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UNDERGROUND RADIOACTIVE MATERIALS IN 100-H AND F PLANTS

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UNDERGROUND RADIOACTIVE MATERIALS IN 100-H AND F PLANTS

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UNDERGROUND RADIOACTIVE MATERIALS IN 100-H AND F PLANTSINTRODUCTION

This report describes the underground radioactive materials in the deactivated reactor areas of 100-H and 100-F. It includes the location of solid waste burial grounds which are marked with permanent marker posts and also locations which are not permanently marked but over which access controls should be maintained until their radioactivity is no longer of concern. Access controls should be maintained by appropriate custodian for at least 5 years after deactivation.

There are 5 locations which are not included in this report. Four of these are disposal sites at 100-F which remain in the custody of Battelle-Northwest and are still in use. The other is a French drain at 100-H which remains in service for disposal of liquid waste from the 1717-H Hot Shop. The shop is operated by Central Services Operation of IPD.

The waste disposal facilities associated with the deactivated DR reactor have not been terminated and remain in the custody of 100-D Reactor Operation (1).

SUMMARY

At 100-H Area there are 13 locations and at 100-F Area 16 locations where radioactive material was deposited underground. Five of these locations, 2 at 100-H and 3 at 100-F, have been permanently terminated as burial sites in compliance with Radiation Control Standards, IPD (2). They contain solid waste with significant quantities of long-life radio-nuclides. In compliance with Radiation Control Standards the legal description and the survey made by Vitro for each are given in Appendix C.

Burial locations within the 105 Building exclusion fences were not marked with permanent posts as the exclusion fences are sufficient marking for such sites. Other locations not permanently marked were the components of the effluent systems, including the 107 retention basins, 1904 outfall structures and associated piping. Control objectives for

- (1) RL-REA-1071, "DR PLANT RADIATION ZONES, FINAL STATUS REPORT," 4-22-65
- (2) HW-45674, "IRRADIATION PROCESSING DEPARTMENT RADIATION CONTROL STANDARDS AND PROCEDURES"

SUMMARY (continued)

these locations were to prevent contamination spreads and limit personnel access for several years. Similar objectives applied to locations where small quantities of liquid waste were released to ground, or small amounts of surface-contaminated materials were buried. At these locations, existing fences and radiation zone signs were left in place. Detailed descriptions and maps of the locations are contained in the Appendices.

The permanently posted burial grounds contain two general types of radioactive waste: neutron-activated reactor components, and surface-contaminated material and equipment. The activated components consist almost entirely of steel and aluminum. The most significant radionuclide contained in these materials is 5-year Co-60. The surface contaminants are primarily corrosion and activation products of the reactor cooling water effluent, of which the long-life emitter is the 245-day Zn-65.

The activity at the radiation zoned sites should be measured at the end of 5 years, or before all control is relinquished, to ascertain if the locations are releasable.

DISCUSSION

Records of underground radioactive materials in the reactor areas are maintained by Radiological Engineering, Research and Engineering Section, and by Radiation Practices Engineering, Manufacturing Section. These records are based on a comprehensive review of the underground sites in 1956 (3), and on notices of subsequent changes submitted by users. The portion of the record pertaining to 100-H and 100-F plants was summarized in October, 1964 (4). Information from that summary plus subsequent changes, including deactivation, is recorded in this report.

Descriptions of the various underground materials at 100-H and 100-F, with reference maps of their locations, are given in Appendices A and B. The sites fall into 4 categories: those terminated sites marked with permanent marker posts as described in Architectural-

- (3) HW-46715, "UNCONFINED UNDERGROUND RADIOACTIVE WASTE AND CONTAMINATION - 100 AREAS," 10-14-56
- (4) HW-83710, "CONTROL OF UNDERGROUND RADIOACTIVE MATERIALS IN DEACTIVATED REACTOR AREAS," 10-7-64

DISCUSSION (continued)

Civil Standard AC-5-40 (5), those which lie within the 105 exclusion areas, those which are marked by radiation zone signs and those released sites.

The locations used for the burial of solid radioactive wastes, which are outside of the 105 exclusion areas, were surveyed and given legal descriptions by Vitro Engineering Company. The boundaries of these burial grounds were marked with permanent marker posts as described in Architectural-Civil Standard AC-5-40. Maps and legal descriptions of these locations are reproduced in Appendix C.

The solid and liquid waste sites which are located within the 105 exclusion fences were not marked with permanent marker posts because the exclusion fences were considered to constitute sufficient marking. Some of these sites can be identified by pipes or posts, and some have no markings. Any future excavation within the 105 exclusion areas will require appropriate radiation control measures, including reference to the applicable portions of Appendices A and B.

Another group of sites which remain as radiation zones but are not marked as permanent burial sites are the components of the reactor effluent systems. These include the 107 retention basins, the 1904 outfall structures and associated effluent pipes. The objective for these locations is to control the remaining contamination for at least 5 years while it is undergoing radioactive decay. The 1608-H and 1608-F sewage lift stations are components of the effluent systems which were described in the radiological status reports for 100-H plant (6), and 100-F plant (7).

The permanently posted burial grounds contain two general types of radioactive waste: neutron-activated reactor components, and surface-contaminated material and equipment. Typical examples of the neutron-activated components are aluminum dummies and process tubing, steel gun barrels and stop plugs, thermocouple wire, and balls from the 3X safety system. At the time of burial, typical dose rates from buckets containing

(5) Hanford Architectural and Civil Standard, AC-5-40

(6) RL-REA-2501, "RADIOLOGICAL STATUS REPORT, DEACTIVATION STATUS - H PLANT," 9-7-65

(7) RL-REA-2502, "RADIOLOGICAL STATUS REPORT, DEACTIVATION STATUS - F PLANT," 9-16-65

DISCUSSION (continued)

150-200 aluminum dummies range from 100 mR/hr to 2 R/hr at a distance of 2 feet. Other examples of typical dose rates from activated components are: steel gun barrels - 300 to 500 mR/hr at 3 feet, step plugs - 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. Surface-contaminated materials, usually called miscellaneous, contaminated waste, include such things as broken hand tools, rags and sweeping compound used in decontamination work, light bulbs removed from the storage basin and sheets of plastic and paper used to keep floors and equipment free of contamination. This type of material is usually sealed in cardboard boxes and placed in separate trenches from the activated components. Dose rates at contact with the sides of such boxes are usually less than 5 mR/hr, but occasionally may be as high as 200 mR/hr.

The activated components consist almost entirely of steel and aluminum. Radionuclides created in irradiated aluminum are 27-day Cr-51, 45-day Hf-181, 70-day Hf-175, 85-day Sc-46, 45-day Fe-59, 245-day Zn-65 and 5-year Co-60. Radionuclides created in iron and steel are 45-day Fe-59, 28-day Cr-51, 314-day Mn-54 and 5-year Co-60. The wires of thermocouple stringers are chromel alumel containing a very high concentration of 5-year Co-60. These activated components, within a few years, lose all of their radioactivity except for that due to Co-60. The radioactive component is an integral part of the solid metal.

The surface contaminants are primarily water-activation products: 84-day Sc-46, 245-day Zn-65, 314-day Mn-54, 5-year Co-60 and 13-year Eu-152. Fission products form a minor part of the surface contaminants. Aged fission products are reduced in 3 years to 290-day Ce-Pr-144, 2.6-year Pm-147, 25-year Sr-Y-90, 30-year Cs-Ba-137 and 93-year Sm-151.

The removed aluminum process tubes contain more radioactivity than all the other buried materials. Each activated tube will contain about 100 mCi of Co-60 and 100 mCi of Zn-65, in the aluminum metal, and also 30 mCi of Sc-46, 200 mCi of Zn-65 and 1 mCi of Co-60 in the film coating the interior of the tubing.

The highest concentration of radioactivity will be found in thermocouple wires which, because of their high nickel content, have a high concentration of Co-60 after irradiation.

Among the locations other than the permanently marked burial sites, the most active are the 107 basins. The amount of sludge in the bottom of these basins is estimated to be 200 tons in the F basin and 300 tons in the H basin. Concentrations of activity are Eu-152 = 1.7 μ Ci/g, Zn-65 = 0.8 μ Ci/g, Co-60 = 0.08 μ Ci/g and beta emitters (Pm-147, Sr-89-90, Tc-99) about 0.5 μ Ci/g.

DISCUSSION (continued)

Activity in the locations which have been periodically saturated with effluent water is due primarily to 245-day Zn-65. This will decay to less than 1 per cent of its present activity in a period of less than 5 years, and the measurable radioactivity should be down to a releasable level at that time.

CONCLUSION

Control objectives for underground radioactive materials at 100-H and 100-F were carried out in accordance with HW-45674. With regard to the 5 permanently posted burial grounds, these sites have been terminated and posted with permanent markers in accordance with the Atomic Energy Commission's letter of November 12, 1964.

For the locations which are not permanently posted, access controls will be maintained by the custodian until the radioactivity has decayed to releasable levels. The activity at these sites should be measured at the end of 5 years or before all control is relinquished to assure that this condition exists. In the interim, any excavations or personnel entries at these locations will be controlled by an appropriate radiation control procedure established by the custodian. Existing fences and radiation zone signs at these locations will be maintained during this period.

Since the 105 exclusion area fences enclose a number of burial sites which are not permanently marked, consideration must be given to the erection of permanent marker posts for these sites in event of any planned removal of the fences.

A soil sterilization or weed control program was considered for the underground radioactive material sites at 100-H and 100-F. However, it was deemed unnecessary since the radionuclides in these locations are insoluble solids.

REFERENCES

1. RL-REA-1071, "DR PLANT RADIATION ZONES, FINAL STATUS REPORT," by R. A. Winship, 4-22-65.
2. HW-45674, "IRRADIATION PROCESSING DEPARTMENT RADIATION CONTROL STANDARDS AND PROCEDURES," 12-14-56.
3. HW-46715, "UNCONFINED UNDERGROUND RADIOACTIVE WASTE AND CONTAMINATION - 100 AREAS," by K. R. Heid, 11-14-56.
4. HW-83710, "CONTROL OF UNDERGROUND RADIOACTIVE MATERIALS IN DEACTIVATED REACTOR AREAS," by W. N. Koop, 10-7-64.
5. Hanford Architectural and Civil Standards, AC-5-40, Instructions for Use, Revision 3, 12-11-64.
6. RL-REA-2501, "RADIOLOGICAL STATUS REPORT, DEACTIVATION STATUS - H PLANT," by G. Herman, Jr., 9-7-65.
7. RL-REA-2502, "RADIOLOGICAL STATUS REPORT, DEACTIVATION STATUS - F PLANT," by G. Herman, Jr., 9-16-65.
8. 100-H Radiation Survey Reports, Numbers H-5608 through H-5822.
9. 100-F Radiation Survey Reports, Numbers 78614 through 78954.

ACKNOWLEDGMENT

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Supervisor
Radiation Monitoring
100-F and 100-H Areas

/vt

APPENDIX A

UNDERGROUND MATERIALS AT 100-H

TERMINATED BURIAL SITES

100-H Burial Ground No. 1

This burial ground, formerly called "Solid Waste Burial Ground," was opened in 1949 and enlarged in 1955. Prior to 1965, a number of large trenches and pits containing dummy elements, process tubing, and miscellaneous waste were backfilled to grade with 6 feet of soil cover. Near the southwest corner, portions of several horizontal control rods are buried in slit trenches with 2 to 4 feet of soil cover. Two trenches were used during the deactivation of H plant for burial of dummy elements and miscellaneous solid waste, and subsequently backfilled to grade with 4 to 6 feet of soil cover. Dose rate at surface of the ground is less than 1 mR/hr. The boundaries of this burial ground are permanently marked by posts numbered H-65-1 through H-65-23. Map and legal description are contained in Appendix C. (Drawing - Reference 1)

100-H Burial Ground No. 2

This burial ground was formerly called "H-1 Loop Burial Area." Two concrete-lined vaults are located in an approximate east-west line. The east vault contains a stainless steel, double tube removed from the reactor in 1955 after several years of irradiation. It is covered to grade with about 12 feet of soil. Within the area, there are also solutions which were used to clean the tube and miscellaneous capsule components. The west vault was constructed in 1958 to receive a smaller facility, but was never used for that purpose. During the deactivation of H plant, it was used for burial of a small amount of contaminated pipe and subsequently covered to grade with about 12 feet of soil cover. Dose rate at surface of ground is less than 1 mR/hr. The boundaries of the area are permanently marked with posts numbered H-65-24 through H-65-29. Map and legal description are contained in Appendix C. (Drawing - Reference 2)

RADIATION ZONES

107-H Retention Basin and Effluent Lines

Coolant effluent water from the reactor was piped to and from this basin through 2-60" steel underground pipes. There are 6 junction boxes

H-7

107-H Retention Basin and Effluent Lines (continued)

which locate the underground effluent lines. Two of these are within the 105-H exclusion area, 2 are located south and near the 1717-H Building. Two are located between the north end of the 107-H basin and the 1904 outfall structure. The basin provided a hold-up period for the coolant water before discharging to the river. The basin is 600 feet long, 273 feet wide, and has an average depth of 18 feet. It is separated into two sections by a center dividing wall which runs lengthwise from inlet to outlet end. Concrete baffles were provided to retard and distribute the flow.

After the H reactor was shut down, water was pumped out of the retention basin to the rupture effluent trench. As the water level was lowered, the exposed walls were washed down by hosing with water. The baffles were demolished and the resulting debris left on the basin floor along with the radioactive sludge already present. The inlet opening was blanked off at the mixing chamber with a steel plate. Debris and sludge on the basin floor were then covered with 5 to 10 feet of earth fill, which also sealed the outlet opening. Portions of the walls which extended above the fill were spray-coated with asphalt to confine the small amount of contamination which remained on them after they were washed down.

The average dose rate at the surface after the earth fill is approximately 1 mR/hr with a maximum of 20 mR/hr observed at a small area in the west section. Dose rates at the surface of the asphalt-covered portions of the walls are 1 to 10 mR/hr. At the top of the walls, and at the outer surfaces, the dose rate is less than 1 mR/hr.

The basin is posted with radiation zone signs attached to the walls. (Drawing - Reference 3)

1904 Outfall Structure

This open, concrete sump received reactor effluent water through 2 lines from the 107 basin and discharged it into the Columbia River through 2-60" pipes. A third line from the area process sewer system also discharged into it. A small volume of drainage water from the 184 powerhouse still discharges to the river through this facility. The dose rate at 1 foot from the bottom of the structure is 30 mR/hr. It is surrounded by a chain link fence which is posted with radiation zone signs. (Drawing - Reference 4)

107-H Rupture Effluent Trench

This trench was excavated in 1952 to dispose of coolant effluent from ruptures. The trench was used during April and May, 1965, to receive water pumped from the 107-H basin in conjunction with deactivation of the basin. After water drained from the trench, a maximum dose rate of 20 mrad/hr, including 10 mR/hr, was observed, at contact, on the bottom of the trench. Analysis of the surface contamination showed primarily the presence of Zn-65 and no fission products. The trench was subsequently backfilled with 6 to 10 feet of soil, and the dose rate at surface is less than 1 mR/hr. Existing chain fence and radiation zone signs were left in place. (Drawing - Reference 6)

1608-H Trench

This trench was excavated in 1953 to receive effluent during the Ball-3X project, and was subsequently backfilled to grade. Dose rate at surface of ground is less than 1 mR/hr. The location is identified by 2 concrete monuments. (Drawing - Reference 8)

Buried Contaminated Pipe

In 1953, several sections of contaminated 16" pipe used as chutes for removal of thimbles from 105-H were buried in trenches and covered with 6 feet of soil. The dose rate at the surface of ground is less than 1 mR/hr. The location is identified by steel posts with chain and radiation signs. (Drawing - Reference 7)

105 EXCLUSION AREAS

Buried Thimble from X-Level

A thimble assembly from "B" hole, 105-H, was buried in a trench during 1953, and backfilled to grade. The location, which is within the 105 exclusion area, is identified by 2 concrete monuments. Dose rate at surface of ground is less than 1 mR/hr. (Drawing - Reference 9)

Ball-3X Burial Ground

Irradiated gear such as VSR thimbles and guides from 105-H was buried in a trench during 1953. It was covered to grade with 5 feet of soil and identified by 2 concrete monuments. The location is within the 105 exclusion area. Dose rate at surface of ground is less than 1 mR/hr. (Drawing - Reference 11)

Perf Decontamination Drain

This French drain received spent acid and rinse water from the 105-H dummy decontamination facility. The site is within the 105 exclusion area, and is identified by a 3-foot vitreous tile conduit and 4 yellow steel posts with signs. Dose rate at surface of ground is less than 1 mR/hr. (Drawing - Reference 12)

RELEASED

117-H Crib

This crib was constructed in 1960 as part of the 105-H confinement system. Its purpose was to contain drainage from the filter seal pits. Any radioactive material drained to this site had a short half-life and has decayed to the point where it is no longer of concern. As a consequence, the site has been released. The facility is identified by a vent pipe and steel fence posts with chain. (Drawing - Reference 13)

107-H Buried Sludge

Sludge and waste from the 107-H retention basin was buried in 1953. Trench was originally covered to grade with 5 feet of soil and marked with 2 non-standard monuments. 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 has been released. The site is no longer marked. (Drawing - Reference 5)

105-H Pluto Crib

This crib was excavated in 1950 to dispose of effluent from tubes containing ruptured fuel elements. In 1952, it was covered to grade with about 10 feet of soil and marked with monuments. The site was re-excavated in 1960 and moved into the "Buried Thimble from X-Level" (Drawing - Reference 9) during construction of the 105-H confinement system. (Drawing - Reference 10)

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APPENDIX A

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APPENDIX BUNDERGROUND MATERIALS AT 100-FTERMINATED BURIAL SITES100-F Burial Ground No. 1

This burial ground combines 2 locations formerly called "Minor Construction Burial Ground No. 2," and "Solid Waste Burial Ground No. 2." Solid waste from 105-F construction work was put into 2 holes in 1954, and covered with soil to grade in late 1955, or early 1956. Adjacent to this site, on the south side, a solid waste burial ground was opened in 1955, and extended on two subsequent occasions. Miscellaneous solid waste was buried in 2 trenches, running north and south, and covered to grade with at least 2 feet of soil. West of these trenches a number of pits containing irradiated process tubing and dummy elements were similarly covered.

A third trench at the east side of the site was used during July and August, 1965, for burial of gun barrel tips, steel sleeves, and metal chips removed from the reactor. Filter boxes containing reactor graphite chips were also buried in this trench which was then backfilled to grade with 4 feet of soil cover. A pit near the west side of the site was used during the same period for burial of miscellaneous surface-contaminated waste and subsequently backfilled with about 6 feet of soil cover. Dose rate at the surface of the ground is less than 1 mR/hr. The boundaries of this burial ground are permanently marked by posts numbered F-65-1 through F-65-21. Map and legal description are contained in Appendix C. (Drawing - Reference 1)

100-F Burial Ground No. 2

This burial ground, formerly called "Solid Waste Burial Ground No. 1," was the original solid waste disposal site in 100-F Area. Eight trenches containing miscellaneous solid waste from 105-F and one containing solid waste from the biology facilities were covered to grade prior to 1956. Several large cylindrical sleeves used for disposal of liquid waste from 108-F were buried under about 6 feet of soil in 1955. Subsequent excavations were made to recover dummy elements; and, as a result, some dummies with relatively low radioactivity remain near the surface. Three horizontal control rods are buried under 2 feet of soil near the south side. Dose rate at surface of the ground is less than 1 mR/hr. The boundaries of the location are permanently marked by posts numbered F-65-22 through F-65-37. Map and legal description are contained in Appendix C. (Drawing - Reference 2)

100-F Burial Ground No. 3

This burial ground was formerly called "Minor Construction Burial Ground No. 1." Irradiated reactor components, such as aluminum VSR thimbles and steel step-plugs, were removed from 105-F in 1952 and buried outside of the exclusion area fence with 5 feet of soil cover. Dose rate at the surface of the ground is less than 1 mR/hr. The boundaries are marked by posts numbered F-65-38 through F-65-43. Map and legal description are contained in Appendix C. (Drawing - Reference 3)

RADIATION ZONES

107-F Retention Basin and Effluent Lines

The 107-F retention basin is similar to the 107-H basin described in Appendix A, with some differences in dimensions and construction details. It is 467 feet long, 230 feet wide, and has an average depth of 18 feet. It is divided into two equal sections by weir walls running lengthwise from inlet to outlet end. Each section was subdivided by a series of wooden baffles.

Deactivation was accomplished in the same manner as at 107-H, by pumping the water to the rupture effluent trench, covering the sludge on the floor with 4 to 10 feet of soil, and spray-coating the walls with asphalt. The average dose rate at the surface of the earth fill is 2 mR/hr with a maximum of 4 mR/hr at a few spots in the west section. Dose rate at the asphalt-covered wall surface is 15 to 20 mR/hr. The perimeter of the basin has a dose rate of less than 1 mR/hr. The basin is posted with radiation zone signs attached to steel fence posts.

Portions of the steel inlet piping are above ground between the basin and the F Area entrance road. The dose rate at contact with these pipes is 1 to 4 mR/hr. A chain fence posted with radiation zone signs encloses the area. The original 42" reinforced concrete inlet pipe lies underground to the north of the steel pipes.

The bottom of a narrow ditch, which originated near the northeast corner of the basin and ran to the river, was contaminated to about 3,000 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 ditch location is not marked. (Drawing - Reference 4)

1904-F Outfall Structure

Reactor effluent water from the 107 basin was piped into the concrete outfall structure, from which it was discharged into the Columbia River. Following deactivation of the basin, the maximum radiation level in the bottom of the structure was 180 mrad/hr, including 20 mR/hr at contact with the surface of the inlet pipe. Maximum smearable contamination was 4,500 c/m. The structure was filled with 4 to 6 feet of earth fill, which also covered the inlet and outlet pipe entrances. The radiation level on the adjacent overflow spillway was less than 1 mrad/hr at contact, and less than 100 c/m smearable. The outfall structure is enclosed by a wire fence which is posted with radiation zone signs. (Drawing - Reference 5)

107-F Rupture Effluent Trench

This trench and flume were excavated in 1950 to dispose of coolant effluent water containing rupture debris. During 1963, reactor effluent water was diverted to the trench to permit pipe repairs. During deactivation of the 107-F retention basin, the trench was used to receive overflow water from the 105-F storage basin. The dose rate at the bottom of the trench and flume was 15 to 20 mrad/hr at contact. In October, 1965, the trench and flume were covered with 4 to 20 feet of soil. Dose rate at surface of the ground is less than 1 mR/hr. Existing chain fences and radiation zone signs were left in place. (Drawing - Reference 6)

188-F Ash Pit

Minor quantities of surface contamination from effluent line leakage were found in this pit resulting in contamination of 200 c/m to 1,000 c/m. The area lies within the posted radiation zone which surrounds the exposed portions of the effluent lines. (Drawing - Reference 7)

1608-F Trench

This trench was excavated in 1952 for disposal of outage effluent water. In September, 1965, it was backfilled to grade with about 20 feet of soil cover. Maximum radiation detected at the bottom of trench prior to backfill was 30,000 c/m. Existing chain fence and radiation signs were left in place. (Drawing - Reference 8)

Lewis Canal

Miscellaneous liquid wastes from 105-F and 190-F Buildings, as well as decontamination wastes from 189-F Building, were routinely released to this ditch. Occasionally, contaminated coolant from the reactor front

Lewis Canal (continued)

and rear faces also drained to it. During the ball-3X outage in 1953, effluent water drained to the river by way of this ditch. Surface contamination, to a maximum of 30,000 c/m, can be detected at spots along the trench banks south of grid coordinate N-80000 (northern boundary of the 151-F Sub-station). This portion of the ditch is marked with chain fencing and radiation zone signs. (Drawing - Reference 13)

Concrete Box

A concrete box about 8 feet deep was used for storage of contaminated equipment. Contamination levels within the box are 200 to 300 c/m. The wooden cover of the box is marked with a radiation zone sign. (Drawing - Reference 16)

Ball Washer Crib

Waste from the decontamination of boron-steel balls was buried under several feet of soil in 1953. An existing chain fence with radiation signs around the location was left in place. (Drawing - Reference 11)

Perf Decontamination Drain

Spent nitric acid and water rinses from the dummy decontamination facility at 105-F were released to this French drain. The site is marked by a 3-foot vitreous tile conduit projecting several feet above ground level. (Drawing - Reference 15)

105 EXCLUSION AREAS

105-F Storage Basin Trench

This trench is located within the 105 exclusion area fence. It was used to receive effluent during an early rupture outage. In 1951, sludge from the 105-F storage basin was put in the trench and covered to grade with about 8 feet of soil. The site location is not identified by markers. (Drawing - Reference 9)

105-F Pluto Crib

This crib was constructed about 1950 for disposal of coolant water from process tubes containing ruptured fuel elements. The crib was covered with 10 to 12 feet of soil after a short period of use. The location is identified by a vent pipe and a 4-inch steel post. (Drawing - Reference 10)

115-F Pit

This pit was excavated in 1949 to receive silica gel removed from a dryer room. It was promptly covered to grade with 5 or 6 feet of soil. The location is identified by a yellow steel post. (Drawing - Reference 12)

RELEASED

117-F Crib

This crib was constructed in 1960 as part of the confinement system to contain drainage from the filter seal pits. Any radioactive material drained to this site had a short half-life and has decayed to the point where it is no longer of concern. As a consequence the site has been released. The facility is identified by a vent pipe and 4 steel fence posts. (Drawing - Reference 14)

APPENDIX B

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100-F AREA

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W73000

W72000

W71000

W70000

W69000

W68000

W67000

APPENDIX C

100-H
BURIAL GROUND
NO 1

Description

A parcel of land called Burial Ground Number 100-H-1 containing buried radioactive material, located on the United States Atomic Energy Commission's Hanford Works Reservation in the State of Washington - Benton County. The afore mentioned parcel is located in the South Half of Section Eighteen, Township Fourteen North, Range Twenty-seven East, Willamette Meridian ($5\frac{1}{2}$, Sec. 18, T. 14N, R. 27E, WM), said parcel being more fully described as follows: commencing at the Northwest corner of Section 18, the coordinates of which on the Washington State Grid System, South Zone, are N 503,267.39 and E 2,252,429.80 thence S $27^{\circ}16'38''$ W, 4,370.97 feet to the true point of beginning having coordinates N 499,382.47 and E 2,254,432.99; thence S $89^{\circ}20'30''$ E, 646.20 feet; thence S $0^{\circ}08'53''$ W, 340.00 feet; thence S $89^{\circ}51'10''$ W, 723.87 feet; then N $4^{\circ}43'54''$ E, 350.96 feet to the true point of beginning, said parcel containing 5.63 acres.

100-H
BURIAL GROUND
NO 2

AS STAKED 5/30/65 *Ellempine*

Description.

A parcel of land called Burial Ground Number 100-H-2 containing buried radioactive material, located on the United States Atomic Energy Commission's Hanford Works Reservation in the State of Washington - Benton County. The afore mentioned parcel is located in the Southwest Quarter of Section Eighteen, Township Fourteen North, Range Twenty seven East, Willametta Meridian (SW $\frac{1}{4}$ of Sec 18, T14N R27E W.M.) said parcel being more fully described as follows: commencing at the Northwest corner of Section 18, the coordinates of which on the Washington State Grid System, South Zone, are N 503,267.39 and E 2,252,429.80, thence S. 28°30'00"E., (LAMBERT MERIDIAN) 3,191.31 feet to the true point of beginning having coordinates of N. 500,462.81 and E. 2,253.95256; thence N 1°51'43"W., 51.40 feet; thence S. 88°21'48"E., 146.36 feet; thence S. 1°32'20"W., 45.80 feet; thence S 89°26'12"W., 143.41 feet to the true point of beginning, said parcel containing 0.16 acres.

100 F BURIAL GROUND
NO # 1

AS - STAKED 9-1-65 *William J. ...*

NOTE: This burial ground revised in field as shown above.

DESCRIPTION

A parcel of land called Burial Ground Number 100 F-1, containing buried radioactive material, located on the United States Atomic Energy Commission's Hanford Works Reservation in the State of Washington - Benton County. The aforementioned parcel is located partially in the Southeast Quarter of Section Thirty-two and partially in the Southwest Quarter of Section Thirty-three, Township Fourteen North, Range Twenty-seven East, Willamette Meridian (SE $\frac{1}{4}$ of Sec 32 and SW $\frac{1}{4}$ of Sec 33, T. 14 N., R. 27 E., W.M.). Said parcel being more fully described as follows: commencing at the Southwest corner of Section 33, the coordinates of which on the Washington State Grid System, South Zone, are N. 482,058.19 and E 2,263,404.57, thence N $8^{\circ}16'03''$ E, 842.30 feet to the true point of beginning having coordinates N. 382,891.74 and E 2,263,525.69; thence S $89^{\circ}51'10''$ W, 600.00 feet; thence N $0^{\circ}08'50''$ W, 400.00 feet; thence N $74^{\circ}50'39''$ E, 414.12; thence N $89^{\circ}51'10''$ E, 200.00 feet; thence S $0^{\circ}08'50''$ E, 507.25 feet to the true point of beginning, said parcel containing 1.25 acres.

100-F
BURIAL GROUND 2

AS-STAKED 9-1-65 *W. Hampton*

Description

A parcel of land called Burial Ground Number 100-F-2, containing buried radioactive material, located on the United States Atomic Energy Commission's Hanford Works Reservation in the State of Washington - Benton County. The afore mentioned parcel is located in the Southeast Quarter of Section Thirty-two, Township Fourteen North, Range Twenty-seven East, Willamette Meridian (SE 1/4 of Sec 32 T14N, R27E, W1M), said parcel being more fully described as follows: commencing at the Southeast corner of Section 32, the coordinates of which on the Washington State Grid System, South Zone, are N. 482,656.19 and E. 2,263,404.57, thence N. 22°48'01"W. (Lambert Meridian), 1,938.20 feet to the true point of beginning having coordinates of N. 483,644.92 and E. 2,262,653.43; thence S. 89°17'44"W, 326.20 feet; thence N. 1°07'52"E., 367.75 feet; thence S. 89°10'20"E, 326.01'; thence S. 1°08'11"W, 359.13'; to the true point of beginning, said parcel containing 2.72 acres.

DESCRIPTION

A parcel of land called Burial Ground Number 100-F-3, containing buried radio-active material, located on the United States Atomic Energy Commission's Hanford Works Reservation in the State of Washington - Benton County. The aforementioned parcel is located in the Southwest quarter of Section Thirty-three, Township Fourteen North, Range Twenty seven East, Willamette Meridian (SW $\frac{1}{4}$ of Sec 33, T.14N., R.27E., W.M.), said parcel being more fully described as follows. commencing at the Southwest corner of Section Thirty-three, the coordinates of which on the Washington State Grid System, South Zone, are N. 482,056.19 and E. 2263,404.57, thence N. $12^{\circ}20'46''$ E (Lambert Meridian), 1,866.54 feet to the true point of beginning having coordinates of N. 483,881.61 and E. 2,263,503.70; thence N. $3^{\circ}56'08''$ W, 112.56 feet; thence N. $33^{\circ}04'52''$ E, 91.68 feet; thence S. $56^{\circ}55'05''$ E, 50.00 feet; thence S. $33^{\circ}04'52''$ W, 74.93 feet; thence S. $3^{\circ}56'08''$ E, 56.14 feet, thence S. $86^{\circ}03'52''$ W, 50.00 feet to the true point of beginning, said parcel parcel containing 0.20 acres.

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AS-STAKED 8-31-65 *llcorpt*