AREA D

General Information

Area D is located at TA-33, 2.9 km (1.8 mi) east of the guard station (~~See~~ Fig. D-1). By the LASL coordinate system it is located between coordinates S.287+50 and S.282+50, and E.310+00 and E.305+00. The location by township and range is SW 1/4 20, T. 18 N., R. ~~7~~ 8 E.[8]

Two underground chambers have been designated as Area D. Eng-3 memo[33] dated May 23, 1967, states that Area D is two open areas 6.1 by 9.1 m (20 by 30 ft).

Geology and Hydrology

Area D is located on top of a mesa formed by Ancho Canyon and White Rock Canyon of the Rio Grande. The surface appears flat and is underlain by the Tshirege member of the Bandelier tuff. The soil cover is thin. The site is approximately 304.8 m (1000 ft) above the Rio Grande and about 243.8 m (800 ft) above the bottom of Ancho Canyon.

4578

Chamber Descriptions

Background

Underground chamber 1 is HP-4; underground chamber 2 is HP-6. An experiment had been detonated in HP-4 before July 22, 1948.[191] Excavation of HP-6 began August 25, 1948, and was completed September 5, 1948.[192] The experiment in chamber 2 was detonated at 9:00 P.M., December 23, 1948.[193]

Type of Waste

According to a 1963 USGS report,[8] the Area D underground chambers were contaminated with explosives containing ^{238}U. Health Physics, H-1, considers the chambers to have been contaminated by polonium and perhaps a trace amount of uranium. (Personal communication, C. Blackwell, ~~HP-1~~ 1974.) A trace amount of ^{60}Co from a fired projectile may be present at the site. (Personal communication, D. L. Meyer, ~~H-1~~ 1974.)

Mode of Disposal

The HP-6 shaft was 1.8 m x 2.4 m (6 ft x 8 ft) with a depth of 14.0 m (46 ft). ~~(Ref.~~ 194) It was completely shored with 5.1 cm x 30.5 cm (2 in. x 12 in.) timbers except for the corners which had 20.3 cm x 20.3 cm (8 in. x 8 in.) timbers.[194] The octagon-shaped chamber, 4.3 m (14 ft) wide with a 3.7 m (12 ft) ceiling, is concrete reinforced with steel and extends southeast from the bottom of the shaft.[194] The door of the chamber

> ...was made of steel plate and wood filled. The edges of the door were wedgeshaped, so that the more pressure applied on the door from within, the tighter the door would be closed. The door was secured by a steel latch 3/8" thick and 3" - 4" wide, operated by a handle on the outside of the door.[194]

HP-4 was probably very similar in construction to HP-6.

No equipment in HP-6, except half of the hemisphere which had a count of approximately a million centimeters, was brought to the surface because of the high level of contamination.[194]

> A table was placed in the center of the room [Chamber] to support 600 lbs. of TNT. The TNT was so arranged that the center of the explosives would be six feet

> from the floor...approximately 600 mc of Po [was supplied] in a vial which was placed in with the charge. The door was closed and equipment that was in the shaft only was brought to the surface and monitored... On April 15, 1952, the shaft was refilled and a tank truck filled with water was on hand to wet down the sand as the shaft was being filled.[194]

The shot was fired at approximately 11:15 A.M. on April 15, 1952.[194]

> As the explosion came, a mass of dirt and debris reached an altitude of approximately 75 feet above the mesa. The dust was quickly carried away by the wind but the mesa was covered with coarse dirt and pieces of burned wood and some metal fragments... A crater over the shaft was formed to a depth of approximately 10 feet. The steel pipes, containing the cables were pulled loose from the wall and pushed over in the pit. The concrete block; where cables terminated, was turned over.[194]

There are no records which indicate HP-4 was disturbed after its experiment.

Studies and Monitoring

Chamber 1 (HP-4) was surveyed July 22, 1948.[191]

> As per request, enclosed area directly over the vicinity of the elevator shaft to the first experiment at T.A. 33 was monitored this A.M. Results were negative. Area south of the fence was monitored also. Results negative. Both areas are therefore considered safe for entry.[191]

During the excavation of Chamber 2 (HP-6) monitoring work was carried out.

> Monitoring operations by the monitoring section of H-Division started on 26 August 1948 and continued each day for eleven days through 5 September 1948. A monitor entered the shaft each morning and afternoon of each day checking approximately at intervals of about 2.5 ft of excavation. At the same time the rock and dirt removed from the shaft were monitored and dirt sample taken and given to Morris Milligan of the Medical Lab for Polonium analysis. This was also done each morning and afternoon...
>
> During the entire monitoring no alpha activity was detected. Morris has the results on the dirt samples. Meter used - a Pee Wee Alpha survey.[192]

After the detonation of the experiment, December 23, 1948, in Chamber 2, the site was inspected.

> On driving to the covered-in shaft, no cracks in the ground could be found. The entire area over the shaft was checked with an Alpha survey meter. The results were negative. The area was rechecked on December 29, 1948. Results were again negative. Snow and mud hampered a complete survey on this date.[195]

On April 7, 1952, the re-excavation of Chamber 2 began.[194] Before heavy equipment was placed over the shaft the ground was checked for contamination and found to have negligible. On April 8 the sand was removed from the shaft by clam shell. As the sand was removed, it was surveyed for alpha contamination. The results were negative as was the survey of the shaft as the sand was removed.

> The first contamination to be found was on the steel box on the south side of the room. It had ruptured during the shot, leaving a crack about 1/4" wide. This box housed wiring from the room and was fed from the box to the surface by three steel pipes. Approximately 8000 c/m was found on the steel box about four inches above where the seam had ruptured. The rest of the steel box had very little or no count. Contamination on the steel box would not rub off but seemed to be

imbedded in the pores of the metal. The sand removed from the steel door was free of contamination but contamination in the amount of 15,000 c/m could be found along the top of the door where it fitted against the concrete. The door had a felt seal and some felt was hanging loose as a result of the blast, and this felt gave a reading of approximately 30,000 c/m.[194]

The door was jacked open with two 50-ton jacks on April 11, 1952.

As the door was opened inch by inch, the area around the door was monitored and the count began to go up very rapidly. It was very damp around the room [Chamber] and drops of water and white mold could be seen on all the ledges. Everyone had been very concerned about the dust problem when the room was entered, but with so much condensation on the concrete, the Po was sticking to the surface very well.

[The chamber] was covered with twisted metal and all the equipment was battered and tossed about the room. The rubble was from 1' to 2' high all over the room and our meter gave a reading of 200,000 + c/m on any equipment that was checked... several pictures [were shot]...[194]

A path was cleared from the door to the center of the chamber where 600 lbs of T.N.T. were placed on a table. "By this time, [April 12th] the surface in the room was beginning to dry out because of the presence of outside air and the level of detectable contamination had risen to 250,000 c/m."[194]

On April 15, 1952, the shaft was refilled and a tank truck filled with water was on hand to wet down the sand as the shaft was being filled. This was to relieve the dust problem in case the shaft was to be re-excavated after the shot and if no contamination could be found on the surface. Three filter queens in the area near the shaft and one placed 1000, away where personnel were to be located, were run for 1 h 15 min before the shot to record a background for the area and for the filter queens. The filters were changed before shot time and filters run for 1 h 9 min, being stopped 30 min after the shot was fired. All personnel, camera crew and firing crew were stationed outside the fence over 1000 ft from firing area and all personnel were issued a respirator. The camera crew was stationed at approximately 800 ft and firing crew 600 ft from firing area. These crews were issued assault masks equipped with ultra filters. The wind, at shot time, was blowing in the direction of observers, so the shot was held up for a few minutes. It was fired at approximately 11:15 a.m., on April 15, 1952, and the wind was blowing from northeast to southwest. As the explosion came, a mass

~~* Chamber~~
~~** April 12th~~

of dirt and debris reached an altitude of approximately 75 feet above the mesa. The dust was quickly carried away by the wind but the mesa was covered with coarse dirt and pieces of burned wood and some metal fragments. Monitors approached the area about 15 min after shot time in full protective clothing. The area was free from radioactivity contamination until we reached the fenced area, where 2000 c/m was recorded. The dirt in the area showed a count of 20,000 c/m with bits of wood going as high as 200,000 c/m. Bits of twisted metal from the room were found in the shot area. A crater over the shaft was formed to a depth of approximately 10 ft. The steel pipes, containing the cables were pulled loose from the wall and pushed over in the pit. The concrete block, where cables terminated, was turned over. Filter queens were covered with wet dirt, some going in the intake when the dirt cloud descended after the shot. Filters were recovered and returned to Tech Area for counting.[194]

The results of the filter queen samples are listed below:

Filter Queen Samples for 1 h 9 min. During and after shot:

#1 West side 40' from shaft	730 c/m	.0936 c/m/L
#2 East side 40' from shaft	460 c/m	.0590 c/m/L
#3 South side 40' from shaft	95 c/m	.0122 c/m/L
#4 Personnel area 1000 ft from shaft (1 h 2 min)	10 c/m	.0014 c/m/L"[194]

A polonium analysis of soil samples was reported November 15, 1952.[195] Seven samples from Area D were analyzed. Sample A - 50,000 cm/25 g; Sample B - no Po; Sample C - 150 cm/25 g; Sample D - 25 cm/25 g; Sample E - 5 cm/25 g; Sample F - 5 cm/25 g, Sample G - no Po. These samples may have been centered ~~around~~ over Chamber 2 (see Fig. D-2 for sample location).

On August 24, 1953, a contamination survey was made within the fenced-in area of Underground Chamber #2 at Hot Point at TA-33. This survey was made to establish the alpha contamination level within the area and results were to be used as a guide in determining the safety precautions to be used in clearing the area of debris, removing existing mounds of dirt, and filling the open pits so that the area could be made level for building purposes.

The surface of the ground showed no detectable alpha contamination, but some of the timbers in the area gave counts ranging up to 500 c/m. Some dirt was removed around the large open pit and soil at a depth of 2 ft gave a reading of 500 c/m.

> The crater of Underground Chamber #2 appears to be large enough to hold all the contaminated dirt and all mounds of dirt found to be contaminated could be pushed directly into the crater. Then a layer of dirt free from contamination could be used to leave all exposed surfaces without detectable counts.[104]

On October 21, 1953[196] the area around Chamber 2 was bulldozed. A radiation survey was then made and the results were negative. "The contamination that had been in the area has been reduced by normal decay and some will be buried under a heavy layer of dirt in the area."[196]

A preliminary survey of local wind conditions with primary emphasis on terrain effects under relatively light wind conditions was reported May 2, 1955.[197] Area D is now referred to as the "New Area."

> This area is located in the eastern portion of TA-33 and is surrounded on the south, east and north by relatively deep and rugged canyons. In addition there are two bunkers surrounding the firing pads. In this area the wind flow is much more complicated than that in Areas 6 [probably Area K] and 7 [probably Area E]... The flow in New Area will be marked by turbulent eddies and erratic changes in direction. No confidence could be placed in a persistence forecast of an observed wind direction.[197]

~~* Probably Area K~~
~~** Probably Area E~~