10^{1}$	$3.9x10^{0}$	*	$4.6x10^{0}$	$4.4x10^{-1}$		
K	0	*	*	$3.8x10^{-1}$	$1.6x10^{0}$	<200/60	$2.5x10^{1}$	$1.5x10^{1}$	$7.8x10^{0}$	*	$1.2x10^{0}$	$7.1x10^{-1}$	$5.5x10^{-2}$	*
	5	*	*	$3.3x10^{-1}$		<200/10	$2.5x10^{-1}$	$3.3x10^{-1}$	$2.8x10^{-1}$	*	$2.1x10^{-1}$	*		
	15	*	*	$3.7x10^{-1}$		<200/10	$4.7x10^{-1}$	*	*	*	$2.2x10^{0}$	$2.2x10^{-1}$		
L	0	*	$4.7x10^{-1}$	$1.3x10^{1}$	$6.3x10^{0}$	20,000	$4.4x10^{3}$	$3.8x10^{2}$	$1.4x10^{3}$	*	$8.9x10^{1}$	$1.6x10^{2}$	$9.7x10^{-2}$	*
	1/2	*	$1.9x10^{0}$	$3.7x10^{1}$		800	$6.2x10^{3}$	$5.6x10^{2}$	$1.8x10^{3}$	*	$1.5x10^{2}$	$4.8x10^{2}$		
M	5	*	*	$1.2x10^{-1}$	*	<200/10	$1.7x10^{-1}$	*	*	*	*	*	$1.2x10^{-1}$	*
N	5	*	*	$9.7x10^{-2}$		<200/20	*	*	*	*	*	*		
O	5	*	*	$2.2x10^{-1}$	*	<200/30	$1.7x10^{-1}$	$7.3x10^{-2}$	*	*	*	*	$5.5x10^{-2}$	*
	10	*	*	$6.3x10^{-2}$		<200/10	*	$4.7x10^{-2}$	*	*	*	*		
	20	*	*	$3.0x10^{-2}$		<200/10	*	*	*	*	$2.7x10^{-2}$	*		
P	5	*	*	$2.6x10^{-1}$		<200/20	*	*	*	*	*	$1.2x10^{-1}$	$3.8x10^{-1}$	
	15	*	*	$1.1x10^{-2}$	$1.1x10^{0}$	<200/20	*	*	*	*	$3.6x10^{-2}$	*		*
	20	*	*	$2.0x10^{-2}$		<200	*	*	*	*	*	*		
Q	0	*	*	$1.7x10^{-1}$	$2.0x10^{1}$	<200/25	$3.5x10^{0}$	$1.1x10^{0}$	$5.5x10^{-1}$	$6.8x10^{-2}$	$3.8x10^{-1}$	$4.3x10^{-2}$	$4.6x10^{-2}$	*
	10	*	*	$2.4x10^{-1}$		<200/15	*	*	*	*	$1.2x10^{0}$	*		
	20	*	*	$1.6x10^{-2}$		<200/20	*	*	*	*	$2.9x10^{0}$	*		

TABLE 2.7-60 (Cont'd)

107-F RETENTION BASIN (Cont'd)

SAMPLE HOLES DRILLED OUTSIDE OF BASIN

Concentration (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	C-14
R 0	*	*	$1.4x10^{-1}$		<200/15	$6.4x10^{-1}$	$2.9x10^{-1}$	*	*	$2.7x10^{-1}$	*		
5	*	*	$1.3x10^{-1}$		<200/20	*	*	*	*	$7.3x10^{-2}$	*		
V 0	*	*	$6.2x10^{-1}$	*	<200/20	$6.8x10^{0}$	$1.7x10^{0}$	$1.6x10^{0}$	$5.4x10^{-2}$	$4.6x10^{-1}$	$1.5x10^{-1}$	$3.0x10^{-1}$	*
10	*	*	$2.5x10^{-1}$		<200/10	*	*	*	*	*	*		
W 0	*	$1.1x10^{0}$	$4.0x10^{0}$		1,000	$3.4x10^{2}$	$1.9x10^{2}$	$1.2x10^{2}$	$7.3x10^{-1}$	$7.1x10^{0}$	$1.5x10^{1}$		
W 12-1/2	*	$2.1x10^{0}$	$3.0x10^{0}$	$1.1x10^{1}$	1,500	$1.2x10^{3}$	$3.7x10^{2}$	$3.7x10^{2}$	*	$9.0x10^{0}$	$2.7x10^{1}$	$5.2x10^{-1}$	*
X 10	*	$1.2x10^{0}$	$1.2x10^{0}$	$1.2x10^{0}$	800	$6.1x10^{2}$	$6.0x10^{1}$	$1.4x10^{2}$	*	$1.0x10^{1}$	$5.1x10^{1}$	$3.5x10^{-1}$	*
20	*	$1.4x10^{-1}$	$6.7x10^{-1}$		<200/20	$1.5x10^{0}$	$1.8x10^{-1}$	$3.4x10^{-1}$	$4.4x10^{-2}$	$4.3x10^{0}$	*		
Y 25	*	$3.8x10^{-1}$	$2.1x10^{0}$	*	<200/20	$1.0x10^{1}$	$3.3x10^{0}$	$2.7x10^{0}$	*	$4.4x10^{0}$	$6.0x10^{-1}$	$1.3x10^{-1}$	*
Z 10	*	*	*	$4.2x10^{-1}$	<200	$2.6x10^{-1}$	$5.8x10^{-2}$	*	*	*	*	$1.1x10^{-1}$	
20	*	*	$2.1x10^{-1}$		<200	$1.8x10^{-1}$	$7.2x10^{-2}$	*	$7.5x10^{-2}$	$1.8x10^{0}$	*		
AA 5	*	$2.1x10^{-1}$	$2.0x10^{-1}$		<200	$1.8x10^{-1}$	$1.1x10^{-1}$	*	$4.6x10^{-2}$	$1.7x10^{0}$	$1.2x10^{-1}$		
AA 10	*	*	$1.8x10^{-1}$	*	<200/15	$1.5x10^{0}$	$6.7x10^{-1}$	$9.0x10^{-1}$	*	$2.0x10^{-1}$	$2.5x10^{-1}$	$1.9x10^{-1}$	
AA 15	*	*	$2.8x10^{-1}$		<200	*	*	*	*	$7.0x10^{-1}$	$1.0x10^{-1}$		
Effluent line scale			$7.3x10^{1}$		8,000	*	$1.7x10^{2}$	*	*	$2.5x10^{2}$	$4.9x10^{2}$		

TABLE 2.7-61

107-F RETENTION BASIN

SAMPLE HOLES DRILLED INSIDE OF BASIN

Concentration (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
S 0	*	*	$1.1x10^{-1}$		<200/50	$4.7x10^{1}$	$2.8x10^{1}$	$1.7x10^{1}$	$3.7x10^{-1}$	$3.1x10^{0}$	$3.3x10^{0}$			
2	*	*	$1.7x10^{-1}$	*	<200/40	$3.1x10^{1}$	$1.8x10^{1}$	$8.5x10^{0}$	$1.2x10^{-1}$	$2.4x10^{0}$	*	$1.5x10^{-1}$		*
4	*	*	$1.6x10^{0}$		<200/40	$2.0x10^{2}$	$1.2x10^{1}$	$6.6x10^{1}$	*	$1.1x10^{0}$	*			
4-1/5	*	$3.7x10^{-1}$	$1.5x10^{1}$	$3.4x10^{0}$	1,000	$1.4x10^{3}$	$5.3x10^{1}$	$9.1x10^{3}$	$2.8x10^{0}$	$5.0x10^{2}$	$4.2x10^{1}$	$9.6x10^{-2}$		
5	$6.2x10^{-1}$	$1.9x10^{-1}$	$3.5x10^{0}$	$5.7x10^{1}$	15,000	$5.8x10^{2}$	$2.0x10^{2}$	$3.4x10^{2}$	$1.6x10^{-1}$	$1.7x10^{1}$	$9.0x10^{1}$	$9.8x10^{-2}$	$1.8x10^{3}$	
7-1/2	*	$9.5x10^{-1}$	$1.2x10^{-1}$	$1.2x10^{1}$	800	$6.4x10^{0}$	$3.9x10^{1}$	$1.9x10^{2}$	$6.9x10^{-1}$	$1.9x10^{1}$	$1.1x10^{1}$	$3.5x10^{-1}$		
15	*	*	$3.8x10^{1}$		<200/70	$4.1x10^{1}$	$6.8x10^{1}$	*	*	$1.0x10^{1}$	*			
T 0	*	*	$5.7x10^{-1}$		<200/40	$3.8x10^{1}$	$1.7x10^{1}$	$1.2x10^{1}$	$8.0x10^{-2}$	$4.2x10^{0}$	$4.7x10^{-1}$			
3	*	$3.1x10^{-1}$	$1.7x10^{-1}$	*	<200	$3.7x10^{1}$	$1.1x10^{1}$	$1.5x10^{1}$	*	$1.9x10^{0}$	$5.3x10^{-1}$	$7.6x10^{-2}$		*
5	*	*	$3.4x10^{-2}$		<200/30	$1.9x10^{1}$	$8.4x10^{0}$	$5.5x10^{0}$	*	$2.5x10^{0}$	*			
5-1/2	*	*	$1.1x10^{-1}$	*	<200/30	$1.1x10^{2}$	$4.0x10^{2}$	$3.2x10^{2}$	$1.6x10^{-1}$	$1.5x10^{1}$	$5.7x10^{-1}$	$5.5x10^{-2}$		*
6	*	$1.1x10^{0}$	$3.0x10^{0}$	$6.8x10^{-1}$	600	$2.7x10^{2}$	$1.1x10^{2}$	$1.2x10^{1}$	$2.2x10^{0}$	$1.1x10^{0}$	$3.4x10^{1}$	$1.5x10^{-1}$		*
C1	*	$2.8x10^{0}$	$2.2x10^{-1}$		400	$1.8x10^{1}$	$3.0x10^{2}$	$6.7x10^{1}$	*	$8.7x10^{1}$	$1.3x10^{0}$			
8-1/2	*	$3.9x10^{-1}$	$1.8x10^{-1}$	$3.2x10^{0}$	<200/100	$5.8x10^{0}$	$1.2x10^{0}$	$2.0x10^{-1}$	$5.4x10^{-2}$	$1.5x10^{1}$	$1.7x10^{0}$	$1.5x10^{-1}$		*
20	*	*	$1.1x10^{-1}$		<200/20	$1.4x10^{1}$	$3.3x10^{0}$	$3.9x10^{-1}$	$8.6x10^{-2}$	$1.1x10^{1}$	*			
U 0	*	*	*		<200/30	$1.3x10^{1}$	$6.6x10^{0}$	$3.8x10^{0}$	$8.6x10^{-2}$	$1.3x10^{0}$	$2.2x10^{-1}$			
2	*	*	$1.5x10^{-1}$	*	<200	$4.0x10^{0}$	$2.2x10^{0}$	$1.7x10^{-1}$	*	$2.8x10^{-1}$	*	$1.2x10^{-1}$		*
4	*	*	$4.9x10^{-2}$		<200/Bkg	$2.3x10^{0}$	$1.2x10^{0}$	$2.7x10^{0}$	$6.4x10^{-2}$	$2.2x10^{-1}$	$3.1x10^{-1}$			
4-1/2	*	$3.2x10^{-2}$	$2.3x10^{-1}$	*	<200/10	$6.1x10^{3}$	$3.6x10^{2}$	$2.9x10^{3}$	$2.7x10^{-1}$	$4.3x10^{-1}$	$5.6x10^{1}$	$8.5x10^{-2}$		*
5	*	$3.1x10^{-1}$	$1.3x10^{-1}$	$3.7x10^{0}$	800	$3.0x10^{0}$	$7.8x10^{1}$	$1.2x10^{-1}$	*	$4.0x10^{1}$	$2.0x10^{1}$	$7.7x10^{-2}$		*
7-1/2	*	$1.7x10^{0}$	$4.9x10^{0}$		/80	$5.9x10^{2}$	$1.1x10^{2}$	$8.8x10^{2}$	*	$1.7x10^{1}$	*			
10	*	$3.0x10^{0}$	$2.7x10^{0}$	$1.6x10^{0}$	1,000	$3.5x10^{2}$	$1.6x10^{2}$	$1.1x10^{2}$	*	$2.4x10^{0}$	$4.1x10^{0}$	$4.2x10^{-1}$		
15	*	*	$1.2x10^{0}$		<200/20	$8.1x10^{-1}$	$2.1x10^{-1}$	$2.1x10^{-1}$	*	$6.7x10^{0}$	*			

TABLE 2.7-62

116-F-2

107-F LIQUID WASTE DISPOSAL TRENCH

Sample No.		Concentration (pCi/g)												
		Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	C-14
A	10	*	*	7.9×10^{-1}		<200/80	4.2×10^{0}	1.9×10^{1}	1.8×10^{1}	*	3.8×10^{0}	1.3×10^{1}	8.8×10^{-2}	*
	18	*	*	4.2×10^{-1}		<200/50	2.3×10^{1}	9.4×10^{0}	7.4×10^{0}	*	2.7×10^{0}	7.7×10^{-1}		
	20	*	*	1.8×10^{-1}		<200/20	2.0×10^{0}	7.5×10^{0}	4.6×10^{0}	*	2.3×10^{0}	2.3×10^{0}		
B	10	*	*	1.1×10^{-2}	*	<200/10	1.5×10^{0}	3.8×10^{-1}	1.3×10^{-1}	*	1.4×10^{-1}	2.3×10^{-1}	8.8×10^{-2}	*
	20	*	*	2.1×10^{-1}		<200/Bkg	1.0×10^{0}	5.7×10^{-1}	7.9×10^{-1}	*	2.4×10^{0}	1.9×10^{-1}		
C	15	*	2.4×10^{-1}	1.3×10^{0}		400	2.6×10^{2}	7.3×10^{1}	7.3×10^{1}	*	2.4×10^{1}	3.0×10^{1}		
	20	*	3.4×10^{-1}	2.0×10^{0}	6.5×10^{0}	600	4.8×10^{2}	8.2×10^{1}	1.6×10^{2}	*	5.9×10^{1}	2.6×10^{1}	1.9×10^{-1}	*
	25	*	3.6×10^{-1}	1.5×10^{0}		600	1.7×10^{2}	6.7×10^{1}	4.3×10^{1}	*	8.5×10^{0}	5.1×10^{0}		
	30	*	*	5.2×10^{-1}		<200/10	4.3×10^{0}	2.6×10^{-1}	6.9×10^{-1}	*	9.4×10^{-1}	1.4×10^{-1}		
D	10	*	*	3.3×10^{-1}	1.4×10^{1}	<200/100	1.4×10^{2}	4.2×10^{0}	2.2×10^{1}	*	5.0×10^{-1}	1.6×10^{0}	2.6×10^{-1}	*
	20	*	*	9.7×10^{-2}		<200/10	1.1×10^{0}	8.2×10^{-2}	2.9×10^{-1}	*	6.2×10^{-2}	1.6×10^{-1}		

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TABLE 2.7-63

EM BY-PASS DITCH TO

116-F-2 TRENCH

Concentration (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	C-14
G 8	*	5.5×10^{-1}	5.4×10^{0}		1,000	2.6×10^{2}	1.9×10^{2}	1.4×10^{2}	*	4.0×10^{1}	1.4×10^{1}		
G 10	*	2.6×10^{-1}	2.6×10^{-1}	5.2×10^{0}	1,000	3.6×10^{1}	5.1×10^{0}	1.3×10^{1}	*	2.7×10^{0}	2.7×10^{0}	1.4×10^{-1}	*
G 12-1/2	*	*	7.6×10^{-1}		200	3.0×10^{0}	9.7×10^{-1}	1.2×10^{-1}	*	5.6×10^{0}	2.9×10^{-1}		
G 15	*	*	5.3×10^{-1}		<200/10	1.6×10^{0}	3.7×10^{-1}	5.2×10^{-1}	*	6.6×10^{-1}	1.5×10^{-1}		
EE 5	*	*	8.3×10^{-2}		<200/15	*	4.2×10^{-2}	*	3.3×10^{-2}	3.0×10^{-2}	2.1×10^{-1}		
10	*	*	3.7×10^{-1}		<200/10	2.0×10^{-1}	*	*	*	*	1.1×10^{-1}		
20	*	*	3.6×10^{-2}	1.0×10^{0}	<200/30	4.4×10^{-1}	1.6×10^{-1}	*	*	*	*	1.6×10^{-1}	
FF 5	*	*	*		<200/10	*	*	*	*	*	*		
15	*	*	*		<200/10	*	*	*	*	*	*		
GG 5	*	*	2.5×10^{-1}		<200/20	4.8×10^{0}	1.3×10^{0}	1.4×10^{0}	5.9×10^{-2}	2.7×10^{0}	4.0×10^{-1}		
7-1/2	*	*	1.4×10^{0}	8.7×10^{-1}	200	5.4×10^{1}	5.7×10^{1}	3.7×10^{1}	2.2×10^{-1}	4.9×10^{0}	4.5×10^{0}	1.7×10^{-1}	
10	*	*	1.7×10^{-1}		<200/20	*	4.6×10^{-2}	*	*	*	1.1×10^{-1}		

TABLE 2.7-64

107-F BASIN LEAK DITCH

Concentration (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	C-14
BNW1- 2-1/2	*	$6.1x10^{-1}$	$3.7x10^{0}$		1,000	$3.0x10^{2}$	$2.4x10^{2}$	$8.9x10^{1}$	$2.1x10^{0}$	$4.2x10^{1}$	$1.9x10^{1}$		
BB 15	*	*	$4.1x10^{-1}$	$7.6x10^{-1}$	<200/10	$9.6x10^{-1}$	$2.4x10^{-1}$	$2.5x10^{-1}$	$3.7x10^{-2}$	$2.7x10^{-1}$	$3.2x10^{-1}$	$1.4x10^{-1}$	
CC 1	*	*	$9.0x10^{-1}$		200	$4.5x10^{1}$	$3.6x10^{1}$	$1.5x10^{1}$	$2.5x10^{-1}$	$5.2x10^{0}$	$1.2x10^{0}$		
8-1/2	*	$3.5x10^{-1}$	$1.3x10^{0}$	$9.1x10^{-1}$	200	$1.3x10^{2}$	$9.7x10^{1}$	$4.6x10^{1}$	$8.8x10^{-1}$	$1.5x10^{1}$	$6.7x10^{0}$	$1.7x10^{-1}$	*
15	*	*	$9.5x10^{-2}$		<200/10	*	$7.0x10^{-2}$	*	*	*	*		
DD 5	*	*	$2.6x10^{-1}$	$5.5x10^{-1}$	<200/30	$1.0x10^{1}$	$6.7x10^{0}$	$2.8x10^{0}$	*	$1.2x10^{0}$	*	$1.9x10^{-1}$	
12-1/2	*	*	$1.1x10^{-1}$		<200/10	*	$4.8x10^{-2}$	*	*	*	*		

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TABLE 2.7-65

107-F RETENTION BASIN

SAMPLING OF BASIN FILL

Concentration (pCi/g)

Sample No.		Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
AN	0	*	*	8.5×10^{-2}		<200/60	2.4×10^{0}	7.3×10^{-1}	8.8×10^{-1}	*	2.4×10^{-1}	1.7×10^{-1}			
	3-1/2	*	1.2×10^{-1}	1.8×10^{1}	9.8×10^{1}	6,000	1.6×10^{3}	1.5×10^{3}	1.1×10^{3}	3.2×10^{1}	1.3×10^{2}	1.9×10^{2}	6.9×10^{-1}		
BN	3	*	*	3.5×10^{-1}		<200/40	1.5×10^{0}	6.7×10^{-1}	5.4×10^{-1}	4.0×10^{-2}	8.0×10^{-2}	8.6×10^{-2}			
	3-1/2	*	9.0×10^{-1}	2.6×10^{-1}	2.5×10^{0}	1,000	5.5×10^{2}	1.0×10^{2}	2.5×10^{2}	3.1×10^{0}	4.2×10^{0}	4.0×10^{1}	2.6×10^{-1}		
CN	3	*	2.3×10^{-1}	8.2×10^{-2}		<200/30	4.4×10^{-1}	2.9×10^{-1}	6.8×10^{-1}	*	1.0×10^{-1}	1.6×10^{-1}			
	3-1/2	1.1×10^{0}	4.5×10^{1}	5.1×10^{1}		20,000	9.2×10^{3}	1.5×10^{3}	5.5×10^{3}	2.7×10^{2}	5.7×10^{2}	1.6×10^{3}	7.4×10^{-1}		
DN	3	*	*	5.0×10^{-2}		<200/30	8.6×10^{-1}	2.0×10^{-1}	2.3×10^{-1}	4.6×10^{-2}	8.5×10^{-2}	7.0×10^{-2}			
	3-1/2	*	1.2×10^{1}	8.5×10^{1}	4.1×10^{0}	10,000	6.5×10^{3}	1.5×10^{3}	3.7×10^{3}	1.3×10^{2}	1.6×10^{2}	1.0×10^{3}	5.3×10^{-1}	3.4×10^{4}	
AS	1	*	1.9×10^{-1}	3.1×10^{-1}		600	2.4×10^{1}	1.2×10^{1}	7.3×10^{0}	*	1.7×10^{0}	1.7×10^{-1}			
	3-1/2	5.7×10^{-1}	1.7×10^{-1}	1.1×10^{1}		20,000	7.5×10^{3}	6.0×10^{3}	5.0×10^{3}	5.5×10^{1}	5.9×10^{3}	8.6×10^{2}			
	4	3.9×10^{-1}	1.4×10^{1}	4.2×10^{0}	1.5×10^{1}	40,000	5.6×10^{3}	4.5×10^{3}	9.8×10^{3}	4.3×10^{2}	5.0×10^{2}	2.8×10^{3}	1.1×10^{0}	3.3×10^{3}	*
CS	3-1/2	*	*	1.4×10^{-1}		<200/120	2.8×10^{2}	4.8×10^{1}	1.2×10^{2}	3.3×10^{-1}	5.2×10^{-1}	1.4×10^{-1}		*	
	4	6.8×10^{-1}	2.4×10^{1}	1.0×10^{1}	3.7×10^{0}	30,000	1.4×10^{4}	2.5×10^{3}	7.0×10^{3}	1.6×10^{1}	3.7×10^{1}	7.5×10^{2}			
DS	0	*	1.5×10^{-1}	2.9×10^{-1}		<200/100	8.3×10^{1}	4.1×10^{1}	2.5×10^{-1}	3.8×10^{-2}	3.6×10^{0}	5.2×10^{-1}			
	4	*	1.5×10^{0}	3.8×10^{0}	8.6×10^{0}	2,000	1.3×10^{3}	2.0×10^{2}	5.5×10^{2}	*	2.1×10^{0}	8.7×10^{1}	5.1×10^{-1}		

TABLE 2.7-66

107-F RETENTION BASIN FILL

BASIN SLUDGE

Ave. Depth = 3" Mass = 1.8×10^9g

Concentrations (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
AN 3-1/2	*	1.2×10^{-1}	1.8×10^{1}	9.8×10^{1}	1.6×10^{3}	1.5×10^{3}	1.1×10^{3}	3.2×10^{1}	1.3×10^{2}	1.9×10^{2}	6.9×10^{-1}		
BN 3-1/2	*	9.0×10^{-1}	2.6×10^{-1}	2.5×10^{0}	5.5×10^{2}	1.0×10^{2}	2.5×10^{2}	3.1×10^{0}	4.2×10^{0}	4.0×10^{1}	2.6×10^{-1}		
CN 3-1/2	1.1×10^{0}	4.5×10^{1}	5.1×10^{1}		9.2×10^{3}	1.5×10^{3}	5.5×10^{3}	2.7×10^{2}	5.7×10^{2}	1.6×10^{3}	7.4×10^{-1}		
DN 3-1/2	*	1.2×10^{1}	8.5×10^{1}	4.1×10^{0}	6.5×10^{3}	1.5×10^{3}	3.7×10^{3}	1.3×10^{2}	1.6×10^{2}	1.0×10^{3}	5.3×10^{-1}	3.4×10^{4}	
AS 3-1/2	5.7×10^{-1}	1.7×10^{-1}	1.1×10^{1}		7.5×10^{3}	6.0×10^{3}	5.0×10^{3}	5.5×10^{1}	5.9×10^{3}	8.6×10^{2}			
AS 4	3.9×10^{-1}	1.4×10^{1}	4.2×10^{0}	1.5×10^{1}	5.6×10^{3}	4.5×10^{3}	9.8×10^{3}	4.3×10^{2}	5.0×10^{2}	2.8×10^{3}	1.1×10^{0}	3.3×10^{3}	*
CS 4	6.8×10^{-1}	2.4×10^{1}	1.0×10^{1}	3.7×10^{0}	1.4×10^{4}	2.5×10^{3}	7.0×10^{3}	1.6×10^{1}	3.7×10^{1}	7.5×10^{2}			
DS 4	*	1.5×10^{0}	3.8×10^{0}	8.6×10^{0}	1.3×10^{3}	2.0×10^{2}	5.5×10^{2}	*	2.1×10^{0}	8.7×10^{1}	5.1×10^{-1}		
S 5	6.2×10^{-1}	1.9×10^{1}	3.5×10^{1}	5.7×10^{0}	5.8×10^{3}	2.0×10^{3}	3.4×10^{3}	1.6×10^{2}	1.7×10^{2}	9.0×10^{2}	9.8×10^{-2}	1.8×10^{3}	*
T 6	*	1.1×10^{0}	3.0×10^{0}	6.8×10^{-1}	2.7×10^{2}	1.1×10^{2}	1.2×10^{2}	2.2×10^{0}	1.1×10^{1}	3.4×10^{1}	1.5×10^{-1}		*
U 5	*	3.1×10^{0}	1.3×10^{1}	3.7×10^{0}	3.0×10^{3}	7.8×10^{2}	1.2×10^{3}	*	4.0×10^{1}	2.0×10^{1}	7.7×10^{-2}		*
Ave. pCi/g	3.1×10^{-1}	1.1×10^{1}	2.1×10^{1}	1.6×10^{1}	5.0×10^{3}	1.9×10^{3}	3.5×10^{3}	1.0×10^{2}	6.8×10^{2}	7.5×10^{2}	4.6×10^{-1}	1.3×10^{4}	0.0
Curies	5.6×10^{-4}	2.0×10^{-2}	3.8×10^{-2}	2.9×10^{-2}	9.0	3.4	6.3	1.8×10^{-1}	1.2×10^{0}	1.4×10^{0}	8.3×10^{-4}	23	0.0

Total Curies in sludge = 45

TABLE 2.7-67

107-F RETENTION BASIN FILL
BASIN FILL (EXCLUDING SLUDGE)
Ave. Depth = 4' Mass = 2.9×10^{10}g
Ave. Concentrations (pCi/g)

Sample Hole	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
AN	*	*	8.5×10^{-2}		2.4×10^{0}	7.3×10^{-1}	8.8×10^{-1}	*	2.4×10^{-1}	1.7×10^{-1}			
BN	*	*	3.5×10^{-1}		1.5×10^{0}	6.7×10^{-1}	5.4×10^{-1}	4.0×10^{-2}	8.0×10^{-2}	8.6×10^{-2}			
CN	*	2.3×10^{-1}	8.2×10^{-2}		4.4×10^{-1}	2.9×10^{-1}	6.8×10^{-1}	*	1.0×10^{-1}	1.6×10^{-1}			
DN	*	*	5.0×10^{-2}		8.6×10^{-1}	2.0×10^{1}	2.3×10^{-1}	4.6×10^{-2}	8.5×10^{-2}	7.0×10^{-2}			
AS	*	1.9×10^{-1}	3.1×10^{-1}		2.4×10^{1}	1.2×10^{1}	7.3×10^{0}	*	1.7×10^{0}	1.7×10^{-1}			
CS	*	*	1.4×10^{-1}		2.8×10^{2}	4.8×10^{1}	1.2×10^{2}	3.3×10^{-1}	5.2×10^{-1}	1.4×10^{-1}		*	
DS	*	1.5×10^{-1}	2.9×10^{-1}		8.3×10^{1}	4.1×10^{1}	2.5×10^{-1}	3.8×10^{-2}	3.6×10^{0}	5.2×10^{-1}			
S	*	9.3×10^{-2}	4.9×10^{-1}	*	6.0×10^{1}	2.8×10^{1}	3.1×10^{1}	8.2×10^{-1}	2.9×10^{0}	2.3×10^{1}	1.2×10^{-1}		*
T	*	7.8×10^{-2}	2.2×10^{-1}	*	2.6×10^{1}	1.0×10^{1}	8.9×10^{0}	6.0×10^{-2}	2.5×10^{0}	5.2×10^{-1}	6.6×10^{-2}		*
U	*	8.0×10^{-3}	1.0×10^{-1}	*	6.4×10^{0}	3.4×10^{0}	2.2×10^{0}	1.4×10^{-1}	1.1×10^{0}	3.6×10^{-1}	1.0×10^{-2}		*
Ave. pCi/g	*	7.5×10^{-2}	2.1×10^{-1}	0.0	4.8×10^{1}	1.4×10^{1}	1.7×10^{1}	1.5×10^{-1}	1.3×10^{0}	2.5×10^{0}	6.5×10^{-2}	0.0	0.0
Curies	0.0	2.2×10^{-3}	6.1×10^{-3}	0.0	1.4	4.1×10^{-1}	4.9×10^{-1}	4.4×10^{-3}	3.8×10^{-2}	7.3×10^{-2}	1.9×10^{-3}	0.0	0.0

Total Curies in fill less sludge = 2.5
sludge = 45
Total Curies in basin fill = 48

TABLE 2.7-68

CONTAMINATION SOIL COLUMN ADJACENT TO 107-F RETENTION BASIN

Description - Averaged 50' from west wall and 25' from basin on all other sides x 20' average depth.

5.0×10^4 ft^2 x 20' = 1.0×10^6 ft^3
Mass = 6.8×10^{10} g

Radionuclides	Ave. pCi/g	Curies
Pu-238	1.9×10^{-4}	1.3×10^{-5}
Pu-239/240	2.4×10^{-1}	1.6×10^{-2}
Sr-90	1.5×10^{0}	1.0×10^{-1}
H-3	4.0×10^{0}	2.7×10^{-1}
Eu-152	1.2×10^{2}	8.2
Co-60	5.1×10^{1}	3.5
Eu-154	3.7×10^{1}	2.5
Cs-134	6.0×10^{-2}	4.1×10^{-3}
Cs-137	4.3×10^{0}	2.9×10^{-1}
Eu-155	4.9×10^{0}	3.3×10^{-1}
U	2.1×10^{-1}	1.4×10^{-2}
C-14	9.5×10^{-1}	6.5×10^{-2}
	Total Curies =	15

TABLE 2.7-69

CONTAMINATED SOIL COLUMN UNDERNEATH 107-F RETENTION BASIN

0-5' Below Basin 1.1×10^5 ft^2 x 5' = 5.5×10^5 ft^3

Mass = 3.7×10^{10}g

5'-10' Below Basin 1.1×10^5 ft^2 x 5' = 5.5×10^5 ft^3

Mass = 3.7×10^{10}g

Radionuclide	0-5' Ave pCi/g	5'-10' Ave pCi/g	Curies
Pu-238	*	*	0.0
Pu-239/240	1.1×10^0	*	4.1×10^{-2}
Sr-90	1.1×10^0	5.6×10^{-1}	6.1×10^{-2}
H-3	5.6×10^0	NA[1]	4.1×10^{-1}
Eu-152	2.6×10^2	2.1×10^0	9.7
Co-60	1.7×10^2	2.4×10^1	7.2
Eu-154	8.0×10^1	2.0×10^{-1}	3.0
Cs-134	3.1×10^{-1}	2.9×10^{-2}	1.3×10^{-2}
Cs-137	1.9×10^1	9.2×10^0	1.0
Eu-155	4.2×10^0	*	1.6×10^{-1}
U	3.1×10^{-1}	NA[1]	2.3×10^{-2}
C-14	1.3×10^0	NA[1]	9.6×10^{-2}

Total Curies = 22

[1] Concentrations conservatively assumed to be the same as 0-5' interval for total Curies calculation.

TABLE 2.7-70

116-F-2

107-F LIQUID WASTE DISPOSAL TRENCH

Potentially Contaminated Soil Column

Volume = 600' x 100' x 20' = 1.2×10^6 ft^3

Mass = 8.1×10^{10}g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	8.6×10^{-2}	7.0×10^{-3}
Sr-90	8.4×10^{-1}	6.8×10^{-2}
H-3	6.8×10^{0}	5.5×10^{-1}
Eu-152	1.0×10^{2}	8.1
Co-60	2.4×10^{1}	1.9
Eu-154	3.0×10^{1}	2.4
Cs-134	*	0.0
Cs-137	9.5×10^{0}	7.7×10^{-1}
Eu-155	7.2×10^{0}	5.8×10^{-1}
U	1.6×10^{-1}	1.3×10^{-2}
C-14	*	0.0

Total Curies = 15

TABLE 2.7-71

EM BY-PASS DITCH TO 116-F-2 TRENCH

Potentially Contaminated Soil Column

Volume = 350' x 50' x 15' = 2.6×10^5 ft^3

Mass = 1.8×10^{10}g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	6.7×10^{-2}	1.2×10^{-3}
Sr-90	9.7×10^{-1}	1.7×10^{-2}
H-3	2.4×10^{0}	4.3×10^{-2}
Eu-152	5.9×10^{1}	1.1
Co-60	2.6×10^{1}	4.7×10^{-1}
Eu-154	2.7×10^{1}	4.9×10^{-1}
Cs-134	2.6×10^{-2}	4.7×10^{-4}
Cs-137	8.5×10^{0}	1.5×10^{-1}
Eu-155	4.1×10^{0}	7.4×10^{-2}
U	1.6×10^{-1}	2.9×10^{-3}
C-14	*	0.0

Total Curies - 2.6

TABLE 2.7-72

SOIL COLUMN

ALONG INLET EFFLUENT LINES TO 107-F BASIN

Description - Triangular area between inlet effluent lines to the 107-F basin, which during active operational period was a contaminated effluent pond. The area is approximately 5.1×10^5 sq. ft.

Sample concentrations are at or below normal background levels for soil samples. Surface samples show the highest radioactive concentrations.

Radionuclide	Ave. pCi/g	Max. pCi/g
Pu-238	*	*
Pu-239/240	*	*
Sr-90	1.0×10^{-1}	2.6×10^{-1}
H-3	3.7×10^{-1}	1.1×10^{0}
Eu-152	4.3×10^{-2}	1.7×10^{-1}
Co-60	1.5×10^{-2}	7.3×10^{-2}
Eu-154	*	*
Cs-134	*	*
Cs-137	7.9×10^{-3}	3.6×10^{-2}
Eu-155	1.5×10^{-2}	1.2×10^{-1}
U	1.9×10^{-1}	3.8×10^{-1}
C-14	*	*

TABLE 2.7-73

CONTAMINATED DRAINAGE DITCH OFF

NORTHEAST CORNER OF 107-F BASIN

Potentially Contaminated Soil Column

Volume = 500' x 15' x 15' = 1.1×10^5 ft^3

Mass = 7.9×10^9 g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	1.9×10^{-1}	1.4×10^{-3}
Sr-90	1.1×10^{0}	8.3×10^{-3}
H-3	7.4×10^{-1}	5.6×10^{-3}
Eu-152	8.1×10^{1}	6.1×10^{-1}
Co-60	6.3×10^{1}	4.7×10^{-1}
Eu-154	2.5×10^{1}	1.9×10^{-1}
Cs-134	5.4×10^{-1}	4.1×10^{-3}
Cs-137	1.1×10^{1}	8.3×10^{-2}
Eu-155	4.5×10^{0}	3.4×10^{-2}
U	1.8×10^{-1}	1.4×10^{-3}
C-14	*	0.0

Total Curies = 1.4

2.7.5 107-H Retention Basin and Liquid Waste Trench

Drilling of radiological sampling holes in the 107-H retention basin and liquid waste trench vicinity was initiated on February 25, 1975, and completed on April 3, 1975. Twenty-five sampling holes were drilled in the 107-H vicinity. The sample hole locations in the 107-H retention basin and trench vicinity are included in Figure 2.7-10. Figure 2.7-11 shows the approximate locations where samples of the soil fill and sludge inside of the 107-H basin were taken.

The spread of underground contamination from past leakage appears to be greatest along the east wall (river side) of the 107-H basin. Contaminated soil (1000 c/m with a p-11 probe) was detected 25 feet below grade in a sample hole located 45 feet away from the basin's east wall. A 35-foot deep sample well drilled 115 feet away from the east wall showed no measurable contamination with a GM probe. Contamination spread along the basin's west wall appears to be less extensive. Sample holes drilled just off of the inlet and outlet ends of the basin did not reveal any contamination measurable with a GM probe.

Sample holes drilled through the floor of the 107-H retention basin indicate that the majority of contamination from past basin leakage is within a few feet below the basin floor. Sludge taken from the basin floor reads up to 20,000 c/m with a GM probe.

Radionuclide concentrations of selected samples from test holes drilled at the 107-H area, and of samples taken of the soil fill and sludge at the backhoe sampling locations inside of the basin are given in Tables 2.7-74 through 2.7-77.

Average and maximum beta-gamma concentrations in the sludge along the 107-H basin floor are 3.1×10^4 and 1.0×10^5, respectively. Pu-239/240 concentrations in the 107-H basin sludge range up to 2.0×10^2 pCi/g and average 5.7×10^1.

Radionuclide concentrations in the fill dirt covering the basin sludge, and the soil adjacent to and underneath the 107-H basin are two orders of magnitude less than the sludge concentrations.

Approximately 80% of the 107-H basin radionuclide inventory is within the basin (including the concrete). The 107-H retention basin contains an estimated radioactive inventory of approximately 118 curies distributed as follows:

Sludge	- 60 Ci
Soil Fill Less Sludge	- 18 Ci
Concrete	- 13 Ci
Soil Underneath Basin	- 9.6 Ci
Soil Adjacent to Basin	- 17 Ci

A detailed breakdown of the 107-H basin radionuclide inventories and average concentrations is given in Tables 2.7-78 through 2.7-81. In addition to the radioactive inventories given above, sludge along the 107-H inlet distribution chamber floor has an estimated radioactive inventory of 4.1 curies as discussed on page 2-134.

A maximum of 3000 c/m with a GM probe was detected in a sample taken at a depth of 18 feet below grade along the center of the 107-H liquid waste disposal trench (116-H-1). Similar contamination was detected at a depth of 2 feet below grade along the upper lip of the trench's east edge (sample hole F). This contamination evidently was splashed up along the edges of the trench when the trench was covered over. Analytical results for selected samples taken from the 116-H-1 trench are given in Table 2.7-76. The maximum Pu-239/240 concentration detected is 11 pCi/g. Beta-gamma concentrations average 5.3×10^2 pCi/g up to a maximum of

5.3×10^3 pCi/g. The radionuclide inventory of the 116-H-1 trench is approximately 33 curies, as shown in Table 2.7-82.

107-H Effluent Line Scale and Inlet Distribution Chamber Sludge

Radionuclide concentrations of five samples, Z-1 through Z-5, taken from inside of the 107-H basin inlet distribution box are given in Table 2.7-77. The samples are identified as follows:

Sample No.	Description
Z-1	Loose scale from a piece of vent pipe lying on the distribution chamber floor.
Z-2	Sludge along distribution chamber floor.
Z-3	Scale from inside inlet effluent line to distribution chamber.
Z-4	Cement chips from wall surrounding inlet effluent line to distribution chamber.
Z-5	Pieces of charred wood lying at west end of distribution chamber.

The scale sample taken from inside the inlet effluent line to the 107-H inlet distribution chamber has a beta-gamma concentration of 6.8×10^3 pCi/g. The concentration of Pu-239/240 in the scale is 14 pCi/g. Sludge along the distribution chamber floor has a Pu-239/240 concentration of 230 pCi/g and a beta-gamma concentration of 3.7×10^5 pCi/g. The estimated radionuclide inventory of the inlet distribution chamber sludge is 4.1 curies as indicated in Table 2.7-83. About 3 mCi of Pu-239/240 is also present in the sludge.

107-H Sludge Burial Trench

No significant radioactive contamination was detected in sample hole C drilled into the sludge burial trench east of the 107-H basin. Radioanalytical results for sample C-15 taken at 15 feet below grade at this location are given in Table 2.7-74. The

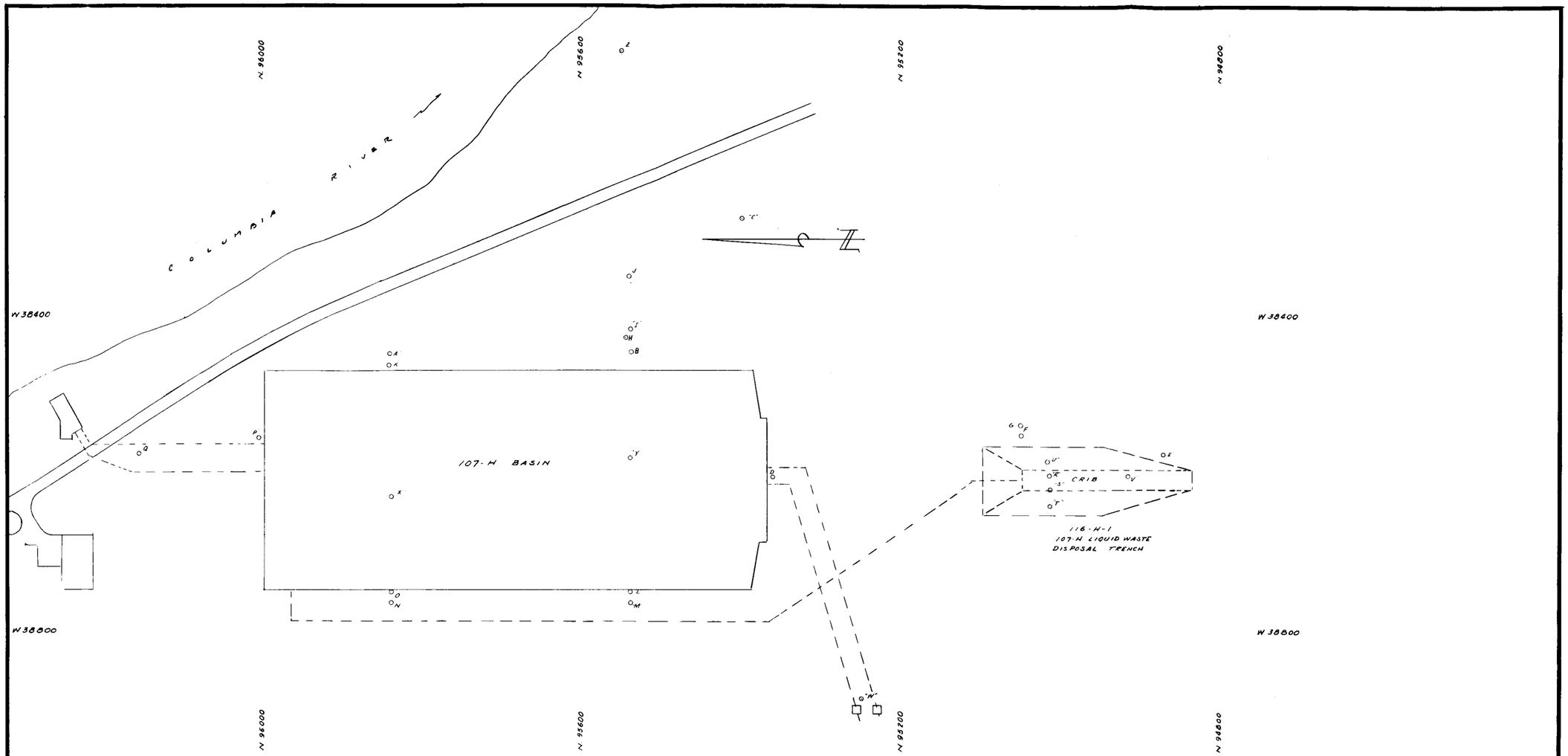
results are in agreement with historical records which indicate that the sludge burial trench was released from radiological controls in May 1965 (see Section 2.4.3).

Effluent Line Leakage

Soil contamination from past effluent line leakage in the 107-H area appears to be minimal. No contamination measurable with a portable GM probe was detected in the soil adjacent to the 107-H effluent lines and junction boxes.

During preliminary radiological characterization studies performed in 1971 at H Area, backhoe sampling was performed outside three concrete junction boxes where the effluent lines enter and leave. Sample holes were dug deep enough to totally expose the effluent lines where they joined the junction boxes. No activity measurable with a GM probe was detected in the soil excavated around the junction boxes. Direct GM readings taken at the sides of the bared effluent pipes were up to 4000 c/m from the contamination on the insides of the pipes. Gamma analyses performed for these samples averaged 14 pCi/g up to a maximum of 40 pCi/g.

Two 30-foot deep sample holes (W and Q) drilled in 1975 along the 107-H effluent lines also failed to identify any significant contamination from past leakage. Average and maximum radionuclide concentrations of selected samples taken from these test holes are given in Tables 2.7-84 and 2.7-85.



107-H BASIN AREA			
TEST HOLE	NORTH	WEST	ELEV.
A	95,842.12	38,444.36	415.54
H	95,547.63	38,426.72	416.08
C	95,398.04	38,236.17	413.19
D	95,363.26	38,601.19	415.60
E	94,878.23	38,551.25	417.55
F	95,052.55	38,548.06	417.69
G	95,053.37	38,536.80	418.02
Q	95,541.50	38,448.37	416.06
I	95,541.34	38,618.40	416.00
J	95,543.75	38,347.74	414.57
K	95,841.03	38,459.38	415.00
L	95,540.86	38,745.10	411.69
M	95,541.20	38,759.85	411.79

107-H BASIN AREA			
TEST HOLE	NORTH	WEST	ELEV
N	95,841.48	38,759.79	410.66
O	95,841.21	38,744.64	410.28
P	96,006.41	38,553.32	415.56
Q	96,155.16	38,577.80	412.68
R	95,018.93	38,599.99	415.66
S	95,017.72	38,619.78	415.99
T	95,016.74	38,638.00	416.58
U	95,019.81	38,538.00	416.08
V	94,917.99	38,608.86	415.06
W	95,257.60	38,881.13	420.34
X	95,842.03	38,427.07	400.75
Y	95,541.06	38,578.18	402.35
Z	95,553.81	38,062.67	385.82

FIGURE 2.7-10

107-H SAMPLE HOLES

FIGURE 2.7-11

BACKHOE SAMPLING LOCATIONS WITHIN 107-H

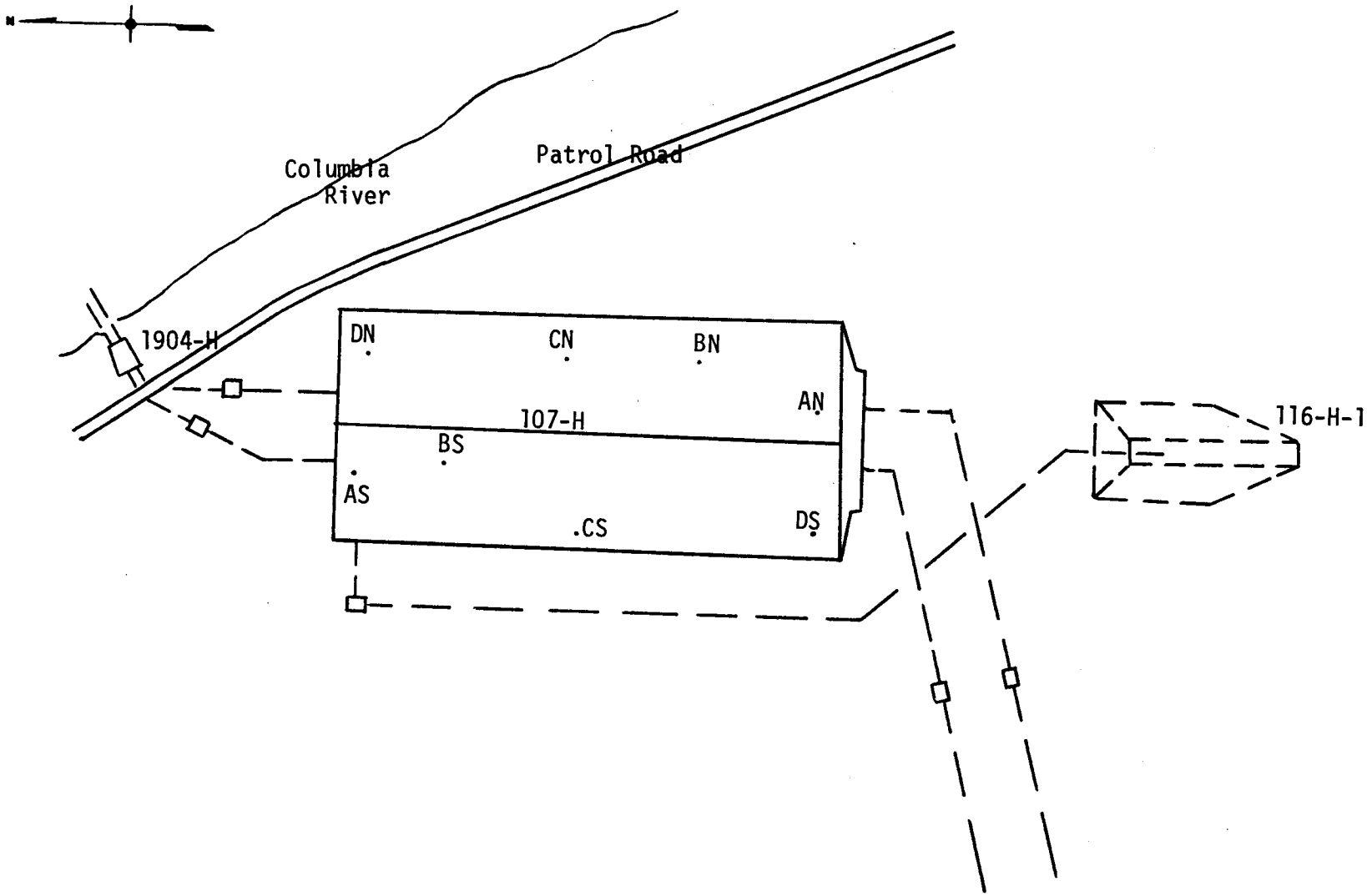


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TABLE 2.7-74

107-H RETENTION BASIN

SAMPLE HOLES DRILLED OUTSIDE OF BASIN

Concentration (pCi/g)

Sample No.		Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	C-14
A	20	*	$2.3x10^{-1}$	$9.8x10^{-1}$		<200	$1.6x10^{-1}$	*	*	*	*	*		
B	15					<200	$8.6x10^{0}$	$7.1x10^{0}$	$3.2x10^{0}$	$1.4x10^{-1}$	$2.2x10^{0}$	$1.3x10^{0}$		
	16	$3.0x10^{-1}$	$3.2x10^{0}$	$9.5x10^{0}$		1000	$2.3x10^{2}$	$1.9x10^{2}$	$6.8x10^{1}$	*	$8.2x10^{1}$	$1.3x10^{1}$	$4.0x10^{-1}$	*
	20	*	$1.2x10^{0}$	$4.7x10^{0}$		600	$1.6x10^{2}$	$1.2x10^{2}$	$4.7x10^{1}$	*	$1.8x10^{1}$	$7.3x10^{0}$		
	25	*	*	$6.8x10^{-1}$		<200	$1.6x10^{0}$	$9.0x10^{-1}$	$3.4x10^{-1}$	*	$3.8x10^{0}$	$1.8x10^{0}$		
C	15	*	*	$3.8x10^{-1}$		<200	*	*	$2.1x10^{-1}$	*	*	$1.4x10^{-1}$		*
D	10					<200	$3.8x10^{-1}$	$7.2x10^{-2}$	*	$8.0x10^{-2}$	$1.2x10^{0}$	$2.2x10^{-1}$		
	20	*	*	$1.4x10^{0}$		<200	$3.6x10^{-1}$	$3.8x10^{-2}$	*	*	$3.1x10^{-2}$	$3.7x10^{-2}$	$2.8x10^{-1}$	*
H	5					<200	*	*	*	*	*	$1.5x10^{-1}$		
	15	*	*	$2.0x10^{-1}$		<200	$1.6x10^{-1}$	*	*	*	$3.4x10^{-2}$	$1.9x10^{-1}$		*
	19-1/2	*	$1.5x10^{0}$	$1.0x10^{0}$		1000	$4.7x10^{2}$	$2.4x10^{2}$	$1.3x10^{2}$	*	$1.5x10^{1}$	$2.4x10^{1}$		*
	25	*	*	$5.9x10^{-1}$		200	$3.5x10^{1}$	$2.6x10^{1}$	$1.1x10^{1}$	*	$7.5x10^{0}$	$2.3x10^{0}$	$5.1x10^{-1}$	*
	30	*	*	$5.0x10^{-1}$		<200	$3.5x10^{0}$	$2.3x10^{0}$	$1.2x10^{0}$	*	$2.7x10^{0}$	$5.9x10^{-1}$		
I	10					<200	*	*	*	*	*	$2.5x10^{-1}$		
	20	*	*	$5.1x10^{-1}$		<200	$1.2x10^{0}$	$8.7x10^{0}$	$5.8x10^{-1}$	*	$2.9x10^{0}$	$2.1x10^{-1}$		
	25	*	$5.0x10^{-1}$	$8.7x10^{-1}$		1000	$3.2x10^{2}$	$3.0x10^{2}$	$1.1x10^{2}$	*	$1.4x10^{1}$	$1.9x10^{1}$	$4.1x10^{-1}$	*
	30	*	*	$4.9x10^{-1}$		<200	*	$1.5x10^{-1}$	*	*	$5.2x10^{0}$	$1.6x10^{-1}$		
J	15					<200	*	*	*	*	*	$1.8x10^{-1}$		
	25	*	*	$6.3x10^{-1}$		<200	$4.7x10^{-1}$	$3.0x10^{0}$	$3.2x10^{-1}$	*	$1.8x10^{0}$	$1.2x10^{-1}$		
	35	*	*	$1.1x10^{0}$		<200	$1.6x10^{-1}$	*	*	*	$5.1x10^{-1}$	*		
K	10	*	$1.9x10^{-1}$	$3.3x10^{-1}$		<200	$7.1x10^{-1}$	$5.3x10^{-1}$	*	*	*	$1.0x10^{-1}$		
	15	*	$1.6x10^{-1}$	$4.1x10^{0}$		500	$4.2x10^{1}$	$1.0x10^{2}$	$1.6x10^{1}$	*	$4.1x10^{1}$	$3.5x10^{0}$	$4.1x10^{-1}$	*
	20	*	*	$2.5x10^{0}$		300	$4.9x10^{1}$	$3.1x10^{1}$	$1.4x10^{1}$	*	$1.2x10^{1}$	$2.7x10^{0}$		
	30	*	*	$2.0x10^{0}$		<200	$1.6x10^{1}$	$2.3x10^{1}$	$4.4x10^{0}$	*	$2.6x10^{1}$	$1.2x10^{0}$		
L	5	*	*	$5.8x10^{-2}$		<200	$2.9x10^{-1}$	$8.9x10^{-2}$	*	*	$6.8x10^{-2}$	$8.3x10^{-2}$		
	10	*	$1.2x10^{0}$	$6.9x10^{-1}$		600	$1.6x10^{2}$	$1.3x10^{2}$	$5.3x10^{1}$	*	$6.7x10^{1}$	$7.6x10^{0}$		
	15	*	$1.9x10^{0}$	$1.8x10^{1}$		400	$9.8x10^{1}$	$7.2x10^{1}$	$3.3x10^{1}$	*	$6.2x10^{1}$	$5.4x10^{0}$	$3.5x10^{-1}$	*
	20	*	*	$8.9x10^{-1}$		<200	$1.0x10^{0}$	$3.8x10^{-1}$	$3.0x10^{-1}$	*	$3.1x10^{1}$	$2.3x10^{-1}$		
	25	*	*	$1.2x10^{0}$		<200	$1.7x10^{0}$	$9.2x10^{-1}$	$8.8x10^{-1}$	*	$2.2x10^{1}$	$5.6x10^{-2}$		
M	10					<200	$2.0x10^{-1}$	*	*	*	*	$2.4x10^{-1}$		
	15	*	*	$8.7x10^{-2}$	$4.4x10^{-1}$	<200	$1.0x10^{-1}$	$1.5x10^{-1}$	*	*	$9.9x10^{-2}$	$6.7x10^{-2}$	$2.0x10^{-1}$	*

TABLE 2.7-74 (Cont'd)

107-H RETENTION BASIN (Cont'd)

SAMPLE HOLES DRILLED OUTSIDE OF BASIN

Concentration (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	C-14
N 10	*	*	$6.0x10^{-1}$		<200	*	*	*	*	*	$9.5x10^{-2}$		
18	*	*	$1.1x10^{-1}$		<200	*	$6.0x10^{-2}$	*	*	$4.5x10^{-2}$	$1.1x10^{-1}$	$1.9x10^{-1}$	*
O 5	*	*	$2.0x10^{-1}$		<200	$1.9x10^{-1}$	$7.2x10^{-2}$	*	*	$3.4x10^{-2}$	$3.0x10^{-1}$		
10	*	$5.2x10^{-1}$	$1.0x10^{0}$		500	$1.1x10^{2}$	$6.0x10^{1}$	$4.1x10^{1}$	*	$3.3x10^{1}$	$7.4x10^{1}$		
15	$7.9x10^{-2}$	$5.9x10^{-1}$	$3.1x10^{0}$		450	$1.8x10^{2}$	$8.0x10^{1}$	$5.7x10^{1}$	*	$3.9x10^{1}$	$1.1x10^{1}$		
P 10	*	*	*		<200	*	*	*	*	*	*		
20	*	*	$3.3x10^{0}$	$5.3x10^{-1}$	<200	$1.9x10^{-1}$	$2.7x10^{-1}$	*	*	*	$5.1x10^{-2}$	$3.8x10^{-1}$	*
30	*	*	$3.1x10^{-2}$		<200	*	$6.1x10^{-2}$	*	*	$4.2x10^{-2}$	$1.0x10^{-1}$		
Q 10	$2.7x10^{-2}$	$1.4x10^{-1}$	$1.3x10^{-1}$		<200	*	*	$2.8x10^{-1}$	*	$3.0x10^{-2}$	$6.0x10^{-2}$		
20	*	$1.3x10^{-2}$	$2.6x10^{-2}$	$7.4x10^{-1}$	<200	*	*	*	*	*	$8.6x10^{-2}$	$2.9x10^{-1}$	
25					<200	*	*	*	*	*	$2.4x10^{-1}$		
30	*	*	$3.4x10^{-2}$		<200	$1.9x10^{-1}$	*	*	*	*	$8.8x10^{-2}$		
W 10					<200	*	*	*	*	$4.9x10^{-2}$	$3.6x10^{-1}$		
15	*	*	$2.3x10^{-2}$		<200	*	*	*	*	$3.6x10^{-2}$	*		
20	*	*	$1.7x10^{2}$	$4.3x10^{1}$	<200	$2.5x10^{-1}$	$3.1x10^{-1}$	*	*	$4.7x10^{-2}$	*	$3.0x10^{-1}$	
30	*	*	*		<200	*	$5.0x10^{-2}$	*	*	*	$1.0x10^{-1}$		
River Beach Sample	*	$1.3x10^{-1}$	$8.7x10^{-1}$	$1.4x10^{0}$	<200	*	$1.0x10^{-1}$	$3.6x10^{-1}$	*	$2.5x10^{-1}$	$8.5x10^{-2}$	$4.5x10^{-1}$	

TABLE 2.7-75

107-H RETENTION BASIN

SAMPLE HOLES DRILLED INSIDE OF BASIN

Concentration (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
X 1	*	*	$1.3x10^{0}$		<200	$1.6x10^{-1}$	*	*	*	$4.7x10^{-2}$	*			
2	*	*	$9.8x10^{-1}$		<200	$3.8x10^{0}$	*	*	*	$5.2x10^{-2}$	$7.8x10^{-2}$			
2-1/2	*	$4.7x10^{-1}$	$3.0x10^{1}$		200	$7.8x10^{2}$	$1.9x10^{1}$	$2.6x10^{1}$	*	$2.0x10^{0}$	$2.3x10^{0}$			
3	$5.1x10^{-1}$	$1.4x10^{0}$	$1.4x10^{2}$	$1.9x10^{1}$	10,000	$8.1x10^{1}$	$2.1x10^{2}$	$2.7x10^{2}$	$1.2x10^{3}$	$3.0x10^{1}$	$1.3x10^{1}$	$8.3x10^{-1}$	$1.2x10^{3}$	*
3C	$1.5x10^{-1}$	$3.9x10^{0}$	$4.4x10^{1}$		3,000	$3.6x10^{1}$	$9.1x10^{1}$	$1.4x10^{2}$	$5.2x10^{2}$	$6.2x10^{1}$	$8.3x10^{1}$		$5.2x10^{2}$	
5-1/2	*	*	$1.8x10^{-1}$	$3.7x10^{0}$	200	$8.7x10^{1}$	$8.5x10^{1}$	$2.9x10^{1}$	*	$1.5x10^{2}$	$1.6x10^{0}$	$4.4x10^{-1}$		*
7-1/2	*	*	$8.9x10^{-1}$		<200	$5.0x10^{-1}$	$3.2x10^{-1}$	*	*	$1.4x10^{0}$	$9.7x10^{-2}$			
12-1/2	*	*	$6.7x10^{0}$		<200/20	$2.2x10^{-1}$	$7.1x10^{-2}$	*	*	$3.6x10^{0}$	$1.1x10^{-1}$			
Y 1	*	*	$2.5x10^{-2}$		<200	$1.7x10^{-1}$	*	*	*	$8.6x10^{-2}$	$1.3x10^{-1}$			
2	*	$8.0x10^{-1}$	$1.1x10^{-1}$		<200	*	$5.5x10^{-2}$	*	*	$3.1x10^{-2}$	*			
3	*	$5.5x10^{-1}$	$4.7x10^{0}$		<200	$7.5x10^{1}$	$2.5x10^{1}$	$2.4x10^{1}$	*	$3.6x10^{0}$	$3.7x10^{0}$			
4	*	*	$5.6x10^{-1}$		<200	$3.1x10^{-1}$	$1.6x10^{-1}$	*	*	$1.1x10^{-1}$	$1.7x10^{-1}$			
4-1/2	$1.0x10^{0}$	$2.2x10^{1}$	$2.5x10^{0}$		3,000	$3.8x10^{3}$	$1.3x10^{3}$	$1.7x10^{3}$	*	$2.9x10^{2}$	$6.6x10^{1}$			
5	$1.4x10^{0}$	$3.2x10^{1}$	$2.4x10^{1}$	$5.5x10^{1}$	40,000	$3.9x10^{4}$	$1.8x10^{4}$	$2.0x10^{4}$	$8.9x10^{1}$	$2.9x10^{3}$	$9.9x10^{2}$	$4.7x10^{0}$	$2.0x10^{4}$	*
5-1/2	*	$9.8x10^{0}$	$3.7x10^{1}$		3,000	$1.0x10^{3}$	$4.8x10^{2}$	$4.8x10^{2}$	*	$2.2x10^{2}$	$4.9x10^{1}$			
7-1/2	*	*	$2.8x10^{0}$	$1.7x10^{1}$	200	$5.5x10^{-1}$	$5.8x10^{-1}$	$8.3x10^{-1}$	*	$2.1x10^{1}$	$2.5x10^{-1}$	$1.6x10^{-1}$		*
10	*	$1.8x10^{-1}$	$1.5x10^{0}$		<200/30	$7.4x10^{0}$	$8.5x10^{0}$	$2.5x10^{0}$	*	$1.7x10^{1}$	*			
12	*	$1.8x10^{-1}$	$6.6x10^{-1}$		<200/30	$5.0x10^{0}$	$1.3x10^{1}$	$1.8x10^{0}$	*	$8.7x10^{0}$	$1.1x10^{-1}$			

TABLE 2.7-76

116-H-1

107-H LIQUID WASTE DISPOSAL TRENCH

Sample No.		Concentration (pCi/g) Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	C-14
E	15	*	*	$1.4x10^{-1}$		<200	*	*	*	*	*	*		*
F	2	$3.2x10^{-1}$	$6.6x10^{0}$	$5.2x10^{1}$		3000	$1.2x10^{3}$	$2.8x10^{2}$	$3.1x10^{2}$	*	$5.8x10^{2}$	$4.2x10^{1}$		
G	15	*	*	$5.5x10^{-2}$		<200	$5.5x10^{-1}$	*	$2.9x10^{-1}$	*	*	$3.0x10^{-1}$		*
	20	*	*	*		<200	*	*	*	*	$4.6x10^{-2}$	$1.0x10^{-1}$		*
R	5					<200	$2.9x10^{0}$	$6.8x10^{-1}$	$5.0x10^{-1}$	$3.8x10^{-2}$	$1.3x10^{0}$	$4.7x10^{-1}$		
	15	*	*	$4.8x10^{-1}$	$9.7x10^{-1}$	<200	$5.1x10^{0}$	$1.0x10^{0}$	$1.7x10^{0}$	*	$2.8x10^{0}$	$6.7x10^{-1}$	$3.1x10^{-1}$	*
	18	$3.5x10^{-1}$	$1.3x10^{-1}$	$8.2x10^{1}$		3000	$1.8x10^{3}$	$4.4x10^{2}$	$5.9x10^{2}$	*	$5.2x10^{2}$	$9.3x10^{1}$		*
	20	*	*	$3.6x10^{0}$		<200	$5.4x10^{1}$	$1.4x10^{1}$	$1.4x10^{1}$	*	$6.5x10^{1}$	$1.8x10^{0}$		
	25	*	*	$1.3x10^{1}$		<200	$3.1x10^{0}$	$3.7x10^{-1}$	$3.2x10^{-1}$	*	$9.5x10^{-1}$	$4.2x10^{-2}$		
S	15	*	*	$5.4x10^{-1}$		<200	$3.7x10^{0}$	$9.8x10^{-1}$	$1.2x10^{0}$	*	$1.9x10^{0}$	$3.8x10^{-1}$		
	18	*	$2.4x10^{-1}$	$1.9x10^{0}$		200	$5.3x10^{1}$	$1.2x10^{1}$	$1.2x10^{1}$	*	$2.7x10^{1}$	$1.4x10^{0}$		
	23	*	$1.8x10^{0}$	$1.6x10^{1}$		600	$2.5x10^{2}$	$6.1x10^{1}$	$6.5x10^{1}$	*	$5.6x10^{1}$	$8.0x10^{0}$		
	25	*	*	$2.6x10^{0}$		<200	$1.5x10^{0}$	$5.5x10^{-2}$	$6.2x10^{-1}$	$4.0x10^{-2}$	$7.5x10^{-2}$	$1.0x10^{-1}$		
T	10					<200	$4.0x10^{-1}$	*	*	*	$1.6x10^{-1}$	$2.2x10^{-1}$		
	20	*	*	$2.4x10^{0}$	$6.3x10^{-1}$	<200	$4.3x10^{0}$	$4.2x10^{-1}$	$6.8x10^{-1}$	*	$3.6x10^{0}$	$3.3x10^{-1}$	$1.6x10^{-1}$	*
	25					<200	$4.4x10^{0}$	$5.3x10^{-1}$	$1.0x10^{0}$	*	$4.1x10^{0}$	$3.0x10^{-1}$		
U	10					<200	$4.6x10^{0}$	$8.4x10^{-1}$	$9.9x10^{-1}$	*	$1.8x10^{0}$	*		
	15	*	$2.0x10^{-1}$	$1.8x10^{0}$		<200	$6.3x10^{0}$	$1.2x10^{0}$	$1.1x10^{0}$	*	$2.2x10^{0}$	$3.3x10^{-1}$		
	17-1/2	$3.1x10^{-1}$	$1.1x10^{1}$	$8.2x10^{1}$		2000	$2.1x10^{3}$	$1.8x10^{2}$	$2.5x10^{3}$	*	$4.0x10^{2}$	$3.0x10^{1}$		
	20	*	$2.4x10^{-1}$	$1.7x10^{0}$		200	$3.3x10^{1}$	$4.6x10^{1}$	$8.4x10^{0}$	*	$1.2x10^{2}$	$1.8x10^{0}$	$3.0x10^{-1}$	
	25	*	*	$1.3x10^{0}$		<200	$1.1x10^{0}$	$1.5x10^{-1}$	$4.8x10^{-1}$	*	$3.6x10^{-1}$	*		
V	10					<200	$4.1x10^{0}$	$7.9x10^{0}$	$1.7x10^{0}$	*	$3.2x10^{1}$	$1.5x10^{-1}$		
	15					<200	$1.2x10^{0}$	*	$2.0x10^{-1}$	$3.4x10^{-2}$	$5.3x10^{-1}$	$3.4x10^{-1}$		
	20	*	*	$2.5x10^{0}$		<200	$9.1x10^{-1}$	$7.2x10^{-2}$	$2.8x10^{-1}$	*	$1.0x10^{-1}$	*		

TABLE 2.7-77

107-H RETENTION BASIN

SAMPLING OF BASIN FILL

Concentration (pCi/g)

Sample No.		Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63
AS	3-1/2	*	*	8.5×10^{-1}		<200/40	8.5×10^{0}	6.5×10^{0}	4.5×10^{0}	9.9×10^{-2}	2.7×10^{0}	7.4×10^{-1}		
	4	*	4.4×10^{0}	2.6×10^{1}	3.0×10^{0}	1,500	5.6×10^{2}	2.8×10^{2}	2.2×10^{2}	*	2.9×10^{1}	7.6×10^{0}	4.0×10^{-1}	
DS	0	*	2.5×10^{0}	8.5×10^{-2}		/350	2.4×10^{2}	4.4×10^{1}	7.1×10^{1}	1.6×10^{-1}	6.2×10^{0}	8.4×10^{0}		
	2	*	1.3×10^{-1}	2.4×10^{-1}		<200/40	1.7×10^{1}	4.0×10^{0}	4.3×10^{0}	*	3.0×10^{-1}	5.0×10^{-1}		
	4-1/2	1.7×10^{0}	5.6×10^{1}	8.2×10^{1}	4.1×10^{0}	15,000	1.4×10^{4}	2.8×10^{3}	3.9×10^{3}	1.8×10^{1}	5.2×10^{2}	2.9×10^{2}	9.2×10^{-1}	
AN	3	*	*	4.1×10^{-2}		<200/20	8.2×10^{-1}	1.9×10^{-1}	*	5.0×10^{-2}	2.9×10^{-1}	6.3×10^{-2}		
	4	*	1.5×10^{-1}	6.8×10^{0}		<200/120	8.5×10^{0}	1.2×10^{1}	2.5×10^{0}	9.0×10^{-2}	1.2×10^{2}	6.3×10^{-1}		
	4-1/2	*	9.0×10^{-1}	1.4×10^{1}	3.9×10^{0}	500	9.2×10^{1}	8.4×10^{1}	4.8×10^{1}	*	1.8×10^{2}	1.2×10^{1}	2.2×10^{-1}	
BN	3-1/2	*	*	3.1×10^{-1}		<200/30	5.1×10^{0}	1.4×10^{0}	1.0×10^{0}	4.3×10^{-2}	1.9×10^{0}	1.4×10^{-1}		
	4	1.5×10^{0}	3.9×10^{1}	7.4×10^{1}	3.7×10^{2}	10,000	7.3×10^{3}	3.1×10^{3}	2.5×10^{3}	2.9×10^{1}	1.9×10^{2}	6.2×10^{3}	5.2×10^{-1}	
CN	3-1/2	*	5.8×10^{-1}	1.1×10^{1}		500	8.3×10^{1}	1.9×10^{1}	2.8×10^{1}	5.7×10^{-1}	6.8×10^{0}	8.3×10^{0}		
	4	7.7×10^{0}	2.0×10^{2}	3.5×10^{2}	2.2×10^{2}	20,000	2.0×10^{4}	5.0×10^{3}	6.5×10^{3}	2.9×10^{1}	1.2×10^{3}	1.7×10^{2}	3.4×10^{0}	4.7×10^{3}
DN	1	*	1.3×10^{0}	5.9×10^{0}		300	1.1×10^{2}	2.8×10^{1}	3.4×10^{1}	9.4×10^{-2}	4.6×10^{0}	4.4×10^{-1}		
	3	*	9.3×10^{0}	5.5×10^{1}		3,000	1.1×10^{3}	2.8×10^{2}	3.3×10^{2}	*	5.8×10^{1}	4.3×10^{0}		
	4	4.0×10^{0}	1.1×10^{2}	1.2×10^{2}	2.4×10^{2}	15,000	1.2×10^{4}	3.1×10^{3}	3.7×10^{3}	*	5.7×10^{2}	1.7×10^{2}	1.2×10^{0}	
107-H INLET DISTRIBUTION BOX														
Z	1	4.3×10^{0}	1.1×10^{2}	5.4×10^{1}		10 mR/hr	2.1×10^{4}	8.2×10^{4}	8.4×10^{3}	*	9.7×10^{2}	5.5×10^{2}		
	2	1.1×10^{1}	2.3×10^{1}	1.4×10^{1}	1.6×10^{3}	3 mR/hr	5.9×10^{3}	9.3×10^{2}	1.1×10^{2}	1.9×10^{1}	4.2×10^{1}	6.9×10^{1}	3.3×10^{0}	
	3	1.0×10^{0}	1.4×10^{0}	2.1×10^{1}	1.3×10^{3}	6,000	2.8×10^{3}	2.3×10^{3}	9.7×10^{3}	2.4×10^{0}	2.1×10^{1}	4.2×10^{2}	1.3×10^{0}	1.4×10^{3}
	4	*	5.4×10^{0}	2.0×10^{1}		7,000	3.8×10^{3}	4.2×10^{3}	1.2×10^{2}	1.9×10^{0}	8.0×10^{2}	2.4×10^{1}		
	5	*	4.9×10^{0}	3.5×10^{1}	3.5×10^{1}	1,000	1.1×10^{3}	1.1×10^{3}	3.4×10^{2}	*	1.5×10^{2}	4.6×10^{1}		

TABLE 2.7-78

107-H RETENTION BASIN FILL

BASIN SLUDGE

Ave. Depth = 2" Mass = 1.9×10^9g

Concentrations (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
AS 4	*	4.4×10^{0}	2.6×10^{1}	3.0×10^{0}	5.6×10^{2}	2.8×10^{2}	2.2×10^{2}	*	2.9×10^{1}	7.6×10^{0}	4.0×10^{-1}		
DS 4-1/2	1.7×10^{0}	5.6×10^{1}	8.2×10^{1}	4.1×10^{0}	1.4×10^{4}	2.8×10^{3}	3.9×10^{3}	1.8×10^{1}	5.2×10^{2}	2.9×10^{2}	9.2×10^{-1}		
AN 4-1/2	*	9.0×10^{-1}	1.4×10^{1}	3.9×10^{0}	9.2×10^{1}	8.4×10^{1}	4.8×10^{1}	*	1.8×10^{2}	1.2×10^{1}	2.2×10^{-1}		
BN 4	1.5×10^{0}	3.9×10^{1}	7.4×10^{1}	3.7×10^{2}	7.3×10^{3}	3.1×10^{3}	2.5×10^{3}	2.9×10^{1}	1.9×10^{2}	6.2×10^{3}	5.2×10^{-1}		
CN 4	7.7×10^{0}	2.0×10^{2}	3.5×10^{2}	2.2×10^{2}	2.0×10^{4}	5.0×10^{3}	6.5×10^{3}	2.9×10^{1}	1.2×10^{3}	1.7×10^{2}	3.4×10^{0}	4.7×10^{3}	
DN 4	4.0×10^{0}	1.1×10^{2}	1.2×10^{2}	2.4×10^{2}	1.2×10^{4}	3.1×10^{3}	3.7×10^{3}	*	5.7×10^{2}	1.7×10^{2}	1.2×10^{0}		
X 3	5.1×10^{-1}	1.4×10^{1}	1.4×10^{2}	1.9×10^{1}	8.1×10^{2}	2.1×10^{2}	2.7×10^{2}	1.2×10^{3}	3.0×10^{1}	*	8.3×10^{-1}	1.2×10^{3}	*
Y 5	1.4×10^{0}	3.2×10^{1}	2.4×10^{1}	5.5×10^{1}	3.9×10^{4}	1.8×10^{4}	2.0×10^{4}	8.9×10^{1}	2.9×10^{3}	9.9×10^{2}	4.7×10^{0}	2.0×10^{4}	*
Ave. pCi/g	2.1	5.7×10^{1}	1.0×10^{2}	1.3×10^{2}	1.2×10^{4}	4.1×10^{3}	4.6×10^{3}	5.4×10^{1}	7.0×10^{2}	1.1×10^{3}	1.5	8.6×10^{3}	0.0
Curies	4.0×10^{-3}	1.1×10^{-1}	1.9×10^{-1}	2.5×10^{-1}	23	7.8	8.7	1.0×10^{-1}	1.3	2.1	2.9×10^{-3}	16	0.0

Total Curies in Sludge = 60

TABLE 2.7-79

107-H RETENTION BASIN FILL
BASIN FILL (EXCLUDING SLUDGE)
Ave. Depth = 4' Mass = 4.5×10^{10}g
Ave. Concentrations (pCi/g)

Sample Hole	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63	C-14
AS	*	*	8.5×10^{-1}		8.5×10^{0}	6.5×10^{0}	4.5×10^{0}	9.9×10^{-2}	2.7×10^{0}	7.4×10^{-1}			
DS	*	1.3×10^{0}	1.6×10^{-1}		1.3×10^{2}	2.4×10^{1}	3.8×10^{1}	1.6×10^{-1}	3.3×10^{0}	4.5×10^{0}			
AN	*	1.5×10^{-1}	3.4×10^{0}		4.7×10^{0}	6.1×10^{0}	2.5×10^{0}	7.0×10^{-2}	6.0×10^{1}	3.5×10^{-1}			
BN	*	*	3.1×10^{-1}		5.1×10^{0}	1.4×10^{0}	1.0×10^{0}	4.3×10^{-2}	1.9×10^{0}	1.4×10^{-1}			
CN	*	5.8×10^{-1}	1.1×10^{1}		8.3×10^{1}	1.9×10^{1}	2.8×10^{1}	5.7×10^{-1}	6.8×10^{0}	8.3×10^{0}			
DN	*	5.3×10^{0}	3.1×10^{1}		6.1×10^{2}	1.5×10^{2}	1.8×10^{2}	9.4×10^{-2}	3.1×10^{1}	2.4×10^{0}			
X	*	1.6×10^{-1}	1.8×10^{0}		2.6×10^{1}	6.3×10^{0}	1.3×10^{1}	*	7.0×10^{-1}	7.9×10^{-1}			
Y	*	4.6×10^{0}	1.6×10^{0}		7.8×10^{2}	3.3×10^{2}	4.3×10^{2}	*	5.9×10^{1}	1.4×10^{1}			
Ave. pCi/g		1.5×10^{0}	6.3×10^{0}		2.1×10^{2}	6.8×10^{1}	8.7×10^{1}	1.7×10^{-1}	2.1×10^{1}	6.6×10^{0}			
Curies		6.8×10^{-2}	2.8×10^{-1}		9.5	3.1	3.9	7.7×10^{-3}	9.4×10^{-1}	2.9×10^{-1}			

Total Curies in Fill Less Sludge	=	18
Sludge	=	60
Total Curies in Basin Fill	=	78

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TABLE 2.7-80

CONTAMINATED SOIL COLUMN ADJACENT TO 107-H RETENTION BASIN

Description - Includes area 100' from east wall and 25' from north, south, and west basin walls x 20' ave. depth.

9.9×10^4 ft^2 x 20' = 2.0×10^6 ft^3
Mass = 1.4×10^{11} g

Radionuclides	Ave. pCi/g	Curies
Pu-238	1.2×10^{-2}	1.6×10^{-3}
Pu-239/240	3.5×10^{-1}	4.8×10^{-2}
Sr-90	1.9×10^{0}	2.6×10^{-1}
H-3	5.7×10^{-1}	7.8×10^{-2}
Eu-152	5.0×10^{1}	6.8
Co-60	3.7×10^{1}	5.0
Eu-154	1.6×10^{1}	2.2
Cs-134	5.8×10^{-3}	7.9×10^{-4}
Cs-137	1.3×10^{1}	1.8
Eu-155	2.9×10^{0}	3.9×10^{-1}
U	3.5×10^{-1}	4.8×10^{-2}
C-14	4.1×10^{-1}	5.6×10^{-2}
	Total Curies =	17

TABLE 2.7-81

CONTAMINATED SOIL COLUMN UNDERNEATH 107-H RETENTION BASIN

0-3' Below Basin 1.7×10^5 ft^2 x 3' = 5.2×10^5 ft^3

Mass = 3.5×10^{10}g

3'-10' Below Basin 1.7×10^5 ft^2 x 7 ft = 1.2×10^6 ft^3

Mass = 8.2×10^{10}g

Radionuclide	0-3' Ave pCi/g	3'-10' Ave pCi/g	Curies
Pu-238	*	*	0.0
Pu-239/240	*	9.0×10^{-2}	7.4×10^{-3}
Sr-90	1.5×10^{0}	2.4×10^{0}	2.5×10^{-1}
H-3	1.0×10^{1}	NA[1]	1.2
Eu-152	4.4×10^{1}	3.3×10^{0}	1.8
Co-60	4.3×10^{1}	5.5×10^{0}	2.0
Eu-154	1.5×10^{1}	1.1×10^{0}	6.2×10^{-1}
Cs-134	*	*	0.0
Cs-137	1.8×10^{2}	7.7×10^{0}	6.9
Eu-155	9.3×10^{-1}	7.9×10^{-2}	3.9×10^{-2}
U	3.0×10^{-1}	NA[1]	3.5×10^{-2}
C-14	7.2×10^{-1}	NA[1]	8.4×10^{-2}

Total Curies = 13

[1] Concentration conservatively assumed to be the same as 0-3' interval for total Curies calculation.

TABLE 2.7-82

116-H-1

107-H LIQUID WASTE DISPOSAL TRENCH

Potentially Contaminated Soil Column

Volume = 300' x 150' x 20' = 9.0×10^5 ft^3

Mass = 6.1×10^{10}g

Radionuclide	Ave. pCi/g	Curies
Pu-238	5.4×10^{-2}	3.3×10^{-3}
Pu-239/240	1.1×10^{0}	6.7×10^{-2}
Sr-90	1.5×10^{1}	9.2×10^{-1}
H-3	8.0×10^{-1}	4.9×10^{-2}
Eu-152	2.3×10^{2}	14
Co-60	4.4×10^{1}	2.7
Eu-154	1.6×10^{2}	9.8
Cs-134	1.1×10^{-2}	6.7×10^{-4}
Cs-137	7.6×10^{1}	4.6
Eu-155	7.6×10^{0}	4.6×10^{-1}
U	2.6×10^{-1}	1.6×10^{-1}
C-14	*	0.0

Total Curies = 33

TABLE 2.7-83

107-H Inlet Distribution Chamber Sludge

Volume = 150'x20'x1" = 2.5×10^2 ft^3

Mass = 1.1×10^7 g

Radionuclide	Concentration (pCi/g)	Curies
Pu-238	1.1×10^1	1.2×10^{-4}
Pu-239/240	2.3×10^2	2.5×10^{-3}
Sr-90	1.4×10^3	1.5×10^{-2}
H-3	1.6×10^3	1.8×10^{-2}
Eu-152	5.9×10^4	6.5×10^{-1}
Co-60	9.3×10^4	1.0×10^0
Eu-154	1.1×10^4	1.2×10^{-1}
Cs-134	1.9×10^1	2.1×10^{-4}
Cs-137	4.2×10^3	4.6×10^{-2}
Eu-155	6.9×10^2	7.6×10^{-3}
U	3.3×10^0	3.6×10^{-5}
Ni-63[1]	2.0×10^5	2.2×10^0
	Total Curies	4.1

[1]Ni-63 concentration estimated by multiplying the Co-60 concentration in the inlet distribution chamber sludge by the Ni-63/Co-60 ratio of the sludge along the 107-H basin floor.

TABLE 2.7-84

SOIL COLUMN

ALONG EFFLUENT LINES TO 107-H BASIN

Description - Location is between two expansion boxes in the effluent lines running to the 107-H basins, approximately 200' from southwest corner of basins.

Radionuclide	Ave. pCi/g	Max. pCi/g
Pu-238	*	*
Pu-239/240	*	*
Sr-90	1.3×10^{-2}	2.3×10^{-2}
H-3	4.3×10^{1}	4.3×10^{1}
Eu-152	6.3×10^{-2}	2.5×10^{-1}
Co-60	9.0×10^{-2}	3.1×10^{-1}
Eu-154	*	*
Cs-134	*	*
Cs-137	3.3×10^{-2}	4.9×10^{-2}
Eu-155	1.2×10^{-1}	3.6×10^{-1}
U	3.0×10^{-1}	3.0×10^{-1}

TABLE 2.7-85

SOIL COLUMN

ALONG EFFLUENT LINES FROM 107-H BASIN TO OUTFALL STRUCTURE

Radionuclide	Ave. pCi/g	Max. pCi/g
Pu-238	9.0×10^{-3}	2.7×10^{-2}
Pu-239/240	5.1×10^{-2}	1.4×10^{-1}
Sr-90	6.3×10^{-2}	1.3×10^{-1}
H-3	7.4×10^{-1}	7.4×10^{-1}
Eu-152	4.8×10^{-2}	1.9×10^{-1}
Co-60	*	*
Eu-154	7.0×10^{-2}	2.8×10^{-1}
Cs-134	*	*
Cs-137	7.5×10^{-3}	3.0×10^{-2}
Eu-155	1.2×10^{-1}	2.4×10^{-1}
U	2.9×10^{-1}	2.9×10^{-1}
C-14	*	*

2.7.6 Retention Basin Concrete Sampling

Sampling of the 107 basin concrete floors showed that contamination has leached all the way into the concrete. Seventy-five percent of the entire mass of a concrete basin (floors and walls) is assumed to be contaminated in calculating the radionuclide inventories in the concrete. Radioanalytical results for selected concrete samples from the 107 retention basins are given in Table 2.7-86. The basis of the sample numbering system used for the concrete samples is discussed in Section 1.5. Basically the letter "C" preceding a digit at the end of a sample number designates that the sample is a concrete sample. The digit following the letter "C" indicates the depth in inches into the concrete. Letters preceding the "C" indicate the sampling location inside the basin.

The retention basins were treated collectively in establishing radioactive inventory estimates within the concretes in order to get a large data base to estimate the average radionuclide concentrations. For any given concrete sample, the physical condition of the floor at the particular sampling location (cracks in the concrete, etc.) could greatly influence the radioactive concentrations in the sample.

Beta-gamma concentrations in the concrete of the 107 retention basins average 1.4×10^3 pCi/g. Pu-239/240 concentrations average 1.8 pCi/g. The radioactive inventory in the concrete of each of the B, D, and F basins is approximately 8 curies. 107-DR and H are larger basins, and each has an estimated 13 curies within the concrete.

TABLE 2.7-86

107-RETENTION BASIN CONCRETE SAMPLES

Retention Basin	Sample No.	Pu-238	Pu-239	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63
		Concentration (pCi/g)											
107-B	HC2					$2.3x10^{0}$	$1.0x10^{1}$	*	*	$7.0x10^{0}$	*		
	HC6					$2.0x10^{1}$	$3.3x10^{1}$	*	*	$2.0x10^{1}$	*		
	IC2					$1.2x10^{2}$	$8.6x10^{1}$	$4.0x10^{1}$	*	$1.4x10^{1}$	$5.7x10^{0}$		
	IC6					$3.1x10^{1}$	$2.9x10^{1}$	$1.2x10^{1}$	*	$5.1x10^{0}$	*		
	JC2					$1.4x10^{2}$	$2.1x10^{2}$	$5.1x10^{1}$	*	$1.6x10^{1}$	*		
	JC16					$6.8x10^{2}$	$4.0x10^{2}$	$2.4x10^{2}$	*	$8.0x10^{1}$	$2.1x10^{1}$		
107-D	D-7					$4.8x10^{1}$	$1.4x10^{2}$	*	*	$8.3x10^{1}$	*		
	D-8					$4.9x10^{3}$	$5.6x10^{3}$	$2.8x10^{3}$	*	$1.9x10^{2}$	$3.0x10^{2}$		
	D-9					$3.4x10^{1}$	$1.9x10^{2}$	*	*	*	*		
107-DR	Concrete[1] Wall	$6.9x10^{-2}$	$2.6x10^{0}$	$1.1x10^{1}$		$1.4x10^{2}$	$6.6x10^{2}$	$3.6x10^{1}$	*	$1.6x10^{2}$	$1.2x10^{1}$		
	AAC2	*	*	$1.2x10^{1}$		$1.1x10^{2}$	$7.5x10^{1}$	$4.7x10^{1}$	*	$1.8x10^{2}$	$7.0x10^{0}$	$2.6x10^{-1}$	
	AAC3					$1.7x10^{2}$	$7.1x10^{1}$	$7.4x10^{1}$	*	$7.8x10^{1}$	$7.3x10^{0}$		
	AAC5					$1.5x10^{2}$	$6.6x10^{1}$	$7.3x10^{1}$	*	$6.5x10^{1}$	$7.5x10^{0}$		
	AAC6					$7.4x10^{0}$	$3.7x10^{0}$	$2.9x10^{0}$	*	$3.4x10^{0}$	*		
	AAC8	*	$2.1x10^{0}$	$8.8x10^{0}$	$2.5x10^{0}$	$5.2x10^{2}$	$5.1x10^{2}$	$1.9x10^{2}$	$5.9x10^{0}$	$1.4x10^{3}$	$2.0x10^{1}$	$5.2x10^{-1}$	
	ABC2					$2.1x10^{2}$	$4.6x10^{1}$	$5.6x10^{1}$	*	$3.8x10^{1}$	$5.8x10^{0}$		
	ABC4					$5.5x10^{1}$	$1.5x10^{1}$	*	*	$7.9x10^{0}$	*		
	ABC5					$4.8x10^{1}$	$1.1x10^{1}$	*	*	$7.5x10^{0}$	*		
	ABC6					$3.3x10^{1}$	$7.4x10^{0}$	$1.4x10^{1}$	*	$7.9x10^{0}$	*		
	ABC8					$9.5x10^{1}$	$4.6x10^{1}$	$2.5x10^{1}$	*	$8.2x10^{1}$	$4.1x10^{0}$		
	ACC4	*	*	$6.1x10^{-1}$	$4.8x10^{0}$	$4.5x10^{0}$	$4.9x10^{1}$	*	*	$9.7x10^{0}$	*	$5.1x10^{-1}$	
	ACC6					$7.9x10^{0}$	$6.7x10^{1}$	*	*	$1.3x10^{1}$	*		
	ACC8	*	$9.7x10^{-1}$	$3.3x10^{0}$	$3.1x10^{0}$	$3.1x10^{2}$	$4.2x10^{2}$	$1.1x10^{2}$	$7.8x10^{-1}$	$2.3x10^{2}$	$7.2x10^{0}$	$6.6x10^{-1}$	
107-F	S5C					$3.4x10^{2}$	$6.7x10^{1}$	$1.0x10^{2}$	*	*	$6.6x10^{1}$		
	TC1	*	$2.8x10^{0}$	$2.2x10^{0}$		$1.8x10^{2}$	$3.0x10^{2}$	$6.7x10^{1}$	*	$8.7x10^{0}$	$1.3x10^{1}$		
	TC3					$4.5x10^{1}$	$5.2x10^{1}$	*	*	*	*		
	TC6					$5.4x10^{1}$	$7.1x10^{1}$	$1.9x10^{1}$	*	*	$2.5x10^{0}$		
	UC1					$4.5x10^{2}$	$1.3x10^{2}$	$1.6x10^{2}$	*	*	$1.4x10^{1}$		
	UC4					$1.7x10^{1}$	$2.6x10^{1}$	*	*	*	*		

[1]Data from UNI-208

TABLE 2.7-86 (Cont'd)

107-RETENTION BASIN CONCRETE SAMPLES

Retention Basin	Sample No.	Pu-238	Pu-239	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63
		Concentration (pCi/g)											
107-H	X3C	$1.5x10^{-1}$	$3.9x10^{0}$	$4.4x10^{1}$		$3.6x10^{1}$	$9.1x10^{1}$	$1.4x10^{2}$	$5.2x10^{2}$	$6.2x10^{1}$	$8.3x10^{1}$		$5.2x10^{2}$
Ave. pCi/g for all basins		$3.1x10^{-2}$	$1.8x10^{0}$	$1.2x10^{1}$	$3.5x10^{0}$	$3.1x10^{2}$	$3.2x10^{2}$	$1.4x10^{2}$	$1.8x10^{1}$	$9.2x10^{1}$	$1.9x10^{1}$	$4.9x10^{-1}$	$5.2x10^{2}$
Contaminated concrete mass/basin for B, D, F = $5.5x10^{9}$g													
Curies in concrete/ basin for B, D, F		$1.7x10^{-4}$	$9.9x10^{-3}$	$6.6x10^{-2}$	$1.9x10^{-2}$	1.7	1.8	$7.7x10^{-1}$	$9.9x10^{-2}$	$5.0x10^{-1}$	$1.0x10^{-1}$	$2.7x10^{-3}$	2.9
											TOTAL CURIES/B, D, F BASIN = 8		
Contaminated concrete mass/basin for DR, H = $9.0x10^{9}$g													
Curies in concrete/ basin for DR, H		$2.8x10^{-4}$	$1.6x10^{-2}$	$1.0x10^{-1}$	$3.1x10^{-2}$	2.8	2.9	1.3	$1.6x10^{-1}$	$8.3x10^{-1}$	$1.7x10^{-1}$	$4.4x10^{-3}$	4.7
											TOTAL CURIES/DR, H BASIN = 13		
OTHER CONCRETE SAMPLES pCi/g													
107-B	Wall #1	$6.4x10^{-1}$	$1.6x10^{1}$	$8.9x10^{0}$		$1.5x10^{4}$	$1.3x10^{4}$	$4.8x10^{3}$	$5.8x10^{1}$	$4.6x10^{2}$	$2.8x10^{2}$		
	Wall #2					$9.4x10^{2}$	$1.2x10^{3}$	$3.5x10^{2}$	*	$1.0x10^{2}$	$5.1x10^{1}$		
	Cement flakes	*	$8.5x10^{0}$	$1.3x10^{-1}$		$1.3x10^{3}$	$6.1x10^{3}$	$4.3x10^{2}$	*	$4.7x10^{2}$	$7.6x10^{2}$		
	BS core[1]	*	$8.7x10^{0}$	$1.7x10^{1}$		$2.0x10^{2}$	$1.3x10^{2}$	$7.5x10^{2}$	$7.9x10^{1}$	$1.5x10^{2}$	$1.6x10^{2}$		
Ave. pCi/g		$2.1x10^{-1}$	$1.1x10^{1}$	$8.7x10^{0}$		$4.4x10^{3}$	$5.1x10^{3}$	$1.6x10^{3}$	$3.4x10^{1}$	$3.0x10^{2}$	$3.1x10^{2}$		

[1]Loose contamination scraped and brushed from concrete core sample taken from sample hole BS.

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3.0 MISCELLANEOUS CRIBS AND TRENCHES

3.1 Description

The miscellaneous cribs and trenches designation includes facilities, usually within a few hundred feet of the reactor buildings, which were used for the ground disposal of liquid wastes resulting from fuel failures, decontamination facilities, and liquid and sludge from the irradiated fuel storage basins. This category includes all of the retired 100 Area cribs and trenches except for the 107 retention basin diversion trenches were are included under Section 2 "Retention Basin Systems." The retired 100 Area contaminated liquid waste disposal soil columns are typically covered with 5 to 20 feet of uncontaminated earth.

These 100 Area cribs and trenches can be broken down into the following designations:

- 105 Storage Basin Trenches
- 105 Pluto Cribs
- 105 Dummy/Perf Decontamination Cribs
- 1608 Liquid Waste Trenches
- 117 Cribs
- 115 Cribs
- 108 Cribs

Three retired 100 Area liquid waste facilities which are not included in the above designations are the Lewis Canal, the 100-F ball washer crib, and the 1706-KER crib. A list of the deactivated 100 Area miscellaneous cribs and trenches is given in Table 3.1-1. Descriptions of the different crib and trench designations are given in the following few paragraphs.

Storage Basin Trenches

The 105 storage basin trenches were dug during the period from 1946 through 1955. With the exception of the 116-D-1B trench, all of the storage basin trenches were covered by the end of 1955. Bottom dimensions

TABLE 3.1-1

DEACTIVATED 100 AREA MISCELLANEOUS CRIBS AND TRENCHES

Designation	Number	Area	Service Dates
105 Storage Basin Trenches	116-B-2	100-B	1946
	116-D-1A	100-D	1947-1952
	116-D-1B	100-D	1953-1967
	116-DR-3	100-DR	1955
	116-F-3	100-F	Late 1940's-1951
105 Pluto Cribs	116-B-3	100-B	1951-1952
	116-C-2	100-C	1952-1969
	116-D-2	100-D	1950-1952
	116-DR-4	100-DR	1950-1952
	116-F-4	100-F	1950-1952
	116-H-4	100-H	1950-1952
105 Dummy/Perf Decontamination Cribs	*116-B-4	100-B	1957-1968
	116-F-10	100-F	Late 1940's-1965
	116-H-3	100-H	1950-1965
1608 Liquid Waste Disposal Trenches	116-F-6	100-F	1952-1965
	116-H-2	100-H	1953-1965
115 Cribs	116-KE-1	100-KE	1955-1970
	116-KW-2	100-KW	1955-1971
117 Cribs	116-F-7	100-F	1960-1965
		100-H	1960-1965
		100-D	1960-1967
		100-DR	1960-1964
108 Cribs	116-B-5	100-B	1950-1968
	116-D-3	100-D	1951-1967
	116-D-4	100-D	1956-1967
Other			
Lewis Canal	116-F-1	100-F	1953-1965
Ball Washer Crib	116-F-5	100-F	1953
111-B Cribs (2)[1]	116-B-6	100-B	1951-1968
1706-KER Crib	116-KE-2	100-KE	1957-1964

[1]Though not designated as such by title, the 111-B cribs fall into the general category of the 105 dummy/perf decontamination cribs.

*This crib was not sampled. There is a solid concrete slab over the crib area, about six feet below grade, which we could not penetrate.

of the storage basin trenches are typically the order of 100 feet long by 10 feet wide and are reported to have been covered with 6 to 15 feet of soil. These trenches received water and sludge from the 105 metal storage basins.

105 Pluto Cribs

There is a pluto crib in each of the following reactor areas: B, C, D, DR, F, and H. The 105-D, DR, F, and H pluto cribs were dug in 1950; the 105-B pluto crib in 1951; and the 105-C pluto crib in 1952. The pluto cribs are small cribs (10' x 10' x 10') which received water from individual process tubes following fuel cladding failures. All of the pluto cribs with the exception of the 105-C pluto crib were used only a short period of time, less than 2 years, when they were covered over with a reported 10 to 12 feet of soil cover. Small standpipes were left standing up through the centers of the B, D, and F pluto cribs to provide access to the cribs when they were covered. Although it was still possible to use the cribs (with the standpipes), they evidently were not used after 1952. The 105-H pluto crib was dug up and moved to the 118-H-5 burial ground (105-H thimble pit) during construction of the 105-H confinement system.

The 116-C-2 crib was the last pluto crib dug in the 100 Areas and was larger and of a different design. This crib was dug in 1952. In addition to liquid wastes from the 105-C reactor rear face, the 105-C pluto crib also received effluents from dummy decontamination done on the wash pad, and from the 105-C irradiated fuel examination facility. The bottom dimensions of the crib are approximately 80' x 40', and the surface dimensions are 140' x 100'. Unlike the other 100 Area pluto cribs, effluent passed through a sand filter prior to being discharged to the soil column of the crib. The sand filter is a 16' x 23' x 5' open bottomed concrete box placed in a sand and gravel pit (french drain). Contaminated process water was spread over the surface of the sand filter media by distribution trays. Excess effluent evidently discharged to the nearby 105-C pluto crib after being filtered. The 25-foot deep crib has been covered as is the case with all of the retired 100 Area cribs and trenches, but the large concrete lids over the sand filter are exposed.

105 Dummy/Perf Decontamination Cribs

The 105-B, F, and H dummy decontamination cribs were dug in the 1950's for disposal of radioactive liquid wastes from decontamination of process dummies; i.e., fuel element spacers. A 3-foot diameter vitrous tile extends a few feet out of the ground at the 116-F-8 and 116-H-3 cribs. The 111-B cribs also received liquid wastes from fuel element spacer decontamination performed in the 111-B building decontamination station.

1608 Liquid Waste Trenches

The 1608-F and H trenches were excavated in 1952 and 1953, respectively, to receive effluent during the Ball 3X Project. Water from the 105 building was pumped via the 1608 pumphouse to a trench outside the exclusion area fence. The 1608-H trench overflowed and contaminated an area about 300 feet wide by 500 feet long. In the spring of 1956 effluent water overflowed from the 1608-F trench flooding an area south of the trench. The flooded area was later released from radiological controls. The 1608-F and H trenches were reported to have been covered with about 20 and 6 feet of soil cover, respectively.

117 Cribs

The 117 cribs were constructed at 100-D, DR, F, and H in 1960 to receive drainage from the confinement system 117 building seal pits. Radioactive effluents drained to these cribs had short half-lives and were released from radiological controls prior to 1967.

115-KE and KW Cribs

The 115-KE and KW cribs were underground French drains constructed to receive condensate and other liquid wastes from the reactor gas purification systems.

108 Cribs

The 108 cribs were underground French drains covered with about 8 feet of soil which received contaminated liquid effluents from the 108 buildings. The 116-D-3 and 116-D-4 cribs both received liquid wastes

from a contaminated maintenance shop in the 108-D building. The 116-D-3 crib also received effluents from a cask decontamination pad in the 108-D building.

The 108-B crib was dug in 1950 for the disposal of liquid tritium wastes. Only wastes with tritium concentrations of 1 μCi/cc were reportedly discharged to this crib.

Lewis Canal

Miscellaneous liquid wastes from the 105-F and 190-F buildings, as well as decontamination wastes from the 189-F building, were routinely released to this ditch. Occasionally, contaminated coolant from the reactor front and rear faces was also drained to the Lewis Canal. During the ball 3X outage in 1953, effluent water drained to the river by way of this ditch. The portion of the ditch north of grid coordinate N-80290 has been released from radiological controls.

100-F Ball Washer Crib

Wastes from the decontamination of boron-steel balls were buried under several feet of soil in 1953.

1706-KER Crib

The 1706-KER crib received radioactive liquid wastes from cleanup columns in the 1706-KER loop.

3.2 Miscellaneous Crib and Trench Sampling

Sampling of the miscellaneous 100 Area cribs and trenches was intended to establish the following parameters:

- Identification of radionuclides present.
- Concentration of radionuclides present, with particular interest in the quantification of low level Pu-239/240 concentrations.
- Horizontal and vertical distribution of the radionuclides.
- Estimates of total activity present.

With the exception of the Lewis Canal, sampling of the miscellaneous cribs and liquid waste trenches in the deactivated 100 Areas (105 pluto cribs, 105 metal storage basin trenches, etc.) was initiated on December 19, 1975, and completed on April 5, 1976. Sample hole drilling at the Lewis Canal in 100-F Area was started on May 12, and completed on May 19, 1975. This category of liquid waste trenches does not include the diversion trenches off of the 100 Area retention basins which are included in Section 2 "Retention Basin Systems."

Generally speaking, a sample hole was first drilled into the center of a crib. Depending upon the radioactivity detected in samples and in situ GM readings taken of the first sample hole, together with the size of a crib or trench, one or several more holes would be drilled along and outside of the facility to estimate the lateral spread of contamination. In situ GM readings taken of the sample holes were also useful in verifying the adequacy of the intervals at which soil samples were collected for lab analyses.

Often the center of a crib could be located by a vent pipe extending above the ground. The center of trenches could often be located by surface depressions from settling of the soil cover, or in some instances where the ground surface was not completely leveled at the time the facility was originally covered. Concrete monuments occasionally marked

the location of a crib and the ends of a trench when no other surface features were present. In a few instances field measurements along with existing drawings and documentation had to be used to establish the crib/trench locations. This last technique was fairly successful when required, but often required drilling additional sample holes to establish the exact crib or trench location.

In addition to the radioactivity detected by field instrumentation in soil samples, the drilling itself was an indication of the facility location. Drilling in areas which had been formerly excavated was invariably easier than those which had not. The ease of drilling could often be used to establish, for instance, if drilling was being performed at the edge of a trench or its center. For example, if a rectangular trench was known to be approximately 15 feet deep and drilling suddenly became difficult at 7 feet, this would indicate that the edge of the trench had been hit rather than its center. An adjacent sample hole (or holes) would then be drilled at an appropriate distance depending upon existing descriptions of the bottom dimensions of the facility to locate the center of the trench.

Procedures used for sampling these cribs and trenches are discussed in Section 1 "Soil Sampling Techniques." Calculational methods used in estimating the radionuclide inventories present are the same as those discussed in Section 2.5.2 for the 107 retention basin systems. Descriptions of the size of the contaminated soil columns of the individual cribs are included on the radionuclide inventory sheets for each facility.

3.3 Summary

Some general conclusions with respect to the radioactivity remaining in the miscellaneous 100 Area cribs and trenches are as follows:

- Maximum beta-gamma contamination levels for the various cribs and trenches range from 10^{-1} to 10^{6} pCi/g.
- Radionuclide concentrations and inventories are lowest in the 117 cribs and highest in the 108-B crib, 115-K cribs, and the 105-C pluto crib sand filter.
- Principal radionuclides are generally Co-60, Cs-137, Sr-90, Eu-152, Eu-154, and Eu-155. C-14 and H-3 are dominant radionuclides in the 115 cribs, and H-3 in the 108-B crib.
- Excluding the 105-C pluto crib sand filter, Pu-239/240 contamination is generally less than 1 pCi/g, but ranges up to 10^{2} pCi/g. Pu-239/240 concentrations in the 105-C pluto crib sand filter range up to 10^{3} pCi/g.
- Radionuclide inventories for individual facilities range from less than 1 mCi to 300 curies.
- Contamination usually drops off to background levels within 5 to 20 feet below the crib/trench bottoms.

Tables 3.3-1 and 3.3-2 summarize the average and maximum beta-gamma and plutonium concentrations, respectively, of the 100 Area miscellaneous cribs and trenches. Radioactive inventories for these facilities are given in Table 3.3-3.

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^{6}
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 3.3-1 (Cont'd)

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-F-7	117-F Crib	3.5×10^{-1}	3.5×10^{-1}
116-F-10	Perf Decontamination Drain	4.0×10^{2}	9.7×10^{2}
116-H-2	1608-H Trench	5.4×10^{1}	1.2×10^{2}
116-H-3	105-H Dummy Decontamination Drain	2.2×10^{2}	3.6×10^{2}

[1]NA-No Analysis. No contamination measurable with field instrumentation was detected in samples taken from two test holes drilled 28' and 30' deep.

[2]Only one sample analyzed. The sample had the highest field count of the samples taken from 116-D-3&4.

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 3.3-2 (Cont'd)

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-F-4	105-F Pluto Crib	4.7×10^{-1}	1.5×10^{0}	3.5×10^{1}	1.1×10^{2}
116-F-5	Ball Washer Crib	*	*	*	*
116-F-6	1608-F Liquid Waste Disposal Trench	*	*	2.4×10^{-1}	7.6×10^{-1}
116-F-7	117-F Crib	*	*	1.0×10^{-1}	1.0×10^{-1}
116-F-10	Perf Decontamination Drain	*	*	2.6×10^{-1}	8.7×10^{-1}
116-H-2	1608-H Trench	*	*	1.6×10^{-2}	1.3×10^{-1}
116-H-3	105-H Dummy Decontamination Drain	*	*	2.7×10^{-1}	2.7×10^{-1}

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 3.3-3 (Cont'd)

RADIOACTIVE INVENTORIES WITHIN THE 100 AREA
MISCELLANEOUS CRIBS AND TRENCHES

Crib No.	Designation	Total Curies
116-F-7	117-F Crib	1.4×10^{-4}
116-F-10	Perf. Decontamination Drain	1.2×10^{-1}
116-H-2	1608-H Trench	1.4
116-H-3	105-H Dummy Decontamination Drain	7.0×10^{-2}

3.4 Discussion of Miscellaneous Crib and Trench Sampling and Results

With the exception of Lewis Canal, sampling of the miscellaneous cribs and liquid waste trenches in the deactivated 100 Areas was initiated on December 19, 1975, and completed on April 5, 1976. Sample hole drilling at the Lewis Canal, in 100-F Area, was performed during the period May 12, 1975, through May 19, 1975. The sampling progress of the 100 Area small cribs and trenches is outlined below:

Area	Sampling Initiated	Sampling Completed
H	12/19/75	12/31/75
F	12/31/75	1/20/76
D,DR	1/20/76	2/5/76
B,C	2/6/76	4/5/76
K	3/17/76	3/31/76

Contamination levels varied in the individual cribs, but maximum levels for a given crib usually were on the order of 1,000 c/m per sample with a GM probe and usually dropped off to background levels within 5-20 feet below the bottom of the cribs. The B&F pluto cribs, for example, had 6,000 c/m per sample at 8 feet below grade and dropped off to background levels at 25 feet below grade.

The highest levels of contamination measurable with portable field instrumentation were detected in the 1706-KER crib and the 105-C pluto crib sand filter. A GM reading of 15,000 c/m was detected in a sample taken at 42 feet below grade, dropping down to 500 c/m per sample at 48 feet below grade in the 1706-KER crib. The 1706-KER crib contains an estimated radioactive inventory of 38 curies, 33 curies of which is Co-60 and the remaining activity primarily from Sr-90. Average and maximum beta-gamma concentrations are 4.3×10^3 and 1.1×10^4 pCi/g, respectively. Pu-239/240 soil contamination is present up to a maximum of 6.1 pCi/g and averages 2.1 pCi/g.

Direct dose rate readings of the 105-C pluto crib filter media surface ranged from 80 to 450 mR/hr. Samples taken of the filter media were only a few grams in order to limit their dose rates to less than 20 mR/hr. Alpha readings of the filter media surface using a PAM were 20,000 d/m.

A GM reading of 1,000 c/m was detected in a sample taken at 25 feet below grade from test hole A drilled approximately 10 feet out from the southwest corner of the sand filter concrete distribution box. Slightly lower levels of soil contamination were detected in sample hole C drilled 10 feet out from the northwest corner of the distribution box. No soil contamination was detected in test hold D which was drilled 20 feet away from the distribution box.

Average radionuclide concentrations in the 105-C pluto crib sand filter are more than 10 times higher than any of the other pluto cribs sampled. Differences in the maximum radionuclide concentrations in the 105-C pluto crib sand filter as compared to the other pluto cribs are even greater. Contaminated liquid wastes from the 105-C irradiated fuel examination facility evidently deposited the high concentrations of radionuclides observed in this facility, including both fission and activation products.

The 105-C pluto crib sand filter contains an estimated radioactive inventory of 260 curies. Beta-gamma concentrations in the sand filter average 4.2×10^4 pCi/g. The maximum beta-gamma activity detected is 7.3×10^6 pCi/g in a crud sample taken from an inlet distribution tray. Radioactivity in this sample is primarily from Co-60, though Sr-90 and Cs-137 concentrations of 2.9×10^4 and 1.4×10^5 pCi/g, respectively, are also present. The concentration of Pu-239/240 in the sample is 1.5×10^3 pCi/g. Pu-239/240 concentrations in the sand filter average approximately 20 pCi/g when averaged throughout the entire mass of the potentially contaminated soil column.

Average beta-gamma concentrations are more than two orders of magnitude less in the 105-C pluto crib itself, as compared to its sand filter. No plutonium was detected in the 105-C pluto crib which contains an estimated radioactive inventory of about 2 curies. The 105-F pluto crib contained the highest radionuclide inventory and concentrations of any of the other 100 Area pluto cribs. The 105-F pluto crib has a radioactive inventory of approximately 4 curies. Pu-239/240 was detected up to 110 pCi/g in the 105-F pluto crib, but was less than 10 pCi/g in samples taken from the remaining 100 Area pluto cribs.

Radionuclide concentrations and inventories of the 100 Area cribs and trenches are lowest in the 117 cribs. Based on sampling of the 117-F and DR cribs, a 117 crib contains less than 1 mCi of activity from reactor related radionuclides having concentrations of less than 1 pCi/g. These low radiation levels were expected since the radioactive effluents drained to these cribs reportedly had short half-lives and, therefore, the cribs had been released from radiological controls prior to 1967.

Estimated radioactive inventories in the individual 105 metal storage basin trenches range from 2 mCi to 4.7 curies. These inventories can be compared to the inventory remaining in the sludge along a typical metal storage basin floor which contains the order of 100 curies. Maximum Pu-239/240 concentrations in the metal storage basin trenches are a few pCi/g. Maximum radionuclide concentrations in the metal storage basin trenches are 10^3 to 10^4 times lower than the average concentrations remaining in the sludge along the metal storage basin floors. The 100 Area production reactor power levels were fairly low prior to the middle 1950s when through reactor redesign and modifications the power levels were increased substantially. The metal storage basin trenches were used primarily before the middle 1950s and, therefore, the radiation levels in the reactor effluents and basin sludge disposed of in the trenches were lower than those resulting after the power upgrade modifications were completed.

The Lewis Canal (116-F-1) is by far the largest trench contained within the miscellaneous cribs and trenches designation. This trench was originally several thousand feet long. All but 1500 feet on the inlet end of the trench have been released from radiological controls.

Fourteen sample holes were drilled in the Lewis Canal area. The sample hole locations for Lewis Canal are indicated on Figure 3.4-5. Contamination measurable with a GM probe was found only near the central portion of the canal (500 c/m for a sample taken at a depth of 3 feet). Spots of surface contamination were also found near the central portion of the canal. Surface readings of 10,000 c/m were detected in a 10-foot radius near the east side of the canal where the canal bends. This material was

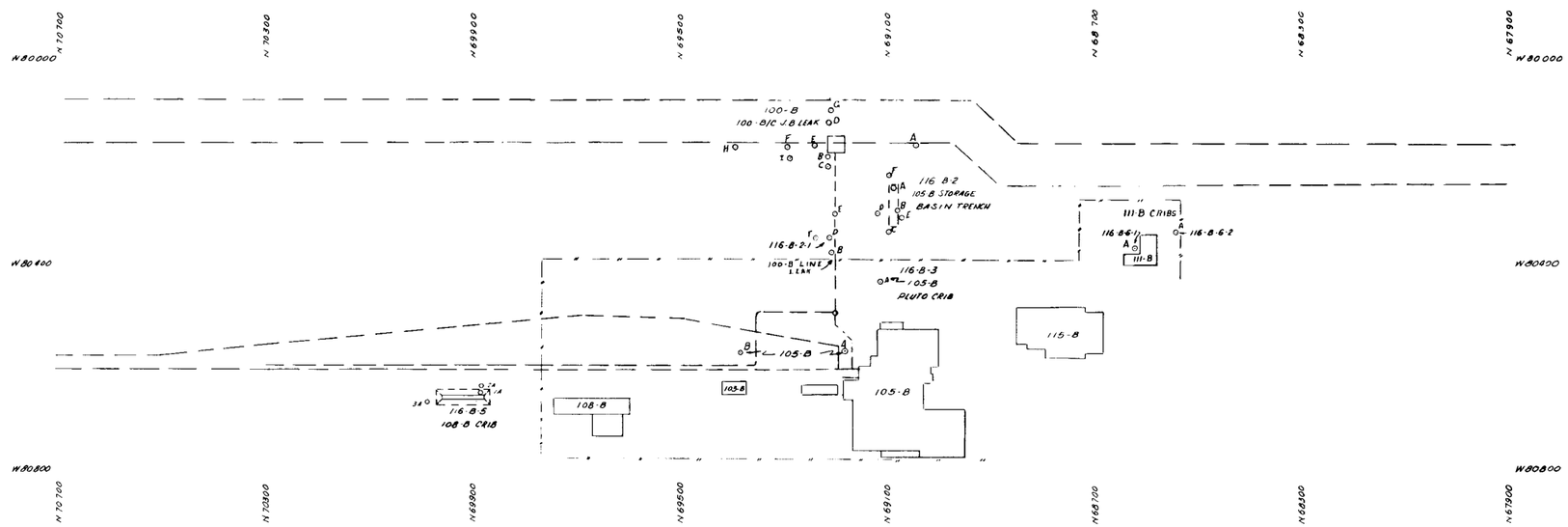
excavated and disposed of in the 200 Area burial grounds. The small excavation was backfilled with uncontaminated soil.

The Lewis Canal contains an estimated radioactive inventory of about 3 curies, primarily from low concentrations of Co-60, Eu-152, Eu-154 and Cs-137. Average beta-gamma concentrations in the Lewis Canal are only 34 pCi/g.

The 115-KW crib has an estimated radioactive inventory of 240 curies. The radioactivity in the 115-KW crib, however, is almost entirely from H-3 and C-14 which are low energy beta emitters. C-14 and H-3 were expected to be present in the 115-K cribs, since these cribs received condensate and other liquid wastes from the reactor gas purification system. H-3 and C-14 are present with approximately equal average concentrations of 2.4×10^5 and 2.1×10^5 pCi/g, respectively.

The 108-B crib has an estimated H-3 inventory of 300 curies. H-3 is present with concentrations up to a maximum of 7.3×10^4 pCi/g and averaging 1.6×10^4 pCi/g. Low concentrations of Eu-152, Eu-154, and Co-60 were also detected, but only account for an inventory of about 0.3 curies.

The locations of all the sample holes drilled into the miscellaneous cribs and trenches in each of the deactivated 100 Areas are given in Figures 3.4-1 through 3.4-7. Radioanalytical results for selected samples taken from the cribs and trenches within a given reactor area immediately follow the figure showing the sample hole locations for the area. Radionuclide inventory sheets for individual contaminated liquid waste disposal facilities are then included for each of the reactor areas. The inventory sheets include a description of the sizes of the potentially contaminated soil columns, and average radionuclide concentrations, in addition to the radionuclide inventories of the individual cribs and trenches.



100-B
100-B/C J.B LEAK

TEST HOLE	NORTH	WEST	ELEV
A	69051.10	80163.21	472.5
B	69221.84	80183.92	471.2
C	69222.10	80203.11	470.6
D	69218.62	80118.67	471.6
E	69247.46	80162.48	470.4
F	69300.21	80166.12	470.1
G	69218.84	80071.92	471.9
H	69400.18	80166.79	470.4
I	69294.23	80187.09	470.8

TEST HOLE	NORTH	WEST	ELEV.
116-B-2			
A	69095.79	80247.63	474.4
B	69086.44	80297.52	474.9
C	69102.34	80327.07	472.8
D	69125.55	80291.80	477.9
E	69080.14	80306.82	473.0
F	69101.72	80218.23	473.2
116-B2-1			
B	69215.65	80369.51	470.5
D	69218.05	80341.78	470.1
E	69209.20	80292.43	470.5
F	69245.71	80341.59	470.2
116-B-5 CRIB			
1A	69890.82	80608.05	462.2
2A	69889.30	80643.28	462.7
3A	69996.03	80660.34	462.3

TEST HOLE	NORTH	WEST	ELEV.
105-B			
A	69188.46	80564.51	469.4
B	69368.97	80568.97	468.9
116-B-3			
A	69120.06	80430.10	470.8
116-B-6			
A	69627.55	80363.05	476.9
B	69548.89	80333.16	477.6

FIGURE 3.4-1

105-B AREA SAMPLE HOLES, MISC. CRIBS & TRENCHES

TABLE 3.4-1

116-B

116-B MISC. CRIBS & TRENCHES

Concentrations (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
116-B-2 105-B STORAGE BASIN, TRENCH												
A 20	*	8.9×10^{-1}	2.0×10^{1}	3.4×10^{1}	400	2.1×10^{0}	6.2×10^{-1}	3.8×10^{-1}	*	3.7×10^{1}	2.3×10^{0}	1.9×10^{-1}
25	*	1.5×10^{-1}	2.1×10^{-1}		<200/40	2.4×10^{-1}	4.5×10^{-2}	*	*	5.6×10^{0}	2.2×10^{-1}	
B 15	*	1.4×10^{0}	5.9×10^{1}		<200/150	9.5×10^{0}	5.5×10^{-1}	1.1×10^{0}	*	6.2×10^{1}	1.4×10^{0}	
20	*	8.7×10^{-1}	4.4×10^{1}	3.1×10^{1}	<200/160	2.1×10^{0}	1.4×10^{-1}	2.0×10^{-1}	*	1.2×10^{1}	5.8×10^{-1}	2.4×10^{-1}
25	*	1.4×10^{-1}	8.1×10^{0}		<200/20	6.1×10^{-1}	1.1×10^{-1}	*	*	3.6×10^{0}	2.6×10^{-1}	
D 15	*	7.0×10^{-1}	6.6×10^{1}	3.6×10^{1}	<200/150	1.7×10^{-1}	9.8×10^{-2}	*	*	3.1×10^{1}	1.2×10^{0}	
20	*	*	3.8×10^{0}		<200/15	*	*	*	3.3×10^{-2}	6.0×10^{-1}	*	
E 12-1/2	*	9.9×10^{-1}	5.0×10^{1}	2.7×10^{1}	400	2.2×10^{0}	2.9×10^{-1}	2.1×10^{-1}	*	1.8×10^{1}	1.7×10^{0}	
15	*	1.1×10^{0}	7.7×10^{1}		<200/280	2.4×10^{0}	2.7×10^{-1}	5.8×10^{-1}	*	2.0×10^{1}	3.3×10^{0}	
20	*	1.8×10^{-1}	2.3×10^{1}		<200/30	5.2×10^{-1}	4.7×10^{-2}	*	*	3.2×10^{0}	3.5×10^{-1}	
116-B-3 105-B PLUTO CRIB												
A 8	3.3×10^{-1}	8.6×10^{0}	5.5×10^{1}	3.0×10^{2}	6,000	9.5×10^{2}	2.2×10^{3}	1.6×10^{2}	*	3.0×10^{2}	6.1×10^{1}	2.8×10^{-1}
10	*	5.2×10^{-1}	1.1×10^{0}		400	3.2×10^{1}	7.4×10^{1}	6.0×10^{0}	4.0×10^{-2}	3.5×10^{1}	3.6×10^{-1}	
15	*	7.7×10^{0}	3.3×10^{0}		200	6.9×10^{1}	5.2×10^{1}	1.7×10^{1}	*	9.7×10^{1}	2.0×10^{0}	

TABLE 3.4-1 (Cont'd)

116-B

116-B MISC. CRIBS & TRENCHES (Cont'd)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
	Concentration (pCi/g)											
116-B-5 108-B CRIB												
A 8	*	*	$1.2x10^{-1}$	$7.3x10^{4}$	300	$2.6x10^{1}$	$2.1x10^{1}$	$8.9x10^{0}$	*	$4.5x10^{-1}$	$1.4x10^{-1}$	
10	*	*	$1.6x10^{-1}$	$4.0x10^{3}$	<200/40	$1.9x10^{0}$	$1.7x10^{0}$	*	$2.9x10^{-2}$	$5.8x10^{-2}$	*	
B 10				$2.1x10^{2}$	<200/15	*	*	*	*	*	*	
22-1/2				$4.5x10^{2}$	<200/5	*	*	*	*	*	*	
C 10				*	<200/25	*	*	*	*	*	*	
116-B-6-1 111-B CRIB #1												
A 15	*	$3.6x10^{0}$	$1.4x10^{3}$	*	1,000	$2.9x10^{-1}$	$6.1x10^{0}$	$4.1x10^{-1}$	*	$2.1x10^{2}$	$1.5x10^{1}$	$1.0x10^{0}$
20	*	$3.0x10^{0}$	$2.2x10^{3}$		600	*	$1.5x10^{1}$	$1.8x10^{-1}$	*	$3.7x10^{2}$	$8.6x10^{0}$	
22-1/2	*	$1.9x10^{-1}$	$3.4x10^{1}$		200/100	*	$7.8x10^{-1}$	$2.7x10^{-1}$	*	$2.1x10^{1}$	$8.7x10^{-1}$	
116-B-6-2 111-B CRIB #2												
A 0	*	*	$2.8x10^{-1}$	$1.5x10^{1}$	<200/300	$2.9x10^{-1}$	$5.3x10^{-2}$	*	$4.1x10^{-2}$	$3.1x10^{-1}$	$1.7x10^{-1}$	$7.7x10^{-2}$

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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	$= 3.7 \times 10^{-1}$

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' = 1.3×10^4 ft^3

Mass = 8.9×10^8g

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

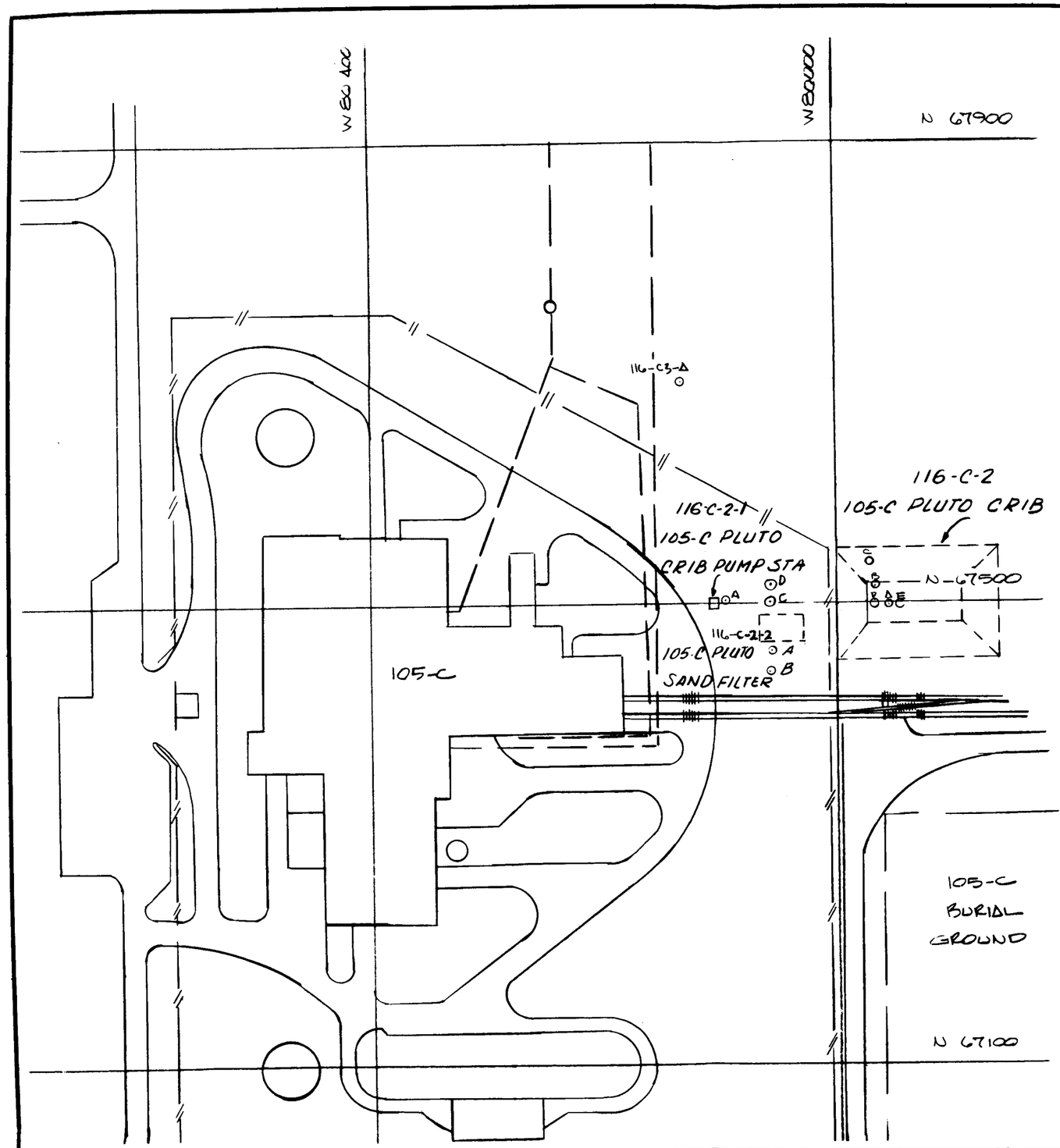
Potentially Contaminated Soil Column

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}



TEST HOLE #	NORTHING	WESTING	ELEV.
116-C-2 A	67 498.66	79 954.90	492.80
116-C-2 B	67 514.75	79 967.75	492.50
116-C-2 C	67 534.17	79 970.66	492.10
116-C-2 D	67 499.93	79 970.04	492.50
116-C-2 E	67 499.76	79 939.22	492.80
116-C-2-1 A	67 503.81	80 094.97	492.60
116-C-2-2 A	67 439.95	80 058.52	493.70
116-C-2-2 B	67 458.69	80 055.85	493.20
116-C-2-2 C	67 495.78	80 060.88	492.60
116-C-2-2 D	67 505.32	80 066.60	492.50
116-C-3 A	67 695.28	80 133.21	492.20

FIGURE 3.4-2

105-C AREA SAMPLE HOLES, MISC. CRIBS & TRENCHES

TABLE 3.4-7

116-C

116-C MISC. CRIBS & TRENCHES

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
	Concentration (pCi/g)											
116-C-2 105-C PLUTO CRIB												
B 31	*	*	$1.1x10^{2}$		250	$4.6x10^{-1}$	$1.6x10^{0}$	*	*	$1.1x10^{-1}$	$2.1x10^{0}$	
35	*	*	$1.8x10^{2}$	$6.9x10^{0}$	500	$1.1x10^{0}$	$2.0x10^{0}$	$4.4x10^{-1}$	*	$1.4x10^{-1}$	$1.8x10^{0}$	$1.1x10^{-1}$
50	*	*	$3.8x10^{1}$		<200/160	*	$1.8x10^{-1}$	*	*	$6.9x10^{-2}$	$1.1x10^{0}$	
D 25	*	*	$1.5x10^{1}$		<200/150	$1.4x10^{0}$	$7.9x10^{0}$	*	*	$1.5x10^{-1}$	$9.5x10^{-2}$	
30	*	*	$2.3x10^{2}$	$2.3x10^{1}$	300	$5.4x10^{0}$	$1.4x10^{1}$	$2.7x10^{-1}$	$6.9x10^{-2}$	$1.3x10^{-1}$	$2.2x10^{0}$	
35	*	*	$1.7x10^{2}$		200	$1.2x10^{0}$	$2.2x10^{0}$	*	$7.5x10^{-2}$	$6.9x10^{-2}$	$1.9x10^{0}$	
E 35	*	*	$1.7x10^{2}$	$1.3x10^{2}$	<200/300	$6.3x10^{-1}$	$1.1x10^{0}$	*	*	$8.4x10^{-2}$	$2.0x10^{0}$	
116-C-2-1 105-C PLUTO CRIB PUMP STATION												
A 30	*	$4.2x10^{-1}$	$2.2x10^{0}$	$4.8x10^{1}$	<200/70	$4.5x10^{0}$	$5.4x10^{-1}$	*	$2.5x10^{-1}$	$2.4x10^{-1}$	$5.2x10^{-1}$	
116-C-2-2 105-C Pluto Crib Sand Filter												
A 25	$7.7x10^{-1}$	$7.9x10^{0}$	$1.4x10^{1}$	$9.3x10^{1}$	1,000	$5.3x10^{1}$	$4.9x10^{2}$	$3.3x10^{0}$	$7.7x10^{0}$	$2.8x10^{2}$	*	$1.3x10^{-1}$
30	*	$9.7x10^{-1}$	$2.2x10^{1}$		750	$7.1x10^{2}$	$4.2x10^{1}$	$4.1x10^{1}$	$1.2x10^{1}$	$8.7x10^{1}$	$9.0x10^{2}$	
C 22-1/2	*	$1.1x10^{0}$	$1.2x10^{1}$		500	$2.7x10^{2}$	$1.8x10^{2}$	$3.7x10^{1}$	$4.3x10^{-1}$	$1.6x10^{2}$	$1.2x10^{1}$	
1	$1.6x10^{3}$	$1.5x10^{3}$	$2.9x10^{4}$	$2.2x10^{2}$	120 mR/hr		$7.1x10^{6}$			$1.4x10^{5}$		
2					80 mR/hr		$1.2x10^{5}$			$4.9x10^{3}$		
3					15 mR/hr	$2.0x10^{3}$	$8.3x10^{4}$			$5.7x10^{3}$		
4				$5.2x10^{1}$	80 mR/hr		$1.0x10^{5}$			$2.1x10^{3}$		

116-C-2-2 Samples

1 through 4 were taken from the sand filter in the following locations:
1 - Crud sample from inlet distribution tray.
2 - Crud sample from outlet distribution tray.
3 - Inlet filter bed sample.
4 - Outlet filter bed sample.

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 = 9.5×10^9 g

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

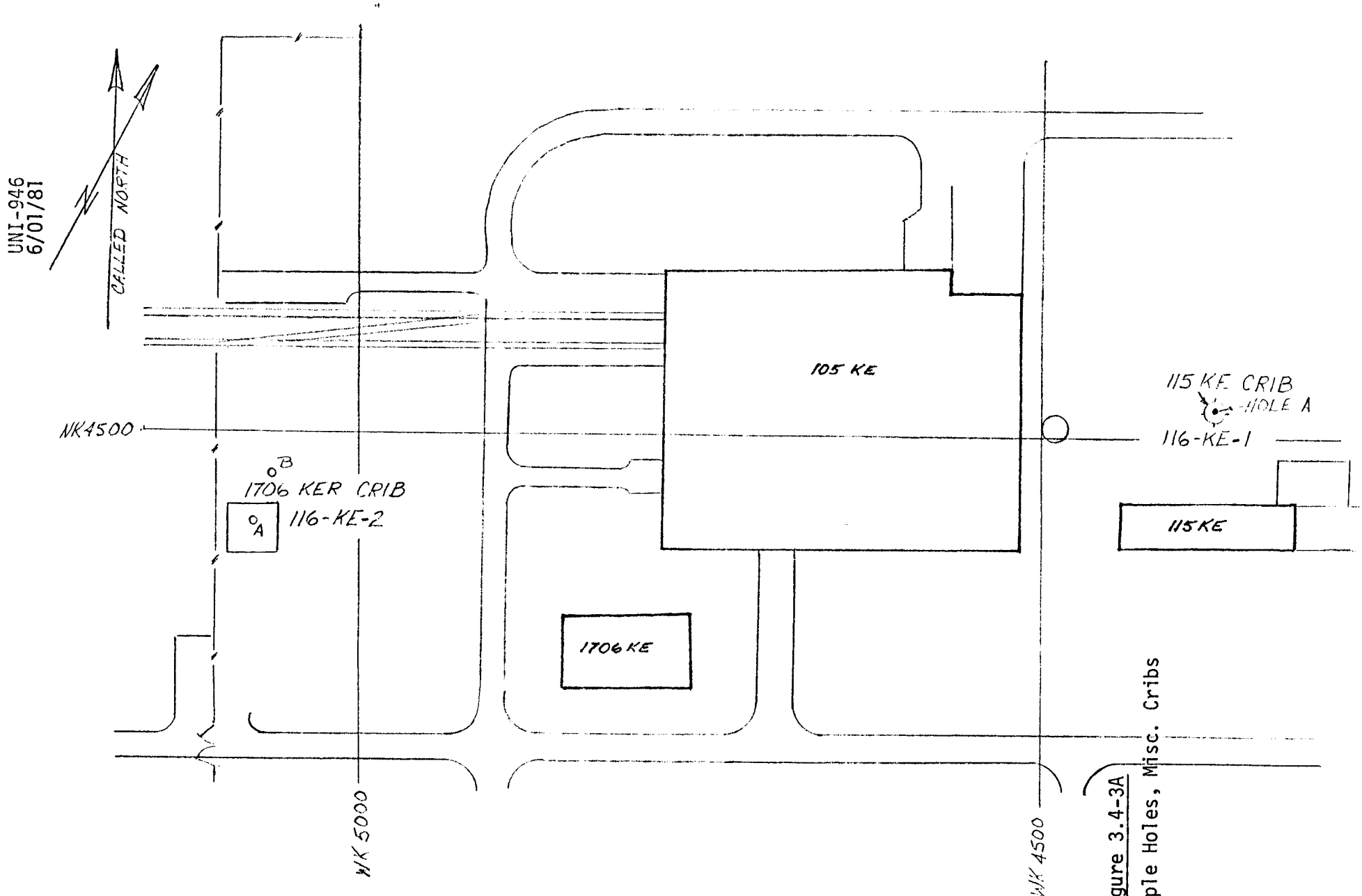
Potentially Contaminated Soil Column

Volume = 50' x 60' x 30' = 9.0×10^4 ft^3

Mass = 6.1×10^9 g

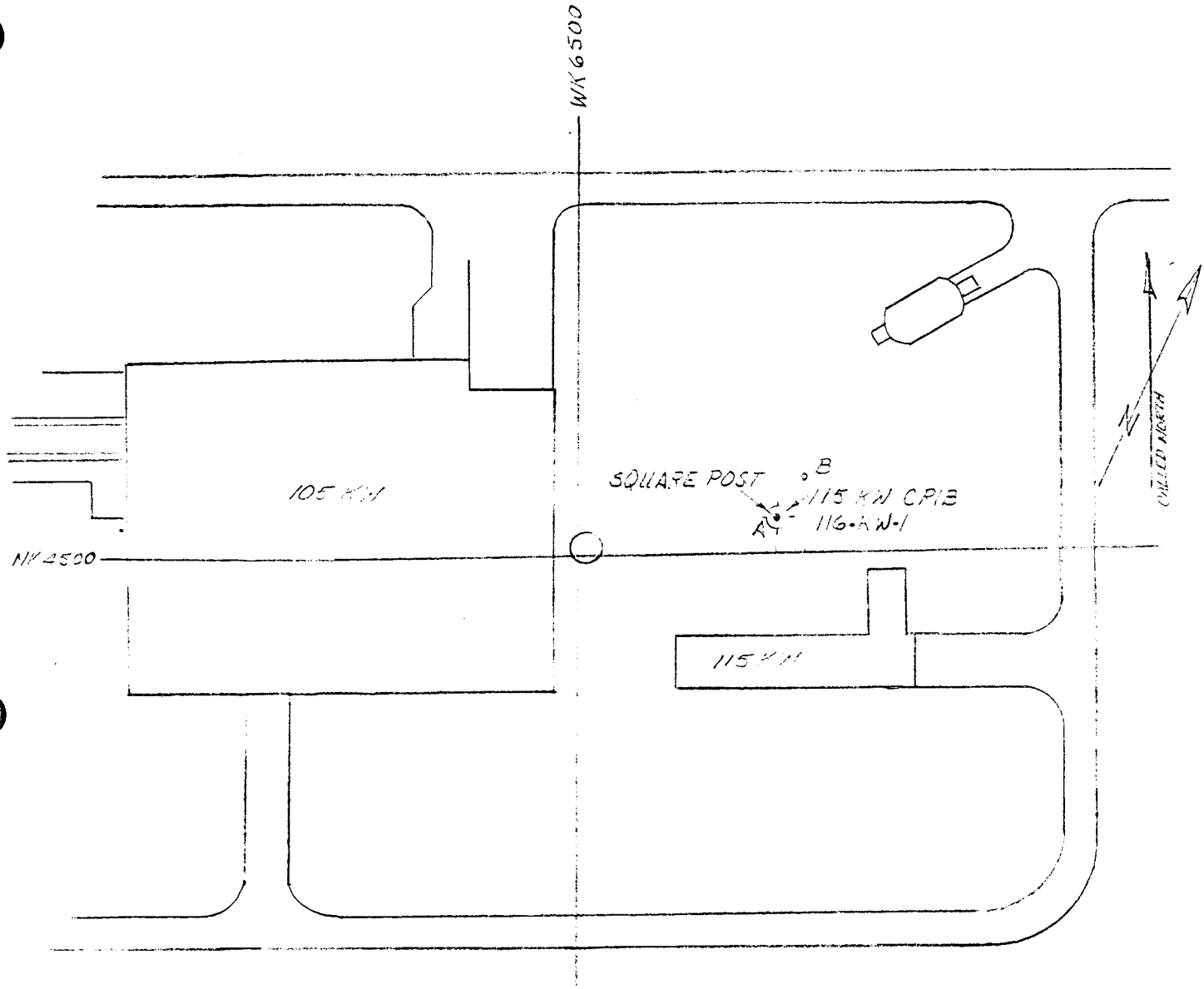
Radionuclide	Ave. pCi/g	Curies
Pu-238	1.9×10^1	1.2×10^{-1}
Pu-239/240	1.9×10^1	1.2×10^{-1}
Sr-90	3.6×10^2	2.2
H-3	7.3×10^1	4.5×10^{-1}
Eu-152	1.3×10^3	7.9
Co-60	3.7×10^4	230
Eu-154	1.0×10^2	6.1×10^{-1}
Cs-134	6.5×10^1	3.9×10^{-1}
Cs-137	1.7×10^3	10
Eu-155	1.1×10^3	6.7
	Total Curies =	260

NOTE: Average concentrations are based on samples A-25, A-30, C-22-1/2, and 3 & 4.



116-KE-1			116-KE-2		
HOLE	NORTH	WEST	HOLE	NORTH	WEST
A	4522.87	4314.29	A	4443.25	5073.95
			B	4473.13	5062.57

Figure 3.4-3A
105-KE Area Sample Holes, Misc. Cribs



115 KW CRIB

HOLE	NORTH	WEST
A	4523.56	6374.72
B	4548.13	6357.51

Figure 3.4-3 B

105-KW Area Sample Holes, Misc. Cribs

TABLE 3.4-10

116-K MISC. CRIBS

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	C-14
					Concentration (pCi/g)								
116-KE-2 1706-KER CRIB													
A 40	*	$1.7x10^{-1}$	$1.6x10^{2}$		4,500	*	$1.5x10^{3}$	$2.2x10^{1}$	*	$5.1x10^{1}$	$3.3x10^{0}$		
42-1/2	*	$6.1x10^{0}$	$6.9x10^{2}$	$1.5x10^{2}$	15,000	$1.1x10^{0}$	$9.7x10^{3}$	$9.2x10^{1}$	*	$2.2x10^{2}$	$1.3x10^{1}$	$2.4x10^{-1}$	$1.4x10^{1}$
47-1/2	*	*	$1.6x10^{1}$	$4.0x10^{0}$	500	$2.5x10^{-1}$	$1.5x10^{2}$	$8.8x10^{-1}$	*	$9.9x10^{-1}$	*		
116-KW-1 115-KW CRIB													
B 27-1/2	*	*	$2.7x10^{1}$	$4.7x10^{5}$	300	*	$3.3x10^{0}$	$3.3x10^{-1}$	$2.4x10^{0}$	$6.4x10^{0}$	$1.1x10^{1}$	$3.1x10^{-1}$	$3.9x10^{5}$
35	*	*	$1.8x10^{0}$	$8.3x10^{3}$	<200/130	*	$7.9x10^{0}$	$2.4x10^{-1}$	$5.3x10^{-2}$	$9.8x10^{0}$	*	$1.1x10^{-1}$	$3.6x10^{4}$
116-KE-1 115-KE CRIB													
A 30				$4.7x10^{3}$									

UNI-946

Table 3.4-11

116-KE-2

1706-KER CRIB

Potentially Contaminated Soil Column

Volume = 80' x 80' x 20' = 1.3×10^5 ft^3

Mass = 8.8×10^9 g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	2.1×10^0	1.9×10^{-2}
Sr-90	2.9×10^2	2.6
H-3	7.7×10^1	6.8×10^{-1}
Eu-152	4.5×10^{-1}	4.0×10^{-3}
Co-60	3.8×10^3	33
Eu-154	3.8×10^1	3.3×10^{-1}
Cs-134	*	0.0
Cs-137	9.1×10^1	8.0×10^{-1}
Eu-155	5.4×10^0	4.8×10^{-2}
U	2.4×10^{-1}	2.1×10^{-3}
C-14	1.4×10^1	1.2×10^{-1}
	Total Curies =	38

Table 3.4-12

116-KW-1

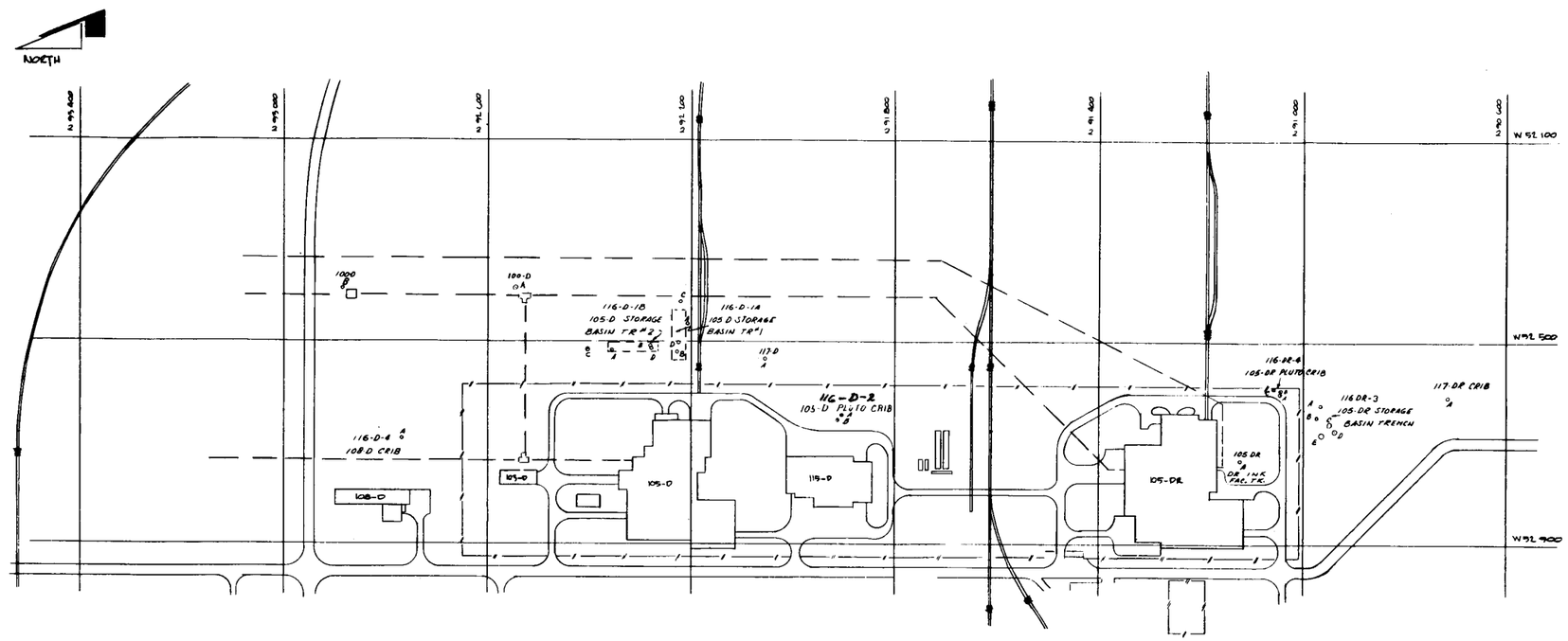
115-KW CRIB

Potentially Contaminated Soil Column

Volume = 20' x 20' x 20' = $8.0 \times 10^3 ft^3$

Mass = $5.4 \times 10^8 g$

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	*	0.0
Sr-90	1.4×10^1	7.6×10^{-3}
H-3	2.4×10^5	130
Eu-152	*	0.0
Co-60	5.6×10^0	3.0×10^{-3}
Eu-154	2.9×10^{-1}	1.6×10^{-4}
Cs-134	1.2×10^0	6.5×10^{-4}
Cs-137	8.1×10^0	4.4×10^{-3}
Eu-155	5.5×10^0	3.0×10^{-3}
U	2.1×10^{-1}	1.1×10^{-4}
C-14	2.1×10^5	110
	Total Curies =	240



TEST HOLE	NORTH	WEST	ELEV.
100-D			
A	92546	52398	469.3
B	92384	52394	468.6
116-D-4			
A	92768	52691	467.9
116-D-1A			
A	92207	52463	467.9
D	92224	52502	467.9
C	92220	52419	468.0
B	92226	52521	467.8
116-D-1B A	92355	52517	468.1
B	92280	51506	468.3
C	92405	52517	467.5
D	92278	52511	468.4
117-D			
A	92053	52532	464.9
116-D-2			
A	91904	52644	464.1
B	91911	52653	464.6
117-DR			
A	90715	52609	458.3

TEST HOLE	NORTH	WEST	ELEV.
116-DR-4			
A	91046	52602	461.1
B	91045	52598	460.8
C	91058	52590	461.2
116-DR-3			
A	90962	52672	460.9
B	90949	52676	460.3
C	90971	52650	459.8
D	90939	52700	459.3
E	90964	52682	462.6
105-DR			
A	91123	52734	461.3

FIGURE 3.4-4

105-D/DR AREA SAMPLE HOLES, MISC. CRIBS & TRENCHES

TABLE 3.4-13

116-D/DR

116-D/DR MISC. CRIBS & TRENCHES

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-514	Cs-134	Cs-137	Eu-155	U
	Concentration (pCi/g)											
116-D-1A 105-D STORAGE BASIN TRENCH #1												
A 0	*	$1.2x10^{-1}$	$2.7x10^{0}$		<200/40	$6.4x10^{0}$	$3.1x10^{0}$	$9.9x10^{-1}$	*	$1.9x10^{1}$	$1.5x10^{-1}$	
B 15	*	$2.0x10^{-1}$	$4.6x10^{0}$		<200/50	$1.1x10^{0}$	$5.1x10^{0}$	$2.5x10^{0}$	$1.1x10^{-1}$	$2.6x10^{1}$	$3.9x10^{-1}$	
22-1/2	*	$6.1x10^{0}$	$5.8x10^{0}$	$1.1x10^{2}$	500	$1.3x10^{2}$	$7.3x10^{1}$	$5.0x10^{0}$	$3.9x10^{0}$	$5.4x10^{2}$	$3.1x10^{1}$	$2.7x10^{-1}$
C 0	*	$1.9x10^{-1}$	$4.6x10^{0}$		<200/100	$1.2x10^{1}$	$5.1x10^{0}$	$2.3x10^{0}$	$4.9x10^{-2}$	$2.6x10^{1}$	$7.7x10^{-1}$	
15	*	*	$5.2x10^{-2}$		<200/20	*	$5.1x10^{-2}$	*	$4.5x10^{-2}$	$2.1x10^{-1}$	*	
D 5	*	$2.7x10^{-1}$	$4.4x10^{0}$		<200/90	$1,5x10^{1}$	$6.5x10^{0}$	$2.9x10^{0}$	*	$3.3x10^{1}$	$1.9x10^{-1}$	
15	*	$4.5x10^{0}$	$5.4x10^{1}$	$8.4x10^{1}$	550	$2.8x10^{2}$	$9.4x10^{1}$	$6.3x10^{1}$	*	$6.6x10^{0}$	$6.1x10^{1}$	
30	*	$1.6x10^{-1}$	$9.8x10^{0}$		400	$1.6x10^{2}$	$4.3x10^{1}$	$5.3x10^{1}$	$1.4x10^{0}$	$6.4x10^{0}$	$2.2x10^{1}$	
116-D-1B 105-D STORAGE BASIN TRENCH #2												
A 0	*	*	$2.4x10^{0}$		<200/40	$5.0x10^{0}$	$2.0x10^{0}$	$1.2x10^{0}$	*	$1.4x10^{1}$	$1.1x10^{-1}$	
20	*	$2.6x10^{-1}$	$6.0x10^{1}$	$1.5x10^{1}$	<200/100	$1.5x10^{1}$	$6.2x10^{0}$	$2.4x10^{0}$	*	$8.7x10^{0}$	$3.6x10^{-1}$	
25			$9.2x10^{0}$		<200/30	$1.5x10^{0}$	$4.3x10^{-1}$	$2.6x10^{-1}$	*	$1.0x10^{0}$	*	
B 5	*	$3.0x10^{-1}$	$7.9x10^{0}$		<200/75	$2.2x10^{1}$	$9.2x10^{0}$	$3.9x10^{0}$	*	$3.6x10^{1}$	$5.3x10^{-1}$	
15	*	$2.3x10^{0}$	$2.9x10^{1}$	$1.8x10^{1}$	450	$1.2x10^{2}$	$3.8x10^{1}$	$2.8x10^{0}$	*	$1.3x10^{1}$	$3.1x10^{-1}$	$1.8x10^{-1}$
25	*	$4.6x10^{-1}$	$8.9x10^{0}$		300	$1.5x10^{1}$	$1.9x10^{1}$	$1.5x10^{0}$	*	$5.6x10^{1}$	$2.5x10^{-1}$	
C 20	*	*	$3.6x10^{-1}$	*	<200/80	*	*	*	*	$4.7x10^{-1}$	*	
25			$6.0x10^{-2}$		<200/25	*	$4.6x10^{-2}$	*	*	$2.1x10^{-1}$	*	
D 15	*	$6.8x10^{-1}$	$9.2x10^{0}$		500	$1.3x10^{2}$	$6.6x10^{1}$	$2.2x10^{1}$	$3.8x10^{0}$	$1.8x10^{2}$	$6.9x10^{2}$	
30	*	$3.2x10^{-1}$	$2.1x10^{0}$		300	$2.7x10^{1}$	$1.4x10^{1}$	$5.2x10^{0}$	*	$6.1x10^{-1}$	$5.3x10^{-1}$	
35	*	*	$2.9x10^{1}$	$2.1x10^{1}$	<200/50	$1.2x10^{0}$	$1.3x10^{-1}$	$2.9x10^{-1}$	*	$3.7x10^{-2}$	$5.1x10^{-1}$	
116-D-4 108-D CRIB #2												
A 5	*	$3.3x10^{-1}$	$2.5x10^{-1}$		<200/25	*	*	*	*	*	$1.1x10^{-1}$	

TABLE 3.4-13 (Cont'd)

116-D/DR

116-D/DR MISC. CRIBS & TRENCHES (Cont'd)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
	Concentration (pCi/g)											
116-DR-3 105-DR STORAGE BASIN TRENCH												
A 25	*	*	$2.3x10^{0}$		<200/40	$6.6x10^{0}$	$7.6x10^{0}$	$1.8x10^{0}$	$2.1x10^{-1}$	$3.5x10^{-1}$	$9.5x10^{-1}$	
C 15	*	$3.8x10^{0}$	$6.7x10^{1}$	$1.3x10^{2}$	100/240	$2.8x10^{1}$	$2.7x10^{1}$	$5.0x10^{0}$	*	$4.8x10^{1}$	*	
25	*	$1.4x10^{-1}$	$6.0x10^{0}$		<200/40	$1.7x10^{0}$	$2.0x10^{0}$	$4.7x10^{-1}$	*	$2.7x10^{0}$	*	
116-DR-4 105-DR PLUTO CRIB												
A 15	*	$1.9x10^{-1}$	$6.1x10^{0}$		<200/100	$8.3x10^{0}$	$3.5x10^{0}$	*	*	$5.1x10^{1}$	$7.4x10^{-1}$	
20	*	*	$3.1x10^{0}$	*	<200/100	$5.8x10^{-1}$	$3.0x10^{0}$	*	*	$3.6x10^{1}$	$3.4x10^{-1}$	
23	*	*	$5.8x10^{-1}$		<200/60	$2.4x10^{-1}$	*	*	$4.9x10^{-2}$	$1.1x10^{-1}$	*	
100-DR 117-DR CRIB												
A 10	*	*	$5.7x10^{-2}$	*	<200/20	*	*	*	*	$1.1x10^{-1}$	*	
105-DR DR INK FACILITY TANK												
A 20	*	*	$2.7x10^{-1}$		<200/40	*	*	*	$4.2x10^{-2}$	$1.6x10^{-1}$	*	

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Table 3.4-14

116-D-1A

105-D STORAGE BASIN TRENCH #1

Potentially Contaminated Soil Column

Volume = 150' x 40' x 35' = 2.1×10^5 ft^3

Mass = 1.4×10^{10}g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	1.4×10^0	2.0×10^{-2}
Sr-90	1.1×10^1	1.5×10^{-1}
H-3	9.7×10^1	1.4
Eu-152	7.6×10^1	1.1
Co-60	2.9×10^1	4.1×10^{-1}
Eu-154	1.6×10^1	2.2×10^{-1}
Cs-134	6.9×10^{-1}	9.7×10^{-3}
Cs-137	9.0×10^1	1.3
Eu-155	7.6×10^0	1.1×10^{-1}
U	2.7×10^{-1}	3.8×10^{-3}
	Total Curies =	4.7

Table 3.4-15

116-D-1B

105-D STORAGE BASIN TRENCH #2

Potentially Contaminated Soil Column

Volume = 150' x 40' x 35' = 2.1×10^5 ft^3

Mass = 1.4×10^{10}g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	4.8×10^{-1}	6.7×10^{-3}
Sr-90	1.4×10^{1}	2.0×10^{-1}
H-3	1.4×10^{1}	2.0×10^{-1}
Eu-152	3.1×10^{1}	4.3×10^{-1}
Co-60	1.4×10^{1}	2.0×10^{-1}
Eu-154	5.9×10^{0}	8.3×10^{-2}
Cs-134	3.5×10^{-1}	4.9×10^{-3}
Cs-137	4.4×10^{1}	6.2×10^{-1}
Eu-155	6.3×10^{1}	8.8×10^{-1}
U	1.8×10^{-1}	2.5×10^{-3}
C-14	No data	

Total Curies = 2.6

Table 3.4-16

116-DR-3

105-DR STORAGE BASIN TRENCH

Potentially Contaminated Soil Column

Volume = 60' x 40' x 15' = 3.6×10^4 ft^3

Mass = 2.5×10^9 g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	1.3×10^0	3.3×10^{-3}
Sr-90	2.5×10^1	6.3×10^{-2}
H-3	1.3×10^2	3.3×10^{-1}
Eu-152	1.2×10^1	3.0×10^{-2}
Co-60	1.2×10^1	3.0×10^{-2}
Eu-154	2.4×10^0	6.0×10^{-3}
Cs-134	7.0×10^{-2}	1.8×10^{-4}
Cs-137	1.7×10^1	4.3×10^{-2}
Eu-155	3.2×10^{-1}	8.0×10^{-4}
	Total Curies =	5.1×10^{-1}

Table 3.4-17

116-DR-4

105-DR PLUTO CRIB

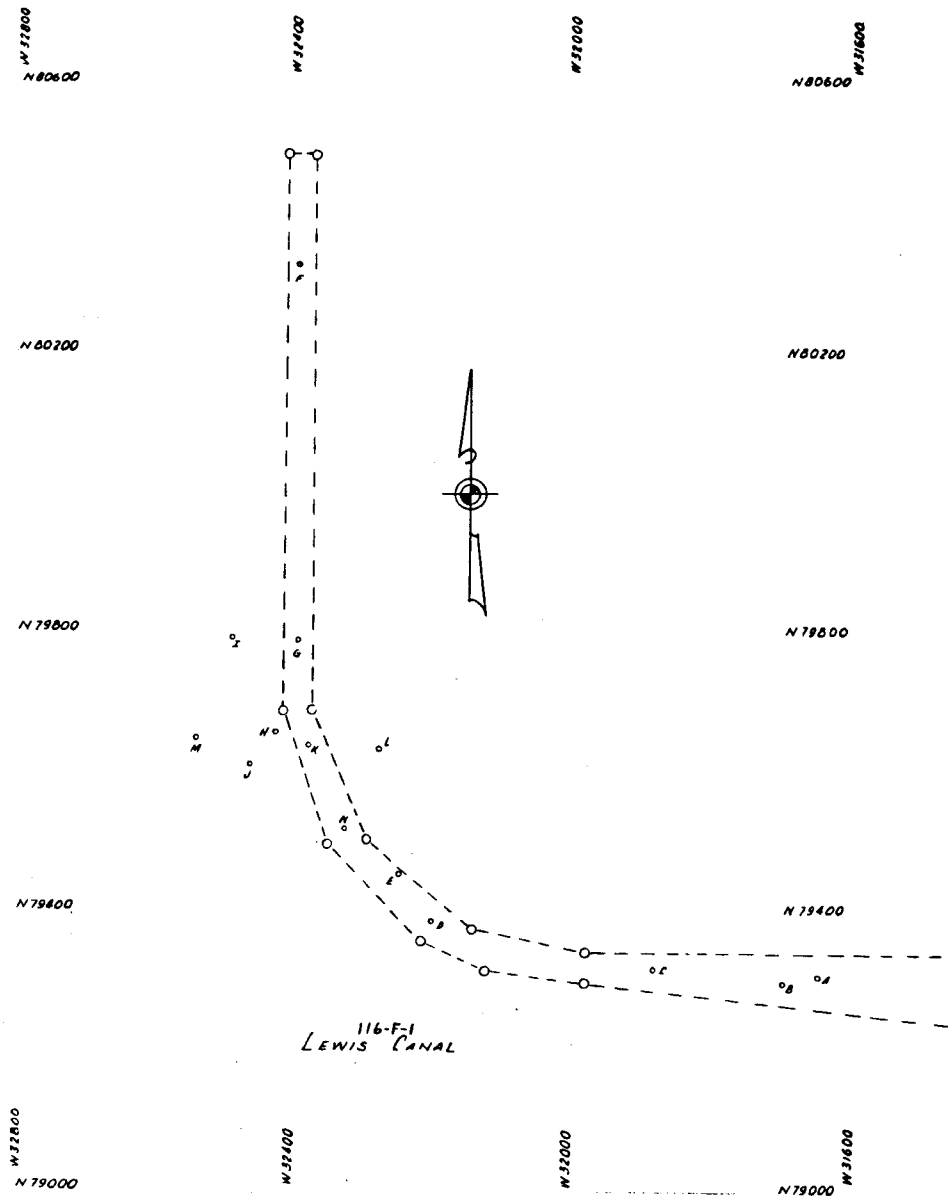
Potentially Contaminated Soil Column

Volume = 30' x 30' x 25' - 2.3×10^4 ft^3

Mass = 1.6×10^9 g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	6.3×10^{-2}	1.0×10^{-4}
Sr-90	3.3×10^{0}	5.3×10^{-3}
H-3	*	0.0
Eu-152	3.0×10^{0}	4.8×10^{-3}
Co-60	2.2×10^{0}	3.5×10^{-3}
Eu-154	*	0.0
Cs-134	1.6×10^{-2}	2.6×10^{-5}
Cs-137	2.9×10^{1}	4.6×10^{-2}
Eu-155	3.6×10^{-1}	5.8×10^{-4}
	Total Curies =	6.0×10^{-2}

100-DR	117 Seal Pit Drain Crib	< 1mCi
105-DR	Inkwell Crib (3X Liquid)	<.1 Curie
116-D2	Pluto Crib. No UST data requested. No field indication <bkg. on any sample from two test holes 28' and 30' depth.	
116=D3 & 4	108-D Cribs	<.1 Curie

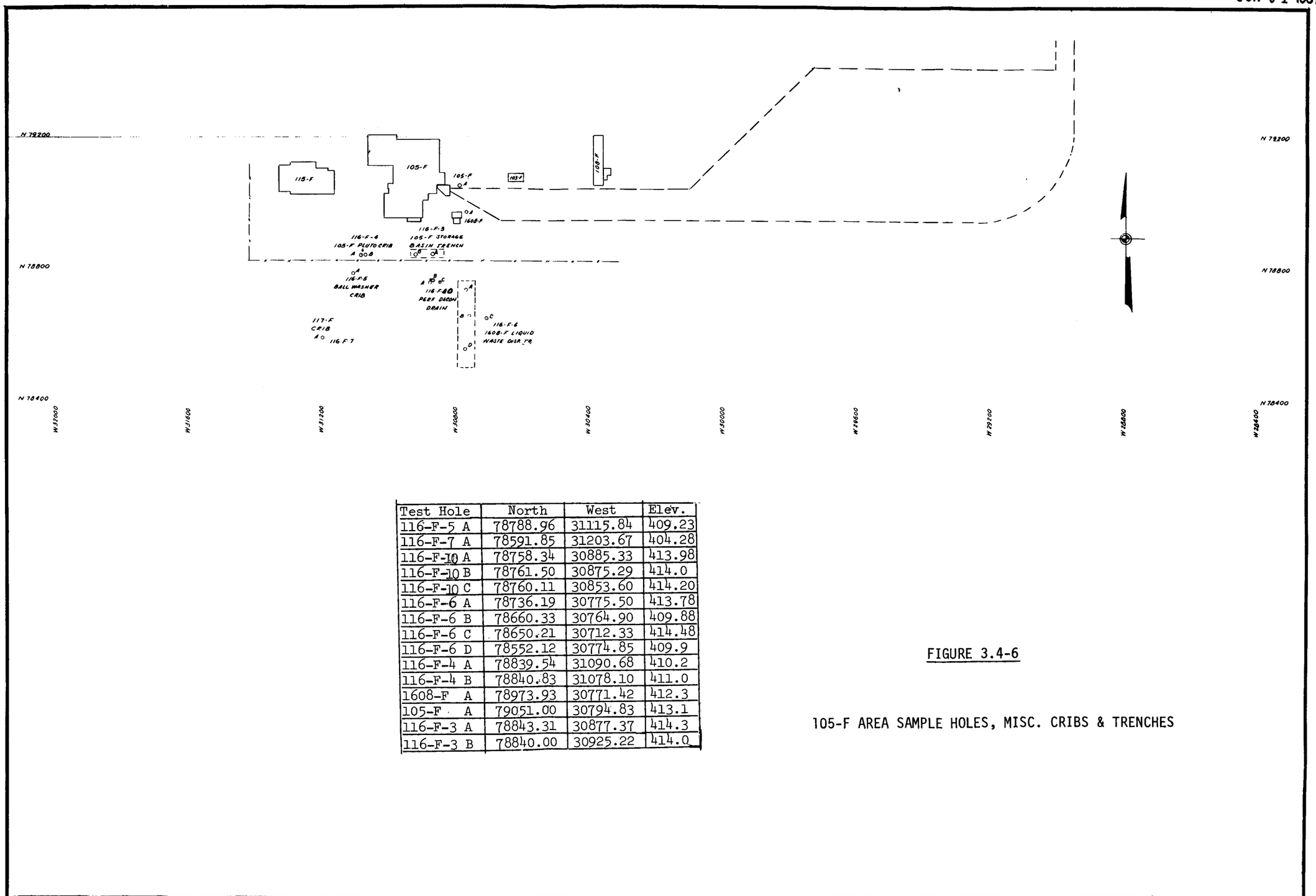


LEWIS CANAL TEST HOLES 116-F-1

TEST HOLE	N	W	ELEV
A	79310.40	31654.65	401.74
B	79300.25	31703.99	401.20
C	79310.11	31889.97	399.56
D	79387.69	32204.24	391.38
E	79457.02	32250.99	391.20
N	79517.32	32333.25	389.83
L	79636.22	32282.48	390.10
K	79642.06	32385.63	389.60
H	79657.91	32429.26	388.05
J	79611.30	32465.35	388.91
M	79648.74	32545.32	389.00
I	79793.23	32495.53	384.05
G	79768.83	32398.76	389.53
F	80332.65	32403.75	389.90

Figure 3.4-5

LEWIS CANAL SAMPLE HOLES



Test Hole	North	West	Elev.
116-F-5 A	78788.96	31115.84	409.23
116-F-7 A	78591.85	31203.67	404.28
116-F-10 A	78758.34	30885.33	413.98
116-F-10 B	78761.50	30875.29	414.0
116-F-10 C	78760.11	30853.60	414.20
116-F-6 A	78736.19	30775.50	413.78
116-F-6 B	78660.33	30764.90	409.88
116-F-6 C	78650.21	30712.33	414.48
116-F-6 D	78552.12	30774.85	409.9
116-F-4 A	78839.54	31090.68	410.2
116-F-4 B	78840.83	31078.10	411.0
1608-F A	78973.93	30771.42	412.3
105-F A	79051.00	30794.83	413.1
116-F-3 A	78843.31	30877.37	414.3
116-F-3 B	78840.00	30925.22	414.0

FIGURE 3.4-6

105-F AREA SAMPLE HOLES, MISC. CRIBS & TRENCHES

TABLE 3.4-18

116-F MISC. CRIBS & TRENCHES

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
	Concentration (pCi/g)											
116-F-3 105-F STORAGE BASIN TRENCH												
A 18	*	*	5.4×10^{-2}		<200/25	*	*	*	*	*	*	
B 20	*	*	1.1×10^{-1}	1.4×10^{-1}	<200/30	1.7×10^{-1}	5.0×10^{-2}	*	*	*	1.1×10^{-1}	
116-F-4 105-F PLUTO CRIB												
A 8	1.5×10^{0}	1.1×10^{2}	3.0×10^{3}	1.4×10^{1}	6,000	2.1×10^{1}	*	1.3×10^{2}	4.2×10^{1}	5.4×10^{3}	3.5×10^{2}	1.3×10^{0}
12-1/2	3.8×10^{-1}	2.9×10^{1}	6.4×10^{2}		3,000	1.4×10^{1}	1.4×10^{0}	3.1×10^{1}	*	1.1×10^{3}	2.6×10^{1}	
20	*	7.2×10^{-1}	1.6×10^{1}		<200/150	5.8×10^{-1}	*	*	*	2.2×10^{1}	3.1×10^{-1}	
B 5	*	1.1×10^{-1}	7.6×10^{-2}		<200/35	*	*	*	*	5.9×10^{-1}	7.6×10^{-2}	
116-F-5 BALL WASHER CRIB												
A 10	*	*	2.7×10^{-2}		<200/30	*	*	5.4×10^{-1}	*	4.0×10^{-2}	1.6×10^{-1}	
116-F-6 1608-F LIQUID WASTE DISPOSAL TRENCH												
A 7-1/2	*	7.6×10^{-1}	9.8×10^{0}	6.9×10^{1}	600	1.8×10^{2}	1.4×10^{2}	5.8×10^{1}	*	7.2×10^{1}	3.8×10^{0}	1.9×10^{-1}
15	*	2.0×10^{-1}	4.9×10^{0}		300	1.6×10^{1}	1.0×10^{1}	5.3×10^{0}	*	9.4×10^{0}	1.6×10^{-1}	
27			4.5×10^{0}		<200/25	2.1×10^{0}	1.3×10^{0}	6.3×10^{-1}	4.4×10^{-2}	1.1×10^{0}	3.1×10^{-1}	
B 10	*	2.0×10^{-1}	3.0×10^{0}	5.4×10^{1}	400	7.6×10^{1}	4.4×10^{1}	2.2×10^{1}	3.8×10^{-1}	2.5×10^{1}	5.1×10^{0}	
17-1/2	*	1.7×10^{-1}	3.4×10^{0}		<200/160	4.8×10^{1}	2.5×10^{1}	1.4×10^{1}	*	2.2×10^{1}	7.2×10^{-1}	
22-1/2			2.3×10^{0}		<200/30	1.1×10^{0}	3.4×10^{-1}	2.3×10^{-1}	5.3×10^{-2}	3.1×10^{-1}	7.3×10^{-2}	
C 25	*	*	2.3×10^{0}		<200/40	*	*	*	*	*	1.1×10^{-1}	
28			3.6×10^{0}		<200/25	*	*	*	*	*	*	
D 5	*	*	2.3×10^{0}		<200/75	7.6×10^{0}	3.3×10^{0}	1.2×10^{0}	5.6×10^{-2}	1.1×10^{1}	9.2×10^{-2}	
20	*	5.7×10^{-1}	7.9×10^{1}	4.2×10^{1}	400	1.3×10^{2}	4.8×10^{1}	3.6×10^{1}	6.4×10^{-1}	3.4×10^{1}	9.8×10^{0}	1.5×10^{-1}
25	*	*	1.1×10^{1}		<200/60	3.8×10^{-1}	1.2×10^{-1}	2.0×10^{-1}	*	1.2×10^{-1}	*	

TABLE 3.4-18 (Cont'd)

116-F MISC. CRIBS & TRENCHES (Cont'd)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
	Concentration (pCi/g)											
116-F-7 117-F CRIB												
A 10	*	1.0×10^{-1}	5.7×10^{-2}		<200/25	2.6×10^{-1}	*	*	*	3.2×10^{-2}	*	
116-F-10 Perf Decontamination Drain												
A 15	*	*	*		<200/30	*	*	*	*	1.9×10^{-2}	*	
B 12-1/2	*	*	3.0×10^{-1}	1.9×10^{2}	1,500	2.5×10^{2}	3.8×10^{2}	3.1×10^{1}	3.9×10^{-1}	1.7×10^{1}	1.0×10^{2}	1.1×10^{-1}
17-1/2	*	4.3×10^{-1}	1.6×10^{-1}		400	2.7×10^{1}	6.1×10^{1}	6.7×10^{0}	7.0×10^{-1}	7.4×10^{1}	6.3×10^{-1}	
27	*	8.7×10^{-1}	7.0×10^{-1}		<200/150	1.1×10^{1}	4.0×10^{1}	4.5×10^{0}	4.9×10^{-2}	4.1×10^{1}	2.3×10^{-1}	
C 20	*	*	*		<200/25	3.3×10^{-1}	1.7×10^{-1}	*	*	*	2.0×10^{-1}	

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TABLE 3.4-19

116-F-1

LEWIS CANAL

Concentration (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
A 5	*	*	*		<200/10	*	*	*	*	$1.6x10^{-1}$	*	
10	*	$1.5x10^{-1}$	$1.3x10^{-1}$	$1.6x10^{-1}$	<200/10	*	*	*	*	*	*	$1.1x10^{-1}$
15	*	*	$1.4x10^{0}$		<200/10	*	*	*	$4.2x10^{-2}$	*	*	
B 5	*	*	$1.7x10^{-1}$		<200/15	*	$9.5x10^{-2}$	*	*	*	*	
10	*	*	$3.6x10^{-1}$	$6.9x10^{-1}$	<200/20	$2.4x10^{-1}$	$4.8x10^{-2}$	*	*	$2.8x10^{-2}$	*	$1.1x10^{-1}$
15	*	*	$1.4x10^{0}$		<200/10	*	*	*	*	$8.1x10^{-2}$	*	
C 5	*	*	$2.3x10^{0}$		<200	*	$4.3x10^{-2}$	*	*	*	*	
10	*	*	$2.0x10^{0}$		<200	*	*	*	$3.1x10^{-2}$	*	*	
18	*	*	*		<200	$1.7x10^{-1}$	*	*	*	$6.7x10^{-2}$	*	
D 5	*	*	$9.6x10^{-2}$		<200	$1.5x10^{0}$	$1.2x10^{0}$	$4-8x10^{-1}$	$3.8x10^{-2}$	$1.4x10^{-1}$	*	
10	*	*	$8.6x10^{-1}$		<200	*	*	*	*	*	*	
E 2-1/2	*	*	$3.1x10^{-1}$		<200/20	$2.0x10^{-1}$	*	*	$5.1x10^{-2}$	$1.9x10^{-1}$	*	
7-1/2	*	*	$9.5x10^{-1}$	$1.2x10^{-1}$	<200/30	$6.5x10^{0}$	$5.3x10^{0}$	$1.2x10^{0}$	*	$7.2x10^{-1}$	*	$1.4x10^{-1}$
F 5	*	*	$8.5x10^{-2}$	*	<200/20	$5.5x10^{-1}$	$1.7x10^{-1}$	$3.6x10^{-1}$	*	$2.0x10^{-1}$	*	$5.4x10^{-2}$
10	*	*	$2.2x10^{0}$		<200/10	*	*	*	*	*	*	
G 3	*	$5.3x10^{-1}$	$5.7x10^{0}$	$2.0x10^{1}$	500	$2.6x10^{2}$	$2.0x10^{2}$	$1.2x10^{2}$	*	$3.2x10^{1}$	$9.8x10^{-2}$	$1.6x10^{-1}$
5	*	$9.9x10^{-1}$	$4.4x10^{-1}$	$2.1x10^{0}$	<200/20	$2.1x10^{-1}$	$1.2x10^{-1}$	*	*	$5.4x10^{-2}$	*	$1.3x10^{-1}$
10	*	*	$1.2x10^{-2}$		<200/15	*	*	*	$3.4x10^{-2}$		$1.0x10^{-1}$	
H 5	*	*	*		<200/10	$2.7x10^{-1}$	$1.6x10^{-1}$	*	*	*	*	
10	*	*	$1.3x10^{-1}$	$2.4x10^{-1}$	<200/20	*	*	*	*	*	$1.2x10^{-1}$	$8.3x10^{-2}$
15	*	*	$6.8x10^{-2}$		<200/10	*	*	*	*	*	$1.9x10^{-1}$	
I 5	*	*	$1.2x10^{-1}$		<200/20	$8.0x10^{-1}$	$1.0x10^{0}$	*	*	$1.7x10^{-1}$	*	
10	*	*	$7.0x10^{-1}$		<200/10	*	*	*	*	*	$2.7x10^{-1}$	
J 2-1/2	*	*	$3.1x10^{-2}$		<200/25	*	$8.9x10^{-2}$	*	$3.9x10^{-2}$	*	*	
5	*	*	$5.2x10^{-2}$		<200/10	$1.7x10^{-1}$	$6.3x10^{-1}$	$4.7x10^{-1}$	*	$8.8x10^{-2}$	*	
10	*	*	*		<200/10	*	*	*	*	*	*	
15	*	*	$2.1x10^{-2}$	$4.9x10^{-1}$	<200/10	*	*	*	*	*	*	$2.0x10^{-1}$

TABLE 3.4-19 (Cont'd)

116-F-1

LEWIS CANAL (Cont'd)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
	Concentration (pCi/g)											
K 5	*	$5.0x10^{-1}$	$5.2x10^{-1}$	$4.1x10^{0}$	<200/40	$7.8x10^{0}$	$8.0x10^{0}$	$3.5x10^{0}$	*	$1.4x10^{0}$	$2.7x10^{-1}$	$1.7x10^{-1}$
15	*	*	*		<200/Bkg	*	*	*	*	$1.2x10^{-1}$	$1.1x10^{-1}$	
L 10	*	*	$3.2x10^{-2}$	$6.0x10^{0}$	<200/10	$5.8x10^{-1}$	$2.6x10^{-1}$	$2.4x10^{-1}$	*	$1.2x10^{-1}$	*	$1.6x10^{-1}$
M 15	*	*	$2.9x10^{-2}$		<200/Bkg	*	*	*	*	*	*	
N 2-1/2	*	*	$3.6x10^{-1}$		<200/10	$3.8x10^{-1}$	$6.4x10^{-1}$	*	$7.1x10^{-2}$	*	$1.4x10^{-1}$	
7-1/2	*	*	$3.1x10^{-1}$	$1.8x10^{0}$	<200/10	$9.6x10^{-1}$	$9.2x10^{-1}$	*	*	$4.5x10^{-1}$	$8.8x10^{-2}$	$2.4x10^{-1}$

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Table 3.4-20

116-F-1

LEWIS CANAL

Potentially Contaminated Soil Column

Volume = 1500' x 100' x 10' = 1.5×10^6 ft^3

Mass = 1.0×10^{11}g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	6.6×10^{-2}	6.6×10^{-3}
Sr-90	6.3×10^{-1}	6.3×10^{-2}
H-3	3.2×10^{0}	3.2×10^{-1}
Eu-152	8.5×10^{0}	8.5×10^{-1}
Co-60	6.6×10^{0}	6.6×10^{-1}
Eu-154	3.8×10^{0}	3.8×10^{-1}
Cs-134	9.3×10^{-3}	9.3×10^{-4}
Cs-137	1.1×10^{1}	1.1×10^{-0}
Eu-155	4.2×10^{-2}	4.2×10^{-3}
U	1.9×10^{-1}	1.9×10^{-2}
	Total Curies =	3.4

E-0 Contamination not included, since it was removed and buried in 200 Area burial grounds.

Table 3.4-21

116-F-3

105-F STORAGE BASIN TRENCH

Potentially Contaminated Soil Column

Volume = 100' x 40' x 20' = 8.0×10^4 ft^3

Mass = 5.4×10^9 g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	*	0.0
Sr-90	8.2×10^{-2}	4.4×10^{-4}
H-3	1.4×10^{-1}	7.6×10^{-4}
Eu-152	8.5×10^{-2}	4.6×10^{-4}
Co-60	2.5×10^{-2}	1.4×10^{-4}
Eu-154	*	0.0
Cs-134	*	0.0
Cs-137	*	0.0
Eu-155	5.5×10^{-2}	3.0×10^{-4}
	Total Curies =	2.1×10^{-3}

Table 3.4-22

116-F-4

105-F PLUTO CRIB

Potentially Contaminated Soil Column

Volume = 30' x 30' x 20' = 1.8×10^4 ft^3

Mass = 1.2×10^9 g

Radionuclide	Ave. pCi/g	Curies
Pu-238	4.7×10^{-1}	5.6×10^{-4}
Pu-239/240	3.5×10^{1}	4.2×10^{-2}
Sr-90	1.1×10^{3}	1.3×10^{0}
H-3	1.4×10^{1}	1.7×10^{-2}
Eu-152	8.9×10^{0}	1.1×10^{-2}
Co-60	4.7×10^{-1}	5.6×10^{-4}
Eu-154	4.0×10^{1}	4.8×10^{-2}
Cs-134	2.1×10^{1}	2.5×10^{-2}
Cs-137	1.6×10^{3}	1.9×10^{0}
Eu-155	9.4×10^{1}	1.1×10^{-1}
U	1.3×10^{0}	1.6×10^{-3}

Total Curies = 3.5

Table 3.4-23

116-F-5

BALL WASHER CRIB

Potentially Contaminated Soil Column

Volume = 30' x 30' x 20' = 1.8×10^4 ft^3

Mass = 1.2×10^9 g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	*	0.0
Sr-90	2.7×10^{-2}	3.2×10^{-5}
Eu-152	*	0.0
Co-60	*	0.0
Eu-154	5.4×10^{-1}	6.5×10^{-4}
Cs-134	*	0.0
Cs-137	4.0×10^{-2}	4.8×10^{-5}
Eu-155	1.6×10^{-1}	1.9×10^{-4}

Total Curies = 9.2×10^{-4}

Table 3.4-24

116-F-6

1608-F LIQUID WASTE DISPOSAL TRENCH

Potentially Contaminated Soil Column

Volume = 300' x 100' x 20' = 6.0×10^5 ft^3

Mass = 4.1×10^{10} g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	2.4×10^{-1}	9.8×10^{-3}
Sr-90	5.0×10^{0}	2.1×10^{-1}
H-3	5.5×10^{1}	2.3
Eu-152	4.2×10^{1}	1.7
Co-60	2.5×10^{1}	1.0
Eu-154	1.3×10^{1}	5.3×10^{-1}
Cs-134	1.1×10^{-1}	4.5×10^{-3}
Cs-137	1.6×10^{1}	6.6×10^{-1}
Eu-155	1.8×10^{0}	7.4×10^{-2}
U	1.7×10^{-1}	7.0×10^{-3}

Total Curies = 6.5

Table 3.4-25

116-F-7

117-F CRIB

Potentially Contaminated Soil Column

Volume = 15' x 15' x 20' = 4.5×10^3 ft^3

Mass = 3.1×10^8 g

Radionuclide	Ave. pCi/g	Curies
Pu-239	1.0×10^{-1}	3.1×10^{-5}
Sr-90	5.7×10^{-2}	1.7×10^{-5}
Eu-152	2.6×10^{-1}	8.0×10^{-5}
Cs-137	3.2×10^{-2}	9.8×10^{-6}

Total Curies = 1.4×10^{-4}

Table 3.4-26

116-F-10

PERF DECONTAMINATION DRAIN

Potentially Contaminated Soil Column

Volume = 15' x 15' x 20' = 4.5×10^3 ft^3

Mass = 3.1×10^8 g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	2.6×10^{-1}	8.1×10^{-5}
Sr-90	2.3×10^{-1}	7.1×10^{-5}
H-3	1.9×10^{2}	5.9×10^{-2}
Eu-152	5.8×10^{1}	1.8×10^{-2}
Co-60	9.6×10^{1}	3.0×10^{-2}
Eu-154	8.4×10^{0}	2.6×10^{-3}
Cs-134	2.3×10^{-1}	7.1×10^{-5}
Cs-137	2.6×10^{1}	8.1×10^{-3}
Eu-155	2.0×10^{1}	6.2×10^{-3}
U	1.1×10^{-1}	3.4×10^{-5}
	Total Curies =	1.2×10^{-1}

116-H-2			116-H-3		
HOLE	NORTH	WEST	HOLE	NORTH	WEST
A	94608.38	39687.29	A	95198.24	39335.17
B	94766.74	39760.62	B	95173.31	39350.0
C	94820.56	39711.97			
D	94818.37	39740.90			
E	94787.24	39742.96			
F	94706.94	39729.11			

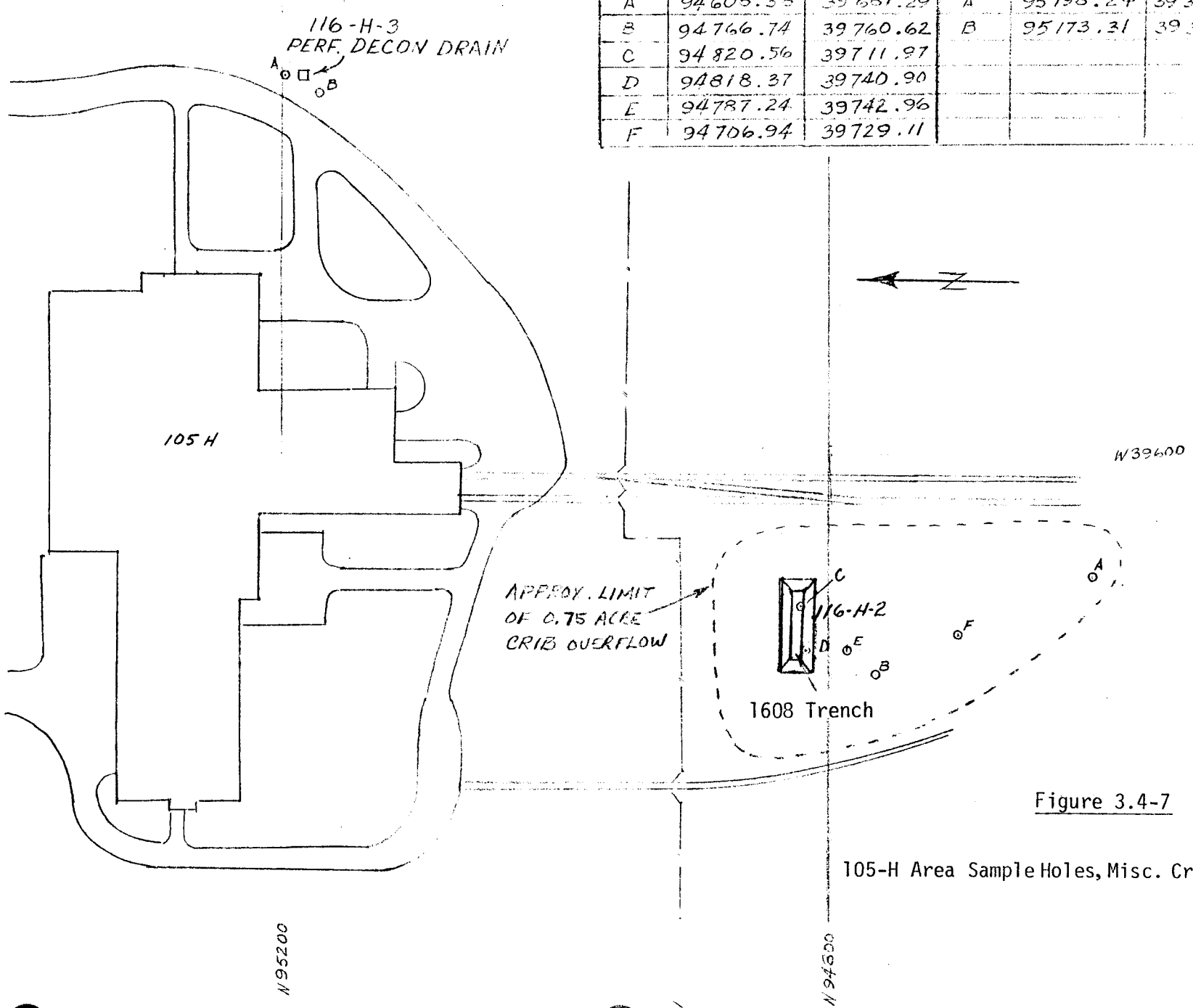

Figure 3.4-7

105-H Area Sample Holes, Misc. Cribs & Trenches

Table 3.4-27

116-H MISC. CRIBS & TRENCHES

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U
					Concentration (pCi/g)							
116-H-2 1608-H TRENCH												
A 1	*	$1.3x10^{-1}$	$7.3x10^{1}$	$1.9x10^{0}$	400	$2.7x10^{1}$	$6.4x10^{0}$	$6.2x10^{0}$	$8.2x10^{-2}$	$2.8x10^{-1}$	$2.5x10^{0}$	$4.5x10^{-1}$
5	*	*	$3.3x10^{1}$	$6.8x10^{0}$	<200/100	$3.8x10^{-1}$	$2.6x10^{-1}$	$2.2x10^{-1}$	$3.3x10^{-2}$	$1.4x10^{1}$	$3.5x10^{-1}$	$2.0x10^{-1}$
10			$1.9x10^{-1}$		<200/20	*	*	*	*	*	*	
B 2-1/2	*	*	$5.4x10^{1}$	$1.1x10^{0}$	<200/100	$4.3x10^{-1}$	$2.7x10^{-1}$	*	*	$1.4x10^{1}$	$5.6x10^{-1}$	$1.5x10^{-1}$
5	*	*	$1.2x10^{-1}$		<200/10	*	*	*	*	$3.5x10^{-2}$	*	
C 5	*	*	$5.0x10^{1}$	$1.1x10^{1}$	<200/150	$2.6x10^{0}$	$3.6x10^{0}$	$1.0x10^{0}$	*	$7.7x10^{1}$	$9.5x10^{-1}$	$1.7x10^{-1}$
10			$1.0x10^{0}$		<200/20	*	$4.1x10^{-2}$	*	*	$1.1x10^{0}$	$5.4x10^{-2}$	
D 10	*	*	$1.3x10^{1}$	$4.5x10^{1}$	<200/80	$7.0x10^{-1}$	$6.6x10^{-1}$	*	*	$1.4x10^{1}$	$2.1x10^{-1}$	$1.8x10^{-1}$
E 15	*	*	$1.1x10^{-1}$		<200/35	*	*	*	$3.1x10^{-2}$	$1.1x10^{-1}$	$7.0x10^{-2}$	
F 10	*	*	$1.8x10^{-1}$		<200/40	*	*	$1.3x10^{-1}$	*	$6.5x10^{-2}$	$8.3x10^{-2}$	
116-H-3 105-H DUMMY DECONTAMINATION DRAIN												
A 15	*	$2.7x10^{-1}$	$5.6x10^{-1}$	$4.4x10^{0}$	<200/60	$2.0x10^{0}$	$1.6x10^{0}$	$1.1x10^{0}$	*	$1.1x10^{2}$	$2.2x10^{0}$	
C 4						$7.2x10^{1}$	$3.0x10^{1}$	$1.7x10^{1}$	*	$5.7x10^{1}$	$9.0x10^{-1}$	
D 4						$2.4x10^{1}$	$1.1x10^{2}$	$8.0x10^{0}$	*	$2.1x10^{2}$	$4.0x10^{-1}$	

A-1 -- Surface sample from south end of trench.

Samples C-4 & D-4 were some preliminary characterization samples taken in 1961. The results were decay corrected to 12/30/75. C-4 & D-4 were taken 4 feet and 2-1/2 feet away, respectively, from the trench drain.

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Table 3.4-28

116-H-2

1608-H TRENCH

Potentially Contaminated Soil Column

Volume = 250' x 75' x 20' = 3.8×10^5 ft^3

Mass = 2.6×10^{10}g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	1.6×10^{-2}	4.2×10^{-4}
Sr-90	2.3×10^{1}	6.0×10^{-1}
H-3	1.3×10^{1}	3.4×10^{-1}
Eu-152	3.1×10^{0}	8.1×10^{-2}
Co-60	1.1×10^{0}	2.9×10^{-2}
Eu-154	7.6×10^{-1}	2.0×10^{-2}
Cs-134	1.5×10^{-2}	4.2×10^{-4}
Cs-137	1.2×10^{1}	3.1×10^{-1}
Eu-155	4.8×10^{-1}	1.3×10^{-2}
U	2.3×10^{-1}	6.0×10^{-3}

Total Curies = 1.4

Table 3.4-29

116-H-3

105-H DUMMY DECONTAMINATION DRAIN

Potentially Contaminated Soil Column

Volume = 15' x 15' x 20' = 4.5×10^3

Mass = 3.1×10^8 g

Radionuclide	Ave. pCi/g	Curies
Pu-238	*	0.0
Pu-239/240	2.7×10^{-1}	8.4×10^{-5}
Sr-90	5.6×10^{-1}	1.7×10^{-4}
H-3	4.4×10^{0}	1.4×10^{-3}
Eu-152	3.3×10^{1}	1.0×10^{-2}
Co-60	4.7×10^{1}	1.5×10^{-2}
Eu-154	8.7×10^{0}	2.7×10^{-3}
Cs-134	*	0.0
Cs-137	1.3×10^{2}	4.0×10^{-2}
Eu-155	1.2×10^{0}	3.7×10^{-4}
	Total Curies =	7.0×10^{-2}

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4.0 BURIAL GROUNDS

4.1 Description of 100 Area Radioactive Solid Waste Burial Grounds

All 100 Area solid radioactive waste disposal sites have been retired. Since 1973, solid waste generated in the 100 Areas has been transferred to the 200 Area waste sites for disposal. The approximate locations of the retired 100 Area burial grounds are shown on Figures 4.1-1 through 4.1-5. A list of the burial grounds is given in Table 4.1-1. Table 4.1-2 indicates the estimated radioactive solid waste inventories in the individual 100 Areas, including waste generated due to the biological research facilities which were located in 100-F Area. Data sheets containing brief descriptions and other pertinent information relative to the individual 100 Area contaminated burial facilities are included in Appendix II.1 of BNW-MA-88, Resource Book - Disposition (D&D) of Retired Contaminated Facilities at Hanford.

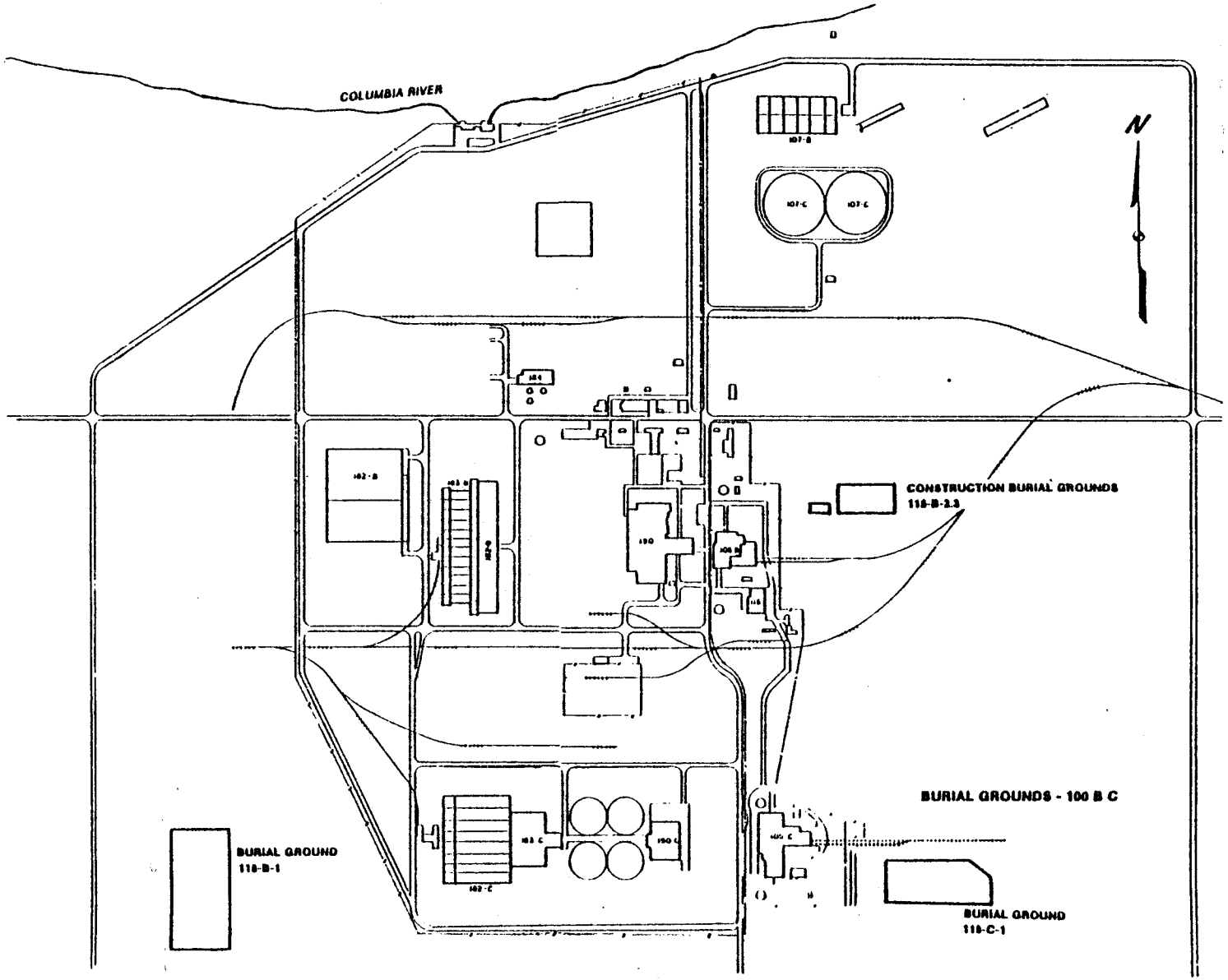

FIGURE 4.1-1

100 B & C AREA RADIOACTIVE SOLID WASTE DISPOSAL SITES

UNI-946

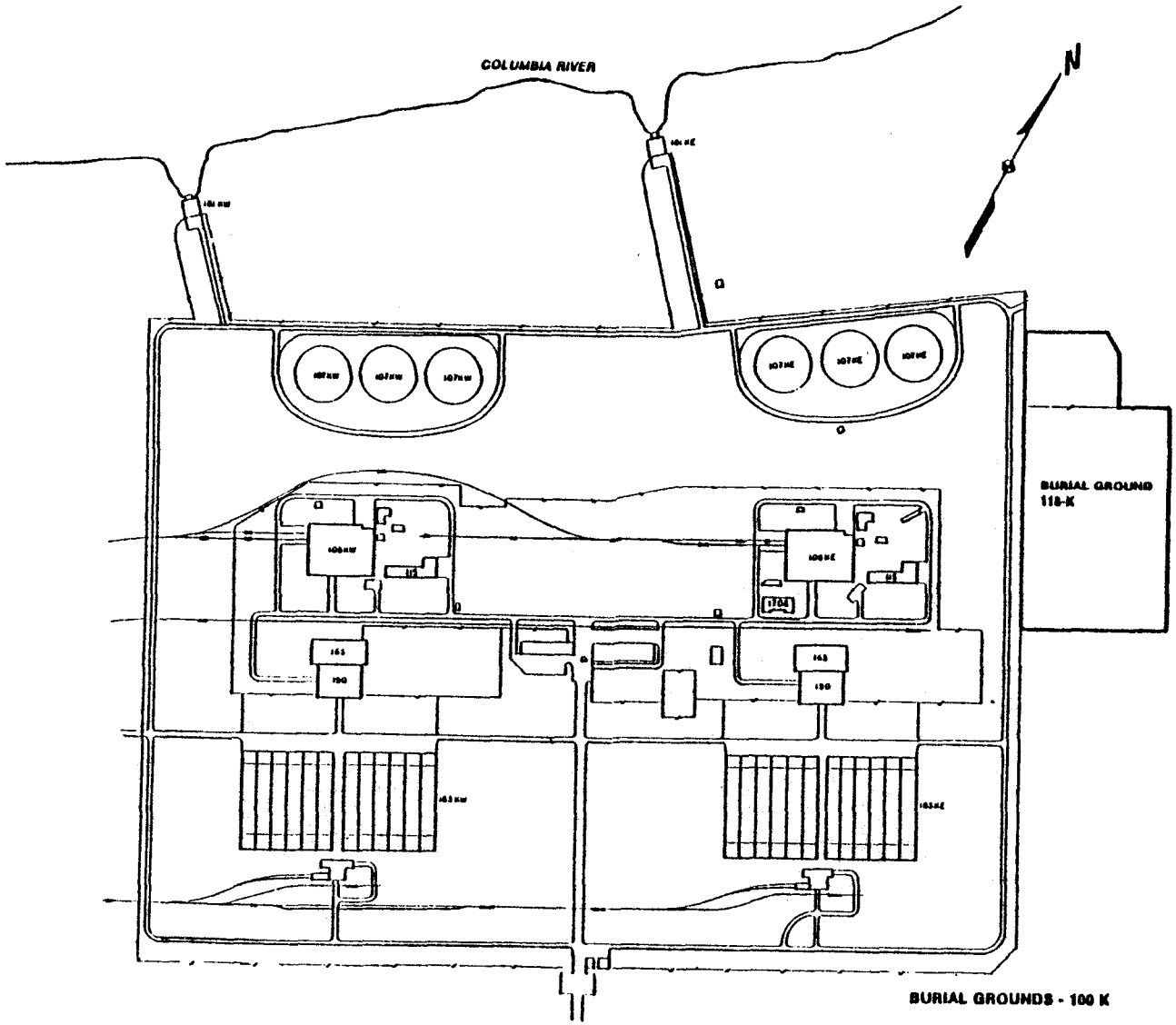

FIGURE 4.1-2

100 K AREA RADIOACTIVE SOLID WASTE DISPOSAL SITES

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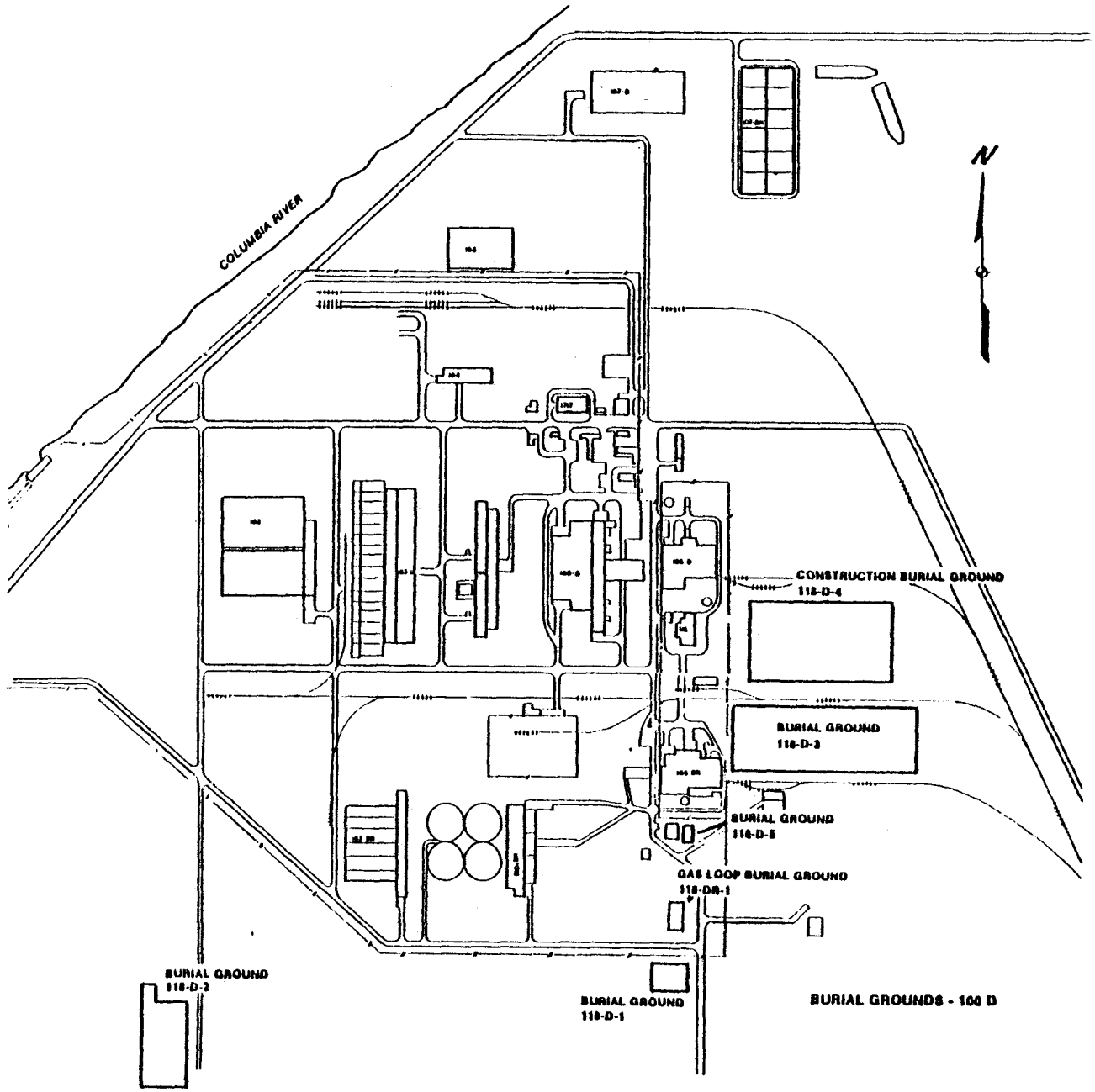

FIGURE 4.1-3

100 D & DR AREA RADIOACTIVE SOLID WASTE DISPOSAL SITES

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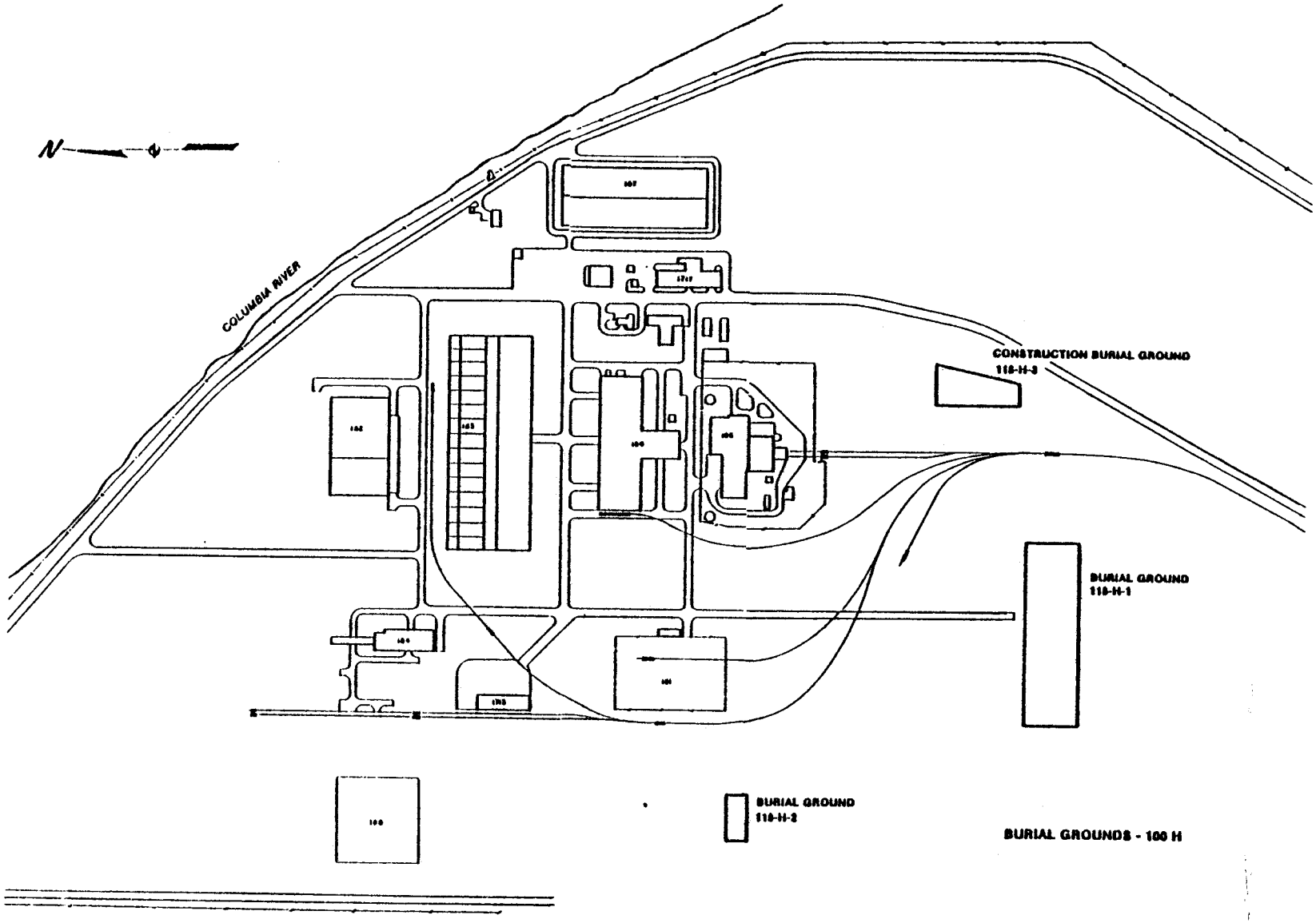


FIGURE 4.1-4

100 H AREA RADIOACTIVE SOLID WASTE DISPOSAL SITES

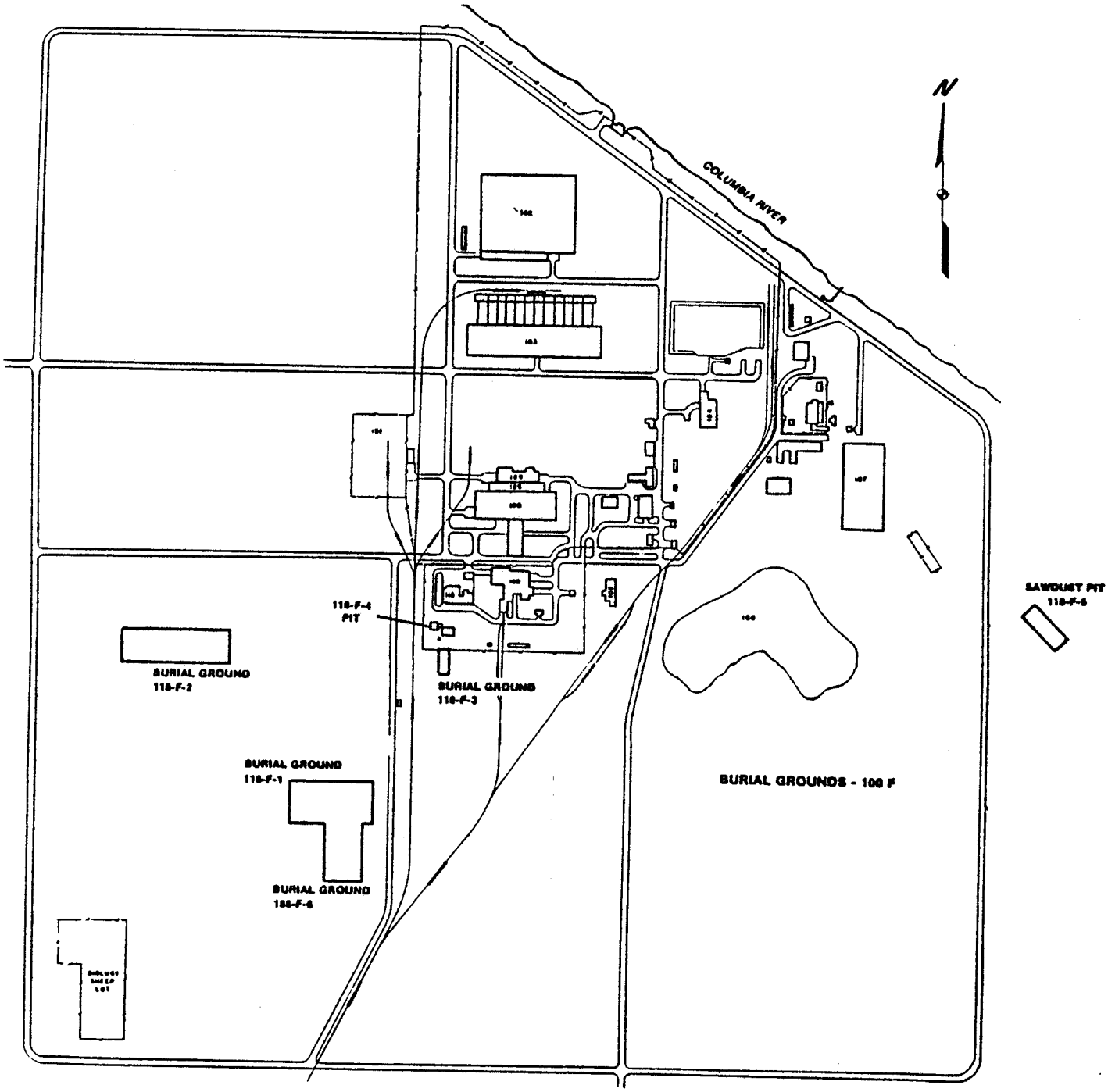


FIGURE 4.1-5

100-F AREA SOLID WASTE DISPOSAL SITES

TABLE 4.1-1

DEACTIVATED 100 AREA RADIOACTIVE SOLID WASTE BURIAL GROUNDS

Number	Past Designation	Approx. Dimensions (ft)	Service Dates
118-B-1	105-B Burial Ground	1,000 x 320	1944 - 1973
118-B-2	Construction Burial Ground No. 1	60 x 30	1954 - 1956
118-B-3	Construction Burial Ground No. 2	350 x 275	1956 - 1960
118-B-4	105-B Dummy Storage Burial Ground	50 x 30	1956 - 1968
118-B-5	Ball 3X Burial Ground	50 x 50	1953
118-B-6	108-B Solid Waste Burial Ground	40 x 40	1950 - 1953
118-C-1	105-C Burial Ground	510 x 400	1953 - 1969
118-D-1	100-D Burial Ground No. 1	450 x 375	1944 - 1967
118-D-2	100-D Burial Ground No. 2	1,000 x 360	1949 - 1970
118-D-3	100-D Burial Ground No. 3	1,000 x 250	1956 - 1973
118-D-4	Construction Burial Ground	600 x 200	1953 - 1967
118-D-5	Ball 3X Burial Ground	20 x 20	1954
118-DR-1	105-DR Gas Loop Burial Ground	125 x 75	1963 - 1964
118-F-1	Solid Waste Burial Ground No. 2; Minor Construction Burial Ground No. 2	600 x 500	1954 - 1965
118-F-2	Burial Ground No. 2 (Solid Waste Burial Ground No. 1)	365 x 325	1945 - 1965
118-F-3	Burial Ground No. 3 (Minor Construction Burial Ground No. 1)	175 x 50	1952
118-F-4	115-F Pit	10 x 10	1949
118-F-5*	PNL Sawdust Repository	500 x 150	1954 - 1975
118-F-6*	Solid Waste Burial Ground	400 x 200	1965 - 1973
118-H-1	100-H Burial Ground No. 1	700 x 350	1949 - 1965
118-H-2	100-H Burial Ground No. 2 (H-1 Loop Burial Ground)	140 x 50	1955 - 1965

TABLE 4.1-1 (Cont'd)

DEACTIVATED 100 AREA RADIOACTIVE SOLID WASTE BURIAL GROUNDS

Number	Past Designation	Approx. Dimensions (ft)	Service Dates
118-H-3	Construction Burial Ground	300 x 200	1953 - 1957
118-H-4	Ball 3X Burial Ground	150 x 30	1953 - 1965
118-H-5	105-H Thimble Pit	30 x 2	1953
118-K	K Burial Ground	1,200 x 600	1953 - 1973

* 100-F Biology Burial Grounds - not reactor related wastes.

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

		Ci
TOTAL		
	Co-60	26,900
	Sr-90	34
	Pu-239	0.38

The estimates of the radioactivity contained in the 100 Area solid waste burial grounds given in Table 4.1-2 were not established as part of this study. The inventories are reported in PWM-530, Rev 1, Hanford Radioactive Waste Management Plans, and were based upon a review of past burial records and a limited sampling of the different types of discarded reactor hardware and wastes that went to the burial grounds. Burial records prior to 1955 are poor, containing minimal information. The power levels of the 100 Area production reactors, however, were fairly low prior to the middle 1950s when through reactor redesign and modifications the power levels were increased substantially. Radiation levels in activated reactor hardware wastes disposed of prior to this date were, therefore, substantially lower than in later years. Estimates used in establishing the Co-60 inventories in the burial grounds are believed to be conservatively high.

A summary of the estimated quantities of different types of metallic wastes buried in the burial grounds of the individual 100 Areas is given in Table 4.1-3. These quantities taken from existing waste management files, were used in establishing the reported estimated inventories given in PWM-530, but had not been formally documented.

TABLE 4.1-3

APPROXIMATE QUANTITIES OF METALLIC WASTES
BURIED IN THE RETIRED 100 AREA BURIAL GROUNDS

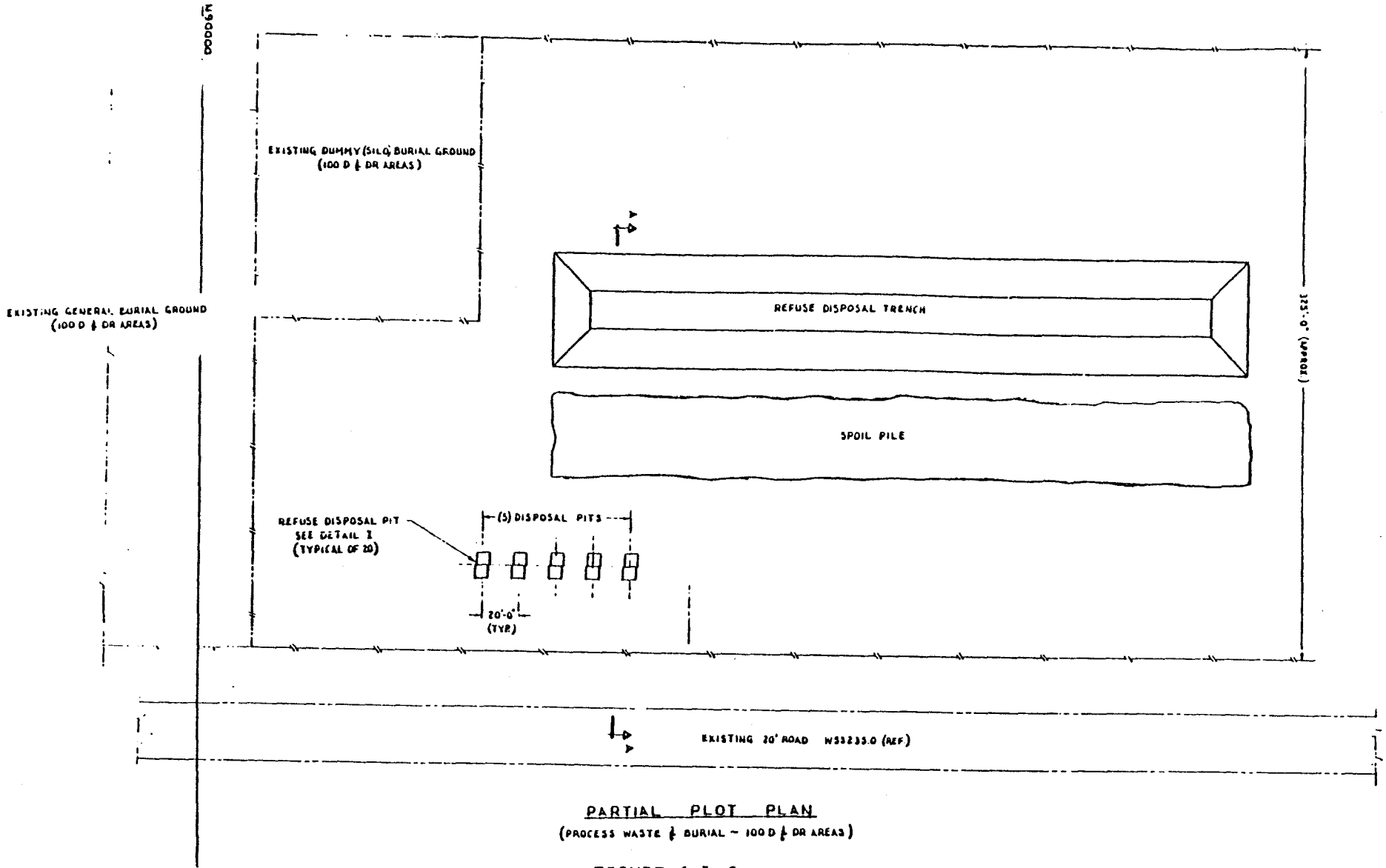
AREA	ITEMS	QUANTITIES
100-B,C	Al Tubes	33 tons
	Irradiated Facilities	15 lbs
	Expendables	120 tons
	Thermocouples	54 lbs
	Al Horizontal Control Rods	2,640 lbs
	Al Thimbles V & H	5,540 lbs
	S. S. Gunbarrel	20 lbs
100-K	Al Tubes	50 tons
	S. S. Irradiated Facilities	1,140 lbs
	Al Expendables	105 tons
	Thermocouples	74 lbs
	Al Horizontal Control Rods	970 lbs
100-D,DR	Al Tubes	40 tons
	Al Expendables	120 tons
	Thermocouples	43 lbs
	Al Horizontal Control Rods	2,100 lbs
	Al Thimbles	11,100 lbs
100-F	Al Tubes	28 tons
	Expendables	60 tons
	Thermocouples	25 lbs
	Al Horizontal Control Rods	945 lbs
	Al Thimbles	5,540 lbs
100-H	Al Tubes	24 tons
	Irradiated Facilities	190 lbs
	Expendables	60 tons
	Thermocouples	23 lbs
	Al Horizontal Control Rods	1,130 lbs
	Al Thimbles	3 tons

Operation of the original reactor facilities began in 1944. During the course of reactor operation, 23 radioactive solid waste burial grounds were established in the deactivated 100 Areas. (Two additional burial grounds were also established in 100-F Area as the result of the biology laboratories.) Since reactor operations began at Hanford, approximately 1×10^6 cubic feet of solid wastes containing approximately 2×10^6 curies have been placed into the 100 Area burial grounds. Of the 2×10^6 curies buried, less than 30,000 curies remained at the end of calendar year 1971. Only a small fraction of the 30,000 curies is long-lived (e.g., Cs-137, Sr-90, and Eu-152). Ninety-nine percent of the radioactivity excluding Ni-63 is Co-60. This radionuclide is found in a matrix of solids having diverse configurations. These solids include paper, rags, structural concrete, wood and a variety of metals such as aluminum, steel, iron and zircaloy. More than 99 percent of the Co-60 is contained in an estimated 600 tons of solid metallic matrices removed from the reactors. Based on the 105-DR Reactor core sampling performed as part of this study, Ni-63, may be present in these metallic wastes with concentrations of up to about 2 percent of the Co-60 concentrations. Less than one percent of the activity includes a minute percentage of dried salts of the activation products associated with the reactor coolant stream.

Some of the small 100 Area burial grounds near the reactor buildings consisted of just one trench or pit. Ten burial grounds are of this type. A typical major burial ground which served a reactor area was a few hundred feet wide by several hundred feet long. The largest burial ground is the 100-K Area burial ground, 118-K, which is approximately 1,200' x 600'. These large burial grounds contained numerous burial trenches and pits of various sizes and orientations depending upon the material being buried. Those pieces of equipment that had a high dose rate (e.g., thermocouple stringers, horizontal control rods, etc.) were often placed into narrow but deep trenches and partially covered over with earth fill to reduce dose rates. Small crib pits (e.g., 8 feet by 8 feet pits made from railroad ties) were often used for the disposal of small reactor hardware having high dose rates, such as dummies. Vertical steel pipes and/or culverts (silos) 5 to 6 feet in diameter were also used for such wastes.

Figure 4.1-6 illustrates a cross section of a disposal trench and some railroad tie disposal pits contained in a section of burial ground, 118-D-2. Few drawings exist which indicate the locations of the individual burial trenches within the larger burial grounds. Figures 4.1-7 through 4.1-9 indicate the approximate as-built status during the 1960s for burial grounds 118-B-1, 118-K, and 118-H-1, respectively. These are the only existing drawings which show approximate locations of individual burial trenches within a 100 Area burial ground.

Figure 4.1-8 also illustrates the location and dimensions of a prototype waste incinerator that was constructed in the 118-K burial ground in 1968. A similar prototype waste incinerator was constructed in 100-C Area in 1967. The incinerators were natural draft incinerators installed above ground over an ash pit. The K Area prototype was modified to permit burning in the ash pit. Air was pumped down to the bottom of the ash pit through a pipe to improve combustion. This modification allowed the operator to fill the pit with boxes instead of burning them two or three at a time on the incinerator grating above the pit. The incinerators had short stacks but no provision was made for smoke treatment. Incineration was discontinued in 1971 because of problems in meeting regulations which limited non-treated burning of wastes to 25 pounds per day (Executive Order 11288). The incinerators were dismantled and buried.



PARTIAL PLOT PLAN

(PROCESS WASTE & BURIAL ~ 100 D & DR AREAS)

FIGURE 4.1-6

Typical Burial Trench and Disposal Pits of Burial Ground 118-D-2

(Continued on next page.)

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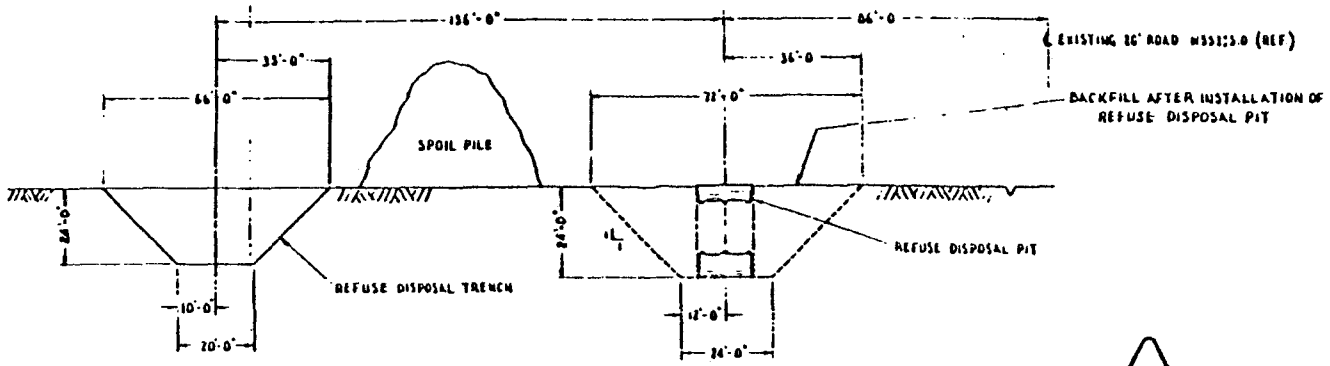
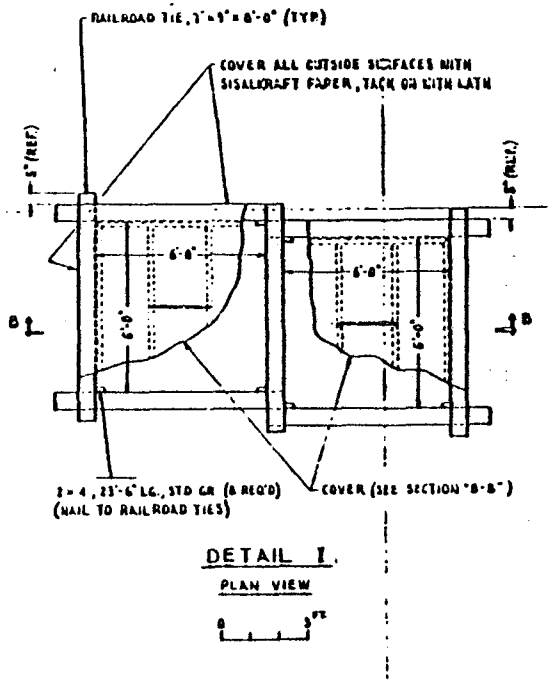
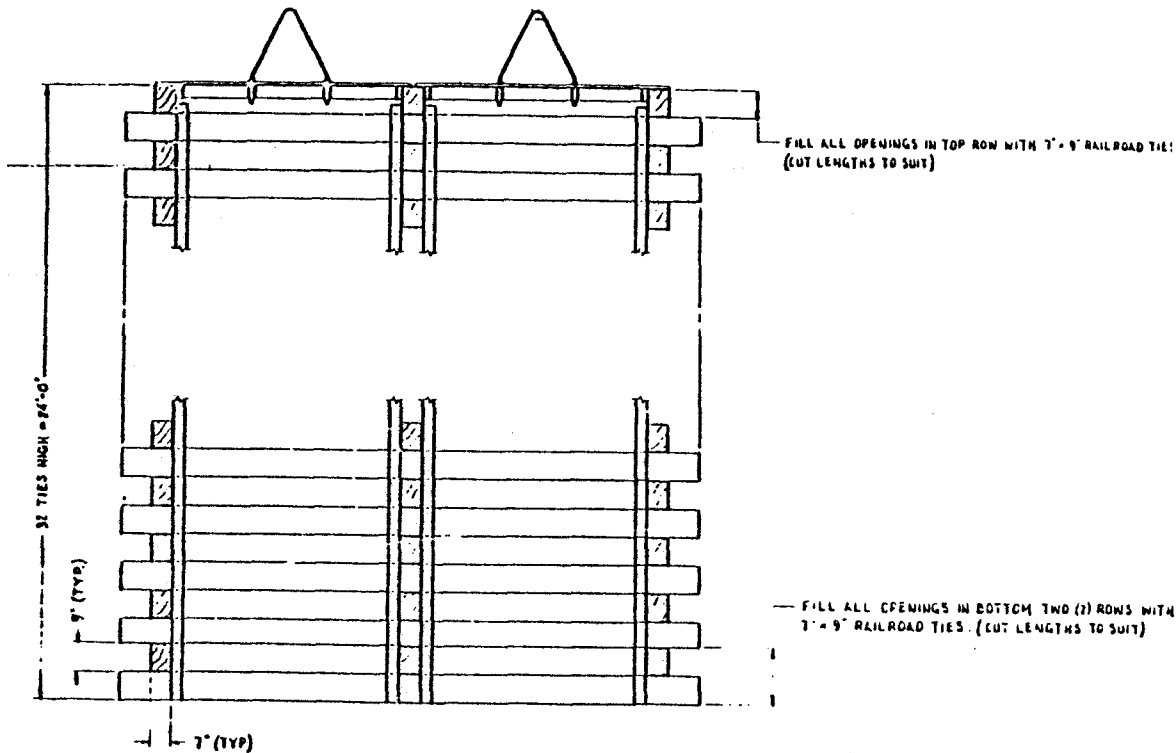


PROFILE "A-A"



DETAIL I.

PLAN VIEW



SECTION "B-B"

FIGURE 4.1-6 (Cont.)

Typical Burial Trench and Disposal Pits of Burial Ground 118-D-2

105-B SOLID WASTE BURIAL GROUND

1944 - 1965

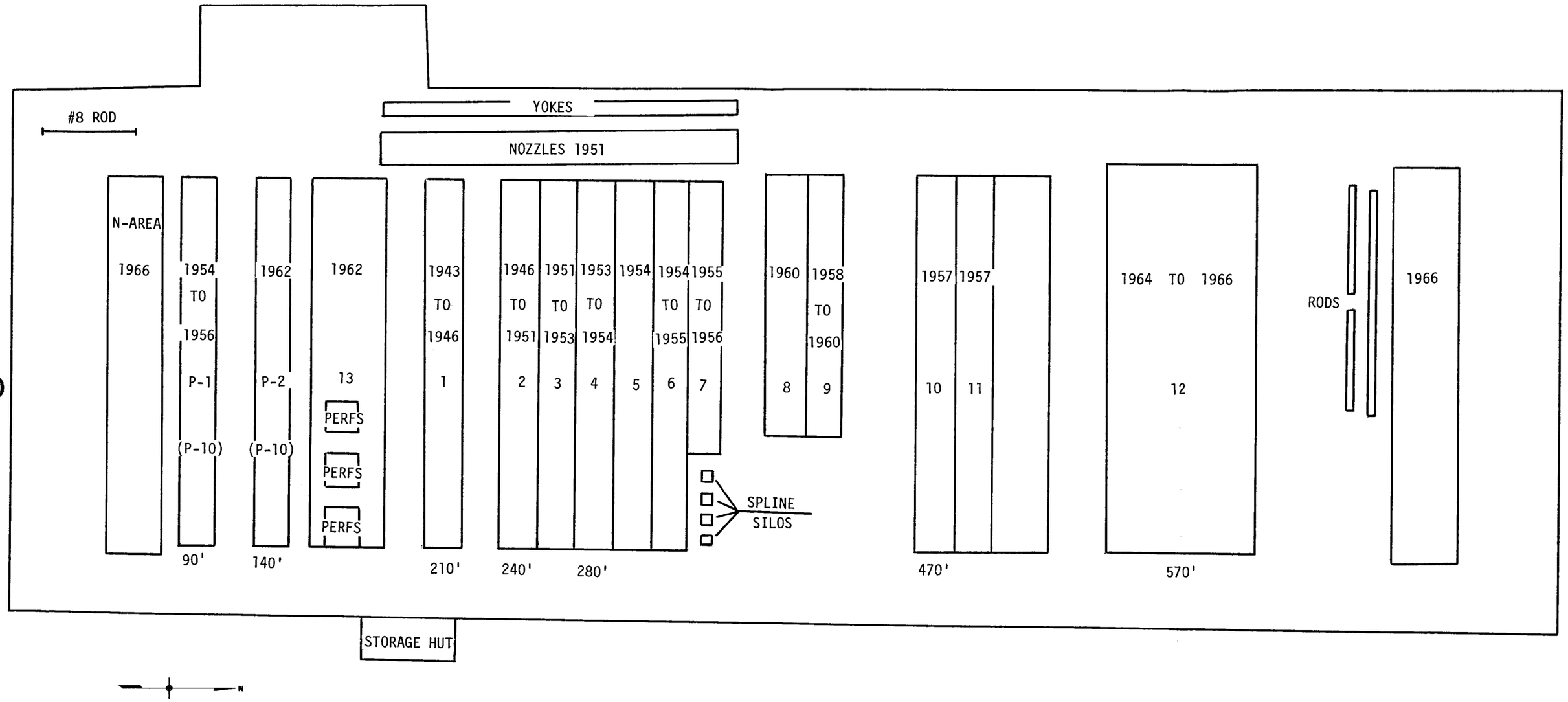


FIGURE 4.1-7

118-B-1 BURIAL GROUND

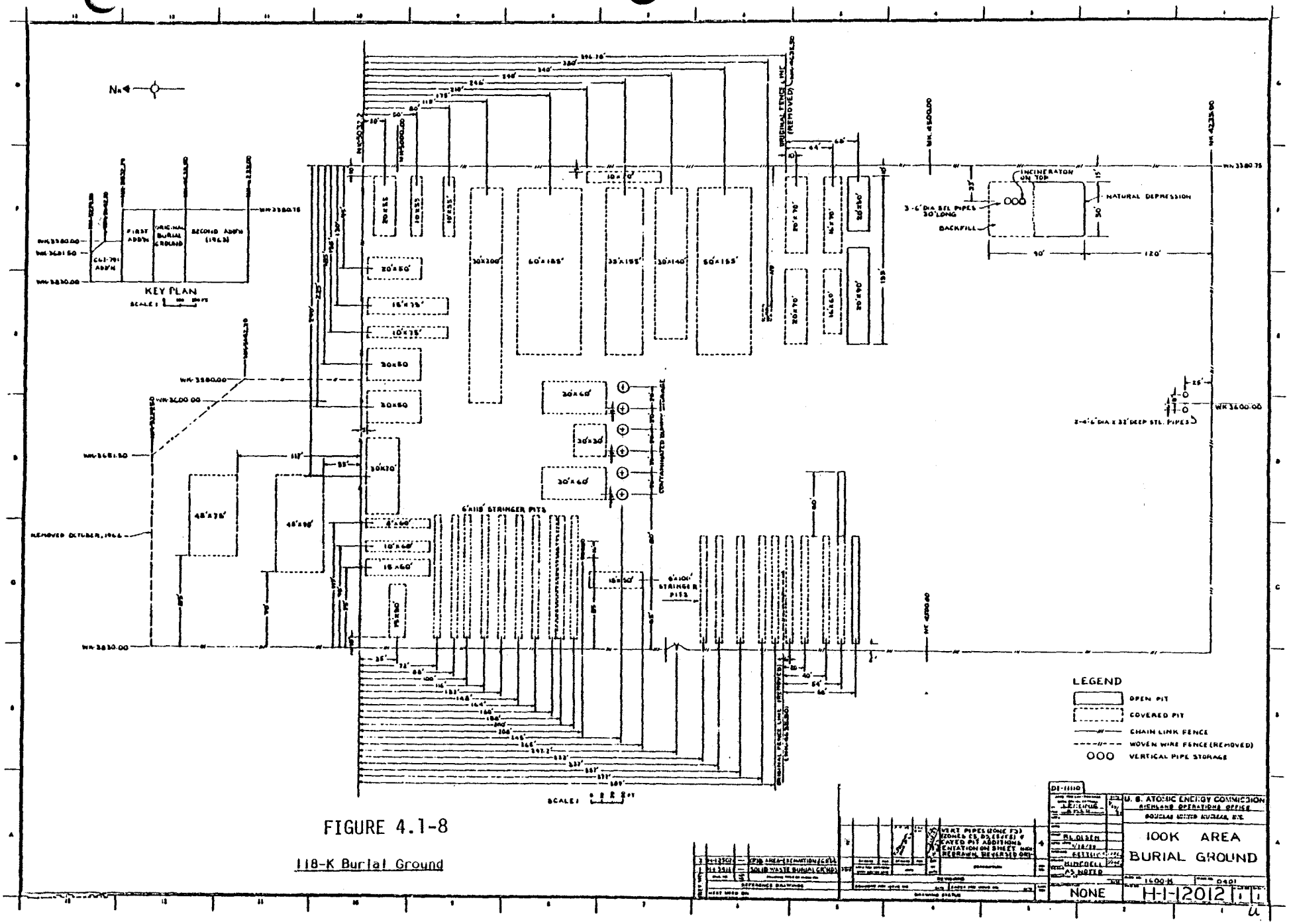


FIGURE 4.1-8

118-K Burial Ground

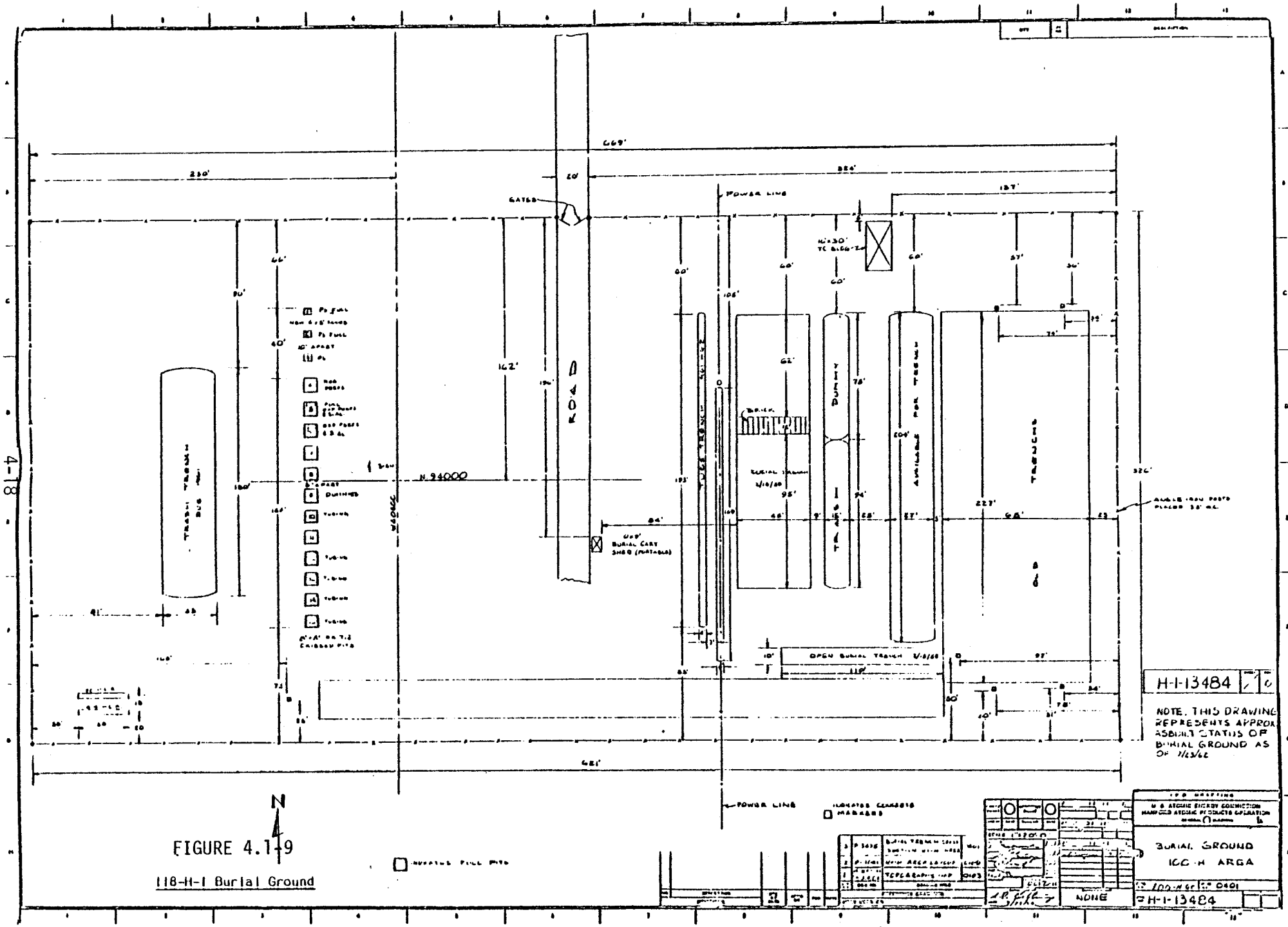


FIGURE 4.1-9

118-H-1 Burial Ground

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A brief outline of past burial practices in the retired 100 Area solid waste disposal facilities is as follows:

1944-1954

- no intensive segregation program
- combustibles and noncombustibles buried in same trench
- burial records contain minimal information.

1955-1965

- alternate disposal methods and sites studied, documented, and in some cases, implemented (no burial in N Area)
- burning of combustibles in burial trenches began and ended
- records improved.

1966-1973

- centralization of burial grounds began and completed
- measurements of burial materials improved
- burial records much more complete
- some segregation of wastes by categories.

1973-Present

- solid waste generated in the 100 Areas transferred to the 200 Area waste sites for disposal.

None of the wastes generated in the reactor facilities were specially treated or packaged to provide control over release or migration of radioactivity after burial. None of the wastes that were buried can take credit for long-term containment by the method of packaging. Most of the radioactivity in the 100 Area burial grounds, however, is contained in the metallic wastes. Wastes of this type would release radioactivity slowly even if subjected to a continuous percolation of water through them. Burial trench depths are approximately 20 feet deep.

The water table lies generally from 55 to over 80 feet below the ground surface at the 100 B-C and D-DR Areas. At the H burial ground sites the water table is about 42-44 feet below the ground surface. The water table is closest to the burial trenches at 100-F Area. At F Area the water table is generally about 33 feet below the ground surface, but in the case of burial grounds 118-F-1, and 118-F-6 the water table is within a few feet of the burial trenches. Appendix II.1 of BNW-MA-88, indicates the approximate surface elevation and water table elevations for each of the 100 Area radioactive solid waste burial grounds.

All radioactive solid waste burial grounds, except 118-K, have been covered with a minimum of 4 feet of clean soil. This clean soil has been stabilized with gravel so that the soil will not be dispersed by wind. In addition, the burial grounds have been treated with herbicides to prevent translocation of radioactivity by deep-rooted weeds. Herbicides are reapplied as required for control. Any slumps which develop from fill material settling in burial trenches are filled as required. All burial grounds in the deactivated 100 Areas have been retired and have been stabilized to establish adequate short-term control.

All radioactive solid waste burial grounds are routinely surveyed to insure that spread of contamination to the environs is not occurring. Bimonthly surveillance surveys are made during the period from May 1 through November 1, of the retired burial grounds for tumbleweeds and any other unusual radioactive conditions which potentially could arise from soil erosion, wind, rodents, digging holes, etc.

4.2 Summary 118-B-1 Burial Ground Sampling

Sampling of the 100 Area solid waste burial grounds was limited to the 118-B-1 burial ground. Techniques studied by Battelle-Northwest in a separately funded program did not develop to the point of providing a usable method for surface mapping of buried materials.

Drilling in the 118-B-1 radioactive solid waste burial ground was initiated on April 5, 1976, and completed on April 29, 1976. Fourteen sample holes

were drilled into miscellaneous burial trenches which ranged from old trenches used in the early 1940s up to trenches which had been used in 1966.

Six sample holes drilled into a series of old burial trenches used during the period of 1943-1956 revealed little radioactivity on any samples taken. Insitu GM readings taken of the sample holes were generally at background levels. A maximum insitu GM reading of 5,000 c/m was detected in one sample hole at a depth of 12 feet below grade. Pieces of lead and cadmium with aluminum jackets were found in some of the samples taken from these old burial trenches.

Drilling in a trench used during the period 1958-1960 recovered 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.

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 feet below grade. The maximum insitu dose rate measured inside sample holes drilled into these trenches was 300 mR/hr. Miscellaneous debris, including plastic, wood, cardboard, 1/2" steel tubing (possibly from past N Reactor steam generator repair work), and cadmium were included in samples taken from these trenches.

Some general results of the 118-B-1 burial ground sampling are as follows:

- No measurable migration of radionuclides is indicated by data.
- The maximum Pu-239/240 concentration detected in samples is 1 pCi/g. Pu-239/240 is generally not detectable.
- The primary radionuclide identified is Co-60 through Eu-152. Eu-154, Eu-155, Cs-134, Cs-137, Sr-90, and Ni-63 are also present.

- The maximum beta-gamma concentration detected in samples is 1.8×10^5 pCi/g of which 1.7×10^5 pCi/g is Co-60.

- Ni-63 was detected up to 7.5×10^1 pCi/g. Based on sampling of the 105-DR Reactor core, considerably higher Ni-63 concentrations are probably present in metallic wastes within this burial ground.

- 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.

4.3 Discussion of the 118-B-1 Burial Ground Sampling and Results

Drawings which show the locations of individual burial trenches in a given burial ground are available only in a few instances. A complete characterization of the materials in the 100 Area burial grounds will not be practical until suitable surface mapping techniques for buried wastes are demonstrated. Battelle-Northwest has been evaluating several possible techniques for the surface mapping of buried wastes as part of a characterization program for the 300 Area and Wye burial grounds. Radar, acoustic, metal detector, and magnetometer systems are being evaluated and field tested as potential techniques for detecting and mapping buried wastes. A more complete or accurate characterization of the metallic wastes in the 100 Areas in the future is dependent upon the demonstration of suitable surface mapping techniques.

A more practical way to improve estimates of the 100 Area burial ground inventories in the future might be to sample selected reactor hardware from one of the 100 Area reactors, and perform comprehensive radionuclide analyses for these samples. Samples could be taken of gunbarrels, process tubes, control rods, etc. Reactor sampling performed as part of this program was directed at the reactor cores rather than the reactor hardware. This approach would establish the individual radionuclide concentrations, and in combination with the estimated quantities of metallic wastes buried in the 100 Areas could refine the current inventory estimates.

The technique outlined above was used to a limited extent to establish the current radionuclide inventories in the 100 Area burial grounds. The Reactor core sampling performed as part of this study, however, indicates Ni-63 is present in the metallic burial ground wastes. Ni-63 is a pure beta emitter, and therefore, was not detected in the gamma analyses which were used to establish the current solid waste burial ground inventory estimates. Ni-63 has a half-life of 92 years.

Sampling of the 100 Area radioactive solid waste burial grounds was limited to the 118-B-1 burial ground. The 100-B burial ground is fairly unique compared to most other 100 Area burial grounds in that the trenches were laid out parallel to one another. Burial trench markers are still in place, and a drawing exists indicating the location and usage dates of the individual trenches (though drilling indicates some inconsistencies exist between the print and trench markers). See Figure 4.1-7.

Sampling of the 118-B-1 burial ground was not directed at establishing the radionuclide inventory which would require retrieving the metallic wastes such as control rods, thimbles, gunbarrels, etc., that contain the majority of the remaining radioactivity. Fourteen sample holes were drilled into miscellaneous trash burial trenches which ranged from old trenches used in the early 1940s up to trenches which had been used in 1966. Sampling of these trenches was intended to establish the following parameters:

- identification of radionuclides present with particular emphasis being placed in the measurement of Pu-239/240, Ni-63, and Sr-90
- concentration of radionuclides present
- horizontal and vertical distribution of radionuclides present
- specific activities in older trenches used before reactor power upgrade modifications were made as compared to those in trenches used after reactor power operating levels were increased.

Drilling in the 118-B-1 radioactive solid waste burial ground was initiated on April 5, 1976, and completed on April 29, 1976. The locations of these sample holes are indicated in Figure 4.2-1. Radionuclide concentrations of selected samples from test holes drilled into the 118-B-1 burial ground are given in Table 4.3-1.

Six sample holes (A through F) drilled into and near trench numbers 1, 2, and 4, used during the period of 1943-1956 revealed little radioactivity on any samples taken. GM readings of samples were less than 100 c/m. Field counts taken with the scaler also indicated minimal activity. Only one sample (A-20) was selected for detailed radionuclide analyses from these burial trenches. Field counts of other samples taken from these three trenches were less than or equal to sample A-20. As indicated in Table 4.3-1, radionuclide concentrations in this sample are negligable.

Insitu GM counts of sample hole B which was 28 feet deep, are as follows:

0-8'	Background
9-10'	2,000 c/m
12'	5,000 c/m
13-14'	4,000 c/m
15-16'	2,000 c/m
20'	Background

An insitu GM reading of 2,000 c/m was detected in test hole D at 6' deep, but readings were at background for all other depths. All other sample holes drilled into trench numbers 1, 2, and 4, had insitu GM readings at background levels. The positive readings detected in sample holes B and D indicate that contaminated materials were nearby, but not in the soil sampled in these test holes. Pieces of lead and cadmium with aluminum jackets were found in samples taken in test hole B at 12 and 21 feet below grade, but no radioactivity was detected on them.

Sample hole G was drilled into trench number 7, used during the period 1958-1960. Low level contamination was first detected in a sample taken 15 feet below grade. GM counts (P-11 probe) for this sample were <100 c/m. Scaler counts indicated slight activity above background. Pieces of reactor poison were brought up from 20 and 20-1/2 feet below grade. GM and scaler counts for these samples were approximately the same as for G-15. A small piece of aluminum reading 15,000 c/m was recovered in a sample taken from 22 feet below grade. Sample G-22-1/2 dropped to 300 c/m and samples G-25 through G-30 had no contamination detectable with a GM probe.

Radionuclide analyses were performed for samples G-15, G-22, and G-22-1/2. No Pu-239/240 was detected in these samples. The maximum Sr-90 concentration is 6.0×10^{-1} pCi/g. Radioactivity is primarily from Co-60, though Ni-63, Eu-152, Eu-154, Eu-155, and Cs-137 were also detected. The beta-gamma concentration for the aluminum sample is 1.8×10^{5} of which 1.7×10^{5} pCi/g is Co-60.

Insitu GM readings of test hole G taken after sampling are as follows:

0-10'	background
10-12'	7,500 c/m
12-15'	50,000 c/m
15-22'	background

One notes that maximum insitu GM readings were at 15 feet below grade, where as the hottest sample was taken from 22 feet below grade. This could indicate that the piece of aluminum recovered in the 22-foot sample had dropped down from up above. Drilling got very hard at 27-1/2 feet below grade indicating that this depth was at or below the trench bottom.

Sample holes H, I, and J, were drilled into trench number 13. Trench number 13 is the furthest trench at the south end of the burial ground, and is approximately 30 feet wide. The trench was first used in 1966, and received 100-N Area radioactive solid wastes.

Contamination measurable with a GM probe was first detected in a sample taken from 20 feet below grade in sample hole H. Sample H-20 had a GM reading of 300 c/m, and had the highest GM count of samples taken from this test hole. Sample H-30 was <100 c/m, i.e., no contamination was detectable with a GM probe. Insitu GM readings from hole H were:

0-12'	background
12-14'	20,000 to 80,000 c/m
17'	swamped GM

LTP readings were:

0-17'	background
17-19'	170 mR/hr
19-20'	300 mR/hr
20-22'	120 mR/hr
22-25'	background

No contamination measurable with a GM probe was detected in samples taken from test hole I. Sample hole I was drilled down to 20 feet at which a cement slab was hit. The insitu GM count at this depth was 600 c/m.

Sample hole J was drilled about 6 feet south of I down to a depth of 32 feet. Drilling from 10-25 feet below grade went through a bunch of approximately 1/2-inch diameter steel tubing which could have been from N Area steam generator repair. Broken up pieces of tubing and other debris were evidently brought down to the bottom of the trench (sample J-30-1/2) before being broken up enough to be brought to the surface with samples. Low level contamination was first detected with the scaler in a sample taken from 25 feet below grade. Contamination measurable with the scaler remained fairly constant in samples down to 30 feet below grade, but GM counts were still <100 c/m. 600 c/m was detected in sample J-30-1/2, but GM readings quickly dropped to <100 c/m at 32 feet below grade.

Insitu GM readings of test hole G were as follows:

0-10'	background
14'	1,000 c/m
15'	3,000 c/m
16'	5,000 c/m
18'	4,000 c/m
20'	1,000 c/m
25'	background

Beta-gamma activity of selected samples from holes H and J is again primarily from Co-60. The Co-60 concentration of sample J-30-1/2, for example, is 3.5×10^2 pCi/g, where other activity from beta-gamma emitters is less than 5.0 pCi/g. Pu-239/240 was detected in this trench, but at a very low concentration of 4.2×10^{-1} pCi/g.

No insitu radioactivity was detected in sample hole K drilled in the P-2 trench. GM counts of samples taken down to 25 feet below grade were <100 c/m, i.e., less than detectable. Scaler counts did not indicate any significant activity.

Sample hole L was drilled 27 feet deep into a trench which was marked with a concrete post as trench number 12. The drawing for the 118-B-1 burial ground shows this trench to be just north of trench number 11, but does not assign it any number. Trench number 12 is shown as an 80-foot wide trench 30 feet further north. Insitu GM counts and samples taken from this test hole were at background levels. Miscellaneous pieces of wood and debris were brought up in samples from 15 feet below grade. Concrete was hit at 23 feet below grade.

The last two sample holes, M and N, drilled into the 118-B-1 burial ground were in the trench furthest to the north end. The trench has no number, but was used in 1966. Samples had background GM counts down to 20 feet below grade. 1,000 c/m was detected in sample M-20, increasing to 3,500 c/m and 7,000 c/m for samples M-23 and M-25, respectively. M-28 and M-30 had readings of 3,000 c/m, dropping to 800 c/m for sample M-32. No contamination was detectable in sample M-35, taken at 35 feet below grade. Pieces of wood, plastic, sheet cadmium, concrete and other debris were included in samples taken from this trench. The trench bottom appeared to be at 30 feet below grade.

Insitu GM readings and dose rate readings were:

0-10'	background
12'	1,000 c/m
14'	full scale (GM)
15'	60 mR/hr
20'	20 mR/hr

Radioanalytical analyses were performed for samples M-20, M-25, and M-32. Maximum beta-gamma concentrations are for sample M-25, which is 8.3×10^3 pCi/g. The beta-gamma activity is primarily Co-60 and Eu-152. Sr-90 is 140 pCi/g and Ni-63 is 78 pCi/g. Low concentrations of Pu-239/240 were detected in all three of the samples analyzed up to a maximum of 1.0 pCi/g.

Samples from test hole N had GM and scaler counts at background levels. Sample N-20 included oil mixed with a small amount of dirt and grease. Insitu GM counts of test hole N were:

10'	3,000 c/m
13'	14,000 c/m
15'	2,000 c/m
18'	800 c/m
19'	background

These insitu counts indicate once again that contaminated materials can be in the proximity of a test hole without any contamination being detected in samples taken from the test hole. This fact seems to indicate that there probably has not been any measurable migration of radionuclides in the soil column adjacent to and underneath the individual burial trenches. Migration of radionuclides in the 100 Area burial grounds is not expected because of the negligible infiltration of moisture into the soil at these depths.

FIGURE 4.2-1

118-B-1 BURIAL GROUND

SAMPLE HOLES

TEST HOLE #	NORTHING	WESTING	ELEV.
118-B1-A	67 029.50	83 554.51	480.80
118-B1-B	67 033.51	83 590.05	480.70
118-B1-C	67 071.75	83 554.94	480.50
118-B1-D	67 069.05	83 601.50	480.50
118-B1-E	67 115.23	83 595.97	480.00
118-B1-F	67 099.93	83 611.73	480.30
118-B1-G	67 173.18	83 593.80	479.20
118-B1-H	66 869.04	83 602.02	483.00
118-B1-I	66 870.95	83 555.52	483.20
118-B1-J	66 861.49	83 555.58	483.70
118-B1-K	67 074.71	83 601.31	480.30
118-B1-L	67 348.00	83 594.50	478.20
118-B1-M	67 568.14	83 591.54	479.00
118-B1-N	67 564.47	83 534.22	478.20

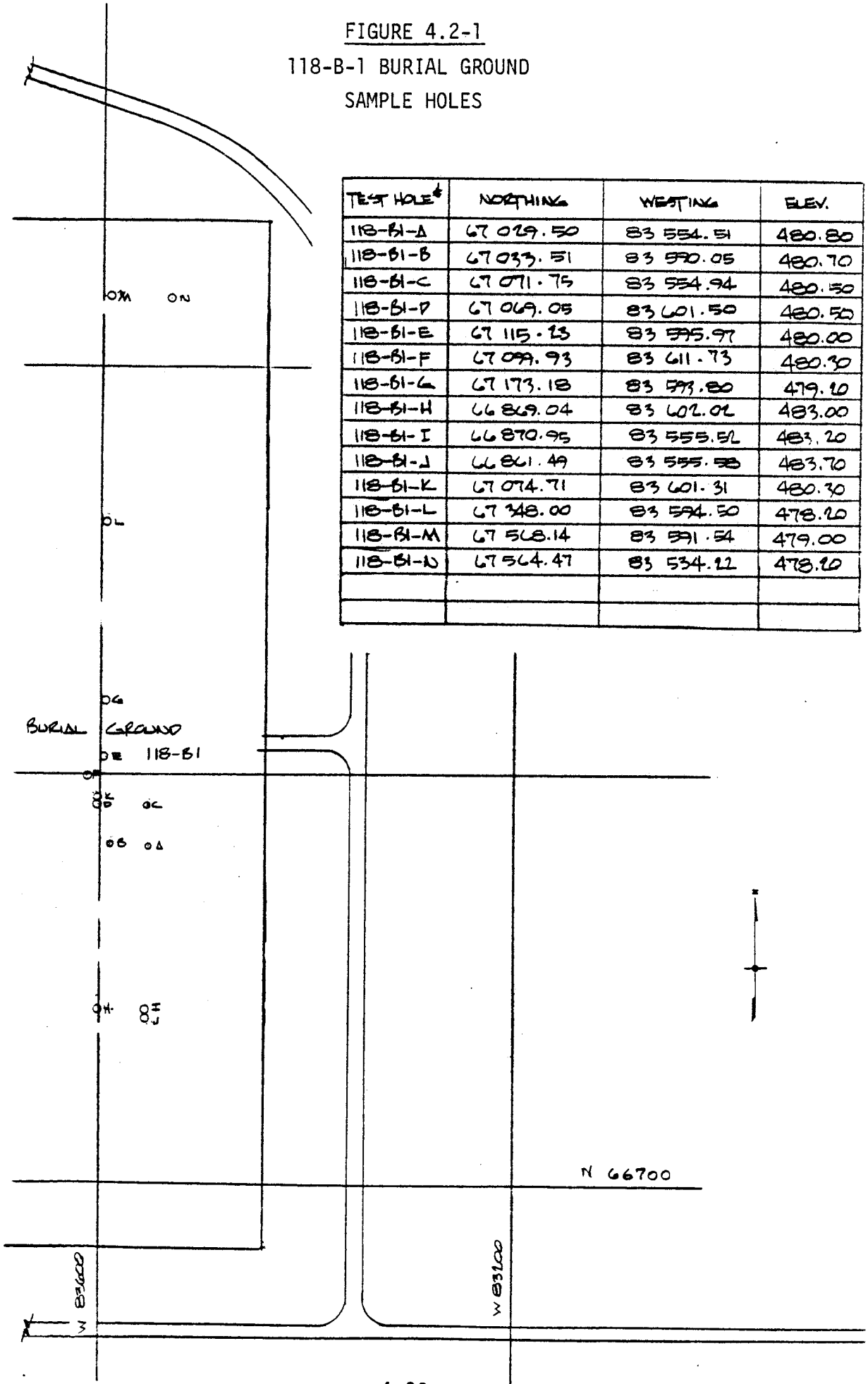

TABLE 4.3-1

118-B1

100-B BURIAL GROUND

Concentration (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	H-3	P-11/Scaler c/m	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	U	Ni-63
A 20	*	*	2.6×10^{-2}		< 200/15	*	7.0×10^{-2}	*	*	3.9×10^{-2}	4.0×10^{-1}		
G 15	*	*	1.0×10^{-1}		< 200/50	4.6×10^{-1}	3.4×10^{1}	6.6×10^{-1}	*	5.4×10^{-1}	6.5×10^{-2}		
22			6.0×10^{-1}		15,000	4.5×10^{3}	1.7×10^{5}	2.7×10^{3}	*	2.7×10^{3}	6.0×10^{2}		3.2×10^{1}
22-1/2	*	*	5.7×10^{-1}	*	300	1.3×10^{1}	9.9×10^{1}	9.3×10^{-1}	*	1.4×10^{0}	*		
H 20	*	*	6.1×10^{-1}		300	1.9×10^{0}	1.1×10^{2}	2.7×10^{0}	*	1.3×10^{0}	1.6×10^{0}		
33					10,000	3.1×10^{3}	8.2×10^{3}	3.8×10^{2}	1.3×10^{1}	1.2×10^{2}	1.8×10^{1}		
J 25	*	*	9.0×10^{-2}		< 200/80	2.3×10^{0}	9.1×10^{1}	6.3×10^{-1}	*	*	1.7×10^{-1}		
30-1/2	*	4.2×10^{-1}	2.3×10^{-2}		600	7.9×10^{-1}	3.5×10^{2}	1.8×10^{0}	2.8×10^{-1}	1.3×10^{0}	5.6×10^{-1}		*
M 20	*	2.8×10^{-1}	1.9×10^{-1}		1,000	8.3×10^{1}	*	4.5×10^{2}	6.4×10^{1}	6.6×10^{1}	4.8×10^{1}		
25	*	5.9×10^{-1}	1.4×10^{2}		7,000	2.8×10^{1}	5.2×10^{3}	2.5×10^{3}	*	4.9×10^{1}	7.5×10^{0}	1.6×10^{-1}	7.8×10^{1}
32	*	1.0×10^{0}	6.2×10^{0}		800	5.4×10^{0}	3.8×10^{2}	7.8×10^{0}	*	5.3×10^{0}	3.0×10^{0}		

NOTE: Sample H-33 was a perforated aluminum fuel element spacer (dummy) found about 20' east of trench #7. It is not a sample taken from 33' below grade at this location.

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5.0 REACTORS

5.1 Objective

The ultimate disposition of the retired 100 Area reactors will be dependent upon the quantity and types of long-lived radionuclides remaining in the reactor blocks.

In order to quantify the radionuclide inventories in the retired 100 Area reactors with reasonable accuracy, representative samples of the thermal and biological shields and graphite cores had to be obtained. The following discussion defines the sampling program used to characterize the radioactivity in the 105-DR Reactor core.

5.2 Description of Retired Reactor Cores

The retired 100 Area reactors are 105-F, H, D, and DR. The 105-B, C, KE, and KW Reactors are still officially on standby. The retired and standby 100 Area reactors are graphite-moderated, water-cooled reactors which were used to produce weapons-grade plutonium. The reactor building, designated as building 105, contains a reactor block, a reactor control room, a spent fuel discharge pool, fuel storage basin and associated fuel handling equipment, fans and ducts for the ventilation and recirculating gas systems, and supporting offices, shops, and laboratories.

The operation dates of the retired reactors are given below:

Reactor	Initial Startup Date	Shutdown Date	No. of Years Operated
D	12/17/44	6/26/67	23
DR	10/ 3/50	12/30/64	14
F	2/25/45	6/25/65	20
H	10/29/49	4/21/65	16

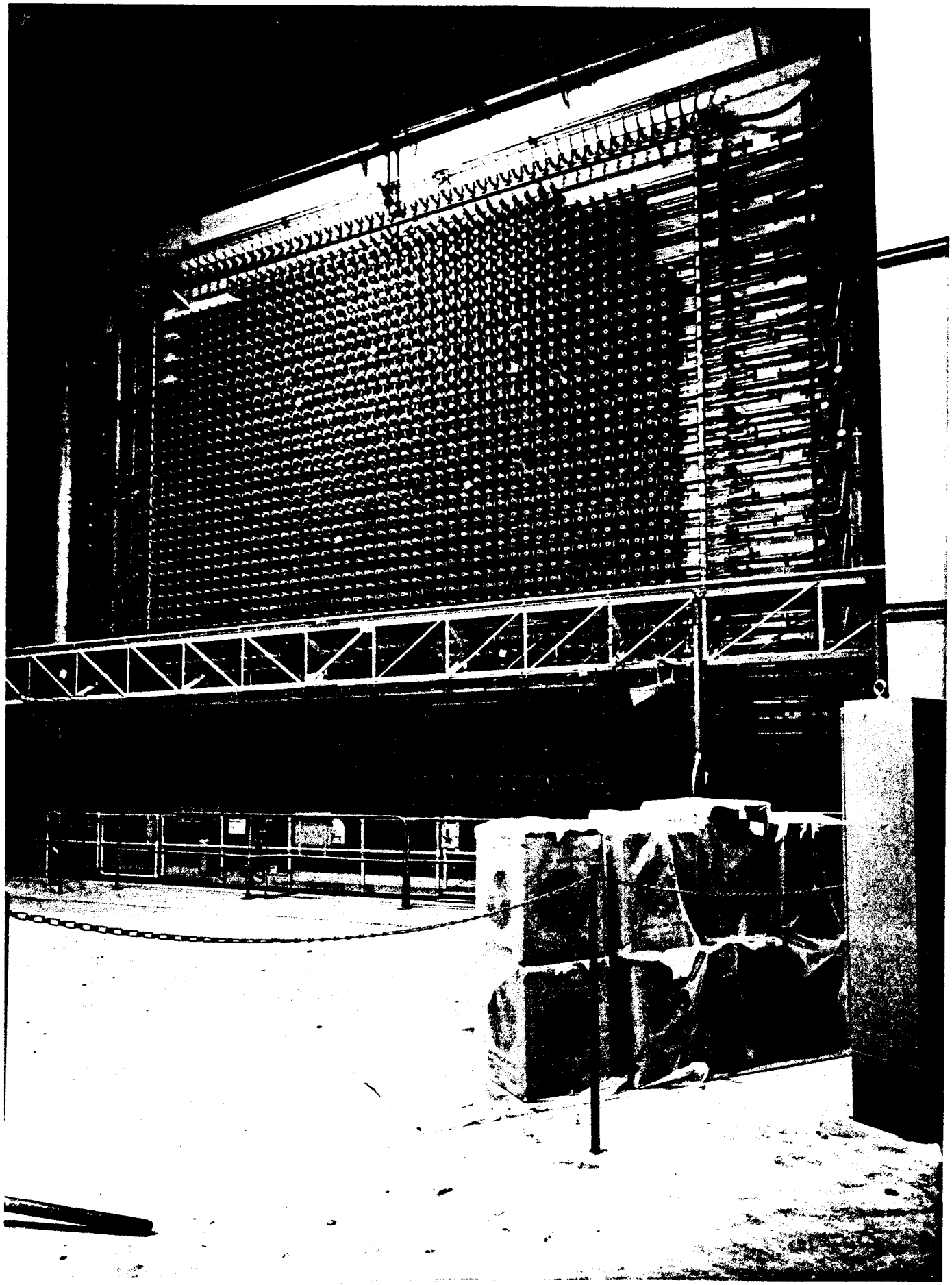


FIGURE 5.2-1
105-DR REACTOR FRONT FACE

The typical production reactor block includes the main components listed below:

- The reactor moderator stack, an assembly of graphite blocks cored to provide channels for the process tubes, control rods, and other equipment.
- The process tubes which held the uranium metal fuel elements and provided channels for cooling water.
- Control rods, gun barrels, monitoring equipment, experimental test holes, etc.
- The thermal and biological shields.
- A welded steel-plate box which encloses the biological shield and served to confine the gas atmosphere within the reactor.

A summary of pertinent reactor design features for 105-B, C, D, DR, F, and H is given in Table 5.2-1. The remaining discussion applies primarily to the officially retired production reactors.

The nominal overall graphite stack dimensions for the D, DR, F, and H Reactors are: front to rear - 28 feet; top to bottom - 36 feet; and side to side - 36 feet. The stack is made up of graphite blocks 4-3/16 inches square and 48 inches long, nominal dimensions. The reactor block contains 2004 aluminum process tubes which supported the fuel and provided cooling water channels. The front face of 105-DR Reactor is shown in Figure 5.2-1.

A cast iron thermal shield (8 inches to 10 inches thick) surrounds the graphite stack. The thermal shield is constructed of overlapping blocks. The thermal shield contains the highest concentration of gamma activity primarily from Co-60 with a half-life of 5.26 years.

Surrounding the thermal shield on all sides except the bottom is a 52-inch thick biological shield composed of alternate layers of masonite and steel. A cross-section of the biological and thermal shields is illustrated in Figure 5.2-2. Relative locations of the thermal and biological shields are indicated in Figure 5.2-3.

TABLE 5.2-1

105-B, C, D, DR, F, AND H REACTOR BLOCKS

(Stack and Shielding Information Including Penetrations)

Stack Measurements: 36' side to side
28' front to rear
36' top to bottom

Reflector in Graphite: 25" thick - stack blocks are 4-3/16" x 48"

Biological Shield: 52" thick with alternate layers of masonite 4-1/2" and steel 3-3/4" thick. All sides extend down over foundation forming a skirt. C Area, top, has heavy aggrate concrete 7' thick. The biological shields are encased in a 1" steel case.

Thermal Shield: Sides, 8" thick overlapping cast iron blocks. Top, 8-1/8" thick. Front and rear, 10" thick. Bottom, 10-1/4" thick. There is an air gap of 1/8" between thermal and biological shields.

Tube Channels: 2004 tubes - 8-3/8" center to center. Size - from 1.744" to 1.818". C Area has 61 (2.328").

Horizontal Rod Channels: Size - all 4-3/16". F, D, DR, and B have (9); C and H (15).

Vertical Rod Channels: Size - all 4-3/16". F, D, DR, and B have (29); C and H (45).

Experimental Channels: B, D, and F - 3, 4-3/16" diameter; 3, 1-1/4" diameter. DR - 7, 4-3/16" diameter. H - 10, 4-3/16" diameter. C - 13, 4-3/16" diameter.

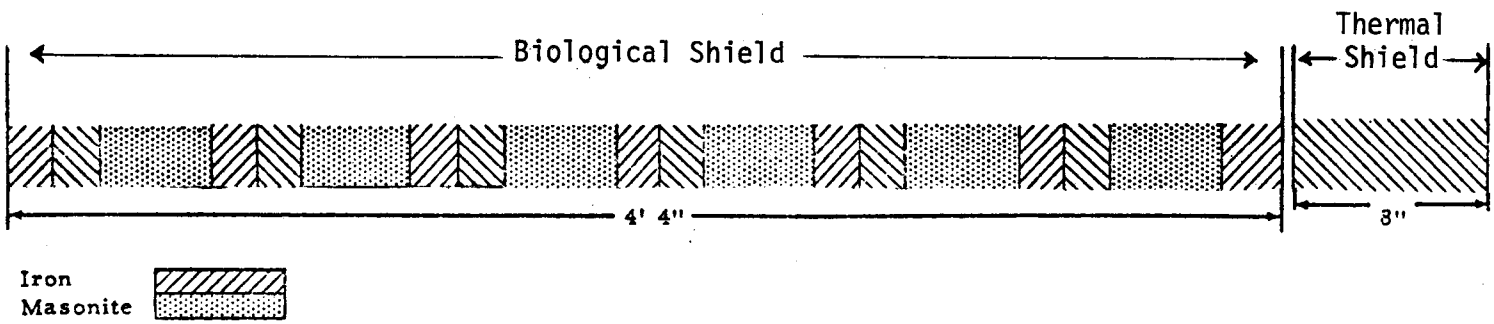
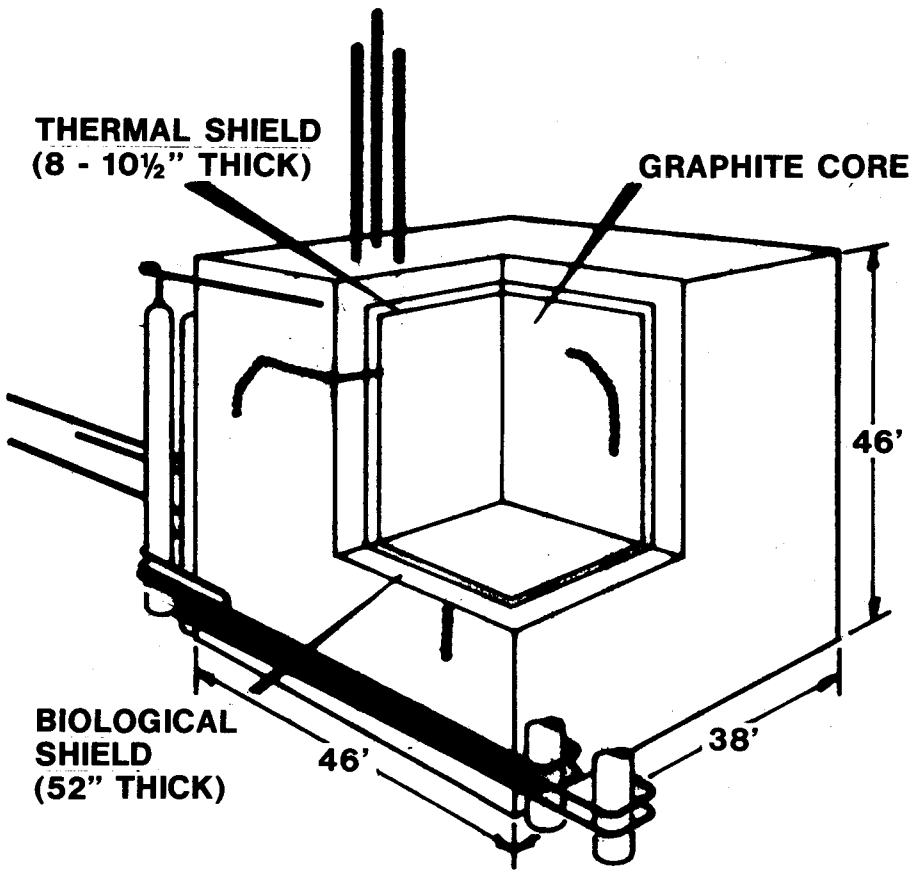


FIGURE 5.2-2

CROSS-SECTION OF BIOLOGICAL AND THERMAL SHIELD (SIDES)

FIGURE 5.2-3

TYPICAL REACTOR BLOCK



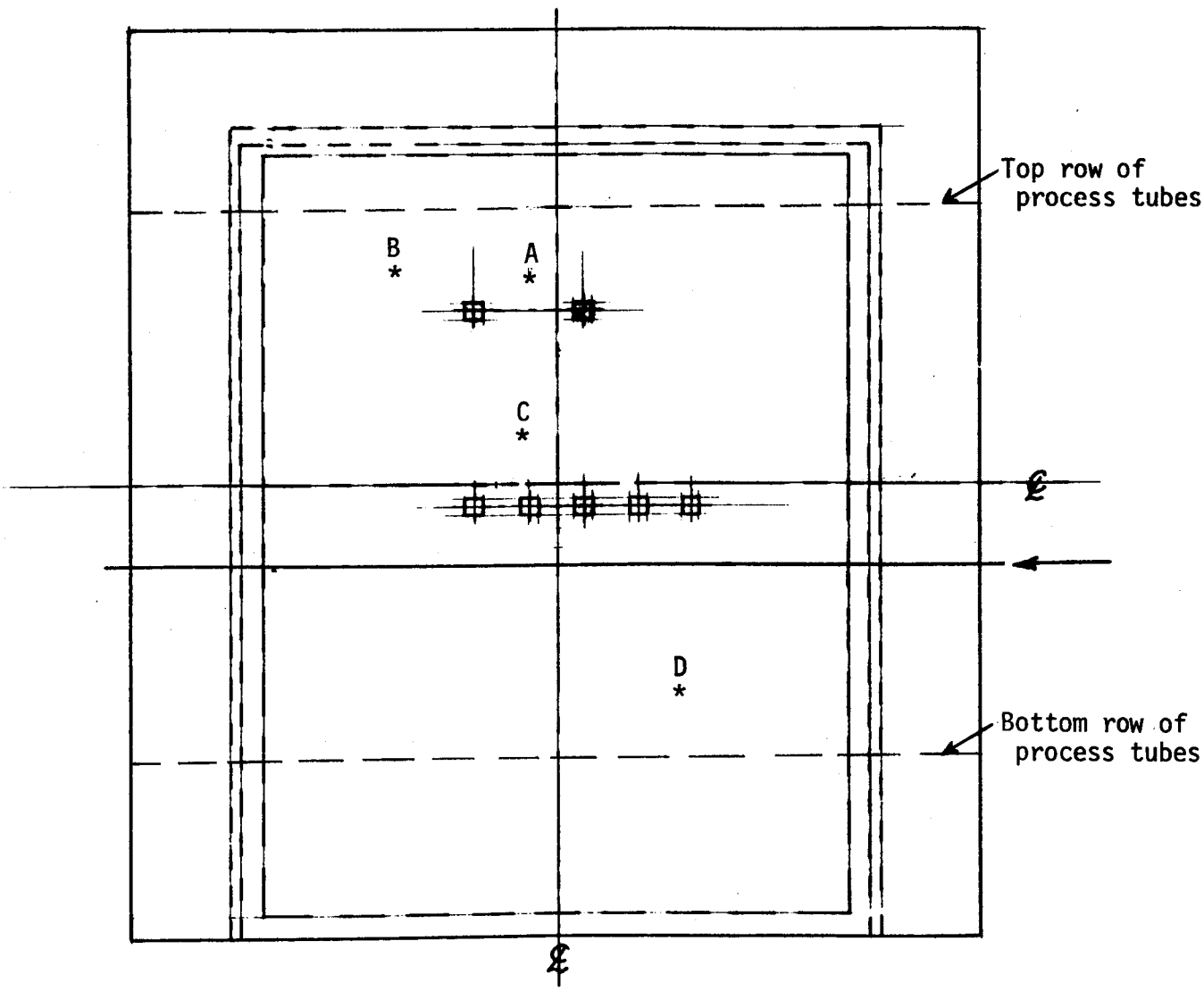
Filtered cooling water was supplied to the reactor through headers which run to the base of the front biological shield. At the base the water was directed upward through risers on each side of the front biological shield. The water was then distributed through 4-inch, schedule 40, stainless steel cross headers which are connected to a nozzle which is bolted directly to the gunbarrel flange. The gunbarrel is a steel support sleeve that fits over the end of the process tube and penetrates approximately 77 inches into the reactor. The outlet cooling water piping arrangement on the reactor rear face is essentially a duplicate of the inlet piping arrangement.

5.3 105-DR Reactor Core Sampling Techniques

Accurate sampling of the 105-DR Reactor core required drilling sample holes through the 1-inch steel plate which encloses the biological shield, through the biological and thermal shields, and into the graphite stack.

Sampling was from the X-levels on the right side of the 105-DR Reactor. Four holes were drilled completely through the graphite core to the graphite reflector at the opposite side of the reactor. Locations of the sample holes are indicated in Figure 5.3-1. Selected samples were taken of the biological and thermal shields and of the graphite core. Figure 5.3-2 shows millwrights drilling into the 105-DR Reactor core.

As an alternate method, the X-level test holes, process tube, and control rod channels themselves were considered as existing access holes by which characterization samples could be obtained. All of these methods would have required removing reactor hardware to obtain samples.



— Indicates existing 4-3/16" square irradiation test holes.

FIGURE 5.3-1

APPROXIMATE SAMPLE HOLE LOCATIONS
AT THE 105-DR, X-LEVELS

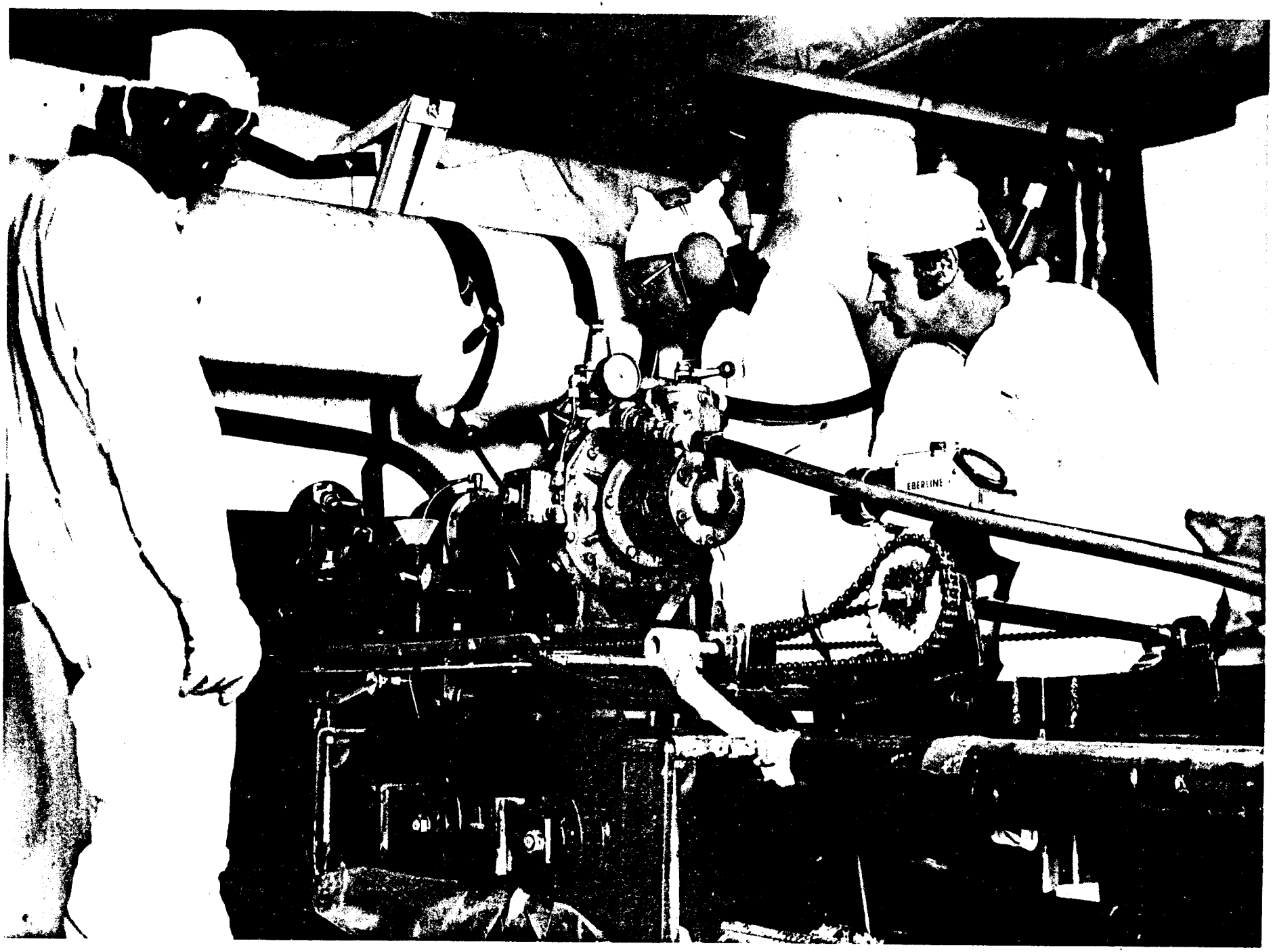


FIGURE 5.3-2
105-DR REACTOR CORE DRILLING

Dose rates and consequently personnel exposure would have been higher using the alternate sampling methods. The front and rear face elevators are inoperative at the retired reactors. Obtaining samples from process tubes would have required scaffolding or reactivating the elevators. Finally, obtaining a continuous core sample of the thermal shield (which contains the highest gamma concentrations in the reactor core) was considered necessary to obtain an accurate cross-section of the radioactive concentrations contained in the thermal shield.

Future characterization of the other retired reactor areas, D, F, and H, will probably consist of obtaining a few samples using one of the above alternative techniques in conjunction with insitu dose rates and an extrapolation of the 105-DR core drilling data. Sufficient funding was not authorized to perform these characterizations as part of this study. A graphite sampler, however, was fabricated which could be used to take core samples by drilling vertically (approximately 1 inch) into the graphite from within an existing reactor stack penetration. This sampler was fabricated in case there were radiological or technical problems encountered using the core drilling technique which was used. The graphite sampler is being stored for any such future sampling.

Basic sampling criteria were as follows:

- Biological shield samples were drill cuttings of approximately 50 grams. The sampling interval of the biological shield samples depended upon the contamination levels encountered as measured by field instrumentation.
- Thermal shield samples were 5/8-inch diameter core samples. Small aliquots were then taken for radioanalytical analyses.
- Graphite stack samples were 1/2" diameter core samples taken approximately every 5 feet. The sample size was about 20 grams of graphite.

5.3.1 Radiological Controls

No radiological control problems were encountered during the sampling of the 105-DR Reactor core.

As expected, the thermal shield samples had the highest concentrations of gamma activity. Thermal shield core samples had uncorrected dose rate readings up to 2500 mR/hr at contact.

Because of graphite's physical properties, the graphite presented the greatest potential for contamination control problems. Requirements used for maintaining radiological control are itemized below:

- A Radiation Work Procedure (RWP) was prepared to assure that all activities were carried out consistent with accepted radiation work practices. The RWP identified expected radiological conditions, protective clothing and respiratory protection requirements, and special procedures or equipment needed to assure the radiological safety of personnel involved.

- Sampling equipment had a vacuum system as an integral part of the equipment. An absolute filter was installed upstream of a vacuum producer and cyclone separator to ensure minimum contamination to vacuum producer filters and maximum assurance of total containment.

- A plastic greenhouse containment with exhaust filtration encased sampling equipment and immediate work area.

- All tools and equipment were surveyed and decontaminated as they were removed from sample hole. The work area and personnel SWP clothing were surveyed for contamination in a routine manner.

- The SWP change area was set up outside the greenhouse area. A double step-off pad procedure was used.

- A radiation monitor was at the job site during all sampling operations. He provided dose rate evaluations, assisted in contamination control, and in general, assisted in maintaining good radiological control.

- A constant air monitoring unit was operating at the job site capable of providing an alert should airborne contamination become a problem. Air samples were taken as deemed necessary.

- All sample holes were sealed with steel plugs upon completion of the job.

Figure 5.3.1-1 shows an external view of the plastic greenhouse enclosure.

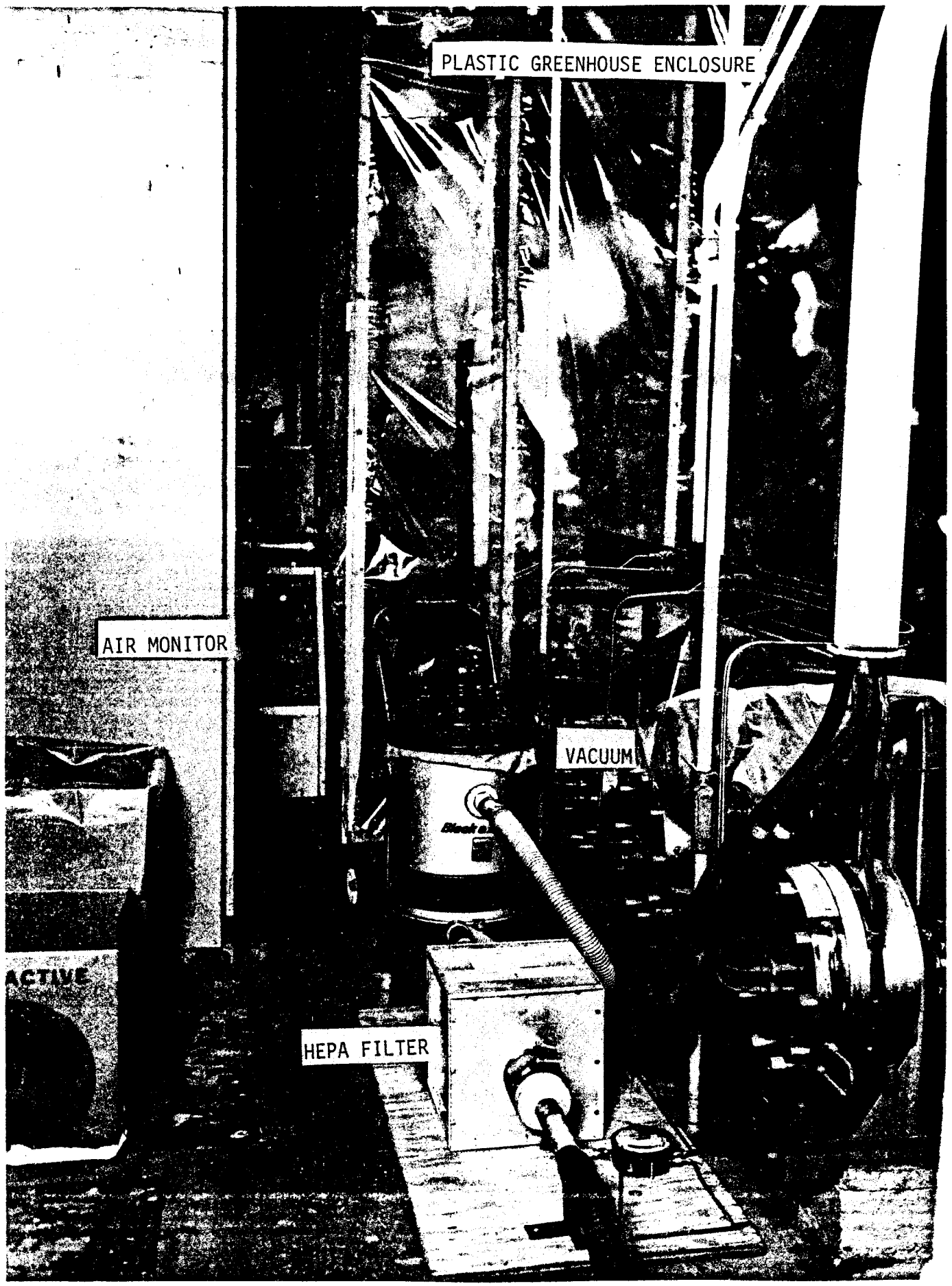


FIGURE 5.3.1-1
TYPICAL 105-DR X-LEVEL SAMPLING LOCATION & SET UP

5.3.2 Sample Logging and Numbering

The format used for entering a given reactor core sample into the sample log was the same as that discussed previously for soil samples. The "Comment" column in the reactor core sample log also included descriptions of insitu dose rates taken using a teleprobe as the drilling progressed, as well as the integrity of the masonite and graphite.

5.3.3 Sample Numbering System

Sample numbers of the following forms were used for the reactor core samples:

1. Biological Shield Samples
   a) Masonite sample - 105-DR-AM1, where "A" designates the sample hole, and "M1" indicates that it was the first layer of masonite encountered in sample hole A. The second layer of masonite would be designated as 105-DR-AM2, etc.
   b) Iron sample - 105-DR-AI1, where "A" designates the sample hole, and "I1" indicates that it was the first layer of iron encountered in sample hole A.

2. Thermal Shield Core Samples
   105-DR-AT, where "A" designates the sample hole, and "T" that the sample is a thermal shield core sample.

   Thermal shield samples were taken as continuous core samples, which were later segmented into smaller samples. Small aliquotes were taken as drill shavings collected at 1/4" intervals along the core samples with the exception of test hole A. For test hole A, the thermal shield core sample was cut into 1/4" thick disks. Drill shavings were then taken by drilling through the face of the 1/4" thick disks. Drill shaving samples have suffixes of the form T1, T2, etc., where T1 indicates the inner 1/4" sample, T2 the following 1/4" sample, etc.

3. Graphite Samples

105-DR-AG15, where "A" designates the sample hole, and "G15" that it is a graphite sample taken from 15 feet into the reactor core.

5.4 Characterization of the Radioactivity Remaining in the 100 Area Retired Reactors

5.4.1 105-DR Reactor Sampling

Reactor sampling performed as part of this study was limited to the 105-DR Reactor core. During 1977, four sample holes were drilled into the 105-DR Reactor block. The sample holes were drilled through the biological and thermal shielding and into the graphite stack. Sampling of the 105-DR Reactor was intended to establish the following:

- Radionuclide concentrations and inventories within the 105-DR biological and thermal shields, and the graphite stack.
- Insitu reactor dose rates at selected locations.
- Distribution of the thermal and biological shield inventories with respect to depth of penetration.

In addition to the sampling and radiological monitoring performed at 105-DR, insitu dose rate measurements were taken of selected process tubes in the 105-F and H Reactors.

Radioanalytical results of process tube sampling performed in 1967 at the 105-DR reactor are also reported along with decay corrections. In addition, samples had been taken of a couple of gunbarrels from the 105-C Reactor in 1967. The results of radionuclide analyses of these samples are also reported.

5.4.2 Estimates of Total Activity Present

The radionuclide inventories have been calculated for the 105-DR thermal shield and graphite stack. Core sampling showed that essentially all of the biological and thermal shield radionuclide inventory (99%) is contained within the inner 4" of the thermal shield. The radionuclide inventory of the biological and thermal shields, therefore, is calculated as the inventory within the inner 4" of the thermal shield.

All penetrations and voids (from process tubes, etc.) are neglected in determining the thermal shield and graphite stack mass used to estimate the radionuclide inventories. This approach is intended to be straight forward and conservative. The following parameters are also used in estimating the thermal shield and graphite stack radionuclide inventories:

- Graphite stack dimensions -- 36' side to side
  28' front to rear
  36' top to bottom
- Volume of graphite -- 1.0×10^9 cm^3
- Density of graphite -- 1.7 g/cm^3
- Mass of graphite -- 1.7×10^9 g
- Volume of inner 4" of thermal shield -- 6.3×10^7 cm^3
- Density of thermal shield -- 7.5 g/cm^3
- Mass of inner 4" of thermal shield -- 4.7×10^8 g

5.4.3 Summary

Reactor sampling at the X-levels of the 105-DR Reactor was initiated on December 28, 1976. Sampling of the first test hole, A, was completed on January 28, 1977. Drill shaving samples were taken of the biological shield, and a continuous core sample of the thermal shield was taken and segmented into sections for radionuclide analyses. Two graphite samples were taken in the active portion of the reactor to a total distance of 33 feet, which is 6 feet from the reflector area at the opposite side of the reactor. The indicated dose rate on the 33-foot sample was 20 mR/hr. All other graphite samples were less than 2 mR/hr.

By March 14, 1977, a second test hole, B, had been completed, and the biological and thermal shield samples of test hole C had been taken. At this point, the sampling was temporarily terminated and

the drilling equipment placed on standby until additional funding could be obtained to complete the work. Additional funding became available in late August, 1977. The sampling work was restarted on August 29 and completed on September 22, 1977. Selected samples were submitted for radioisotopic analyses.

Some general conclusions with respect to the radioactivity in the 105-DR Reactor are as follows:

- Insitu dose rates of selected process tubes at the 105-DR Reactor average 50 R/hr in the vicinity of the gunbarrel tips and drop down to 4 R/hr 15 feet into the process tube from the nozzle.
- Insitu dose rates at the outer surface of the thermal shield at 105-DR were approximately 2 R/hr at the sample hole locations.
- The maximum insitu dose rate measured at 105-DR is approximately 100 R/hr.
- Approximately 90% of the biological shield radioactivity is contained in the inner 1-3/4" thick layer of steel closest to the thermal shield at 105-DR.
- Approximately 90% of the total biological and thermal shield radioactivity is in the inner 2" portion of the thermal shield; 99% of the activity is in the inner 4" portion of the shield.
- The estimated radionuclide inventory of the 105-DR thermal shield is approximately 17,000 curies. Approximately 98 percent of the inventory is from Co-60, and the remaining activity from Ni-63.
- An estimated 18,000 curies of radioactivity are contained in the 105-DR Reactor graphite. Approximately 67% of the inventory is from H-3 and 27% from C-14.
- Pu-239/240 concentrations in the 105-DR graphite stack average 2.6×10^3 pCi/g up to a maximum of 2.7×10^4 pCi/g.

Some other general results reported in this study are as follows:

- Insitu dose rates of selected process tubes at the 105-F and H Reactors average approximately 100 R/hr in the vicinity of the gunbarrel tips and drop down to 8 R/hr 15 feet into the process tubes from the nozzle.

- Based on sampling performed in 1967, Co-60 concentrations in the 105-DR process tubes are the order of 2.5×10^7 pCi/g. Co-60 concentrations in a mild steel gunbarrel tip removed from 105-C are approximately 1×10^8 pCi/g, and 2×10^9 pCi/g in a stainless steel gunbarrel tip.

5.4.4 Past Process Tube and Gunbarrel Sampling

Sampling of the reactor hardware (process tubes, gunbarrels, etc.) was not performed as part of this program. Examples of typical dose rates of activated reactor hardware removed as part of maintenance projects during operating periods are: gunbarrels - 300 mR/hr to 4 R/hr at 3 feet; stepplugs - 100 mR/hr to 3 R/hr at 4 feet; horizontal control rods - 1 to 5 R/hr at 6 feet; and bundles of process tubing - 500 mR/hr to 5 R/hr at 6 feet.

A limited amount of sampling of the 105-DR process tubes was performed in March, 1967, a little more than 2 years after reactor shutdown. Sections of aluminum process tubes 3768, 1166, and 2568 were removed and analyzed for radionuclides. The film was removed from the interior of the tubes for separate analyses. All samples were taken 14 feet from the rear face van stone flange. The process tube and connections are made to the gunbarrels by van stone flanges which were intended to prevent water from leaking into the stack and the gas atmosphere. A cross section of a process tube channel for DR Reactor is given in Figure 5.4-1. The fuel element charges started approximately 8.5 feet from the end of the van stone flange.

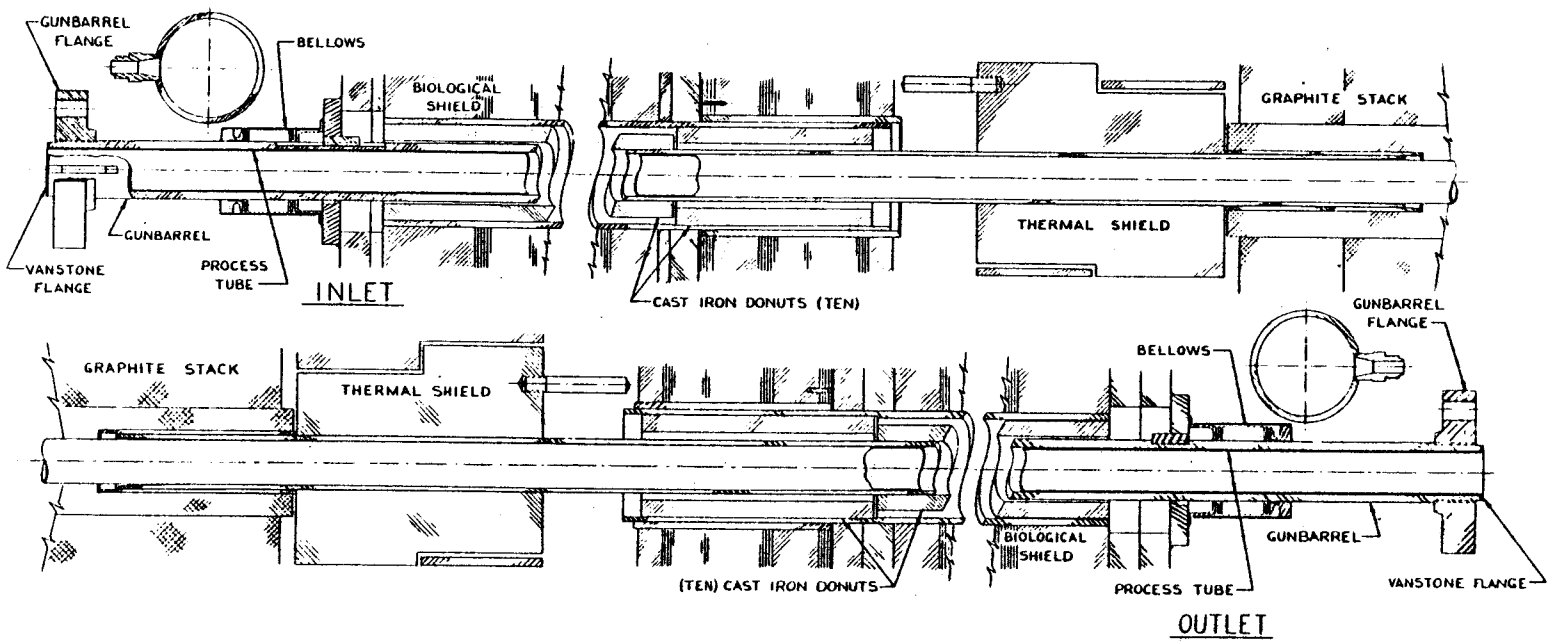


FIGURE 5.4-1

Process Tube Channel Cross Section

The radioanalytical results for the process tube samples are given below:

Radionuclide	T 1/2	#3768 (pCi/gAl)	#1166 (pCi/gAl)	#2568 (pCi/gAl)
Tube				
Mn-54	314 day	2.4×10^7	2.4×10^7	3.8×10^8
Co-60	5.3 year	9.4×10^7	9.2×10^7	4.6×10^8
Film				
Mn-54	314 day	3.9×10^5	3.0×10^5	
Co-60	5.3 year	3.0×10^6	2.7×10^6	
Zn-65	245 day	8.8×10^6	5.1×10^6	
Eu-152	13 year	2.8×10^5	4.0×10^5	
Eu-154	16 year	5.0×10^5	2.8×10^5	
Sr-90	28 year	2.0×10^4		

Decay correcting these data to March, 1977, the mid-point of the reactor core sampling performed as part of this study, gives the following concentrations:

Radionuclide	No. of T 1/2's	#3768 (pCi/gAl)	#1166 (pCi/gAl)	#2568 (pCi/gAl)
Tube				
Mn-54	12	5.9×10^3	5.9×10^3	9.3×10^4
Co-60	1.9	2.5×10^7	2.5×10^7	1.2×10^8
Film				
Mn-54	12	9.5×10^1	7.3×10^1	
Co-60	1.9	8.0×10^5	7.2×10^5	
Zn-65	15	2.7×10^2	1.6×10^2	
Eu-152	0.77	1.6×10^5	2.3×10^5	
Eu-154	0.63	3.2×10^5	1.8×10^5	
Sr-90	0.36	1.6×10^4		

After 10 years of decay since the analyses were performed, Co-60 is the dominant radionuclide in the process tube wall, and Co-60, Eu-152, Eu-154, and Sr-90 are the primary radionuclides in the reactor film. Mn-54 and Zn-65 have decayed to levels three orders of magnitude less than the other radionuclides. Mn-54 and Zn-65 would probably be masked by the activity of the other radionuclides if gamma analyses of process tube samples were now performed.

In April, 1967, samples from the tips of two gunbarrels removed from 105-C Reactor were analyzed. The Co-60 results for these two samples are given below.[1]

105-C Gunbarrel (4475) - 304 stainless steel

Co-60 = 3.2×10^9 pCi/g (Redox Lab Analysis)
Co-60 = 7.9×10^9 pCi/g (Purex Lab Analysis)

105-C Rear Gunbarrel (0954) - mild steel

Co-60 = 4.4×10^8 pCi/g (Redox Lab Analysis)

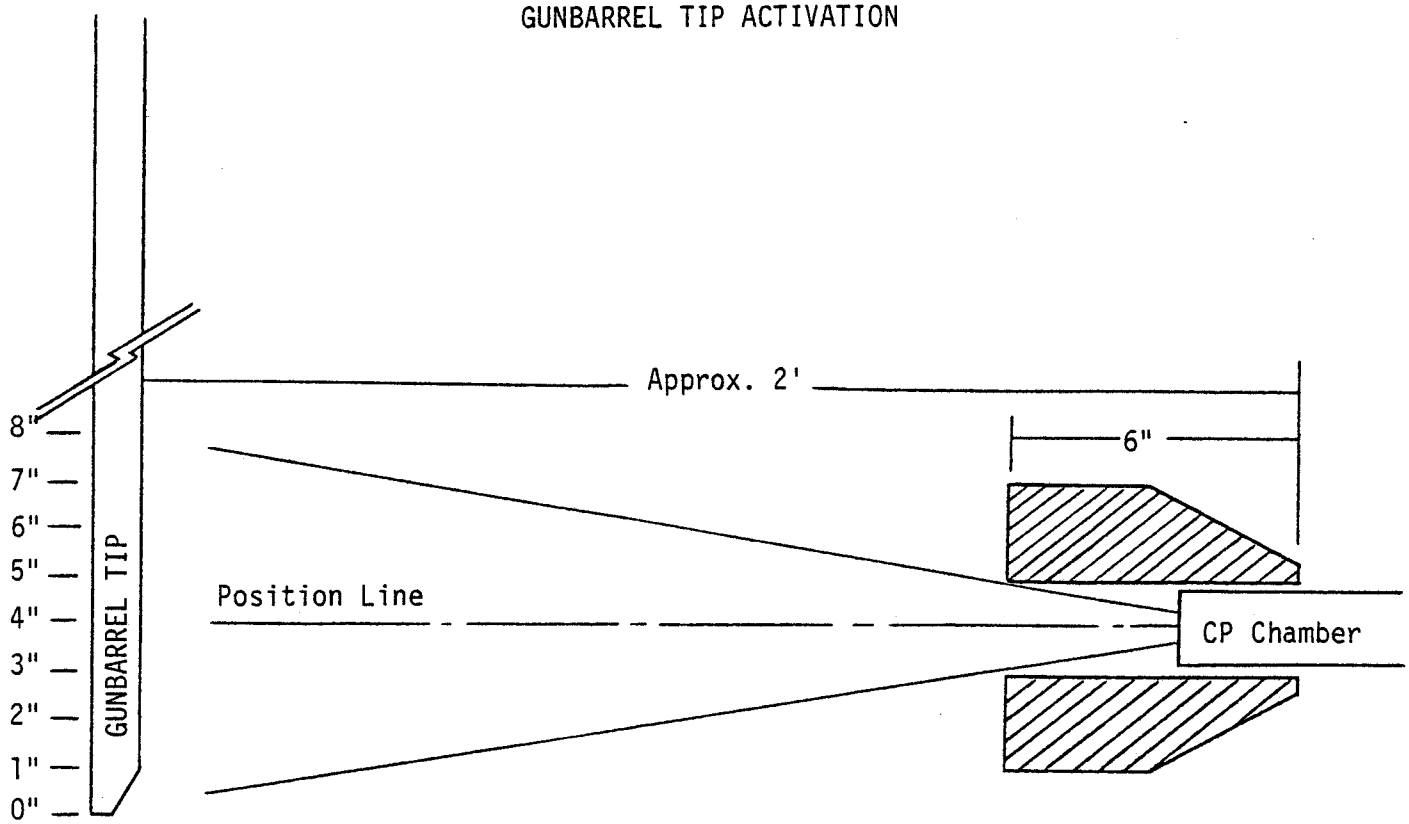
Decay correcting these data to March, 1977, gives an average concentration of 1.5×10^9 pCi/g for the stainless steel gunbarrel, and 1.2×10^8 pCi/g for the mild steel gunbarrel.

Dose rate measurements using a shielded VCP (with window closed) were taken of the mild steel gunbarrel to determine the extent of the gunbarrel tip activation. Figure 5.4-2 illustrates the dose rate measurements taken along the tip of the gunbarrel. The dose rate information indicates that about 1/3 of the gunbarrel was activated. (See Figure 5.4-3) The biological and thermal shield sampling performed as part of this study also indicates that the inner third of a gunbarrel will be activated.

[1]Other short half-lived radionuclides (Fe-59, Co-51, etc.) were detected but would have since decayed away.

FIGURE 5.4-2

DOSE RATES TO DETERMINE
GUNBARREL TIP ACTIVATION



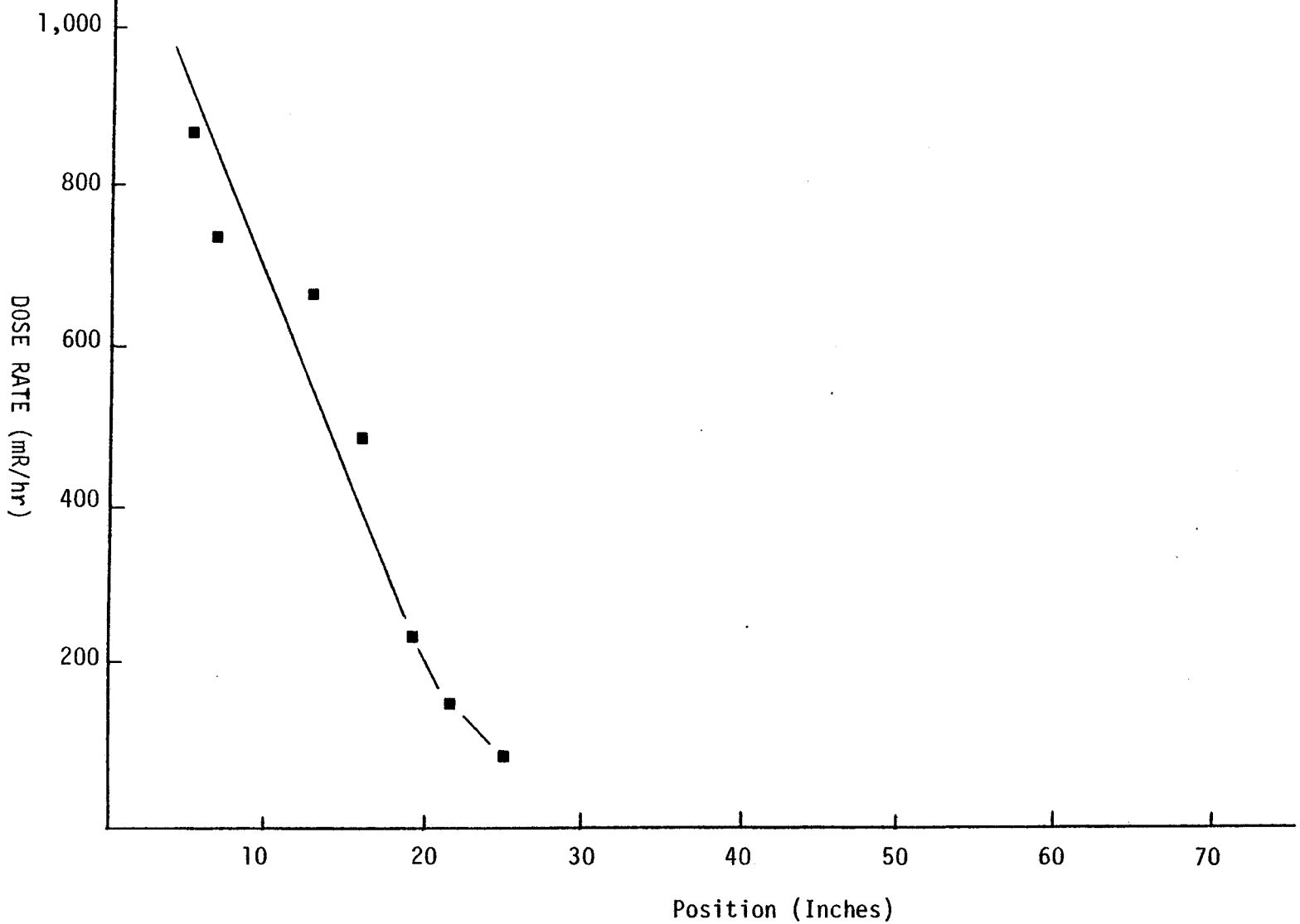
POSITION (Inches)	DOSE RATE (mR/hr)
0	580
5	870
7	730
13	670
16	480
19	240
22	150
25	85

FIGURE 5.4-3

105-C Gunbarrel Dose Rate Measurements @ 2 Ft.

vs.

Detector Position Line Along Gunbarrel Tip



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5.4.5 Discussion of the 105-DR Reactor Core Sampling and Results

The approximate locations of the four sample holes drilled into 105-DR Reactor from the X-levels are given in Figure 5.3-1. A more precise description of the sample hole locations is as follows:

Sample Hole A - Located on the X-2 level of the right side of the reactor. The hole is in graphite layer number 80 from the bottom of the graphite stack and is approximately 10' above the reactor horizontal centerline and 5" left of the vertical centerline.[2]

Sample Hole B - Located on the X-2 level of the reactor. The hole is in graphite layer number 82 and is approximately 10'8" above the reactor horizontal centerline and 94" to the left of the vertical centerline.

Sample Hole C - Located on the X-1 level of the reactor. The hole is in graphite layer number 58 and is about 2'3" above the reactor horizontal centerline and 14" left of the vertical centerline.

Sample Hole D - Located on the X-0 level of the reactor. The hole is 30" above the bottom row of process tubes and is between the 4th and 5th rows of process tubes. Test hole D is 13' below the reactor horizontal centerline and 84" right of the vertical centerline.

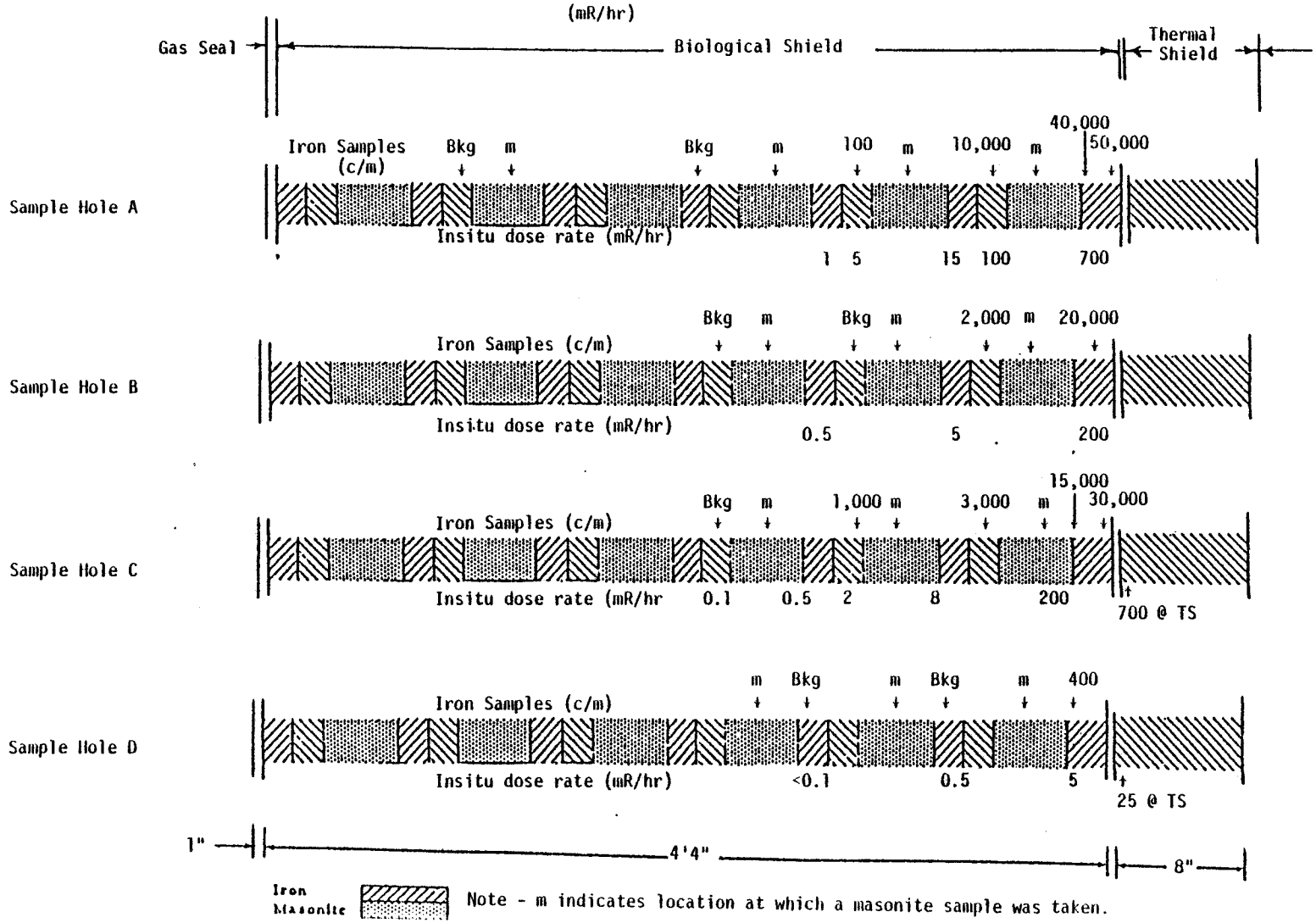
Insitu dose rates and GM counts of the biological shield iron drill shaving samples for the four test holes are shown in Figure 5.4-4. The GM counts for the drill shaving samples are only partially representative of the specific activities because of possible variations in sample sizes. Insitu dose rates and GM counts of the samples were highest for test hole A, even though test hole C is closest to the center of the reactor.

[2]There are 102 graphite layers in the 105-DR Reactor graphite stack

FIGURE 5.4-4

INSITU DOSE RATES WITHIN 105-DR SAMPLE HOLES

(mR/hr)



Radioactivity was not detected with field instrumentation in the iron samples of the biological shield until the inner 5th layer for test holes A and C, the 6th layer for test hole B, and the last layer for test hole D. Insitu dose rates for test holes B and C were essentially the same, ranging from 0.5 mR/hr at the start of the 5th layer of iron up to 200 mR/hr at the start of the last layer of iron. Insitu dose rates for test hole A were the highest, ranging from 1 to 700 mR/hr for the same interval. Test hole D had the lowest insitu dose rates which ranged from <.1 mR/hr at the start of the 5th iron layer up to only 5 mR/hr at the start of the last layer of the biological shield.

No activity measurable with field instrumentation was detected in any of the masonite samples, except for the last layer for sample hole A which read 1,000 c/m with a GM probe. This activity, however, is attributable to contamination from drill shavings which were visibly present in the sample. The contamination was removed from this masonite sample by using a magnet.

Co-60 concentrations for selected samples from the biological shields followed the same pattern as field instrumentation except that low concentrations of Co-60 were detected in the 4th layer of iron as indicated below:

Biological Shield Iron Layer	Co-60 Concentration (pCi/g)			
	Hole A	Hole B	Hole C	Hole D
7	1.3×10^5	5.4×10^4	5.4×10^4	4.0×10^3
6	1.7×10^4	6.8×10^3	3.0×10^3	<detect.
4	3.3×10^1	1.7×10^1	<detect.	<detect.

A comparison of similar thermal shield samples for these test holes also shows the same trend. Sample holes B and C have similar concentrations and test hole A has concentrations about four times greater than B and C.

Distance from Inner Surface of Thermal Shield	Co-60 Concentration (pCi/g)			
	Hole A[3]	Hole B	Hole C	Hole D
1/4"	4.0×10^8	7.4×10^7	7.6×10^7	5.0×10^7
1/2"	1.8×10^8	4.8×10^7	4.6×10^7	3.5×10^7
1-1/2"	2.6×10^7	9.0×10^6	1.8×10^7	6.4×10^6
3"	4.7×10^6	1.4×10^6	3.1×10^6	9.6×10^5

[3] Sample hole A results are adjusted for the difference in the technique used for segmenting the thermal shield core sample for this test hole; i.e., the concentration at 1/4" is the average of samples T-1 and T-2, etc.

More complete summaries of the radionuclide analyses of selected biological and thermal shield samples are included in Tables 5.4-1 and 5.4-2, respectively. The data indicates that approximately 90% of the total thermal and biological shield Co-60 inventory is within the inner 1-3/4" of the thermal shield, and 99% of the inventory is in the inner 4" of the thermal shield. The estimated Co-60 inventory within the inner half of the thermal shield is 17,000 curies with an average concentration of 3.6×10^7 pCi/g.

Ni-63 is also present in the thermal and biological shields. Because of the high expense of performing Ni-63 analyses, the average Ni-63 concentration within the inner 4" of the thermal shield was established using the average Ni-63/Co-60 ratio for those samples which Ni-63 analyses were performed. The average Ni-63/Co-60 ratio was then multiplied by the average Co-60 concentration on the inner half of the thermal shield. This results in an average Ni-63 concentration of 7.9×10^5 pCi/g within the inner 4" of the thermal shield and an inventory of 370 curies.

Graphite samples had direct GM counts generally of the order of 10,000 c/m, but ranged from 1,000 to over 80,000 c/m. Uncorrected dose rate measurements of the samples with a CP were generally 1 mR/hr up to a maximum of 20 mR/hr for sample A-G33.

Radionuclide analyses for selected graphite samples from the 105-DR Reactor are given in Table 5.4-3. H-3 and C-14 are present in addition to mixed fission and activation products. Transuranics are also present. Pu-239/240 concentrations average 2.6×10^3 pCi/g. Sample A-G33 had a Pu-239/240 concentration of 2.7×10^4 pCi/g which is above the 1.0×10^4 pCi/g (i.e., 10 nCi/g) limit for retrievable storage of TRU materials. Ni-63 is present with concentrations of up to 1.5×10^5pCi/g.

At 105-DR Reactor, there was enough stack separation and graphite breakage so that balls were known to have been retained in the stack structure after spurious ball-drops (HW-74094, Volume 3). In fact,

one ball was recovered in a graphite sample taken from sample hole A drilled into the 105-DR stack. The ball had uncorrected CP readings of 10 R/hr at 1" and 150 mR/hr at 1'. This undoubtedly was the case to various degrees at the other reactors as well. The ball 3X systems of the 100 Area production reactors utilized both 3/8" and 7/16" diameter nickel plated boron steel, nickel plated carbon steel, and stainless steel balls which dropped into the vertical safety rod channels after a trip of the ball 3X circuit. The nickel plating and nickel impurities contained within the stainless steel would be sources of Ni-63 radioactivity. Balls retained in the graphite stack would have been subjected continuously during reactor operation to the neutron flux, heat, and moisture within the stack.

Estimated radionuclide inventories of the 105-DR graphite are given in Table 5.4-4, along with the average radionuclide concentrations. An estimated 18,000 curies of radioactivity is contained in the reactor graphite. Approximately 67% of the inventory is from H-3, and 27% from C-14.

TABLE 5.4-1

105-DR BIOLOGICAL SHIELD IRON SAMPLES

Sample No.	Concentration (pCi/g) Co-60	Ni-63
A-I2	2.6×10^{-1}	
I4	3.3×10^{1}	
I5	3.7×10^{2}	1.2×10^{1}
I6	1.7×10^{4}	
I7	1.3×10^{5}	3.4×10^{3}
I7-1/2	9.7×10^{4}	
(3/4" core)I8	2.5×10^{5}	
B-I4	1.7×10^{1}	*
I6	6.8×10^{3}	
I7	5.4×10^{4}	8.2×10^{2}
C-I4	*	
I5	2.5×10^{3}	4.1×10^{1}
I6	3.0×10^{3}	
I7	5.4×10^{4}	
I7-1/2	6.8×10^{4}	7.8×10^{2}
D-I4,5,&6	*	
I7	4.0×10^{3}	6.6×10^{1}

TABLE 5.4-2

105-DR THERMAL SHIELD SAMPLES

Concentration (pCi/g)

Sample No.*	Co-60	Ni-63
A-T1	5.4×10^8	4.8×10^6
T2	2.6×10^8	
T3	9.1×10^7	
(1") T4	7.8×10^7	
T5	4.6×10^7	
T6	2.4×10^7	
T7	2.7×10^7	
(2") T8	2.5×10^7	
T9	2.7×10^7	
T10	1.4×10^7	
T11	8.8×10^6	
(3") T12	5.2×10^6	
T13	4.1×10^6	
T14	8.6×10^6	
T15	2.5×10^6	
(4") T16	2.6×10^6	3.9×10^4
T17	1.6×10^6	
B-T1	7.4×10^7	2.9×10^6
T2	4.8×10^7	
T6	9.0×10^6	
(3") T12	1.4×10^6	
T18	3.2×10^5	
(5") T20	2.3×10^5	5.0×10^3

Sample No.**	Co-60	Ni-63
C-T1	7.6×10^7	7.5×10^6
(1/2") T2	4.6×10^7	
(1-1/2") T6	1.8×10^7	
(3") T12	3.1×10^6	
T18	8.2×10^5	
(6") T24	2.5×10^5	6.9×10^3
(7-1/4") T26	1.4×10^4	
D-T1	5.0×10^7	9.2×10^5
T2	3.5×10^7	
T3	2.1×10^7	
(1") T4	1.2×10^7	
T5	9.2×10^6	
T6	6.4×10^6	
T7	4.2×10^6	
(2") T8	4.2×10^6	
(3") T9	9.6×10^5	
(4") T10	2.4×10^5	
(5") T11	7.8×10^4	1.3×10^3

*Thermal shield samples were taken as continuous 5/8" diameter cores. Drill shaving samples were taken at 1/4" intervals and designated as T-1, T-2, etc.

**For test hole D, drill shaving samples were taken at 1/4" intervals for the first 2", and then at 1" intervals.

TABLE 5.4-3

105-DR GRAPHITE SAMPLES

Concentration (pCi/g)

Sample No.	Pu-238	Pu-239/240	Sr-90	U	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	C-14	Ba-133	Ni-163
A-G 6						$5.6x10^4$	$8.0x10^4$	$4.6x10^4$	$1.0x10^3$	$2.0x10^3$	$1.2x10^4$	$5.4x10^5$	$4.9x10^3$	$1.2x10^5$
G 7						$4.3x10^4$	$6.1x10^4$	$1.7x10^4$	$3.2x10^3$	$1.1x10^3$	$4.5x10^3$		$3.5x10^3$	
G 13	$1.3x10^2$	$2.0x10^2$	$3.5x10^3$	*	$9.8x10^6$	$7.7x10^4$	$1.1x10^5$	$1.8x10^3$	$1.1x10^3$	$7.1x10^3$	$1.1x10^3$	$2.7x10^6$	$7.4x10^3$	
G 18	*	*	$1.7x10^3$	*	$1.3x10^7$	$1.9x10^3$	$2.7x10^3$	$9.9x10^1$	$1.2x10^2$	$3.0x10^3$	$1.3x10^2$	$7.1x10^6$	$3.4x10^3$	
G 23						$3.4x10^4$	$4.8x10^4$	$7.8x10^3$	$2.5x10^3$	$2.1x10^3$	$2.2x10^3$	$1.2x10^7$	$2.4x10^3$	
G 28	*	$3.9x10^2$	$5.6x10^3$	*	$7.1x10^6$	$1.3x10^5$	$1.8x10^5$	$6.6x10^3$	$1.8x10^3$	$1.6x10^4$	$1.9x10^3$	$4.3x10^6$	$1.4x10^4$	
G 33 (1)	$4.7x10^4$	$2.7x10^4$	$7.5x10^6$	$8.1x10^{-2}$	$6.3x10^6$	$1.1x10^4$	$1.2x10^5$	$2.1x10^4$	$2.2x10^4$	$5.7x10^5$	$5.8x10^3$	$5.0x10^6$	$3.4x10^4$	
B-G 6						$5.7x10^2$	$8.2x10^2$	$1.4x10^2$	$2.1x10^1$	$3.5x10^2$	$3.8x10^1$	$8.2x10^5$	$2.8x10^2$	
G 13	$7.8x10^0$	$2.7x10^1$	$1.0x10^3$	$1.9x10^0$	$4.7x10^6$	$4.8x10^2$	$6.9x10^2$	$1.2x10^2$	$3.3x10^1$	$1.6x10^2$	$3.2x10^1$	$1.8x10^6$	$1.3x10^2$	
G 18						$6.2x10^3$	$8.9x10^4$	$1.0x10^4$	$1.4x10^3$	$1.3x10^4$	$2.7x10^3$		$1.0x10^4$	
G 23	$7.7x10^1$	$1.6x10^2$	$2.8x10^3$	*	$7.8x10^6$	$1.3x10^5$	$1.8x10^5$	$3.8x10^3$	$3.2x10^3$	$1.1x10^4$	$1.1x10^4$	$2.2x10^6$	$1.8x10^4$	
G 28						$2.1x10^4$	$3.0x10^4$	$5.9x10^3$	$2.6x10^3$	$1.1x10^4$	$1.1x10^3$		$4.4x10^3$	
G 33	$2.0x10^2$	$4.9x10^2$	$3.8x10^3$		$3.4x10^6$	$3.6x10^4$	$5.1x10^4$	$5.1x10^3$	$1.7x10^3$	$9.3x10^3$	$1.3x10^3$	$1.8x10^6$	$2.6x10^3$	
C-G 7	$2.9x10^1$	*	$1.0x10^3$	*	$2.4x10^6$	$1.2x10^5$	$4.3x10^4$	$1.4x10^5$	$9.7x10^2$	$1.6x10^3$	$2.9x10^4$	$3.8x10^5$	$5.5x10^3$	$5.1x10^4$
G 13						$3.3x10^2$	$8.9x10^2$	$3.4x10^2$	$2.0x10^1$	$4.5x10^1$	$7.6x10^1$	$2.8x10^6$	$7.7x10^1$	
G 18	*	0.0	$1.4x10^3$	*	$4.1x10^6$	$4.9x10^1$	$1.3x10^2$	$5.0x10^1$	$2.9x10^0$	$1.3x10^3$	$1.1x10^1$	$2.2x10^6$	$2.2x10^3$	
G 23	$4.9x10^3$	$5.1x10^3$	$5.0x10^4$	*	$5.0x10^6$	$1.9x10^3$	$8.5x10^3$	$3.3x10^3$	$1.7x10^3$	$6.5x10^4$	$7.2x10^2$	$3.3x10^6$	$1.1x10^5$	$1.5x10^4$
G 28						$7.9x10^2$	$2.1x10^3$	$8.1x10^2$	$4.7x10^1$	$2.8x10^3$	$1.8x10^2$	$1.5x10^6$	$4.8x10^3$	
G 33						$1.4x10^4$	$3.1x10^5$	$1.6x10^4$	$5.4x10^3$	$2.4x10^4$	$4.2x10^3$	$1.5x10^6$	$4.8x10^4$	
G 38	$2.5x10^2$	$2.0x10^2$	$5.3x10^3$	*	$4.2x10^6$	$9.4x10^4$	$2.5x10^5$	$7.4x10^4$	$5.6x10^3$	$1.5x10^4$	$1.8x10^4$	$1.6x10^6$	$1.9x10^4$	
D-G 7						$2.4x10^5$	$4.5x10^4$	$2.8x10^5$	$7.1x10^2$	$3.0x10^3$	$4.5x10^4$	$6.1x10^5$	$8.2x10^3$	
G 13	$7.0x10^1$	$1.8x10^2$	$2.6x10^3$	*	$1.3x10^7$	$4.4x10^4$	$8.6x10^4$	$4.5x10^4$	$1.4x10^3$	$4.7x10^3$	$1.1x10^4$	$1.6x10^6$	$1.7x10^4$	
G 18						$1.6x10^4$	$6.0x10^4$	$1.9x10^4$	$2.6x10^3$	$1.0x10^4$	$4.0x10^3$	$2.7x10^6$	$1.3x10^3$	
G 23	$2.7x10^2$	$2.4x10^2$	$2.7x10^3$	*	$7.7x10^6$	$1.0x10^5$	$2.0x10^5$	$1.0x10^5$	$3.2x10^3$	$1.3x10^4$	$2.4x10^4$	$2.0x10^6$	$1.7x10^4$	$1.5x10^5$
G 28						$1.8x10^5$	$1.8x10^5$	$1.8x10^5$	$1.2x10^3$	$1.0x10^4$	$7.4x10^3$		$1.9x10^4$	
G 33						$1.1x10^5$	$1.1x10^5$	$8.8x10^4$	$1.7x10^3$	$5.7x10^3$	$1.8x10^4$		$1.4x10^4$	

(1) Am-241 $3.8x10^3$

TABLE 5.4-4

RADIONUCLIDE INVENTORY OF 105-DR GRAPHITE STACK

Mass = 1.7×10^9g

Radionuclide	Ave. pCi/g	Curies	
Pu-238	4.1×10^3	7.0×10^0	
Pu-239	2.6×10^3	4.4×10^0	
Sr-90	5.8×10^5	9.9×10^2	
H-3	6.8×10^6	1.2×10^4	
Eu-152	5.6×10^4	9.5×10^1	
Co-60	8.6×10^4	1.5×10^2	
Eu-154	4.3×10^4	7.3×10^1	
Cs-134	2.5×10^3	4.3×10^0	
Cs-137	3.1×10^4	5.3×10^1	
Eu-155	7.9×10^3	1.3×10^1	
U	1.7×10^{-1}	2.9×10^{-4}	
C-14	2.8×10^6	4.8×10^3	
Am-241	(one sample 3.8×10^3pCi/g)		
Ba-133	1.4×10^4	2.4×10^1	
Ni-63	8.4×10^4	1.4×10^2	(4 samples)
		1.8×10^4 Curies	

5.5 Reactor Insitu Dose Rate Measurements

During February, 1978, insitu dose rate measurements were taken in selected process tubes at the 105-DR and 105-F Reactors. The insitu dose rate measurements were taken using a Tele-probe. Similar measurements were taken at the 105-H Reactor in August, 1975. Readings were taken from both the front and rear faces up to 15 feet into the process tube from the end of the nozzel. Fifteen feet is the furthest distance the Tele-probe could be extended. The results of these readings are given in Table 5.5-1. Two measurements are generally reported for each of the process tubes measured. The first reading is the maximum dose rate detected at the end of the gunbarrel, or about 9-1/2 feet from the nozzle. In two cases, three readings are reported. In these instances, insitu dose rate readings went down going away from the gunbarrel tip and then went back up, thereby indicating higher than normal activity in the graphite stack.

As part of the 100-F Area Decontamination & Decommissioning (D&D) program, additional process tube insitu dose-rate surveys were initiated and completed on 6/11/79. The instrument used was ZETEX-302A with a 40' extension cable. A summary of the findings is as follows:

Readings were taken at predetermined points of 37 selected process tubes. The highest readings were found in the area of the front thermal shield and the front gunbarrel tips. The maximum reading was 251 R/hr with the average being 120 R/hr. Seven localized hot spots were found reading 15 to 78 R/hr; they were located in a random pattern but within 5 feet of the reactor center. The general background in this area is approximately 5 to 10 R/hr.

TABLE 5.5-1

PROCESS TUBE INSITU DOSE RATE MEASUREMENTS

Reactor	Process Tube No.	Dose Rate at Gunbarrel Tip (R/hr)	Dose Rate 15' in From Nozzle (R/hr)
105-DR Front Face	0459	28	2.7
	0472	43	3
	0488	35	3.5
	1476	50	Not measured
	2361	70	Not measured
	2374	80	5
	2386	50	Not measured
105-DR Rear Face	0659	50	
	0673	70	
	0690	40	
105-F Front Face	0459	65	2.5
	0473	75	4
	0488	110	7-24*
	2173	150	4-6 *
105-F Rear Face	0659	30	Not measured
	0673	45	Not measured
	0688	27	Not measured
105-H Front Face	1873	300	12
	0673	100	8
	0473	65	8

*Insitu dose rate readings went down going away from the gunbarrel tip (1st no.) and then went back up (2nd no.).

REFERENCES

1. Hazards Summary Report, Vol. 3, Description of the 100-B, 100-C, 100-D, 100-DR, 100-F and 100-H Production Reactor Plants, HW-74095, General Electric Co., Richland, WA, April 1, 1963.

2. Resource Book - Disposition (D & D) of Retired Contaminated Facilities at Hanford, BNWL-MA-88, Battelle Pacific Northwest Laboratories, August, 1975.

3. F.E. Owen, Radiological Guide to Deactivation of D-DR Production Facilities, DUN-2447, May 5, 1967.

TABLE 6.2-1 (Cont'd)

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
105KW	Dummy Ele. Pit	$4.2x10^1$	$1.3x10^3$	$9.8x10^3$	$4.7x10^1$	$2.5x10^4$	$1.7x10^4$	$9.3x10^4$	$6.0x10^5$	$1.5x10^4$	$3.8x10^1$	
105KW	Pick up Chutes	$8.7x10^1$	$1.4x10^3$	$1.8x10^3$	$3.2x10^2$	$3.4x10^4$	$4.1x10^4$	$6.2x10^4$	$3.7x10^5$	$1.2x10^4$	$7.3x10^1$	
105KW	Transfer Area	$7.6x10^1$	$4.7x10^2$	$2.0x10^3$	$6.4x10^1$	$1.1x10^4$	$3.5x10^4$	$2.5x10^4$	$1.1x10^5$	$1.9x10^4$	$6.5x10^1$	
105KW	Center Basin	$2.2x10^2$	$3.2x10^3$	$5.2x10^3$	$1.0x10^2$	$1.6x10^5$	$5.1x10^4$	$6.9x10^5$	$1.9x10^6$	$7.3x10^5$	$4.5x10^1$	$6.5x10^5$
Ave.		$1.1x10^2$	$1.6x10^3$	$4.7x10^3$	$1.3x10^2$	$5.8x10^4$	$3.6x10^4$	$2.2x10^5$	$7.4x10^5$	$1.9x10^5$	$5.5x10^1$	

TABLE 6.2-2

105 METAL STORAGE BASIN - WATER SAMPLES

		Concentration (pCi/l)									
Area	Location	Pu-238	Pu-239/240	Sr-90	H-3	Eu-155	Cs-137	Eu-154	Co-60	Eu-152	U
105DR	Storage Basin	$5.3x10^0$	$2.7x10^1$	$8.7x10^3$	$4.1x10^4$	$4.3x10^2$	$8.0x10^3$	*	$2.8x10^2$	*	$6.3x10^0$
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	$1.0x10^0$	$1.5x10^1$	$3.0x10^4$	$6.8x10^3$	$7.8x10^2$	$1.2x10^4$	*	$5.3x10^2$	*	$4.4x10^1$

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7.0 CONTAMINATED REACTOR ANCILLARY FACILITIES

7.1 Description of Contaminated Reactor Ancillary Facilities

7.1.1 115 Gas Recirculation and 117 Exhaust Air Filter Buildings

The major contaminated ancillary structures for the reactors are the 115 and 117 buildings. The reactor moderator (graphite) had a helium and carbon dioxide cover gas. The gas was recirculated at low pressures to minimize gas losses. Driers, injection and circulation equipment are located in the 115 building.

A 117 building houses the 105 building exhaust air filters, and air flow control system. Reactor building exhaust gases (primarily ventilation) were directed to the 117 building where the air passed through "absolute" (particulate) and "halogen" (activated charcoal) filters and was then discharged to the atmosphere through a 200 foot high stack (116 Building). Each 117 building contains two identical filter cells separated by a two-storied operating gallery almost entirely underground. The 117 buildings are about 59 feet long, 39 feet wide and 35 feet high. Underground concrete ventilation and gas piping tunnels run from the reactor building to the 115 and 117 buildings, and in the case of the ventilation tunnels from the 117 building to the stack. These tunnels are also contaminated.

The reactor gas piping and ventilation tunnels for a given reactor are typically a few hundred feet long. Ventilation ducts are approximately 5 feet wide by 11 1/2 feet high. Turning vanes are installed in the inlet and exhaust tunnels of a 117 building. These turning vanes assisted in deflecting air into or out of the filter cells. A 115 gas piping tunnel is about 36 feet wide by 8 feet high.

Each reactor had its own 117 reactor exhaust air filter building. The 105-B and C reactors, and the 105-D and DR reactors shared 115 gas recirculation buildings.

7.1.2 Reactor Exhaust Stacks

After passing through the 117 building filters, the reactor confinement air was exhausted to the atmosphere via a 200 foot high stack at each of the 100 area reactors. A reactor exhaust stack (designated as a 116 building) is of reinforced concrete construction, with a base diameter of approximately 16 feet.

7.1.3 1608 Waste Water Pump Houses

A 1608 Building or waste water pump house functioned as a collection sump for all potentially radioactive or contaminated liquids from the 105 building with the exception of the once-through reactor cooling effluent. The 1608 building included facilities for pumping the collected contaminated liquid wastes into the reactor effluent lines for final disposal. The 1608 buildings are small, ranging from approximately 400 to 1200 ft^2.

7.1.4 108-B Laboratory Building

The 108-B building was originally built to provide laboratory support for operations. The building contains three stories and a basement and is 132 x 32 x 41 feet high. The building was once used for recovering tritium from irradiated lithium-aluminum target elements and still contains process equipment. The upper three floors are contaminated with tritium.

7.1.5 Other Miscellaneous Contaminated Deactivated 100 Area Facilities

In addition to the facilities discussed above there are a few other types of contaminated facilities in the deactivated 100 areas. The three additional contaminated facilities of most significance include the 144-F, 141-C, and 108-F buildings in 100-F area. These facilities were used by Battelle for experimental work performed as part of their former biological research activities conducted in 100-F area. The 100-F biology facilities were not included in the scope of this study.

The major contaminated reactor ancillary facilities other than those specifically addressed earlier are the 103 fresh metal storage buildings. During reactor operating periods the 103 buildings were used for pallet storage of fuel elements before use in a reactor. Appendix VII of BNW-MA-88, Resource Book - Disposition (D & D) of Retired Contaminated Facilities at Hanford, includes lists of all the contaminated facilities in each of the reactor areas. In addition to buildings, the solid waste burial grounds and contaminated liquid waste disposal facilities are also included on these lists.

7.2 Contaminated Reactor Ancillary Facility Sampling

Radiation surveys of contaminated buildings other than the reactor buildings (115, 117, 1608 buildings, etc.) were initiated in August, 1976. Detailed radiological analyses were performed for selected smears.

Radiation surveys included general direct surveys of contaminated floors, equipment, piping etc. inside of contaminated buildings tunnels, stacks etc., with portable survey instruments. These instruments included a mica window GM probe, PAM, and CP - standard instruments used by Radiation Monitors at Hanford.

In addition to qualitative smears using Masslinn Cloth* or Kotex swabs, standard smears (per 100 cm^2) were also taken. The standard smears were then counted for alpha and beta activity using a NMC lab proportional counter. The amount of removable material per 100 cm^2 of surface was determined by wiping the area of concern with dry filter paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe. The qualitative smears are used to establish whether or not loose contamination is present. Standard smears are most useful for comparison of smearable contamination levels, particularly with respect to criteria for removing surface contaminated areas from radiological controls. One example of such criteria are the release limits specified in AEC Regulatory Guide 1.86 "Termination of Operating Licenses for Nuclear Reactors, dated June, 1974.

7.3 Summary

Some general conclusions with respect to the radioactivity remaining in the miscellaneous contaminated reactor ancillary facilities are as follows:

- Background dose rates are generally less than 1 mR/hr. Direct dose rate readings of piping and other equipment range up to a maximum of 30 mR/hr.

- Qualitative smears range from less than 200 c/m to 10,000 c/m with a GM probe.

- Standard smears have beta counts ranging up to a maximum of 200,000 dpm/100 cm^2. Smearable beta contamination is generally less than 10,000 dpm/100 cm^2.

- Standard smears have alpha counts ranging up to a maximum of approximately 1,000 dpm/100 cm^2. Smearable alpha contamination is usually less than 20 dpm/100 cm^2.

* Chicopee Mills, Inc., Trademark

- The primary contribution of radioactivity with high enough energies to be detected with a GM probe are Co-60 and Cs-137, though lower concentrations of Sr-90, Cs-134 Eu-152, Eu-154 and Eu-155 are also present.

- C-14 and H-3 (both weak beta emitters) are present within sections of the 115 and 117 buildings and associated tunnels. Standard smears have C-14 contamination up to a maximum of 2.1×10^6 pCi/100 cm^2 and H-3 up to a maximum of 1.3×10^4 pCi/100 cm^2.

7.4 Discussion of Contaminated Reactor Ancillary Facilities and Results

Radiation surveys of the various rooms within the 115, 117, 1608 buildings, etc. are included in extensive tables at the end of this section. Radionuclide analyses for selected standard smears are included in Table 2.7-1. A discussion of some of the general results for the different categories of the contaminated reactor facilities are discussed in the following few paragraphs.

7.4.1 115 Buildings

Drier Rooms

Direct GM readings on piping, condensate drains, valves, turbine blowers, and condensors with the 115 building drier rooms are typically in the order of 10,000 c/m. Direct GM readings of the silica gel towers range from 1,000 to 15,000 c/m and average about 3,000 c/m. The 115-KE and KW building drier rooms have the highest radiation levels with direct GM readings on condensors of about 50,000 c/m. Direct doserate readings of the condensors within the 115-KE and KW drier rooms are 30 mR/hr. Background radiation levels within the 115 building drier rooms in general are about 1,000 c/m with a GM probe. Radiation levels are lowest in the 115-D building drier rooms. The highest direct GM reading on equipment within the

115-D building drier rooms is 4,000 c/m. The general background readings inside the 115-D building drier rooms are about 300 c/m.

Smearable contamination (qualitative smears) on floors, walls, and equipment within the 115 building drier rooms averages about 1,000 c/m and ranges from less than 200 c/m to 6,500 c/m with a GM probe. Standard smears have beta counts averaging approximately 1,000 dpm/100 cm^2 up to a maximum of 110,000 dpm/100 cm^2. Low level alpha contamination is present up to a maximum of 800 dpm/100 cm^2 and averages 20 dpm/100 cm^2.

Gas Piping Tunnels

General background doserates in the reactor gas piping tunnels are about 1 mR/hr. Direct doserate readings of piping inside the tunnels range from 3 to 20 mR/hr, and are highest in the 115-KW gas piping tunnels. Direct GM readings on piping, valves, and drains average approximately 10,000 c/m up to a maximum of 40,000 c/m. Smearable contamination along floors, walls and piping averages about 2,000 c/m and was detected up to 8,000 c/m.

Low level alpha contamination is present in all of the reactor gas piping tunnels as determined by proportional counter analyses of standard smears taken from these facilities. Smearable alpha contamination within the individual tunnels averages from about 10 to 1,000 dpm/100 cm^2, being highest for 115-KW.

Smearable beta contamination levels within the different tunnels average from about 500 to 20,000 dpm/100 cm^2. A maximum of 55,000 dpm/100 cm^2 of smearable beta contamination was detected in the reactor gas piping tunnels.

Filter Rooms

Doserates within the 115 building filter rooms are generally less

than 1 mR/hr. The highest radiation levels are near the filter boxes which have direct GM readings ranging 200 c/m in the 115-H building to a maximum of 20,000 c/m in the 115-KW building. Direct GM readings of the filter boxes average a few thousand counts per minute. The filter boxes, walls, floors, and other equipment have smearable contamination up to 600 c/m and averaging about 300 c/m. Standard smears have beta counts ranging up to a maximum of 6,000 dpm/100 cm^2. Smearable beta contamination is usually less than 100 dpm/100 cm^2. Smearable alpha contamination is generally not detectable with a proportional lab counter. The highest smearable alpha contamination was 70 dpm/100 c/m^2 in the 115-KW filter room.

Blower Rooms

Radiation levels within the blower rooms are fairly low with background levels typically from less than 200 to 300 c/m with a GM probe. Contaminated tools are stored in the cooler-blower rooms of the 115-B building. Maximum GM readings on the tools in these rooms range from 8,000 to 25,000 c/m. Tools generally read about 500 c/m. Smearable contamination (qualitative smears) ranges from less than 200 c/m to 500 c/m inside of the 115 building blower rooms. Standard smears have beta counts of generally less than 100 dpm/100 cm^2 up to a maximum of 2,000 dpm/100 cm^2. Alpha contamination was detected in a few instances up to a maximum of 25 dpm/100 cm^2.

7.4.2 117 Buildings

Doserates in the deactivated 100 area 117 building filter cells range from less than 1 mR/hr up to a maximum of 5 mR/hr. Doserates are less than 1 mR/hr in the 117-B, H, F and D buildings and a few mR/hr in 117-C, KE & KW. Direct GM readings on the inlet surfaces of the 117-B, D, F and H filters are about 2,000 c/m and are approximately 20,000 c/m for the 117-C, KE and KW buildings. Smearable

contamination (qualitative smears) along the floors, walls, and filter surfaces range from 200 to 10,000 c/m being highest in the 117-KW building. Smearable contamination in the 117 buildings, however, is generally 1,000 - 2,000 c/m. No alpha contamination was detectable within portable survey instrumentation (i.e., less than 100 dpm using a PAM).

Standard smears of floors and walls taken from the inlet sides of the filter cells have beta counts ranging from less than 200 to 16,500 dpm/100 cm^2. Smearable beta contamination is highest in the 117-C, KE and KW filter cells, averaging approximately 10,000 dpm/100 cm^2 in these buildings. Contamination levels are lowest in the 117-B building filter cells with smearable beta counts averaging only 200 dpm/100 cm^2.

Low level alpha contamination is present within the 117 buildings as determined by proportional counter analyses of the standard smears taken from these facilities. Smearable alpha contamiation averages less than 10 dpm/100 cm^2 in the 117-B, D, H and F filter cells. Smearable alpha contamination was highest in 117-C and KW averaging approximately 100 dpm/100 cm^2.

Many of the filters have been removed from the 117 buildings. Those filters which have been removed include the following:

Building	Filters Which Have Been Removed
117-B	A1 & B1
117-C	B1
117-KW	A1, A2, & B1
117-D	A1
117-H	A1, A4, B3, & B4
117-F	A1, A3, B1, & B3

Doserates in the inlet tunnels running from the 105 building to the 117 buildings are the order of 1 mR/hr up to a maximum of 2.5 mR/hr in the inlet tunnel to 117-KW. Floors and walls within the inlet tunnels to the 117 buildings are dusty with accumulations up to 1/16" thick. Low level smearable contamination on floors, walls, and turning vanes averages from 3,000 to 10,000 c/m.

As would be expected contamination levels are lower in the exhaust tunnels running from the 117 building to the stacks. Direct GM readings on qualitative smears are generally a few hundred counts per minute or less, up to a maximum of 600 c/m.

Low level smearable alpha contamination is present in all of the 117 building inlet tunnels. Smearable alpha contamination within these tunnels averages from about 10 to 1,000 dpm/100 cm^2. Smearable beta contamination within the 117 inlet tunnels is typically the order of 10^3 to 10^4 dpm/100 cm^2. The 117-KW inlet tunnel has the highest contamination levels with smearable beta contamination averaging approximately 100,000 dpm/100 cm^2 up to a maximum of 200,000 dpm/100 cm^2. Smearable beta contamination levels within the 117 building exhaust tunnels are about 10^2 dpm/100 cm^2. Smearable alpha contamination is generally not detectable in the exhaust tunnels, but was detected up to 30 dpm/100 cm^2.

7.4.3 Reactor Exhaust Stacks

Doserates at the base of the reactor stacks are less than 1 mR/hr. General background levels within the bottoms of the stacks are approximately 1,000 c/m with a GM probe. Low level smearable alpha contamination is present up to 130 dpm/100 cm^2, and averages about 30 dpm/100 cm^2. Smearable beta contamination ranges from 100 to 5,000 dpm/100 cm^2. An inlet duct to the 105-C stack had smearable beta contamination of 15,000 dpm/100 cm^2.

7.4.4 1608-Buildings

Radiation levels within the 1608 buildings are low with general background levels typically from less than 200 c/m up to 500 c/m with a GM probe. Radiation levels are highest in the 1608-H building with direct GM readings of piping and pumps up to 4,000 c/m.

Low level smearable beta contamination is present in the 1608 buildings. Smearable beta contamination along floors, walls and equipment ranges from less than 10 dpm/100 cm^2 up to a maximum of 3,000 dpm/100 cm^2.

7.4.5 Radionuclides Present Within the 115, 117, and 1608 Buildings and Reactor Stacks

C-14 and H-3 (both low energy beta emitters) are present in the 115 and 117 buildings, primarily in the reactor gas piping tunnels, exhaust air tunnels, 117 building filter cells, and the 115 building reactor gas drier rooms. The 200 ft. high reactor exhaust air stacks also have C-14 and H-3 contamination on their interior surfaces. Standard smears from the above facilities have C-14 present ranging from 200 pCi/100 cm^2 to 2.1×10^6 pCi/100 cm^2, generally averaging a few thousand pCi/100 cm^2. Average H-3 concentrations are similar, but range from 400 pCi/100 cm^2 to 1.3×10^4 pCi/100 cm^2.

Radionuclide analyses indicate that beta-gamma activity (excluding H-3 and C-14) is primarily from Co-60 and Cs-137, though Sr-90, Cs-134, Eu-152, Eu-154, and Eu-155 are also present.

Alpha activity detected on standard smears is attributable to Pu-238, and Pu-239/240.

7.4.6 108-B Building

GM readings in the 108-B building are generally less than 200 c/m.

Direct readings inside of process cells and of other process equipment and piping within the building are a few thousand counts per minute with a GM probe.

All smears within the 108-B building and stack were taken using Masslinn Cloth and wiped over a surface of about 6" x 6" or 36 square inches (approximately 300 cm^2).

All corridors, accessible rooms, and external surfaces of hot cells, etc., had smearable contamination of less than 100 c/m with a GM probe. Smears inside of process cubicles, tube examination cells, etc., range from 200 c/m to a maximum of 50,000 c/m. Gamma analyses of these smears indicate the activity measurable with a GM probe to be primarily from Eu-152 and Eu-154, except for in the tube examining cell on the first floor. A smear taken from a H-3 process line cubicle had a GM reading of 12,000 c/m and had the following radionuclide concentrations:

Radionuclide	Concentration pCi/Smear
Cs-137	6.5×10^3
Eu-152	3.4×10^5
Eu-154	8.0×10^4
H-3	1.3×10^6

Co-60 is the dominant radionuclide present within the tube examination cell. A smear reading 50,000 c/m with a GM probe taken from this cell had the following radionuclide concentrations:

Radionuclide	Concentration pCi/Smear
H-3	3.9×10^5
Co-60	6.9×10^6
Eu-154	5.2×10^4

H-3 was detected up to a maximum of 1.1×10^9 pCi for a smear taken from inside a glove box cell on the third floor. Smearable H-3 contamination inside of cubicles, cells, hoods, etc., is generally approximately 10^6 pCi/smear.

A smear taken from inside the main exhaust duct on the upper floor but inside the building had a GM reading of less than 100 c/m. No activity was detected above background levels in this smear using gamma spectral analyses. H-3, however, is present in this smear, having a concentration of 7.7×10^4 pCi/sample.

A sample was taken of fine dust and dirt inside the main exhaust duct outside of the building running to the 108-B stack. Gamma analysis indicated a concentration of 9.4×10^3 pCi/g. The gamma activity is primarily due to Eu-152 and Eu-154, though Cs-137, Co-60 and Eu-155 are also present. The H-3 concentration in this sample is 8.4×10^5 pCi/g. Scale and concrete samples and smears were also taken from inside of the 108-B stack. The radioanalytical results of this sampling are shown in Table 2.7-1.

TABLE 2.7-1

STANDARD SMEARS/100 CM^2

pCi/Sample

LOCATION	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	C-14
105-B Gas Piping Tunnel											
Scale from Sump at 105 End (pCi/g)					$1.0x10^2$	$1.0x10^4$	$1.2x10^3$	$1.3x10^2$	$1.6x10^2$	*	
115-B Gas Piping Tunnel											
Floor, Middle of 115 Bldg.				$7.0x10^3$							
Floor, N end of 115 Bldg.	$8.9x10^{-1}$	$2.1x10^0$	$5.4x10^1$		*	$7.0x10^2$	*	*	$9.5x10^2$	*	$1.8x10^4$
115-B Dryer Rm #5											
Floor at Condensate Drain				$4.2x10^2$							
Floor under Silica Gel Tower	$8.8x10^{-1}$	$7.9x10^{-1}$	$2.9x10^1$		*	$7.4x10^1$	*	*	$2.1x10^2$	$3.8x10^0$	$6.3x10^3$
117-B Filter Cells											
Scale from Drains under 1st A & B Filter Frames (pCi/g)					$1.3x10^1$	$3.5x10^2$	$3.5x10^1$	*	$2.4x10^2$	*	
117-B Inlet Tunnel											
1st Turning Vanes	$9.9x10^{-1}$	$6.6x10^0$	$1.1x10^2$		$1.2x10^2$	$1.7x10^3$	$7.4x10^1$	*	$5.0x10^2$	$5.8x10^1$	
Floor Upstream of 1st Turning Vane				$9.6x10^2$							
Upstream Turning Vanes	*	$2.5x10^0$	$4.5x10^1$		$5.6x10^1$	$2.9x10^2$	*	*	$1.9x10^2$	*	$4.5x10^4$
117-C Filter Cells											
B-2 Filter Frame	$1.2x10^0$	$2.0x10^0$	$4.1x10^1$		*	$1.6x10^3$	$6.6x10^1$	$2.9x10^1$	$3.6x10^2$	*	
B-1 Floor				$3.1x10^3$							$8.0x10^3$
105-C Stack											
Inlet to Stack, Floor	$1.1x10^0$	$2.1x10^1$	$6.2x10^2$		*	$3.9x10^2$	$5.2x10^1$	*	$1.0x10^3$	*	
115-KE Gas Piping Tunnel											
Floor				$5.9x10^2$	*	$3.7x10^1$	*	*	*	*	
Wall			$1.6x10^0$		*	*	*	*	*	*	$5.0x10^2$
105-KE Gas Piping Tunnel											
Wall				$6.2x10^3$							$5.5x10^3$
Ball Chute (top)			$5.5x10^0$		*	$5.7x10^2$	*	*	$2.0x10^2$	*	

TABLE 2.7-1
(Continued)

LOCATION	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	CS-137	Eu-155	C-14
115-KE Dryer Rooms											
Rm #1 Floor at Condensate Drain				$6.6x10^3$							$3.3x10^3$
Rm #2 Floor at Condensate Drain			$2.9x10^0$		*	$3.1x10^1$	*	*	*	*	
117-KE Inlet Tunnel											
1st Turning Vanes Upstream of Cells	$2.8x10^{-1}$	$3.0x10^0$	$7.3x10^1$		$1.7x10^2$	$4.4x10^3$	*	*	$1.4x10^2$	*	
105-KW Gas Piping Tunnel											
Floor	$7.3x10^{-1}$	$1.9x10^0$	$4.4x10^1$		$5.5x10^2$	$1.4x10^3$	$2.7x10^2$	*	$2.0x10^2$	$3.7x10^1$	
Floor				$9.0x10^3$	$4.2x10^3$	$3.0x10^4$	$2.2x10^3$	$3.1x10^2$	$5.1x10^3$	$8.4x10^2$	$1.6x10^4$
115-KW Gas Piping Tunnel											
Floor				$1.2x10^4$	*	$2.1x10^4$	*	$2.4x10^1$	$2.5x10^3$		$4.3x10^4$
Louvered Air Duct to 105 Pipe Tunnel	$4.2x10^1$	$4.7x10^1$			*	$3.2x10^3$	$3.6x10^2$	$1.6x10^1$	$5.0x10^4$	*	
115-KW Dryer Room #1											
Floor at Silica Gel Tower				$1.8x10^3$							$5.6x10^3$
Floor at Drain	$7.1x10^0$	$4.9x10^0$	$4.2x10^2$		*	$5.2x10^1$	*	*	*	*	
115-KW Dryer Room #2											
Floor at Condensate Pot			$2.1x10^1$		*	*	*	*	$6.0x10^1$	*	
Floor				$1.4x10^3$							$2.5x10^3$
Floor at Drain			$2.9x10^2$		*	$1.1x10^4$	*	*	$2.1x10^3$	*	
Floor under Silica Gel Tower	$8.1x10^{-1}$	$6.0x10^{-1}$	$6.0x10^1$		*	$5.1x10^3$	*	*	*	*	
117-KW Inlet Tunnel											
Floor Upstream of 1st Turning Vane			$4.7x10^2$								$2.1x10^3$
Floor at 2nd Turning Vane				$6.5x10^4$							$4.1x10^4$

TABLE 2.7-1
(Continued)

LOCATION	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	C-14
117-KW Filter Cells											
B1 Floor (1st filter removed)	$1.8x10^0$	$3.7x10^0$	$8.6x10^{-1}$		$1.5x10^2$	$4.8x10^3$	$4.7x10^1$	*	$6.6x10^2$	$5.1x10^1$	
Wall of B1 Filter Cell				$1.5x10^3$							
Charcoal Sample from A Filter Cell (pCi/g)					$2.0x10^0$	$7.7x10^0$	$1.5x10^0$	*	$1.0x10^0$	$2.4x10^1$	
105-KW Stack											
Wall at Ground Level				$2.0x10^2$							$5.1x10^3$
Stack Floor	$4.5x10^{-1}$	$1.4x10^1$	$2.9x10^2$		*	$1.4x10^1$	*	*	$3.9x10^2$	*	
115-D Gas Piping Tunnel											
Inside Removed Valve				$1.3x10^4$							$9.7x10^4$
Floor, 105 Side	$1.3x10^0$	$3.5x10^0$	$8.0x10^1$		$2.6x10^2$	$1.4x10^3$	$5.1x10^2$	*	$4.8x10^3$	$3.1x0^1$	
Floor, 105 Exh. Wing	$3.5x10^{-1}$	$2.5x10^0$	$2.1x10^2$		$2.5x10^2$	$1.2x10^3$	$3.9x10^2$	*	$4.4x10^3$	$4.0x10^1$	
115-D Cooler Blower Rm #2											
Inside Pipe Between Blower and Condenser	$1.1x10^0$	$1.6x10^0$	$6.3x10^1$		$4.5x10^1$	$1.7x10^3$	$7.7x10^1$	$1.6x10^1$	$1.1x10^3$	*	
115-D Dryer Rooms											
Room #4, Inside Condensate Drain Line				$4.3x10^3$							$1.4x10^5$
Room #5, Condensate Drain Line	$1.3x10^0$	$1.8x10^0$	$6.7x10^0$		*	$8.4x10^2$	*	*	$1.1x10^3$	*	
117-D Inlet Tunnel											
Floor Between Cells	$1.3x10^0$	$3.8x10^0$	$7.4x10^2$		*	$5.8x10^3$	*	$1.7x10^1$	$4.8x10^3$	*	
Floor Between 1st and 2nd Vanes				$5.9x10^3$							$2.1x10^6$
117-D Filter Cell A											
#1 Filter Bay Floor				$2.5x10^3$							$5.4x10^4$
Floor Between 1st and 2nd Frame	$4.2x10^{-1}$	$4.9x10^{-1}$	$2.3x10^2$		*	$2.4x10^2$	*	*	$9.3x10^2$	*	

TABLE 2.7-1
(Continued)

LOCATION	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	Cs-134	Cs-137	Eu-155	C-14
105-DR Gas Piping Tunnel											
Floor	*	*	$7.8x10^{-1}$		*	*	*	*	$2.1x10^{2}$	*	
105-H Gas Wing Pipe Tunnel											
Floor, N End at Drain	$1.1x10^{0}$	$1.0x10^{0}$	$6.9x10^{0}$		$5.7x10^{1}$	$3.6x10^{2}$	*	*	$5.8x10^{1}$	*	
Piping, North End				$7.7x10^{2}$							$1.2x10^{4}$
Piping, South End			$8.2x10^{0}$		*	$2.0x10^{1}$	*	*	$4.3x10^{1}$	*	
Piping, Center				$2.4x10^{2}$							$6.0x10^{2}$
115-H Dryer Room #2											
Silica Gel Tower	$7.5x10^{-1}$	$1.5x10^{0}$	$5.0x10^{1}$		*	$2.2x10^{1}$	*	*	$4.4x10^{2}$	*	
Inside 10" Pipe from Turbine				$2.7x10^{4}$	*	$2.0x10^{3}$	$1.7x10^{2}$	*	$5.5x10^{4}$	$7.8x10^{1}$	$3.5x10^{5}$
117-H Inlet Tunnel											
Wall Between 1st and 2nd Vanes				$2.1x10^{1}$							$1.3x10^{2}$
Wall at Inlet Vanes to Stack	*	$5.2x10^{-1}$	$8.5x10^{0}$		*	*	*	*	$2.1x10^{1}$	*	
1608-H Pump House											
Floor				$7.2x10^{2}$							$7.2x10^{3}$
Floor	*	$3.8x10^{0}$	$3.4x10^{1}$		$1.4x10^{2}$	$1.5x10^{2}$	*	*	$1.5x10^{2}$	*	
Piping	*	$9.9x10^{-1}$	$1.2x10^{0}$		*	$1.7x10^{1}$	*	*	*	*	
115-F Gas Piping Tunnel											
Inside Blanked Valve from Purification Room	*	*	$1.2x10^{1}$		*	*	*	*	*	*	
Piping, North End				$6.4x10^{2}$							$4.3x10^{3}$
115-F Dryer Rooms											
Rm #1, Silica Gel (pCi/g)[1]				$1.6x10^{10}$	*	$2.9x10^{1}$	$2.5x10^{6}$	*	$1.2x10^{3}$	*	
Rm #1, Floor of Gel Tower	*	$1.7x10^{-1}$	$2.2x10^{1}$		*	*	*	*	$1.4x10^{2}$	*	
Rm #2, Scale from Inside of Condenser (pCi/g)					$8.3x10^{-1}$	$1.0x10^{1}$	*	$4.9x10^{-1}$	$1.8x10^{3}$	$4.9x10^{1}$	
Rm #2, Floor at Condensate Drain				$6.6x10^{2}$							$9.8x10^{3}$

[1] Ni-63 = $3.2x10^{1}$ pCi/g

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TABLE 2.7-1
(Continued)

LOCATION	Pu-238	Pu-239/240	Sr-90	H-3	Eu-152	Co-60	Eu-154	CS-134	Cs-137	Eu-155	C-14
117-F Inlet Tunnel											
Floor Between Cells	*	$1.5x10^0$	$3.0x10^1$		$8.9x10^2$	$3.5x10^2$	$3.4x10^2$	*	$8.8x10^1$	*	
Floor at 2nd Turning Vanes				$7.3x10^2$							$3.5x10^4$
1608-F Pump House											
Basement Floor	*	$3.1x10^{-1}$	$8.1x10^0$		$5.8x10^1$	$4.1x10^1$	*	*	$1.1x10^1$	$2.3x10^2$	
MASSLINN CLOTH SMEARS/36 IN^2 (pCi/Sample)											
108-B Laboratory Building											
4th Floor - Inside Main Exhaust Duct				$7.7x10^4$							
3rd Floor - Process Cubicle				$1.3x10^6$	$3.4x10^5$	*	$8.0x10^4$	*	$6.5x10^3$	*	
Process Cubicle, Floor				$6.6x10^6$	$3.3x10^4$	*	*	*	*	*	
Process Cubicle, Floor					$1.1x10^5$	$4.6x10^3$	$6.2x10^4$	*	*	*	
Process Instrument Cubicle				$2.0x10^7$							
Inside Glove Box Cell				$1.1x10^9$							
2nd Floor - Inside H-3 Sampling cubicle				$1.6x10^6$							
1st Floor - Tube Exam Cell, Hood				$3.9x10^5$	*	$6.9x10^6$	$5.2x10^4$	*	*	*	
Tube Exam Cell, Floor				$2.2x10^5$	$4.4x10^4$	$1.4x10^6$	$3.6x10^4$	*	*	*	
108-B Stack											
Inside of Stack				$2.7x10^6$							
108-B STACK - DIRT, SCALE, & CONCRETE SAMPLES (pCi/g)											
Oily Dirt From Main Exhaust Duct to Stack				$8.4x10^5$	$7.1x10^3$	$8.7x10^1$	$2.1x10^3$	*	$4.9x10^1$	$1.1x10^2$	
Steel Liner Approx. 15' Above Grade, Scale				$2.4x10^5$	$1.2x10^4$	$4.0x10^2$	$2.8x10^3$	*	*	*	
Concrete, Just Above Steel Liner				$2.8x10^6$	$2.9x10^1$	*	*	*	*	*	

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TABLE 2.7-2

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CONTAMINATION STATUS

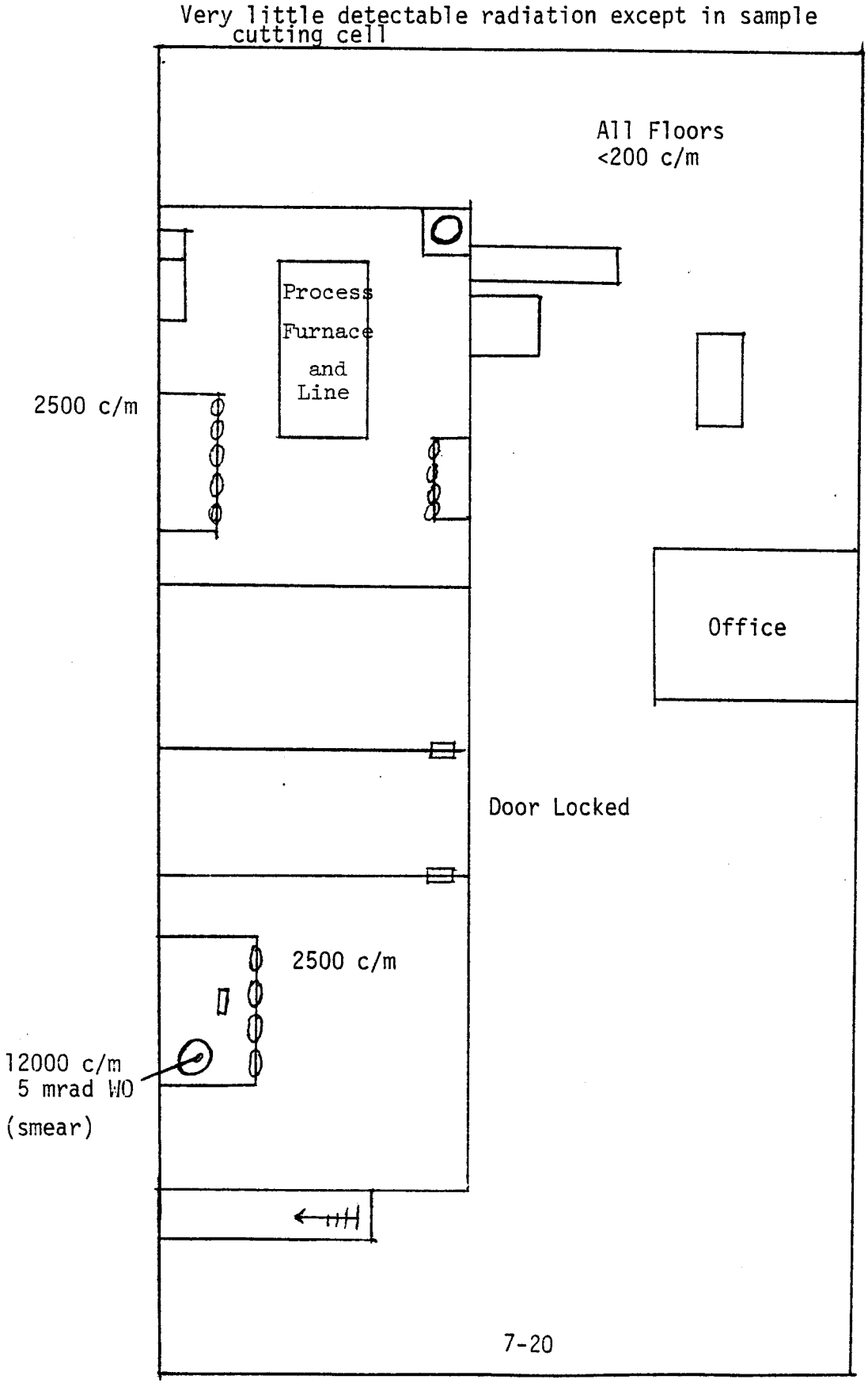
BUILDING 108-B LOCATION 108-B DATE 10-10-77

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. 1st floor (general bkg.)	<1	<200
2. Tube exam cell (hood)	140	50,000
3. Tube exam cell (floor)		1,000
4. Tube exam cell (general bkg.)	<2	
5. 2nd floor	<1	<200
6. 3rd floor (C-diagram attached)		
7. 4th floor general bkg. and smears	<1	<200
8. Weighing scale	25	
9. Ave. true limiting doserate (tube exam cell)	2	
10. Ave. true limiting doserate rest of bldg.	<1	
11. All smears <100 d/m alpha		
Cloth Smears of about 36 square inches		
4th floor - inside main exhaust duct to stack		Bkg.
3rd floor - process cubicle (lazy suzan)		12,000
floor area beside lathe		2,500
oily spot on floor		3,000
process instrument cubicle		Bkg.
3rd floor - general floor smears		Bkg.
inside glove boxes (3 smears)		200
2nd floor - inside H^3 sampling cubicle		Bkg.
1st floor - tube exam cell (hood)		50,000
floor		10,000
weighing scale		1,000
All building corridors, accessable rooms and including external surfaces of hot cells, etc.		Bkg.
All smears <100 d/m alpha.		

COMMENTS: There were two locked rooms, one was a final process room. All smears inside cubicles and hoods taken remotely using long poles, etc.

108-B

3rd FLOOR



CONTAMINATION STATUS

BUILDING 108-B LOCATION Stack DATE 11-1-77

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. General bkg. in stack	<1	200
2. Crud on steel liner		1,000
3. Sample of crud		400
4. Concrete chipped from inside stack		Bkg.
5. Sample of oily dirt from main exhaust duct to stack		350
6. Ave. true limiting doserate	<1	
Cloth Smears of about 36 square inches		
Inside stack (2 smears)		Bkg.
Steel liner		200

COMMENTS:

CONTAMINATION STATUS

BUILDING 111-B LOCATION 111-B DATE 9-28-77

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. bkg. in bldg.	1	
2. Boxes of dummies	3	
3. Boxes of Boron Steel Balls	20	
4. Floor smears		2,500

COMMENTS: All smears <100 d/m alpha. Dummies and Balls are enclosed in established Radiation Zones.

CONTAMINATION STATUS

BUILDING 105-B **LOCATION** Pipe Tunnel **DATE** 9/1/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd in Tunnel		300 c/m
2. Max. Reading on Piping		30,000 c/m
3. Smears of Piping		400 c/m
4. Smears of Floor & Walls		400 c/m
5. Smears for Alpha		<200 d/m
6. Ave. True Limiting Doserate	1	
STANDARD SMEARS/100 cm^2		
Floor at Center of 105 Tunnel		150 c/m 1,200 d/m β 20 d/m α
Wall at Center of 105 Tunnel		100 c/m 160 d/m β 0 d/m α
Piping at Center of 105 Tunnel		350 c/m 2,000 d/m β 15 d/m α
Piping near 105 Bldg.		200 c/m 2,000 d/m β 15 d/m α
Floor near 105 Bldg.		200 c/m 1,200 d/m β 10 d/m α

COMMENTS: A crud sample from a sump at the 105 and at the tunnel had a GM reading of 10,000 c/m.

CONTAMINATION STATUS

BUILDING 115-B **LOCATION** Pipe Tunnel **DATE** 9/1/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Max. Reading on C Piping		15,000 c/m
2. Gen. Bkgd in tunnel		800 c/m
3. Smears of Floor and Walls*		3,000 c/m - *1,000 c/m
4. Smear of Piping		1,500 c/m
5. Smears for Alpha 3 & 4		<200 d/m
6. Ave. True Limiting Doserate	1	
STANDARD SMEARS/100 cm^2		
Floor at South End of 115 Bldg.		1,500 c/m 25,000 d/mβ 30 d/mα
Piping at South End of 115 Bldg.		100 c/m 250 d/mβ d/mα
Floor at Middle of 115 Bldg.		100 c/m 400 d/mβ 0 d/mα
Floor at Middle of 115 Bldg.		1,500 c/m 27,000 d/mβ 60 d/mα
Piping at Middle of 115 Bldg.		150 c/m 1,200 d/mβ 40 d/mα
Continued on next page		

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-B **LOCATION** Pipe Tunnel, Cont. **DATE** 9/1/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
Floor at North End of 115 bldg.		2,500 c/m 38,000 d/m β 20 d/m α
Piping at North End of 115 Bldg.		450 c/m 3,400 d/m β 40 d/m α

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-B **LOCATION** Purge Blower Room #1 **DATE** 8/11/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		<200 c/m
2. Gen. Smears of Floor		<200 c/m
3. Gen. Smears of Piping & Motors		<200 c/m
4. Smears for Alpha #2 & 3		<200 d/m
5. Ave. True Limiting Doserate	<1	
STANDARD SMEARS/100 cm^2		
Floor		<100 c/m Bkg. β 0 d/c α

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-B **LOCATION** Purge Blower Room #2 **DATE** 8/11/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd.		<200 c/m
2. Gen. Smears of Floor		<200 c/m
3. Gen. Smears of Piping and Motors		<200 c/m
4. Smears for Alpha #2 and 3		<200 d/m
5. Ave. True Limiting Doserate	<1	
STANDARD SMEARS/100 cm^2		
Floor at compressor		<100 c/m Bkg.β 0 d/m α

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-B **LOCATION** Cooler Blower Room #1 **DATE** 8/12/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Max. Reading on Tools		8,000 c/m
2. Ave. Gen. Reading on Tools		500 c/m
3. Gen. Bkgd		350 c/m
4. Smears of Tools		500 c/m
5. Gen. Smears of Floor		< 200 c/m
6. Smears for Alpha 4 & 5		< 200 d/m
7. Ave. True Limiting Doserate	1	
STANDARD SMEARS/100 cm^2		
Floor (2 smears) & Wall (1 smear)		< 100 c/m Bkg. β 0 d/m α

COMMENTS: Room used for tool storage only. No blowers in room .

CONTAMINATION STATUS

BUILDING 115-B **LOCATION** Cooler Blower Room #2 **DATE** 8/12/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Max. Reading on Tools		25,000 c/m
2. Ave. Gen. Reading on Tools		500 c/m
3. Smears of Tools		500 c/m
4. Gen. Smears of Floor		250 c/m
5. Smears for Alpha 3 & 4		< 200 d/m
6. Gen. Bkgd		350 c/m
7. Ave. Time Limiting Doserate	1	
STANDARD SMEARS/100 cm^2		
Floor		< 100 c/m 300 d/m β 0 d/m α
Floor		< 100 c/m 200 d/m β 0 d/m α
Wall		< 100 c/m 60 d/m β 0 d/m α

COMMENTS: Room used for tool storage only. No blowers in room .

CONTAMINATION STATUS

BUILDING 115-B **LOCATION** C Area Filter Room #1 **DATE** 3/12/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		1,500 c/m
2. Max. Reading on Filter Box		3,500 c/m
3. Gen. Smears of Filter Box		< 200 c/m
4. Gen. Smears of Floor		< 200 c/m
5. Smears for Alpha 3 & 4		< 200 d/m
6. Ave. True Limiting Doserate	1	
STANDARD SMEARS/100 cm^2		
Floor (2 smears) & Filter Housing (1 smear)		< 100 c/m Bkg. β 0 d/m α

COMMENTS: Filters are stored in hall of Filter Room #2, no contamination.

CONTAMINATION STATUS

BUILDING 115-B **LOCATION** B Area Filter Room #2 **DATE** 8/12/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		500 c/m
2. Max. Reading on Filter Box		750 c/m
3. Gen. Smears of Filter Box		<200 c/m
4. Gen. Smears of Floor		<200 c/m
5. Smears for Alpha 3 & 4		<200 d/m
6. Ave. True Limiting Doserate	<1	
STANDARD SMEARS/100 cm^2		
Floor (2 smears) & Filter Housing (1 smear)		<100 c/m Bkg. β 0 d/m α

COMMENTS: Filters are stored in hall of Filter Room #2, no contamination.

CONTAMINATION STATUS

BUILDING 115-B LOCATION #1 Dryer Room DATE 8/11/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Condensate Drain		1,000 c/m
2. Condensate Drain Valve		1,500 c/m
3. Gel. Tower Bottom		1,000 c/m
4. Turbine Outside		4,000 c/m
5. Gen. Bkgd		300 c/m
6. Gen. Smears		250 c/m
7. Smears of Piping & Motors		<200 c/m
8. Smears for Alpha 1-4 & 6, 7		<200 d/m
9. Ave. True Limiting Doserate	<1	
STANDARD SMEARS/100 cm^2		
Floor at Gel. Tower		<100 c/m 80 d/m β 20 d/m α
Floor at Condensate Pot		<100 c/m 120 d/m β 0 d/m α
Floor at Turbine		<100 c/m 75 d/m β 0 d/m α

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-B **LOCATION** #2 Dryer Room **DATE** 8/11/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Condensate Drain		2,500 c/m
2. Condensate Drain Valve		30,000 c/m
3. Gel. Tower Bottom		1,500 c/m
4. Turbine Outside		25,000 c/m
5. Gen. Bkgd		1,000 c/m
6. Gen. Smears		<200 c/m
7. Smears for Alpha 1-4 & 6,8		<200 d/m
8. Smears of Piping & Motors		<200 c/m
9. Ave. True Limiting Doserate	2	
STANDARD SMEARS/100 cm^2		
Floor at Gel. Tower		<100 c/m 100 d/m β 6 d/m α
Floor at Condensate Drain		<100 c/m 160 d/m β 6 d/m α
Floor at Turbine		<100 c/m Bkg. β 0 d/m α

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-B **LOCATION** #3 Dryer Room **DATE** 8/11/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Condensate Drain		500 c/m
2. Condensate Drain Valve		4,000 c/m
3. Gel. Tower Bottom		1,500 c/m
4. Turbine Outside		8,000 c/m
5. Gen. Bkgd		500 c/m
6. Gen. Smears		<200 c/m
7. Smears of Piping & Motors		<200 c/m
8. Smears for Alpha 1-4 & 6, 7, 9		<200 d/m
9. Misc. Tools		2,500 c/m
10. Ave. True Limiting Doserate	1	
STANDARD SMEARS/100 cm^2		
Floor at Condensate Drain		<100 c/m 200 d/m β 0 d/m α
Floor at Condensate Valve		<100 c/m 575 d/m β 15 d/m α
Floor at Turbine		<100 c/m 600 d/m β 0 d/m α
Floor Under Gel. Tower		<100 c/m 175 d/m β 6 d/m α

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-B **LOCATION** #4 Dryer Room **DATE** 8/11/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Condensate Drain		20,000 c/m
2. Condensate Drain Valve		15,000 c/m
3. Gel. Tower Bottom		10,000 c/m
4. Turbine Outside		20,000 c/m
5. Gen. Bkgd		1,500 c/m
6. Gen. Smears		500 c/m
7. Smears of Piping & Motors		1,000 c/m
8. Smears for Alpha 1-4 & 6-7		<200 d/m
9. Ave. True Limiting Doserate	2	
STANDARD SMEARS/100 cm^2		
Floor at Turbine		<100 c/m 80 d/m β 0 d/m α
Floor at Gel. Tower		150 c/m 920 d/m β 30 d/m α
Condensate Drain		150 c/m 1,200 d/m β 6 d/m α
Floor at Condensate Drain		<100 c/m 300 d/m β 6 d/m α

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-B **LOCATION** #5 Dryer Room **DATE** 8/11/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Condensate Drain	1.5	45,000 c/m
2. Condensate Drain Valve	6.	25,000 c/m
3. Gel. Tower Bottom		15,000 c/m
4. Turbine Outside		20,000 c/m
5. Gen. Bkgd.	.5	3,000 c/m
6. Gen. Smears		3,500 c/m
7. Smears of Piping & Motors		1,000 c/m
8. Smears for Alpha 1-6 & 7		<200 d/m
9. Ave. True Limiting Doserate	2	
STANDARD SMEARS/100 cm^2		
Floor at Condensate Drain		<100 c/m 1,600 d/mβ 25 d/mα
Floor Under Gel. Tower		200 c/m 2,050 d/mβ 60 d/mα
Floor at Turbine		200 c/m 2,200 d/mβ 20 d/mα

COMMENTS: (1) At grating over a 12" x 16" drain.

CONTAMINATION STATUS

BUILDING 117-B **LOCATION** Inlet Tunnel **DATE** 8/12/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Direct Scan of Turning Vanes		1,000 c/m
2. Smears of Turning Vanes (2)		750 c/m
3. (Direct Scan of Inlet Vanes to Tunnel)		3,000 c/m
4. Smears of Inlet Vanes		2,000 c/m
5. Direct Scan of Dust Down Stream from Vanes		2,000 c/m
6. Gen. Bkgd		100 c/m
7. Gen. Smears of Floor & Walls		500 c/m
8. Smears for Alpha 2, 4, 7		< 200 d/m
9. Ave. True Limiting Doserate	1	
STANDARD SMEARS/100 cm^2		
Inlet Vanes to Tunnel		600 c/m 11,500 d/mβ 30 d/mα
Floor Just Downstream of Inlet Turning Vanes to Tunnel (thick dust)		300 c/m 5,000 d/mβ 30 d/mα
Upstream Turning Vanes		300 c/m 4,080 d/mβ 50 d/mα
Wall Between Vertical Turning Vanes		200 c/m 800 d/mβ 6 d/mα
Floor Between Vertical Turning Vanes		300 c/m 5,000 d/mβ 60 d/mα

COMMENTS: "A" Cell has been blanked off. Plywood over inlet to cell. Dust very variable and is piled up in little trails downstream of turning vanes for about 12".

CONTAMINATION STATUS

BUILDING 117-B LOCATION A & B Cells DATE 8/12/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. B 1 & 2 Max. Reading on Filters		2,500 c/m
2. Gen. Smears of Floor		200 c/m
3. Gen. Smears of Filters		250 c/m
4. Direct Scan of Drains		1,000 c/m
5. A 1 & 2 Max. Reading on Filters		2,500 c/m
6. Gen. Smears of Floor		200 c/m
7. Gen. Smears of Filters		300 c/m
8. Direct Scan of Drains		1,000 c/m
9. Smears for Alpha 2, 3, 6, 7		<200 d/m
10. Ave. True Limiting Doserate	1	
STANDARD SMEARS/100 cm^2		
B 1 Floor at Drain		<100 c/m 500 d/mβ 6 d/m α
B 1 Floor		<100 c/m 150 d/mβ 0 d/mα
B 1 Wall		<100 c/m 200 d/mβ 6 d/m α
B 2 Filter Frame		<100 c/m 220 d/mβ 0 d/mα
B 2 Floor		<100 c/m 50 d/mβ 0 d/mα
Continued on next page		

COMMENTS:

CONTAMINATION STATUS

BUILDING 117-B **LOCATION** A & B Cells, Cont. **DATE** 8/12/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
Top of Filter Bank A (Main Deck)		<100 c/m Bkg. β 0 d/mα
Top of Filter Bank B		<100 c/m 15 d/mβ 0 d/mα

COMMENTS:
B1 and A1 filters have been removed from cells.
A sample taken of crud removed from drain under the B1 and A1 filter frames had a GM reading of 1,000 c/m.

CONTAMINATION STATUS

BUILDING 117-B **LOCATION** A Cell **DATE** 8/13/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Direct Scan of Filters		250 c/m
2. Smears of Filters		200 c/m
3. Gen. Smears of Floors and Walls		<200 c/m
4. Smears for Alpha 2 & 3		<200 d/m
5. Ave. True Limiting Doserate	<1	
STANDARD SMEARS/100 cm^2		
A4 Floor		<100 c/m 60 d/mβ 0 d/mα
A4 Wall		<100 c/m Bkg. β 0 d/mα
A4 Filter Frame		<100 c/m 30 d/mβ 0 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 117-B **LOCATION** Exhaust Tunnel To Stack **DATE** 8/13/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Exit Vanes to Stack Direct		<200 c/m
2. Direct Scan of Turning Vanes		<200 c/m
3. Smears of Above 1 & 2		<200 c/m
4. Smears of Floor and Walls		<200 c/m
5. Smears for Alpha 3 & 4		<200 d/m
6. Ave. True Limiting Doserate	<1	
STANDARD SMEARS/100 cm^2		
Floor Just Downstream of Filters		<100 c/m Bkg. β 0 d/m α
1st Turning Vanes to Stack		<100 c/m 50 d/m β 30 d/m α
Wall Just Upstream of Stack		<100 c/m 50 d/m β 0 d/m α
Floor Just Upstream of Stack		<100 c/m 15 d/m β 0 d/m α
Stack Inlet Vanes		<100 c/m 25 d/m β 0 d/m α

COMMENTS:

CONTAMINATION STATUS

BUILDING 117-C **LOCATION** Inlet Tunnel **DATE** 8/13/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		2,500 c/m
2. Direct Scan of Floor		6,000 c/m
3. Smears of Floor and Walls		4,000 c/m
4. Smears for Alpha 2 & 3		<200 d/m
5. Ave. True Limiting Doserate	1	
STANDARD SMEARS/100 cm^2		
Ramp Just Upstream of Filter Cells		600 c/m 12,000 d/m β 400 d/m α
Walls Just Upstream of Filter Cells		500 c/m 10,500 d/m β 300 d/m α

COMMENTS:

CONTAMINATION STATUS

BUILDING 117-C **LOCATION** B Filter Cell **DATE** 8/13/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Max. Reading on Filters		25,000 c/m
2. Max. Reading on Floor Drains		7,000 c/m
3. Gen. Bkgd B1 and B2		2,500 c/m
4. Smears of Filters		3,000 c/m
5. Smears of Floor B2		3,000 c/m
6. Smears of Floor & Walls B-1		3,000 c/m
7. Smears for Alpha 4, 5, 6		<200 d/m
8. Ave. True Limiting Doserate	1	
STANDARD SMEARS/100 cm^2		
B-2 Filter Frame		450 c/m 12,000 d/m β 280 d/m α
B-1 Space, Wall		250 c/m 4,000 d/m β 6 d/m α
B-1 Space at Floor Drain		450 c/m 9,300 d/m β 50 d/m α
B-1 Space, Floor		450 c/m 13,000 d/m β 80 d/m α
Top of Filter Cells (Non. R.Z. Area)		100 c/m 80 d/m β 0 d/m α

COMMENTS: Filters have been removed from B1 frame.

CONTAMINATION STATUS

BUILDING 116-C **LOCATION** C-Area Stack **DATE** 8/16/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Max. Reading Inside Stack		20,000 c/m
2. Gen. Bkgd		1,000 c/m
3. Smears of Floor		300 c/m
4. Smears of Walls		< 200 c/m
5. Smears for Alpha 3 & 4		< 200 d/m
6. Ave. True Limiting Doserate	1	
STANDARD SMEARS/100 cm^2		
Base of Stack, Floor		< 100 c/m 150 d/m β 18 d/m α
Stack Wall, 6' above Base		< 100 c/m 400 d/m β 18 d/m α
Wall at Inlet to Stack, +16'		< 100 c/m 400 d/m β 0 d/m α
Floor at Inlet to Stack, +16'		650 c/m 15,000 d/m β 160 d/m α

COMMENTS:

CONTAMINATION STATUS

BUILDING 105-KE **LOCATION** Pipe Tunnel **DATE** 8/17/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd	<1	2,000 c/m
2. Ball Chute	5	15,000 c/m
3. Floor Drain	5	15,000 c/m
4. Vent (Louvered Exhaust)	15	40,000 c/m
5. Direct Scan of Floor	1	3,000 c/m
6. Max. Reading on Piping	3	10,000 c/m
7. Smears of Floor & Walls	<1	1,000 c/m
8. Smears of Piping	2	6,000 c/m
9. Smears for Alpha 7 & 8		200 d/m
10. Ave. True Limiting Doserate	2	
STANDARD SMEARS/100 cm^2		
Piping Underneath Reactor		300 c/m 3,200 d/m β 0 d/m α
Wall Underneath Reactor		600 c/m 30,500 d/m β 20 d/m α
Ball Chute		800 c/m 55,000 d/m β 50 d/m α
Floor, Pipe Tunnel, at Drain		500 c/m 20,000 d/m β 16 d/m α
Floor		300 c/m 3,000 d/m β 0 d/m α

COMMENTS: Floor area generally badly etched.

CONTAMINATION STATUS

BUILDING 115-KE **LOCATION** Pipe Tunnel **DATE** 8/16/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		300 c/m
2. Max. Reading on Piping		6,000 c/m
3. Max. Reading on Valves		15,000 c/m
4. Smears of Piping		750 c/m
5. Smears of Floor		2,500 c/m
6. Smears for Alpha 4 & 5		< 200 d/m
7. Ave. True Limiting Doserate	<1	
STANDARD SMEARS/100 cm^2		
Floor		200 c/m 1,500 d/m β 6 d/m α
Floor		250 c/m 1,800 d/m β 0 d/m α
Floor at Floor Drain		< 100 c/m 400 d/m β 6 d/m α
Wall		250 c/m 1,700 d/m β 6 d/m α
Wall		< 100 c/m 320 d/m β 0 d/m α
Piping		200 c/m 1,350 d/m β 6 d/m α

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-KE **LOCATION** Booster Blower Room **DATE** 8/17/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		250 c/m
2. Max. Reading on Turbine		1,000 c/m
3. Gen. Reading on Pipe From Turbine		2,000 c/m
4. Smears of Piping and Motors		300 c/m
5. Smears of Floor & *Walls		250 c/m - *200 c/m
6. Smears for Alpha 4 & 5		< 200 d/m
7. Ave. True Limiting Doserate	<1	
STANDARD SMEARS/100 cm^2		
Wall		100 c/m 30 d/m β 0 d/m α
Floor at Floor Drain		250 c/m 2,000 d/m β 15 d/m α
Blower		100 c/m 60 d/m β 0 d/m α

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-KE **LOCATION** Filter Room **DATE** 8/17/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		300 c/m
2. Max. Reading on Filter Box		3,000 c/m
3. C^{14} Adsorber in Filter Box		6,000 c/m
4. Smears of Filter Box & Piping		< 200 c/m
5. Smears of Floor & Walls		< 200 c/m
6. Smears for Alpha 4 & 5		< 200 d/m
7. Ave. True Limiting Doserate	<1	
STANDARD SMEARS/100 cm^2		
Floor Area at Drain		100 c/m 60 d/mβ 0 d/mα
Filter Housing		100 c/m 110 d/mβ 0 d/mα
Floor		100 c/m 840 d/mβ 6 d/mα
Wall		100 c/m 50 d/mβ 0 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-KE **LOCATION** #1 Dryer Room **DATE** 8/16/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		2,000 c/m
2. Max. Reading on Condenser	30	50,000 c/m
3. Max. Reading on Gel. Tower		2,000 c/m
4. Max. Reading on Turbine		30,000 c/m
5. Condensate Lines		20,000 c/m
6. Condensate Drain		15,000 c/m
7. Smears of Piping & Motors		500 c/m
8. Smears of Floor & *Walls		750 c/m - *200 c/m
9. Smears for Alpha 7 & 8		< 200 d/m
10. Ave. True Limiting Doserate	2	
STANDARD SMEARS/100 cm^2		
Floor at Condensate Drain		500 c/m 1,450 d/m β 0 d/m α
Floor		200 c/m 1,350 d/m β 6 d/m α
Floor under Gel. Tower		200 c/m 1,500 d/m β 6 d/m α
Piping		200 c/m 560 d/m β 0 d/m α
Piping		250 c/m 1,800 d/m β 0 d/m α

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-KE **LOCATION** #2 Dryer Room **DATE** 8/16/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		2,500 c/m
2. Max. Reading on Condenser	30	50,000 c/m
3. Max. Reading on Gel. Tower		2,000 c/m
4. Max. Reading on Turbine		15,000 c/m
5. Condensate Lines		10,000 c/m
6. Condensate Drain		15,000 c/m
7. Smears of Piping & Motors		500 c/m
8. Smears of Floor & *Walls		750 c/m - *200 c/m
9. Smears for Alpha 7 & 8		< 200 d/m
10. Ave. True Limiting Doserate	2	
STANDARD SMEARS/100 cm^2		
Wall		100 c/m 200 d/m β 0 d/m α
Floor		250 c/m 1,760 d/m β 6 d/m α
Floor Under Gel. Tower		200 c/m 1,360 d/m β 0 d/m α
Piping		100 c/m 760 d/m β 0 d/m α
Contined on next page		

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-KE LOCATION #2 Dryer Room, Cont. DATE 8/16/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
Floor at Condensate Drain		450 c/m 14,000 d/m β 6 d/m α
Condenser		250 c/m 2,500 d/m β 0 d/m α

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-KE **LOCATION** Operations Gallery **DATE** 8/16/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		< 200 c/m
2. #2 Drain		2,000 c/m
3. Max. Reading Collection Chamber		10,000 c/m
4. Smears of Piping		< 200 c/m
5. Smears of Floor and Walls		< 200 c/m
6. Smears for Alpha 4 & 5		< 200 d/m
7. Ave. True Limiting Doserate	<1	
STANDARD SMEARS/100 cm^2		
Floor		< 100 c/m 400 d/mβ 0 d/mα
Floor		< 100 c/m 80 d/mβ 0 d/mα
Floor at Main Drain		< 100 c/m 400 d/mβ 0 d/mα

COMMENTS: (Item #3) Floor under collection chamber covered up with plastic and taped down.
(Item #2) #2 drain covered with plastic and taped down.

CONTAMINATION STATUS

BUILDING 117-KE **LOCATION** Inlet Tunnel **DATE** 8/17/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		2,000 c/m
2. Direct Scan of Floor & Walls		4,000 c/m
3. Smears of Floor & Walls		3,000 c/m
4. Smears for Alpha #3		< 200 d/m
5. Ave. True Limiting Doserate	1	
STANDARD SMEARS/100 cm^2		
*Floor Between A & B Cells		2,000 c/m
*Wall Between A & B Cells		2,500 c/m
*Floor Ramp, Just Upstream of Cells		1,000 c/m
1st Turning Vane Upstream of Cells		500 c/m 25,000 d/mβ 25 d/mα

COMMENTS: *Smears judged too difficult to mount for NMC count.

CONTAMINATION STATUS

BUILDING 117-KE LOCATION B Cell DATE 8/17/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd B1 & B2 Cells		3,000 c/m
2. Cell B2 Filters	5	15,000 c/m
3. Cell B1 Drain	5	15,000 c/m
4. Smears of B1 Drain		4,500 c/m
5. Smears of B2 Filter Frame		4,000 c/m
6. Smears of Floor & Walls B1 & B2		1,000 c/m
7. Smears for Alpha 4, 5, 6		< 200 d/m
8. Ave. True Limiting Doserate	1	
STANDARD SMEARS/100 cm^2		
Wall Inlet Bay		450 c/m 16,500 d/mβ 0 d/mα
Floor Inlet Bay		400 c/m 13,000 d/mβ 15 d/mα
Floor Between 1st & 2nd Filter Frames		450 c/m 15,500 d/mβ 30 d/mα
1st Filter Frame		600 c/m 30,000 d/mβ 30 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 117-KE **LOCATION** Exhaust Tunnel To Stack **DATE** 8/17/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd in Tunnel		300 c/m
2. Direct Scan of Floor & Walls		< 200 c/m
3. Direct Scan of Turning Vanes		250 c/m
4. Direct Scan Turning Vanes to Stack		400 c/m
5. Smears of Turning Vanes to Stack		400 c/m
6. Smears of Turning Vanes to 117 Bldg.		200 c/m
7. Smears of Floor & Walls		200 c/m
8. Smears for Alpha 5, 6, 7		200 d/m
9. Ave. True Limiting Doserate	<1	
STANDARD SMEARS/100 cm^2		
Floor Between A & B Cells		100 c/m 180 d/m β 6 d/m α
Turning Vanes at Stack		150 c/m 350 d/m β 0 d/m α
Floor at Above Location		< 100 c/m Bkg. β 0 d/m α
Turning Vanes Downstream of Filter Cells		< 100 c/m 40 d/m β 0 d/m α
Wall at Above Location		< 100 c/m 60 d/m β 6 d/m α
Area Above Cells, Non. RZ, Walls & Floors (4 smears)		< 100 c/m 30 d/m β 0 d/m α

COMMENTS:

CONTAMINATION STATUS

BUILDING 116-KE **LOCATION** 105-KE Stack **DATE** 8/20/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		1,000 c/m
2. Smears of Floor & Walls		400 c/m
3. Smears for Alpha		< 200 d/m
4. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Wall at Ground Level		100 c/m 1,000 d/m β 0 d/m α
Base of Stack (Floor)		200 c/m 1,600 d/m β 15 d/m α
Access Door to Stack (Inside)		450 c/m 4,000 d/m β 130 d/m α

COMMENTS: Standard smears were taken using a 25' light bulb ext. pole.

CONTAMINATION STATUS

BUILDING 105-KW **LOCATION** Pipe Tunnel **DATE** 8/20/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		10,000 c/m
2. Gen. Reading on Piping		20,000 c/m
3. Max. Reading on Floor Drains		20,000 c/m
4. Max. Reading on Valves		40,000 c/m
5. Max. Reading on Ball Chute		15,000 c/m
6. Smears of Floor & Walls		4,000 c/m
7. Smears for Alpha		< 200 d/m
8. Ave. True Limiting Doserate	5	
STANDARD SMEARS/100 cm^2		
Floor		500 c/m 2,500 d/m β 125 d/m α
Floor		1,000 c/m 32,500 d/m β 75 d/m α
Floor at Drip Legs		600 c/m 35,600 d/m β 50 d/m α
Wall Underneath Reactor		150 c/m 1,000 d/m β 30 d/m α
Wall		450 c/m 7,800 d/m β 6 d/m α
Piping		750 c/m 26,000 d/m β 75 d/m α

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-KW LOCATION Pipe Tunnel DATE 8/19/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		2,500 c/m
2. Max. Reading on Piping		10,000 c/m
3. Max. Reading on Valves		6,000 c/m
4. Max. Reading on Drain		6,000 c/m
5. Smears of Floor & *Walls		5,000 c/m - *1,000 c/m
6. Smears of Piping		8,000 c/m
7. Smears for Alpha 5 & 6		< 200 d/m
8. Ave. True Limiting Doserate	2	
STANDARD SMEARS/100 cm^2		
Wall		100 c/m 450 d/m β 0 d/m α
Wall		250 c/m 2,000 d/m β 80 d/m α
Floor		450 c/m 30,000 d/m β 400 d/m α
Floor		150 c/m 800 d/m β 15 d/m α
Floor & Drain		< 100 c/m 350 d/m β 15 d/m α
Continued on next page		

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-KW LOCATION Pipe Tunnel, Cont. DATE 8/19/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
*Louvered Exhaust Duct in Wall to 105-KW Pipe tunnel		750 c/m 50,000 d/m β 6,000 d/m α
Piping		300 c/m 10,000 d/m β 500 d/m α
Piping		150 c/m 10,000 d/m β 1,300 d/m α

COMMENTS:
*This smear indicated 200 c/m, uncorrected, with the PAM.

CONTAMINATION STATUS

BUILDING 115-KW **LOCATION** Booster Blower Room **DATE** 8/19/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		300 c/m
2. Max. Reading on Turbine		1,500 c/m
3. Max. Reading on Piping		500 c/m
4. Smears of Floor & Walls		300 c/m
5. Smears of Piping & Motors		300 c/m
6. Smear for Alpha 4 & 5		< 200 d/m
7. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Piping		100 c/m 300 d/m β 5 d/m α
Wall		< 100 c/m 50 d/m β 0 d/m α
Floor		< 100 c/m 200 d/m β 25 d/m α
Floor at Floor Drain		< 100 c/m 160 d/m β 0 d/m α

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-KW **LOCATION** Filter room **DATE** 8/19/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd	1	2,500 c/m
2. Max. Reading on Filter Box	6.5	20,000 c/m
3. Smears of Floor & *Walls	<1	1,000 c/m - *300 c/m
4. Smears of Piping and Filter Box	<1	600 c/m
5. Smears for Alpha		<200 d/m
6. Ave. True Limiting Doserate	1	
STANDARD SMEARS/100 cm^2		
Floor		300 c/m 6,000 d/mβ 70 d/mα
Floor at Floor Drain		250 c/m 3,700 d/mβ 20 d/mα
Filter Housing		150 d/m 1,800 d/mβ 0 d/mα
Piping		350 c/m 5,000 d/mβ 50 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-KW **LOCATION** #1 Dryer Room **DATE** 8/14/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd	< 1	2,000 c/m
2. Condensate Drain Lines	65	20,000 c/m
3. Condenser	20	40,000 c/m
4. Gel. Tower	< 1	2,000 c/m
5. Turbine	65	20,000 c/m
6. Scan of Piping	3	8,000 c/m
7. Smears of Floor & *Walls	25	6,500 c/m - *500 c/m
8. Smears of Piping & Motors	1	4,000 c/m
9. Scan of Floor Drain	1	30,000 c/m
10. Smears for Alpha 7 & 8		200 d/m
11. Ave. True Limiting Doserate	5	
STANDARD SMEARS/100 cm^2		
Piping		350 c/m 8,400 d/m β 300 d/m α
Wall		150 c/m 550 d/m β 40 d/m α
Wall		250 c/m 3,200 d/m β 25 d/m α
Condenser		250 c/m 2,000 d/m β 100 d/m α
Continued on next page		

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-KW **LOCATION** #1 Dryer Room, Cont. **DATE** 8/14/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
Floor		250 c/m 4,400 d/mβ 60 d/mα
Floor at Gel. Tower		300 c/m 4,800 d/mβ 240 d/mα
Floor at Floor Drain		4,000 c/m 110,000 d/mβ 800 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-KW **LOCATION** #2 Dryer Room **DATE** 8/19/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd	< 1	2,000 c/m
2. Condensate Drain Lines	6.5	20,000 c/m
3. Condenser	25	45,000 c/m
4. Gel. Tower	< 1	2,000 c/m
5. Turbine	6.5	20,000 c/m
6. Scan of Piping	3.5	10,000 c/m
7. Floor Drain	17	35,000 c/m
8. Smears of Floor & *Walls	1	3,000 c/m - *500 c/m
9. Smears of Piping & Motors	< 1	1,000 c/m
10. Smears for Alpha 8 & 9		< 200 d/m
11. Ave. True Limiting Doserate	2	
STANDARD SMEARS/100 cm^2		
*Floor at Condensate Pot		10,000 c/m
Floor		800 c/m 5,000 d/mβ 150 d/mα
*Floor at Floor Drain		7,500 c/m
Floor Under Gel. Tower		1,000 c/m 6,500 d/mβ 125 d/mα
Condenser		250 c/m 1,400 d/mβ 40 d/mα

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COMMENTS:

CONTAMINATION STATUS

BUILDING 115-KW LOCATION #2 Dryer Room, Cont. DATE 8/19/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
Piping		250 c/m 2,200 d/mβ 60 d/mα
Wall		350 c/m 5,800 d/mβ 100 d/mα

COMMENTS: *Smears judged difficult to mount for NMC count.

CONTAMINATION STATUS

BUILDING 115-KW **LOCATION** Operations Gallery **DATE** 8/19/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		200 c/m
2. Collection Chamber (Sample)		6,000 c/m
3. #2 Drain		6,000 c/m
4. Drain Valve Line		10,000 c/m
5. Smears of Piping		< 200 c/m
6. Smears of Floor & *Walls		< 200 c/m
7. Smears for Alpha 5 & 6		< 200 d/m
8. Ave. True Limiting Doserate	<1	
STANDARD SMEARS/100 cm^2		
Wall		< 100 c/m 80 d/m β 0 d/m α
Sample Line Drain		100 c/m 400 d/m β 15 d/m α
Floor		< 100 c/m 80 d/m β 0 d/m α
Floor at Floor Drain		100 c/m 300 d/m β 15 d/m α

COMMENTS:

CONTAMINATION STATUS

BUILDING 117-KW **LOCATION** Inlet Tunnel **DATE** 8/20/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		4,000 c/m
2. Direct Scan of Floor		8,000 c/m
3. Smears of Floor		10,000 c/m
4. Smears of Walls		5,000 c/m
5. Smears of Turning Vanes		10,000 c/m
6. Smears for Alpha 3-5		< 200 d/m
7. Ave. True Limiting Doserate	2	
STANDARD SMEARS/100 cm^2		
Floor Area Between A and B Cells		5,000 c/m 170,000 d/m β 1,000 d/m α
1st Turning Vane Upstream of Cells		3,000 c/m 100,000 d/m β 1,100 d/m α
Wall at 1st Turning Vane		3,000 c/m 94,000 d/m β 1,250 d/m α
Floor Upstream of 1st Turning Vane		5,000 c/m 150,600 d/m β 1,200 d/m α
2nd Turning Vane		5,000 165,000 d/m β 1,100 d/m α
Continued on next page		

COMMENTS:

CONTAMINATION STATUS

BUILDING 117-KW **LOCATION** Inlet Tunnel, Cont. **DATE** 8/20/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
Floor at 2nd Turning Vane		7,500 c/m 225,000 d/mβ 1,000 d/mα
Wall at 2nd Turning Vane		4,500 c/m 100,000 d/mβ 1,000 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 117-KW LOCATION B Cell DATE 8/20/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		3,000 c/m
2. Max. on Filters B-2 Cell		20,000 c/m
3. B-1 Floor Drain		10,000 c/m
4. Smears of Filters		10,000 c/m
5. Smears of Floor & *Walls		8,000 c/m - *1,000 c/m
6. Smears for Alpha 4 & 5		< 200 d/m
7. Ave. True Limiting Doserate	2	
STANDARD SMEARS/100 cm^2		
B-1 Floor Area		850 c/m 16,000 d/mβ 125 d/mα
B-1 Wall		450 c/m 6,000 d/mβ 60 d/mα
B-2 Floor		450 c/m 6,000 d/mβ 25 d/mα

COMMENTS:

The 1st filter frame has been removed from B Cell and the 1st and 2nd frame has been removed from A Cell.

CONTAMINATION STATUS

BUILDING 117-KW **LOCATION** Exhaust Tunnel to Stack **DATE** 8/20/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		300 c/m
2. Direct Scan of Floors & Walls		300 c/m
3. Smears of Floor & Walls		300 c/m
4. Smears of Turning Vanes		300 c/m
5. Max. Reading at Outlet to Stack		8,000 c/m
6. Smears for Alpha 3 & 4		< 200 d/m
7. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Wall Area Between Cells		100 c/m 300 d/mβ 0 d/mα
Floor at 1st Turning Vane		200 c/m 1,150 d/mβ 20 d/mα
Walls at 1st Turning Vane		100 c/m 240 d/mβ 0 d/mα
Floor at Inlet Vanes to Stack		100 c/m 600 d/mβ 0 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 116-KW **LOCATION** 105-KW Stack **DATE** 8/20/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		800 c/m
2. Smears of Floor & Walls		500 c/m
3. Smears of Access Door		4,000 c/m
4. Smears for Alpha 2-5		< 200 d/m
5. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Wall at Ground Level		450 c/m 4,600 d/mβ 30 d/mα
Base of Stack (Floor)		450 c/m 4,800 d/mβ 30 d/mα

COMMENTS: Standard smears were taken using a 25' light bulb ext. pole.

CONTAMINATION STATUS

BUILDING 1608-D **LOCATION** Inside Building **DATE** 9/13/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		200 c/m
2. Max. Reading on Piping		1,000 c/m
3. Max. on Pumps		800 c/m
4. Smears of Pumps & Piping		< 200 c/m
5. Smears of Floor & Walls		< 200 c/m
6. Smears for Alpha 4 & 5		< 200 d/m
7. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor (2 Smears)		< 100 c/m 120 d/mβ 0 d/mα
Base of Pumps and Pumps (3 Smears)		< 100 c/m 80 d/mβ 0 d/mα
Floor, Outlet Pipe Cubicle		< 100 c/m 80 d/mβ 0 d/mα
Wall, Outlet Pipe Cubicle (2 Smears)		< 100 c/m 60 d/mβ 0 d/mα
Elect. Equip. Control, Boxes, etc.		< 100 c/m 70 d/mβ 0 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-D LOCATION Pipe Tunnel DATE 9/10/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Direct Scan of Floor, South End	1	3,000 c/m
2. Direct Scan of Piping		1,000 c/m
3. Smears of Floor & *Walls	1	3,000 c/m - *500 c/m
4. North End Direct Scan Floor		1,000 c/m
5. Smears of Piping North End		1,000 c/m
6. Smears of Floor & Walls		1,000 c/m
7. Smears of Piping South End	1	3,000 c/m
8. Gen. Bkgd, All		750 c/m
9. Smears for Alpha 3, 5, 6, 7		< 200 d/m
10. Ave. True Limiting Doserate	1	
STANDARD SMEARS/100 cm^2		
Wall, 200' Toward 105 DR		< 100 c/m 70 d/mβ 0 d/mα
Floor, 200' Toward 105 DR		200 c/m 850 d/mβ 20 d/mα
Floor, South End		150 c/m 40 d/mβ 0 d/mα
Piping, South End		< 100 c/m 120 d/mβ 0 d/mα
Floor, Center		200 c/m 600 d/mβ 0 d/mα
Continued on next page		

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-D **LOCATION** Pipe Tunnel, Cont. **DATE** 9/10/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
Piping, Center		< 100 c/m 160 d/mβ 0 d/mα
Wall, Center		100 c/m 220 d/mβ 0 d/mα
Inside Removed Valve		2,500 c/m
Floor (105-D Side)		2,000 c/m
Wall (105-D Side)		200 c/m 1,000 d/mβ 0 d/mα
Floor (105 Exhaust Wing)		1,000 c/m 31,000 d/mβ 40 d/mα
Piping (105 Side)		450 c/m 10,000 d/mβ 25 d/mα

COMMENTS:

(11) Rust on floor reading 10,000 c/m South End
Rust on floor reading 3,000 c/m North End
(2) Valves on floor reading 7,000 c/m
Valves smearable to 5,000 c/m inside.

CONTAMINATION STATUS

BUILDING 115-D **LOCATION** #1 Cooler Blower (Tool Storage Room) **DATE** 9/9/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		300 c/m
2. Max. Reading on Tools		1,000 c/m
3. Smears of Tools		300 c/m
4. Smears of Floor & Walls		200 c/m
5. Smears for Alpha 3 & 4		< 200 d/m
6. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor at Drain		100 c/m 175 d/mβ 6 d/mα
Wall		100 c/m 20 d/mβ 0 d/mα
Piping		100 c/m Bkg. β 0 d/mα

COMMENTS: Tools in storage are misc. hand tools.

CONTAMINATION STATUS

BUILDING 115-D **LOCATION** #2 Cooler Blower Room **DATE** 9/9/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		300 c/m
2. Max. Reading on Blower		2,000 c/m
3. Condenser		500 c/m
4. Condensate Lines		500 c/m
5. Condensate Drain		500 c/m
6. Smears of Floor & Walls		200 c/m
7. Smears of Piping and Motors		< 200 c/m
8. Smears for Alpha 6 & 7		< 200 d/m
9. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor		100 c/m 350 d/m β 0 d/m α
Wall		< 100 c/m 40 d/m β 0 d/m α
Inside Pipe Between Blower and Condenser		1,000 c/m 28,000 d/m β 40 d/m α

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-D **LOCATION** D-Area Filter Room **DATE** 9/9/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		400 c/m
2. Max. Reading on Filter Box		1,000 c/m
3. Floor Drain		500 c/m
4. Smears of Floor & Walls		400 c/m
5. Smears of Filter Box		300 c/m
6. Smears for Alpha 4 & 5		< 200 d/m
7. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor		100 c/m 160 d/mβ 0 d/mα
Wall		100 c/m 250 d/mβ 0 d/mα
Filter Enclosure		100 c/m 400 d/mβ 0 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-D LOCATION DR Filter Room and Miscellaneous Storage DATE 9/9/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		500 c/m
2. Max. Reading on Filter Box		1,000 c/m
3. Floor Drain		1,000 c/m
4. Max. Reading on Piping	3.5	8,000 c/m
5. Smears of Floor & *Walls		400 c/m - *200 c/m
6. Smears of Filter Box		400 c/m
7. Smears for Alpha 5 & 6		< 200 d/m
8. Ave. True Limiting Doserate	1	
STANDARD SMEARS/100 cm^2		
Floor		< 100 c/m 20 d/m β 0 d/m α
Wall		< 100 c/m 40 d/m β 0 d/m α
Filter Enclosure		100 c/m 175 d/m β 6 d/m α
Floor, Misc. Storage Room		< 100 c/m 40 d/m β 0 d/m α

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-D **LOCATION** Oil Storage and Equipment Storage Rooms **DATE** 9/9/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Direct Scan & Smears		< 200 c/m
2. Smears for Alpha		< 200 d/m
3. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor, 2 Smears		< 100 c/m 15 d/mβ 0 d/mα
Walls, 2 Smears		< 100 c/m Bkg. β 0 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-D **LOCATION** #1 Dryer Room **DATE** 9/9/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		300 c/m
2. Turbine		2,500 c/m
3. Condenser		800 c/m
4. Condensate Lines		800 c/m
5. Condensate Drains		800 c/m
6. Gel. Tower		1,000 c/m
7. Smears of Floor & Walls		300 c/m
8. Smears of Piping & Motors		300 c/m
9. Smears for Alpha 7 & 8		< 200 d/m
10. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 c/m^2		
Floor at Turbine		< 100 c/m 60 d/mβ 0 d/mα
Floor at Gel. Tower		100 c/m 160 d/mβ 0 d/mα
Piping		100 c/m 200 d/mβ 12 d/mα
Inside Open Old Condensate Holding Tank		150 c/m 450 d/mβ 0 d/mα
Floor at Condensate Drain		100 c/m 160 d/mβ 0 d/mα

COMMENTS: Gel. Tower empty.

CONTAMINATION STATUS

BUILDING 115-D **LOCATION** #2 Dryer Room **DATE** 9/9/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		300 c/m
2. Turbine		2,000 c/m
3. Condenser		1,000 c/m
4. Condensate Lines		800 c/m
5. Condensate Drain		1,000 c/m
6. Gel. Tower		600 c/m
7. Smears of Floor & Walls		300 c/m
8. Smears of Piping and Motors		300 c/m
9. Smears for Alpha 7 & 8		< 200 d/m
10. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor at Turbine		100 c/m 200 d/mβ 0 d/mα
Floor at Gel. Tower		100 c/m 170 d/mβ 6 d/mα
Gel. Tower		< 100 c/m 60 d/mβ 0 d/mα
Floor at Condensate Drain		100 c/m 220 d/mβ 6 d/mα
Piping		100 c/m 170 d/mβ 0 d/mα

COMMENTS: Gel. Tower empty.

CONTAMINATION STATUS

BUILDING 115-D **LOCATION** #3 Dryer Room **DATE** 9/9/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		300 c/m
2. Turbine	1.5	4,000 c/m
3. Condenser		400 c/m
4. Condensate Lines		400 c/m
5. Condensate Drain		400 c/m
6. Gel. Tower		600 c/m
7. Smears of Floor & Walls		300 c/m
8. Smears of Piping & Motors		300 c/m
9. Smears for Alpha 7 & 8		< 200 d/m
10. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor at Turbine		150 c/m 240 d/mβ 0 d/mα
Floor at Gel. Tower		100 c/m 160 d/mβ 0 d/mα
Gel. Tower		100 c/m 125 d/mβ 6 d/mα
Piping		100 c/m 125 d/mβ 12 d/mα
Floor at Condensate Drain		150 c/m 320 d/mβ 6 d/mα
Wall		< 100 c/m Bkg. β 0 d/mα

COMMENTS: Gel. Tower empty.

CONTAMINATION STATUS

BUILDING 115-D **LOCATION** #4 Dryer Room **DATE** 9/10/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		400 c/m
2. Turbine		2,500 c/m
3. Condenser		2,000 c/m
4. Condensate Lines		2,000 c/m
5. Condensate Drains		1,500 c/m
6. Gel. Tower		1,000 c/m
7. Smears of Floors & *Walls		400 c/m - *200 c/m
8. Smears of Piping and Motors		300 c/m
9. Smears for Alpha 7 & 8		< 200 d/m
10. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 c/m^2		
Floor at Turbine		100 c/m 150 d/mβ 0 d/mα
Floor at Gel. Tower		100 c/m 400 d/mβ 0 d/mα
Floor at Condensate Drain		100 c/m 400 d/mβ 0 d/mα
Inside Condensate Drain Line		250 c/m
Piping		< 100 c/m 80 d/mβ 0 d/mα
Wall		< 100 c/m 25 d/mβ 0 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-D **LOCATION** #5 Dryer Room **DATE** 9/10/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		400 c/m
2. Turbine		3,000 c/m
3. Condenser		800 c/m
4. Condensate Lines		1,000 c/m
5. Condensate Drains		1,000 c/m
6. Gel. Tower		800 c/m
7. Smears of Floor & *Walls		400 c/m - *200 c/m
8. Smears of Piping and Motors		400 c/m
9. Smears for Alpha 7 & 8		< 200 d/m
10. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor at Turbine		150 c/m 350 d/mβ 6 d/mα
Piping		< 100 c/m 120 d/mβ 0 d/mα
Floor at Condensate Drain		100 c/m 500 d/mβ 0 d/mα
Condensate Drain Line		1,000 c/m 8,000 d/mβ 25 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-D **LOCATION** ~~Dryer Rooms #1, 2, 3,~~ Blower Room #1 **DATE** 3/7/75

SURVEY DESCRIPTION	mR/hr	c/m or d/m
Dryer Room #1		
Max. Reading on Floor under Condensate Drain		20,000 c/m
Max. on Floor in Entry Corridor Direct		500 c/m
Dryer Room #2		
Max. Reading on Blower Fan Direct		2,000 c/m
Smear		< 500 c/m
Dryer Room #3		
Max. Reading on Blower Fan Direct		3,000 c/m
Smear		< 500 c/m
Corridors Direct		500 c/m
#1 Blower Room Bkgd		< 1
Max. Reading Inside Lines Where Expansion Joint was Removed Direct		10,000 c/m
Smears		3,000 c/m

COMMENTS:

This is a survey made prior to characterization surveys.
Crud on floor in #1 dryer room by condensate drain is wet.

CONTAMINATION STATUS

BUILDING 117-D LOCATION Inlet Tunnel DATE 9/13/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		500 c/m
2. Direct Scan of Floor	1	3,000 c/m
3. Direct Scan of Turning Vanes	1	3,000 c/m
4. Smears of Turning Vanes	1	3,000 c/m
5. Smears of Floor & *Walls	1	6,000 c/m - *2,000 c/m
6. Smears for Alpha 4 & 5		< 200 d/m
7. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor Between Cells		3,500 c/m 60,000 d/mβ 100 d/mα
Wall Between Cells		550 c/m 7,000 d/mβ 12 d/mα
Floor Between 1st and 2nd Turning Vanes		2,000 c/m 40,000 d/mβ 50 d/mα
Wall Between 1st and 2nd Turning Vanes		950 c/m 10,400 d/mβ 15 d/mα
Floor at Inlet Vanes (from 105-D)		2,000 c/m 50,000 d/mβ 15 d/mα
Continued on next page		

COMMENTS:

CONTAMINATION STATUS

BUILDING 117-D **LOCATION** Inlet Tunnel, Cont. **DATE** 9/13/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
Wall at Inlet Vanes		850 c/m 13,600 d/mβ 30 d/mα
Inlet Turning Vanes		2,000 c/m 44,000 d/mβ 50 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 117-D LOCATION A Cell DATE 9/13/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd in A1 & A2	< 1	1,000 c/m
2. Max. Reading on Filters A2	< 1	2,500 c/m
3. Floor Drain A2 Cell	8	25,000 c/m
4. Floor Drain A1 Cell	3	10,000 c/m
5. Smears of Filters	< 1	1,000 c/m
6. Smears of Floor & *Walls	1	3,000 c/m - *1,000 c/m
7. Smears for Alpha 5 & 6		< 200 d/m
8. Ave. True Limiting Doserate	1	
STANDARD SMEARS/100 cm^2		
A1 Floor		1,000 c/m 12,000 d/mβ 0 d/mα
Floor Between 1st and 2nd Frames		850 c/m 8,000 d/mβ 20 d/mα
Wall Between 1st and 2nd Frames		500 c/m 4,500 d/mβ 6 d/mα
2nd Filter Frame		500 c/m 5,000 d/mβ 0 d/mα

COMMENTS: Filters removed from A1 Cell.
3' of water in sump.

CONTAMINATION STATUS

BUILDING 117-D **LOCATION** Exhaust Tunnel **DATE** 9/13/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		200 c/m
2. Exit Vanes to Stack Direct		200 c/m
3. Smears of Exit Vanes		300 c/m
4. Smears of Floor & Walls		< 200 c/m
5. Smear for Alpha 3 & 4		200 d/m
6. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Wall Between Cells		100 c/m 260 d/mβ 0 d/mα
Floor Between Cells		200 c/m 1,000 d/mβ 6 d/mα
Floor at Inlet Vanes to Stack		100 c/m 200 d/mβ 0 d/mα
Wall at Inlet Vanes to Stack		300 c/m 2,000 d/mβ 0 d/mα
Access to Cells, Normally Clean Area, (3 Smears)		< 100 c/m 120 d/mβ 0 d/mα

COMMENTS: No turning vanes in exhaust tunnel except at entrance to stack.

CONTAMINATION STATUS

BUILDING 1608-H **LOCATION** Pump House **DATE** 8/26/75

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		500 c/m
2. Scan of Piping		1,000 c/m
3. Scan of Pumps		4,000 c/m
4. Smears of Floor & Walls		300 c/m
5. Smears of Piping & Pumps		500 c/m
6. Smears for Alpha 4 & 5		< 200 d/m
7. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor		250 c/m 3,000 d/mβ 0 d/mα
Floor		250 c/m 2,800 d/mβ 20 d/mα
Piping		100 c/m 175 d/mβ 0 d/mα
Wall		< 100 c/m 60 d/mβ 0 d/mα
Wall		< 100 c/m 200 d/mβ 0 d/mα
Inside Pump Housing		< 100 c/m 40 d/mβ 0 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 105-H **LOCATION** Pipe tunnel **DATE** 8/26/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		1,000 c/m
2. Scan of Piping		6,000 c/m
3. Scan of Floor Drains		10,000 c/m
4. Scan of Valves		10,000 c/m
5. Smears of Floor & Walls		400 c/m
6. Smears of Piping & Motors		400 c/m
7. Smears for Alpha 5 & 6		< 200 d/m
8. Ave. True Limiting Doserate	1	
STANDARD SMEARS/100 cm^2		
Floor, North End		250 c/m 3,000 d/mβ 40 d/mα
Floor, North End at Floor Drain		250 c/m 5,000 d/mβ 40 d/mα
Wall, North End		200 c/m 2,400 d/mβ 30 d/mα
Piping, North End		250 c/m 3,400 d/mβ 50 d/mα
Floor, South End		100 c/m 700 d/mβ 6 d/mα
Continued on next page		

COMMENTS:

CONTAMINATION STATUS

BUILDING 105-H **LOCATION** Pipe Tunnel, Cont. **DATE** 8/26/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
Wall, South End		< 100 c/m 80 d/mβ 0 d/mα
Piping, South End		100 c/m 500 d/mβ 25 d/mα
Piping, Center		150 c/m 1,000 d/mβ 6 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 105-H **LOCATION** Gas Wing #2 Blower Room **DATE** 8/24/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		300 c/m
2. Max. Reading on Turbine		2,500 c/m
3. Smears of Piping and Motors		300 c/m
4. Smears of Floor & *Walls		400 c/m - *200 c/m
5. Smears for Alpha 3 & 4		< 200 d/m
6. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor		< 100 c/m 100 d/m β 0 d/m α
Wall		< 100 c/m 100 d/m β 0 d/m α
Piping		< 100 c/m 100 d/m β 0 d/m α

COMMENTS:

CONTAMINATION STATUS

BUILDING 105-H **LOCATION** Gas Wing #1 Blower Room **DATE** 8/24/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		300 c/m
2. Max. Reading on Turbine		2,500 c/m
3. Smears of Piping & Motors		300 c/m
4. Smears of Floor & *Walls		450 c/m - *200 c/m
5. Smears for Alpha 3 & 4		< 200 d/m
6. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor		< 100 c/m 100 d/mβ 0 d/mα
Wall		< 100 c/m 100 d/mβ 0 d/mα
Piping		< 100 c/m 100 d/mβ 0 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 105-H **LOCATION** Gas Wing #1 Filter Room **DATE** 8/24/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		200 c/m
2. Direct Scan of Filter Box		200 c/m
3. Smears of Filter Box		300 c/m
4. Smears of Floor and Walls		300 c/m
5. Smears for Alpha 3 & 4		< 200 d/m
6. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor		< 100 c/m 40 d/mβ 0 d/mα
Piping		< 100 c/m 36 d/mβ 0 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 105-H **LOCATION** Gas Wing #1 Dryer Room **DATE** 8/24/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		650 c/m
2. Condensate Drain		2,000 c/m
3. Condenser		2,500 c/m
4. Turbine		8,000 c/m
5. Gel. Tower		3,000 c/m
6. Smears of Floor & *Walls		500 c/m - *200 c/m
7. Smears of Piping & Motors		250 c/m
8. Smears for Alpha 6 & 7		< 200 d/m
9. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor at Turbine		< 100 c/m 80 d/mβ 0 d/mα
Floor at Gel. Tower		< 100 c/m 120 d/mβ 0 d/mα
Floor at Condensate Pot		100 c/m 260 d/mβ 0 d/mα
Piping		< 100 c/m 60 d/mβ 0 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 105-H **LOCATION** Gas Wing #2 Dryer Room **DATE** 8/24/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		500 c/m
2. Condensate Drain		2,000 c/m
3. Condenser		2,000 c/m
4. Turbine		10,000 c/m
5. Gel. Tower		3,000 c/m
6. Smears of Floor & *Walls		540 c/m - *250 c/m
7. Smears of Piping & Motors		250 c/m
8. Smears for Alpha 6 & 7		< 200 d/m
9. Ave. True Limiting Doserate	1	
STANDARD SMEARS/100 cm^2		
Floor at Turbine		100 c/m 300 d/mβ 6 d/mα
Floor at Gel. Tower		100 c/m 280 d/mβ 0 d/mα
Floor at Condensate Pot		100 c/m 300 d/mβ 0 d/mα
Piping		100 c/m 280 d/mβ 0 d/mα
Continued on next page		

COMMENTS:

CONTAMINATION STATUS

BUILDING 105-H **LOCATION** Gas Wing #2 Dryer Room, Con **DATE** 8/24/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
Gel. Tower		300 c/m 3,000 d/mβ 25 d/mα
*Inside Open Pipe from Turbine		15,000 c/m 260,000 d/mβ 2,000 d/mα

COMMENTS: *Reading with PAM indicated 100 c/m uncorrected.

CONTAMINATION STATUS

BUILDING 105-H **LOCATION** Gas Wing #3 Dryer Room **DATE** 8/24/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		500 c/m
2. Condensate Drain		4,000 c/m
3. Condenser		2,000 c/m
4. Turbine		8,000 c/m
5. Gel. Tower		3,000 c/m
6. Smears of Floor & *Walls		800 c/m - *400 c/m
7. Smears of Piping & Motors		2,000 c/m
8. Smears for Alpha		< 200 d/m
9. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor at Turbine		100 c/m 500 d/mβ 6 d/mα
Floor at Gel. Tower		< 100 c/m 200 d/mβ 6 d/mα
Floor at Condensate Pot		150 c/m 300 d/mβ 15 d/mα
Piping		150 c/m 1,000 d/mβ 15 d/mα
Condenser		250 c/m 4,000 d/mβ 75 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 117-H **LOCATION** Inlet Tunnel **DATE** 8/24/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		500 c/m
2. Scan of Floor		2,000 c/m
3. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor Between Cells		650 c/m 11,000 d/mβ 120 d/mα
Wall Between Cells		300 c/m 2,100 d/mβ 90 d/mα
Floor Between 1st and 2nd Turning Vanes		400 c/m 3,600 d/mβ 25 d/mα
Wall Between 1st and 2nd Turning Vanes		550 c/m 6,000 d/mβ 100 d/mα
Floor at Inlet Vanes to Stack		600 c/m 4,600 d/mβ 100 d/mα
Wall at Inlet Vanes to Stack		650 c/m 9,000 d/mβ 150 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 117-H **LOCATION** B Cell **DATE** 8/24/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		500 c/m
2. Max. on Filters B2 Cell		2,000 c/m
3. Max. on Drains B1 Cell		1,000 c/m
4. Smears of Filters		750 c/m
5. Smears of Floor & Walls		500 c/m
6. Smears for Alpha 4 & 5		< 200 d/m
7. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
B1 Floor		150 c/m 1,400 d/mβ 6 d/mα
Floor Between 1st and 2nd Filter		300 c/m 2,600 d/mβ 6 d/mα

COMMENTS: B1 & A1 have been removed from cells.
B3 & A4 have been removed from cells.

CONTAMINATION STATUS

BUILDING 117-H **LOCATION** Exhaust Tunnel to Stack **DATE** 8/24/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		300 c/m
2. Direct Scan of Floor & Walls		300 c/m
3. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Wall Between Cells		< 100 c/m Bkg. β 0 d/m α
Floor Between Cells		< 100 c/m 240 d/m β 0 d/m α

COMMENTS: (Bats living in exhaust tunnel.) Did not survey too much, just inside door only.

CONTAMINATION STATUS

BUILDING 1608-F **LOCATION** Steam Turbine Pump Room **DATE** 8/31/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Max. Reading Inside Pump		400 c/m
2. Smears of Pump Walls and Floor		< 200 c/m
3. Smears for Alpha		< 200 d/m
4. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor		< 100 c/m 10 d/m β 0 d/m α
Pump		< 100 c/m < 10 d/m β 0 d/m α
Wall		< 100 c/m 40 d/m β 0 d/m α

COMMENTS:

CONTAMINATION STATUS

BUILDING 1608-F LOCATION #1 & 2 Elec. Pump Rooms 1608-F Basement DATE 8/31/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Max. Reading		400 c/m
2. Smear of Floor Walls, Pumps, and Motors & Piping		< 200 c/m
3. Smears for Alpha		< 200 d/m
4. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floors (2 Smears)		< 100 c/m 60 d/mβ 0 d/mα
Walls (2 Smears)		< 100 c/m 30 d/mβ 0 d/mα
Piping (2 Smears)		< 100 c/m 16 d/mβ 0 d/mα
Inside Pipe From #2 Elect. Pump		100 c/m 650 d/mβ 650 d/mα
Floor (Basement)		< 100 c/m 175 d/mβ 0 d/mα
Floor (Basement)		< 100 c/m 560 d/mβ 0 d/mα
Wall (2 Smears)		< 100 c/m Bkg. β 0 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-F LOCATION Pipe Tunnel DATE 8/30/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd South End		200 c/m
2. Gen. Bkgd North End		600 c/m
3. Scan of Piping South End		300 c/m
4. Scan of Piping North End		15,000 c/m
5. Direct Scan of Floor Drains		200 c/m
6. Smears of Floor & Walls		300 c/m
7. Smears of Piping		300 c/m
8. Smears for Alpha 6 & 7		< 200 d/m
9. Ave. True Limiting Doserate	1	
STANDARD SMEARS/100 cm^2		
Wall, South End		< 100 c/m 50 d/mβ 0 d/mα
Piping, South End		100 c/m 200 d/mβ 6 d/mα
Floor, South End		< 100 c/m 16 d/mβ 6 d/mα
Floor, Center		< 100 c/m 100 d/mβ 6 d/mα
Floor of Drain Trough		< 100 c/m 16 d/mβ 6 d/mα

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COMMENTS:

CONTAMINATION STATUS

BUILDING 115-F **LOCATION** Pipe Tunnel, Cont. **DATE** 8/30/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
Inside of Blanked Valve from Purification Room		300 c/m 2,640 d/mβ 6 d/mα
Floor, North End (105 Side)		100 c/m 400 d/mβ 0 d/mα
Piping, North End (105 Side)		350 c/m 2,500 d/mβ 12 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-F **LOCATION** #1 Purification Room **DATE** 8/27/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		Bkgd
2. Direct Scan and Smears		Bkgd
3. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor		< 100 c/m 25 d/mβ 0 d/mα
Floor at Floor Drain		< 100 c/m 70 d/mβ 0 d/mα
Wall		< 100 c/m 8 d/mβ 0 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-F **LOCATION** #2 Purification Room **DATE** 8/27/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		Bkgd
2. Direct Scan and Smears		Bkgd
3. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor		<100 c/m 40 d/mβ 0 d/mα
Floor at Floor Drain		< 100 c/m 50 d/mβ 0 d/mα
Wall		<100 c/m 30 d/mβ 0 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-F LOCATION #1 Filter Room DATE 8/30/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		600 c/m
2. Max. Reading on Filter Box		1,000 c/m
3. Smears of Floor & *Walls		500 c/m - *200 c/m
4. Smears of Filter Box		500 c/m
5. Smears for Alpha		< 200 d/m
6. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor at Floor Drain		< 100 c/m Bkg.β 0 d/mα
Wall		< 100 c/m 40 d/mβ 0 d/mα
Filter Housing		< 100 c/m 8 d/mβ 0 d/mα

COMMENTS: #1 & 2 Purification rooms northwest corner are empty. No detectable smearable contamination with GM. In #2 room, about one dozen balls, boron steel, were around floor drain 400 c/m direct.

CONTAMINATION STATUS

BUILDING 115-F **LOCATION** Maintenance Storage Room **DATE** 8/30/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Direct Scan & Smears		< 200 c/m
2. Smears for Alpha		< 200 c/m
3. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor		< 100 c/m 60 d/mβ 0 d/mα
Wall		< 100 c/m 40 d/mβ 0 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-F **LOCATION** Miscellaneous Storage **DATE** 8/30/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Direct Scan & Smears		< 200 c/m
2. Smears for Alpha		< 200 c/m
3. Ave. True Limiting Doserate	<1	
STANDARD SMEARS/100 cm^2		
Floor		<100 c/m 16 d/mβ 0 d/mα
Wall		< 100 c/m 12 d/m 0 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-F **LOCATION** #1 Dryer Room **DATE** 8/27/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		500 c/m
2. Condenser		1,500 c/m
3. Condensate Drain		2,000 c/m
4. Turbine		3,000 c/m
5. Gel. Tower		1,500 c/m
6. Silca Gel. Sample		1,000 c/m
7. Smears of Floor & Walls		200 c/m
8. Smears of Piping and Motors		300 c/m
9. Smears for Alpha 7 & 8		< 200 d/m
10. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor at Turbine		150 c/m 320 d/mβ 0 d/mα
Floor at Gel. Tower		250 c/m 2,000 d/mβ 20 d/mα
Gel. Tower		< 100 c/m 36 d/mβ 0 d/mα
Floor at Condensate Pot		100 c/m 320 d/mβ 0 d/mα
Continued on next page		

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-F LOCATION #1 Dryer Room, Cont. DATE 8/27/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
Condenser		< 100 c/m 90 d/mβ 0 d/mα
Piping		100 c/m 220 d/mβ 0 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-F LOCATION #2 Dryer Room DATE 8/27/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		500 c/m
2. Condenser		25,000 c/m
3. Condensate Drain		8,000 c/m
4. Turbine		2,000 c/m
5. Gel. Tower		1,500 c/m
6. Sample From Inside Condenser		10,000 c/m
7. Smears of Floor & Walls		300 c/m
8. Smears of Piping and Motors		400 c/m
9. Smears for Alpha 7 & 8		< 200 d/m
10. Ave. True Limiting Doserate	1	
STANDARD SMEARS/100 cm^2		
Floor at Turbine		100 c/m 180 d/mβ 0 d/mα
Floor at Gel. Tower		100 c/m 230 d/mβ 12 d/mα
Gel. Tower		100 c/m 376 d/mβ 0 d/mα
Floor at Condensate Drain		300 c/m 4,100 d/mβ 6 d/mα
Piping		100 c/m 230 d/mβ 0 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 115-F LOCATION #3 Dryer Room DATE 8/27/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		500 c/m
2. Condenser		2,500 c/m
3. Condenate Drain		3,000 c/m
4. Turbine		4,000 c/m
5. Gel. Tower		2,000 c/m
6. Smears of Floor & Walls		400 c/m
7. Smears of Piping & Motors		400 c/m
8. Smears for Alpha 6 & 7		< 200 d/m
9. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor at Turbine		100 c/m 90 d/mβ 0 d/mα
Floor at Gel. Tower		100 c/m 85 d/mβ 0 d/mα
Gel. Tower		< 100 c/m 60 d/mβ 0 d/mα
Floor at Condensate Drain		150 c/m 960 d/mβ 20 d/mα
Piping		100 c/m 320 d/mβ 0 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 117-F LOCATION Inlet Tunnel DATE 8/31/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		300 c/m
2. Direct Scan of Floor & Walls		600 c/m
3. Direct Scan of Turning Vanes		600 c/m
4. Smears of Floor & Walls		1,500 c/m
5. Smears of Turning Vanes		1,000 c/m
6. Smears for Alpha 4 & 5		< 200 d/m
7. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor Between Cells		450 c/m 6,300 d/mβ 15 d/mα
Wall Between Cells		150 c/m 1,300 d/mβ 0 d/mα
Floor at 1st Turning Vanes		150 c/m 2,670 d/mβ 0 d/mα
Wall at 1st Turning Vanes		350 c/m 3,400 d/mβ 0 d/mα
Floor at 2nd Turning Vanes		450 c/m 4,660 d/mβ 15 d/mα
Wall at 2nd Turning Vanes		150 c/m 1,400 d/mβ 15 d/mα
Continued on next page		

COMMENTS:

CONTAMINATION STATUS

BUILDING 117-F LOCATION Inlet Tunnel, Cont. DATE 8/31/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
Floor at Inlet Vanes to Stack		200 c/m 3,180 d/mβ 15 d/mα
Wall at Inlet Vanes to Stack		250 c/m 3,100 d/mβ 6 d/mα
Inlet Vanes to Stack		150 c/m 1,200 d/mβ 6 d/mα

COMMENTS: Light fixture in tunnel 1/2 full of water.

CONTAMINATION STATUS

BUILDING 117-F LOCATION A Cell DATE 8/31/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Max. Reading on Filters A2		2,000 c/m
2. Max. Reading on Drains		2,000 c/m
3. Gen. Bkgd in A1 & A2 Cells		300 c/m
4. Smears of Filters		1,000 c/m
5. Smears of Floor & Walls		1,000 c/m
6. Smears for Alpha 4 & 5		< 200 d/m
7. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
A1 Wall		100 c/m 850 d/mβ 0 d/mα
A1 Floor		100 c/m 500 d/mβ 0 d/mα
A2 Floor (Between 1st & 2nd Filters)		200 c/m 2,100 d/mβ 12 d/mα

COMMENTS:

CONTAMINATION STATUS

BUILDING 117-F LOCATION Exhaust Tunnel DATE 8/31/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		200 c/m
2. Direct Scan of Floor & Walls		200 c/m
3. Smears of Floor & Walls		600 c/m
4. Smears of Turning Vanes at Stack		600 c/m
5. Smears for Alpha 3 & 4		< 200 d/m
6. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor Between Cells		100 c/m 100 d/mβ 0 d/mα
Wall Between Cells		< 100 c/m 80 d/mβ 0 d/mα
Inlet Vanes to Stack		100 c/m 500 d/mβ 0 d/mα
Floor at Inlet Vanes		100 c/m 200 d/mβ 0 d/mα
Wall at Inlet Vanes		< 100 c/m 120 d/mβ 0 d/mα

COMMENTS: No turning vanes in tunnel except at entrance to stack. Light fixture in tunnel 1/2 full of water.

CONTAMINATION STATUS

BUILDING 117-F **LOCATION** Drainage Sump **DATE** 8/31/76

SURVEY DESCRIPTION	mR/hr	c/m or d/m
1. Gen. Bkgd		200 c/m
2. Ave. True Limiting Doserate	< 1	
STANDARD SMEARS/100 cm^2		
Floor (2 Smears)		< 100 c/m 70 d/mβ 0 d/mα
Piping		< 100 c/m < 10 d/mβ 0 d/mα
Piping		< 100 c/m 50 d/mβ 0 d/mα
Wall Between Cells and Sump		< 100 c/m 70 d/mβ 0 d/mα

COMMENTS:

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1. Resource Book - Disposition (D & D) of Retired Contaminated Facilities at Hanford, BNWL-MA-88, Battelle Pacific Northwest Laboratories, August 1975.

2. Hazards Summary Report, Vol. 3, Description of the 100-B, 100-C, 100-D, 100-DR, 100-F, and 100-H Production Reactor Plants, HW-74095, General Electric Co., Richland, WA, April 1, 1963.

3. Hazards Summary Report, Vol. 3, Description of the 100-KE and 100-KW Production Reactor Plants, HW-74095, General Electric Co., Richland, WA, April 15, 1963.

4. Catalog of Hanford Buildings and Facilities, 100 Areas, AEC-GE Study Group for the Economic Development of Richland, WA, April 1964.

5. J.T. Baker, Surveillance Program for 100 Area Deactivated Facilities, DUN-7805 Rev. 2, December 30, 1975.