

## MDAs at TA-33

Site of initiator testing from 1947 to 1972.

Site of tritium facility from 1952 to 1990

### MDA D at East Site PRSs 33-003(a,b)

- Two underground chambers for initiator tests in 1948 and 1952.
- Potential contaminants were high explosives, beryllium, and PCBs.
- Environmental sampling found no soil contamination above SALs.
- **Reports:** September 1995 proposed NFA for 33-002(a) and PCB sampling at 33-002(b). Final report for 33-002(b) in progress.

### MDA E at South Site PRSs 33-001 (a, b,c,d,e)

- One underground chamber for initiator test in 1952.
- Five burial trenches for experimental debris in early 1950s.
- Debris in trenches contains uranium, lead, cadmium, beryllium.
- Geomorphological study concludes the site is geologically stable.
- Environmental sampling indicated that contaminants are not moving from trenches.
- **Report** in progress.

### MDA K at Main Site PRSs 33-002(a,b,c,d,e)

- Effluent area for the tritium facility, 1955 - 1990.
- Septic tank, two sumps, outfall, roof drain. Septic tank active.
- Potential contaminants were tritium, solvents, inorganic constituents.
- Environmental sampling found tritium above SAL but below risk levels. Septic sludge contained contaminants above SALs.
- **Reports:** September 1995. Includes further sampling for PRSs 33-002(a,b,c), NFA recommendation for 33-002(d,e). PRSs 33-002(b,c) final report in progress. Septic tank 33-002(a) awaits cleaning as a VCA.

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RFI Work Plan for OU 1122

2-3

May 1992

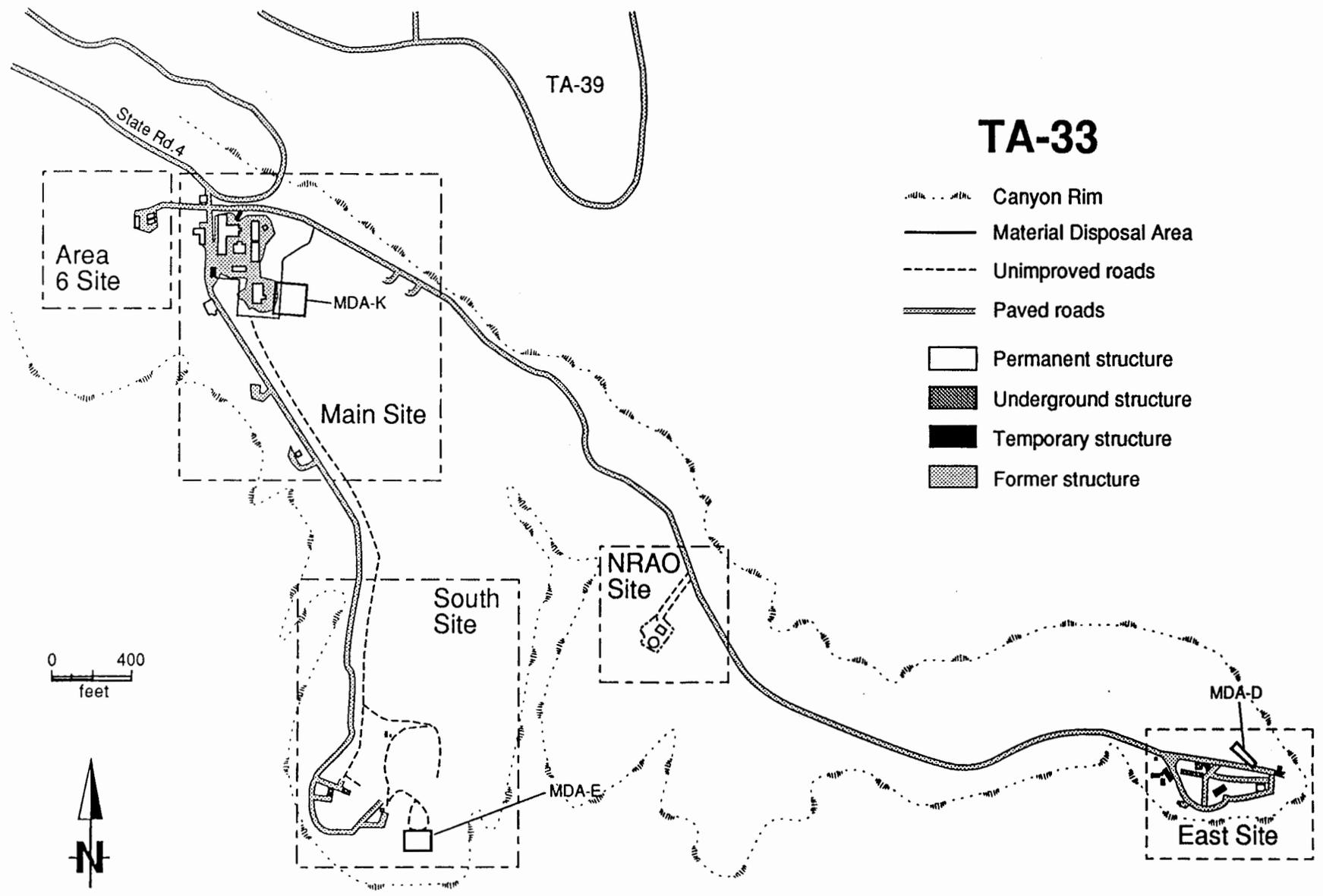


Fig. 2-2. The five sites at TA-33.

## MDA D at East Site PRSs 33-003(a,b)

PRS 33-003(a and b) are underground chambers TA-33-4 and TA-33-6 at MDA D in East Site, discussed in the RFI Work Plan for OU 1122, Subsections 3.5.2.1 and 4.5.3.1 (LANL 1992, 0784). High explosives and inorganics, principally beryllium, were identified in the work plan as potential contaminants. Subsequent archival investigation indicated that polychlorinated biphenyls (PCBs) may be present in material that was deposited as a result of an explosion in chamber 33-003(b). A revised Phase I sampling plan for the surface and subsurface soil components was presented in the September 1995 TA-33 RFI report (Environmental Restoration Project 1995, 1265).

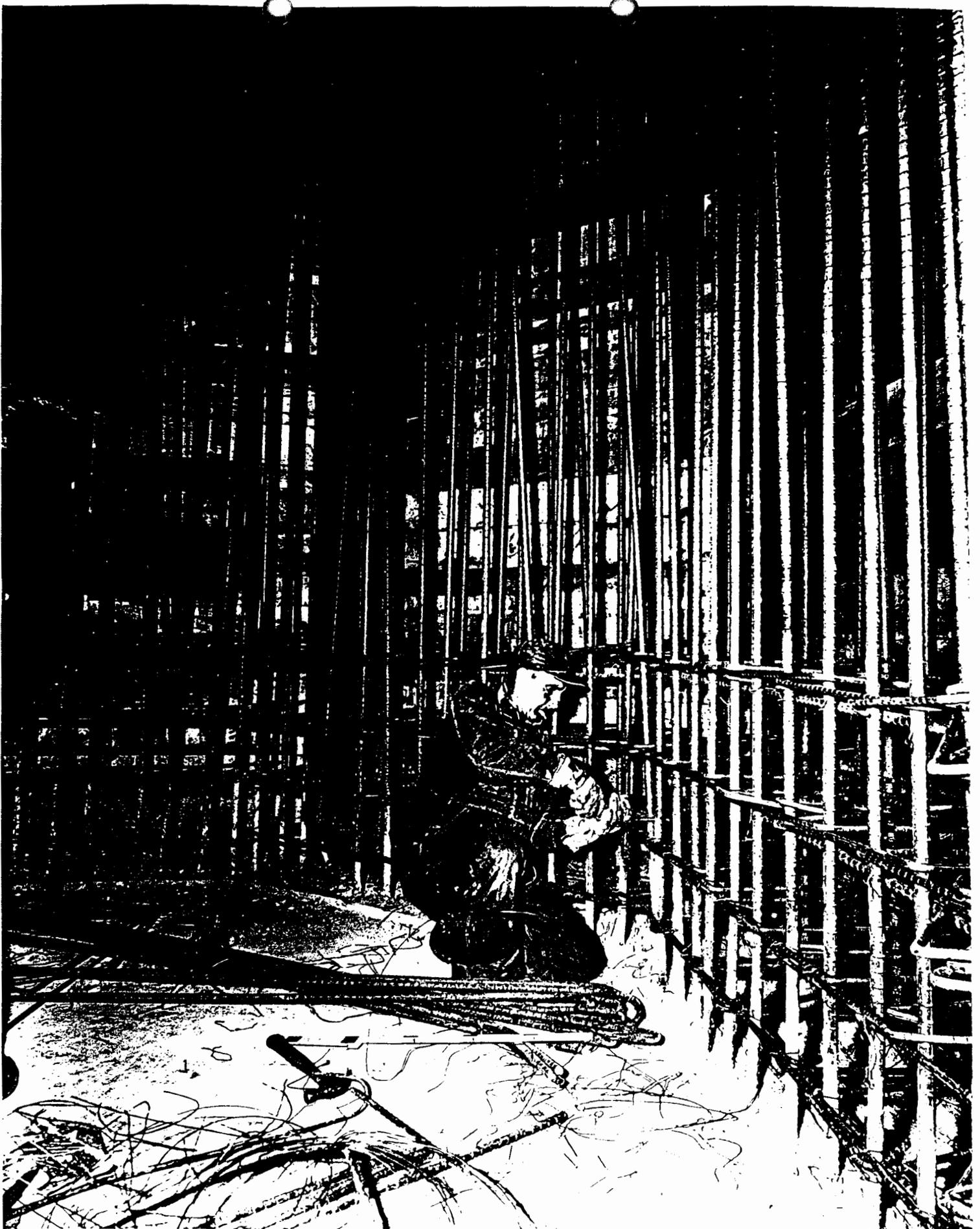
**History:** The MDA D chambers were constructed in 1948 and used for initiator tests involving milligram quantities of beryllium and polonium-210 (half-life 138 days). PRs 33-003(a), chamber TA-33-4, was used once in 1948. PRS 33-003(b), chamber TA-33-6, was used twice, once in December 1948 and again in April 1952. The tests required detonation of HE and the second test destroyed the chamber. Debris from the detonation was ejected through the elevator shaft and spread over the mesa. A 10-ft deep crater formed around the chamber. The crater was later filled with the ejected debris and covered with uncontaminated soil. In 1963 the depression was refilled.

MDA D is located at East Site on the level mesa north of the East Site Road. Surface concrete pads mark the chamber locations. The chambers were 18 ft by 18 ft octagonal, vault-like structure 11 ft high., and buried with the roof approximately 30 ft below grade. Access was through a 4 ft by 6 ft elevator shaft at the side of the chamber. The elevator shafts, now filled, were approximately 46 ft deep.

**Sampling and Analysis:** Existing surface data for PRS 33-003(b) at East Site include surface soil samples collected by LANL's Environmental Surveillance Program in 1977. The surveillance samples were analyzed for tritium, uranium, and cesium-137; all results were within background ranges. These data are summarized in the RFI Work Plan for OU 1122 (LANL 1992, 0784).

In 1989 Weston personnel conducted sampling from three boreholes at each chamber. In 1994 and 1996. Field Unit 3 collected surface and borehole samples and analyzed for inorganic constituents and PCBs. No contamination was detected above screening action levels. Results are discussed in Subsection 5.3.3.1 of the September 1995 RFI report (ER 1995, 1265) and reviewed in the Field Unit 3 NFA report in progress.





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## MDA E at South Site PRSs 33-001 (a, b,c,d,e)

MDA E, containing PRSs 33-001(a-e), is discussed in the RFI Work Plan for OU 1122, Subsections 3.4.2.1 and 4.4.4 (LANL 1992, 0784). MDA E consists of trenches containing buried debris from initiator studies and an underground chamber.

**History:** The first structure at South Site was underground chamber No. 3, TA-33-29, PRS 33-001(e) completed in February 1950 and used for a single experiment in April 1950. The explosive experiment in the chamber did not breach the surface. In the early 1950s, the area around the chamber was developed as a disposal area for material from elsewhere at TA-33. Six to 10 ft deep trenches and pits were dug to dispose of spent experimental devices contaminated with radioactive polonium-210, now decayed to undetectable levels. Solid metallic pieces were put in the pits; there is no indication that liquid wastes were dumped at MDA E. The trenches contain uranium casings and hazardous metals, e.g. barium, beryllium, cadmium, and lead. Other debris was also buried, including a can of beryllium dust immersed in kerosene. MDA E is located at the southeast corner of South Site near the rim of Chaquehui Canyon. The MDA is enclosed within a 150-ft by 200-ft 8-ft high fenced area posted as radiologically contaminated. The only gate, at the northwest corner of the site, is locked. Within the fenced area is the intact concrete pad of the chamber.

**Sampling and analysis:** The trenches have never been sampled. No archival evidence indicates that debris was ever removed from MDA E; it is presumed that the original material remains in the trenches. Surface sampling for uranium was performed at MDA E in the 1980s by the LANL Surveillance Group. Results are discussed in the RFI Work Plan for OU 1122 (LANL 1992, 0784). Subsequent sampling focused on determining if contaminants are moving from the trenches. In 1989, Roy F. Weston personnel conducted borehole sampling at MDA E. Five boreholes were sampled, three within the fenced area and two just outside the fence line. Field Unit 3 field work was performed in June, 1996. Two boreholes adjacent to the east and west trenches were drilled to a depth of 40 ft, well below the depth of the trenches. Four samples were collected from each borehole. Sample locations were selected to complement borehole locations from sampling activities in 1989. Analytical results indicate that inorganic constituents, radionuclides, volatile and semivolatile organic compounds, and high explosives are far below screening action levels. No contamination was detected above SALs.

A geomorphological study was completed in 1994 to determine whether the mesa on which the MDA is situated is subject to failure and landsliding. It was determined that landsliding at MDA E is improbable in a period of hundreds to thousands of years (Reneau et. al. 1995, 02-092).

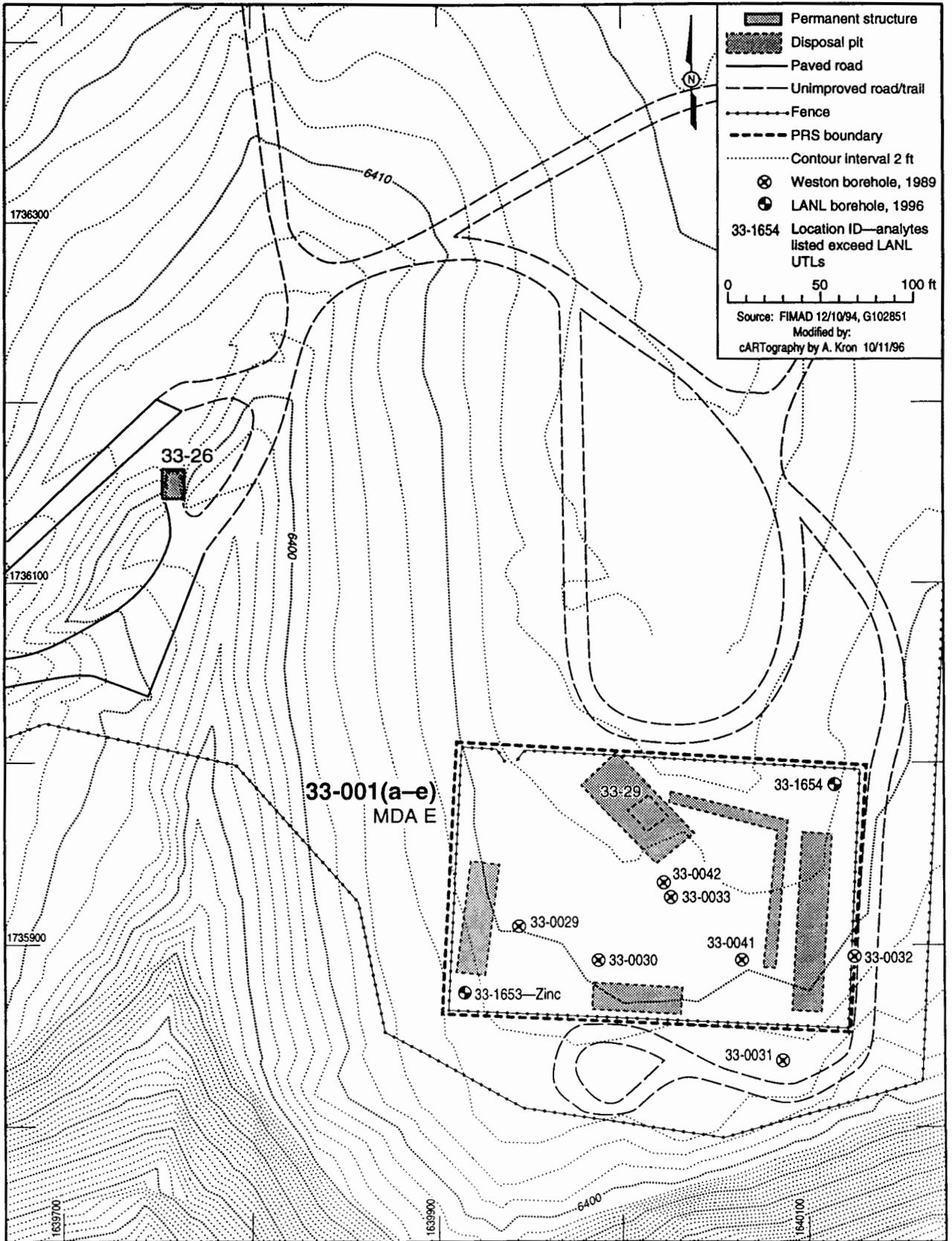


Fig. South Site MDA E, showing borehole locations.

## MDA K at Main Site PRS 33-002(a)

PRS 33-002(a) is the septic system at MDA K, the effluent area from the high pressure tritium facility, TA-33-86. A known subsurface tritium plume exists at MDA K and contaminated sludge was found in the septic tank. Tritium was detected above SAL but below human risk-based levels of concern.

**History:** PRS 33-002(a), discussed in the OU 1122 RFI work plan Subsections 3.2.2.1, 4.1.4, and 4.2.3.1, is the septic system established when TA-33-86 was built in 1954. The system consists of 1 860-gal.-tank TA-33-93 and a tiled drain field approximately 50 by 100 ft. The system served three floor drains, three sinks, and two bathrooms—each with toilet, sink, and shower facilities. Tritium operations ceased in 1990. No personnel are stationed in the building, and all equipment has been removed. Because TA-33-86 has a water supply, the septic system is currently considered active. The building may be targeted for demolition.

The tank is located about 100 ft east of the tritium facility. The drain field is east and downslope of the tank. The soil is a porous sandy loam with many inclusions of pumice. The MDA rarely supports standing water. The eastern end has sections of exposed bedrock. The surface of the drain field once supported a thick, almost impenetrable, growth of chamisa, but has been cleared for investigative activities. The lower section of the drain field has been disturbed by drilling activities. The remainder of MDA K is typical pinyon-juniper woodland.

**Sampling and Analysis:** A subsurface tritium plume was discovered during drilling in 1989 and confirmed in 1993. Phase I sampling performed in 1993 indicated that surface tritium is widespread at MDA K. A risk assessment using the DOE RESRAD model was run. The results show that the effective dose equivalent (EDE) to an individual living at the site in 1993 was 11.9 mrem/year, below the DOE guidance of 15 mrem/year. Because exposure to tritium fluxing from the soil at MDA K does not pose an unacceptable risk, no remediation is recommended.

Arsenic, cadmium, and lead were elevated in the septic tank sludge. No other contaminants were found at levels of concern at PRS 33-002(a). Removal of septic tank sludge is anticipated. Results are discussed in Subsection 5.3.3.1 of the September 1995 RFI report (ER 1995, 1263) and a Field Unit 3 NFA report awaiting sludge removal.

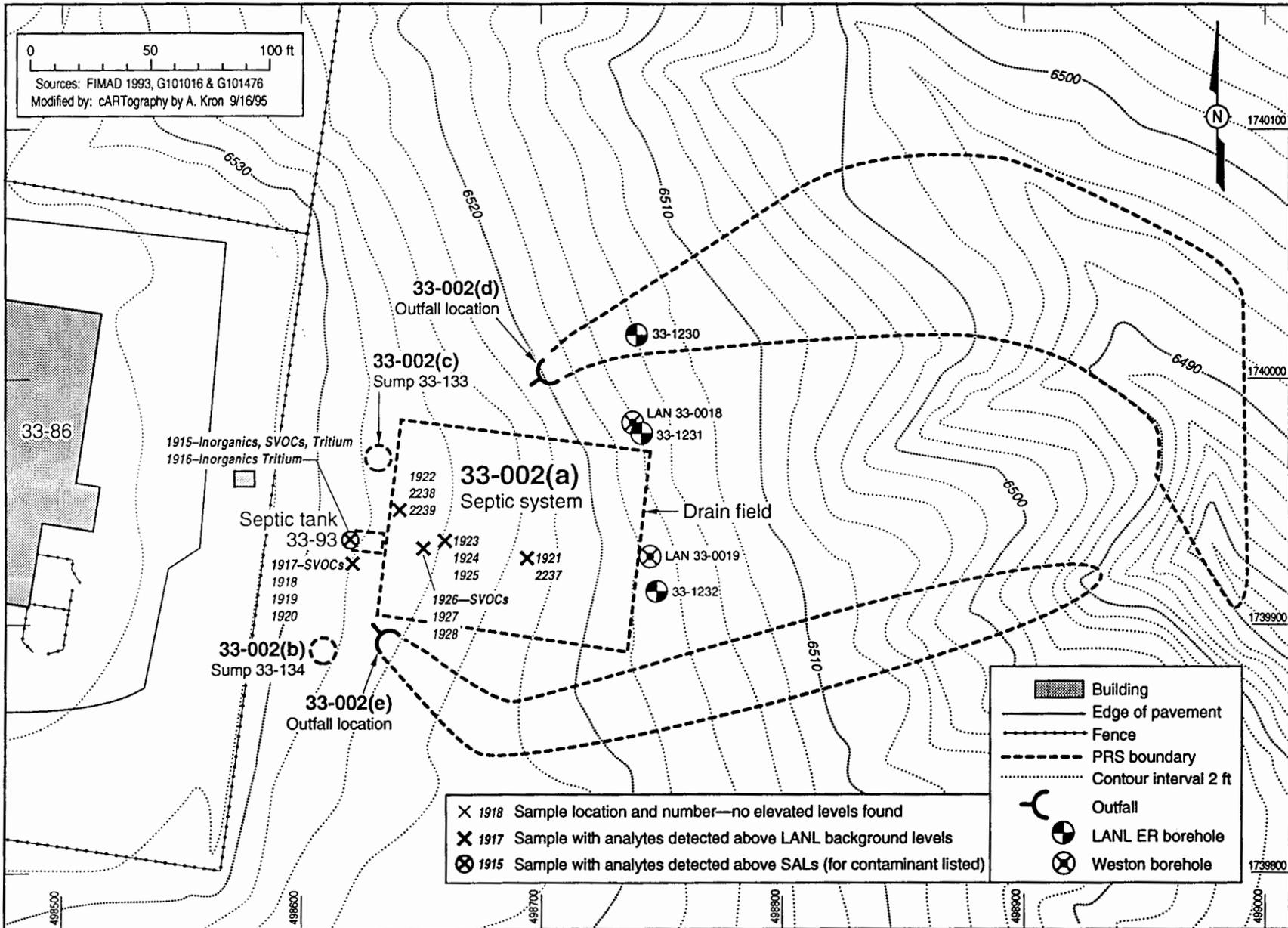


Fig. 4-3. SWMU 33-002(a) septic system and borehole locations.

## MDA K at Main Site PRSs 33-002(b,c)

PRSs 33-002(b and c) are sumps TA-33-133 and TA-33-134 at MDA K. Sampling was performed in 1993 and 1996. Tritium was detected, but at levels below the DOE guideline of 15 mrem/year above background. No other contamination was found above levels of concern in either campaign. The PRSs are recommended for no further action.

**History:** PRSs 33-002(b,c) are discussed in the RFI work plan for OU 1122 in Subsections 3.2.2.1, 4.1.4, and 4.2.3.1 (LANL 1992, 0784). The sumps were constructed in 1955 when the tritium facility, TA-33-86, was built. A sink and floor drain in the southern section of TA-33-86 are connected to PRS 33-002(b). Archival information indicates that PRS 33-002(b) received organic contaminants such as ethanol, methanol, trichloroethene, and tritium-contaminated benzene and acetone. The sumps may also have received beryllium, mercury, and depleted uranium. PRS 33-002(c) was disconnected from sinks and drains in 1959 and a cooling water pipe routed through it. The sumps are rubble-filled, unlined seepage pits 6 ft in diameter and 8 ft deep. Concrete covers overlaid by soil originally covered the sumps. The covers were broken during sampling by Weston personnel in 1989. The sumps lie on a level area near septic tank TA-33-93, PRS 33-002(a).

**Sampling and Analysis:** Roy F. Weston personnel collected surface samples at the sumps during investigations at TA-33 in 1989. Samples were analyzed for inorganics, radionuclides, pesticides, and polychlorinated biphenyls (PCBs). Only tritium, at 190 000 pCi/ml in soil moisture, was detected. Results of Field Unit 3 sampling in 1993 found tritium in all samples, exceeding 600 000 pCi/g in one sample. In 1996 boreholes were drilled directly into the sumps. Samples were collected within the first 15 ft and were analyzed for uranium, plutonium, VOCs, and SVOCs. Below the 15-ft level, samples were collected at approximately 5-ft intervals and analyzed for tritium. The sampling plan directed that three samples be analyzed below the sample in which the screening results fell below tritium SAL. Final depths of 117 ft at 33-002(b) and 60 ft at 33-002(c) exceeded these requirements. Only tritium was found above screening action levels, but below DOE dose guidelines of 15 mrem/year. Results are discussed in the September 1995 RFI report (ER 1995, 1263) and in the Field Unit 3 NFA report in progress.

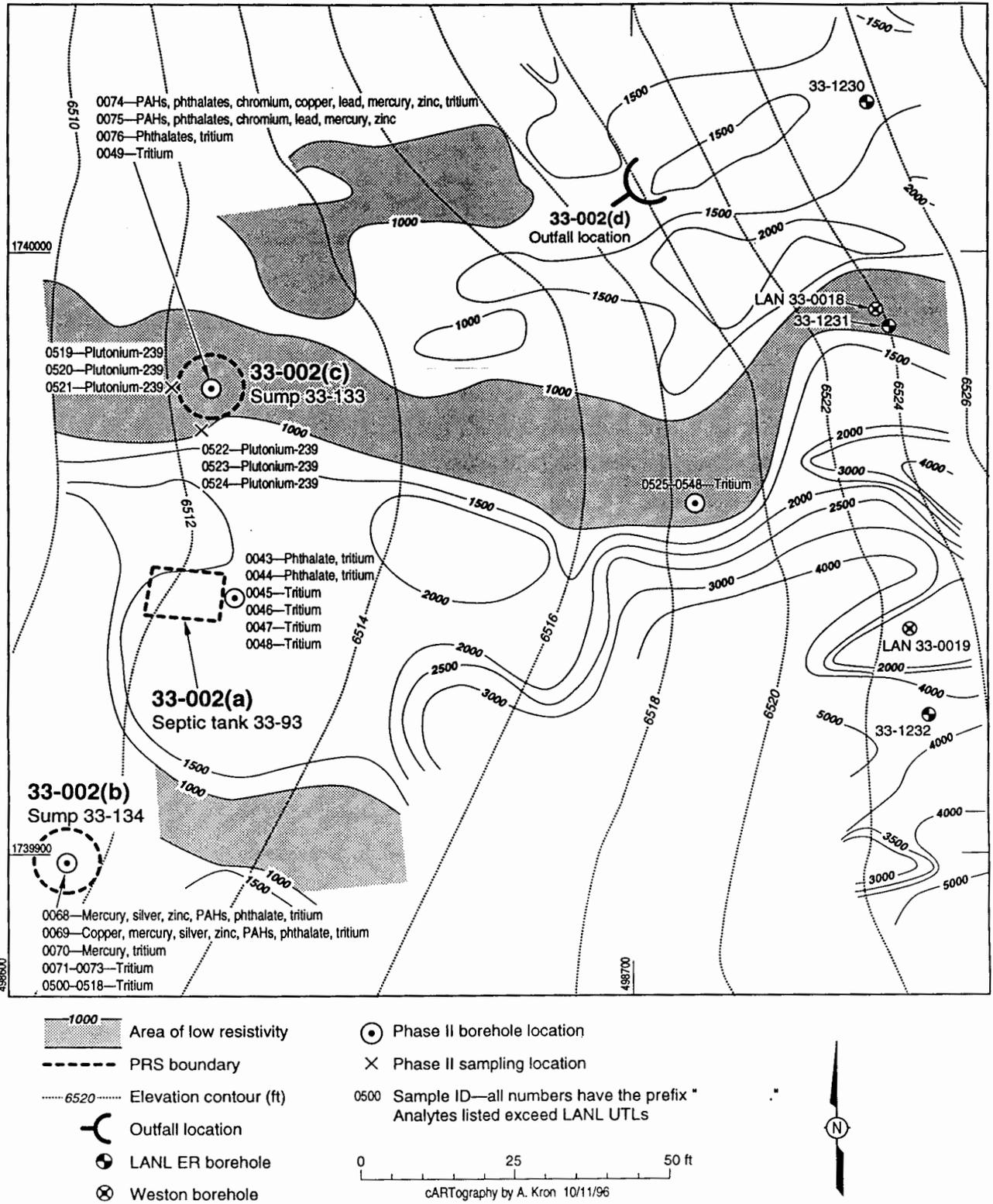


Fig. Phase II sampling locations at MDA K.

## MDA K at Main Site PRSs 33-002(d,e)

**SWMU 33-002(d)** is National Pollutant Discharge Elimination System (NPDES) permitted outfall EPA 04A147. It is discussed in the RFI work plan for OU 1122 in Subsections 3.2.2.1, 4.1.4, and 4.2.3.1 (LANL 1992, 0784). Tritium was found above SAL. The MDA K risk assessment indicated maximum dose was well below DOE guidelines of 15 mrem/year above background. The outfall is recommended for NFA.

**History:** SWMU 33-002(d) was the outfall for cooling water from a heat exchanger in the tritium facility. The outfall was created when the sump TA-33-133, PRS 33-002(c) was disconnected in 1959 and its drain line from TA-33-86 was extended approximately 90 ft past the sump. The tritium facility ceased operations in December 1990. The outfall has been disconnected and the heat exchanger removed. The outfall is located at the head of a shallow drainage leading into the tributary of Chaquehui Canyon east of Main Site. The constant supply of water supported heavy vegetation in the drainage. Remains of cattails and willows mark the drainage path for approximately a quarter mile beyond the outfall.

**Sampling and analysis:** Field Unit surface samples collected in the 1993 campaign were analyzed for radionuclides, inorganics, SVOCs, PCBs, and pesticides. Tritium was detected above SAL but below DOE guideline dose limits. Inorganic constituents were found above background but a multiple constituent analysis indicated that concentrations were below levels of concern. Results are discussed in the September 1995 RFI report (ER 1995, 1263).

**SWMU 33-002(e)** is a roof drain outfall from TA-33-86 discussed in the work plan for OU 1122 RFI in Subsections 3.2.2.1, 4.1.4, and 4.2.3.1. SVOCs detected were not part of a waste stream.

**History:** SWMU 33-002(e) roof drain discharges east of the building near the septic tank and sump TA-33-134, PRS 33-002(b). This 12-in. drain line is approximately 90 ft long and is active during rainstorms and snowmelt. The roof of the tritium facility is flat and covered with asphalt. The roof receives regular maintenance and reroofing. At the outfall opening is a concrete structure approximately 3 ft square with a concrete apron. A shallow, almost imperceptible, drainage leads from the box toward the lower (eastern) end of MDA K. Runoff from the drainage enters one of the gullies leading to the Chaquehui tributary approximately 250 ft east of the outfall.

**Sampling and analysis:** Tritium and SVOCs were analyzed for. Tritium results were near local background levels. SVOCs shedding from the asphalt roof were detected at the outfall. Because the roof is not a waste management area and the SVOCs are not a waste stream, the SWMU is recommended for NFA. Results are discussed in the September 1995 RFI report (ER 1995, 1263).

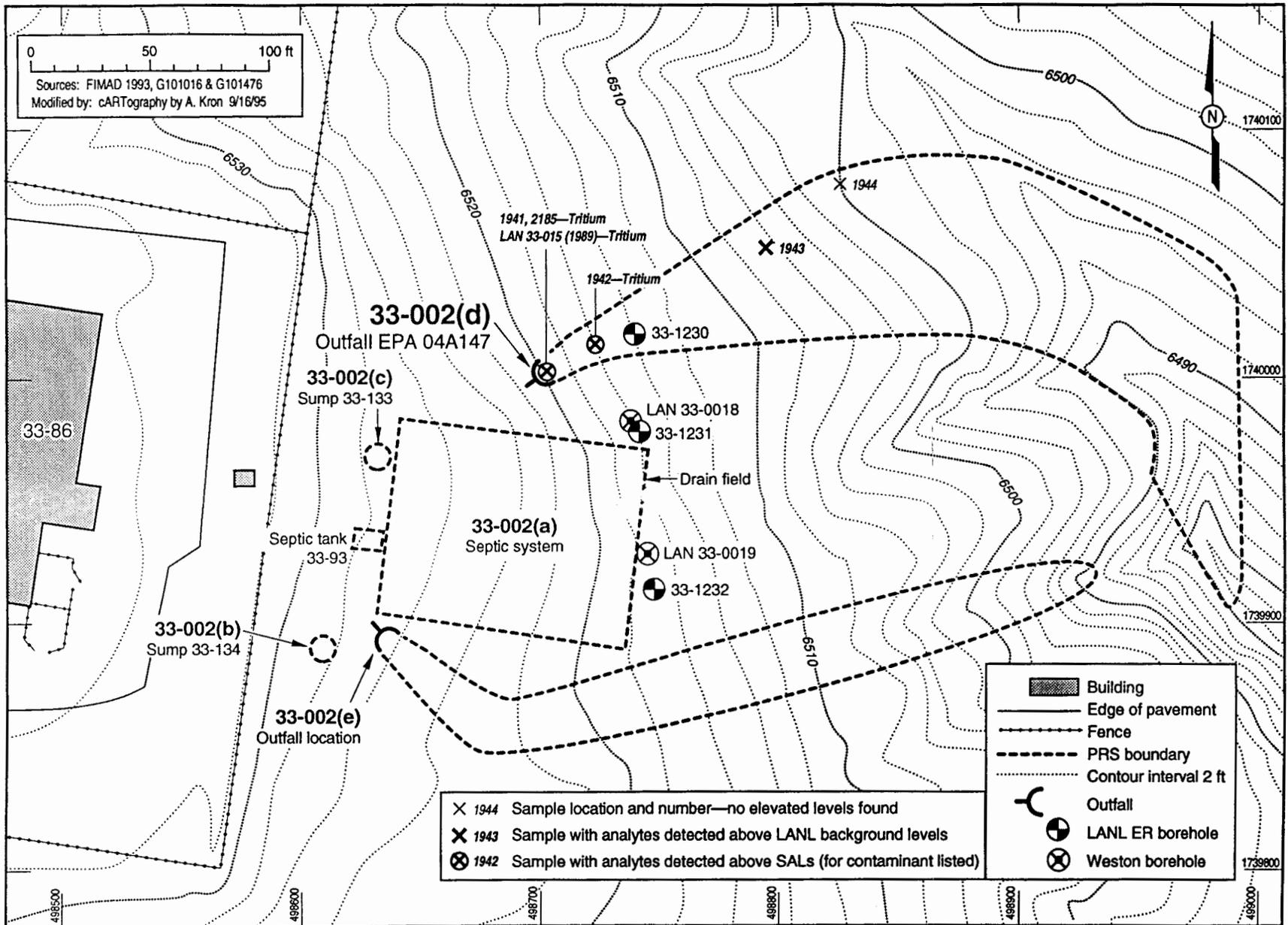


Fig. 4-11. SWMU 33-002(d) cooling water outfall.