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OU 1129 File, M321
Allyn Pratt, EES-13, J521
7-0844/7-1934
EES-13-ER-03-95-
March 31, 1995

Recommendation of No Further Action for SWMU No. 5-003

SWMU No-5-003 is the "calibration chamber" which housed the "Godiva" reactor from 1959 to 1960, 35 feet below ground-level. Lead bricks were used for shielding in the chamber. The 1990 SWMU Report stated that it was not known if the lead bricks were removed prior to or at the time TA-5 was decommissioned in 1976. Due to the sensitive nature of the original uses of the "calibration chamber", information on the disposition of the lead bricks subsequent to the abandonment of t Request s and is extremely limited . ERID

The SWMU was recommended for no further action submittal of Chapter 6 of the RFI Work Plan for OU recommendation. (MO, I am not sure of how to cit of the cover letter that went to the EPA. EPA No Corresponding Responses for RCRA Facility Inv 1129, 9/30/93). Since that time, a decision has been Cleanup (EC) action at the SWMU.

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606-0873
4-3-2006

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Reviews of historical information on the site were conducted during the EC Work Plan development. The investigations reveal through conversations with Art Tegtmeier (ENG-4 representative in charge of TA-5 clean-up) that the lead bricks were removed from the calibration chamber in 1976, and were taken to the "contaminated" landfill (Ulery 1995b). Conversations with Charles Blackwell and Raymond Pederson collaborate Tegtmeier's assertion (Miller, 1995). Also, radiation surveys conducted prior to backfilling document that no contamination was detected (Blackwell 1976).

Based on the archival information attached to this memo, SWMU No. 5-003 should be re-recommended for NFA. The archival information proves that the site poses no current or future threat to human health or the environment. The evidence presented in the attachments to this memorandum outweighs the evidence originally used to list the site as a SWMU.

Dave McInroy
Jorg Jansen
Rick Hutton
Rich Koch

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TA-5 "Calibration Chamber" (SWMU No. 05-003)

SWMU No. 5-003 is associated with lead shielding bricks that potentially remain in an underground chamber. Technical Area (TA) 5 is located along Puye Drive on a small mesa that extends eastward from Pajarito Mesa. In 1944, TA-5 was established as a firing site (Beta Site). A facility for the calibration of neutron detectors was constructed in late 1959. The Solid Waste Management Units Report for Los Alamos National Laboratory (LANL 1990, 0145) identifies the calibration facility (structure TA-5-20) as Solid Waste Management Unit (SWMU) No. 5-003. The SWMU and CEARP reports state that it is not known, but is believed, that the lead bricks were removed before the shaft was backfilled (LANL 1990, ; DOE 1987, 0264). However, the RFI Work Plan for Operable Unit 1129 references these documents as saying that the bricks were not removed (LANL 1992a,). In support of the site characterization, a review of historical information was implemented. This included a search of records from the period between 1959 and 1985, and contacts with personnel involved with operations at, and closure of, the site.

The calibration chamber was constructed in late 1959 and used to calibrate neutron detector systems for experiments at TA-49 (Miller 1995,). No engineering drawings of the facility have been located as of the time of this report. Approximate dimensions and layout of the facility have been obtained through conversations with people who worked on the project and personal logs. The facility consisted of a 6 foot diameter, 35 foot deep shaft with an approximately 10 foot cubical room located to the west at the base of the shaft. The shaft and room were connected by an 8 foot tall, 7 foot long tunnel. The connecting tunnel may have a downward slope toward the room. A second 24 inch diameter shaft extended from the center of the room to the surface. The shafts were separated by 15 feet (center-to-center). The smaller shaft was lined with 16 inch diameter casing and capped with concrete. There was a 3 inch diameter hole was left in the cap. The floor of the tunnel and chamber may have been covered with wood planking. Also, the walls and ceiling of the tunnel and chamber were shored with either wood or steel beams (Miller 1995, ; Ulery 1995a,). Based on the information available a conceptual cross section of the facility has been created (fig. 1).

The neutron source used in the calibration facility was a critical assembly called Godiva. This assembly consists of a spherical assembly of machined highly enriched uranium (HEU). Godiva was operated in the underground chamber. The detectors were located on the surface above the opening in the small shaft. Godiva could be pulsed about every 2 hours producing 2×10^{16} fissions per pulse. Records from operations of Godiva at TA-49, and conversations with project personnel (LANL 1992b, ; Miller 1995,) indicate that small amounts of HEU would spall off the source with each pulse. The energy and intensity of the neutrons could be moderated using D₂O. Borated paraffin and lead bricks were used as shielding. The configuration of the shielding materials is not known.

Following the removal of Godiva from the chamber, Raymond A. Pederson (health physics technician) detected elevated gamma radioactivity in the underground chamber (Miller 1995,). Measurements conducted at unspecified intervals over the next several years indicated that the soil activity was decreasing. This is consistent with short lived activation products that may have been produced during the operation of Godiva. In preparation for removal of the buildings Charles Blackwell (H-1) conducted a survey of the TA-5 site for radiation contamination on May 5, 1976. A June 10, 1976, memo to J.B. Montoya (ENG-3) from Blackwell reports that building TA-5-20 was free of detectable activity (Blackwell 1976,). Blackwell remembers that the survey was conducted in both above and below ground portions of the facility and that the underground room and tunnel were completely free of all materials (i.e., no lead bricks) (Miller 1995,). Pederson did not remember there being any lead bricks in the chamber at the time of his measurements (Miller 1995,). In a telephone conversation Art Tegtmeier (retired ENG-4) stated that the bricks were removed and sent to the contaminated dump in the summer of 1976 (Ulery 1995b,). Art Tegtmeier was in charge of the cleanup of TA-5 which was conducted in 1976.

Presently the only above ground structures remaining at TA-5 is a 12.5 x 8.75 foot concrete slab with the 72 inch diameter CMP extending 2.45 feet above the slab (Koch 1995,). The CMP has been backfilled with local materials. Raymond Pederson was told that, when the facility was backfilled, an attempt to fill the tunnel and experimental room was made (Miller 1995,).

Site Chronology

The sequence of events relating to the TA-5 calibration chamber (TA-5-20), unless otherwise noted, was obtained from the notebooks of Bill Francis (Ulery 1995a,).

Oct. 3, 1959	Project proposed by Neel W. Glass
Oct. 29, 1959	Order placed for 72 inch diameter corrugated metal pipe (CMP).
Oct. 30, 1959	Construction began at Beta site (TA-5).
Oct. 31, 1959	Drillers completed 6.5 foot diameter, 35 foot deep hole and 24 inch diameter hole, 15 feet center-to-center west of 6.5 foot diameter hole.
Nov. 1, 1959	CMP placed in 6.5 foot hole and grouted in place.
Nov. 2, 1959	Ladder in 6 foot diameter pipe completed
Nov. 3, 1959	Problem reported with tunnel ceiling collapsing.
Nov. 4, 1959	Steel or wood beams used to shore tunnel. Horizontal excavation at base of shaft extends 9.5 feet westward.
Nov. 6, 1959	Underground (10 foot cubical) room completed. Experiments using Godiva at Beta site approved by the Nuclear Criticality Safety Committee (Reider 1959, 04-01774).
Nov. 8, 1959	Tinners completed ventilation system and metal canopy in underground room. Cased water compartments set and grouted in place. Electrical cables and fittings installed.

Nov. 9, 1959	Job approved/accepted by LASL pending some modifications.
Nov. 10, 1959	Robert Thorne briefed on the need for 4 inch I-beam supports in underground chamber. 16 inch diameter casing placed in 24 inch diameter hole and grouted in place. Poured top of casing 24 inches square and 8 inches high with 3 inch diameter opening into casing.
Nov. 12, 1959	I-beams installed in underground chamber.
Nov. 13, 1959	Iron workers (ZIA) set lead bricks in "back chamber."
Nov. 14, 1959	Ladder safety enclosure installed.
Nov. 16, 1959	Godiva installed in underground chamber.
Dec. 18, 1959	TA-5 officially abandoned (Montoya 1976, 04-0163).
Jan. 12, 1960	Experiments using Godiva started at TA-49.
Dec. 7, 1973	Memo reporting that TA-5-20 (building over 6 foot diameter shaft) locked and could not be entered (Martin 1973, 04-0151).
Jan. 25, 1974	Building TA-5-20 found accessible. Cover requested for shaft. Cover had been installed by Jan. 31, 1974 (Bacastow 1974, 04-0022).
May 5, 1976	Structures at TA-5 surveyed for radiation contamination by Charles D. Blackwell. Survey conducted in preparation for structure removal. Building 20 free of detectable radioactivity (Blackwell 1976,).
1976(?)	Structures removed (exact date unknown) and 6 foot diameter shaft backfilled (Ulery 1995b,).

Conclusions

Based primarily on conversations with Art Tegtmeier (Ulery 1995b,), Charles Blackwell, and Raymond Pederson (Miller 1995,) it is believed that the lead bricks were removed prior to backfilling the underground chambers. Radiation surveys conducted before backfilling did not detect any contamination (Blackwell 1976,). This represents the results of a fairly complete search of available documentation and of personal contacts with individuals involved with the TA-5 calibration chamber.

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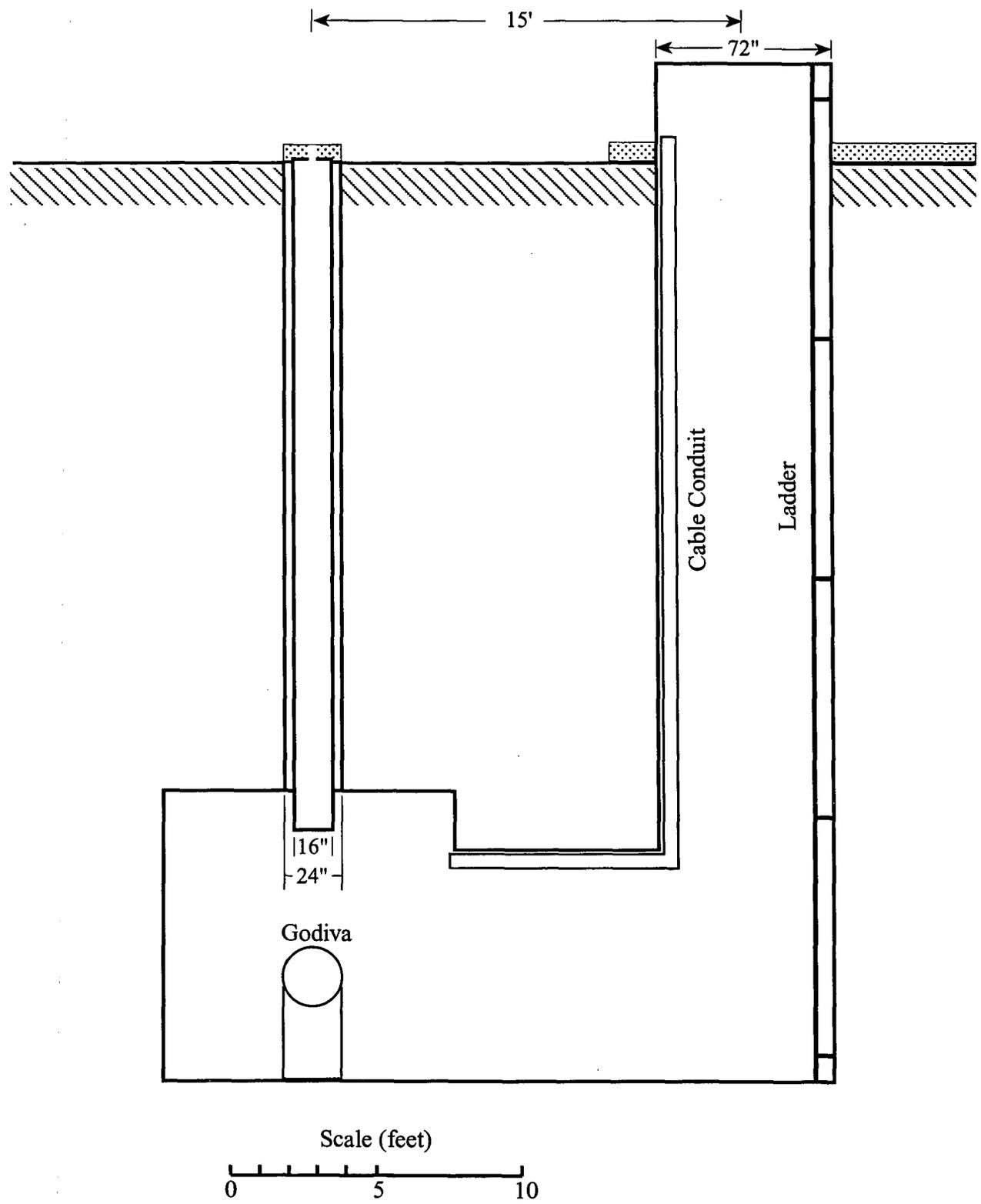


Figure 1. Conceptual cross-section of the TA-5 calibration facility (TA-5-20).