

TABLE 1-1
TANK DESCRIPTIONS
OU9 ORIGINAL PROCESS WASTE LINES

TANK NUMBER	HSS	BUILDING NO.(1)	NUMBER OF TANKS	CONSTRUCTION TYPE(2)	VOLUME (gal)	CONSTRUCTION MATERIAL(3)	TANK STATUS(4)	YEAR INSTALLED
T-1	NA	122	1	UG	800	SS	Removed (Jan 1984)	1955
T-2	122	441	1	UG	3,000	Conc	Abandoned (June 1982)	1952
T-3	122	441 (428)	2	1 - UG, 1 - AG1	UG-3,000, AG-3,200	UG-Conc, AG-Stl	Abandoned (June 1982)	1952
T-4	NA	447	3	FS	80 ea	Conc	Active(e)	1962
T-5	NA	444	2	AG1	4,000 ea	Stl	Active(b)	1952
T-6	NA	444	2	FS	500 & 300	Conc	Active(e)	1952
T-7	159	559 (528)	2	AG2	2,000 ea	Stl	Currently inactive (90-day)*	1969
T-8	126	771 (728)	2	UG	25,000 ea	Conc	Plenum deluge(f)	1952
T-9	132	776 (730)	2	UG	22,500 ea	Conc	Plenum deluge(f)	1955
T-10	132	776 (730)	2	UG	4,500 ea	Conc	Abandoned (Dec 1982)	1955
T-11	NA	707 (731)	2	UG	2,000 ea	Conc	Abandoned part removed 1975	1959
T-12	NA	N/A	N/A	N/A	N/A	N/A	Invalid tank location	N/A
T-13	215	774	1	SU	600	Conc	Abandoned (1972)	1952
T-14	124	774	1	UG	90,000	Conc	Abandoned (1989)	1952
T-15	146	774	2	UG	7,500 ea	Conc	Removed (1972)	1969
T-16	124,125	774	2	UG	14,000 ea	Conc	Abandoned (1989)	1952
T-17	146	774	4	UG	2-3,750; 2-7,500	Conc	Removed (1972)	1969
T-18	NA	776	1	SU	Unknown	Conc	Abandoned (1982?)	Unk.
T-19	NA	779	2	SU	1,000 ea	Conc	Plenum deluge(f)	1964
T-20	NA	779	2	SU	8,000 ea	Conc	Abandoned (Dec 1982)	1964
T-21	NA	886 (828)	1	FS	135	Conc	Abandoned (1978)	1963
T-22	NA	886 (828)	3	AG2	2-450, 1-100	SS	Abandoned (1978)	1963
T-23	NA	865	1	SU	6,000	Conc	Abandoned (May 1982)	1979
T-24	NA	881 (887)	7	AG2	2,700 ea	Stl	Active(b)	1952
T-25	NA	883	2	AG1	750 ea	Stl	Active(b)	1952
T-26	NA	883	3	AG1	750 ea	Stl	Active(b)	1965
T-27	NA	886	1	AG1	500	Stl	Removed (July 1989)	Unk.
T-28	NA	889	2	FS	1,000	Conc	Active(e)	1965
T-29	NA	774	1	OG	200,000	Stl	Abandoned (1985)	1952
T-30	NA	707 (731)	1	SU	23,111	Conc	Active(e)	1959

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Memorandum is Volume I, Part A - Outside Tanks. Part B (Inside Tanks) and Volume II (Pipelines) are planned to be submitted at a later date.

At this time, a document/drawing search of the OPWL pipelines is proceeding concurrently with the outside building tank investigations. This search includes acquiring engineering drawings and information to supplement knowledge of pipeline locations, structural features, and releases to better define initial sampling locations. Because the majority of valve vaults are associated with the pipelines and further information is being collected on the pipelines including structural features such as valve vaults, valve vaults associated with pipelines will be addressed in Volume II of this Technical Memorandum, which will be submitted at a later date. However, any valve vault that is associated with an OPWL tank (e.g., Tank T-3) will be investigated under this volume of the Technical Memorandum for tanks outside buildings or under Volume I, Part B, for tanks inside buildings.

The outside tanks in the OPWL are generally tanks in open areas of the Industrial Area (IA) at RFP and are either outside or are within small buildings (vaults or waste pits) that only enclose the tank. There are 20 outside tank locations. The tank numbers and descriptions for outside tanks are listed in Table 1-2. Potential overlap of these tanks with other OUs or Individual Hazardous Substance Sites (IHSSs) is shown in Table 1-3.

Some of these tanks are actively used at the Plant and, therefore, are not included for investigation under this Technical Memorandum. These include Tanks T-8, T-9, T-24, and T-32. Investigation of these tanks will be deferred until they become inactive; however, the possibility of initiating investigations before they are inactivated will be further evaluated.

The tank investigations comprise two stages. Stage 1 is designed to locate areas of contamination within the OU9 vadose zone soils and to assess the nature of contamination

TABLE 1-3 (continued)
POTENTIAL OPWL INTERACTIONS WITH OTHER RFP OPERABLE UNITS

TANK	POTENTIAL INTERACTION WITH OTHER OUs
T-9, 3T-10 (cont.)	IHSS 118.1 (Multiple Solvent Spills West of Building 730), OU8, is located immediately west of the building which houses T-9 and T-10. 118.1 is the former location of an underground carbon tetrachloride storage tank which may have leaked during its operating history. The tank was removed in 1981. The IAG specifies a soil gas survey of 118.1, with soil borings where the survey detects contamination.
T-11, T-30	None
T-14, T-16	T-14 and T-16 consist of three inactive process waste tanks (designated T66, T67, and T68) located on the east side of Building 774. Two other IHSSs also address these tanks. IHSS 124 (Radioactive Liquid Waste Storage Tanks), is comprised of three subparts (124.1, 124.2, and 124.3) which target T66, T67, and T68, respectively. IHSS 125 (Holding Tank), also targets tank T66. IHSSs 124 and 125 have incorporated in to OU9 from OU8.
T-21, T-22	IHSS 164.2 (Building 886 Radioactive Spills) that has been incorporated from OU14, targets uranium contamination in soil around and beneath Building 886. 164.2 appears on location maps to focus on the eastern side of 886, whereas T-21 and T-22 are immediately west of 886. The IAG specifies a surface radiation survey and analysis of soil boring samples for HSL volatiles, HSL semi-volatiles and various radionuclides at 164.2.
T-24, T-32	T-24 and T-32 are possibly affected by IHSSs 106 (Outfall) and 107 (Hillside Oil Leak), OU1. Numerous monitoring wells and boreholes have been completed in the vicinity of T-24 and T-32 in conjunction with the 881 Hillside RI. T-24 and T-32 are active, permitted RCRA waste units.
T-27	T-27 is immediately adjacent to T-21 and T-22; see T-21, T-22 comments.
T-29	Chromate contamination related to IHSS 137 (Cooling Tower Blowdown, Building 774), OU8 may affect soils on the northwest side of T-29.
T-40	IHSS 164.3 (Building 880 Storage Pad), OU14 targets TCL volatiles, TCL semivolatiles, and various radionuclides.

TABLE 3-1
 SAMPLE, MEDIA, QUANTITY, AND ANALYTES
 OJ9 ORIGINAL PROCESS WASTE LINES

TANK NO.	DUPLICATE IHSS No.	TANK INSPECTION	HPGe/NAI SURVEY	RESIDUE OR WIPE (1)	VALUT WATER (2)	GROUND-WATER (2)	SURFACE SOIL	BOREHOLE/ SOIL SAMPLES	SAMPLE ANALYTE							
									METALS	VOLS	SEM-VOLS	RAD	WQ	PCBs	PEST.	HERB.
T-1	NA	NO	4/TBD	0	0	3	0	3/6	X	NA	NA	X	X	NA	NA	NA
T-2, T-3,	IHSS 122	YES (T-3)	4/TBD	3 (T-2) 1 (T-3)	3 (T-2)	5	11	5/15	X	X	X	X	X	X	NA	NA
T-7	IHSS 150	NO	4/TBD	0	0	4	0	4/12	X	X	X	X	X	X	X	X
T-8	IHSS 126	Active fire plutonium tanks - no investigation proposed.														
T-9	IHSS 132	Active fire plutonium tanks - no investigation proposed.														
T-10	IHSS 132	YES	4/TBD	2	0	4	0	4/12	X	X	X	X	X	NA	NA	NA
T-11, T-30	NA	YES	5/TBD	3	0	4	0	4/12	X	X	X	X	X	NA	NA	NA
T-14, T-16	IHSS 124 and 125	YES	12/TBD	1 (T-14) 2 (T-16)	0	5	0	5/25	X	X	X	X	X	NA	NA	NA
T-15, T-17	IHSS 146	NO	see T-14, T-16	0	0	see T-14, T-16	see T-14, T-16	0	X	X	X	X	X	NA	NA	NA
T-21, T-22	NA	YES	4/TBD	1 (T-21) 3 (T-22)	2	4	0	4/12	X	X	X	X	X	NA	NA	NA
T-27	NA	NO	see T-21, T-22	0	0	0	3	0	X	X	X	X	X	NA	NA	NA
T-24	Active RCRA interim status unit - no investigation proposed.															
T-32	Active secondary containment unit - no investigation proposed.															
T-29	NA	YES	10/TBD	2	1	4	2	4/12	X	X	X	X	X	NA	NA	NA
T-40	NA	YES	4/TBD	2	2	4	0	4/12	X	X	X	X	X	NA	NA	NA
TOTAL				20	8	37	19	37/118								

Notes:
 (1) If no residue is present, a wipe sample will be collected. Wipe samples will be analyzed only for qualitative radiological analysis.
 (2) Sample collected only if water is encountered.
 Herb - Herbicides
 HPGe - High purity Germanium
 IHS - Individual Hazardous Substances Site
 NA - Not applicable
 No - Number
 PCBs - Polychlorinated biphenyls
 Pest. - Pesticides
 Rad - Qualitative radiological analysis
 RF - Rocky Flats Method
 TBD - to be determined in the field based on HPGe results
 Vol - Volatiles
 WQ - pH, specific conductivity, selected anions (nitrate, sulfate, chloride, fluoride),
 Total organic carbon (only for water samples)
 X - analytes to be tested

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3.2.6 Tanks T-11 and T-30

Tanks T-11 and T-30 are located in Building 731 (the Building 707 Process Waste Pit). Tank T-11 consists of two 2,000 gallon, concrete tanks that were situated inside the Building 731 structure. Tank T-30 is one 23,111 gallon underground concrete structure (Building 731) and a 100 gallon concrete sump. In 1975, the concrete tanks were partially removed. The concrete wall that separated the two tanks was removed along with part of the concrete tank surface. New concrete was poured into the old process waste tanks and the 100 gallon sump. Currently, the area of the old process waste tanks serves as a secondary containment for the Building 707 process waste tanks. Waste streams for Tanks T-11 and T-30 are from Building 707. These wastes include solvents, radionuclides, metals and other wastes used at RFP.

According to Building 707 personnel, there is a 100 gallon steel tank filled with Raschig Rings located in Building 731. This tank was used to contain fire deluge from Building 707. If the tank did overflow, it overflowed into the concrete process waste tanks. The piping that connected to the 100 gallon steel tank was disconnected in 1975. This tank did not contain process waste.

Stage 1 activities will include a HPGe Radiological Survey. If the results of the HPGe Survey detect anomalies, then a NaI Radiological Survey will be conducted on 4-foot grids.

A total of four soil boreholes will be drilled. One borehole at each accessible side of the concrete vault (T-30), containing the T-11 tanks. Three soil samples from each borehole will be collected at the following locations: Surface sample (0 to 6 inches), 1 foot below the base of the tanks (estimated at 13 to 15 feet below ground surface), and directly above the water table (estimated at 10 to 12 feet below ground surface).

If groundwater is encountered in the boreholes, a HydroPunch® sampler or equivalent will be used to collect a groundwater sample. One residue sample will be collected from each tank.

If no residue is present, then 1 wipe sample will be taken from the vault area for radiological analysis. Sample locations are provided in Figure 3-4a.

Soil, groundwater, and residue samples will be analyzed for radiological analyses that include gross alpha, gross beta, uranium 233, 234, 235, and 238, americium 241, and plutonium 239 and 240. Tritium will be analyzed in groundwater samples. Chemical analyses include TAL metals, TCL volatiles, TCL semi-volatiles, and water quality parameters that include pH, specific conductivity, nitrate/nitrite, sulfate, chloride, fluoride, and TOC. Wipe samples will be analyzed for quantitative radionuclides. In the event that the water table yields insufficient quantities of groundwater, samples will be collected based on the following priority. TCL volatiles, radionuclides, water quality parameters, TCL semi-volatiles, and metals.

-  Buildings
-  Tanks
-  Process Waste Lines

- | ACTIVITY | NUMBER |
|--|--------|
|  | 4 |
|  | 3 |
|  | 4 |
|  | 5 |

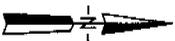
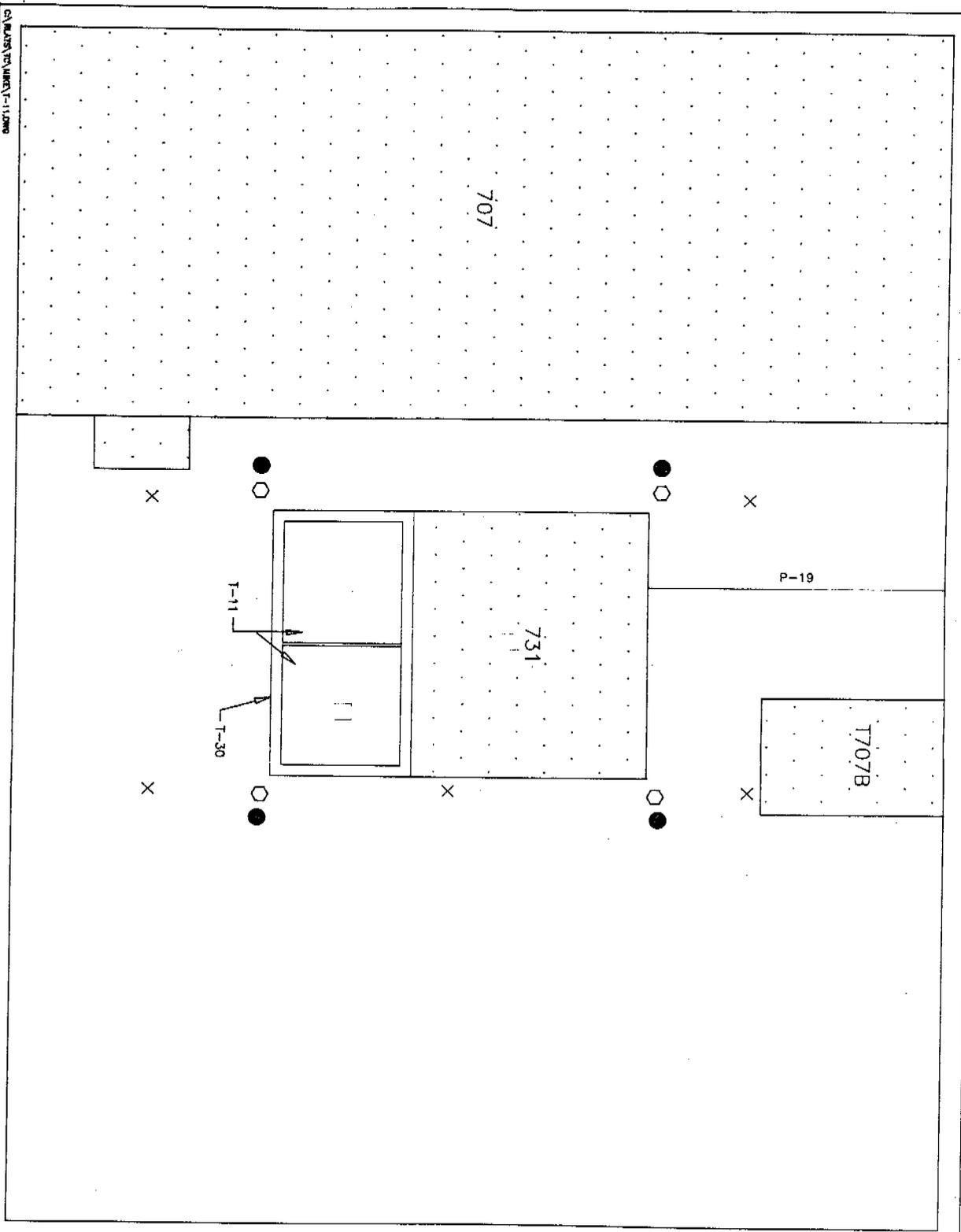


FIGURE 3-4a
SAMPLE LOCATIONS
FOR T-11 AND T-30
Operable Unit 9
Original Process Waste Lines

EG&G ROCKY FLATS
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464

SCALE: 1" = 7'-6"



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3.2.9 Tanks T-21 and T-22

Tanks T-21 and T-22 are located in Building 828 (the Building 886 process waste pit). There is a discrepancy in the information obtained on what tanks are located in the waste pit. According to as-built drawing 14830-4 from 1965. The tank vault consists of a 135 gallon floor sump, one 450 gallon waste holding tank, one 450 gallon process tank and one 100 gallon process tank. According to building personnel the tank vault consists of a 250 gallon floor sump, one 250 gallon process waste tank and one 250 gallon process tank. This information will be clarified when the tank investigation occurs under stage 1 activities. Tanks T-21 and T-22 held waste from the laboratories in Building 886. Waste streams included radionuclides, laboratory soaps, janitorial cleaning fluids, and possibly nitrates, Tank -21, the floor sump, collected overflow from Tank T-22 and groundwater infiltrating the tank vault. The tanks were abandoned in 1978. There are no known releases at this location.

Stage 1 activities will include a visual tank inspection of the tanks. An HPGe radiological survey will be conducted around the tank locations. If the results of the HPGe detect anomalies, a NaI radiological survey will be conducted on 4-foot grids.

One residue sample will be collected from each tank and from the sump. If no residue is present, one wipe sample will be taken from the interiors of the tanks and sumps for radiological analysis. If groundwater has filled the pit or tanks, a water sample will be collected. (Reference Appendix B for access ports for residue sampling.)

A total of four soil boreholes will be drilled: one borehole at each accessible side of the concrete vault containing Tanks T-21 and T-22. Three soil samples from each borehole will be collected at the following locations: ground surface (before drilling), 1 foot below the base of the tanks (estimated at 20 to 25 feet below ground surface), and directly above the water table (estimated at 15 to 20 feet below ground surface).

If groundwater is encountered in the boreholes, a HydroPunch® sampler or equivalent will be used to collect a groundwater sample. Sample locations are shown in Figure 3-6.

Vault water, soil, and residue samples will be analyzed for radiological analyses that include gross alpha; gross beta; uranium 233, 234, 235, and 238; americium 241; plutonium 239 and 240; and cesium 137. Chemical analyses include TAL metals; TCL volatiles; TCL semivolatiles; and water quality parameters that include pH, specific conductivity, nitrate/nitrite, sulfate, chloride, fluoride, and TOC. Wipe samples, if collected, will be analyzed for quantitative radionuclides. In the event that the water table yields insufficient quantities of groundwater, samples will be collected based on the following priority: TCL volatiles, radionuclides, water quality parameters, TCL semivolatiles, and metals.

APPENDIX A
 INVESTIGATION REQUIREMENTS AND PROPOSED ACTIONS
 TANKS T-11, T-30
 BUILDING 707 PROCESS WASTE PIT

INTER-AGENCY AGREEMENT REQUIRED ACTION	OU9 WORK PLAN REQUIRED ACTION	OU9 PROPOSED ACTION FOR STAGE I
<p>No Required Action</p>	<ol style="list-style-type: none"> 1. Conduct a prework radiation survey of borehole locations according to OP FO.16, Field Radiological Measurements. 2. Boreholes will be drilled and sampled according to OP GT.02, Drilling and Sampling Using Hollow-stem Auger Techniques, using the continuous core method. Investigation of removed tanks will consist of a single borehole drilled as closely as possible to the center of the original tank location. One discrete soil sample will be collected at each of the following locations: (a) ground surface (before drilling) collected according to OP GT.08, Surface Soil Sampling; (b) 1 to 3 feet below the base of the original tank; (c) directly above the water table or bedrock/alluvium contact, whichever is encountered first; and (d) in bedrock at the bedrock/alluvium contact if groundwater is not encountered above the contact (i.e., where the vadose zone extends to the bedrock/alluvium contact). 	<ol style="list-style-type: none"> 1. Conduct a visual tank inspection. 2. Conduct an HPGe survey of the area to assess radioactive contamination. If radioactive anomalies are found, a NaI radiation survey will be conducted. The survey will be conducted using 4-foot grids and will cover the entire area of T-11, T-30 to delineate source. 3. Conduct a prework radiation survey of all sample locations to assess radioactive contamination. Survey will be conducted using the NaI instrument, and in accordance with OP FO.16, Field Radiological Measurements. 4. One residue sample will be collected from each tank that has not been cleaned and painted since removal from process waste service, to help characterize OPWL wastes. In instances where no residue is present, one wipe sample will be collected from the interior surface of the tank. Wipe samples will be collected and tested according to OP FO.16, Field Radiological Measurements. 5. Four boreholes will be drilled; one on each side of the tanks. The boreholes will be drilled and sampled according to OP GT.02, Drilling and Sampling Using Hollow-stem Auger Techniques, using the continuous core method. In all cases, boreholes will be drilled as close as possible to the tank structure. One discrete soil sample will be collected at each of the following locations: (a) ground

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APPENDIX A
 INVESTIGATION REQUIREMENTS AND PROPOSED ACTIONS
 TANKS T-11, T-30
 BUILDING 707 PROCESS WASTE PIT

INTER-AGENCY AGREEMENT REQUIRED ACTION	OU9 WORK PLAN REQUIRED ACTION	OU9 PROPOSED ACTION FOR STAGE I
		<p>surface (before drilling) collected according to OP GT.08, Surface Soil Sampling; (b) 1 to 3 feet below the base of below-grade tanks. If the base of the tank is in bedrock or if the water table is not encountered and the distance from the base of the tank to the alluvium/bedrock contact is less than 5 feet, this sample will be omitted; (c) directly above the water table or bedrock/alluvium contact, whichever is encountered first; and (d) 1 foot below the bedrock/alluvium contact or at refusal if bedrock is encountered before the water table.</p> <p>6. If groundwater is encountered during borehole drilling, a HydroPunch® will be used to collect groundwater samples according to OP GW.06, Groundwater Sampling.</p>
<p>Notes: HPOc = high purity germanium NaI = sodium iodide OP = EMD Operating Procedure OPWL = Original Process Waste Lines OU = Operable Unit RFP = Rocky Flats Plant</p>		

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APPENDIX A
 INVESTIGATION REQUIREMENTS AND PROPOSED ACTIONS
 TANK T-40
 BUILDING 889 PROCESS WASTE PIT

INTER-AGENCY AGREEMENT REQUIRED ACTION	OU9 WORK PLAN REQUIRED ACTION	OU9 PROPOSED ACTION FOR STAGE I
<p>No Required Action</p>	<p>Not previously identified.</p>	<ol style="list-style-type: none"> 1. Conduct a visual tank inspection. 2. Conduct an HPGe survey of the area to assess radioactive contamination. If radioactive anomalies are found, a NaI radiation survey will be conducted. The survey will be conducted using 4-foot grids and will cover the entire area of T-40 to delineate source. 3. Conduct a prework radiation survey of all sample locations to assess radioactive contamination. Survey will be conducted using the NaI instrument, and in accordance with OP FO.16, Field Radiological Measurements. 4. One residue sample will be collected from each tank that has not been cleaned and painted since removal from process waste service, to help characterize OPWL wastes. In instances where no residue is present, one wipe sample will be collected from the interior surface of the tank. Wipe samples will be collected and tested according to OP FO.16, Field Radiological Measurements. 5. One water sample will be collected from the concrete vault if water is present. 6. Four boreholes will be drilled; one on each side of the tanks. The boreholes will be drilled and sampled according to OP GT.02, Drilling and Sampling Using Hollow-stem Auger Techniques, using the continuous core method. In all cases, boreholes will be drilled as close as possible to the tank structure. One discrete soil sample will be collected at each of the following locations: (a) ground

APPENDIX A
 INVESTIGATION REQUIREMENTS AND PROPOSED ACTIONS
 TANK T-40
 BUILDING 889 PROCESS WASTE PIT

INTER-AGENCY AGREEMENT REQUIRED ACTION	OU9 WORK PLAN REQUIRED ACTION	OU9 PROPOSED ACTION FOR STAGE I
		<p>surface (before drilling) collected according to OP GT.08, Surface Soil Sampling; (b) 1 to 3 feet below the base of the below-grade tanks. If the base of the tank is in bedrock or if the water table is not encountered and the distance from the base of the tank to the alluvium/bedrock contact is less than 5 feet, this sample will be omitted; (c) directly above the water table or bedrock/alluvium contact, whichever is encountered first; and (d) 1 foot below the bedrock/alluvium contact or at refusal if bedrock is encountered before the water table.</p> <p>6. If groundwater is encountered during borehole drilling, a HydroPunch® will be used to collect groundwater samples according to OP GW.06, Groundwater Sampling.</p>
<p>Notes: HPCc = high purity germanium NaI = sodium iodide OP = EMD Operating Procedure OPWL = Original Process Waste Lines OU = Operable Unit RFP = Rocky Flats Plant</p>		

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