Records of wells, test holes, springs, and surface-water stations in the Los Alamos area, N. Mex.

Compiled by

Edward C. John, Eugene Enyart
and William D. Purtymun

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Albuquerque, New Mexico

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Open-file report

Prepared for and in cooperation with the U.S. Atomic Energy Commission and Groups H-6 and H-7 of the Los Alamos Scientific Laboratory

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Introduction

The U.S. Atomic Energy Commission, the Los Alamos Scientific Laboratory and the U.S. Geological Survey have jointly conducted investigations of the geology and hydrology of the Los Alamos area related to water supply and to disposal of low-level radioactive effluents. These investigations covering the period 1950-65 required the drilling of many holes, some for special problems, others to obtain data concerning areal geologic and hydrologic characteristics.

Sampling points to obtain quality-of-water data for the ground and surface water of the area were established at several springs and at stations along the streams of the area.

Records of data collected from the holes and sampling points are scattered among several reports, thus they are not always readily available when needed by workers in the area. This report is a compilation and summarization of the geologic and hydrologic data on all wells, test holes, springs, and surface-water sampling points collected to date in the Los Alamos area.

Summary statements on the results obtained from various investigations are included where appropriate to answer questions posed by the stated purpose for which the work was done.

Most of the data presented here for the period since 1950 were collected by the Survey. Prior to 1950, military organizations and private firms conducted investigations of the water resources for public supply; data from these sources have been included in this report.

Location and designation numbers

USGS location number: USGS location numbers used in this report are based on the common system of subdivision of public lands. A number consists of four segments (fig. 1); the first segment denotes

Figure 1 (caption on next page) belongs near here.

the township north of the New Mexico base line; the second segment denotes the range east of the New Mexico principal meridian; the third segment denotes the section within the township; and the fourth segment denotes subdivisions of the section.

A section is considered as being divided into four quarters; 1, 2, 3, and 4 for the northwest, northeast, southwest, and southeast quarters respectively. The first digit of the fourth segment of the location numbers refers to the appropriate quarter of the section, or 160-acre tract. Similarly, each quarter section is divided into four quarters, or 40-acre tracts. The 40-acre tract is divided into 10-acre tracts which are numbered in the same manner as the 160- and 40-acre tracts. Thus location number 19.6.13.344 identifies the data collection point located in $SE\frac{1}{4}SE\frac{1}{4}SW\frac{1}{4}$ sec. 13, T. 19 N., R. 6 E.

Figure 1.--System of numbering wells in New Mexico

USGS location number (continued)

If more than one data collection point is in a single 10-acre tract, lower case letters (a,b,c, and so forth) are added to the fourth segment to identify the additional points in that tract. Springs and surface-water collection points are identified by addition of the upper case letter S prior to the location number.

The system of subdivision of the public lands was extended arbitrarily into land grants in the Los Alamos area to facilitate well numbering within the boundaries of the grants. This extended land net is shown by dashed lines on Figure 2 of this report.

Figure 2 (caption on next page) belongs near here.

USGS designation: A combination of words, letters, and numbers used to designate the approximate location of a data collection point and the original purpose for which the hole was put down.

AEC and LASL coordinates: Surveyed location on the Los Alamos grid system. The use of this system of coordinates will soon be discontinued in favor of the federal system of the public land survey of New Mexico.

Figure 2.--Map of the Los Alamos area showing location of wells, test holes, and springs.

Definition of terms

Hydrologic terms that have meanings not commonly known or self explanatory are defined below. The reader is referred to Meinzer (1923) and the American Geologic Institute Glossary (1960) for more detailed discussion and definitions not given here.

Aquifer - A formation, group of formations, or part of a formation that is water bearing.

Chief Aquifer - that formation which yields the greater portion of water to a well.

c.f.s. - cubic foot per second (one cfs=449 gallons per minute).

Moisture access tube - a hole 3 to 5 inches in diameter cased with 2-inch diameter plastic pipe through which the moisture content or density of material penetrated by the tube can be determined with a neutron-neutron moisture probe or gamma-ray density probe, and suitable metering equipment.

Perched water - ground water separated from an underlying body of ground water by unsaturated rock.

Potentiometric surface - a surface that everywhere coincides with the head of the water in the aquifer.

Specific capacity - yield of the well in gallons per minute divided by the drawdown in feet.

Test hole - Any exploratory hole drilled for the purpose of obtaining geologic or hydrologic information. A test hole may be utilized for fluid dynamics tests or may never be developed for any use.

Transmissibility - The coefficient of transmissibility is defined as the number of gallons of water per day that will pass through a vertical strip of the aquifer one foot wide and extending the height of the aquifer, under a unit hydraulic gradient, at the prevailing temperature of the water in the aquifer.

Water table - The upper surface or potentiometric surface of a zone of saturation except where that surface is formed by an impermeable body.

Well - An artifical excavation, other than ditches or tunnels, that derives some fluid from the interstices of the rock or soil which it penetrates. Divided by use in this report into public supply, observation, stock, and unused wells.

Use of tables

The tables in this report contain summaries of the data available for individual wells and test holes. The information is in abbreviated form and the following discussions of subject headings explain the abbreviated notations in greater detail for those headings which might not be clear and are not covered under "Definitions".

Method drilled: Method used in drilling well or test hole.

Hydraulic rotary - a method of drilling that is accomplished by rotating suitable tools that cut, chip, or abrade the rock formation. Water or drilling mud is pumped down the drill stem to cool the bit and carry the cuttings to the surface.

Air rotary - a drilling method similar to hydraulic rotary, in which compressed air is pumped down to the bit and carries the drill cuttings to the surface.

Cable-tool - the familiar "percussion" or "churn-drill" method in which a heavy drilling tool is raised and lowered with enough force to chip and abrade the rock. The rock debris suspended in water or mud is removed from the hole with a bailer.

Auger - a method of boring a hole in which the earth materials are raised from the hole along the spiral blades of an auger and thrown away from the hole at the surface by the spinning action.

Method drilled (continued)

Bucket-auger - a method of boring a hole by using a cylindrical bucket type auger that has a hinged blade on the bottom. The cuttings are lifted within the bucket.

Drive-point - a method of making a well (usually shallow and of small diameter) by driving a length of pipe equipped with a sand point and screen to the desired depth.

Dug - a well excavated by hand.

Diameter: Diameter of the smallest casing of a well at the surface.

Use: Current use of a well.

1. Observation - a well used for water-level measurements and/or for the collection of water samples for quality of water data.
2. Public supply - a well supplying water for municipal or domestic use.
3. Stock - a well supplying stock water.
4. Unused

Chemical analysis: Analyses by the U.S. Geological Survey unless otherwise noted. Constituents are in parts per million (ppm) unless noted.

Radiochemical analysis: Analyses by the Los Alamos Scientific Laboratory unless noted. Plutonium and gross beta (gamma) reported as disintegrations per minute per liter (d/m/l). Uranium reported as micrograms per liter (μgm/l).

Data sources: Published and unpublished reports were used to reference the source of data in the tables. Published reports are listed in selected references.

Geology and hydrology

A brief description of the geology and hydrology of the area is included in this report as background material. The reader is referred to a report by Griggs (1964) for a more detailed discussion of the geology of Los Alamos County.

The rock units described in this report, from oldest to youngest, are: the Santa Fe Group of middle(?) Miocene to Pleistocene(?) age, the volcanic rocks of the Jemez Mountains of Pliocene and Pleistocene age, and the alluvium and soil of Recent age. Their generalized stratigraphic relations are shown on Figure 3.

Figure 3 (caption on next page) belongs near here.

Figure 3.--Diagrammatic cross section showing generalized stratigraphic relation of rocks in the Los Alamos area.

Santa Fe Group

The Santa Fe Group, in ascending order, consists of the Tesuque Formation, the Puye Conglomerate, and basaltic rocks of Chino Mesa.

The Tesuque Formation is a sequence of light-colored sediments laid down as coalescing alluvial-fan and flood-plain deposits in the Rio Grande depression. These sedimentary rocks were derived from highlands to the north, and possibly in part, from the Sangre de Cristo Mountains to the east. The separate beds are composed of friable to moderately well-cemented, light-pink-gray to light-brown siltstone and sandstone that contain lenses of conglomerate and clay. Bedding generally is poorly developed except locally in fine-grained material.

The Puye Conglomerate consists of two members. The lower member, the Totavi Lentil, is a poorly consolidated, channel-fill deposit. The fanglomerate member overlies the Totavi Lentil and is composed of volcanic debris.

The Totavi Lentil of the Puye Conglomerate overlies the Tesuque Formation disconformably along the Rio Grande and noncomformably in Los Alamos and Guaje Canyons. It is a gray, poorly consolidated conglomerate consisting of fragments of quartzite, schist, gneiss, and granite ranging in size from sand to boulders; well-sorted lenses of silt and sand are present sporadically. The materials making up the conglomerate were derived principally from igneous and metamorphic rocks to the north and northeast. They were deposited on a broad flood plain and in channels of the ancestral Rio Grande. A zone near the top of the Totavi Lentil is composed of a mixture of pegmatitic rocks and volcanic debris. This mixed zone represents a change in source of sediments from igneous and metamorphic terrane to the north to the igneous and volcanic terrane to the west.

The fanglomerate member of the Puye Conglomerate conformably overlies the Totavi Lentil; it is generally gray and composed of pebbles, cobbles, and boulders of rhyolite, latite, quartz latite, and pumice in a matrix of silt and sand. These rocks were derived from flows associated with the volcanic rocks of the Jemez Mountains. Sorting is poor, but tongues and lenses of fairly well-sorted pumiceous siltstone and water-lain pumice are present within the fanglomerate. The degree of cementation varies from friable to well-cemented. In upper Guaje and Los Alamos Canyons, the fanglomerate member consists of angular boulders; eastward it grades to silt, sand, gravels, and rounded boulders.

The basaltic rocks of Chino Mesa consist of five mappable units which originated from volcanic vents near Chino Mesa southeast of the Los Alamos area (Griggs, 1964, p. 37-41). The lower unit (unit 1) lies unconformably on the Tesuque Formation south of Ancho Canyon and interfingers unconformably with the Totavi Lentil north of Ancho Canyon, along the Rio Grande. The upper flows of unit 1 are conformable on the Totavi. To the west, beneath the Pajarito Plateau, unit 1 and unit 2 interfinger with the fanglomerate member. The middle unit (unit 3), which consists of a series of flows deposited in an old river channel, crops out in lower Los Alamos, Sandia, and Mortandad Canyons west of the Rio Grande.

Flows of unit 4 cap the mesas south of Los Alamos Canyon. They rest unconformably on the Puye Conglomerate and the Tesuque Formation and butt against unit 3 in lower Los Alamos Canyon. Unit 5 is composed of cinder cones and local basalt flows that crop out in secs. 13 and 24, T. 18 N., R. 6 E., and lie unconformably on the underlying rocks.

Volcanic rocks of the Jemez Mountains

Volcanic rocks of the Jemez Mountains along the eastern flanks of the Sierra de los Valles and on the Pajarito Plateau consist of the Tschicoma Formation and the younger Bandelier Tuff.

The Tschicoma Formation is composed of undifferentiated latite and quartz latite flows and pyroclastic rocks that are highly. fractured and jointed; some intervals contain weathered zones and interflow breccia.

The Bandelier Tuff is composed chiefly of ashfall and ashflow tuff and some thin, water-lain sediments. The formation has been divided (Griggs, 1964, p.47-56) into three members: Guaje, Otowi, and Tshirege, from oldest to youngest

The Guaje Member of the Bandelier Tuff is an ashfall pumice and water-laid pumiceous tuff that rests unconformably on older rocks. The base of the unit contains gray lump-pumice fragments as much as 2-inches in length. Glass shards and crystals of quartz and sanidine are present in the cellular structure of partly devitrified pumice. Rounded, pebble-size fragments of light-red rhyolite are present near the top.

The Otowi Member of the Bandelier Tuff is a light-gray, nonwelded, pumiceous rhyolite tuff that weathers to a gentle slope; it is conformable with the underlying Guaje. Quartz crystals, glass shards, minor amounts of mafic minerals, and varying amounts of rhyolite, latite, and pumice fragments included in a fine-grained ash compose the tuff. Most of the rock fragments are rounded. The Otowi consists of ashflows primarily but it contains several beds of silt and water-laid pumice near the top.

The Tshirege Member of the Bandelier Tuff, is composed of a series of ashflows of rhyolite tuff that contains at least one thin, water-laid bed near the top. The Tshirege unconformably overlies the Otowi and forms the caprock of the fingerlike mesas of the Pajarito Plateau. The rhyolite tuffs range from nonwelded to welded. The thin, water-laid bed is composed of material derived from the underlying tuff.

Alluvium and soil

Alluvium from the Sierra de los Valles and the Pajarito Plateau has been deposited in the canyons of the plateau. Near the heads of the canyons bedrock commonly is exposed in the lower parts; but further down the canyons alluvium may be several hundred feet wide and as much as 80 feet thick.

Alluvial deposits in the canyons heading on the flanks of the Sierra de los Valles contain cobbles and boulders with accompanying clay, silt, sand, and gravel derived from the Tschicoma Formation and Bandelier Tuff. Deposits in the canyons heading on the Pajarito Plateau contain clay, silt, sand, and gravel derived from the Bandelier Tuff.

Clayey soil derived from weathering of the Bandelier Tuff covers most of the fingerlike mesas of the Pajarito Plateau.

Structure

The Rio Grande depression is a structurally low area that constitutes the valley through which the Rio Grande flows (Kelley, 1952, p.93-105). The Pajarito Plateau is part of the structural depression although it forms a topographic high area along the western margin of the valley.

A faulted part of the area called the Pajarito fault zone trends northward along the flanks of the Sierra de los Valles and the western edge of the Pajarito Plateau. Movement along the fault zone has caused the Bandelier Tuff to be downdropped against the Tschicoma Formation. The fault zone consists of several en echelon normal faults that are downthrown to the east. Northeast of the town of Los Alamos two normal faults are downthrown to the west and form a garben-like depression. The outcrop of Tschicoma Formation in Pueblo Canyon in the western part of sec. 3, T. 19 N., R. 6 E. is an indication of this northerly-trending fault zone.

A small depositional basin lies between the Pajarito fault zone and the basaltic rocks of Chino Mesa beneath the Pajarito Plateau (fig. 3). The basaltic rocks of Chino Mesa originated as flows from volcanic centers east of the Rio Grande; flowed northward, northwestward, and westward, and filled channels cut into the older sediments. The thick flows moved westward across the present position of the Rio Grande south of Sandia Canyon to Frijoles Canyon to form the edge of the small basin or trough. The eastern edge of the northerly-trending basin is 2 to 4 miles west of the river and the basin is filled with volcanic debris.

The Bandelier Tuff was extruded from volcanic centers to the northwest and west. It is thickest along the central and western edges of the plateau and thins eastward toward the Rio Grande. The upper ashflows of the Bandelier dip gently eastward toward the river at 1 to 2 degrees.

Surface water

Rito de los Frijoles is the only perennial stream in the Los Alamos area that crosses the Pajarito Plateau and discharges into the Rio Grande. The upper reaches of Los Alamos and Guaje Canyons contain naturally perennial streams; but the perennial flow in the upper and mid-reach of Pueblo Canyon and Sandia Canyon results from the discharge of treated sewage. Only during periods of abnormally great precipitation do the intermittent streams which cross the Pajarito Plateau carry water to the Rio Grande.

The Rito de los Frijoles is fed by streams in canyons cut into the flanks of the Sierra de los Valles. The average discharge in Frijoles Canyon at the Pajarito fault zone averages about 1.5 cfs (cubic feet per second). Seepage runs in Frijoles Canyon indicate that the Rito de los Frijoles is a gaining stream on the upthrown (western) block of the fault which is underlain by the Tschicoma Formation at shallow depth, and is a losing stream on the downthrown block which is underlain by the Bandelier Tuff. The Tschicoma Formation at shallow depth west of the fault has a relatively low permeability allowing little infiltration from the stream.

The base flows in the upper reaches of the major canyons (Guaje, Los Alamos, Pajarito, Canonde Valle, and Water Canyons) discharge from perched water zones in the rocks of the Tschicoma Formation and the Bandelier Tuff. The average discharge at Guaje reservoir (about 4 miles northwest of Los Alamos) is generally less than 1 cfs, and the average discharge near Los Alamos Canyon reservoir ($NE\frac{1}{2}$ sec. 13, T. 19 N., R. 5 E projected) is generally less than 0.5 cfs.

The effluent from three full treatment sewage plants discharges to Pueblo Canyon and sustains the average flow of about 2 cfs from September through April and about 0.7 cfs from May through August near the eastern edge of sec. 9, T. 19 N., R. 6 E. The stream flows for a distance of about 5 miles below the discharge point but the water does not reach the Rio Grande as surface flow.

An average of about 100,000 gpd (gallons per day) of treated sewage and cooling water from the power plant is discharged into Sandia Canyon near the western edge of sec. 16, T. 19 N., R. 6 E. This discharge sustains flow in the stream channel for a distance of about 4 miles in the summer months.

Ground water

The main aquifer in the Los Alamos area is in the Santa Fe Group. The potentiometric surface (fig 3) rises from the Rio Grande westward through the Tesuque Formation into the lower part of the Puye Conglomerate which interfingers with the Tschicoma Formation. The position of the potentiometric surface in the Tschicoma Formation is not known beneath the western edge of the plateau. Brecciated zones within the Tschicoma Formation may contain water but where encountered in wells such zones have not yielded more than 5 to 10 gpm.

The gradient of the potentiometric surface beneath the Pajarito Plateau averages about 70 feet per mile. The depth to the main aquifer varies from about 1,200 feet along the western edge of the plateau to about 600 feet at the confluence of Pueblo and Los Alamos Canyons. Water in the aquifer moves eastward toward the Rio Grande where some water is discharged through springs in the channel and along the banks (fig. 2).

Ground water is perched in the alluvium at some places in Pueblo, Mortandad, and Los Alamos Canyons, and probably is perched seasonally in the upper parts and perenially in the lower parts of other canyons which receive seasonal runoff from the Pajarito Plateau and the Sierra de los Valles.

Supply wells

Growth of Los Alamos has been paralleled by increased water demand for residential and industrial uses. Originally surface-water sources were used for public water supply. A larger and more dependable source of water was developed by drilling wells in Los Alamos Canyon and in Guaje Canyon. New water-supply wells are currently being developed southeast of Los Alamos on the Pajarito Plateau. Approximately 16 wells now provide an average of 3 million gallons of water per day for domestic supply, and industrial use. Geologic, hydrologic, and construction data of these wells are presented in table 1 to 16. Locations are shown on figure 2.

Table 1.--Supply well PM-2

USGS Location No. 19.6.36.113 USGS Designation PM-2 (Pajarito Mesa - 2)

AEC Coordinates _____ AEC Designation _____

Driller Layne-Texas Inc. Address Houston, Texas

Topography Floor of Pajarito Canyon Altitude 6,715 feet

Method drilled Hydraulic Rotary Diameter 14 inches Use Public Supply

Drilled depth 2,600 feet Completed depth 2,300 feet

Date drilled July 1965 Chief Aquifer(s) Puye Conglomerate and Tesuque Formation

Depth to water 823 feet Date July 6, 1965 Transmissibility 40,000 gpd/ft

Specific capacity 24 gpm/ft After 24 hours of pumping at 1,200 gpm

Log:

	Thickness	Depth
Alluvium	30	30
Bandelier Tuff:		
Otowi Member	375	405
Guaje Member	27	432
Basaltic rocks of Chino Mesa:		
Unit 3	268	700
Puye Conglomerate:		
Fanglomerate member	640	1,340
Totavi Lentil	70	1,410
Tesuque Formation	1,190	2,600

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
26 ID	0- 504	
14 ID	0-2,300	Blank from 0-1,004 feet, slotted with 3/32-inch louver openings 1,004 to 2,300 feet.

Chemical analysis: 1/ Constituents in parts per million

Date July 15, 1965, Temp. ____ °F, SiO_2 _____, Fe _____, Ca 8.8,

Mg 3.1, Na + K 11, HCO_3 59, CO_3 0, SO_4 _____, Cl 3.5,

F .16, NO_3 .08, Hardness 35, Dissolved solids 158,

Specific conductance 68 micromhos, pH 7.6

Radiochemical analysis: Date July 15, 1965, Pu $\leq$ 0.4 d/m/l, U $\leq$ 0.5 µg/l,

Gross β (Gamma) 1.6 d/m/l

Report source of data: Cooper, J. B., Purtymun, W. D., and John, E. C., 1965./ (unpublished data)

Remarks: Electric logs available

1/ Analysis by Los Alamos Scientific Laboratory

Table 2.--Supply well G-3

USGS Location No. 19.7.4.133 USGS Designation G-3 (Guaje 3)

AEC Coordinates _____ AEC Designation _____

Driller Texas Water Wells Inc. Address Houston, Texas

Topography Floor of Guaje Canyon Altitude 6,139 feet

Method drilled Hydraulic Rotary Diameter 12 inches Use Public Supply

Drilled depth 1,996 feet Completed depth 1,792 feet

Date drilled July 1951 Chief Aquifer(s) in Tesuque Formation

Depth to water 280 feet Date July 1951 Transmissibility 7,500 gpd/ft

Specific capacity 4.5 gpm/ft After 14 years of production (1965)

Log:	Thickness	Depth
Alluvium	17	17
Puye Conglomerate:		
Fanglomerate member	41	58
Totavi lentil	52	110
Tesuque Formation	1,886	1,996

Basalts at 921 to 936 feet and 1,012 to 1,090 feet.

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
12 ID	0- 705	With 140 feet of torch cut slots.
10 ID	705-1,800	With 260 feet of torch cut slots.

Chemical analysis: Constituents in parts per million

Date April 1, 1964, Temp. 82 °F, SiO_2 56, Fe .02, Ca 13,
Mg 2.1, Na + K 25, HCO_3 103, CO_3 0, SO_4 4.8, Cl 3.0,
F .3, NO_3 .9, Hardness 41, Dissolved solids _____,
Specific conductance 172 micromhos, pH _____

Radiochemical analysis: Date Dec. 10, 1964, Pu <0.4 d/m/l, U 1.2 µg/l,
Gross β (Gamma) 5.2 d/m/l

Report source of data: Griggs, R. L., 1964

Remarks: Electric logs available.

Table 3.--Supply well G-2

USGS Location No. 19.7.4.411 USGS Designation G-2 (Guaje 2)

AEC Coordinates _____ AEC Designation _____

Driller Texas Water Wells Inc. Address Houston, Texas

Topography Floor of Guaje Canyon Altitude 6,056 feet

Method drilled Hydraulic Rotary Diameter 12 inches Use Public Supply

Drilled depth 2,006 feet Completed depth 1,990 feet

Date drilled August 1951 Chief Aquifer(s) in Tesuque Formation

Depth to water 259 feet Date Aug. 1951 Transmissibility 15,000 gpd/ft

Specific capacity 11 gpm/ft After 14 years of production (1965)

Log:

	Thickness	Depth
Alluvium	13-	13
Puye Conglomerate:		
Fanglomerate member	17-	30
Totavi Lentil	45-	75
Tesuque Formation	1,931-	2,006

No basalt logged

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
12	0-600	
10	600-1,990	With 425 feet of perforations

Chemical analysis: Constituents in parts per million

Date May 29, 1952, Temp. 85 °F, SiO_2 54, Fe .03, Ca 13,

Mg 1.4, Na + K 54, HCO_3 166, CO_3 _____, SO_4 8.2, Cl 4.8,

F 1.4, NO_3 1.0, Hardness 38, Dissolved solids _____,

Specific conductance 281 micromhos, pH _____

Radiochemical analysis: Date 12-10-64, Pu <0.4 d/m/l, U <0.5 µg/l,

Gross β (Gamma) 11.3 d/m/l

Report source of data: Griggs, R. L., 1964

Remarks: Electric logs available.

Table 4.--Supply well G-1A

USGS Location No. 19.7.4.441 USGS Designation G-1A (Guaje 1A)

AEC Coordinates _____ AEC Designation _____

Driller B and W Drilling Co. Address Borger, Texas

Topography Floor of Guaje Canyon Altitude 6,014 feet

Method drilled Hydraulic Rotary Diameter 12 inches Use Public Supply

Drilled depth 2,071 feet Completed depth 1,519 feet

Date drilled December 1954 Chief Aquifer(s) in Tesuque Formation

Depth to water 255 feet Date Dec. 1954 Transmissibility 11,000 gpd/ft

Specific capacity 11 gpm/ft After 11 years of production (1965)

Log:

	Thickness	Depth
Alluvium	12	12
Puye Conglomerate:		
Fanglomerate member	47	59
Totavi Lentil	63	122
Tesuque Formation	1,949	2,071

Basalts or basalt breccias from 1,505 to 1,675 feet and 1,755 to 1,789 feet.

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
12 ID	0- 663	
10 ID	660-1,519	With 563 feet of torch cut slots.

Chemical analysis: Constituents in parts per million

Date Dec. 29, 1954, Temp. 84 °F, SiO_2 80, Fe .11, Ca 12,
Mg .5, Na + K 27, HCO_3 97, CO_3 _____, SO_4 4.6, Cl 2.8,
F 0.4, NO_3 0.2, Hardness 32, Dissolved solids _____,
Specific conductance 167 micromhos, pH _____

Radiochemical analysis: Date May 24, 1964, Pu 1.5 d/m/l, U <0.5 µg/l,
Gross β (Gamma) 5 d/m/l.

Report source of data: Cushman, R. L., 1963

Remarks: Electric logs available.
Tritium units <0.5, Mar. 1959.

Table 5.--Supply well G-1

USGS Location No. 19.7.4.444 USGS Designation G-1 (Guaje 1)

AEC Coordinates _____ AEC Designation _____

Driller Texas Water Wells Inc. Address Houston, Texas

Topography Floor of Guaje Canyon Altitude 5,973 feet

Method drilled Hydraulic rotary Diameter 12 inches Use Public Supply

Drilled depth 2,100 feet Completed depth 2,000 feet

Date drilled July 1950 Chief Aquifer(s) in Tesuque Formation

Depth to water 192 feet Date July 20, 1950 Transmissibility 12,000 gpd/ft

Specific capacity 5 gpm/ft After 15 years of production (1965)

Log:

	Thickness	Depth
Alluvium	12-	12
Puye Conglomerate:		
Fanglomerate member	13-	25
Totavi Lentil	50-	75
Tesuque Formation	2,075-	2,100

Basalts logged between 1,540 and 1,838 feet.

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
12	0- 490	
10	490-2,000	With 490 feet of perforations

Chemical analysis: Constituents in parts per million

Date April 4, 1954, Temp. 78 °F, SiO_2 66, Fe .01, Ca 13,
Mg 1.1, Na + K 25, HCO_3 97, CO_3 _____, SO_4 4.9, Cl 3.5,
F .3, NO_3 1.0, Hardness 37, Dissolved solids _____,
Specific conductance 169 micromhos, pH _____

Radiochemical analysis: Date Dec. 10, 1964, Pu <0.4 d/m/l, U 2.6 µg/l,
Gross β (Gamma) 8.7 d/m/l

Report source of data: Griggs, R. L., 1964

Remarks: Electric logs available.

Table 6.--Supply well G-5

USGS Location No. 19.7.5.112 USGS Designation G-5 (Guaje 5)

AEC Coordinates _____ AEC Designation _____

Driller Texas Water Wells Inc. Address Houston, Texas

Topography Floor of Guaje Canyon Altitude 6,306 feet

Method drilled Hydraulic rotary Diameter 12 inches Use Public Supply

Drilled depth 1,997 feet Completed depth 1,840 feet

Date drilled May 1951 Chief Aquifer(s) in Tesuque Formation

Depth to water 411 feet Date May 1951 Transmissibility 12,000 gpd/ft

Specific capacity 8.0 gpm/ft After 14 years of production (1965)

Log:	Thickness	Depth
Alluvium	8	8
Puye Conglomerate:		
Fanglomerate member	119	127
Totavi Lentil (not present)		
Tesuque Formation	1,870	1,997

Basalts or basalt breccias in the intervals: 586-613; 906-1,135; 1,211-1,238; 1,241-1,268; and 1,291-1,318 feet.

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
12	0- 739	
10	739-1,840	400 feet of slots in the casing.

Chemical analysis: Constituents in parts per million

Date April 1, 1952, Temp. 78 °F, SiO_2 46, Fe .01, Ca 19,
Mg 4.4, Na + K 12, HCO_3 9.6, CO_3 _____, SO_4 4.4, Cl 4.5,
F .3, NO_3 1.5, Hardness 66, Dissolved solids _____,
Specific conductance 176 micromhos, pH _____

Radiochemical analysis: Date Dec. 10, 1964, Pu <0.4 d/m/l, U <0.5 µg/l,
Gross β (Gamma) 19.9 d/m/l

Report source of data: Griggs, R. L., 1964

Remarks: Electric logs available.
Tritium units <0.5, Mar. 1959

Table 7.--Supply well G-4

USGS Location No. 19.7.5.231 USGS Designation G-4 (Guaje 4)

AEC Coordinates _____ AEC Designation _____

Driller Texas Water Wells Inc. Address Houston, Texas

Topography Floor of Guaje Canyon Altitude 6,229 feet

Method drilled Hydraulic rotary Diameter 12 inches Use Public Supply

Drilled depth 2,002 feet Completed depth 1,930 feet

Date drilled May 1951 Chief Aquifer(s) Tesuque Formation

Depth to water 347 feet Date May 1951 Transmissibility 17,500 gpd/ft

Specific capacity 2 gpm/ft After 14 years of production (1965)

Log:	Thickness	Depth
Alluvium	15	15
Puye Conglomerate:		
Fanglomerate member	45	60
Totavi Lentil	60	120
Tesuque Formation	1,882	2,002

Basalts or basalt breccias in the intervals: 499-526; 855-929; 956-976; and 1,103-1,141 feet.

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
12	0- 720	
10	720-1,930	

Chemical analysis: Constituents in parts per million

Date June 7, 1951, Temp. 79 °F, SiO_2 50, Fe .02, Ca 16,
Mg 2.6, Na + K 19, HCO_3 9.6, CO_3 _____, SO_4 4.9, Cl 4.5,
F .3, NO_3 1.2, Hardness 50, Dissolved solids _____,
Specific conductance 177 micromhos, pH _____

Radiochemical analysis: Date Dec. 10, 1964, Pu <0.4 d/m/l, U <0.5 µg/l,
Gross β (Gamma) <0.1 d/m/l

Report source of data: Griggs, R. L., 1964

Remarks: Electric logs available.

Table 8.--Supply well G-6

USGS Location No. 19.7.6.241 USGS Designation G-6 (Guaje 6)

AEC Coordinates _____ AEC Designation _____

Driller Burgett Drilling Co. Address Carlsbad, New Mexico

Topography Floor of Rendija Canyon Altitude 6,422 feet

Method drilled Cable tool and Hydraulic rotary Diameter 12 inches Use Public Supply

Drilled depth 2,005 feet Completed depth 1,530 feet

Date drilled March 1964 Chief Aquifer(s) in Tesuque Formation

Depth to water 572 feet Date March 1964 of Transmissibility 6,300 gpd/ft

Specific capacity 4.2 gpm/ft After 171 hours/pumping (Oct. 1964)

Log:	Thickness	Depth
Alluvium	40	40
Puye Conglomerate		
Fanglomerate member	90	130
Totavi lentil	70	200
Tesuque Formation	1,805	2,005

Basalt or basalt breccias in the intervals: 1,070-1,170; 1,180-1,220; 1,270-1,425; 1,445-1,470; 1,605-1,665; 1,720-1,730; 1,815-1,825; 1,905-1,915; and 1,955-1,970 feet.

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
12	0-1,530	3/32-inch louver perforations from 700-1,530 feet.

Chemical analysis: Constituents in parts per million

Date June 8, 1965, Temp. 83 °F, SiO_2 50, Fe .00, Ca 13,
Mg 1.7, Na + K 21.2, HCO_3 89, CO_3 0, SO_4 4.9, Cl 3.3,
F .3, NO_3 1.8, Hardness 40, Dissolved solids _____,
Specific conductance 160 micromhos, pH 7.7

Radiochemical analysis: Date Dec. 10, 1964, Pu <0.4 d/m/l, U 1.2 µg/l,
Gross β (Gamma) <1.0 d/m/l

Report source of data: Cooper, J. B., Purtymun, W. D., and John, E. C., 1965./ (unpublished data)

Remarks: Electric logs available.

Table 9.--Supply well L-1

USGS Location No. 19.7.13.114 USGS Designation L-1 (Los Alamos 1)

AEC Coordinates _____ AEC Designation _____

Driller _____ Address _____

Topography Floor of Los Alamos Canyon Altitude 5,624 feet

Method drilled Hydraulic rotary Diameter 12 inches Use Observation

Drilled depth 1,001 feet Completed depth 870 feet

Date drilled November 1946 Chief Aquifer(s) in Tesuque Formation

Depth to water Flowing feet Date December 1946 Transmissibility _____ gpd/ft

Specific capacity _____ gpm/ft After _____

Log:

	Thickness	Depth
Alluvium	76	76
Tesuque Formation	925	1,001

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
12	0-870	12-inch slotted casing and screens alternating with 10-inch slotted casing and screen. 60 feet to 870 feet.

Chemical analysis: Constituents in parts per million

Date May 14, 1952, Temp. 63 °F, SiO_2 29, Fe .03, Ca 7.4,
Mg 1.0, Na + K 80, HCO_3 177, CO_3 _____, SO_4 20, Cl 18,
F 1.3, NO_3 1.8, Hardness 22, Dissolved solids _____,
Specific conductance 383 micromhos, pH _____

Radiochemical analysis: Date Oct. 9, 1957, Pu 0 d/m/l, U 52 µg/l,
Gross β (Gamma) 12 d/m/l

Report source of data: Griggs, R. L., 1964

Remarks: Unused water-supply well equipped with water-level recorder.

Table 10.--Supply well L-1B

USGS Location No. 19 7.13.114b USGS Designation L-1B (Los Alamos 1B)

AEC Coordinates _____ AEC Designation _____

Driller H. P. Doty Drilling Co. Address Albuquerque, New Mexico

Topography Floor of Los Alamos Canyon Altitude 5,622 feet

Method drilled Hydraulic rotary Diameter 12 inches Use Public supply

Drilled depth 2,256 feet Completed depth 1,750 feet

Date drilled March 1960 Chief Aquifer(s) in Tesuque Formation

Depth to water Flowing feet Date March 1960 Transmissibility 17,000 gpd/ft

Specific capacity .5 gpm/ft After 5 years of production (1965)

Log:

	Thickness	Depth
Alluvium	78	78
Tesuque Formation	2,178	2,256

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
12	0- 650	
10	650-1,750	591 feet of perforation between 326 and 1,750 feet.

Chemical analysis: Constituents in parts per million

Date March 18, 1965 Temp. 87 °F, SiO_2 40, Fe .03, Ca 8.0,

Mg .7, Na + K 171.3, HCO_3 387, CO_3 0, SO_4 40, Cl 16,

F 2.3, NO_3 1.8, Hardness 23, Dissolved solids _____,

Specific conductance 717 micromhos, pH 7.8

Radiochemical analysis: Date Feb. 5, 1965 Pu <0.4 d/m/l, U 2.7 µg/l,

Gross β (Gamma) 3.8 d/m/l

Report source of data: Cushman, R. L., 1963

Remarks: Electric logs available.

Table 11.--Supply well L-3

USGS Location No. 19.7.14.221 USGS Designation L-3 (Los Alamos 3)

AEC Coordinates _____ AEC Designation _____

Driller Layne-Western Inc. Address Kansas City, Mo.

Topography Floor of Los Alamos Canyon Altitude 5,672 feet

Method drilled Hydraulic rotary Diameter 12 inches Use Public supply

Drilled depth 910 feet Completed depth 870 feet

Date drilled May 1947 Chief Aquifer(s) Tesuque Formation

Depth to water Flowing feet Date May 1947 Transmissibility _____ gpd/ft

Specific capacity 2.6 gpm/ft After 19 years of production (1965)

Log:

	Thickness	Depth
Alluvium	51	51
Tesuque Formation	859	910

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
12	0-870	12-inch and 10-inch screens and casing alternate throughout depth of well. 140 feet of 10-inch screen and 620 feet of slotted 12-inch casing.

Chemical analysis: Constituents in parts per million

Date May 14, 1952, Temp. 58 °F, SiO_2 32, Fe .01, Ca 16,
Mg .5, Na + K 32, HCO_3 117, CO_3 _____, SO_4 7.5, Cl 4.0,
F .5, NO_3 1.3, Hardness 42, Dissolved solids _____,
Specific conductance 200 micromhos, pH _____

Radiochemical analysis: Date Feb. 5, 1965, Pu <0.4 d/m/l, U <0.5 µg/l,
Gross β (Gamma) 2.4 d/m/l

Report source of data: Griggs, R. L., 1964

Remarks:

Table 12.--Supply well L-2

USGS Location No. 19.7.14.222 USGS Designation L-2 (Los Alamos 2)

AEC Coordinates _____ AEC Designation _____

Driller Layne-Western Inc. Address Kansas City, Mo.

Topography Floor of Los Alamos Canyon Altitude 5,651 feet

Method drilled Hydraulic rotary Diameter 12 inches Use Public supply

Drilled depth 882 feet Completed depth 870 feet

Date drilled December 1946 Chief Aquifer(s) in Tesuque Formation

Depth to water Flowing feet Date Dec. 1946 Transmissibility 4,100 gpd/ft

Specific capacity 1.6 gpm/ft After 19 years of production (1965)

Log:

	Thickness	Depth
Alluvium	60	60
Tesuque Formation	822	882

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
12	0-870	12-inch casing and 10-inch screen alternate to depth of well. 195 feet of 10-inch screen and 565 feet of 12-inch slotted casing

Chemical analysis: Constituents in parts per million

Date May 14, 1952, Temp. 65 °F, SiO_2 30, Fe .01, Ca 5.8,
Mg 1.0, Na + K 84, HCO_3 185, CO_3 _____, SO_4 18, Cl 18,
F 2.0, NO_3 1.3, Hardness 18, Dissolved solids _____.
Specific conductance 378 micromhos, pH _____

Radiochemical analysis: Date Feb. 5, 1965, Pu <0.4 d/m/l, U<0.5 µg/l,
Gross β (Gamma) 3.5 d/m/l

Report source of data: Griggs, R. L., 1964.

Remarks:

Table 13.--Supply well L-6

USGS Location No. 19.7.14.312 USGS Designation L-6 (Los Alamos 6)

AEC Coordinates _____ AEC Designation _____

Driller Layne-Western Inc. Address Kansas City, Mo.

Topography Floor of Los Alamos Canyon Altitude 5,770 feet

Method drilled Hydraulic rotary Diameter 12 inches Use Public supply

Drilled depth 2,030 feet Completed depth 1,790 feet

Date drilled December 1948 Chief Aquifer(s) in Tesuque Formation

Depth to water 5 feet Date Dec. 1948 Transmissibility _____ gpd/ft

Specific capacity 14 gpm/ft After 17 years of production (1965)

Log:

	Thickness	Depth
Alluvium	36	36
Tesuque Formation	1,994	2,030

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
12	0- 597	Perforated 420 to 597 feet.
10	420-1,790	With 400 feet of 10-inch screen.

Chemical analysis: Constituents in parts per million

Date May 14, 1952, Temp. 58 °F, SiO_2 30, Fe .02, Ca 2.9,
Mg .4, Na + K 63, HCO_3 158, CO_3 _____, SO_4 6.9, Cl 4.0,
F 1.3, NO_3 1.4, Hardness 8, Dissolved solids _____,
Specific conductance 273 micromhos, pH _____

Radiochemical analysis: Date Feb. 5, 1965, Pu <0.4 d/m/l, U 7.3 µg/l,
Gross β (Gamma) <1.0 d/m/l

Report source of data: Griggs, R. L., 1964

Remarks: Electric logs available.
Tritium units <0.5, Mar. 1959.

Table 14.--Supply well L-5

USGS Location No. 19.7.15.434 USGS Designation L-5 (Los Alamos 5)

AEC Coordinates _____ AEC Designation _____

Driller Layne-Western Inc. Address Kansas City, Mo.

Topography Floor of Los Alamos Canyon Altitude 5,840 feet

Method drilled Hydraulic rotary Diameter 12 inches Use Public supply

Drilled depth 2,024 feet Completed depth 1,750 feet

Date drilled Sept. 1948 Chief Aquifer(s) in Tesuque Formation

Depth to water 71 feet Date Sept. 1948 Transmissibility _____ gpd/ft

Specific capacity 4 gpm/ft After 13 years of production (1961)

Log:

	Thickness	Depth
Alluvium	42	42
Tesuque Formation	1,982	2,024

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
12	0- 630	With 50 feet of 12-inch screen.
10	630-1,750	With 350 feet of 10-inch screen.

Chemical analysis: Constituents in parts per million

Date May 14, 1952, Temp. 62 °F, SiO_2 36, Fe .01, Ca 10,
Mg .5, Na + K 54, HCO_3 140, CO_3 _____, SO_4 6.9, Cl 3.0,
F .7, NO_3 1.5, Hardness 27, Dissolved solids _____,
Specific conductance 254 micromhos, pH _____

Radiochemical analysis: Date Oct. 13, 1964, Pu <0.4 d/m/l, U 0.9 µg/l,
Gross β (Gamma) 3.0 d/m/l

Report source of data: Griggs, R. L., 1964.

Remarks: **Electric logs available.**

Table 15.--Supply well PM-1

USGS Location No. 19.7.20.341 USGS Designation PM-1 (Pajarito Mesa 1)

AEC Coordinates _____ AEC Designation _____

Driller Layne-Texas Co. Inc. Address Houston, Texas

Topography Floor of Sandia Canyon Altitude 6,520 feet

Method drilled Hydraulic rotary Diameter 12 inches Use Public supply

Drilled depth 2,501 feet Completed depth 2,499 feet Puye Conglomerate (fan-

Date drilled February 1965 Chief Aquifer(s) in glomerate member and Totovi Lentil) and Tesuque Formation

Depth to water 722.10 feet Date Mar. 8, 1965 Transmissibility 55,000 gpd/ft

Specific capacity 15.7 gpm/ft After 2 months of production (July 1965)

Log:

Bandelier Tuff	Thickness	Depth
Otowi Member	120	120
Guaje Member	45	165
Basaltic rocks of Chino Mesa		
Unit 3	342	507
Old alluvium	43	550
Puye Conglomerate:		
Fanglomerate member	225	775
Totavi Lentil	20	795
Tesuque Formation	1,706	2,501

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
24	0- 474	
12	0-2,499	Blank from 0-945 feet; slotted with 3/32-inch louver openings 945-2,499 feet.

Chemical analysis: 1/ Constituents in parts per million

Date July 15, 1965, Temp. ____ °F, SiO_2 _____, Fe _____, Ca 17,

Mg 8.6, Na + K 18, HCO_3 115, CO_3 7, SO_4 _____, Cl 8.5,

F .16, NO_3 .44, Hardness 79, Dissolved solids 123,

Specific conductance 132 micromhos, pH 7.5

Radiochemical analysis: Date July 15, 1965, Pu < 0.4 d/m/l, U < 0.5 µg/l,

Gross β (Gamma) 2.4 d/m/l

Report source of data: Cooper, J. B., Purtymun, W. D., and John, E. C., 1965./ (unpublished data)

Remarks: Electric logs available.

1/ Analyses by the Los Alamos Scientific Laboratory

Table 16.--Supply well L-4

USGS Location No. 19.7.22.114 USGS Designation L-4 (Los Alamos 4)

AEC Coordinates _____ AEC Designation _____

Driller Layne-Western Co. Address Kansas City, Mo.

Topography Floor of Los Alamos Canyon Altitude 5,975 feet

Method drilled Hydraulic rotary Diameter 12 inches Use Public supply

Drilled depth 2,019 feet Completed depth 1,965 feet

Date drilled July 1948 Chief Aquifer(s) in Tesuque Formation

Depth to water 189 feet Date July 1948 Transmissibility _____ gpd/ft

Specific capacity 8.5 gpm/ft After 18 years of production (1965)

Log:	Thickness	Depth
Alluvium	27	27
Puye Conglomerate:		
Fanglomerate member	86	113
Totavi Lentil	50	163
Tesuque Formation	1,856	2,019

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
12	0- 754	
10	754-1,965	With 400 feet of 10-inch screen.

Chemical analysis: Constituents in parts per million

Date May 14, 1952, Temp. 73°F, SiO_2 36, Fe .01, Ca 9.2,
Mg .3, Na + K 27, HCO_3 91, CO_3 _____, SO_4 3.5, Cl 2.5,
F .3, NO_3 .8, Hardness 24, Dissolved solids _____,
Specific conductance 151 micromhos, pH _____

Radiochemical analysis: Date Feb. 5, 1965 Pu <0.4 d/m/l, U <0.5 µg/l,
Gross β (Gamma) 2.4 d/m/l

Report source of data: Griggs, R. L., 1964.

Remarks: Electric logs available.
Tritium Units <0.5, Mar. 1959

General investigations

Test holes were drilled to determine the thickness of geologic units and of water-bearing formations. Some of the holes are now used as observation wells to monitor the chemical and radiochemical quality of water in perched water zones and in the main aquifer. Geologic, hydrologic and construction data of these test holes and observation wells are presented in table 17 to table 38. Locations are shown on Figure 2. Included in the tables are records of two wells drilled for stock water and now used also as observation wells.

Table 17.--Test well T-4

USGS Location No. 19.6.9.443 USGS Designation T-4

AEC Coordinates _____ AEC Designation _____

Driller Layne-Western Inc. Address Kansas City, Mo.

Topography Rim of Pueblo Canyon Altitude 7,243 feet

Method drilled Cable Tool Diameter 6 inches Use Observation

Drilled depth 1,205 feet Completed depth 1,205 feet

Date drilled March 1950 Chief Aquifer(s) in Tschicoma Formation

Depth to water 1,166.0 feet Date Jan. 5, 1951 Transmissibility 1,000 gpd/ft

Specific capacity 0.6 gpm/ft After 720 hrs.

Log:	Thickness	Depth
Bandelier Tuff		
Tshirege Member	0-280	280
Otowi Member	280- 88	368
Guaje Member	368- 27	395
Puye Conglomerate		
Fanglomerate Member	395-240	635
Tschicoma Formation	635-570	1,205

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
16 - OD	0- 109	
12 - ID	0- 288	
10 - ID	0- 734	
6 - ID	0-1,195	
4 - screen	1,195-1,205	

Chemical analysis: Constituents in parts per million

Date July 17, 1952, Temp. 70 °F, SiO_2 73, Fe .02, Ca 11,
Mg 7.1, Na + K 9.4, HCO_3 87, CO_3 0, SO_4 1.8, Cl 2.2,
F .1, NO_3 2, Hardness 56, Dissolved solids _____,
Specific conductance 149 micromhos, pH 7.2

Radiochemical analysis: Date Feb. 1, 1965, Pu <0.4 d/m/l, U 1.9 µg/l,
Gross β (Gamma) <1.0 d/m/l

Report source of data: Griggs, R. L., 1964

Remarks: Drilled for geologic and hydrologic information

Table 18.--Test well T-3

USGS Location No. 19.6.13.344 USGS Designation T-3

AEC Coordinates _____ AEC Designation _____

Driller Layne-Western Inc. Address Kansas City, Mo.

Topography Floor of Los Alamos Canyon Altitude 6,625 feet

Method drilled Cable tool Diameter 10 inches Use Observation

Drilled depth 815 feet Completed depth 815 feet

Date drilled November 1949 Chief Aquifer(s) in Totovi Lentil

Depth to water 749.9 feet Date Jan. 17, 1951 Transmissibility 7,800 gpd/ft

Specific capacity 0.5 gpm/ft After 720 hrs. pumping

Log:	Thickness	Depth
Bandelier Tuff		
Otowi Member	140	140
Guaje Member	35	175
Puye Conglomerate		
Fanglomerate member	91	266
Basalt Unit 2	72	338
Puye Conglomerate		
Fanglomerate member	415	753
Totovi Lentil	62	815

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
16 - OD	0- 33	
10 - ID	0-811	
6 - ID	804-815	Screen from 805-815 feet

Chemical analysis: Constituents in parts per million

Date Jan. 7, 1953, Temp. 74 °F, SiO_2 76 ppm, Fe .01 ppm, Ca 19 ppm, Mg 6.2 ppm, Na + K 14 ppm, HCO_3 112 ppm, CO_3 0 ppm, SO_4 3.8 ppm, Cl 4.8 ppm, F .3 ppm, NO_3 .2 ppm, Hardness 73 ppm, Dissolved solids _____, Specific conductance 194 micromhos, pH 7.3

Radiochemical analysis: Date March 11, 1965, Pu $<$0.4 d/m/l, U$\leq$0.5 µg/l, Gross β (Gamma) $<$1.0 d/m/l

Report source of data: Griggs, R. L., 1964

Remarks: Drilled for geologic and hydrologic information.

Table 19.--Test well T-7

USGS Location No. 18.6.13.444 USGS Designation T-7

AEC Coordinates ____ - ____ AEC Designation ____

Driller Jenkins Drilling Co. Address ____

Topography Ancho Canyon Altitude 6,224 feet

Method drilled Cable tool Diameter ____ inches Use Unused

Drilled depth 55 feet Completed depth 55 feet

Date drilled April 1950 Chief Aquifer(s) None

Depth to water dry feet Date ____ Transmissibility ____ gpd/ft

Specific capacity ____ gpm/ft After ____

Log:	Thickness	Depth
Alluvium		10
Bandelier Tuff		
Otowi Member		35-45
Basaltic rocks of Chino		
Mesa Unit 2		10-55
(clay 45-51)		

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
		Open hole

Chemical analysis: Constituents in parts per million

Date ____, Temp. ____ °F, SiO_2 ____, Fe ____, Ca ____,

Mg ____, Na + K ____, HCO_3 ____, CO_3 ____, SO_4 ____, Cl ____,

F ____, NO_3 ____, Hardness ____, Dissolved solids ____,

Specific conductance ____ micromhos, pH ____

Radiochemical analysis: Date ____, Pu ____ d/m/l, U ____ µg/l,

Gross β (Gamma) ____ d/m/l

Report source of data: Griggs, R. L. 1964

Remarks: Drilled for geologic and hydrologic information.

Table 20.--Test well T-2

USGS Location No. 19.6.14.221 USGS Designation T -2

AEC Coordinates _____ AEC Designation _____

Driller Layne - Western Inc. Address Kansas City, Mo.

Topography Floor of Pueblo Canyon Altitude 6,646 feet

Method drilled Cable tool Diameter 8 inches Use Observation

Drilled depth 789 feet Completed depth 789 feet

Date drilled November 1949 Chief Aquifer(s) in Totovi Lentil

Depth to water 760.1 feet Date Jan. 4, 1951 Transmissibility 7,000 gpd/ft

Specific capacity 1.0 gpm/ft After 760 hours pumping

Log:	Thickness	Depth
Alluvium	11	11
Bandelier Tuff		
Otowi Member	20	31
Guaje Member	32	63
Puye Conglomerate		
Fanglomerate member	637	700
Totovi Lentil	89	789

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
16 - OD	0- 57	
12 - ID	0-197	
10 - ID	0-519	
8 - ID	0-778	
6-in. well screen	778-788	

Chemical analysis: Constituents in parts per million

Date Jan. 6, 1953, Temp. 71 °F, SiO_2 75, Fe .01, Ca 15,

Mg 4.1, Na + K 10, HCO_3 83, CO_3 0, SO_4 2.9, Cl 3.0,

F .3, NO_3 .5, Hardness 54, Dissolved solids _____,

Specific conductance 141 micromhos, pH 7.4

Radiochemical analysis: Date 10-19-64, Pu <0.4 d/m/l, U 0.5 µg/l,

Gross β (Gamma) 8.0 d/m/l

Report source of data: Griggs, R. L., 1964

Remarks: Several abandoned holes nearby. Drilled for geologic and hydrologic information.

Table 21.--Test well T-2A

USGS Location No. 19.6.14.221a USGS Designation T-2A

AEC Coordinates _____ AEC Designation _____

Driller Layne - Western Inc. Address Kansas City, Mo.

Topography Floor of Pueblo Canyon Altitude 6,646 feet

Method drilled Cable tool Diameter 8 inches Use Observation

Drilled depth 133 feet Completed depth 133 feet

Date drilled November 1949 Chief Aquifer(s)/ Fanglomerate member

Depth to water 117.1 feet Date Dec. 22, 1950 Transmissibility 50 gpd/ft

Specific capacity .03 gpm/ft After 4.5 hrs. pumping

Log:

	Thickness	Depth
Alluvium	11	11
Bandelier Tuff		
Otowi Member	21	31
Guaje Member	32	63
Puye Conglomerate		
Fanglomerate member	70	133

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
12 - ID	0- 12	
8 - ID	0-118	
6 - ID	118-128	
6 - Screen	128-133	

Chemical analysis: Constituents in parts per million

Date Jan. 6, 1953, Temp. 53 °F, SiO_2 60, Fe 2.6, Ca 7.8,
Mg 3.7, Na + K 9.2, HCO_3 53, CO_3 0, SO_4 4.5, Cl 3.2,
F 0.2, NO_3 1.6, Hardness 34, Dissolved solids _____,
Specific conductance 102 micromhos, pH 7.3

Radiochemical analysis: Date March 11, 1965, Pu <0.4 d/m/l, U <0.5 µg/l,
Gross β (Gamma) 4.8 d/m/l

Report source of data: Griggs, R. L., 1964

Remarks: Drilled to locate perched water at 130 feet.

Table 22.--Test hole H-19

USGS Location No. 19.6.17.234 USGS Designation H-19

AEC Coordinates _____ AEC Designation _____

Driller Jenkins Drilling Co. Address _____

Topography Floor of Los Alamos Canyon Altitude 7,178 feet

Method drilled Cable tool Diameter 8 inches Use Unused

Drilled depth 2,000 feet Completed depth - feet

Date drilled September 1949 Chief Aquifer(s) in Tschicoma Formation

Depth to water 970 ±5 feet Date Oct. 1949 Transmissibility - gpd/ft

Specific capacity -- gpm/ft After -

Log:	Thickness	Depth
Alluvium	27	27
Bandelier Tuff		
Tshirege Member	173	200
Otowi Member	215	415
Guaje Member	57	472
Tschicoma Formation	347	819
Puye Conglomerate		
Fanglomerate member	391	1,210
Tschicoma Formation	270	1,480
Puye Conglomerate		
Totovi Lentil	10	1,490
Tschicoma Formation	510	2,000

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
8 - ID	0-10	Open hole

Chemical analysis: Constituents in parts per million

Date_____, Temp._____°F, SiO_2_____, Fe_____, Ca_____,

Mg_____, Na + K_____, HCO_3_____, CO_3_____, SO_4_____, Cl_____,

F_____, NO_3_____, Hardness_____, Dissolved solids _____,

Specific conductance_____ micromhos, pH_____

Radiochemical analysis: Date_____, Pu_____d/m/l, U_____µg/l,

Gross β (Gamma)_____d/m/l

Report source of data: Griggs, R. L., 1964

Remarks: Drilled for geologic and hydrologic information.

Table 23.--Test well T-6

USGS Location No. 19.6.36.141 USGS Designation T-6

AEC Coordinates _____ AEC Designation _____

Driller Jenkins Drilling Co. Address _____

Topography Floor of Pajarito Canyon Altitude 6,705 feet

Method drilled Cable tool Diameter _____ inches Use Unused

Drilled depth 300 feet Completed depth 300 feet

Date drilled March 1950 Chief Aquifer(s) None

Depth to water dry feet Date _____ Transmissibility _____ gpd/ft

Specific capacity _____ gpm/ft After _____

Log:	Thickness	Depth
Alluvium	25	25
Bandelier Tuff		
Tshirege Member	60	85
Otowi Member	180	265
Guaje Member	20	285
Puye Conglomerate		
Fanglomerate member	15	300

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
		Open hole

Chemical analysis: Constituents in parts per million

Date _____, Temp. _____°F, SiO_2 _____, Fe _____, Ca _____,

Mg _____, Na + K _____, HCO_3 _____, CO_3 _____, SO_4 _____, Cl _____,

F _____, NO_3 _____, Hardness _____, Dissolved solids _____,

Specific conductance _____ micromhos, pH _____

Radiochemical analysis: Date _____, Pu _____ d/m/l, U _____ µg/l,

Gross β (Gamma) _____ d/m/l

Report source of data: Griggs, R. L., [illegible], 1964

Remarks: Drilled for geologic and hydrologic information.

Table 24.--Layne-Western well

USGS Location No. 19.7.4.444a USGS Designation Layne-Western ~~XXX~~ Well

AEC Coordinates _____ AEC Designation _____

Driller Layne-Western Co. Address Kansas City, Mo.

Topography Floor of Guaje Canyon Altitude 5,971 feet

Method drilled Cable tool Diameter 8 inches Use Observation

Drilled depth 157 feet Completed depth 147 feet

Date drilled March 1950 Chief Aquifer(s)/ Tesuque Formation

Depth to water 100.6 feet Date Dec. 6, 1952 Transmissibility - gpd/ft

Specific capacity - gpm/ft After -

Log:	Thickness	Depth
Alluvium	12	12
Puye Conglomerate		
Fanglomerate member	13	25
Totovi Lentil	50	75
Tesuque Formation	82	157

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
8	0-147	20 feet of screen 127 feet to 147 feet

Chemical analysis: Constituents in parts per million

Date Apr. 21, 1959, Temp. 63 °F, SiO_2 _____, Fe _____, Ca _____,

Mg _____, Na + K 8.9, HCO_3 98, CO_3 0, SO_4 _____, Cl 2.2,

F 0.4, NO_3 0.3, Hardness 60, Dissolved solids _____,

Specific conductance 162 micromhos, pH 7.4

Radiochemical analysis: Date Apr. 21, 1959, Pu 0 d/m/l, U 0 µg/l,

Gross β (Gamma) 0 d/m/l

Report source of data: USGS well schedules. (unpublished data)

Remarks: Used to supply contractor with water during drilling of supply wells in Guaje Canyon.

Table 25.--Test GT-1

USGS Location No. 19.7.13.114a USGS Designation GT-1 (L-1A, Guaje Test)

AEC Coordinates _____ AEC Designation _____

Driller Layne-Western Co. Address Kansas City, Mo.

Topography Floor of Los Alamos Canyon Altitude 5,624 feet

Method drilled Hydraulic rotary Diameter 4 inches Use Observation

Drilled depth 400 feet Completed depth 400 in feet

Date drilled March 1946 Chief Aquifer(s) / Tesuque Formation

Depth to water flowed feet Date March 1946 Transmissibility - gpd/ft

Specific capacity - gpm/ft After -

Log:

	Thickness	Depth
Alluvium	78	78
Tesuque Formation	322	400

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
6	0-76.5	
4	0-400	

Chemical analysis: Constituents in parts per million

Date May 1960, Temp. 64 °F, SiO_2 _____, Fe _____, Ca _____,
Mg _____, Na + K 70, HCO_3 188, CO_3 0, SO_4 25, Cl 7.0,
F 0.4, NO_3 1.0, Hardness 37, Dissolved solids 239,
Specific conductance 363 micromhos, pH 8.1

Radiochemical analysis: Date May 1960, Pu 0.0 d/m/l, U 17.5 µg/l,
Gross β (Gamma) 10 d/m/l

Report source of data: Black and Veatch, 1946 (unpublished data)

Remarks: Sounded depth 305 feet. Exploratory test hole for water supply.

Table 26.--Test GT-5

USGS Location No. 19.7.13.124 USGS Designation GT-5 (Stop Sign, Guaje Test)

AEC Coordinates _____ AEC Designation _____

Driller Layne-Western Inc. Address Kansas City, Mo.

Topography Floor of Los Alamos Canyon Altitude 5,609 feet

Method drilled Cable tool Diameter 2 inches Use Observation

Drilled depth 475 feet Completed depth 275 ~~in~~ feet

Date drilled March 1946 Chief Aquifer(s) / Tesuque Formation

Depth to water flowing feet Date March 1946 Transmissibility - gpd/ft

Specific capacity - gpm/ft After -

Log:	Thickness	Depth
Alluvium	38	38
Tesuque Formation	437	475

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks

2-inch to an undetermined depth. Well sounded and found to be open to a depth of 275 feet, Oct. 1965.

Chemical analysis: Constituents in parts per million

Date _____, Temp. _____ °F, SiO_2 _____, Fe _____, Ca _____,

Mg _____, Na + K _____, HCO_3 _____, CO_3 _____, SO_4 _____, Cl _____,

F _____, NO_3 _____, Hardness _____, Dissolved solids _____,

Specific conductance _____ micromhos, pH _____

Radiochemical analysis: Date _____, Pu _____ d/m/l, U _____ µg/l,

Gross β (Gamma) _____ d/m/l

Report source of data: Black and Veatch, 1946 (unpublished data)

Remarks: Exploratory test hole for water supply.

Table 27.--Test GT-3

USGS Location No. 19.7.13.211 USGS Designation GT-3 (Guaje Test)

AEC Coordinates _____ AEC Designation _____

Driller Layne-Western Inc. Address Houston, Texas

Topography Floor of Los Alamos Canyon Altitudeapp. 5,620 feet

Method drilled Hydraulic rotary Diameter - inches Use Unused

Drilled depth 475 feet Completed depth 0 in feet

Date drilled March 1946 Chief Aquifer(s) / Tesuque Formation

Depth to water flowing feet Date March 1946 Transmissibility - gpd/ft

Specific capacity - gpm/ft After -

Log:

	Thickness	Depth
Alluvium	31	31
Tesuque Formation	444	475

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
		Open hole

Chemical analysis: Constituents in parts per million

Date_____, Temp._____°F, SiO_2_____, Fe_____, Ca_____,

Mg_____, Na + K_____, HCO_3_____, CO_3_____, SO_4_____, Cl_____,

F_____, NO_3_____, Hardness_____, Dissolved solids _____,

Specific conductance_____ micromhos, pH_____

Radiochemical analysis: Date_____, Pu_____d/m/l, U_____µg/l,

Gross β (Gamma)_____d/m/l

Report source of data: Black and Veatch, 1946 (unpublished data)

Remarks: Exploratory test hole for water supply.

Table 28.--Test GT-2

USGS Location No. 19.7.13.424 USGS Designation GT-2 (Guaje Test)

AEC Coordinates _____ AEC Designation _____

Driller Layne-Western Inc. Address Kansas City, Mo.

Topography Floor of Los Alamos Canyon Altitude - feet

Method drilled Cable tool Diameter - inches Use Unused

Drilled depth 50 feet Completed depth 0 feet

Date drilled March 1946 Chief Aquifer(s) Alluvium

Depth to water - feet Date _____ Transmissibility _____ gpd/ft

Specific capacity - gpm/ft After _____

Log:	Thickness	Depth
Alluvium	40	40
Tesuque Formation	10	50

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
		Open hole

Chemical analysis: Constituents in parts per million

Date _____, Temp. _____ °F, SiO_2 _____, Fe _____, Ca _____,

Mg _____, Na + K _____, HCO_3 _____, CO_3 _____, SO_4 _____, Cl _____,

F _____, NO_3 _____, Hardness _____, Dissolved solids _____,

Specific conductance _____ micromhos, pH _____

Radiochemical analysis: Date _____, Pu _____ d/m/l, U _____ µg/l,

Gross β (Gamma) _____ d/m/l

Report source of data: Black and Veatch, 1946 (unpublished data)

Remarks: Exploratory test hole for water supply.

Table 29.--Test GT-4

USGS Location No. 19.7.14.221a USGS Designation GT-4 (L-3A, Guaje Test)

AEC Coordinates _____ AEC Designation _____

Driller Layne-Western Inc. Address Kansas City, Mo.

Topography Floor of Los Alamos Canyon Altitude 5,675 feet

Method drilled Hydraulic rotary Diameter 2 inches Use Observation

Drilled depth 315 feet Completed depth 315 feet

Date drilled March 1946 Chief Aquifer(s) / Tesuque Formation
in

Depth to water flowing feet Date March 1946 Transmissibility. _____ gpd/ft

Specific capacity _____ gpm/ft After _____

Log:

	Thickness	Depth
Alluvium ----------	54	54
Tesuque Formation ---------	261	315

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
2	0-315	Perforated 60 to 315 feet Bottom sounded 164 feet, Oct. 1965.

Chemical analysis: Constituents in parts per million

Date _____, Temp. _____ °F, SiO_2 _____, Fe _____, Ca _____,

Mg _____, Na + K _____, HCO_3 _____, CO_3 _____, SO_4 _____, Cl _____,

F _____, NO_3 _____, Hardness _____, Dissolved solids _____,

Specific conductance _____ micromhos, pH _____

Radiochemical analysis: Date _____, Pu _____ d/m/l, U _____ µg/l,

Gross β (Gamma) _____ d/m/l

Report source of data: Black and Veatch Inc., 1946 (unpublished data)

Remarks: Exploratory test hole for water supply.

Table 30.--Test well T-1

USGS Location No. 19.7.20.221 USGS Designation T-1 (Test well 1)

AEC Coordinates _____ AEC Designation _____

Driller Jenkins Drilling Co. Address _____

Topography Pueblo Canyon Altitude 6,371 feet

Method drilled Cable tool Diameter 8 inches Use observation

Drilled depth 642 feet Completed depth 642 feet

Date drilled January 1950 Chief Aquifer(s) Totavi Lentil

Depth to water 593.1 feet Date Jan. 4, 1951 Transmissibility 200 gpd/ft

Specific capacity 2 gpm/ft After 246 hours pumping

Log:

	Thickness	Depth
Puye Conglomerate		
Fanglomerate member	50	50
Basaltic rocks Unit 3	115	165
Puye Conglomerate		
Fanglomerate member	11	176
Basaltic rocks Unit 2	79	255
Puye Conglomerate		
Fanglomerate member	155	410
Basaltic rocks Unit 2	100	510
Puye Conglomerate		
Fanglomerate member	95	605
Totavi Lentil	37	642

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
16 OD	0-52	
12 ID	0-241	
8 ID	0-627	
6	622-642	10 feet of screen from 622-632 feet.

Chemical analysis: Constituents in parts per million

Date Jan. 7, 1953, Temp. 70 °F, SiO_2 56, Fe .04, Ca 20,

Mg 1.2, Na + K 19, HCO_3 92, CO_3 _____, SO_4 5.1, Cl 4.2,

F 1.1, NO_3 7.2, Hardness 55, Dissolved solids _____,

Specific conductance 183 micromhos, pH _____

Radiochemical analysis: Date June 19, 1962, Pu <0.4 d/m/l, U 3.0 µg/l,

Gross β (Gamma) < 20 d/m/l

Report source of data: Griggs, R. L., 1964

Remarks: Drilled for geologic and hydrologic information.

Table 31.--Test well T-1A

USGS Location No. 19.7.20.221a USGS Designation T-1A (Test well 1A)

AEC Coordinates _____ AEC Designation _____

Driller Jenkins Drilling Co. Address _____

Topography Pueblo Canyon Altitude 6,370 feet

Method drilled Cable tool Diameter 6 inches Use Observation

Drilled depth 225 feet Completed depth 225 feet

Date drilled Jan. 1950 Chief Aquifer(s) Basaltic rocks of Chino Mesa Unit 2

Depth to water 183.8 feet Date Dec. 22, 1950 Transmissibility 8,300 gpd/ft

Specific capacity .75 gpm/ft After 1,128 hours pumping

Log:

	Thickness	Depth
Puye Conglomerate		
Fanglomerate member	50	50
Basaltic rocks Unit 3	115	165
Puye Conglomerate		
Fanglomerate member	11	176
Basaltic rocks Unit 2	49	225

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
16 OD	0- 39	
12 ID	0-100	
6 ID	0-223	10 feet of 6-inch diameter screen welded on the bottom.

Chemical analysis: Constituents in parts per million

Date Jan. 7, 1953, Temp. 53 °F, SiO_2 49, Fe .09, Ca 17,
Mg 7.8, Na + K 38, HCO_3 125, CO_3 _____, SO_4 19, Cl 14,
F .5, NO_3 17, Hardness 74, Dissolved solids _____,
Specific conductance 321 micromhos, pH 7.2

Radiochemical analysis: Date Oct. 19, 1964, Pu <0.4 d/m/l, U 0.7 µg/l,
Gross β (Gamma) 10 d/m/l

Report source of data: Griggs, R. L., 1964

Remarks: Drilled to locate perched water at 205 feet.

Table 32.--Test well T-5

USGS Location No. 19.7.31.433 USGS Designation T-5 (Test well 5)

AEC Coordinates _____ AEC Designation _____

Driller Jenkins Drilling Co. Address _____

Topography floor of Pajarito Canyon Altitude 6,592 feet

Method drilled Cable tool Diameter 24 inches Use Unused

Drilled depth 263 feet Completed depth 263 feet

Date drilled March 1950 Chief Aquifer(s) None

Depth to water dry feet Date _____ Transmissibility _____ gpd/ft

Specific capacity _____ gpm/ft After _____

Log:	Thickness	Depth
Alluvium	23	23
Bandelier Tuff	[illegible]	[illegible]
Tshirege Member	17	40
Otowi Member	120	160
Guaje Member	11	171
Basaltic rock		
Unit 2	92	263

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
24 OD	0-22	Open hole below 22 feet

Chemical analysis: Constituents in parts per million

Date _____, Temp. _____ °F, SiO_2 _____, Fe _____, Ca _____,

Mg _____, Na + K _____, HCO_3 _____, CO_3 _____, SO_4 _____, Cl _____,

F _____, NO_3 _____, Hardness _____, Dissolved solids _____,

Specific conductance _____ micromhos, pH _____

Radiochemical analysis: Date _____, Pu _____ d/m/l, U _____ µg/l,

Gross β (Gamma) _____ d/m/l

Report source of data: Griggs, R. L., 1964

Remarks: Drilled for geologic and hydrologic information.

Table 33.--Buckman No. 1

USGS Location No. 19.7.36.314 USGS Designation Buckman No. 1

AEC Coordinates _____ AEC Designation _____

Driller _____ Address _____

Topography Flood plain of Canada Ancha Altitude 5,550 feet

Method drilled _____ Diameter _____ inches Use stock

Drilled depth _____ feet Completed depth _____ feet

Date drilled _____ Chief Aquifer(s) in Tesuque Formation

Depth to water Flowing feet Date _____ Transmissibility _____ gpd/ft

Specific capacity _____ gpm/ft After _____

Log: feet feet

Not available

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks

Chemical analysis: 1/ Constituents in parts per million

Date Oct. 1964, Temp. 63 °F, SiO_2 _____, Fe _____, Ca 4,

Mg 0.5, Na + K 48, HCO_3 63, CO_3 14, SO_4 _____, Cl 4,

F 0.4, NO_3 1.2, Hardness 12, Dissolved solids 247 ppm,

Specific conductance 120 micromhos, pH 8.9

Radiochemical analysis: Date Nov. 2, 1964, Pu < 0.4 d/m/l, U 2.0 µg/l,

Gross β (Gamma) 18.0 d/m/l

Report source of data: Spiegel, Zane, and others, 1963

Remarks: Sounded depth was 43 feet in October, 1964. Well flows 4 gpm.

1/ Analyses by the Los Alamos Scientific Laboratory

— Well used as part of LASL and AEC monitoring net.

Table 34.--Buckman well

USGS Location No. 19.7.36.443 USGS Designation Buckman well

AEC Coordinates Canada Ancha AEC Designation

Driller Address

Topography Flood plain of Canada Ancha Altitude 5,680 feet

Method drilled Diameter 6 inches Use Stock

Drilled depth feet Completed depth feet

Date drilled Chief Aquifer(s) Tesuque Formation

Depth to water Flowing feet Date Oct. 6, 1950 Transmissibility gpd/ft

Specific capacity gpm/ft After

Log: feet feet

Not available

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks

Chemical analysis: Constituents in parts per million

Date, Temp. 60 °F, SiO_2, Fe, Ca,

Mg, Na + K, HCO_3, CO_3, SO_4, Cl,

F, NO_3, Hardness, Dissolved solids,

Specific conductance micromhos, pH

Radiochemical analysis: Date, Pu d/m/l, U µg/l,

Gross β (Gamma) d/m/l

Report source of data: USGS well schedules, Santa Fe County (unpublished data)

Remarks: Well used as part of LASL and AEC monitoring net.

Table 35.--Test RGT-3

USGS Location No. 19.8.7.143 USGS Designation RGT-3 (Rio Grande Test-3)

AEC Coordinates _____ AEC Designation _____

Driller Layne-Western Inc. Address Kansas City, Mo.

Topography Valley of Rio Grande Altitude _____ feet

Method drilled Cable tool Diameter _____ inches Use Unused

Drilled depth 495 feet Completed depth 0 in feet

Date drilled February 1946 Chief Aquifer(s) Alluvium and Tesuque Formation

Depth to water _____ feet Date _____ Transmissibility _____ gpd/ft

Specific capacity _____ gpm/ft After _____

Log:

	Thickness	Depth
Alluvium	68	68
Tesuque Formation	427	495

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks

Chemical analysis: Constituents in parts per million

Date _____, Temp. _____ °F, SiO_2 _____, Fe _____, Ca _____,

Mg _____, Na + K _____, HCO_3 _____, CO_3 _____, SO_4 _____, Cl _____,

F _____, NO_3 _____, Hardness _____, Dissolved solids _____,

Specific conductance _____ micromhos, pH _____

Radiochemical analysis: Date _____, Pu _____ d/m/l, U _____ µg/l,

Gross β (Gamma) _____ d/m/l

Report source of data: Black and Veatch, 1946 (unpublished data)

Remarks: Water reported from 50 to 80 feet
Exploratory test hole for water supply.

Table 36.--Test RGT-1

USGS Location No. 19.8.7.144 USGS Designation RGT-1 (Rio Grande Test 1)

AEC Coordinates _____ AEC Designation _____

Driller Layne-Western Inc. Address Kansas City, Mo.

Topography Rio Grande Valley Altitude _____ feet

Method drilled Cable tool Diameter _____ inches Use Unused

Drilled depth 53 feet Completed depth 0 feet

Date drilled Feb. 1946 Chief Aquifer(s) Alluvium

Depth to water _____ feet Date _____ Transmissibility _____ gpd/ft

Specific capacity _____ gpm/ft After _____

Log:	Thickness	Depth
Alluvium	48	48
Tesuque Formation	5	53

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks

Chemical analysis: Constituents in parts per million

Date _____, Temp. _____ °F, SiO_2 _____, Fe _____, Ca _____,

Mg _____, Na + K _____, HCO_3 _____, CO_3 _____, SO_4 _____, Cl _____,

F _____, NO_3 _____, Hardness _____, Dissolved solids _____,

Specific conductance _____ micromhos, pH _____

Radiochemical analysis: Date _____, Pu _____ d/m/l, U _____ µg/l,

Gross β (Gamma) _____ d/m/l

Report source of data: Black and Veatch, 1946 (unpublished data)

Remarks: Exploratory test hole for water supply.

Table 37.--Test RGT-2

USGS Location No. 19.8.7.144a USGS Designation RGT-2 (Rio Grande test)2)

AEC Coordinates _____ AEC Designation _____

Driller Layne-Western Inc. Address Kansas City, Mo.

Topography Valley of Rio Grande Altitude _____ feet

Method drilled Cable tool Diameter _____ inches Use Unused

Drilled depth 497 feet Completed depth 0 feet

Date drilled Feb. 1946 Chief Aquifer(s)/ Alluvium and Tesuque Formation

Depth to water _____ feet Date _____ Transmissibility _____ gpd/ft

Specific capacity _____ gpm/ft After _____

Log:

	Thickness	Depth
Alluvium	41	41
Tesuque Formation	456	497

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks

Chemical analysis: Constituents in parts per million

Date _____, Temp. _____ °F, SiO_2 _____, Fe _____, Ca _____,

Mg _____, Na + K _____, HCO_3 _____, CO_3 _____, SO_4 _____, Cl _____,

F _____, NO_3 _____, Hardness _____, Dissolved solids _____,

Specific conductance _____ micromhos, pH _____

Radiochemical analysis: Date _____, Pu _____ d/m/l, U _____ µg/l,

Gross β (Gamma) _____ d/m/l

Report source of data: Black and Veatch, 1946 (unpublished data)

Remarks: Water reported from 50 feet to 80 feet.
Exploratory test hole for water supply.

Table 38.--Test RGT-4

USGS Location No. 19.8.7.213 USGS Designation RGT-4 (Rio Grande Test 4)

AEC Coordinates _____ AEC Designation _____

Driller Layne-Western Inc. Address Kansas City, Mo.

Topography Valley of Rio Grande Altitude _____ feet

Method drilled Cable tool Diameter _____ inches Use Unused

Drilled depth 495 feet Completed depth 0 in feet

Date drilled Feb. 1946 Chief Aquifer(s) Alluvium and Tesuque Formation

Depth to water _____ feet Date _____ Transmissibility _____ gpd/ft

Specific capacity _____ gpm/ft After _____

Log:

	Thickness	Depth
Alluvium	47	47
Tesuque Formation	448	495

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks

Chemical analysis: Constituents in parts per million

Date _____, Temp. _____ °F, SiO_2 _____, Fe _____, Ca _____,

Mg _____, Na + K _____, HCO_3 _____, CO_3 _____, SO_4 _____, Cl _____,

F _____, NO_3 _____, Hardness _____, Dissolved solids _____,

Specific conductance _____ micromhos, pH _____

Radiochemical analysis: Date _____, Pu _____ d/m/l, U _____ µg/l,

Gross β (Gamma) _____ d/m/l

Report source of data: Black and Veatch, 1946 (unpublished data)

Remarks: Water reported from 50 to 80 feet.
Exploratory test hole for water supply.

Special investigations

Special investigations related to test-site evaluations and to the disposal of low-level radioactive wastes were made at Technical Area TA-49, Mortandad Canyon, Acid and Pueblo Canyons, Bayo Canyon, Los Alamos and DP Canyons, and the contaminated waste pits near TA-21. Fluid dynamics studies were made near TA-50 and TA-52.

Technical Area TA-49

A study was made of the geology and hydrology of area TA-49 (Weir and Purtymun, 1962). Four test holes were drilled to determine the hydrologic and geologic characteristics of this site. Three test holes were drilled to determine the presence or absence of perched water beneath Ancho and Water Canyons and four test holes were cored to determine the physical properties of the tuff. Applicable geologic, hydrologic, and construction data obtained from these holes are presented on tables 39-50. Locations are shown on Figures 2 and 4. Construction

Figure 4 (caption on next page) belongs near here.

records of twenty-five moisture access tubes used to determine the distribution of moisture in soil and underlying tuff are shown in table 51 and locations are shown on Figures 2 and 5.

Figure 5 (caption on next page) belongs near here.

No radioactive contamination was found in the main aquifer, and no perched water was found under Ancho and Water Canyons. Air permeability, porosity, density, and water content of the cores was studied.

Figure 4.--Location of test holes in TA-49, Los Alamos County, N. Mex.

5.--Location of moisture access tubes in TA-49, Los Alamos County, New Mexico.

Table 39.--Deep Test DT-5

USGS Location No. 18.6.3.113 USGS Designation DT-5

AEC Coordinates _____ AEC Designation _____

Driller Soil Mech. Inc. Address Bryan, Texas

Topography Surface of Frijoles Mesa Altitude 7,143 feet

Method drilled Air rotary Diameter 8 inches Use Unused

Drilled depth 978 feet Completed depth 927 feet

Date drilled 1959 Chief Aquifer(s) None

Depth to water dry feet Date - Transmissibility - gpd/ft

Specific capacity - gpm/ft After _____

Log:

	Thickness	Depth
Bandelier Tuff		
Tshirege Member	641	-641
Otowi Member	198	-839
Guaje Member	101	-940
Puye Conglomerate	38	-978

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
8	0-180	Open hole below 180 feet

Chemical analysis: Constituents in parts per million

Date _____, Temp. _____°F, SiO_2 _____, Fe _____, Ca _____,

Mg _____, Na + K _____, HCO_3 _____, CO_3 _____, SO_4 _____, Cl _____,

F _____, NO_3 _____, Hardness _____, Dissolved solids _____,

Specific conductance _____ micromhos, pH _____

Radiochemical analysis: Date _____, Pu _____ d/m/l, U _____ µg/l,

Gross β (Gamma) _____ d/m/l

Report source of data: Weir, J. E. Jr., and Purtymun, W. D., 1962 (unpublished data)

Remarks: Abandoned due to drilling difficulties. Electric logs available.

Table 40.--Core hole CH-2

USGS Location No. 18:6.3.114 USGS Designation CH-2 (core hole 2)

AEC Coordinates _____ AEC Designation _____

Driller Soil Mech. Inc. Address Bryan, Texas

Topography Surface of Frijoles Mesa Altitude 7,137 feet

Method drilled Air Rotary Diameter 3 inches Use Observation

Drilled depth 501 feet Completed depth 500 feet

Date drilled November 1959 Chief Aquifer(s) None

Depth to water dry feet Date _____ Transmissibility _____ gpd/ft

Specific capacity _____ gpm/ft After _____

Log:	Thickness	Depth
Bandelier Tuff		
Tshirege Member ----------	501	501

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
2	0-500	Galvanized pipe with lower 20 feet perforated

Chemical analysis: Constituents in parts per million

Date _____, Temp. _____ °F, SiO_2 _____, Fe _____, Ca _____,

Mg _____, Na + K _____, HCO_3 _____, CO_3 _____, SO_4 _____, Cl _____,

F _____, NO_3 _____, Hardness _____, Dissolved solids _____,

Specific conductance _____ micromhos, pH _____

Radiochemical analysis: Date _____, Pu _____ d/m/l, U _____ µg/l,

Gross β (Gamma) _____ d/m/l

Report source of data: Weir, J. E., Jr., and Purtymun, W. D., 1962 (unpublished data)

Remarks: Drilled to obtain core samples of Bandelier Tuff.

Table 41.--Deep test DT-5P

USGS Location No. 18.6.3.131 USGS Designation DT-5P

AEC Coordinates _____ AEC Designation _____

Driller Soil Mech., Inc. Address Bryan, Texas

Topography Surface of Frijoles Mesa Altitude 7,144 feet

Method drilled Air Rotary Diameter 4 3/4 inches Use unused

Drilled depth 692 feet Completed depth 692 feet

Date drilled 1959 Chief Aquifer(s) None

Depth to water dry feet Date _____ Transmissibility _____ gpd/ft

Specific capacity _____ gpm/ft After _____

Log:	Thickness	Depth
Bandelier Tuff		
Tshirege Member	641	641
Otowi Member	51	692

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
		Open hole

Chemical analysis: Constituents in parts per million

Date _____, Temp. _____°F, SiO_2 _____, Fe _____, Ca _____,

Mg _____, Na + K _____, HCO_3 _____, CO_3 _____, SO_4 _____, Cl _____,

F _____, NO_3 _____, Hardness _____, Dissolved solids _____.

Specific conductance _____ micromhos, pH _____

Radiochemical analysis: Date _____, Pu _____ d/m/l, U _____ µg/l,

Gross β (Gamma) _____ d/m/l

Report source of data: Weir, J. E., Jr., and Purtymun, W. D., 1962 (unpublished data)

Remarks: Drilled to locate possible perched water zones in the Bandelier Tuff.

Table 42.--Deep test DT-5A

USGS Location No. 18.6.3.131a USGS Designation DT-5A

AEC Coordinates _____ AEC Designation _____

Driller Soil Mech. Inc. Address Bryan, Texas

Topography Surface of Frijoles Mesa Altitude 7,144 feet

Method drilled Hydraulic Rotary Diameter 8 inches Use Observation

Drilled depth 1,821 feet Completed depth 1,821 feet

Date drilled January 1960 Chief Aquifer(s) Santa Fe Group and Tschicoma Fm.

Depth to water 1,173 feet Date April 1960 Transmissibility 11,000 gpd/ft

Specific capacity 5.7 gpm/ft After pumping 25 hours at 81 gpm

Log:	Thickness	Depth
Bandelier Tuff		
Tshirege Member	641	641
Otowi Member	198	839
Guaje Member	91	930
Puye Conglomerate		
Fanglomerate member	237	1,167
Tschicoma Formation	126	1,293
Puye Conglomerate		
Fanglomerate member	138	1,431
Tschicoma Formation	26	1,457
Puye Conglomerate		
Fanglomerate member	18	1,475
Totovi Lentil	52	1,527
Tesuque Formation	294	1,821

Casing schedule:

Diameter (inches)	Depth (feet)	Remarks
12	0-525	
8	0-1,821	220 feet of torch cut slots below depth of 1,172 feet.

Chemical analysis: Constituents in parts per million

Date Apr. 30, 1960, Temp. 70 °F, SiO_2 76, Fe .21, Ca 8.8,
Mg 2.9, Na + K 15.8, HCO_3 68, CO_3 0, SO_4 8.7, Cl .5,
F 0.2, NO_3 2.0, Hardness 34, Dissolved solids _____,
Specific conductance 132 micromhos, pH 7.6

Radiochemical analysis: Date 11-13-63, Pu < 0.4 d/m/l, U 0.5 µg/l,
Gross β (Gamma) 8 d/m/l

Report source of data: Weir, J. E., Jr., and Purtymun, W. D., 1962 (unpublished data)

Remarks: Electric logs available. Drilled for geologic and hydrologic information.
(Tritium Units 2.6, May 1960).

Table 43.--Test hole Alpha

USGS Location No. 18.6.3.132 USGS Designation Alpha

AEC Coordinates _____ AEC Designation _____

Driller Casey Drilling Co. Address Los Angeles, Calif.

Topography Surface of Frijoles Mesa Altitude 7,125 feet

Method drilled Rotary bucket Diameter 24 inches Use Unused

Drilled depth 189 feet Completed depth 189 feet

Date drilled February 1960 Chief Aquifer(s) None

Depth to water dry feet Date _____ Transmissibility _____ gpd/ft

Specific capacity _____ gpm/ft After _____

Log:	Thickness	Depth
Bandelier Tuff	189	189

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
24	0-10	Corrugated metal pipe cemented at surface

Chemical analysis: Constituents in parts per million

Date _____, Temp. ____ °F, SiO_2 _____, Fe _____, Ca _____,

Mg _____, Na + K _____, HCO_3 _____, CO_3 _____, SO_4 _____, Cl _____,

F _____, NO_3 _____, Hardness _____, Dissolved solids _____,

Specific conductance _____ micromhos, pH _____

Radiochemical analysis: Date _____, Pu _____ d/m/l, U _____ µg/l,

Gross β (Gamma) _____ d/m/l

Report source of data: Weir, J. E., Jr., and Purtymun, W. D., 1962 (unpublished data)

Remarks: Drilled for geologic information.

Table 44.-- Core hole CH-4

USGS Location No. 18.6.3.134 USGS Designation CH-4 (core hole 4)

AEC Coordinates _____ AEC Designation _____

Driller Soil Mech. Inc. Address Bryan, Texas

Topography Surface of Frijoles Mesa Altitude 7,116 feet

Method drilled Air Rotary Diameter 3 inches Use Observation

Drilled depth 303 feet Completed depth 300 feet

Date drilled February 1960 Chief Aquifer(s) none

Depth to water dry feet Date _____ Transmissibility _____ gpd/ft

Specific capacity _____ gpm/ft After _____

Log:	Thickness	Depth
Bandelier Tuff		
Tshirege Member ----------	303	303

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
2	0-300	Galvanized pipe with the lower 20 feet slotted

Chemical analysis: Constituents in parts per million

Date _____, Temp. _____°F, SiO_2 _____, Fe _____, Ca _____,

Mg _____, Na + K _____, HCO_3 _____, CO_3 _____, SO_4 _____, Cl _____,

F _____, NO_3 _____, Hardness _____, Dissolved solids _____,

Specific conductance _____ micromhos, pH _____

Radiochemical analysis: Date _____, Pu _____ d/m/l, U _____ µg/l,

Gross β (Gamma) _____ d/m/l

Report source of data: Weir, J. E., Jr., and Purtymun, W. D., 1962 (unpublished data)

Remarks: Drilled to obtain core samples of Bandelier Tuff

Table 45.--Deep test DT-10

USGS Location No. 18.6.3.241 USGS Designation DT-10

AEC Coordinates _____ AEC Designation _____

Driller Branch Drilling Co. Address Farmington, New Mexico

Topography Surface of Frijoles Mesa Altitude 7,019 feet

Method drilled Cable tool Diameter 12 inches Use Observation

Drilled depth 1,409 feet Completed depth 1,408 feet

Date drilled March 1960 Chief Aquifer(s) in Santa Fe Group and Tschicoma Formation

Depth to water 1,085 feet Date April 1960 Transmissibility 36,100 gpd/ft

Specific capacity 16 gpm/ft After 16 hours pumping at 78 gpm

Log:

	Thickness	Depth
Bandelier Tuff		
Tshirege Member		672-672
Otowi Member		157-829
Guaje Member		35-864
Puye Conglomerate		
Fanglomerate member		108-972
Tschicoma Formation		40-1,012
Basaltic rocks of Chino Mesa		
Unit 2		96-1,108
Unit 1		173-1,281
Puye Conglomerate		
Fanglomerate member		75-1,356
Totovi Lentil		46-1,402
Tesuque Formation		7-1,409

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
12	0-1,128	
8	1,096-1,408	8-inch casing rests on the bottom and is swedged into the 12-inch casing at 1,096 feet. 12-inch casing contains 50 feet of slots below 1,078 feet and the 8-inch casing contains 141 feet of slots.

Chemical analysis: Constituents in parts per million

Date April 1960, Temp. 67 °F, SiO_2 65, Fe .00, Ca 12,
Mg 2.9, Na + K 12.2, HCO_3 80, CO_3 0, SO_4 3.7, Cl 2.2,
F .2, NO_3 1.0, Hardness 42, Dissolved solids _____,
Specific conductance 135 micromhos, pH 7.3

Radiochemical analysis: Date Nov. 13, 1963, Pu < 0.4 d/m/l, U 0.7 µg/l,
Gross β (Gamma) 4 d/m/l

Report source of data: Weir, J. E. Jr., and Purtymun, W. D., 1962 (unpublished data)

Remarks: Electric logs available. Drilled for geologic and hydrologic information.

Table 46.--Test hole Gamma

USGS Location No. 18.6.3.314 USGS Designation Gamma

AEC Coordinates _____ AEC Designation _____

Driller Los Alamos Contractors Inc. Address Los Alamos, New Mexico

Topography Floor of Ancho Canyon Altitude 6,870 feet

Method drilled Air rotary Diameter 4 inches Use Observation

Drilled depth 54 feet Completed depth 54 feet

Date drilled March 1960 Chief Aquifer(s) None

Depth to water dry feet Date _____ Transmissibility _____ gpd/ft

Specific capacity _____ gpm/ft After _____

Log:

	Thickness	Depth
Alluvium	3	3
Bandelier Tuff		
Tshirege Member	51	54

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
4	0-6	

Chemical analysis: Constituents in parts per million

Date _____, Temp. _____ °F, SiO_2 _____, Fe _____, Ca _____,

Mg _____, Na + K _____, HCO_3 _____, CO_3 _____, SO_4 _____, Cl _____,

F _____, NO_3 _____, Hardness _____, Dissolved solids _____,

Specific conductance _____ micromhos, pH _____

Radiochemical analysis: Date _____, Pu _____ d/m/l, U _____ µg/l,

Gross β (Gamma) _____ d/m/l

Report source of data: Weir, J. E. Jr., and Purtymun, W. D., 1962 (unpublished data)

Remarks: A nearby 24-inch diameter hole was drilled with a bucket auger to 7 feet and abandoned because of the hardness of the tuff.
Drilled to locate possible perched water beneath Ancho Canyon.

Table 47.--Deep test DT-9

USGS Location No. 18.6.3.443 USGS Designation DT-9

AEC Coordinates _____ AEC Designation _____

Driller Branch Drilling Co. Address Farmington, New Mexico

Topography Surface of Frijoles Mesa Altitude 6,937 feet

Method drilled Cable tool Diameter 12 inches Use Observation

Drilled depth 1,501 feet Completed depth 1,501 feet

Date drilled February 1960 Chief Aquifer(s) Santa Fe Group and Tschicoma Formation in

Depth to water 1,003 feet Date April 1960 Transmissibility 61,000 gpd/ft

Specific capacity 22 gpm/ft After pumping for 24 hours at a rate of 88 gpm.

Log:

	Thickness	Depth
Bandelier Tuff		
Tshirege Member	676-	676
Otowi Member	126-	802
Guaje Member	48-	850
Puye Conglomerate		
Fanglomerate member	74-	1,924
Tschicoma Formation	238-	1,162
Puye Conglomerate		
Fanglomerate member	157-	1,319
Totovi Lentil	38-	1,357
Tesuque Formation	144-	1,501

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
12	0-1,335	115 feet of slots above 1,003 feet and 180 feet below 1,003 feet.
8	1,314-1,500	183 feet of slots.

Chemical analysis: Constituents in parts per million

Date May 7, 1960, Temp. 70 °F, SiO_2 69, Fe 4, Ca 12,

Mg 1.2, Na + K 13.2, HCO_3 68, CO_3 0, SO_4 3.7, Cl 2.0,

F .3, NO_3 .0, Hardness 34, Dissolved solids _____.

Specific conductance 132 micromhos, pH 7.6

Radiochemical analysis: Date _____, Pu _____ d/m/l, U _____ µg/l,

Gross β (Gamma) _____ d/m/l

Report source of data: Weir, J. E. Jr., and Purtymun, W. D., 1962 (unpublished data)

Remarks: Electric logs available. Drilled for geologic and hydrologic information
Tritium units 3,8, Feb. 1960, depth 1,325 feet.
Tritium units 3,5, Feb. 1960, depth 1,501 feet.

Table 48.--Core hole CH-1

USGS Location No. 18.6.4.224 USGS Designation CH-1 (corehole 1)

AEC Coordinates _____ AEC Designation _____

Driller Soil Mech. Inc. Address Bryan, Texas

Topography Surface of Frijoles Mesa Altitude 7,170 feet

Method drilled Air Rotary Diameter 3 inches Use Observation

Drilled depth 501 feet Completed depth 500 feet

Date drilled December 1959 Chief Aquifer(s) None

Depth to water dry feet Date _____ Transmissibility _____ gpd/ft

Specific capacity _____ gpm/ft After _____

Log:

	Thickness	Depth
Bandelier Tuff		
Tshirege Member ----------	501	501

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
2	0-500	Galvanized pipe with the lower 20 feet slotted.

Chemical analysis: Constituents in parts per million

Date _____, Temp. _____ °F, SiO_2 _____, Fe _____, Ca _____,

Mg _____, Na + K _____, HCO_3 _____, CO_3 _____, SO_4 _____, Cl _____,

F _____, NO_3 _____, Hardness _____, Dissolved solids _____,

Specific conductance _____ micromhos, pH _____

Radiochemical analysis: Date _____, Pu _____ d/m/l, U _____ µg/l,

Gross β (Gamma) _____ d/m/l

Report source of data: Weir, J. E. Jr., and Purtymun, W. D., 1962 (unpublished data)

Remarks: Drilled to obtain core samples of Bandelier Tuff.

Table 49.--Core hole CH-3

USGS Location No. 18.6.4.242 USGS Designation CH-3 (core hole 3)

AEC Coordinates _____ AEC Designation _____

Driller Soil Mech. Inc. Address Bryan, Texas

Topography Surface of Frijoles Mesa Altitude 7,170 feet

Method drilled Air Rotary Diameter 3 inches Use Observation

Drilled depth 300 feet Completed depth 300 feet

Date drilled February 1960 Chief Aquifer(s) None

Depth to water dry feet Date _____ Transmissibility _____ gpd/ft

Specific capacity _____ gpm/ft After _____

Log:	Thickness	Depth
Bandelier Tuff		
Tshirege Member	300	300

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
2	0-300	Galvanized pipe with the lower 20 feet slotted.

Chemical analysis: Constituents in parts per million

Date _____, Temp. _____ °F, SiO_2 _____, Fe _____, Ca _____,

Mg _____, Na + K _____, HCO_3 _____, CO_3 _____, SO_4 _____, Cl _____,

F _____, NO_3 _____, Hardness _____, Dissolved solids _____,

Specific conductance _____ micromhos, pH _____

Radiochemical analysis: Date _____, Pu _____ d/m/l, U _____ µg/l,

Gross β (Gamma) _____ d/m/l

Report source of data: Weir, J. E. Jr., and Purtymun, W. D., 1962 (unpublished data)

Remarks: Drilled to obtain core samples of Bandelier Tuff.

Table 50.--Test hole Beta

USGS Location No. 19.6.34.331 USGS Designation Beta

AEC Coordinates _____ AEC Designation _____

Driller Casey Drilling Co. Address Los Angeles, Calif.

Topography Floor of Water Canyon Altitude 6,801 feet

Method drilled Bucket Auger Diameter 24 inches Use Observation

Drilled depth 180 feet Completed depth 180 feet

Date drilled 1960 Chief Aquifer(s) None

Depth to water dry feet Date _____ Transmissibility _____ gpd/ft

Specific capacity _____ gpm/ft After _____

Log:	Thickness	Depth
Bandelier Tuff		
Tshirege Member ----------	180	180

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
24	0-15	Corrugated iron pipe

Chemical analysis: Constituents in parts per million

Date _____, Temp. _____ °F, SiO_2 _____, Fe _____, Ca _____,

Mg _____, Na + K _____, HCO_3 _____, CO_3 _____, SO_4 _____, Cl _____,

F _____, NO_3 _____, Hardness _____, Dissolved solids _____,

Specific conductance _____ micromhos, pH _____

Radiochemical analysis: Date _____, Pu _____ d/m/l, U _____ µg/l,

Gross β (Gamma) _____ d/m/l

Report source of data: Weir, J. E., Jr., and Purtymun, W. D., 1962 (unpublished data)

Remarks: Drilled to determine possible perched water beneath Water Canyon.

Table 51.--Moisture access tubes in TA-49

USGS designation	USGS location number	AEC-LASL designation (hole number)	AEC-LASL cordinates	Construction date	Altitude of land surface (feet above mean sea level)	Diameter of casing (inches)	Length of plastic casing below land surface (feet)	Log	
								Alluvium (feet)	Bandelier Tuff (feet)
1M-1	18. 6. 4.224a	13	104 + 40S 85 + 48E	Feb. 1960	7,162	2	49	4.5	44.5
1M-2	18. 6. 4.224b	14	104 + 63S 83 + 39E	Feb. 1960	7,170	2	19	1	18
1M-3	18. 6. 4.224c	12	105 + 92S 84 + 95E	Feb. 1960	7,171	2	19	4	15
1M-3A	18. 6. 4.224d	11	105 + 92S 85 + 02E	Apr. 1960	7,171	2	49	3	46
2M-1	18. 6. 3.114a	17	104 + 73E 99 + 28E	Feb. 1960	7,129	2	49	1	48
2M-2	18. 6. 3.114b	16	107 + 12S 100 + 05E	Feb. 1960	7,131	2	10	5	5
2M-3	18. 6. 3.114c	15	106 + 66S 96 + 01E	Feb. 1960	7,141	2	19	5	14
3M-1	18. 6. 4.243	19	115 + 97E 82 + 03E	Feb. 1960	7,163	2	50	1	49
3M-2	18. 6. 4.242a	18	114 + 82S 82 + 67E	Feb. 1960	7,169	2	19	2.5	16.5
3M-3	18. 6. 4.241	20	114 + 56S 79 + 96E	Feb. 1960	7,174	2	20	7	13
4M-1	18. 6. 3.134a	7	121 + 29S 96 + 44E	Feb. 1960	7,112	2	49	2	47

Table 5.--Moisture access tubes - Continued

USGS designation	USGS location number	AEC-LASL designation (hole number)	AEC-LASL coordinates	Construction date	Altitude of land surface (feet above mean sea level)	Diameter of casing (inches)	Length of plastic casing below land surface (feet)	Log	
								Alluvium (feet)	Bandelier Tuff (feet)
4M-2	18. 6. 3.133	5	120 + 57S 94 + 70E	Feb. 1960	7,116	2	20	1.5	18.5
4M-3	18. 6. 3.312	8	122 + 76E 96 + 94E	Feb. 1960	7,107	2	19	3	16
4M-4	18. 6. 3.133a	6	118 + 72S 94 + 94E	Feb. 1960	7,122	2	19	3	16
5M-1	18. 6. 3.132a	23	111 + 32S 94 + 36E	Feb. 1960	7,136	2	39	2.5	36.5
5M-2	18. 6. 3.131	1	111 + 05S 92 + 38E	Feb. 1960	7,146	2	19	3	16
6M-1	18. 6. 4.212	10	102 + 15S 68 + 83E	Feb. 1960	7,210	2	19	9	10
9M-1	18. 6. 4.244	9	116 + 67S 88 + 44E	Feb. 1960	7,115	2	19	6	13
9M-2	18. 6. 3.132b	3	113 + 40S 98 + 15E	Mar. 1960	7,104	2	19	6.5	12.5
9M-3	18. 6. 3.143	4	117 + 02S 104 + 57E	Feb. 1960	7,049	2	19	4	15
9M-4	18. 6. 3.132c	2	113 + 93S 100 + 40E	Feb. 1960	7,097	2	19	12.5	6.5
10M-1	18. 6. 3.124	21	104 + 96S 110 + 31E	Feb. 1960	7,090	2	29	2	27

Table 51--Moisture access tubes - Concluded

USGS designation	USGS location number	AEC-LASL designation (hole number	AEC-LASL coordinates	Construction date	Altitude of land surface (feet above mean sea level)	Diameter of casing (inches)	Length of plastic casing below land surface (feet)	Log	
								Alluvium (feet)	Bandelier Tuff (feet)
10M-2	18. 6. 3.124a	22	104 + 54S 108 + 69E	Feb. 1960	7,093	2	20	4	16
WCM-1	19. 6.34.344	-	92 + 20S 1/ 111 + 20E	Feb. 1960	6,745	2	10	10	-
WCM-2	18. 6. 2.113	-	102 + 20S 1/ 145 + 00E	Feb. 1960	6,650	2	10	10	-

1/ Location approximate, taken from map.

Mortandad Canyon

An investigation of Mortandad Canyon as a site for disposal of treated low-level radioactive wastes was conducted prior to its use as a disposal area (Baltz, Abrahams, and Purtymun, 1963). A well to monitor possible radioactive contamination of the main aquifer, a system of observation wells to monitor the movement of perched water within the alluvium, and lines of moisture access tubes adjacent to many of the observation wells to monitor movement of moisture into the underlying tuff were constructed. Eight surface-water sampling points were established. No contamination has been found in the main aquifer. The perched water was found to infiltrate the tuff underlying the canyon and not to flow beyond the area of study. Geologic, hydrologic, and construction data are presented on table 52 to table 55. Locations of observation and test wells are shown on Figure 6 and location of

Figure 6 (caption on next page) belongs near here.

moisture access tubes are shown on Figure 7.

Figure 7 (caption on next page) belongs near here.

Figure 6.--Mortandad Canyon disposal area.

Figure 7.--Location of moisture access tubes in the Mortandad Canyon disposal area.

Table 52.--Test well T-8

USGS Location No. 19.6.23.322 USGS Designation T-8

AEC Coordinates _____ AEC Designation _____

Driller Branch Drilling Co. Address Farmington, New Mexico

Topography Floor of Mortandad Canyon Altitude 6,872 feet

Method drilled Cable Tool Diameter 8 inches Use Observation

Drilled depth 1,065 feet Completed depth 1,065 feet

Date drilled December 1960 Chief Aquifer(s) in member Puye Conglomerate, Fanglomerate

Depth to water 968 feet Date Nov. 1961 Transmissibility 2,400 gpd/ft

Specific capacity 2 gpm/ft After 2 hours of pumping

Log:

	Thickness	Depth
Alluvium	40±	40
Bandelier Tuff:		
Tshirege Member	20-	60
Otowi Member	385-	445
Guaje Member	45-	490
Puye Conglomerate		
Fanglomerate member	90-	580
Basalt unit	145-	725
Puye Conglomerate:		
Fanglomerate member	340-	1,065

Casing Schedule:

Diameter (inches)	Depth (feet)	Remarks
20 OD	0- 44	
14 OD	0- 64	
8 ID	0-1,065	With the lower 112 feet torch slotted.

Chemical analysis: Constituents in parts per million

Date Dec. 16, 1960, Temp. 67 °F, SiO_2 62, Fe 0, Ca 11.0,
Mg 5.8, Na + K 14.4, HCO_3 86.0, CO_3 0, SO_4 6.2, Cl 2.0,
F .7, NO_3 3.0, Hardness 51, Dissolved solids _____,
Specific conductance 158 micromhos, pH _____

Radiochemical analysis: Date Nov. 15, 1963, Pu <0.4 d/m/l, U <0.5 µg/l,
Gross β (Gamma) 4 d/m/l

Report source of data: Baltz, E. H., Abrahams, J. H., Jr., and Purtyman, W. D., 1963.

Remarks: Drilled for geologic and hydrologic information.

Table 53.--Observation wells in Mortandad and Ten-Site Canyons - Los Alamos Area, New Mexico.

USGS designation	USGS location number	AEC-LASL coordinates	Construction date	Altitude of land surface (feet above mean sea level)	Diameter of casing (inches)	Length of plastic casing below land surface (feet)	Log		Remarks
							Alluvium (feet)	Bandelier Tuff (feet)	
MCO-1	19.6.22.133		Nov. 1960	7,153.3	3	1.2	1	0.2	-
-2	19.6.22.134		Nov. 1960	7,133.5	2	9.9	1	8.9	-
-3	19.6.22.144		Nov. 1960	7,046.2	2	12.7	7	5.7	-
-4	19.6.23.312		Oct. 1960	6,009.4	2	23.5	22	1.5	Destroyed, new well 5 ft. west
-4A[a]	19.6.23.312a		Oct. 1963	6,009.5	3	19	18	1.0	Now known as MCO-
-5	19.6.23.322b		Oct. 1960	6,876.7	3	38.5	35	3.5	-
-6	19.6.23.414		Oct. 1960	6,848.9	3	70.7	36	34.7	-
-6.5A	19.6.23.414a		Dec. 1961	-	2	45	45	-	-
-6.5B	19.6.23.414b		Nov. 1961	6,839.3	4	42[b]	42	-	-
-7	19.6.23.441		Oct. 1960	6,827.6	3	68.5	55	13.5	-
-7.5	19.6.23.442		Nov. 1961	6,808.6	3	60	60	-	-
-8	19.6.24.313		Oct. 1960	6,797.3	3	83.4	61	22.4	-
-8A	19.6.24.313a		Nov. 1961	-	2	50	50	-	-
-8.2	19.6.24.314		Nov. 1961	6,781.8	2	70	70	-	-
-9	19.6.24.342		Nov. 1961	6,749.8	3	55.5	55.5	-	-
-9.5	19.6.24.431		Nov. 1961	-	2	46	46	-	-

Table 53.--Observation wells in Mortandad and Ten-Site Canyons - Los Alamos Area, New Mexico - Concluded

USGS designation	USGS location number	AEC-LASL coordinates	Construction date	Altitude of land surface (feet above mean sea level)	Diameter of casing (inches)	Length of plastic casing below land surface (feet)	Log		Remarks
							Alluvium (feet)	Bandelier Tuff (feet)	
MCO-11	19.6.24.441		Nov. 1961	-	2	20	20	-	-
-12	19.6.24.442		Nov. 1961	-	2	60	60	-	-
TW-8A	19.6.23.322a		Nov. 1960	6,874.7	24[c]	30	30	-	-
TSCO-1	19.6.23.431		Nov. 1961	6,856.9	2	35	35	-	-

a/ Replacement well for MCO-4

b/ 20 feet of 4-inch plastic casing; 22 feet of 4-inch steel

c/ Corrugated metal pipe

Table 54.--Moisture access holes in Mortandad and Ten-Site Canyons

USGS designation	USGS location number	ARC-IASL coordinates	Construction date	Altitude of land surface (feet above mean sea level)	Diameter of casing (inches)	Length of plastic casing below land surface (feet)	Log		Remarks
							Alluvium (feet)	Bandelier Tuff (feet)	
MCM-1A	19.6.22.133a		Nov. 1960	7,155.9	2	11.7	-	-	-
-1B	19.6.22.133b		Nov. 1960	7,154.7	2	10.5	-	-	-
-2A	19.6.22.134a		Nov. 1960	7,138.6	2	11.0	-	-	-
-2B	19.6.22.134b		Nov. 1960	7,133.7	2	1.0	-	-	-
-2.2	19.6.22.143		Nov. 1961	7,109	2	82	-	82	-
-2.8	19.6.22.143a		Nov. 1961	-	2	58	-	58	-
-3A	19.6.22.144a		Nov. 1960	7,048.8	2	13.0	-	-	-
-3B	19.6.22.144b		Nov. 1960	7,048.3	2	10.0	-	-	-
-4A	19.6.23.312b		Oct. 1960	6,900.9	2	9.0	-	-	-
-4B	19.6.23.312c		Oct. 1960	6,900.0	2	23.5	-	-	-
-4.5	19.6.23.321		Nov. 1961	6,891.3	2[1/]	48	26	22	-
-4.8	19.6.23.322		Nov. 1961	-	2	33	30	3	-
-5A	19.6.23.322c		Oct. 1960	6,881.4	2	25.0	-	-	-
-5B	19.6.23.322d		Oct. 1960	6,879.0	2	30.0	-	-	-
-5C	19.6.23.322a		Oct. 1960	6,877.6	2	37.0	-	-	-
-6A	19.6.23.414c		Oct. 1960	6,852.6	2	17.8	-	-	-
-6B	19.6.23.414d		Oct. 1960	6,851.2	2	51.8	-	-	-
-6C	19.6.23.414e		Oct. 1960	6,851.0	2	56.8	-	-	-

Table 54.--Moisture access holes in Mortandad and Ten-Site Canyons - Concluded

USGS designation	USGS location number	AEC-LASL coordinates	Construction date	Altitude of land surface (feet above mean sea level)	Diameter of casing (inches)	Length of plastic casing below land surface (feet)	Log		Remarks
							Alluvium (feet)	Bandelier Tuff (feet)	
MCM-6D	19.6.23.414f		Oct. 1960	6,850.0	2	34.9	-	-	-
-6E	19.6.23.414g		Oct. 1960	6,850.6	2	21.0	-	-	-
-6.5	19.6.23.414h		Nov. 1961	6,840.2	2 2/	95	46	49	-
-7.5	19.6.23.442a		Nov. 1961	6,809.4	2 3/	94	61	33	-
-8A	19.6.24.331		Oct. 1960	6,807.1	2	20.0	-	-	-
-8B	19.6.24.331a		Oct. 1960	6,797.2	2	30.0	-	-	-
-8C	19.6.24.313		Oct. 1960	6,797.3	2	66.0	-	-	-
-8D	19.6.24.313		Oct. 1960	6,796.3	2	86.3	-	-	-
-8E	19.6.24.313		Oct. 1960	6,796.9	2	52.6	-	-	-
-8F	19.6.24.313		Oct. 1960	6,799.2	2	23.1	-	-	-
-10	19.6.24.432		Oct. 1960	6,730.9	2	67.2	62	5	-
-12	19.6.24.442a		Nov. 1961	-	2	42	42	-	-
TSCM-1	19.6.23.431a		Nov. 1961	6,858.6	2	22	22	-	-

1/ Double cased - 29 feet of 4-inch steel casing
2/ Double cased - 51 feet of 4-inch steel casing
3/ Double cased - 66 feet of 4-inch steel casing

Table 55.--Surface water sampling points in Mortandad Canyon

USGS designation	USGS location number
Effluent Canyon (TA-48)	S19.6.22.134
New Sigma effluent near outfall	S19.6.21.121
(Confluence of Mortandad and Effluent canyons	S19.6.22.143a
Gaging Station (GS-1)	S19.6.22.143
MCS 3.2	S19.6.22.234
MCS 3.8	S19.6.22.422
MCS 3.9	S19.6.23.311
Gaging Station 2 (GS-2)	S19.6.23.312
MCS 5	S19.6.23.322

A study of the disposal of treated low-level radioactive wastes was conducted in Acid and Pueblo Canyons (Abrahams and others, 1961). An observation well system consisting of drive points and dug wells in the alluvium and shallow wells drilled into the underlying conglomerate was constructed. Weirs and surface-water sampling points to measure discharge and monitor water-borne radioactivity were established.

Sparse information is available on construction of wells in Acid and Pueblo Canyons. Several wells have been destroyed by high water flow; others have been partially filled by sand. Many of the sites are used only as reference points in surface water and alluvium sampling. In general, the system is in poor repair. Locations and available construction data are presented in tables 56 to 58. Locations are shown on Figure 8. Radioactive nuclides were found to collect

Figure 8 (caption on next page) belongs near here.

mostly in the clay and alluvial particles and dispersed downstream by flood flow and intermittent waste discharge such that there was no high concentration buildup. Contamination was generally below off site tolerances.

Figure 8.--Location of well, spring, stream, and alluvium sampling points in Acid, Pueblo and Bayo Canyons.

Table 56.--Wells in Acid and Pueblo Canyons disposal area, AC and PC series wells

USGS location number	USGS designation	AEC-LASL cordinates	Remarks
19.6.16.214	AC-1		Destroyed.
19.6.16.212	AC-2		Do.
19.6.16.212a	AC-3		Corrugated metal pipe.
19.6. 9.434	AC-4		Destroyed.
19.6. 9.441	AC-5		Corrugated metal pipe.
19.6. 9.423	PC-1		Drive point.
19.6. 9.442	PC-2		Destroyed.
19.6.10.331	PC-3		Do.
19.6.10.431	PC-4		Drive point.
19.6.11.333	PC-5		Destroyed.
19.6.14.222	PC-6		Corrugated metal pipe.
19.6.14.221	PC-6A		Drive point.
19.6.13.131	PC-7		Do.
19.7.18.132	PC-8		Destroyed.
19.7.18.241a	PC-9		Corrugated metal pipe.
19.7.17.321	PC-10		Drive point.
19.7.17.322	PC-11		Do.

Table 57.--Observation wells drilled April 10 to 18, 1956, in Pueblo Canyon, PO series wells

USGS designation	USGS location number	AEC-LASL coordinates	Altitude of land surface (feet above mean sea level)	Well depth (feet)	Depth to water below measuring point (feet)	Remarks
PO-1	19.7.18.1422		-	16	dry	Abandoned
PO-1A	19.7.18.244		6,442.0	36	do.	18 feet of 3-inch pipe.
PO-1B	19.7.18.244a		6,411.2	18	do.	Abandoned
PO-1C	19.7.18.242		6,446.5	22	do.	Abandoned
PO-1D	19.7.18.242a		6,450(?)	23	do.	Abandoned
PO-2	19.7.18.234		6,478.4	30	do.	Abandoned
PO-2A	19.7.18.241a		6,452.0	14½	2 feet	8 feet of 1½-inch pipe and sandpoint.
PO-2B	19.7.18.241b		6,455.5	11	dry	Abandoned
PO-3	19.7.18.141		6,498.9	27	1½ feet	12 feet of 1½-inch pipe and sandpoint. Abandoned
PO-3A	19.7.18.141a		6,512.7	33	10 feet	22 feet of 1½-inch pipe and sandpoint.
PO-3B	19.7.18.132a		6,520.4	73	50½ feet	59 feet of 2-inch plastic pipe.
PO-4	19.6.13.242		6,524.2	43	25.8	27 feet of 1½-inch pipe and sandpoint.
PO-4A	19.6.13.242a		6,524.3	43	18	21 feet of 3-inch pipe.
PO-4B	19.6.13.242b		6,541.6	57	24	27 feet of 1½-inch pipe and sandpoint.
PO-5	-		6,475(?)	22	dry	Abandoned
PO-6	-		6,520(?)	18	do.	Abandoned

Table 58.--Surface water sampling points, Acid and Pueblo Canyons

AEC-LASL designation	USGS location number	Remarks
Acid Weir	S19.6. 9.442	-
Pueblo 1	S19.6. 9.442a	-
Pueblo 2	S19.6.14.223	-
Pueblo 3	S19.6.18 and 19	Water collected at end of flow in Pueblo Canyon (generally between Hamilton Bend Spring and well PC-11.
Otowi Seep	S19.7.18.241	-
Hamilton Bend Spring	S19.7.18.124	-

Bayo Canyon

Four test holes ranging in depth from 25 to 89 feet were augered at Bayo Site in Bayo Canyon to determine if perched water was present. No perched water was found. Geologic and hydrologic data for these test holes are shown in table 59 and the locations of the holes are shown on Figure 8.

Table 59.--Test holes augered at Bayo Site, December 7 and 8, 1961

USGS designation	USGS location number	AEC-LASL Coordinates	Altitude of land surface (feet above mean sea level)	Depth of hole (feet)	Log			Remarks
					Alluvium	Bandelier Tuff	Puye Conglomerate	
B-1	19. 6.13.212		6,660	89[a]	-	0-85	85-89	Destroyed
B-2	19. 6.13.212a		6,660	25[a]	0- 5	5-24	24-25	Do.
B-3	19. 7. 7.313		6,610	70[a]	0-12	12-65	65-70	Do.
B-4	19. 6.12.434		6,670	79[a]	0-10	10-77	77-79	Do.

a/ dry hole

Technical Areas TA-50 and TA-52 (fluid dynamics studies)

Five test holes were drilled or augered at Site 1 near Technical Area TA-52 and 8 holes at Site 1 near Technical Area TA-50 to implement study of behavior of gas injected into the rock. At Site 2 near Technical Area TA-50 12 holes were augered or drilled to study the behavior of liquid injected into rock. The studies which are still in progress are expected to yield information relative to the problems of disposing of liquid and gaseous wastes by injection into the Bandlier Tuff. Results are not yet available. Descriptions of the holes are shown in tables 60 through 62. Locations are shown on Figure 9.

Figure 9 (caption on next page) belongs near here.

Figure 9.--Location of test holes at Sites 1 and 2, TA-50 and Site 1, TA-52.

Table 60.--Site 1, TA-52, air-injection test holes

USGS Hole Designation	USGS Location	AEC-LASL Designation (structure number)	AEC-LASL Coordinates	Drilling date	Altitude of land surface (feet above mean sea level)	Diameter (in inches)	Depth (in feet)	Type of drilling
I	19.6.22.441a	TA-52-25	N. 24 + 08 E.124 + 57	Dec 1964	7168.8	5	97	Auger
NW-1	19.6.22.441b	TA-52-24	N. 24 + 10 E.124 + 53	Dec 1964	7169.1	5	97	Do.
SE-1	19.6.22.441c	TA-52-26	N. 23 + 90 E.124 + 66	Dec 1964	7167.4	5	97	Do.
NE-1	19.6.22.441d	TA-52-23	N. 24 + 15 E.124 + 67	Dec 1964	7169.2	5	97	Do.
NE-2	19.6.22.441e	TA-52-22	N. 24 + 53 E.124 + 69	Oct 1965	7171.5	4	295	Rotary-air

Note: Holes I, NE-1, SE-1 and NW-1 have steel casing 6-inches in diameter cemented into top of tuff, near surface.

Table 61.--Site 1, TA-50 air injection test holes

Location

USGS Hole designation	USGS Location number	AEC-LASL Designation (structure number)	AEC-LASL Coordinates	Drilling date	Altitude of land surface (feet above mean sea-level)
E-1	19.6.22.321a	TA-50-29	N. 34 + 08 E. 99 + 89	Nov 1964	7240.4
N-1	19.6.22.321b	TA-50-25	N. 34 + 16 E. 99 + 62	Nov 1964	7241.8
W-1	19.6.22.321c	TA-50-27	N. 34 + 08 E. 99 + 48	Nov 1964	7241.7
W-2	19.6.22.321d	TA-50-26	N. 34 + 05 E. 99 + 22	Nov 1964	7241.7
I	19.6.22.321e	TA-50-28	N. 34 + 07 E. 99 + 64	Nov 1964	7241.6
S-1	19.6.22.321f	TA-50-30	N. 33 + 86 E. 99 + 65	Nov 1964	7239.7
S-2	19.6.22.321g	TA-50-31	N. 32 + 89 E. 99 + 81	Nov 1964	7231.6
S-3	19.6.22.321h	TA-50-32	N. 31 + 63 E. 99 + 77	Nov 1964	7218.3

Table 61.--Site 1, TA-50, air injection test holes - Continued

Construction

USGS Hole Designation	Diameter (in inches)	Depth (in feet)	Depth Injection Zone No. 1	Depth Injection Zone No. 2	Depth Injection Zone No. 3	Depth Injection Zone No. 4	Type of drilling	Remarks
E-1	3	86	3- 8	37- 43	69-74	81-86	Rotary-air	Monitoring tubes
N-1	5	94	3- 6	25- 30	54-60	86-94	Auger	Injection and monitoring tubes
W-1	3	91	3- 8	39- 44	69-74	86-91	Rotary-air	Monitoring tubes
W-2	3	114	3- 8	109-114	-	-	do.	Do.
I	5	60	3- 8	25- 30	55-60	-	Auger	Injection and monitoring tubes
S-1	5	90	3- 8	24- 29	50-55	83-90	do.	Do.
S-2	5	56	49-56	-	-	-	do.	Water injection test
S-3	5	43	-	-	-	-	do.	Open hole

Note: Injection zone consists of 3/8" diameter gravel. Monitoring tube is $\frac{1}{2}$ inch plastic tubing perforated about 1 foot from bottom. Injection tube is 3/4" plastic tubing perforated about 3 feet from bottom. Perforations in each tube are separated from those in the other tube by lead plate. Tubes are cemented into the gravel-pack intervals.

Table 62.--Site 2, TA-50, liquid injection test holes

USGS Hole Designation	USGS Location number	AEC-LASL Designation (structure number)	AEC-LASL Coordinates	Drilling date	Altitude of Land Surface (feet above mean sea-level)	Diameter of hole (inches)	Depth (feet)	Type of drilling
N-2	19.6.22.312a	TA-50-16	N 34+55 E 98+18	Sept 1965	7,247.7	5	112	Auger
NE-1	19.6.22.312b	TA-50-17	N 34+34 E 98+36	Sept 1965	7,246.6	5	118	Do.
N-1	19.6.22.312c	TA-50-18	N 34+29 E 98+26	Nov 1964	7,245.2	5	97	Do.
I	19.6.22.312d	TA-50-19	N 34+24 E 98+26	Nov 1964	7,244.7	5	67	Do.
SE-3	19.6.22.312e	TA-50-20	N 34+23 E 98+28	Oct 1965	7,244.6	4	295	Rotary, air
SW-1	19.6.22.312f	TA-50-21	N 34+17 E 98+19	Nov 1964	7,244.4	5	97	Auger
SE-1	19.6.22.312g	TA-50-22	N 34+15 E 98+39	Nov 1964	7,243.9	5	97	Do.
S-1	19.6.22.312h	TA-50-23	N 33+99 E 98+30	Oct 1965	7,242.9	4	295	Rotary, air
SE-2	19.6.22.312j	TA-50-24	N 33+92 E 98+56	Sept 1965	7,241.6	5	112	Auger

Table 62.--Site 2, TA-50, liquid injection test holes - Continued

USGS Hole Designation	USGS Location number	AEC-LASL Designation (structure number)	AEC-LASL Coordinates	Drilling date	Altitude of Land Surface (feet above mean sea-level)	Diameter of hole (inches)	Depth (feet)	Type of drilling
C-1	19.6.22.312k	TA-50-13	N 34+62 E 98+33	Dec 1964	Approx. 7,248	5	18	Auger
C-2	19.6.22.3121	TA-50-14	N 34+62 E 98+38	Dec 1964	Approx. 7,248	5	18	Do.
C-3	19.6.22.312m	TA-50-15	N 34+63 E 98+43	Dec 1964	Approx. 7,248	5	18	Do.

Note: All holes are drilled in tuff. Hole I, the injection well, has an injection tube and an observation tube set in gravel from 55 ft to 65 ft. The bottom 2 ft from 65 ft to 67 ft are filled with crushed tuff. The hole is cemented from the surface to the top of the gravel pack at 55 ft. Hole C-1, a calibration hole, cased with 1.5 in. steel tubing. Hole C-2, a calibration hole, open hole. Hole C-3, a calibration hole, is cased with 2 in. plastic tubing.

Los Alamos and DP Canyons

Six observation wells were constructed in Los Alamos Canyon during February 1966 to monitor the chemical and radiochemical quality of water in the alluvium of the canyon downgradient from TA-2 and TA-21. No interpretations have yet been from data obtained in this study. The logs and construction data are shown on table 63 and the location of the wells on Figure 2.

Table 63.--Observation wells in Los Alamos and DP Canyons

USGS designation	USGS location number	Altitude of land surface (feet above mean sea level) [1/]	Depth of well (feet)	Log		Casing schedule (4-inch diameter plastic hung in hole) (depth in feet)
				Alluvium (feet)	Bandelier Tuff (feet)	
LAO-1	19.6.15.423	6,940	32	12	20	20
LAO-2	19.6.13.343	6,625	32	19	13	32
LAO-3	19.6.13.343a	6,610	32	16	16	24
LAO-4	19.6.24.222	6,560	31	17	14	24
LAO-5	19.7.20.113	6,425	27	12	[a/] 15	19
LAO-6	19.7.20.113a	6,430	26	11	[a/] 15	14
DPO-1 [b/]						
DPO-2 [b/]						
DPO-3 [b/]						

1/ Estimated from U.S. Geological Survey topographic sheets.

a/ Bottomed in the basaltic rocks of Chino Mesa.

b/ To be constructed in the early summer, 1966.

Contaminated waste pit near TA-21

Thirteen test holes were drilled around the perimeter of a contaminated waste pit west of TA-21 to determine if there had been any movement of radioactive contaminants from the pit into the adjacent tuff. Logs of the holes are shown on table 64 and the locations of the test holes are shown on Figure 10.

Figure 10 (caption on next page) belongs near here.

The distribution of moisture in the soil and tuff adjacent to the bore holes was determined and samples of tuff collected during drilling of the holes were analyzed for alpha and beta emission as well as plutonium and uranium. The results of the investigation indicated no lateral migration of contaminants from the pit into the adjacent soil and tuff.

Figure 10.--Location of test holes drilled near the contaminated waste pit west of TA-21.

Table 64.--Test holes drilled during February 1966 near the contaminated waste pit west of TA-21

USGS designation	AEC and LASL Coordinates	Depth (feet)	Altitude (feet above mean sea level)	Log	
				Soil (feet)	Bandelier Tuff (feet)
DPS-1	N 95 + 13 E132 + 97	50	7,190	3	47
DPS-2	N 94 + 78 E130 + 56	25	7,191	3	22
DPS-3	N 94 + 43 E127 + 87	50	7,194	3	47
DPS-4	N 94 + 16 E125 + 89	25	7,202	3	22
DPS-5	N 93 + 80 E122 + 85	50	7,214	3	47
DPS-6	N 92 + 58 E122 + 10	50	7,216	6	44
DPS-7	N 94 + 41 E135 + 69	25	7,185	3	22
DPS-8	N 93 + 66 E138 + 06	50	7,181	6	44
DPS-9	N 93 + 66 E135 + 19	25	7,180	4	21
DPS-10	N 93 + 66 E131 + 55	35	7,182	4	31
DPS-11	N 93 + 21 E128 + 50	50	7,192	4	46

Table 64.--Test holes drilled during February 1966 - Concluded

USGS designation	AEC and LASL coordinates	Depth (feet)	Altitude (feet above mean sea level)	Log	
				Soil (feet)	Bandelier Tuff (feet)
DPS-12	N 92 + 79 E125 + 21	36	7,192	3	33
DPS-13	N 91 + 39 E122 + 72	35	7,210	2	33

Note: Holes augered 4-inches in diameter, destroyed after study.

Springs

Natural discharge from the aquifers in the Los Alamos area is from springs. Samples of water from some springs are taken periodically and analyzed for possible radioactive contamination. Other springs are sampled less frequently for a check on chemical and radiochemical changes. One spring is currently equipped with a weir and recorder for continuous discharge measurement to assess the effect of pumpage from the Los Alamos area on the discharge from the springs. No contamination of water from the main aquifer has been found and no effects from pumping on the discharge has been observed.

Geologic and hydrologic data of the springs are presented on table 65. Chemical quality of the water is shown on table 66. Locations are shown on Figure 2.

Table 65.--Springs of the Los Alamos area, New Mexico

USGS location number	NMSE designation	AEC and LASL corrdinates	Topographic situation	Altitude (feet)	Geologic unit	Structure	Opening	Yield (gpm) 1/	Use 2/	Temperature (°F)	Remarks
S18.5. 2.131	Sawyer Spring	Steep slope canyon	Steep slope	8,320	Tshirege Member	Contact between welded ashflows	Crack	1 E	U	48°	Piped in to stock watering trough
S18.7. 3.421	Spring 3		Slope on west side of Rio Grande Canyon	5,560	Totavi Lentil	Gravels underlying basalt	Seeps and boils	19M	U	67°	-
S18.7. 3.421a	Spring 3A		do.	5,560	do.	do.	do.	47M	U	67°	-
S18.7. 3.443	Spring 3AA		do.	5,460	Tesuque Formation	Sandy layer	Seep	< $\frac{1}{4}$E	U		-
S18.7. 9.422	Spring 4A		West side of Pajarito Canyon	5,600	Totavi Lentil	Gravels underlying basalt	Gravel beds	122M	U	69°	Equipped with a water-stage recorder. Other springs this area
S18.7.10.113	Spring 4		Slope on west side of Rio Grande Canyon	5,502	do.	Gravel	Seep area	81M	U	63°	Seep area about 50 ft. long
S18.7.10.224	Spring 3B		Flat area on east side of Rio Grande	5,500	Tesuque Formation	Sandy layer	Seep area	31M	U,S	67°	-
S18.7.12.244	Canoncito Spring		Floor of Canada Ancha	5,700	do.	Contact with basalt dike	Crack	10E	S	-	-
S18.7.16.234	Spring 5		Slope on west side of Rio Grande	5,570	Contact of basaltic rocks Unit 1 and Totavi Lentil	Contact	Crack in basalt	9M	U	69°	-

Table 65.--Springs of the Los Alamos area, New Mexico - Continued

USGS location number	USGS designation	NAD and NASL coordinates	Topographic situation	Altitude (feet)	Geologic unit	Structure	Opening	Yield (gpm) 1/	Use 2/	Temperature (°F)	Remarks
S18.7.16.423	Spring 5A		West bank of Rio Grande	5,430	Tesuque Formation	Basalt flow in siltstone	Boils	27M	U	69°	-
S18.7.20.312	Ancho Spring		Floor of Ancho Canyon	5,700	Totavi Lentil	Gravels	Seeps	65M	U	67° to 69°	-
S18.7.20.431	Spring 6		West bank of Rio Grande	5,380	Tesuque Formation	Basalt flow	Fractures	57M	U	68° to 74°	Spring ar 200 ft. length
S18.7.21.131	Spring 5B		West do.	5,400	do.	do.	do.	10E	U	59°	-
S18.7.29.112	Spring 6A		do.	5,375	do.	do.	Boil	150M	U	71°	-
S18.7.30.123	Doe Spring		Slope on north side of Chaquehui Canyon	5,600	do.	Sandy bed	Seep	5E	U	-	-
S18.7.30.124	Spring 9		Slope on west side of Rio Grande Canyon	5,510	do.	do.	do.	8E	U	68°	-
S18.7.30.213	Spring 8A		do.	5,365	do.	Basalt flow	Fractures	26M	U	70°	-
S18.7.30.214	Spring 8		East bank of Rio Grande	5,370	do.	do.	do.	70M	U	69° to 70°	-
S18.7.30.223	Spring 7		do.	5,370	do.	do.	do.	173 M	U	70° to 72°	-
S19.5.12.143	-		Floor of Los Alamos Canyon	8,000	Alluvium and talus	Contact	Seeps	20E	U	-	-
S19.5.14.431	Pajarito Spring		Floor of Pajarito Can.	8,660	do.	do.	do.	25E	U	-	-
S19.5.25.111	-		Wall of Valle Canyon		Tshirege Member	Contact between welded ash flows	Crack	4E	U	-	-

Table 65.--Springs of the Los Alamos area, New Mexico - Continued

Location number	Local designation	NMC and LASL coordinates	Topographic situation	Altitude (feet)	Geologic unit	Structure	Opening	Yield (gpm) 1/	Use 2/	Temperature (°F)	Remarks
S19.5.25.333	-		Floor of Water Canyon	8,000	Tshirege Member	Contact between welded ash flows	Crack	90E	-	-	- -
S19.5.26.221	-		Floor of Valle Canyon	8,240	Talus and alluvium	Contact	Seep	4E	U	-	-
S19.5.26.332	Armstead Spring		Floor of Water Canyon	8,216	Tschicoma Formation	Fractured latite	Fracture	2E	U	-	-
S19.5.33.431	-		Wall of west Fork of Frijoles Canyon	8,430	Tshirege Member	Contact between welled ashflows	Cracks and Seeps	108M	U	-	-
S19.5.33.234	-		Wall of North Fork of Frijoles Canyon	8,430	do.	do.	do.	99M	U	-	-
S19.5.35.114	American Spring		Slope of Canyon	8,280	do.	do.	do.	5M	U	-	-
S19.7.12.233	Sacred Spring		Hillside	5,640	Tesuque Formation	Fault zone	Seep	1E	S	55° to 62°	-
S19.7.13.112	Indian Spring		do.	5,640	do.	do.	do.	1½E	S	59° to 65°	-
S19.7.22.114	Los Alamos Spring		South wall of Los Alamos Canyon	6,000	Basaltic rocks Unit 4	Contact	do.	¼E	U	47° to 55°	-
S19.7.22.131	Basalt Spring		do.	6,000	Basaltic rocks Unit 3	do.	do.	3E	U	49° to 54°	-
S19.7.24.222	La Mesita Spring		Slope on east side of Rio Grande	5,580	Tesuque Formation	Sandy bed	do.	6M	S	59°	-

Table 65.--Springs of the Los Alamos area, New Mexico - Concluded

USGS location number	DOE designation	AEC and LASL corrdinates	Topographic situation	Altitude (feet)	Geologic unit	Structure	Opening	Yield (gpm) 1/	Use 2/	Temperature (°F)	Remarks
S19.7.24.332	Spring 1		Slope on west side of Rio Grande Canyon	5,615	Tesuque Formation	Sandy bed	Seep	< 1E	U	65°	-
S19.7.25.111	Spring 2		do.	5,600	do.	do.	do.	< 1E	U	61°	-
S19.7.35.121	Sandia Spring		do.	5,640	do.	do.	do.	< $\frac{1}{4}$E	U	67°	-
S20.5.26.113	-		Floor of Guaje Canyon	8,850	Tshirege Member	Contact between welded ash flows	Fractures	25E	U	-	-
S20.5.26.311	-		Floor of Canyon	8,840	do.	do.	do.	40M	U	-	-
S20.5.35.433	-		Floor of Quemazon Canyon	8,660	Talus	Contact	Seep	15M	U	-	-

1/ M-measured; E-estimated

2/ U-Unused; S-stock

Table 66.--Chemical and radiochemical quality of water from springs in the Los Alamos area, New Mexico

(Analyses by the Los Alamos Scientific Laboratory)

USGS Location Number	USGS designation	Date of collection	Chemical												Radiochemical		
			Parts per million														
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Total hardness	Specific conductance (micromhos at 25°C)	pH	Plutonium (disintegrations per minute per liter)	Uranium (micrograms per liter)	Beta (gamma) emitters (disintegrations per minute per liter; Bg: background)
[1/] S18.5. 2.131	Sawyer Spring	6- 7-61	-	-	4.8	0	67	1.2	0.1	0.1	-	44	119	7.1	<0.4	<0.5	<10
S18.7. 3.421	Spring 3	6-20-63	18	2	14	2	77	4	.4	.1	183	52	68	8.0	< .4	< .5	<10
S18.7. 3.421a	Spring 3A	8-26-64	19	2	13	0	82	4	.4	.2	185	56	81	7.9	< .4	< .5	10.0
S18.7. 3.443	Spring 3AA	8-26-64	18	0	20	0	81	3	.8	.3	163	46	81	7.7	< .4	< .5	17.0
S18.7. 9.422	Spring 4A	6- 8-65	17	1	21	0	78	2	.3	.6	169	49	68	7.9	< .4	< .5	11.0
S18.7.10.113	Spring 4	8-26-64	22	5	13	0	90	6	.4	.8	192	75	108	7.7	< .4	< .5	9.0
S18.7.10.224	Spring 3B	8-26-64	14	9	122	0	345	5	.8	2.1	538	72	304	7.6	< .4	9.8	15.0
S18.7.16.234	Spring 5	8-27-64	18	5	12	0	82	5	.4	.3	187	70	91	7.9	< .4	< .5	10.0
S18.7.16.424	Spring 5A	8-27-64	21	2	22	0	107	4	.4	.2	235	62	108	7.4	1.3	1.2	7.0
S18.7.20.312	Ancho Spring	9-28-65	13	3	7	0	53	3	.5	.5	124	44	68	7.7	< .4	< .5	< 1.0
S18.7.20.431	Spring 6	8-27-64	14	4	10	0	66	2	.4	.2	218	50	68	7.7	< .4	< .5	8.0
S18.7.21.131	Spring 5B	8-27-64	18	5	13	0	83	3	.4	.2	196	65	81	7.7	< .4	< .5	25.0
S18.7.29.112	Spring 6A	8-27-64	12	3	10	0	61	2	.4	.0	201	43	53	7.3	< .4	< .5	9.0
S18.7.30.123	Doe Spring	7- 2-65	21	15	13	3	159	5	.2	.1	218	115	160	7.8	< .4	< .5	8.2
S18.7.30.124	Spring 9	8-27-64	15	4	12	0	78	3	.4	.2	243	54	81	7.5	< .4	1.8	14.0
S18.7.30.213	Spring 8A	8-27-64	12	3	12	0	67	3	.4	.1	275	41	68	7.4	< .4	< .5	9.0
S18.7.30.223	Spring 7	8-27-64	16	4	16	0	85	2	.4	.4	248	57	91	7.0	< .4	< .5	14.0
S19.5.12.141	-	6- 7-61	-	-	3.2	0	30	1	.1	.2	-	21	64	7.4	< .4	< .5	<10
[1/] S19.5.14.431	Pajarito Spring	6- 7-61	-	-	3	0	34	.3	.1	.0	-	25	67	6.9	< .4	< .5	<10
[1/] S19.5.26.332	Armstead Spring	6- 7-61	-	-	4	0	44	1.2	.2	.2	-	36	97	7.4	< .4	< .5	< .10

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Table 66.--Chemical and radiochemical quality of water from springs in the Los Alamos area, New Mexico - Concluded

USGS Location Number	USGS designation	Date of collection	Chemical												Radiochemical		
			Parts per million										Specific conductance (micromhos at 25°C)	pH	Plutonium (disintegrations per minute per liter)	Uranium (micrograms per liter)	Beta (gamma) emitters (disintegrations per minute per liter; Bg: background)
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Total hardness					
1/ S19.5.33.234	-	5-22-60	-	-	4	-	-	1.4	-	-	-	28	89.	-	<0.4	<0.5	<10
1/ S19.5.35.114	American Spring	6- 7-61	-	-	4	0	64	1.4	0.1	0.1	-	44	117	-	< .4	< .5	<10
S19.7.12.233	Sacred Spring	11- 5-63	21	0	25	0	92	3	.4	.6	128	54	108	7.1	< .4	1.5	6
S19.7.13.112	Indian Spring	11- 5-63	22	3	25	0	98	2	.4	.2	154	68	108	7.7	< .4	1.6	4
S19.7.18.124	Hamilton Bend Spring	6- 8-65	8	6	78	0	122	10	2.8	.5	336	47	200	7.3	< .4	1.2	8.0
S19.7.18.241	Otowi Seep	10-21-64	9	10	87	0	184	33	2.0	1.0	387	62	267	7.6	< .4	< .5	21.0
S19.7.22.114	Los Alamos Spring	10-22-64	30	10	30	0	93	20	1.2	3.0	238	116	173	8.0	< .4	1.7	15.0
S19.7.22.131	Basalt Spring 2/	9-23-65	26	11	10	0	79	14	.2	3	201	108	132	7.8	< .4	.7	1.5
S19.7.24.222	La Mesita Spring	10-21-64	28	3	40	0	142	7	.4	2.0	191	84	147	7.7	< .4	9.0	8.0
S19.7.24.332	Spring 1	8-25-64	16	1	27	0	80	3	.4	.4	218	45	108	7.7	< .4	.7	9.0
S19.7.25.111	Spring 2	8-25-64	18	1	40	0	122	4	.8	.0	235	48	121	7.6	< .4	.7	15.0
S19.7.35.121	Sandia Spring	11-11-63	22	13	20	0	120	4	.4	.5	180	108	132	7.7	< .4	2.7	6

1/ Chemical analysis by the U.S. Geological Survey

2/ Tritium Units 2.5, Mar. 1959

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Surface-water sampling stations

Surface-water samples are collected at several stations along the streams on the Pajarito Plateau and along the Rio Grande. Because a majority of the streams are intermittent, samples can be collected only when storm runoff or waste water is present. Samples are analyzed by the Los Alamos Scientific Laboratory for chemical and radiochemical contamination. Most samples are collected in connection with the study of disposal of radioactive wastes. Results of these studies are found in various reports. In general, there has been no contamination found. Data on surface-water sampling stations are shown on table 67 and locations on Figure 2.

Table 67.--Miscellaneous surface-water sample sites sampled by the U.S. Geological Survey

Description of sampling sites	USGS location number	Remarks
Los Alamos Canyon		
At reservoir	S19. 5.13.224	Also one sample taken 200 yds. above reservoir
At fence below Omega site	S19. 6.15.323	-
1.2 miles below Omega site	S19. 6.14.341	-
Near TW-3	S19. 6.24.111	-
At Highway 4	S19. 7.21.121	-
100 yds. above Guaje Canyon	S19. 7.14.222	-
At confluence with Guaje Canyon	S19. 7.14.222a	-
0.5 mile upstream from Rio Grande	S19. 7.13.234	-
Frijoles Canyon		
At Park Headquarters	S18. 6.23.211	-
At confluence with Rio Grande	S18. 6.25.443	-
Guaje Canyon		
At reservoir	S20. 6.31.114	Also one sample taken 100 yds. above reservoir
Return flow 500 yds. below G-1	S19. 7. 4.444	-

Table 67.--Miscellaneous surface-water sample sites - Concluded

Description of sampling sites	USGS location number	Remarks
Guaje Canyon - Continued		
At Highway 4	S19. 7.14.222b	Also one sample taken 100 yds. below Highway 4
Rio Grande		
At Embudo	S23. 9.23.333	-
At Otowi	S19. 5.18.331	-
At Cochiti	S16. 6.17.243	-
Rio Chama		
At Chamita	S21. 8. 8.221	-
Pajarito Canyon		
At gravel pit	S19. 6.36.233	-
At confluence with Rio Grande	S19. 7.10.313	-
Fence Canyon		
At Highway 4	S19. 7. 6.344	Floodflow
Bayo Canyon		
Below Bayo Site (at county line)	S19. 7. 7.331	Effluent
DP Canyon		
Near test well 3	S19. 6.13.343	Also called Turkey Creek Surface pool

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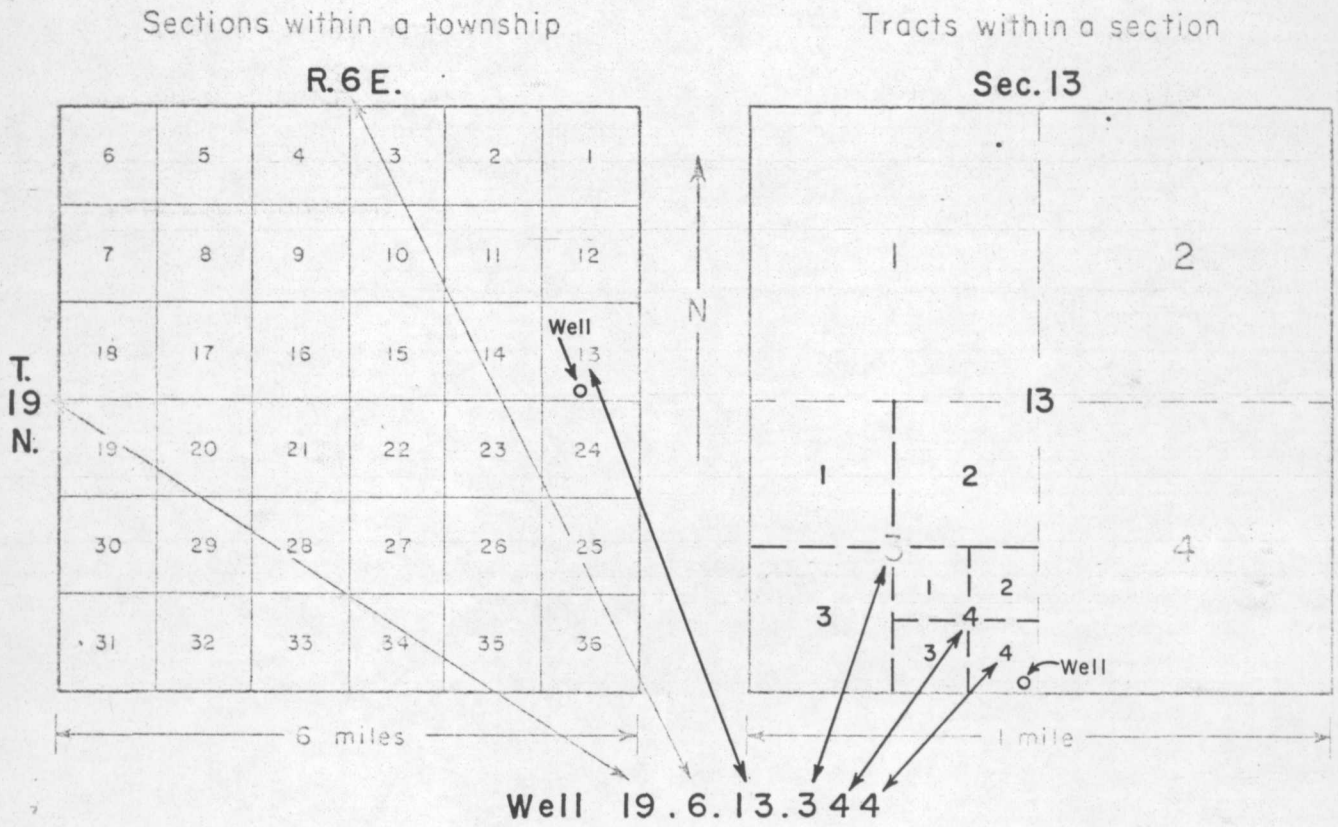


Figure 1.--System of numbering wells in New Mexico

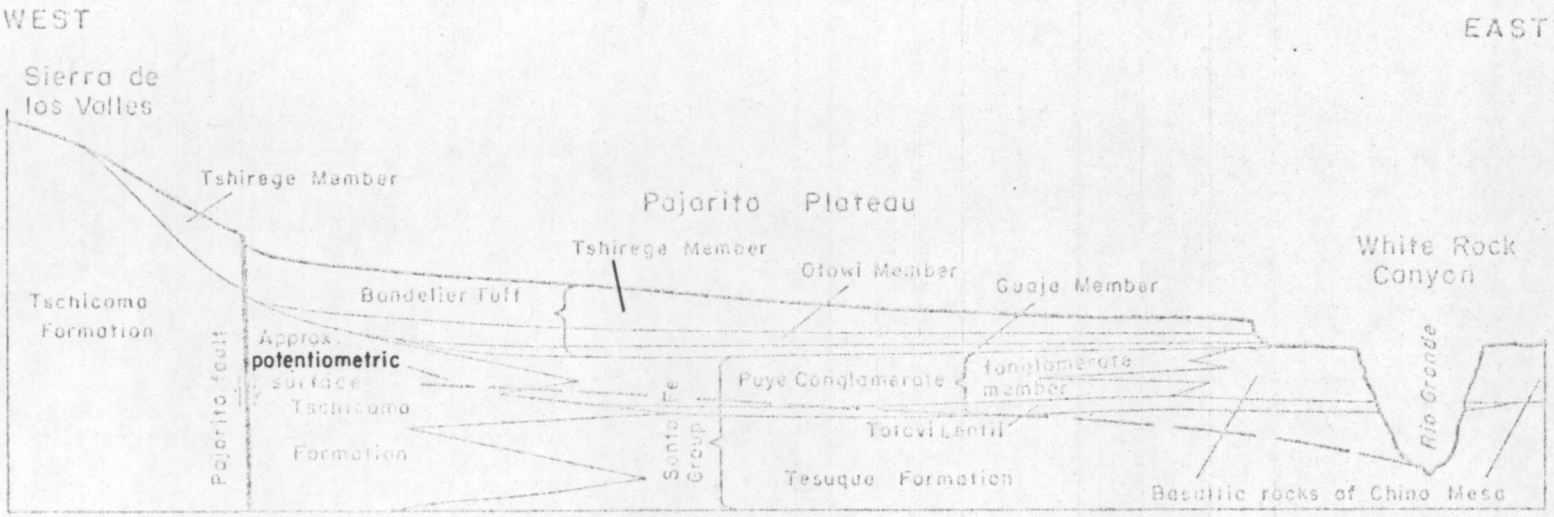


Figure 3.--Diagrammatic cross section showing generalized stratigraphic relations of rocks in the Los Alamos area

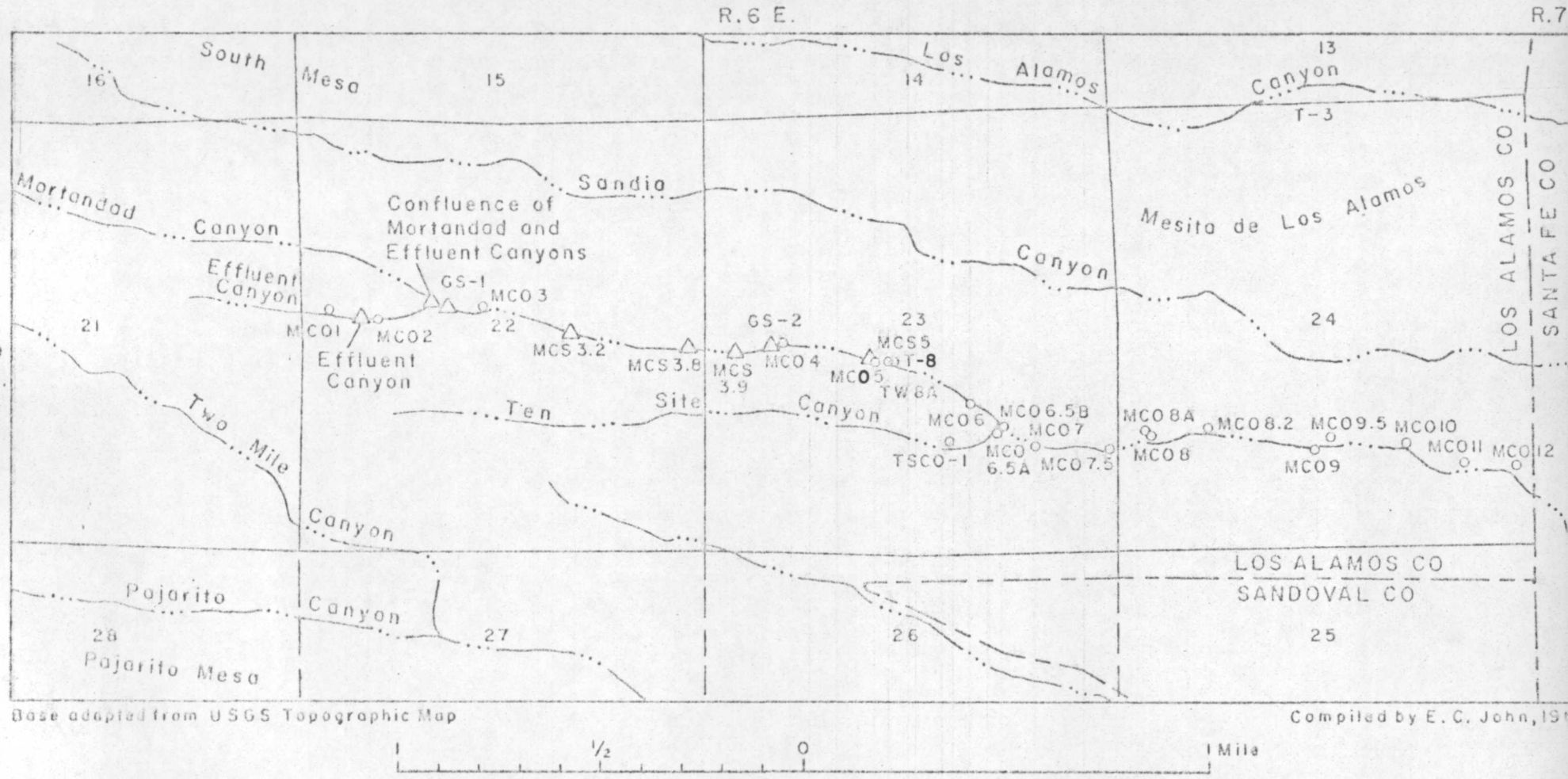


Figure 6.--Mortandad Canyon disposal area

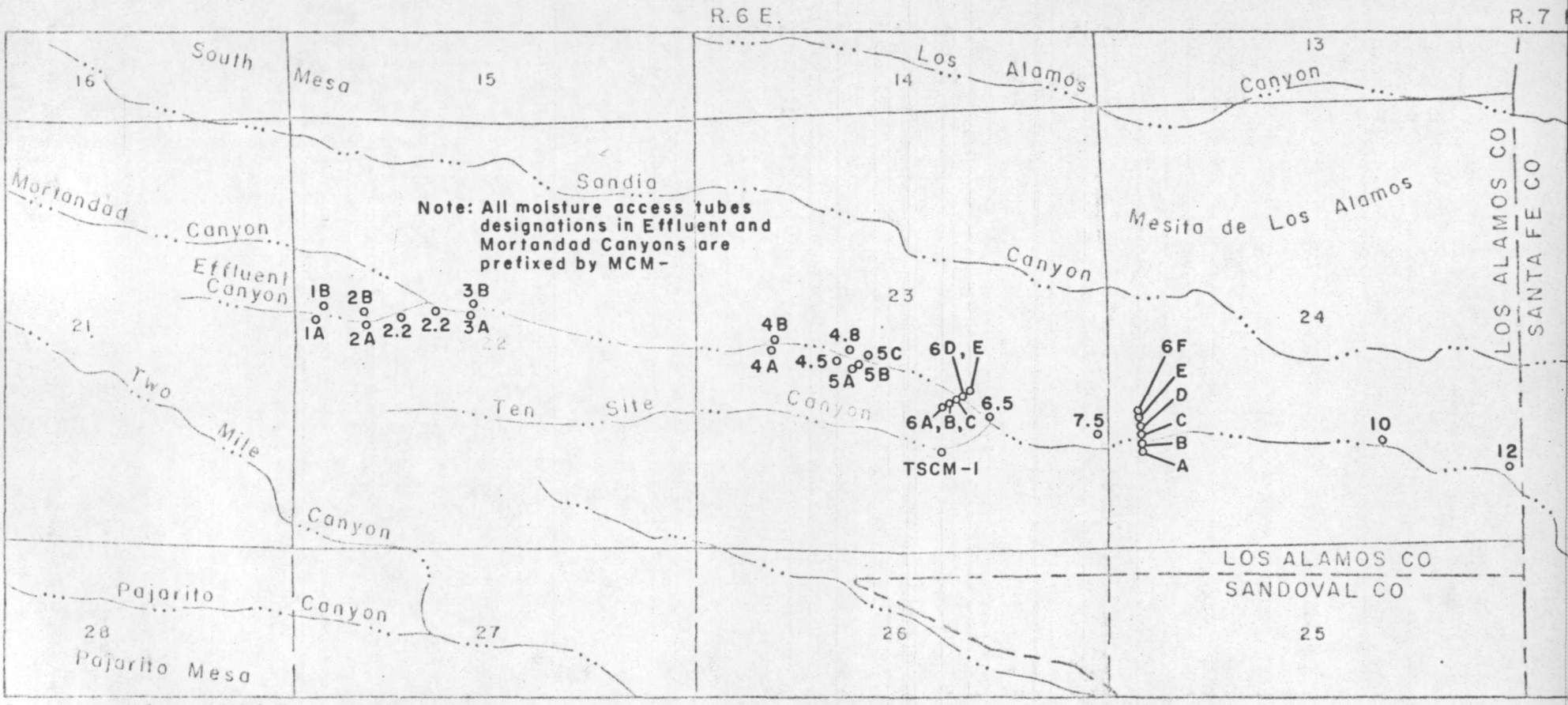


Figure 7.--Location of moisture access tubes in Mortandad Canyon disposal area.

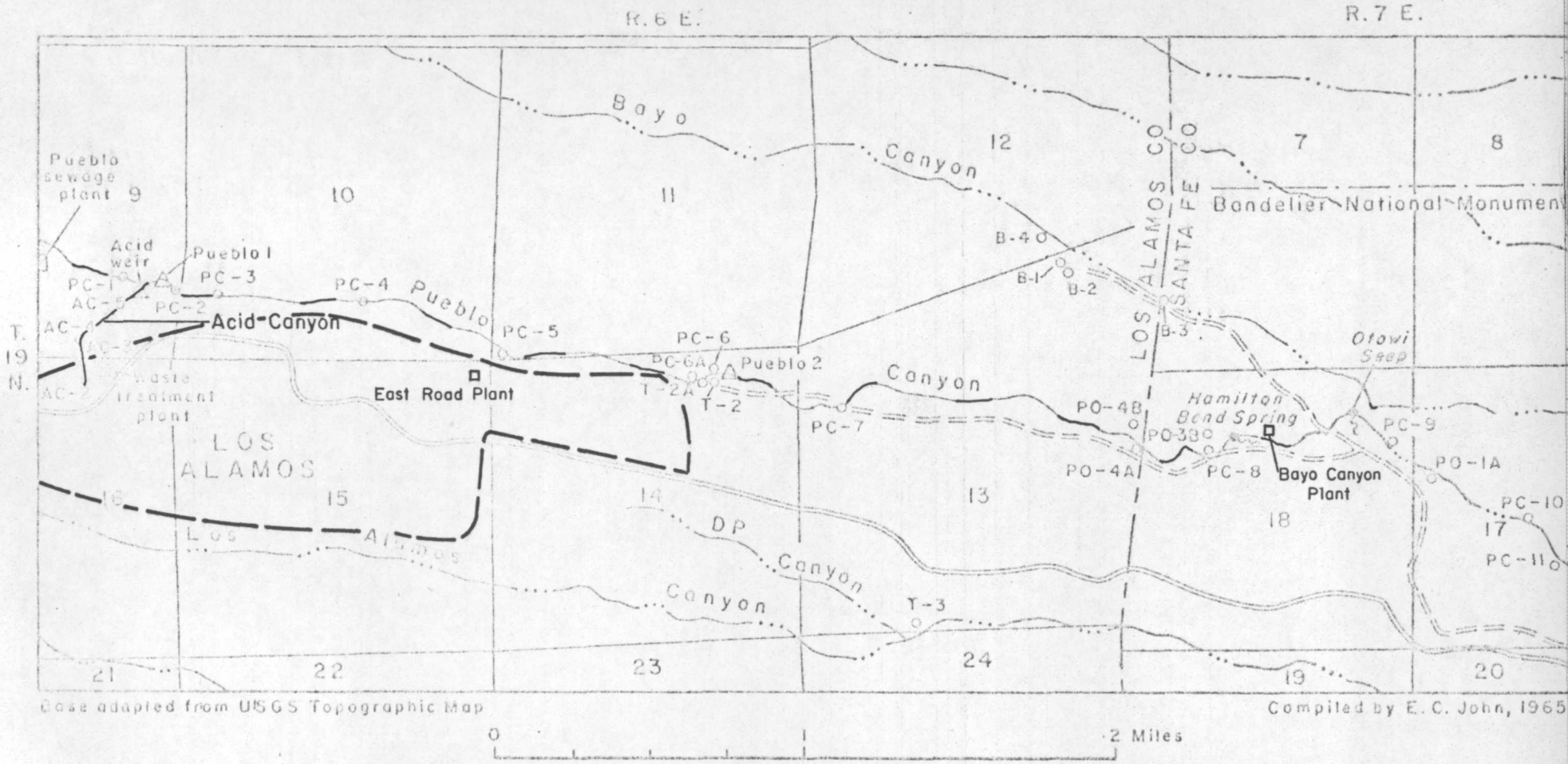


Figure 8.--Location of well, spring, stream, and alluvium sampling points in Acid, Pueblo, and Bayo Canyons.

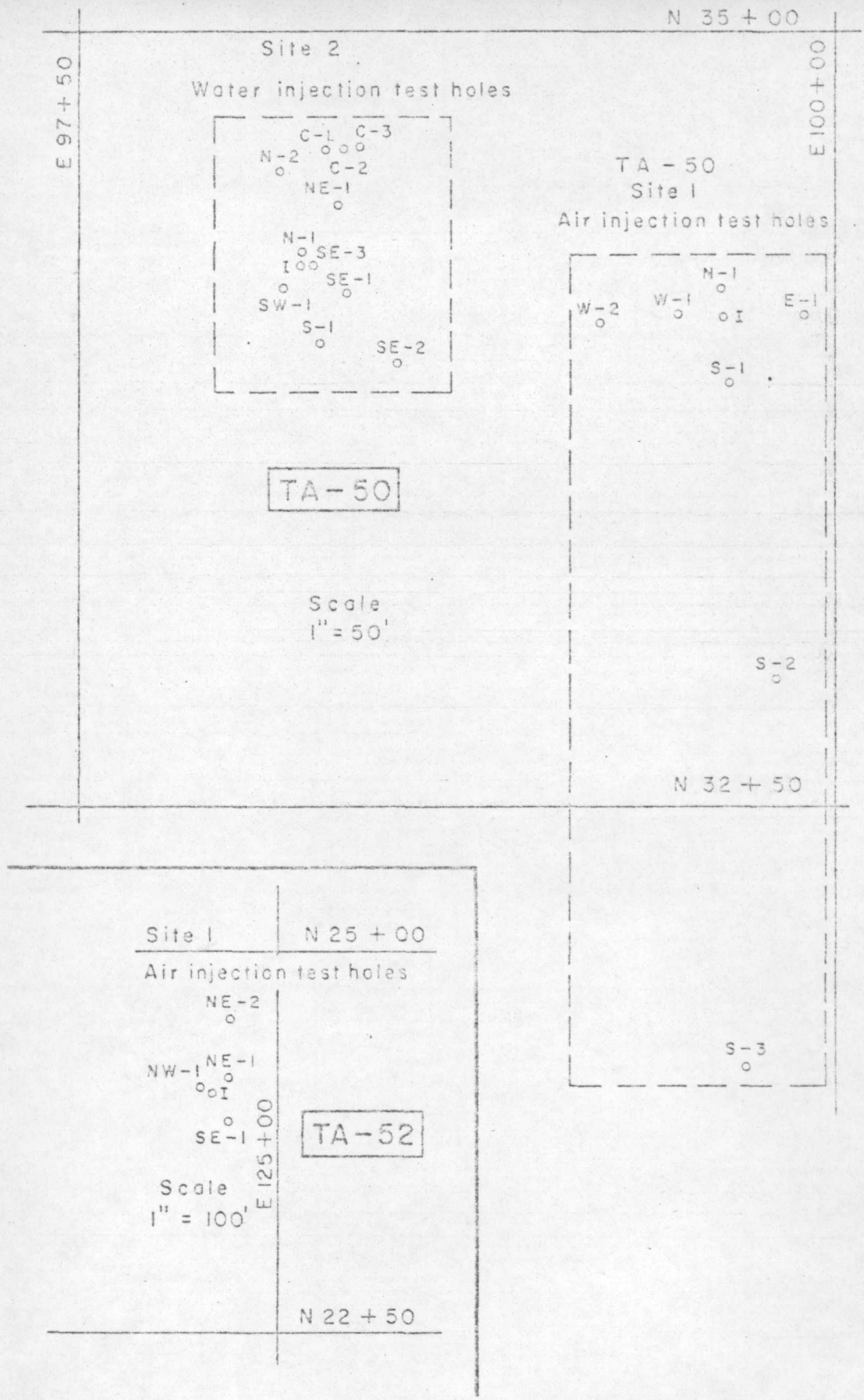
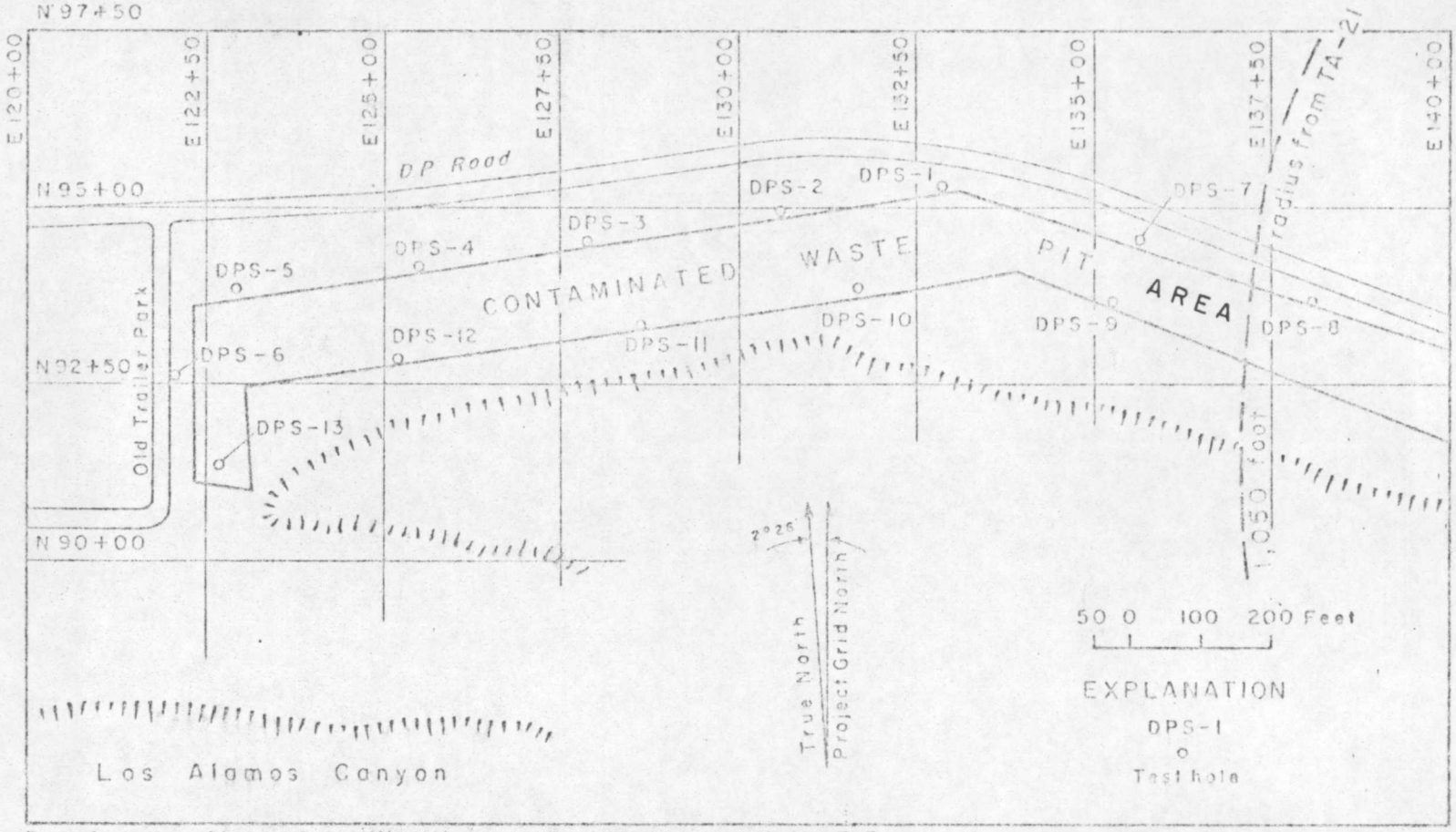


Figure 9.--Location of test holes at site 1 and 2,

TA-50 and site 1, TA-52.



Base from Los Alamos Scientific Laboratory Engineering sheet N.10 - E.7

Figure 10.--Location of test holes drilled near the contaminated waste pit west of TA-21.

Records of wells, test holes, springs, and surface-water stations in the Los Alamos area, N. Mex.

Figure 2.--Map of the Los Alamos area showing location of wells, test holes, and springs.

4.--Location of test holes in TA-49, Los Alamos County, New New Mexico.

5.--Location of moisture access tubes in TA-49, Los Alamos County, New Mexico.