Waste Isolation Pilot Plant

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UNITED STATES
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Mail Stop 954, Federal Center, Box 25046
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TEST DRILLING FOR POTASH RESOURCES: WASTE ISOLATION PILOT PLANT SITE, EDDY COUNTY, NEW MEXICO

By

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ABSTRACT

Twenty-one borings to augment existing information on potash resources at the proposed site for a waste isolation pilot plant in eastern Eddy County, N. Mex., were drilled and logged in an 11-week period, mid-August to November 1976. The basic data developed from the borings are tabulated in the present report. The tabulation includes lithologic and geophysical logs of all the borings, as well as the results of chemical analyses, X-ray determinations, and calculations to establish a modal mineralogical composition of core samples from potash ore zones and mineralized salt beds.

INTRODUCTION

The USGS (U.S. Geological Survey) is contributing technical assistance to the U.S. Department of Energy (formerly U.S. Energy Research and Development Administration) in the evaluation and characterization of a proposed site for WIPP (waste isolation pilot plant) in southeastern New Mexico. As part of this contribution the USGS conducted an exploratory drilling program to expand knowledge on the distribution, composition, and tonnage of potash resources at the site. This program included the selection of drill sites, inhole geophysical logging, and examination and sampling of core from the exploratory boreholes. The program was funded by the U.S. Department of Energy; engineering assistance and other support services were provided by Sandia Laboratories.

For the exploratory work at the proposed WIPP site, drill sites were selected, archaeological surveys were made, access roads and drill pads were built, and 21 boreholes totaling 11,197 m (36,737 ft) were drilled and completed in an 11-week period between August 18 and November 4, 1976. The archaeological surveys were conducted by the Agency for Conservation Archaeology, Portales, N. Mex., under contract to Sandia Laboratories. Two companies--Boyles Bros. Drilling Co., Salt Lake City, Utah, and Pennsylvania Drilling Co., Carlsbad, N. Mex.--provided five drill rigs and crews under contract to F&S (Fenix & Scisson, Inc.), which in turn was acting on behalf of Sandia Laboratories. All road construction and the furnishing of equipment, supplies, and services required for the operation of the drill rigs were done by private contractors for F&S. Contractual phases of the operation were supervised by F&S.

The collection of resource information from the exploratory boreholes involved geologists and technicians from F&S and the USGS. C. L. Jones coordinated the core examination and other geologic work performed by P. C. Aguilar, R. J. Cheeseman, G. S. Corchary, J. D. Kibler, J. C. Lorenz, Florian Maldonado, J. W. Mercer, R. P. Snyder, R. W. Spengler (all USGS),

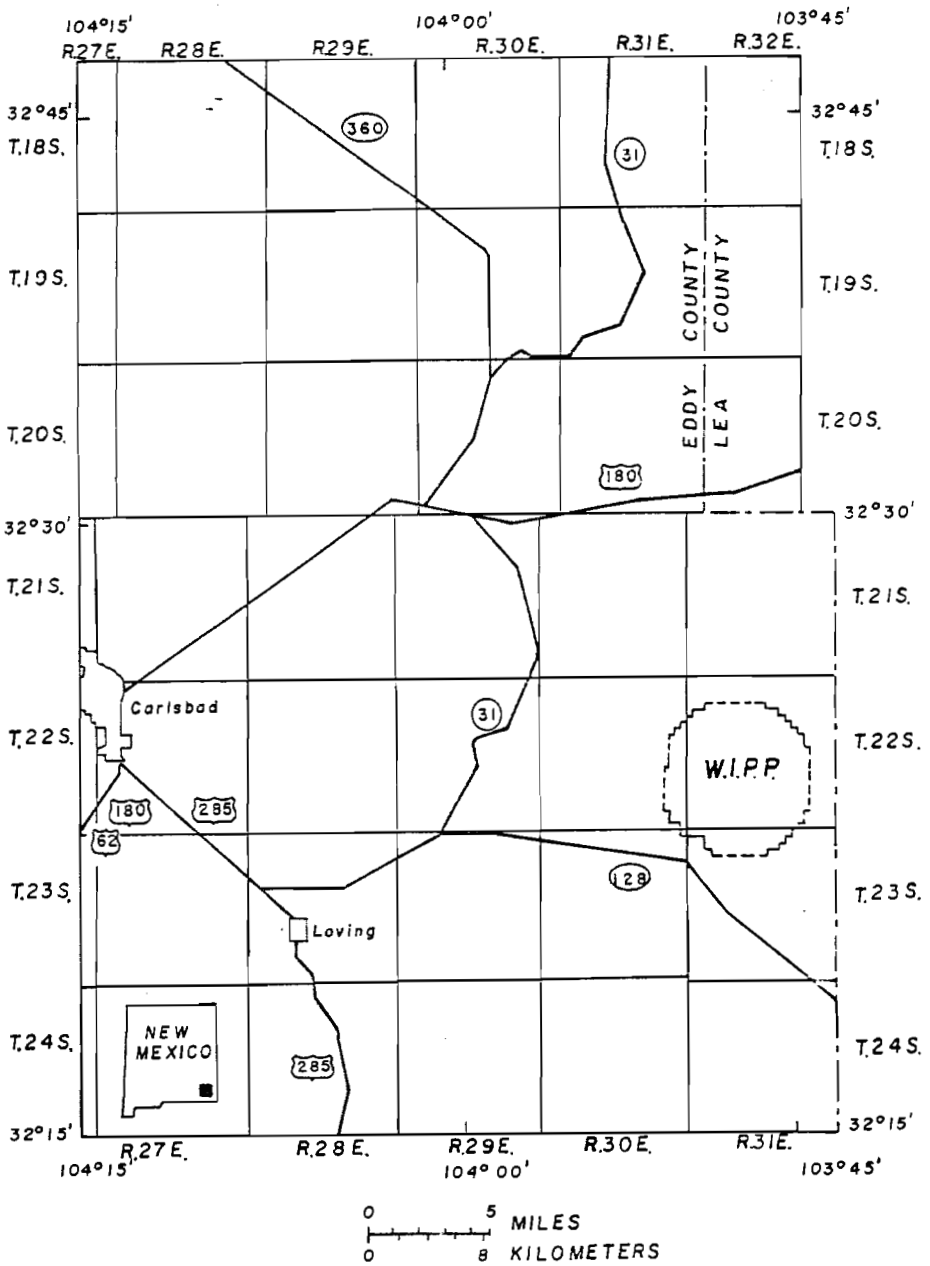

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Table A.--Boreholes drilled in support of potash resource evaluation at the proposed site of a waste isolation pilot plant

[FNL, from north line; FEL, from east line; FSL, from south line; FWL, from west line. To convert from English to metric units multiply feet by 0.3048]

Borehole	Location Sec.	T.	R.	Coordinates (feet)	Surface elevation (feet)	Total depth (feet)	Footage drilled (feet)	Footage cored (feet)	Core interval (feet)
P-1	29	22S	31E	327FSL, 551FWL	3,344.9	1,591	1,200	391	1,200-1,591
P-2	28	22S	31E	125FNL, 172FEL	3,477.7	1,895	1,500	395	1,500-1,895
P-3	20	22S	31E	103FSL, 3122FEL	3,382.3	1,676	1,300	376	1,300-1,676
P-4	28	22S	31E	146FSL, 1487FEL	3,441.2	1,857	1,450	407	1,450-1,857
P-5	17	22S	31E	202FSL, 165FEL	3,471.8	1,830	1,420	410	1,420-1,830
P-6	30	22S	31E	2767FSL, 199FWL	3,353.5	1,573	1,150	423	1,150-1,573
P-7	5	23S	31E	513FNL, 396FWL	3,331.7	1,574	1,177	397	1,177-1,574
P-8	4	23S	31E	642FNL, 96FWL	3,336.4	1,660	1,240	420	1,240-1,660
P-9	33	22S	31E	1493FSL, 143FEL	3,408.6	1,796	1,410	386	1,410-1,796
P-10	26	22S	31E	2315FNL, 339FWL	3,508.4	2,009	1,620	389	1,620-2,009
P-11	23	22S	31E	175FNL, 177FWL	3,505.8	1,940	1,580	360	1,580-1,940
P-12	24	22S	30E	167FNL, 195FEL	3,376.0	1,598	1,280	318	1,280-1,598
P-13	18	22S	31E	125FNL, 116FWL	3,345.4	1,576	1,220	356	1,220-1,576
P-14	24	22S	30E	312FSL, 613FWL	3,358.1	1,545	1,188	357	1,188-1,545
P-15	31	22S	31E	398FSL, 184FWL	3,309.7	1,465	1,038	427	1,038-1,465
P-16	5	23S	31E	951FSL, 1629FWL	3,322.8	1,585	1,110	475	1,110-1,585
P-17	4	23S	31E	1351FSL, 395FWL	3,339.5	1,660	1,220	440	1,220-1,660
P-18	26	22S	31E	134FSL, 797FEL	3,478.7	1,998	1,630	368	1,630-1,998
P-19	23	22S	31E	1652FSL, 2330FWL	3,546.3	2,000	1,635	365	1,635-2,000
P-20	14	22S	31E	794FSL, 103FEL	3,552.9	1,995	1,620	375	1,620-1,995
P-21	15	22S	31E	852FNL, 150FEL	3,510.2	1,915	1,510	405	1,510-1,915

marine origin; they are overlain by a succession of marine and continental red beds that range from Late Permian to Quaternary. Table B summarizes the lithologic characteristics and other details of the sedimentary units identified in the borings.

Upper Permian rocks

Upper Permian rocks include, in ascending order, the Salado Formation, Rustler Formation, and Dewey Lake Red Beds. The distribution of the three formations and younger rocks in the borings at the proposed WIPP site is summarized in table C.

Salado Formation

The oldest rock in the resource evaluation borings is the Salado Formation, which Lang (1935) named and differentiated from the Castile Gypsum (Richardson, 1904). However, only 241-287 m (790-940 ft) of the upper part of the Salado was drilled and cored. This part of the formation is chiefly rock salt, less abundant polyhalite and anhydrite, a few thin beds of siltstone, and numerous partings of mudstone. Associated with some of the rock salt 152 m (500 ft) and more below the top of the formation there are a few potash deposits that contain sylvite, langbeinite, and other potassium and magnesium minerals.

The Salado Formation in the general area of the Los Medaños pilot plant site is divided into a lower, middle, and upper member (Jones, 1973). Only 11 m (35 ft) of the lower member was penetrated by the resource-evaluation borings, but the member is known from other borings in the area to range between 296 and 354 m (970-1,160 ft) in thickness. The lower member consists dominantly of rock salt with interbeds of anhydrite and polyhalite and a few partings and thin seams of mudstone and siltstone. The lower part of the lower member is light to medium gray, whereas the upper part is decidedly red with shades of reddish orange and reddish brown predominating. The middle member, known locally as McNutt potash zone, is the ore-bearing part of the Salado from which potassium salts have been extracted from deposits containing sylvite and langbeinite; it is 106-126 m (347-415 ft) of brown and reddish-orange rock salt with interbeds of red polyhalite and gray anhydrite. Thin seams of siltstone occur in the upper part of the McNutt and there are many partings of mudstone between salt beds in all parts of the unit. The upper member, 136-161 m (446-528 ft) thick, is predominantly brown and reddish-orange rock salt with less abundant red polyhalite, gray anhydrite, and brown siltstone, as well as partings of brown and gray mudstone. The upper boundary of the Salado is drawn at a sharp conformable contact between rock salt and siltstone.

Insofar as has been determined from the resource-evaluation borings and all other exploratory drilling in and near the proposed WIPP site, the lower and upper members of the Salado are virtually, if not entirely, free of potassium minerals of commercial interest. The two members are very similar in lithologic and sedimentalogic detail and greatly resemble the McNutt zone in all but one respect: they lack the potash deposits that make the McNutt the economically important member of the Salado.

Within the McNutt and other members of the Salado Formation, many beds having distinctive characteristics and great lateral continuity are widely used as stratigraphic markers by mining companies and others doing exploratory drilling in southeastern New Mexico. The terminology of these marker beds follows that of Jones, Bowles, and Bell (1960) and involves

locally as "blowouts." The dunes are stabilized to semistabilized by a sparse growth of scrub oak, mesquite, and associated grasses representative of the northern Chihuahuan zone. Geologists and others concerned with the geology and mineral resources of the area find the bedrock almost totally concealed by dune sand, and a search for geologic information and minerals requires test drilling.

EXPLORATION FOR POTASH RESOURCES

During the exploratory drilling at the proposed WIPP site, the prime criterion for selection of drill sites was the need to augment existing information on the distribution and character of potash resources. Using this criterion, several areas deficient in resource information were identified, and a total of 21 drill sites were selected. The location, surface elevation, and other data concerning the boreholes drilled at the selected sites are given in table A.

Diesel-powered wireline and conventional-core drill rigs of the types used for potash exploration in southeastern New Mexico were employed in the present investigation. With this equipment, conventional rotary drilling procedures were used to bore to the top of the potash-bearing section, and consecutive cores, 6 cm (2 1/4 in.) in diameter, were taken through the full thickness of the potash-bearing section. The cores were cut with a face-discharge bit that was set with diamonds, and they were recovered in 3- and 6-m (10- and 20-ft) sections by means of a double-tube core barrel through which drilling fluid circulated between the inner and outer tubes. The drilling fluid was saturated sodium and potassium chloride brine to which starch, gel, and diesel oil had been added.

All cores were logged in the field within a few hours after removal from the boreholes, and a lithologic log containing a description of the cuttings and cores was prepared for each borehole (tables 1C-21C). In logging, reliance was placed on inspection of the cuttings through a binocular microscope and on visual examination of the cores. Detailed mineralogical examinations were made only on the sections of cores found to contain potassium minerals of commercial importance or potential economic importance. The mineralized sections of cores were split longitudinally: one half was analysed and the other half was retained by Sanida Laboratories for possible study and for storage as a matter of public record.

As part of the exploratory work, geophysical logs were taken the full length of each borehole (tables 1F-21F; 1G-21G). The logging was done to facilitate the identification and correlation of rock units and potash deposits, and to provide a depth determination independent of that indicated by drill-rod measurement. For each borehole, the geophysical logs included (1) a gamma-ray curve that recorded variations in the distribution of potassium and other radioactive elements, (2) a gamma-gamma curve that recorded variations in rock density, and (3) a neutron curve that recorded variations in the distribution of hydrogen.

GEOLOGY

Sedimentary rocks totaling 686 m (2,250 ft) in thickness were penetrated by the resource-evaluation borings at the proposed site for a waste isolation pilot plant in Los Medaños. The oldest rocks of Late Permian age include anhydrite, rock salt, and other evaporites of

M. N. Mitchell (F&S), B. R. Orr (USGS), and L. A. Rives (F&S). J. W. Mercer supervised the geophysical logging of boreholes done by J. A. Basler, J. D. Hudson, and B. R. Orr (all USGS). Jones and Corchary collaborated in sampling core from the boreholes. B. M. Madison (USGS) was responsible for X-ray determination of the potassium and other minerals in the core samples.

All the core samples selected for chemical analysis were submitted by Sandia Laboratories to Skyline Labs, Inc., Tucson, Ariz., for determination of potassium, magnesium, and other elements required to characterize the potash resources of the proposed WIPP site. For purposes of quality control, a number of randomly selected samples also were analysed by the Herron Testing Laboratories, Inc., Cleveland, Ohio, and by the U.S. Bureau of Mines.

The basic data developed from the drilling program are tabulated in the present report. The tabulation includes lithologic and geophysical logs of all the boreholes drilled for resource evaluation purposes, and the results of the chemical analyses, the X-ray determinations of minerals, and the calculations to establish a modal mineralogical composition and the distribution of potassium between individual minerals. These data will be used elsewhere to define and evaluate the potash resource believed to occur at the site. An estimate of the distribution, composition, and tonnage of resources will be prepared by C. B. John, R. J. Cheeseman, and J. C. Lorenz (all USGS). A determination of the economic value and recoverability of the resources will be made by members of the U.S. Bureau of Mines (U.S.Bureau of Mines, 1977).

Acknowledgments

Appreciation is expressed for the cooperation given by the BLM (U.S. Bureau of Land Management) and for the assistance contributed by personnel of drilling, supply, service, and construction companies. Individuals to whom credit is given for valuable contributions too numerous to itemize include W. E. Cunningham of F&S, Manuel Espinoza of Pecos Valley Construction, Inc., and Don Durham of Cooper Mud Service. Mention is gratefully made of the assistance given by Dan Landes and Miles Linnaberry of Agency for Conservation Archaeology and Cleo Shipler of Construction Enterprises in the location of drill pads and establishing the routes of access roads. The many courtesies extended by R. D. Statler and personnel of Sandia Laboratories are gratefully acknowledged.

Geography

The proposed site for a waste isolation pilot plant is in eastern Eddy County, N. Mex., about 40 km (25 mi) east of Carlsbad, N. Mex. (fig. 1). The site, centered at the common corner for sec. 20, 21, 28, and 29, T. 22 S., R. 31 E., includes about 60 km^2 (23 mi^2) in T. 22 S., R. 31 E., and stretches of slightly more than 8 km^2 (3 mi^2) in adjacent parts of T. 22 S., R. 30 E., and T. 23 S., R. 31 E., for a total of more than 78 km^2 (30 mi^2). Approximately 90 percent of the area is federally owned land with surface and mineral rights; the remainder is State-owned land.

The proposed site is a typical part of the surrounding westward-sloping Los Medaños plain of eastern Eddy County. The topography is of a hummocky sand-dune type; dunes rise to heights of 6 m (20 ft) or more above interdunal troughs and scattered small basins known

Table B.--Summary description of rock units penetrated by the potash resource evaluation borings

Age		Formation	Member or zone	Thickness feet (meters)	Description
QUATERNARY	Holocene		--	0-15 (0-5)	Sand, fine- to medium-grained, subrounded to angular, frosted, reddish-brown, unconsolidated, eolian
	Pleistocene	Mescalero caliche[1]		3-5 (0.9-1.5)	Calcareous soil, well-indurated crystalline, white, locally laminated in dark and light bands
					UNCONFORMITY
		Gatuna		0-32 (0-10)	Sandstone, fine- to medium-grained, poorly sorted, pale-red to pinkish-gray, locally conglomeratic with subangular to rounded clasts of siltstone and coarse-grained sandstone
					UNCONFORMITY
LATE TRIASSIC		Santa Rosa Sandstone		0-255 (0-78)	Sandstone, fine- to coarse-grained, micaceous, yellow-brown, gray, and greenish-gray; interbedded with reddish-brown siltstone and mudstone
					UNCONFORMITY
LATE PERMIAN		Dewey Lake Red Beds		267-541 (81-165)	Siltstone and mudstone, reddish-orange to reddish-brown, irregularly bleached greenish-gray in streaks and spots; extensively cut by veins of cross-fibrous selenite; contains a few thin lenticular beds of fine- to coarse-grained, white to grayish-white sandstone
					UNCONFORMITY
		Rustler		53-76 (16-23)	Anhydrite, finely crystalline, very light gray; locally gypsiferous along margins of interbedded red silt and mud where halite has been removed by dissolution processes
			Magenta Dolomite	22-27 (7-8)	Dolomite, fine-grained, laminated, very light gray to pale-greenish-gray
				84-179 (26-55)	Anhydrite, finely crystalline, very light gray, locally gypsiferous along margins of interbedded seam of red silt and mud and other rock layer from which halite has been removed by dissolution processes
			Culebra Dolomite	22-29 (7-9)	Dolomite, finely crystalline, light-gray, dotted with solution cavities from which anhydrite has been partially to completely removed by dissolution processes
				92-150 (28-46)	Siltstone, clayey, reddish-brown, grading downward abruptly into medium-dark-gray to bluish-gray, clayey siltstone; interbeds of finely crystalline gray anhydrite and rock salt occur near the top of unit
		Salado		446-528 (136-161)	Dominantly rock salt with interbeds of polyhalite and anhydrite at irregular short to long interval a few interbeds of reddish-brown siltstone near top of unit
			McNutt potash[1]	347-415 (106-126)	Dominantly rock salt with interbeds of polyhalite and anhydrite; contains sylvite, langbeinite and other potassium minerals

[1]Informal name.

Table C.--Distribution of pre-Holocene rocks in the potash resource evaluation borings

[Leaders (---), not present. To convert from English to metric units, multiply feet by 0.3048]

Borehole	Surface elevation (feet)	Total depth (feet)	Pre-Holocene rocks (depth interval in feet)				
			Gatuna Formation	Santa Rosa Sandstone	Dewey Lake Red Beds	Rustler Formation	Salado Formation
P-1	3,344.8	1,591	10-40	---	40-358	358- 677	677-1,591
P-2	3,477.7	1,895	18-38	38-164	164-690	690-1,008	1,008-1,895
P-3	3,382.3	1,676	10-41	---	41-468	468- 786	786-1,676
P-4	3,441.2	1,857	---	8- 99	99-609	609- 930	930-1,857
P-5	3,471.8	1,830	---	13-146	146-623	623- 947	947-1,830
P-6	3,353.5	1,573	8-18	---	18-357	357- 659	659-1,573
P-7	3,331.7	1,574	11-45	---	45-312	312- 630	630-1,574
P-8	3,336.4	1,660	9-39	---	39-391	391- 715	715-1,660
P-9	3,408.6	1,796	---	11- 66	66-562	562- 881	881-1,796
P-10	3,508.4	2,009	---	8-151	151-686	686-1,086	1,086-2,009
P-11	3,505.8	1,940	---	9-244	244-745	745-1,058	1,058-1,940
P-12	3,376.0	1,598	---	---	8-461	461- 749	749-1,958
P-13	3,345.4	1,576	12-38	---	38-427	427- 721	721-1,576
P-14	3,358.1	1,545	19-37	---	37-387	387- 687	687-1,545
P-15	3,309.7	1,465	11-32	---	32-231	231- 542	542-1,465
P-16	3,322.8	1,585	14-32	---	32-316	316- 646	646-1,585
P-17	3,339.5	1,660	14-46	---	46-382	382- 715	715-1,660
P-18	3,478.7	1,998	---	9- 87	87-628	628-1,088	1,088-1,998
P-19	3,546.3	2,000	---	8-232	232-758	758-1,117	1,117-2,000
P-20	3,552.9	1,995	---	6-261	261-780	780-1,103	1,103-1,995
P-21	3,510.2	1,915	---	8-225	225-734	734-1,043	1,043-1,915

a system of numbering that makes use of cardinal numbers to designate key horizons--marker beds composed of anhydrite and polyhalite--and ordinal numbers to designate ore zones--salt beds containing potash deposits of possible commercial interest. All the marker beds and ore zones that occur within the McNutt zone of the Salado are identified by number on the geophysical logs of the resource-evaluation borings (tables 1F-21F; 1G-21G). Identified also on the geophysical logs is a siltstone unit at the top of the McNutt which was named the Vaca Triste Sandstone Member by Adams (1944) and a bed of polyhalitic anhydrite near the middle of the McNutt which is known locally and informally as the Union anhydrite.

Rustler Formation

Overlying the Salado Formation in all the resource-evaluation borings is the Rustler Formation, which was named by Richardson (1904) for exposures in the Rustler Hills in western Texas about 80 km (50 mi) southwest of the WIPP site. In the borings, the Rustler is 88-140 m (288-460 ft) of anhydrite (locally altered to gypsum), dolomite, and fine-grained clastic rocks. Rock salt is present locally but formerly was more widespread, as indicated by the presence of dissolution debris, convergence of beds, and structural evidence for subsidence. The clastic rocks range in composition from mudstone, through clayey siltstone, to very fine grained sandstone, and include structureless accumulations of unconsolidated clays and silts that are residual dissolution products of clayey and silty rock salt.

A fivefold division of the Rustler is present in all the resource-evaluation borings: (1) at the base, a unit of clayey siltstone and very fine grained sandstone with thin interbeds of anhydrite and rock salt in its upper part; (2) a unit of thin-bedded, solution-pitted, finely crystalline dolomite (Culebra Member); (3) a unit of anhydrite with a single thin interbed of unconsolidated clayey silt (residum from a thick seam of rock salt and associated polyhalite and halitic siltstone); (4) a unit of thinly cross-laminated, fine-grained dolomite (Magenta Member); and (5) a unit of anhydrite with a single thin interbed of unconsolidated clayey silt (residum from a much thicker seam of clayey and silty rock salt). The dolomite members, named by Adams (1944), are regionally extensive units, and are important aquifers in areas west of the WIPP site.

The upper boundary of the Rustler Formation is sharp and is interpreted as an unconformity of slight discordance.

Dewey Lake Red Beds

Overlying the Rustler Formation in all the resource-evaluation borings are the Dewey Lake Red Beds, which were named by Page and Adams (1940) for an alkali lake in western Glasscock County, Tex., about 201 km (125 mi) southeast of the proposed site for WIPP. In the borings, the Dewey Lake is 81-165 m (267-541 ft) of predominantly reddish-orange to reddish-brown siltstone and mudstone with lenticular interbeds of fine- to coarse-grained grayish-white sandstone. Virtually all the siltstone and mudstone are veined with fibrous selenite and are generously sprinkled with greenish-gray spots and patches.

The Dewey Lake Red Beds are separated from the overlying Santa Rosa Sandstone of Late Triassic age by an erosional unconformity. Between 145 and 163 m (477-535 ft) of the Dewey

Lake is preserved beneath this unconformity in the eastern part of the proposed pilot plant site, but the formation is much thinner in areas to the west where a part of it has been removed by erosion during Cenozoic time.

Upper Triassic rocks

Santa Rosa Sandstone

Overlying the Dewey Lake Red Beds in about one-half of the resource-evaluation borings at the proposed pilot plant site is the Santa Rosa Sandstone of Late Triassic age. The Santa Rosa has been stripped from the western part of the site by erosion, but as much as 78 m (255 ft) of the formation is present in the eastern part of the site. In the borings the formation consists of fine- to coarse-grained micaceous, yellow-brown, gray, and greenish-gray sandstone with interbeds of reddish-brown siltstone and mudstone.

The type locality of the Santa Rosa Sandstone, as defined by Darton (1922), is along the Pecos River at Santa Rosa, N. Mex., about 306 km (190 mi) north of the proposed pilot plant site at Los Medaños.

Quaternary rocks

Quaternary rocks in the borings include the Gatuna Formation, an indurated calcareous soil known informally as the Mescalero caliche, as well as surficial deposits of dune sand. All these units lie unconformably on older rocks.

Gatuna Formation

The Gatuna Formation of Pleistocene age, named by Robinson and Lang (1938), is restricted to the western part of the proposed pilot plant site. In this area, the Gatuna is represented by a few tens of feet of fine- to medium-grained, poorly sorted, pale-red to pinkish-gray sandstone, grading downward locally into a conglomeratic sandstone that contains subangular to rounded clasts of siltstone and sandstone. The Gatuna unconformably overlies the Santa Rosa and older formations.

Mescalero caliche

The Mescalero caliche, an informal stratigraphic unit named by Bachman (1976), is a well-lithified illuvial deposit of chalky white, finely crystalline calcium carbonate ranging between 0.9 and 1.5 m (3-5 ft) in thickness. The Mescalero forms a caprock that lies with angular unconformity on the underlying Gatuna and older formations, and its lower part commonly engulfs irregular masses of the bedrock. Parts of it are laminated in shades of light and darker brown, and are sparingly pisolitic.

Surficial deposits

Hummocky surficial deposits of unconsolidated dune sand cover virtually all parts of the proposed pilot plant site. The sand is reddish brown, fine to medium grained, and angular to subrounded. In some areas of prominent dunes, the sand may exceed 6 m (20 ft) in thickness.

MINERALOGY

Many identifications of minerals from core examinations in the field are given in the lithologic logs of the resource-evaluation borings (tables 1C-21C), but detailed mineralogical examinations have been made only of the mineralized sections of core analysed for resource-evaluation purposes.

Table D lists the saline minerals found upon X-ray diffraction and petrographic examination of the mineralized section of core. Six of the saline minerals are potassium bearing, but only two of them--sylvite (KCl) and langbeinite ($(KMg)_2(SO_4)_3$)--are commercially important. All the other minerals have little, if any, economic importance, owing to the lack of commercially feasible methods for mineral utilization or for extraction of potassium compounds.

Sylvite and langbeinite are the potassium minerals of prime concern in any evaluation of potash resources, but their value as a resource depends on the ease with which they can be separated from associated minerals and clays. Neither mineral forms beds of pure material in the cores from the resource-evaluation borings; both are invariably mixed with halite and appreciable clayey detritus, as well as with generally less abundant polyhalite and (or) anhydrite. Locally, the clayey sylvite-halite and the clayey langbeinite-halite mixtures are free from other saline minerals, but more commonly they contain complex mineral assemblages. Table E lists some mineral assemblages involving sylvite and langbeinite that were identified in core samples from the resource-evaluation borings. For further details on the mineralogical composition of all the assemblages found, reference should be made to tables 1D-21D and tables 1E-21E.

CHEMISTRY

To characterize the potash resources at the proposed WIPP site, a total of 426 samples representing 132 m (432 ft) of core were analysed for Ca, K, Mg, Na, Cl, SO, H_2O-, H_2O+, and water insolubles. A boring-by-boring tabulation of the chemical data and X-ray diffraction data on the samples are given in tables 1D-21D. The chemical determinations reported in the series of tables were made by Skyline Labs, Inc., whereas the X-ray determinations were made by the USGS.

The analytical procedures used by Skyline Labs, Inc., involved washing each sample (namely, an intact half section of core) in acetone to remove the diesel oil used as a drilling-fluid additive. After air drying, the washed sample was crushed and homogenized, and a portion of the crushed material was weighed, heated to 80°C, and then reweighed for determination of H_2O- as represented by the weight loss. Thereafter, the portion of crushed material was heated to 250°C for determination of H_2O+ as represented by the weight loss between 80° and 250°C. Once the H_2O determinations were made, the crushed material was then leached in distilled water to extract soluble components, leaving the insoluble clayey detritus associated with the saline minerals in most samples. Cation concentrations were determined by atomic absorption; the chloride determination was by titration; and the sulfate was determined gravimetrically.

For 71 of the 426 samples listed in tables 1D-21D, a threefold split of the crushed and homogenized material was made; one split was analysed by Skyline Labs, Inc., a second by Herron Testing Laboratories, Inc., and the third by the U.S. Bureau of Mines. A comparison of the analytical procedures used by the three organizations is made in table F; whereas the analytical results are compared in table G.

Table D.--Saline minerals identified in core samples from potash resource-evaluation borings
[Leaders (---), not present]

	Mineral	Formula	Weight percent K_2O	Weight percent H_2O	Specific gravity
ORE MINERALS	Sylvite	KCl	63.17	---	1.98
	Langbeinite	$(KMg)_2(SO_4)_3$	22.69	---	2.83
GANGUE MINERALS	Leonite	$K_2Mg(SO_4)_2 \cdot 4H_2O$	25.68	19.65	2.2
	Kainite	$(KMgClSO_4)_2 \cdot 11H_2O$	19.26	20.27	2.1
	Carnallite	$KMgCl_3 \cdot 6H_2O$	16.91	38.91	1.6
	Polyhalite	$K_2Ca_2Mg(SO_4)_4 \cdot 2H_2O$	15.62	5.98	2.8
	Bloedite	$Na_2Mg(SO_4)_2 4H_2O$	---	21.53	2.2
	Loeweite	$Na_{12}Mg_7(SO_4)_{13} \cdot 15H_2O$	---	13.75	2.4
	Vanthoffite	$Na_6Mg(SO_4)_4$	---	---	2.7
	Halite	$NaCl$	---	---	2.1
	Anhydrite	$CaSO_4$	---	---	2.9

Table E.--Mineral assemblages with sylvite and langbeinite found in core samples from potash resource-evaluation borings

[Sy, sylvite; La, langbeinite; Ha, halite; Ca, carnallite; Bl, bloedite; Ka, kainite; Ki, kieserite; Le, leonite; Lo, loeweite; Po, polyhalite]

Assemblages with sylvite	Assemblages with langbeinite
Sy+Ha	La+Ha
Sy+Ha+Ca	La+Ha+Bl
Sy+Ha+Ca+Ka	La+Ha+Ka
Sy+Ha+Ka	La+Ha+Ki
Sy+Ha+Ka+Ki	La+Ha+Le
Sy+Ha+Ka+Ki+Bl	La+Ha+Lo
Sy+Ha+Ka+La	La+Ha+Sy
Sy+Ha+Ka+Le	La+Ha+Bl+Lo
Sy+Ha+Ka+Ki+La	La+Ha+Ka+Bl
Sy+Ha+Ka+Ki+La	La+Ha+Ka+Ki
Sy+Ha+Ki	La+Ha+Ka+Le
Sy+Ha+Ki+La	La+Ha+Le+Bl
Sy+Ha+La	La+Ha+Ka+Le+Bl
Sy+Ha+La+Ka+Le	La+Ha+Ka+Ki+Le+Bl
	La+Ha+Sy+Ka
	La+Ha+Sy+Ki
	La+Ha+Sy+Ki+Ka
	La+Ha+Sy+Le
	La+Ha+Po+Le

Table F.--Analytical procedures used by SL (Skyline Labs, Inc.), HTL (Herron Testing Laboratories, Inc.), and BM (U.S. Bureau of Mines)

	SL	HTL	BM
Sample preparation	Washed in acetone, air dried and ground through 100 mesh	Used 100-mesh material as received	Material reground through 200 mesh
Dissolution	Water leached for 30 minutes at room temperature	Warm water leached for 30 minutes, followed by water leached overnight at room temperature	Boiling water leached for 30 minutes
H_2O determination	Sample heated for 2 hours at 80° and 250°C	Sample heated to constant weight at 250°C	Sample heated to constant weight at 80° and 250°C
Ca and Mg determination	Atomic absorption	Atomic absorption with use of lanthanum to reduce interference	Atomic absorption
K and Na determination	Atomic absorption	Atomic absorption with use of lanthanum to reduce interference	Flame photometry
CL determination	Potentiometric titration	Potentiometric titration	Potentiometric titration
SO_4 determination	Gravimetric	Gravimetric	Gravimetric

Despite differences in analytical procedures and the considerable sensitivity of atomic absorption techniques to sample variation and changes in instrumental parameters, the results reported by the three organizations generally agree. Nevertheless, some discrepancies do exist, but most are considered to be due largely, if not entirely, to the differences in analytical procedures. However, for those samples for which some uncertainty existed with respect to one or more determinations, a repeat analysis was done. The results of repeat analyses are given in tables of chemical data (tables 1D-21D).

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TABLES 1A-1G

Basic data from drill hole P-1,
Waste Isolation Pilot Plant area, Eddy County, New Mexico

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1G.--Gamma-ray and neutron logs of drill hole	foldout

Table 1A.--Abridged drill-hole history

LOCATION: Sec. 29, T. 22 S., R. 31 E.
100 m (327 ft) from south line
168 m (551 ft) from west line

ALTITUDE (LAND SURFACE): 1,019 m (3,344.8 ft). Datum for depth measurements in drilling and logging operations.

LITHOLOGIC LOGS PREPARED BY: P. C. Aguilar, R. J. Cheeseman, G. S. Corchary, J. D. Kibler, B. R. Orr, and R. P. Snyder, August 26 to September 3, 1976.

DRILLING CONTRACTOR: Pennsylvania Drilling Co.

DRILLING RECORD: Commenced drilling on August 23, 1976, and completed on September 2, 1976, at 485 m (1,591 ft) below land surface.

Last circulation at 54 m (178 ft) below land surface.

62 m (203 ft) of 11-cm (4 1/2-in.) casing left in hole between 180 and 242 m (591-794 ft) below land surface.

Plugged with cement.

REMARKS: Top of salt in Rustler Formation at depth of 182 m (597 ft) below land surface.

Table 1B.--Stratigraphic summary

Rock unit	Depth interval[1] feet	meters
Holocene deposits	0-10	0-3
Pleistocene rocks:		
Gatuna Formation	10-40	3-12
Permian rocks:		
Dewey Lake Red Beds	40-358	12-109
Rustler Formation	358-677	109-206
Magenta Dolomite Member	423-448	129-137
Culebra Dolomite Member	538-565	164-172
Salado Formation	677-1,591	206-485
Upper member	677-1,191	206-363
McNutt potash zone	1,191-1,583	363-482
Vaca Triste Sandstone Member[2]	1,191-1,201	363-366
11th ore zone	1,246-1,250	380-381
Marker bed 117	1,259-1,262	383-384
Marker bed 118	1,282-1,285	391-392
Marker bed 119	1,307-1,309	398-399
10th ore zone	1,319-1,324	402-404
Marker bed 120	1,334-1,335	407-407+
9th ore zone	1,338-1,343	408-409
Marker bed 121	1,347-1,349	410-411
Marker bed 122	1,356-1,357	413-414
8th ore zone	1,361-1,370	415-418
Union anhydrite[3]	1,381-1,393	421-425
7th ore zone	1,400-1,404	427-428
6th ore zone	1,414-1,416	431-432
5th ore zone	1,419-1,432	433-436
Marker bed 123	1,462-1,469	446-448
Marker bed 124	1,477-1,486	450-453
4th ore zone	1,490-1,503	454-458
3d ore zone	1,511-1,526	460-465
2d ore zone	1,533-1,538	467-469
1st ore zone	1,554-1,562	474-476
Marker bed 126	1,582-1,583	482-482+
Lower member	1,583-1,587	482-484
Maximum depth recorded	1,587	484

[1]Depth interval recorded from geophysical logs.
[2]Of Adams, 1944.
[3]Informal unit of Salado Formation.

Table 1C.--Lithologic log

Description	Depth (feet)
Caliche, very pale red to white with fine sand grains; reddish-brown fine-grained sandstone	0.0- 10.0
Sandstone, reddish brown, fine- to very fine grained, subrounded to rounded, poorly sorted	10.0- 20.0
Sandstone, reddish-brown, very fine grained; brown to reddish-brown siltstone; contains calcite crystals	20.0- 30.0
Sandstone, reddish-brown, fine- to very fine grained; contains calcite crystals	30.0- 80.0
Same as above; and white, fine- to very fine grained sandstone	80.0- 100.0
Siltstone, reddish-brown	100.0- 140.0
Claystone, reddish-brown with gray-green reduction spots	140.0- 180.0
Siltstone, reddish-brown; reddish-brown sandstone with reduction spots; approx. 10 percent reddish-brown claystone	180.0- 190.0
Claystone, dark-reddish-brown, light-reddish-brown, and pale-brown with gray-green reduction spots; some siltstone and very fine grained, reddish-brown sandstone	190.0- 200.0
Same as above, lighter in color (pale-brown); cavings	200.0- 210.0
Same as above, increase in siltstone and sandstone	210.0- 220.0
Same as above, decrease in siltstone and sandstone	220.0- 240.0
No sample	240.0- 250.0
Siltstone, light-reddish-brown	250.0- 255.0
Claystone, reddish-brown with gray-green reduction spots	255.0- 260.0
Siltstone, reddish-brown	260.0- 265.0
Claystone, reddish-brown	265.0- 270.0
Siltstone, reddish-brown; contains vein selenite	270.0- 280.0
Claystone, dark-reddish-brown	280.0- 290.0
Siltstone, reddish-brown with gray-green reduction spots; approx. 2 percent very light gray siltstone	290.0- 295.0
Claystone, dark-reddish-brown with gray-green reduction spots	295.0- 300.0
No sample	300.0- 305.0
Siltstone, reddish-brown	305.0- 320.0
Siltstone, reddish-brown; reddish-brown with gray-green reduction spots, very fine grained sandstone	320.0- 325.0
Siltstone, reddish-brown with gray-green reduction spots; some light-gray siltstone; some reddish-brown claystone	325.0- 330.0
Siltstone, reddish-brown; reddish-brown, very fine grained sandstone; reddish-brown claystone	330.0- 345.0
Claystone, reddish-brown; some reddish-brown siltstone	345.0- 360.0

Table 1C.--Lithologic log--(Continued)

Description	Depth (feet)
Siltstone, red with gray-green reduction spots; carbonaceous cement----	360.0- 365.0
Siltstone, red with gray-green reduction spots; vein selenite----------	365.0- 367.5
Gypsum, white, fine crystalline----------	367.5- 370.0
Gypsum and anhydrite, white to gray, fine crystalline----------	370.0- 375.0
Gypsum and anhydrite, white, fine crystalline; some red siltstone------	375.0- 380.0
Gypsum, white, fine crystalline----------	380.0- 386.0
Gypsum, white, fine crystalline----------	386.0- 388.0
Siltstone, gray-red with gray-green reduction spots; carbonaceous cement; friable----------	388.0- 390.0
Siltstone, gray-red with gray-green reduction spots; carbonaceous cement; friable; white, crystalline gypsum; clear selenite----------	390.0- 395.0
Siltstone, gray-red with gray-green reduction spots; carbonaceous cement; friable----------	395.0- 398.0
Gypsum, white, fine crystalline----------	398.0- 400.0
Gypsum, white crystalline; some gray-red siltstone; friable----------	400.0- 405.0
Gypsum, white to gray, fine crystalline; gray-red siltstone; micaceous----------	405.0- 410.0
Gypsum, white to gray, fine crystalline to clear; selenite; gray-red with gray-green reduction spots; siltstone----------	410.0- 420.0
Gypsum, white to gray, fine crystalline; light-gray, fine-grained dolomite----------	420.0- 425.0
No sample----------	425.0- 430.0
Dolomite, light-gray, fine-grained----------	430.0- 440.0
Dolomite, light-gray, fine-grained; white, fine crystalline gypsum-----	440.0- 445.0
Dolomite, light-gray, fine-grained; light-red siltstone; white gypsum--	445.0- 450.0
Dolomite, light-gray, fine-grained----------	450.0- 455.0
Anhydrite, white to gray, crystalline; white to gray selenite----------	455.0- 460.0
Anhydrite, gray to clear, fine crystalline; red (with gray-green reduction spots) siltstone----------	460.0- 465.0
Anhydrite, gray to clear, fine crystalline, dense----------	465.0- 515.0
Anhydrite, white to clear, fine crystalline; contains some selenite----	515.0- 525.0
Anhydrite, white to clear, fine crystalline; some red siltstone--------	525.0- 530.0
Siltstone, red; some white, fine crystalline anhydrite----------	530.0- 535.0
Gypsum and anhydrite, white to clear, fine crystalline----------	535.0- 538.0
Same as above; some red siltstone----------	538.0- 545.0
Gypsum, white to clear, fine crystalline; selenite; some red micaceous siltstone----------	545.0- 550.0

Table 1C.--Lithologic log--(Continued)

Description	Depth (feet)
Anhydrite, white to gray, fine crystalline; orange to clear selenite, red with gray-green reduction spots;siltstone	550.0- 555.0
Selenite, clear to white	555.0- 557.0
Dolomite, gray, fine crystalline	557.0- 560.0
Dolomite, gray, fine crystalline	560.0- 565.0
Dolomite, gray, fine crystalline, vuggy in some places; selenite	565.0- 575.0
Dolomite, gray, fine crystalline	575.0- 579.0
Mudstone, gray	579.0- 580.0
Mudstone, gray, friable; white to clear, fine crystalline anhydrite; some red siltstone	580.0- 585.0
Mudstone, gray, friable; white to clear, fine crystalline anhydrite; red siltstone	585.0- 590.0
Anhydrite, white to clear, fine crystalline; orange to clear selenite; some red siltstone	590.0- 595.0
Gypsum	595.0- 600.0
Anhydrite, white, fine crystalline, dense; orange to clear selenite	600.0- 605.0
Anhydrite, white, fine crystalline, dense	605.0- 610.0
Anhydrite, white to buff, fine crystalline, dense	610.0- 620.0
Anhydrite, white granular, dense, hard; red siltstone	620.0- 625.0
Anhydrite, white, dense; red siltstone	625.0- 630.0
Anhydrite, gray to white; white, crystalline gypsum; orange to clear selenite; red to brown siltstone	630.0- 640.0
Selenite, orange to clear, increased from 630.0- to 640.0-foot interval; white, dense anhydrite; brown to gray to red sandy siltstone	640.0- 645.0
Anhydrite, white to gray; brown to gray to red sandy siltstone	645.0- 650.0
Gypsum, white, fine crystalline; red to gray to brown, sandy siltstone; clear to orange selenite	650.0- 665.0
Same as above; anhydrite	665.0- 670.0
Anhydrite gray to white, dense; red to gray siltstone	670.0- 675.0
Anhydrite, gray to white; gypsum; selenite; siltstone	675.0- 690.0
Same as above; minor, clear halite	690.0- 695.0
Anhydrite, white, fine crystalline, dense; some caliche and dolomite cavings; gypsum; orange selenite	695.0- 698.0
Siltstone, red to gray; pink to clear, crystalline halite	698.0- 700.0
Anhydrite, gray to white; gypsum; orange selenite; red to gray siltstone; clear, crystalline halite	700.0- 705.0

Table 1C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear, argillaceous, with orange polyhalite blebs; gray to white, dense anhydrite; gray to red siltstone; orange, fine crystalline polyhalite; caliche and dolomite	705.0- 710.0
Halite, clear with orange, argillaceous; brown siltstone; white to gray anhydrite	710.0- 725.0
Same as above	725.0- 750.0
Halite (90 percent), clear, argillaceous, contains polyhalite blebs; 2 percent orange, fine crystalline polyhalite; 3 percent brown to red siltstone; 5 percent white, fine crystalline anhydrite	750.0- 770.0
No sample	770.0- 775.0
Halite (90 percent), clear, argillaceous, contains polyhalite blebs; 2 percent orange, fine crystalline polyhalite; 3 percent brown to red siltstone; 5 percent white, fine crystalline anhydrite	775.0- 800.0
No sample	800.0- 805.0
Halite, clear, argillaceous, contains polyhalite blebs; orange to moderate-reddish-brown, fine crystalline polyhalite; some brown siltstone	805.0- 820.0
Same as above, with quite a bit of caliche and gray-red siltstone	820.0- 840.0
Halite, clear, clayey; very little polyhalite	840.0- 850.0
Halite, 95 percent; polyhalite, 5 percent	850.0- 875.0
Halite, dirty; less than 2 percent clay and polyhalite	875.0- 880.0
Halite, clayey; less than 2 percent polyhalite and siltstone	880.0- 885.0
Halite, clayey; polyhalite	885.0- 890.0
Halite, clayey; increasing polyhalite	890.0- 895.0
Halite, clayey; polyhalite	895.0- 925.0
Halite; polyhalite; less than 2 percent siltstone	925.0- 950.0
Halite, clayey; less polyhalite	950.0- 970.0
Halite, clayey; some polyhalite and some black mudstone	970.0-1,020.0
Halite; polyhalite; less than 2 percent anhydrite	1,020-0-1,025.0
Halite, clayey; polyhalite	1,025.0-1,030.0
Halite, clayey; anhydrite and polyhalite	1,030.0-1,040.0
Halite, clayey; less than 1 percent polyhalite	1,040.0-1,050.0
Halite; clay and anhydrite; less than 2 percent polyhalite	1,050.0-1,055.0
Halite; very minor polyhalite	1,055.0-1,060.0
Halite; polyhalite; argillaceous material	1,060.0-1,065.0
Halite, clayey; polyhalite; gypsum or anhydrite	1,065.0-1,075.0
Halite, fairly clean; less than 2 percent polyhalite	1,075.0-1,085.0
Halite; increasing anhydrite	1,085.0-1,090.0

Table 1C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite; less than 2 percent polyhalite	1,090.0-1,120.0
Halite; approx. 2-3 percent polyhalite	1,120.0-1,125.0
Halite; approx. 3-5 percent polyhalite	1,125.0-1,130.0
Halite; approx. 2-3 percent polyhalite	1,130.0-1,150.0
Halite; less than 2 percent polyhalite	1,150.0-1,195.0
Halite; contains intergranular clay and polyhalite	1,195.0-1,200.0
Halite, dark-brown, clayey, with indistinct salmon to clear zones; band of dense red-brown polyhalite at 1,207.2-1,207.3 feet; clay bands at 1,214.0 feet (gray), 1,214.6 feet (brown), 1,213.1 feet (brown), and 1,213.3 feet (brown)	1,200.0-1,220.0
Halite, dark-brown to salmon and clear, coarse crystalline; polyhalite fills fractures; green clay parting at 1,226.2 feet, brown clay partings at 1,226.8 and 1,227.3 feet; intergranular clay increases downward, and color changes from green to brown	1,220.0-1,227.3
Halite, like above; clay decreased; polyhalite blebs increased; mottled salmon to red-orange to gray polyhalite bands at 1,232.4-1,232.7 and 1,233.2 feet	1,227.3-1,233.2
Halite, brown-gray, mottled, clayey; contains indistinct polyhalite blebs	1,233.2-1,238.4
Halite, light-salmon to clear, coarse crystalline; contains polyhalite blebs and seams; gray, clayey halite zone at 1,238.8-1,238.9 feet	1,238.4-1,240.0
Halite, light-salmon to clear, coarse crystalline; contains polyhalite seams	1,240.0-1,245.7
Halite, clear to buff	1,245.7-1,248.8
Halite, gray, grades to brown, clayey; contains numerous cavities after leached potash minerals; brown clay parting at 1,250.8 feet	1,248.8-1,252.2
Halite, mottled salmon and clear, coarse crystalline; contains polyhalite blebs and stringers	1,252.2-1,253.3
Halite, gray mottled, grading downward to clear, light-brown, and gray; contains polyhalite blebs and cavities after leached potash minerals	1,253.3-1,256.0
Halite, salmon, coarse crystalline; contains numerous polyhalite blebs and streaks; solution cavities at 1,258.8 feet	1,256.0-1,260.0
Halite, red-brown; polyhalite; unit grades from unit above	1,260.0-1,262.9
Halite, salmon to clear; contains polyhalite blebs and narrow zones of clear to yellowish-brown clayey halite	1,262.9-1,271.5
Halite, gray, clayey; gray clay partings at 1,271.8 and 1,272.5 feet	1,271.5-1,273.6

Table 1C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, brown, medium crystalline, clayey; contains approx. 20 percent intergranular clay	1,273.6-1,274.7
Halite, brown, medium-coarse crystalline; contains less clay	1,274.7-1,276.2
Halite, grading from brown to salmon, coarse-grained, clayey; increasing polyhalite	1,276.2-1,277.1
Halite, salmon, coarse crystalline, contains polyhalite blebs	1,277.1-1,279.8
Halite, salmon to gray, very coarse crystalline; contains partially leached K_2SO_4 mineral blebs (pseudomorph after langbeinite)	1,279.8-1,280.3
Halite, medium-brown to salmon, coarse crystalline	1,280.3-1,282.4
Halite, clear to buff, coarse crystalline	1,282.4-1,282.9
Polyhalite, red-brown, fine crystalline; contains less than 10 percent medium to coarse halite inclusions	1,282.9-1,286.3
Claystone, gray-green	1,286.3-1,286.6
Halite, buff to salmon, medium-coarse crystalline; 1/4 inch polyhalite band at 1,289.9 feet	1,286.6-1,291.2
Polyhalite, red-brown, fine crystalline	1,291.2-1,291.3
Halite, salmon, fine to medium crystalline; contains minor polyhalite bands	1,291.3-1,291.7
Polyhalite, red-brown; contains sparse lenticular halite inclusions	1,291.7-1,292.5
Halite, gray; clay partings	1,292.5-1,292.7
Halite, salmon, medium to coarse crystalline; contains indistinct gray-tan clayey zones at 1,293.1-1,293.5 and 1,294.8-1,295.3 feet	1,292.7-1,296.1
Halite, gray, clayey; contains high concentration of clay partings	1,296.1-1,296.4
Halite, gray, grading to dark-brown, medium crystalline; high concentration of gray clay at 1,297.1-1,297.3 feet, clay decreases with depth; contains polyhalite bands and blebs	1,296.4-1,301.0
Halite, grading from light-buff to salmon, medium crystalline; contains increasing polyhalite blebs and bands at depth; two prominent 1-inch bands at 1,307.0-1,307.1 and 1,307.3-1,307.4 feet	1,301.0-1,309.3
Polyhalite, red-brown, fine crystalline, massive	1,309.3-1,310.2
Clay, gray, interbedded with polyhalite; gray clay parting at 1,311.0 feet	1,310.2-1,311.1
Halite, clear to buff, medium crystalline, with minor bleb of polyhalite, grading to brown coarse crystalline, with brown clay	1,311.1-1,314.0
Halite, clear to salmon, medium to coarse crystalline; contains minor polyhalite in indistinct blebs and bands	1,314.0-1,320.8
Halite, brown, clayey with gray clay partings at 1,32?. -1,322.7 and 1,323.7 feet; sylvite blebs at approx. 1,322.0 feet; clay decreases with depth	1,320.8-1,323.7

Table 1C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, orange to clear; contains banded polyhalite blebs	1,323.7-1,338.0
Polyhalite	1,338.0-1,338.9
Halite, clear to orange	1,338.9-1,341.0
Halite, brown, coarse crystalline; brown clay partings at 1,342.3, 1,343.5, 1,344.5, and 1,345.2 feet	1,341.0-1,347.0
Halite, orange	1,347.0-1,350.0
Polyhalite	1,350.0-1,351.8
Clay, gray	1,351.8-1,352.0
Halite, orange-pink; clear halite at 1,354.3-1,356.0 feet	1,352.0-1,358.2
Polyhalite band	1,358.2-1,359.1
Halite, orange-red, medium-grained; contains gray clay partings	1,359.1-1,361.0
Halite, brown, clayey	1,361.0-1,362.1
Halite, orange to clear; contains polyhalite bands	1,362.1-1,365.1
Halite, clear, very coarse crystalline	1,365.1-1,367.1
Halite, clear to orange; contains polyhalite blebs that increase with depth	1,367.1-1,372.1
Halite, clear, medium-grained; contains intergranular clay (4-5 percent); clay seams at 1,372.7, 1,373.6, 1,374.8, 1,377.1, and 1,378.2 feet	1,372.1-1,382.3
Anhydrite, white- to gray-banded, grading to pink	1,382.3-1,388.8
Anhydrite, gray to white, medium crystalline	1,388.8-1,393.8
Halite, clear to salmon, coarse crystalline grades to clear, medium crystalline halite, with blebs and polyhalite bands	1,393.8-1,397.7
Halite, dark-gray, medium crystalline, clayey; contains clay partings (5 percent) at 1,398.1-1,398.3 feet	1,397.7-1,400.8
No sample	1,400.8-1,401.5
Halite, salmon, medium crystalline; contains polyhalite blebs and sylvite	1,401.5-1,407.0
Halite, clear; contains less than 1 percent intercrystalline gray clay; clay partings at 1,407.2, 1,407.4, 1,407.8, 1,410.4, 1,411.7, 1,408.4, and 1,408.6 feet; coarser crystalline gray halite contains minor blebs of polyhalite	1,407.0-1,412.5
Halite, salmon to orange; contains polyhalite blebs; clay partings at 1,413.4, 1,413.8, 1,413.0, 1,412.9, and 1,412.6 feet	1,412.5-1,414.0
Halite, clear, medium to coarse crystalline; contains gray clay grading to brown at 1,420.0 feet; clay partings at 1,414.3, 1,415.0, 1,416.1, 1,419.5, and 1,425.0 feet	1,414.0-1,426.0

Table 1C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear, grading to salmon; contains brown intercrystalline clay and blebs and bands of polyhalite; partings of brown clay at 1,426.9, 1,428.3, 1,428.4, and 1,428.6 feet	1,426.0-1,431.0
Halite, salmon to dark-red-brown, medium crystalline; contains intercrystalline brown clays and minor polyhalite blebs	1,431.0-1,434.0
Halite, orange to dark-brown, medium crystalline; contains sylvite and polyhalite blebs, leached sulfate crystals (langbeinite), large, clear crystal of halite at 1,437.3 feet; clay partings at 1,434.1 and 1,434.9 feet	1,434.0-1,438.0
Halite, clear to salmon, coarse crystalline; contains blebs and bands of polyhalite and possibly sylvite	1,438.0-1,442.3
Halite, clear, grading to orange-brown; contains leached potash crystals from 5th ore zone	1,442.3-1,448.0
Halite, clear to red-brown to light-gray, medium crystalline; contains less than 1 percent clay and polyhalite blebs	1,448.0-1,452.0
Halite, clear to light-salmon, medium crystalline; contains less than 1 percent polyhalite blebs	1,452.0-1,453.2
Halite, salmon to light-brown, fine crystalline; contains intercrystalline clay and polyhalite blebs	1,453.2-1,454.8
Halite, clear to light-salmon, medium crystalline	1,454.8-1,456.6
Halite, clear to light-gray, fine crystalline; gray clay	1,456.6-1,457.4
Halite, clear to light-salmon, medium to large crystalline	1,457.4-1,463.9
Anhydrite, light-gray, salt-and-pepper texture; contains clear halite pseudomorphs after gypsum	1,463.9-1,471.0
Halite, clear to light-salmon, medium to coarse crystalline; contains polyhalite bands	1,471.0-1,477.3
Anhydrite, similar to 1,463.9-1,471.0 feet, lower 1+ foot grades to red and pink; halite pseudomorphs after gypsum; lower part of section laminated	1,477.3-1,486.2
Halite, clear to salmon, medium to large crystals; contains polyhalite bands and blebs	1,486.2-1,502.6
Langbeinite and halite, medium-gray to dark-pink; contains kainite and (or) leonite, clay partings at 1,515.1 and 1,515.4 feet, and minor sylvite; core leached	1,502.6-1,504.8
Halite, reddish-brown, grades to clear, large crystalline grain size; halite containing approx. 25 percent polyhalite in 0.4-foot band at 1,507.7 feet and 100 percent polyhalite in 0.1-foot band at 1,508.2 feet	1,504.8-1,508.8

Table 1C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to light-gray, fine to medium crystalline; intercrystalline red-brown clay partings at 1,521.8, 1,521.9, 1,522.2, and 1,522.4 feet; clear to salmon, medium to large crystalline; contains polyhalite blebs; clear to light-gray, fine crystalline halite; contains leached polyhalite blebs; brown sylvite; langbeinite--------	1,508.8-1,522.4
Halite, salmon to clear, small to medium crystalline; contains bands and blebs of polyhalite----------	1,522.4-1,525.6
Halite, gray, medium to large crystalline; contains gray clay, sulfates, and polyhalite blebs----------	1,525.6-1,526.5
Halite, clear to light-salmon, medium crystalline; langbeinite crystal at 1,530.5 feet----------	1,526.5-1,534.7
Halite, clear, medium-grained, clayey (1,534.7-1,535.8 ft); contains langbeinite; clear, medium-grained, clayey halite (1,535.8-1,537.5 ft); contains polyhalite; clear, grading from gray to brown downward, coarse-grained halite (1,537.5-1,540.1 ft); contains polyhalite blebs and bands; brown clay partings at 1,535.0, 1,535.7, and 1,536.3 feet----------	1,534.7-1,540.1
Halite, clear; contains small amount of gray clay----------	1,540.1-1,541.5
Halite, buff to medium-salmon; medium to coarse crystalline; contains numerous polyhalite blebs; indistinct clear halite horizons contain little polyhalite; gray clay parting at 1,545.8 feet----------	1,541.5-1,549.1
Mudstone, orange-brown, halitic----------	1,549.1-1,549.5
Halite, beige to brown, medium to coarse crystalline, clayey, crushed, brown clay partings at 1,550.4-1,550.7, 1,551.3, and 1,551.7 feet; gray parting at 1,557.9 feet----------	1,549.5-1,558.6
Halite, clear to buff to salmon, coarse crystalline; contains polyhalite blebs and seams----------	1,558.6-1,563.4
Halite, clayey, light- to medium-gray, fine to medium crystalline, some recrystallization; contains minor polyhalite blebs and seams; clay parting at 1,563.4 feet; possible healed fracture showing apparent brecciation at 1,563.6 feet----------	1,563.4-1,572.2
Halite, red-brown, mottled, fine to medium crystalline; high clay content; contains brownish-red polyhalite blebs; brown halitic clay zone at 1,572.2-1,572.8 feet----------	1,572.2-1,575.3
Halite, light-gray to salmon to clear, medium-coarse crystalline; polyhalite quite prominent in 1,576.5-1,581.4-foot interval----------	1,575.3-1,582.3
Polyhalite band, red, crystalline, massive----------	1,582.3-1,583.3
Claystone, green-gray, halitic----------	1,583.3-1,583.7

Table 1C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, gray to light-brown, medium to coarse crystalline; contains polyhalite; red-brown clay parting at 1,584.1-1,584.4 feet; very high clay content at 1,584.4-1,584.8 feet; brown-gray clay partings at 1,584.8 and 1,586.6 feet----------	1,583.7-1,587.9
Halite, clear, coarse crystalline; contains minor lenticular blebs of polyhalite----------	1,587.9-1,589.2
Clay, halitic to clayey halite, brown to tan, fine crystalline---------	1,589.2-1,591.0 Total depth

Table 1D.--Mineralogical and chemical analyses of core samples from potash ore zones and mineralized salt beds in drill hole P-1

[oz, ore zone; um, upper member; mm, middle member; lm, lower member; sb, salt bed; tr, trace; Bl, bloedite; Ha, halite; Ka, kainite; La, langbeinite; Le, leonite; Lo, loeweite; Po, polyhalite; Va, vanthoffite; n.d., not determined. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mineralogy: X-ray diffraction analysis[1]	Chemical analysis (weight percent): Ca	K	Mg	Na	Cl	SO_4	H_2O+	H_2O-	Water insoluble
P-1/1	1,429.40-1,429.90	0.50	sb	>9 Ha; tr Po	0.14	0.16	0.05	39.0	59.8	n.d.	n.d.	n.d.	n.d.
P-1/2	1,429.90-1,431.45	1.55	5th oz	8 Ha; <1 Ka, Le; tr Po	.17	3.2	1.7	32.0	48.5	8.6	4.0	0.10	1.5
P-1/3	1,431.45-1,432.50	1.05		>9 Ha; <1 Po; tr Ka	n.d.	.28	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
P-1/4	1,432.50-1,433.55	1.05		9 Ha; <1 Ka; tr Po	.07	1.4	1.1	35.0	54.1	5.0	2.1	.43	.84
P-1/5	1,433.55-1,434.60	1.05		>8 Ha; <1 Ka; tr Bl, Le	.04	1.8	1.2	34.0	52.3	5.6	2.8	.33	1.9
P-1/6	1,434.60-1,435.55	.95		9 Ha; <1 Ka; tr Bl, Le	.06	2.4	1.6	33.0	50.6	8.0	3.5	.06	.88
P-1/7	1,435.55-1,436.10	.55		10 Ha	.02	.18	.18	38.0	59.5	.25	.54	.19	1.2
P-1/8	1,439.80-1,440.47	.67	sb (below 5th oz)	9 Ha; <1 Po	2.0	1.9	.66	34.0	50.6	n.d.	n.d.	n.d.	n.d.
P-1/9	1,440.47-1,441.35	.88		8 Ha; <1 Ka, La, Po	1.0	3.8	2.3	30.0	45.3	14.7	2.8	.11	.08
P-1/10	1,441.35-1,442.30	.95		>8 Ha; <1 La, Po	1.2	2.0	.99	34.0	51.6	[illegible]	n.d.	n.d.	n.d.
P-1/11	1,442.30-1,443.50	1.20		>8 Ha; <1 Bl, Ka	.04	2.4	2.1	31.0	46.9	10.6	3.9	.36	1.9
P-1/12	1,443.50-1,444.35	.85		>9 Ha; tr Ka, La, Po	.06	.50	.46	37.4	57.4	n.d.	n.d.	n.d.	n.d.
[2]P-1/13	1,444.35-1,445.30	.95		8 Ha; tr Bl, Ka, La, Po	.19	3.4	2.3	31.0	47.6	12.8	1.8	.14	.55
[2]P-1/13					.19	3.4	2.3	31.0	47.8	12.7	1.8	.13	.52
P-1/14	1,445.30-1,447.06	1.76		9 Ha; tr Bl, Ka, Le, Po	.36	2.1	1.3	33.0	52.0	7.6	2.6	.19	.55
[2]P-1/15	1,447.06-1,448.95	.89		9 Ha; tr Ka, Po	.11	2.2	1.6	32.0	51.3	6.0	2.9	.62	2.5
[2]P-1/15					.19	2.5	1.4	32.5	51.0	5.6	2.4	.88	3.3
P-1/16	1,448.95-1,449.75	.80		9 Ha; <1 Po; tr La	n.d.	.31	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
P-1/17	1,501.55-1,502.15	.60	4th oz, mm	9 Ha; tr La, Po	.42	.96	.62	36.5	56.8	n.d.	n.d.	n.d.	n.d.
[2]P-1/18	1,502.15-1,503.55	1.40	4th oz, lm	9 Ha; <1 Po; tr Bl, Ka, Va	.54	2.0	1.3	33.0	50.4	8.1	2.4	.33	2.7
[2]P-1/18					.54	2.0	1.3	33.0	50.8	8.1	2.5	.37	2.7
P-1/19	1,503.55-1,504.12	.57		9 Ha; <1 Po; tr La	.70	.76	.45	35.0	54.7	n.d.	n.d.	n.d.	n.d.
P-1/20	1,511.45-1,512.30	.85	sb	>9 Ha; <1 Po	.36	.36	.12	37.4	59.2	n.d.	n.d.	n.d.	n.d.
P-1/21	1,512.30-1,513.10	.80	3d oz, um	>9 Ha; <1 Po; tr La	.33	.60	.36	36.6	56.6	2.3	.47	.32	1.7
P-1/22	1,513.10-1,514.37	1.27		>9 Ha; <1 La; tr Po	.23	1.1	.72	36.0	56.6	4.4	.19	.12	1.7
[2]P-1/23	1,514.37-1,515.35	.98	3d oz, mm	>9 Ha; tr Ka, La, Le	.07	1.4	1.2	32.0	50.9	5.1	2.4	.75	4.5
[2]P-1/23					.05	1.6	1.1	34.0	50.5	4.7	1.9	.71	4.7
P-1/24	1,515.35-1,516.55	1.20		>9 Ha; tr Ka, Le	<.01	.96	.77	35.5	55.8	3.3	.81	.25	1.0
[2]P-1/25	1,516.55-1,518.15	1.60		9 Ha; <1 La; tr Po	<.15	1.6	1.1	35.0	54.3	6.0	.66	.16	.70
[2]P-1/25					.15	1.6	1.1	35.0	53.9	6.0	.60	.17	.66
P-1/26	1,518.15-1,519.37	1.22		9 Ha; <1 La, Po	.54	2.0	1.1	33.5	52.0	7.7	.24	.07	.18
P-1/27	1,519.37-1,520.12	.75		9 Ha; <1 Po; tr La	.24	.68	.55	36.0	56.2	n.d.	n.d.	n.d.	n.d.
P-1/28	1,533.90-1,535.17	1.27	sb	9 Ha; <1 Po; tr La	.26	2.0	1.4	34.0	53.1	8.4	.51	.11	.10
[2]P-1/29	1,535.17-1,536.10	.93	2d oz	5 Ha; 4 Lo; 1 La	.03	2.7	6.2	19.4	18.1	44.8	7.7	1.2	.64
[2]P-1/29					.03	2.7	7.0	19.0	20.5	41.5	7.7	1.2	.89
P-1/30	1,536.10-1,536.95	.8[illegible]		>8 Ha; <1 Po	1.3	1.2	.52	34.0	53.9	n.d.	n.d.	n.d.	n.d.

[1]Estimate of amount reported on a scale of 0-10.
[2]Replicate analyses.

Table 1E.--Calculated mode (mineral content) and potash distribution by mineral in core samples from potash ore zones and mineralized salt beds in drill hole P-1

[oz, ore zone; um, upper member; mm, middle member; lm, lower member; sb, salt bed; Bl, bloedite; Ha, halite; Ka, Kainite; La langbeinite; Le, leonite; Lo, loeweite; Po, polyhalite; Va, vanthoffite; Insol., clay and silt; n.d., not determined; leaders (---), not present. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mode (weight percent mineral)									K_2O distribution by minerals				
				La	Ka	Le	Bl	Lo	Va	Ha	Po	Insol.	La	Ka	Le	Po	Total
P-1/1	1,429.40-1,429.90	0.50	sb	---	---	---	---	---	---	98.6	1.2	n.d.	---	---	---	0.2	0.2
P-1/2	1,429.90-1,431.45	1.55	5th oz	---	12.7	4.9	---	---	---	77.0	1.3	1.5	---	2.4	1.2	.2	3.8
P-1/3	1,431.45-1,432.50	1.05		---	.5	---	---	---	---	n.d.	1.6	n.d.	---	.1	---	.2	.3
P-1/4	1,432.50-1,433.55	1.05		---	4.3	---	---	---	---	89.0	.5	0.8	---	1.5	---	<.1	1.6
P-1/5	1,433.55-1,434.60	1.05		---	10.1	.8	2.2	---	---	83.8	.3	1.9	---	1.9	.2	<.1	2.1
P-1/6	1,434.60-1,435.55	.95		---	12.6	1.7	3.4	---	---	80.4	.4	.9	---	2.4	.4	<.1	2.9
P-1/7	1,435.55-1,436.10	.55		---	---	---	---	---	---	98.1	1.4	1.2	---	---	---	.2	.2
P-1/8	1,439.80-1,440.47	.67	sb (below 5th oz)	---	---	---	---	---	---	83.4	14.6	n.d.	---	---	---	2.2	2.2
P-1/9	1,440.47-1,441.35	.88		8.7	7.6	---	---	---	---	76.3	7.5	<.1	2.0	1.4	---	1.2	4.6
P-1/10	1,441.35-1,442.30	.95		4.4	---	---	---	---	---	86.4	9.0	n.d.	1.0	---	---	1.4	2.4
P-1/11	1,442.30-1,443.50	1.20		---	15.0	---	8.0	---	---	73.8	.3	1.9	---	2.8	---	<.1	2.8
P-1/12	1,443.50-1,444.35	.85		1.2	1.3	---	---	---	---	95.1	.4	n.d.	.3	.2	---	<.1	.5
[1]P-1/13	1,444.35-1,445.30	.95		13.8	4.0	---	1.2	---	---	78.4	1.4	.6	3.1	.7	---	.2	4.0
[1]P-1/13				13.8	4.0	---	1.2	---	---	78.4	1.4	.5	3.1	.7	---	.2	4.0
P-1/14	1,445.30-1,447.06	1.76		---	5.6	4.1	2.7	---	---	83.0	2.7	.6	---	1.1	1.1	.4	2.6
[1]P-1/15	1,447.06-1,448.95	.89		---	13.3	---	---	---	---	81.4	.8	2.5	---	2.5	---	.1	2.6
[1]P-1/15				---	14.8	---	---	---	---	80.6	1.4	3.3	---	2.8	---	.2	3.0
P-1/16	1,448.95-1,449.75	.80		.4	---	---	---	---	---	n.d.	1.8	n.d.	.1	---	---	.3	.4
P-1/17	1,501.55-1,502.15	.60	4th oz, mm	2.9	---	---	---	---	---	93.6	3.1	n.d.	.7	---	---	.5	1.2
[1]P-1/18	1,502.15-1,503.55	1.40	4th oz, lm	---	9.4	---	2.8	---	0.4	80.9	4.0	2.7	---	1.8	---	.6	2.4
[1]P-1/18				---	9.4	---	2.8	---	.4	81.5	4.0	2.7	---	1.8	---	.6	2.4
P-1/19	1,503.55-1,504.12	.57		.4	---	---	---	---	---	90.2	5.2	n.d.	---	---	---	.9	.9
P-1/20	1,511.45-1,512.30	.85	sb	---	---	---	---	---	---	97.6	2.7	n.d.	---	---	---	.4	.4
P-1/21	1,512.30-1,513.10	.80	3d oz, um	1	---	---	---	---	---	93.3	2.5	1.7	.3	---	---	.4	.7
P-1/22	1,513.10-1,514.37	1.27		4.7	---	---	---	---	---	91.5	1.7	1.7	1.1	---	---	.3	1.4
P-1/23	1,514.37-1,515.35	.98	3d oz, mm	.5	9.9	.4	---	---	---	82.2	.5	4.5	.1	1.4	.1	<.1	1.7
P-1/23				2.8	4.3	1.6	---	---	---	86.4	.4	4.7	.6	.8	.4	<.1	1.9
P-1/24	1,515.35-1,516.55	1.20		---	4.9	.9	---	---	---	90.8	<.1	1.0	---	.9	.2	<.1	1.1
P-1/25	1,516.55-1,518.15	1.60		8.1	---	---	---	---	---	89.5	.6	.7	1.8	---	---	<.1	1.9
P-1/25				8.1	---	---	---	---	---	89.0	.6	.7	1.8	---	---	<.1	1.9
P-1/26	1,518.15-1,519.37	1.22		9.2	---	---	---	---	---	85.7	2.1	.2	2.1	---	---	.3	2.4
P-1/27	1,519.37-1,520.12	.75	3d oz, lm	2.4	---	---	---	---	---	92.6	1.8	n.d.	.5	---	---	.3	.8
P-1/28	1,533.90-1,535.17	1.27	sb	6.3	---	---	---	---	---	86.4	6.3	.1	1.4	---	---	1.0	2.4
[1]P-1/29	1,535.17-1,536.10	.93	2d oz	14.2	---	---	---	54.6	---	9.8	.2	.6	3.2	---	---	<.1	3.2
[1]P-1/29				14.2	---	---	---	49.8	---	33.8	.2	.9	3.2	---	---	<.1	3.2
P-1/30	1,536.10-1,536.95	.85		---	---	---	---	---	---	88.8	9.2	n.d.	---	---	---	1.4	1.4

[1]Replicate analyses.

TABLES 2A-2G

Basic data from drill hole P-2,
Waste Isolation Pilot Plant area, Eddy County, New Mexico

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Table 2A.--Abridged drill-hole history

LOCATION: Sec. 28, T. 22 S., R. 31 E.
38 m (125 ft) from north line
52 m (172 ft) from east line

ALTITUDE (LAND SURFACE): 1,060 m (3,477.7 ft). Datum for depth measurements in drilling and logging operations.

LITHOLOGIC LOG PREPARED BY: R. J. Cheeseman, G. S. Corchary, J. D. Kibler, B. R. Orr, and R. P. Snyder, August 27 to September 7, 1976.

DRILLING CONTRACTOR: Boyles Bros. Drilling Co.

DRILLING RECORD: Commenced drilling on August 25 and completed on September 2, 1976, at 578 m (1,895 ft) below land surface.

Drilled with air form to casing point at 316 m (1,038 ft) below land surface. No water reported by driller.

Recovered all casing and plugged with cement.

REMARKS: Top of salt in Rustler Formation at 276 m (906 ft) below land surface.

Table 2B.--Stratigraphic summary

Rock unit	Depth interval[1] feet	meters
Holocene deposits	0-18	0-5
Pleistocene rocks:		
Gatuna Formation	18-38	5-12
Triassic rocks:		
Santa Rosa Sandstone	38-164	12-50
Permian rocks:		
Dewey Lake Red Beds	164-690	50-210
Rustler Formation	690-1,008	210-307
Magenta Dolomite Member	748-773	228-236
Culebra Dolomite Member	857-883	261-269
Salado Formation	1,008-1,895	307-578
Upper member	1,008-1,506	307-459
McNutt potash zone	1,506-1,883	459-574
Vaca Triste Sandstone Member[2]	1,506-1,512	459-461
11th ore zone	1,562-1,565	476-477
Marker bed 117	1,574-1,576	480-480+
Marker bed 118	1,599-1,601	487-488
Marker bed 119	1,622-1,626	494-496
10th ore zone	1,632-1,639	497-500
Marker bed 120	1,646-1,647	502-502+
9th ore zone	1,652-1,656	503-505
Marker bed 121	1,662-1,663	507-507+
Marker bed 122	1,670-1,671	509-509+
8th ore zone	1,678-1,687	511-514
Union anhydrite[3]	1,695-1,705	517-520
7th ore zone	1,712-1,719	522-524
6th ore zone	1,731-1,733	528-528+
5th ore zone	1,738-1,745	530-532
Marker bed 123	1,774-1,781	541-543
Marker bed 124	1,787-1,795	545-547
4th ore zone	1,799-1,809	548-551
3d ore zone	1,818-1,832	554-558
2d ore zone	1,836-1,840	560-561
1st ore zone	1,859-1,870	567-570
Marker bed 126	1,882-1,883	573-573+
Lower member	1,883-1,894	573-577
Maximum depth recorded	1,894	577

[1]Depth interval recorded from geophysical logs.
[2]Of Adams, 1944.
[3]Informal unit of Salado Formation.

Table 2C.--Lithologic log

Description	Depth (feet)
Sand, reddish-brown, fine- to very fine grained, subrounded, poorly sorted	0.0- 10.0
Similar to above, but lighter in color	10.0- 20.0
Sandstone, pale-reddish-brown, medium- to fine-grained, subrounded, poorly sorted, calcareous cement	20.0- 40.0
Same as above; contains approx. 5 percent caliche	40.0- 50.0
Same as above; less caliche	50.0- 65.0
Same as above, grain size smaller, fine- to very fine grained	65.0- 95.0
Sandstone, dark-reddish-brown, very fine grained but poorly sorted, containing some fine sand grains, micaceous	95.0-105.0
Sandstone, pale-reddish-brown, fine- to very fine grained, poorly sorted, micaceous	105.0-110.0
Similar to above, not micaceous	110.0-115.0
Sandstone, dark-reddish-brown, fine- to very fine grained; contains dark-reddish-brown siltstone; greenish-gray, very fine grained sandstone	115.0-120.0
Siltstone, dark-reddish-brown; contains less than 5 percent greenish-gray sandstone	120.0-125.0
Same as above; contains greenish-gray reduction spots	125.0-135.0
Siltstone, dark-reddish-brown, micaceous; contains approx. 5 percent greenish-gray, fine-grained sandstone	135.0-140.0
Siltstone, same as above; contains pale-reddish-brown, medium- to fine-grained, poorly sorted sandstone, as in 20.0-95.0-foot interval	140.0-160.0
Same as above; contains reduction spots on siltstone	160.0-165.0
Sandstone, very light gray to greenish-gray to pale-red, medium- to very fine grained, poorly sorted	165.0-170.0
Siltstone, dark-reddish-brown and light-greenish-gray, micaceous	170.0-175.0
Sandstone, pale-red, very fine grained	175.0-180.0
Same as above; contains some reddish-brown and greenish-gray siltstone; some greenish-gray sandstone	180.0-185.0
Sandstone, pale-red, fine- to very fine grained; contains dark-reddish-brown siltstone	185.0-200.0
Siltstone, grayish-red, micaceous	200.0-250.0
Sandstone, pale-red, medium- to fine-grained, poorly sorted; contains grayish-red siltstone, with greenish-gray reduction spots; and approximately 5 percent light-gray, very fine grained, micaceous sandstone	250.0-265.0
Sandstone, pale-red, medium- to very fine grained, poorly sorted; contains some green-gray, very fine grained sandstone	265.0-270.0
Same as 250.0-265.0-foot interval	270.0-295.0
Same as above, micaceous	295.0-300.0

Table 2C.--Lithologic log--(Continued)

Description	Depth (feet)
Siltstone, dark-reddish-brown, micaceous	300.0-315.0
Same as above; contains pale-red and light-gray fine- to very fine grained sandstone	315.0-325.0
Sandstone, pale-red, fine- to very fine grained, poorly sorted; contains some very light gray, fine-grained sandstone	325.0-345.0
Siltstone, pale-red, micaceous, with reduction spots	345.0-385.0
Same as above; vein selenite	385.0-400.0
Siltstone, gray-red, with gray-green reduction spots, micaceous	400.0-500.0
Siltstone, gray-red, with gray-green reduction spots; vein selenite, micaceous	500.0-600.0
Siltstone, gray-red, with gray-green reduction spots, micaceous, selenitic	600.0-650.0
Siltstone, gray-red, with gray-green reduction spots, micaceous, selenitic; sparse green mudstone	650.0-690.0
Siltstone, gray-red, with gray-green reduction spots, micaceous	690.0-695.0
Siltstone, gray-red, with gray-green reduction spots, micaceous; fine crystalline gypsum	695.0-700.0
Siltstone, gray-red, with gray-green reduction spots, micaceous, selenitic; white to gray, fine crystalline anhydrite	700.0-705.0
Anhydrite, white to gray, fine crystalline; gray-red siltstone, with gray-green reduction spots; micaceous, selenitic	705.0-710.0
Anhydrite, gray, fine crystalline, dense; gray-red siltstone, with gray-green reduction spots; micaceous, selenitic	710.0-715.0
Same as above, decreasing siltstone	715.0-730.0
Same as above, increased gray-red siltstone, with gray-green reduction spots, selenitic	730.0-735.0
Siltstone, gray-red, with gray-green reduction spots, selenitic; contains approx. 20 percent anhydrite	735.0-740.0
Same as above; increasing anhydrite	740.0-745.0
Anhydrite, brown-gray, dense	745.0-755.0
Same as above; gray, fine crystalline dolomite	755.0-760.0
Dolomite, gray, fine crystalline	760.0-775.0
Same as above; some anhydrite	775.0-785.0
Anhydrite, gray to brown-gray, fine crystalline	785.0-790.0
Anhydrite, brown-gray; some red siltstone	790.0-800.0
Anhydrite, brown-gray, fine crystalline	800.0-820.0
Same as above; appearance of sugary gypsum	820.0-825.0
Same as above; increasing gypsum	825.0-830.0
Anhydrite; gypsum	830.0-840.0

Table 2C.--Lithologic log--(Continued)

Description	Depth (feet)
Same as above; selenite	840.0- 845.0
Siltstone, gray red; white, sugary-textured gypsum; some anhydrite with gypsiferous rind	845.0- 850.0
Siltstone, gray-red, with gray-green reduction spots, micaceous, selenitic	850.0- 860.0
Anhydrite, sugary, dense, crystalline; gypsum; clear to orange selenite; red-gray siltstone	860.0- 865.0
Siltstone, gray-red; white selenite; light-gray, vuggy dolomite	865.0- 870.0
Dolomite, light-gray, vuggy; gray-red siltstone	870.0- 880.0
Same as above; increasing gray-red siltstone; clear to orange selenite	880.0- 885.0
Dolomite, light-gray, vuggy	885.0- 890.0
Same as above; increasing gray-red siltstone	890.0- 900.0
Siltstone, gray-red to brown; anhydrite; gypsum	900.0- 910.0
Siltstone, gray-red; anhydrite; green-gray mudstone; gypsum	910.0- 920.0
Siltstone, gray-red to brown, micaceous; some selenite veining with gray-green reduction spots	920.0- 925.0
Same as above; some white, fine crystalline anhydrite	925.0- 950.0
Same as above, color change; dark-reddish-brown siltstone; selenite	950.0- 955.0
Same as above; occasional gray to gray-red siltstone	955.0- 965.0
Siltstone, gray-red; dark-gray mudstone; selenite	965.0- 975.0
Mudstone, dark-gray	975.0- 985.0
Mudstone, dark-gray; red-brown siltstone	985.0-1,000.0
Mudstone, dark-gray; red-brown siltstone	1,000.0-1,010.0
Siltstone, gray-red	1,010.0-1,015.0
Siltstone, gray-red, micaceous; selenite	1,015.0-1,020.0
Mudstone, red; selenite; halite	1,020.0-1,025.0
Halite, clear, argillaceous	1,025.0-1,030.0
Halite, silty	1,030.0-1,035.0
Halite, clear, sandy	1,035.0-1,040.0
Halite, clear	1,040.0-1,045.0
Same as above; approx. 2 percent polyhalite	1,045.0-1,050.0
Same as above; increasing polyhalite	1,050.0-1,055.0
Same as above; decreasing polyhalite	1,055.0-1,065.0
Halite, clear to very pale salmon; approx. 1-2 percent polyhalite	1,065.0-1,070.0
Halite, clear	1,070.0-1,080.0
Same as above, some very light salmon	1,080.0-1,085.0
Halite, clear	1,085.0-1,090.0
Halite, clear to light-salmon	1,090.0-1,100.0

Table 2C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear	1,100.0-1,110.0
Halite, clear to very light salmon	1,110.0-1,120.0
Same as above, light-salmon	1,120.0-1,130.0
Halite, clear to very light salmon; approx. 40 percent dark-salmon polyhalite; anhydrite	1,130.0-1,135.0
Halite, clear to light-salmon; approx. 10 percent polyhalite	1,135.0-1,145.0
Halite, clear to very light salmon	1,145.0-1,160.0
Halite, clear	1,160.0-1,175.0
Halite, clear to very light salmon	1,175.0-1,190.0
Halite, clear	1,190.0-1,195.0
Halite, clear to light-gray	1,195.0-1,205.0
Halite, clear to light-gray; less than 5 percent polyhalite	1,205.0-1,210.0
Halite, clear	1,210.0-1,220.0
Halite, very light salmon	1,220.0-1,230.0
Halite, clear to light-gray and light-salmon	1,230.0-1,235.0
Halite, clear to very light salmon	1,235.0-1,250.0
Halite, light-salmon; trace polyhalite	1,250.0-1,260.0
Same as above, darker salmon; increase of approx. 2 percent polyhalite	1,260.0-1,265.0
Halite, clear to very light pale salmon; trace of polyhalite	1,265.0-1,280.0
Halite, darker; increase of approx. 5 percent polyhalite	1,280.0-1,295.0
Halite, clear	1,295.0-1,310.0
Halite, clear to very light salmon; trace of polyhalite	1,310.0-1,315.0
Same as above; increase of approx. 5 percent polyhalite	1,315.0-1,325.0
Halite, clear	1,325.0-1,335.0
Halite, clear to light-salmon	1,335.0-1,355.0
Halite, clear	1,355.0-1,370.0
Halite, clear to light-salmon	1,370.0-1,385.0
Halite, clear	1,385.0-1,400.0
Halite, clear to light-salmon; 5 percent polyhalite	1,400.0-1,405.0
Same as above; increase in polyhalite	1,405.0-1,410.0
Same as above, slightly lighter color	1,410.0-1,430.0
Halite, clear	1,430.0-1,460.0
Same as above; 2 percent polyhalite	1,460.0-1,475.0
Halite, clear to very light salmon; 2 percent polyhalite	1,475.0-1,480.0
Halite, clear; trace of polyhalite	1,480.0-1,490.0
Same as above; no polyhalite	1,490.0-1,500.0
Halite, gray-brown, fine to medium crystalline, mottled; high clay content; light-pink to white, intergranular polyhalite, with brown halitic clay partings at 1,500.3 feet, brown halitic clay zones at 1,502.1-1,502.3, and 1,502.6-1,502.9 feet	1,500.0-1,504.0

Table 2C.—Lithologic log--(Continued)

Description	Depth (feet)
Siltstone, dark-brown, clayey, halitic; lower contact gradational to halite; Vaca Triste member	1,504.0-1,506.6
Halite, brown to buff, clear, mottled, medium-coarse crystalline; very high brown clay content at gradational contact; clay decreasing with depth	1,506.6-1,514.0
Halite, salmon, coarse crystalline; polyhalite in lenticular blebs disseminated throughout; red band of polyhalite at 1,516.4-1,516.7 feet	1,514.0-1,518.5
Halite, gray-orange, medium crystalline, mottled; polyhalite blebs and lenses; gray clay parting at 1,519.2 feet	1,518.5-1,520.0
Halite, buff to salmon to clear, coarse crystalline; numerous small polyhalite blebs and seams	1,520.0-1,522.0
Halite, brown-gray, medium-coarse crystalline, mottled; indistinct bands of salmon-colored halite; contains polyhalite; zones of recrystallized, large halite crystals; dessication fracture at 1,525.0 feet	1,522.0-1,529.1
Halite, salmon to buff to clear, medium-coarse crystalline; polyhalite disseminated as minor blebs	1,529.1-1,534.2
Halite, light-gray to yellow-gray to orange, medium crystalline, mottled; minor polyhalite; high, brown clay content; brown clay zone at 1,535.3-1,535.5 and 1,538.2-1,538.4 feet; thin clay parting at 1,537.0 feet	1,534.2-1,539.6
Halite, salmon to clear, mottled; polyhalite blebs and bands; red polyhalite band at 1,540.7-1,540.8 feet; some dirty, mottled gray halite throughout	1,539.6-1,544.6
Clay, brown, halitic, grading to buff, clayey, medium crystalline at 1,545.5 feet returning to brown halitic clay at 1,546.6 feet; some indistinct polyhalite bands and blebs	1,544.6-1,546.8
Halite, mottled salmon to light-brown, medium crystalline; brown clay decreasing with depth; indistinct gray clayey halite zones; minor clay parting at 1,547.3 feet	1,546.8-1,551.8
Halite, clear to salmon, coarse crystalline; variable polyhalite blebs; gray clayey halite band at 1,554.2-1,554.4 feet; brown clay parting at 1,554.2 feet; minor leached sylvite	1,551.8-1,558.3
Halite, brown, medium crystalline, clayey, minor mineralization; plentiful interstitial brown clay (sylvite, langbeinite); some leaching of soluble minerals on core exterior	1,558.3-1,563.1
Halite, salmon to gray, coarse crystalline; polyhalite blebs and bands increasing at bottom; minor langbeinite and some soluble potash minerals	1,563.1-1,570.8

Table 2C.--Lithologic log--(Continued)

Description	Depth (feet)
Polyhalite, red-brown, banded, massive; gray clay seam 0.1-foot thick marking lower contact	1,570.8-1,572.3
Halite, light-salmon, medium crystalline; polyhalite blebs; indistinct zones of gray to light-brown halite	1,572.3-1,580.2
Halite, brown to clear mottled, medium crystalline; polyhalite blebs; leaching of soluble potash minerals; some langbeinite as white, granular eroded crystals; reaction rims of polyhalite	1,580.2-1,587.0
Halite, salmon, coarse crystalline, gradationally silty with depth; polyhalite and minor langbeinite	1,587.0-1,589.5
Halite, mottled gray and salmon, medium crystalline, clayey; scattered blebs and bands of polyhalite; minor potash mineralization	1,589.5-1,591.8
Halite, salmon to clear, medium crystalline; moderate amounts of polyhalite blebs	1,591.8-1,595.0
Halite, dark-salmon to medium-red-brown; polyhalite bands and blebs	1,595.0-1,595.5
Polyhalite, red-brown; medium crystals of halite in upper 0.7 foot; mostly polyhalite in mid 0.4-foot; mostly halite and green-gray clay at basal 1.2 feet; polyhalite with green-gray clay at base	1,595.9-1,598.2
Halite, clear to light-medium-yellow-brown, medium to coarse crystalline; blebs of polyhalite	1,598.2-1,600.5
Halite, salmon to light-brown, medium to coarse crystalline; 0.2-foot band of polyhalite at 1,600.8 feet	1,600.5-1,602.6
Polyhalite, dark-red; clay parting at 1,603.0 feet	1,602.6-1,603.0
Halite, dark-gray to light-gray, medium to coarse crystalline; polyhalite blebs; minor leaching; gray to green-gray clay	1,603.0-1,604.1
Halite, salmon to light-gray, coarse crystalline; polyhalite bands and blebs; 0.3-foot of light-gray halite with clay at 1,605.4 feet	1,604.1-1,607.0
Halite, green, clay-rich; interbedded light bands of halite; some anhydrite; contains gypsum rings	1,607.0-1,607.8
Clay, halitic, grading to dark-medium brown clayey halite; medium to coarse crystalline polyhalite blebs	1,607.8-1,610.0
Halite, clear to dusky-brown, coarse crystalline, clayey; rare blebs of polyhalite; very fine grains filled with clay; trace of leaching	1,610.0-1,611.2
Halite, clear to light-medium-red, coarse crystalline; occasional green clay; minor leaching	1,611.2-1,616.0
Halite, red-brown to clear, medium to coarse crystalline; many bands of medium-salmon polyhalite; some minor clay	1,616.0-1,618.7
Halite, grades to polyhalite	1,618.7-1,619.7
Halite, medium-red, medium crystalline; numerous polyhalite blebs and bands; 0.4-foot of polyhalite at base	1,619.7-1,621.4

Table 2C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, argillaceous; halitic clay; gray-green clay; polyhalite bands	1,621.4-1,622.4
Halite, argillaceous, clear to light-gray, coarse crystalline; polyhalite blebs; gray clay; no visible sulfates; minor leaching	1,622.4-1,625.0
Halite, argillaceous, pink to gray, medium-green; numerous blebs and stringers of polyhalite with clay	1,625.0-1,625.3
Halite, salmon, coarse crystalline; polyhalite band at 1,626.8 feet; some clear, clay parting at base	1,625.3-1,627.1
Halite, beige, grades to light-salmon, medium to coarse crystalline; some clay and polyhalite blebs; green to dark-gray, intercrystalline clay at 1,627.4 feet	1,627.1-1,628.3
Halite, argillaceous, dark-red to dark-gray, medium to coarse crystalline; clusters of polyhalite; 0.01-0.2 inches of sulfate minerals	1,628.3-1,629.5
Halite, salmon, medium crystalline; beds and blebs of polyhalite	1,629.5-1,630.7
Halite, green and red-brown, fine crystalline, argillaceous; rare polyhalite blebs; sulfate mineralization; leached	1,630.7-1,635.0
Halite, light-gray to light-brown to clear, medium to coarse crystalline; small blebs of polyhalite; trace of sulfates; no leaching	1,635.0-1,636.0
Halite, light-orange to clear to gray; scattered blebs of polyhalite; trace of clay in upper part of unit	1,636.0-1,640.0
Halite, light- to medium orange, medium to coarse crystalline, bands of polyhalite	1,640.0-1,641.5
Polyhalite, light-red, clay particles at base	1,641.5-1,642.4
Halite, dark-gray; clay; grades to orangey, clayey halite	1,642.4-1,643.0
Halite, medium- to dark-gray, medium-crystalline, clayey	1,643.0-1,643.7
Halite, orange to clear, coarse crystalline	1,643.7-1,647.0
Halite, light-gray to dark-gray, medium crystalline, clayey; clay partings at 1,647.4, 1,649.5, and 1,649.8 feet	1,647.0-1,650.0
Halite, clear to light-gray, coarse crystalline; trace of white sulfate	1,650.0-1,650.6
Halite, dark-green-gray to light-brown-gray, medium to coarse crystalline, clayey; tr[illegible] sulfate at approx. 1,653.0-foot depth	1,650.6-1,654.0
Halite, clear, grades to red-brown, coarse crystalline; polyhalite blebs; trace of leaching	1,654.0-1,656.6
Halite, medium-pink plus light-gray, coarse crystalline; polyhalite bands; core discs; grades to polyhalite in lower four-fifths	1,656.6-1,657.6
Halite, light-gray to medium-pink, medium to coarse crystalline; bands and blebs of polyhalite	1,657.6-1,659.1
Halite, light-gray to light-salmon, medium to coarse crystalline; much green-gray clay; trace of leaching	1,659.1-1,661.4

Table 2C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, medium-orange, coarse crystalline; contains a few polyhalite blebs	1,661.4-1,665.4
Polyhalite, medium-red-brown, massive; clay partings at 1,666.0 and 1,666.3 feet; scaly gray-white anhydrite coating	1,665.4-1,666.3
Halite, clear to red-brown, fine-to medium-grained; polyhalite blebs and green-gray clay partings at 1,667.1 and 1,667.4 feet	1,666.3-1,667.8
Halite, clear to light-gray, fine- to medium-grained; clay partings at 1,667.9 and 1,668.4 feet; white crystals on outside of core; leaching in many places (sulfate)	1,667.8-1,668.8
Halite, clear to light-gray grading downward to pale-orange; large halite crystals; polyhalite blebs at 1,670.0-1,670.4 feet; green clay parting at 1,669.4 feet; many leached vugs	1,668.8-1,670.5
Halite, clear to light-salmon, very coarse grained; blebs and bands of polyhalite; minor tiny empty holes (leached)	1,670.5-1,674.3
Similar to 1,667.8-1,668.8-foot interval	1,674.3-1,674.8
Halite, light-gray, medium- to coarse-grained; clay partings at 1,674.0 and 1,674.4 feet	1,674.8-1,675.4
Halite, mottled pale-gray and red-brown, medium- to large grained; blebs and bands of polyhalite	1,675.4-1,676.6
Halite, clear to light-gray to pale-orange, large crystalline; few blebs of polyhalite and some banding from 1,677.7 to 1,678.0 feet	1,676.6-1.679.0
Halite, clear to green-gray, medium crystalline, very light bands throughout; parting blebs of polyhalite; gray-green clay seams; some leaching	1,679.0-1,679.8
Halite, clear to light-gray, with red-brown clay in patches and seams; some washed out clay	1,679.8-1,686.9
Halite, light-tan to medium-light-gray, coarse crystalline; grades to beds and blebs of polyhalite in lower part	1,686.9-1,687.2
Halite, light-orange to medium-orange, medium to coarse crystalline; green clay; polyhalite blebs; clay parting at 1,687.5 feet	1,687.2-1,688.0
Halite, light-gray to clear, medium crystalline; polyhalite blebs	1,688.0-1,689.1
Halite, light-gray to light-medium-orange, coarse crystalline	1,689.1-1,691.4
Anhydrite, light-gray to clear, banded	1,691.4-1,701.2
Halite, brown-gray, coarse crystalline; green clay partin at top grades to orange and gray; few polyhalite blebs	1,701.2-1,704.2
Halite, salmon, coarse crystalline; rare polyhalite blebs; clay parting at 1,709.2 feet	1,704.2-1,710.1
Halite, brown to light-gray, coarse crystalline	1,710.1-1,711.4

Table 2C.—Lithologic log--(Continued)

Description	Depth (feet)
Halite, light-yellow to medium-orange, medium to coarse crystalline	1,711.4-1,712.6
Halite, light-gray-green, coarse crystalline, clay-rich; polyhalite blebs; clay partings at 1,712.9 and 1,713.4 feet	1,712.6-1,714.0
Halite, orange to light-gray, medium to coarse crystalline; numerous polyhalite blebs in green clay in the upper 0.2 foot of unit	1,714.0-1,714.6
Halite, gray-green, argillaceous, medium to coarse crystalline; contains sparse polyhalite blebs	1,714.6-1,715.3
Halite, light-gray, medium to coarse crystalline; polyhalite blebs and beds, rich clay partings at 1,718.3, 1,718.6, and 1,718.1 feet	1,715.3-1,719.0
Halite, light-gray to clear, medium to coarse crystalline; large irregular masses of clay; polyhalite blebs	1,719.0-1,721.2
Halite, orange, medium crystalline, polyhalite blebs mottled with spots of clay	1,721.2-1,727.5
Halite, gray, coarse crystalline; clay; occasional stringers of polyhalite near base; sulfate at 1,729.0 feet in bands	1,727.5-1,730.7
Halite, salmon, medium to coarse crystalline; blebs and stringers of polyhalite; clay band at 1,731.4 feet	1,730.7-1,732.3
Halite, clear to white, coarse crystalline, sparse polyhalite blebs	1,732.3-1,733.5
Halite, light-gray to medium-gray; blebs and stringers of polyhalite; clay parting at base and at 1,734.5-foot depth	1,733.5-1,734.7
Halite, medium-gray with red, coarse crystalline; polyhalite blebs; minor sylvite at 1,734.8, 1,735.1, and 1,735.2 feet	1,734.7-1,735.2
Halite, red, alternating with white to gray, coarse crystalline	1,735.2-1,737.5
Halite, clear to white	1,737.5-1,740.8
Halite, gray, medium to coarse crystalline; outer coating of anhydrite	1,740.8-1,744.1
Halite, white to green-gray, medium to coarse crystalline; sparse blebs of clayey polyhalite	1,744.1-1,745.3
Halite, gray, coarse crystalline; polyhalite bands and stringers; clay bands	1,745.3-1,749.6
Halite, clear, medium to coarse crystalline; blebs of polyhalite; sparse clay	1,749.6-1,750.1
Halite, orange, many polyhalite blebs and dendritic stringers	1,750.1-1,755.1
Halite, medium-gray to dark-gray, coarse crystalline; sparse polyhalite blebs	1,755.1-1,757.4
Halite, gray to white, coarse crystalline; clay is leached; clay parting at 1,758.2 feet	1,757.4-1,760.3
Halite, pink to opaque smoky, coarse crystalline; large polyhalite blebs; occasional green-gray clay	1,760.3-1,762.5
Halite, smoky-gray; polyhalite stringers; gray-green clay	1,762.5-1,764.5
Halite, clear, coarse crystalline; top 0.6 foot contains small scattered polyhalite blebs	1,764.5-1,770.0

Table 2C.--Lithologic log--(Continued)

Description	Depth (feet)
Anhydrite, medium-gray, massive	1,770.0-1,776.5
Halite, white-yellow to salmon, coarse crystalline, occasional bands of polyhalite; a few bands of anhydrite at base	1,776.5-1,781.4
Halite, dark-salmon-pink to medium-brown, coarse crystalline	1,781.4-1,782.3
Anhydrite, light-medium-gray, very fine grained, laminated	1,782.3-1,788.9
Polyhalite, dark-salmon-red, glassy	1,790.0-1,790.7
Halite, orange, concentrated bleb of polyhalite at upper 1.0 foot; 0.1 foot of green-gray clay at top; polyhalite decreases downward	1,790.7-1,795.1
Halite, clear to light-gray-yellow; a few polyhalite blebs; gray-green clay at base	1,795.1-1,795.8
Halite, gray to dark-brown-green, coarse crystalline, scattered blebs of polyhalite	1,795.8-1,796.7
Halite, light-orange to yellow, coarse crystalline	1,796.7-1,802.4
Halite, gray to black; abundance of green-black clay	1,802.4-1,802.7
Halite, white, clear to orange, scattered polyhalite; irregular masses of clay	1,802.7-1,804.0
Halite, clear to white, green clay throughout, clay partings at 1,804. and 1,804.9 feet	1,804.0-1,805.3
Halite, pale- to medium-red-salmon, medium-coarse crystalline; contains yellow-brown, fine crystalline langbeinite at 1,808.2-1,809.1 feet; minor langbeinite blebs throughout; polyhalite blebs throughout	1,805.3-1,810.6
Halite, brown, clayey; interbedded polyhalitic halite; brown clay partings at 1,811.5 and 1,811.6 feet	1,810.6-1,811.6
Halite, grading from salmon to buff-gray, clayey, medium to coarse crystalline, polyhalitic; moderate polyhalite in bands and venticular blebs	1,811.6-1,814.0
Halite, buff to salmon, medium to coarse crystalline, several indistinct gray clayey halite bands; some disseminated langbeinite crystals	1,814.0-1,828.8
Halite, grading from salmon to clear, medium to coarse crystalline; polyhalite bands in upper part of unit; sparse polyhalite in lower part	1,828.8-1.834.0
Halite, gray to salmon, clayey; concentration of yellow-brown, crystalline langbeinite	1,834.0-1,834.7
Halite, gray-brown, medium crystalline, clayey; gray clay parting at 1,835.0 feet; brown clay parting at 1,835.6 feet, abundant brown clay seams and pockets	1,834.7-1,837.9
Halite, clear to salmon, coarse crystalline; moderate amount of disseminated orange polyhalite; brown clay parting at 1,844.4 feet	1,837.9-1,847.5

Table 2C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, brown to smoky-gray, medium to coarse crystalline, mottled; scattered red polyhalite blebs	1,847.5-1,858.6
Halite, clear to light-buff, coarse crystalline; minor gray polyhalite blebs	1,858.6-1,860.8
Halite, light-gray to brown, medium to coarse crystalline; minor amounts of disseminated polyhalite following potash mineral	1,860.8-1,869.8
Halite, blue-gray to gray-brown, medium crystalline, clayey, mottled; indistinct polyhalite blebs with clay partings; gray clay partings at 1,870.0 feet and brown clay partings at 1,871.3 feet; numerous green and brown clay pockets	1,869.8-1,873.6
Halite, light- to medium-red-salmon, medium to coarse crystalline, polyhalitic; increasing blebs and bands of polyhalite with depth	1,873.6-1,878.5
Polyhalite, brick-red, granular, massive	1,878.5-1,879.0
	Total depth

Table 2D.--Mineralogical and chemical analyses of core samples from potash ore zones and mineralized salt beds in drill hole P-2

[oz, ore zone; lm, lower member; sb, salt bed; tr, trace; Bl, bloedite; Ha, halite; Ka, kainite; La, langbeinite; Le, leonite; Po, polyhalite. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mineralogy: X-ray diffraction analysis[1]	Chemical analysis (weight percent): Ca	K	Mg	Na	Cl	SO_4	H_2O+	H_2O-	Water insoluble
P-2/1	1,833.08-1,834.00	0.92	2d oz	9 Ha; 1 La	0.20	2.8	1.7	31.0	52.5	10.0	0.41	0.14	0.24
P-2/2	1,834.00-1,834.50	.50		>4 Ha; 5 La; tr, Ka, Le, Bl	.04	10.0	6.7	15.0	25.[illegible]	50.0	1.7	.34	.30
P-2/3	1,834.50-1,835.15	.65		10 Ha	.14	.17	.45	35.5	66.4	.45	.58	1.50	3.0
P-2/4	1,801.80-1,802.70	.90	4th oz, lm	>9 Ha; tr La, Po	.16	.15	.12	36.5	61.9	.35	.26	.30	.58
P-2/5	1,802.70-1,804.00	1.30		5 Ha; 4 La; tr Ka, Le, Bl	.12	9.7	6.3	15.5	26.1	37.5	3.3	.65	1.4
[2]P-2/6	1,804.00-1,805.00	1.00		>8 Ha; >1 Po	.74	.72	.57	31.5	52.9	3.1	.91	.57	8.8
[2]P-2/6					1.1	.84	.48	33.0	51.5	3.0	.60	1.5	9.0
P-2/7	1,805.00-1,805.85	.85	sb	>9 Ha; >1 Po	.61	.52	.17	35.0	60.6	2.3	.20	.13	.37
P-2/8	1,805.85-1,806.30	.45		7 Ha; 2 La; tr Po, Ka, Le	.74	6.0	3.7	23.5	39.9	24.0	.99	.42	.70
P-2/9	1,806.30-1,807.50	1.20		>9 Ha; >1 Po; tr La	.84	1.2	.63	33.4	58.2	4.9	.22	.09	.19
P-2/10	1,807.50-1,808.37	.87		8 Ha; >1 La; tr Po	.64	4.4	2.6	28.0	46.4	17.0	.21	.20	.13
[2]P-2/11	1,808.37-1,809.20	.83		3 Ha; >5 La; <1 Po; tr Le	1.4	13.0	7.4	[illegible]	18.0	48.5	.31	.11	.30
[2]P-2/11					1.5	12.0	8.6	[illegible]	19.0	49.5	.25	.09	.13
P-2/12	1,809.20-1,810.42	1.22		>9 Ha; <1 Po; tr Le	1.2	.84	[illegible]	[illegible]	58.0	4.0	.32	.10	.17
P-2/13	1,626.50-1,627.15	.65	sb	8 Ha; 2 Po; tr Le	2.6	2.4	.82	30.0	51.8	11.0	.13	.10	.22
P-2/14	1,627.15-1,628.35	1.20		5 Ha; >4 La; tr Po, Le	.19	10.5	6.7	15.5	24.7	41.5	.61	.43	.43
P-2/15	1,628.35-1,629.52	1.17	10th oz	6 Ha; 4 La; tr Ka, Le	.09	8.9	5.5	18.0	31.9	33.5	.88	.04	1.4
P-2/16	1,629.52-1,630.00	.48		>9 Ha; <Po	.16	.37	.14	35.5	61.5	.70	.25	.11	.32

[1] Estimate of amount reported on a scale of 0-10.
[2] Replicate analyses.

Table 2E.--Calculated mode (mineral content) and potash distribution by mineral in core samples from potash ore zones and mineralized salt beds in drill hole P-2

[oz, ore zone; lm, lower member; sb, salt bed; Bl, bloedite; Ha, halite; Ka, kainite; La, langbeinite; Le, leonite; Po, polyhalite; Insol., clay and silt; leaders (----), not present. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mode (weight percent mineral)							K_2O distribution by minerals				
				La	Ka	Le	Bl	Ha	Po	Insol.	La	Ka	Le	Po	Total
P-2/1	1,833.08-1,834.00	0.92	2d oz	13.8	----	----	----	86.5	1.5	0.2	3.1	----	----	0.2	3.3
P-2/2	1,834.00-1,834.50	.50	2d oz	49.1	4.4	0.2	6.9	41.5	.3	.3	11.1	0.8	<0.1	.1	12.0
P-2/3	1,834.50-1,835.15	.65	2d oz	----	----	----	----	99.6	1.3	3.0	----	----	----	.2	.2
P-2/4	1,801.80-1,802.70	.90	4th oz, lm	.4	----	----	----	92.8	1.1	.6	.1	----	----	.1	.2
P-2/5	1,802.70-1,804.00	1.30	4th oz, lm	45.7	2.0	3.0	2.7	42.5	.9	1.4	10.4	.4	.8	.1	11.7
[1]P-2/6	1,804.00-1,805.00	1.00	4th oz, lm	----	----	----	----	87.2	5.6	8.8	----	----	----	.9	.9
[1]P-2/6			4th oz, lm	----	----	----	----	84.9	6.4	9.0	----	----	----	1.0	1.0
P-2/7	1,805.00-1,805.85	.85	sb below 4th oz	----	----	----	----	89.0	4.0	.4	----	----	----	.6	.6
P-2/8	1,805.85-1,806.30	.45	sb below 4th oz	24.9	1.2	1.8	----	65.5	5.6	.7	5.6	.2	.5	.9	7.2
P-2/9	1,806.30-1,807.50	1.20	sb below 4th oz	2.0	----	----	----	84.9	6.3	.2	.4	----	----	1.0	1.4
P-2/10	1,807.50-1,808.37	.87	sb below 4th oz	20.0	----	----	----	76.5	4.8	.1	4.6	----	----	.7	5.3
[1]P-2/11	1,808.37-1,809.20	.83	sb below 4th oz	60.0	----	1.6	----	28.0	10.5	.3	13.6	----	.4	1.6	15.6
[1]P-2/11			sb below 4th oz	54.5	----	1.3	----	31.3	11.3	.1	12.4	----	.3	1.8	14.5
P-2/12	1,809.20-1,810.42	1.22	sb below 4th oz	----	----	.9	----	95.6	4.9	.2	----	----	.2	.8	1.0
P-2/13	1,626.50-1,627.15	.65	sb above 10th oz	----	----	.7	----	76.3	17.4	.2	----	----	.2	2.7	2.9
P-2/14	1,627.15-1,628.35	1.20	sb above 10th oz	51.3	----	3.1	----	40.7	1.4	.2	11.6	----	.8	.2	12.6
P-2/15	1,628.35-1,629.52	1.17	10th oz	43.0	3.2	1.0	----	51.8	.5	1.4	9.8	.6	.2	.1	10.7
P-2/16	1,629.52-1,630.00	.48	10th oz	----	----	----	----	90.3	2.8	.3	----	----	----	.4	.4

[1] Replicate analyses.

TABLES 3A-3G

Basic data from drill hole P-3,
Waste Isolation Pilot Plant area, Eddy County, New Mexico

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Table 3A.--Abridged drill-hole history

LOCATION: Sec. 20, T. 22 S., R. 31 E.
31 m (103 ft) from south line
952 m (3,122 ft) from east line

ALTITUDE (LAND SURFACE): 1,031 m (3,382.3 ft). Datum for depth measurement in drilling and logging operations.

LITHOLOGIC LOG PREPARED BY: R. J. Cheeseman, G. S. Corchary, J. D. Kibler, B. R. Orr, and R. P. Snyder, August 28 to September 7, 1976.

DRILLING CONTRACTOR: Pennsylvania Drilling Co.

DRILLING RECORD: Commenced drilling on August 26, and completed on September 7, 1976, at 511 m (1,676 ft) below land surface.

102 m (336 ft) of 11-cm (4 1/2-in.) casing left in hole between 149 and 252 m (490-826 ft) below land surface.

Plugged with cement.

REMARKS: Top of salt in Rustler Formation at 210 m (688 ft) below land surface.

Table 3B.--Stratigraphic summary

Rock unit	Depth interval[1] feet	meters
Holocene deposits	0-10	0-3
Pleistocene rocks:		
Gatuna Formation	10-41	3-12
Permian rocks:		
Dewey Lake Red Beds	41-468	12-143
Rustler Formation	468-786	143-240
Magenta Dolomite Member	529-553	161-169
Culebra Dolomite Member	642-665	196-202
Salado Formation	786-1,668	240-508
Upper member	786-1,287	240-392
McNutt potash zone	1,287-1,668	392-508
Vaca Triste Sandstone Member[2]	1,287-1,295	392-395
11th ore zone	1,346-1,349	410-411
Marker bed 117	1,357-1,358	414-414
Marker bed 118	1,375-1,378	419-420
Marker bed 119	1,405-1,407	428-429
10th ore zone	1,415-1,420	431-433
Marker bed 120	1,428-1,429	435-435
9th ore zone	1,434-1,438	437-438
Marker bed 121	1,443-1,445	440-440
Marker bed 122	1,452-1,453	443-443
8th ore zone	1,458-1,467	444-447
Union anhydrite[3]	1,473-1,481	449-451
7th ore zone	1,494-1,499	455-457
6th ore zone	1,509-1,511	460-461
5th ore zone	1,515-1,525	462-465
Marker bed 123	1,555-1,563	474-476
Marker bed 124	1,571-1,579	480-481
4th ore zone	1,585-1,595	483-486
3d ore zone	1,599-1,617	487-493
2d ore zone	1,623-1,627	495-496
1st ore zone	1,645-1,656	501-505
Marker bed 126	1,667-1,668	508-508
Maximum depth recorded	1,668	508

[1]Depth interval recorded from geophysical logs.
[2]Of Adams, 1944.
[3]Informal unit of Salado Formation.

Table 3C.--Lithologic log

Description	Depth (feet)
Calcite, white, crystalline, sandy; brown to clear sand; red siltstone	0.0- 5.0
Calcite, white, crystalline, sandy; caliche; brown, with white reduction spots, fine-grained sandstone; biotitic	5.0- 10.0
Sandstone, brown, with white reduction spots; gray-red, with gray-green reduction spots, siltstone; micaceous	10.0-400.0
Siltstone, gray-red, with gray-green reduction spots; micaceous; selenitic	400.0-470.0
Siltstone, gray-red, with gray-green reduction spots; micaceous;selenitic; trace of white granular gypsum	470.0-475.0
Gypsum, white, granular; some gray-red siltstone	475.0-500.0
Gypsum, white, granular; white to clear gypsum or anhydrite	500.0-505.0
Siltstone, gray-red, with gray-green reduction spots; selenite	505.0-510.0
Siltstone, gray-red, with gray-green reduction spots; selenite; gray to clear, crystalline anhydrite, with gypsum rind	510.0-515.0
Anhydrite, white to brown-gray, crystalline	515.0-530.0
Anhydrite with gypsum rind; light-gray, fine crystalline dolomite	530.0-535.0
Dolomite, light-gray, fine crystalline	535.0-540.0
Same as above	540.0-545.0
Same as above; powdered and clayey	545.0-555.0
Dolomite, light-gray, fine crystalline; white, granular gypsum	555.0-560.0
Anhydrite, brown-gray, crystalline, with white granular gypsum rind	560.0-600.0
Anhydrite, green-gray, crystalline, with gypsum rind	600.0-615.0
Anhydrite, light-gray, crystalline, with gypsum rind; white granular gypsum; friable	615.0-625.0
Clay, red, silty	625.0-630.0
Anhydrite, with gypsum rind, crystalline; contains less than 2 percent red, silty clay	630.0-635.0
Anhydrite, with gypsum rind, crystalline; less than 1 percent selenite	635.0-645.0
Dolomite; 5-10 percent medium-grained anhydrite, with gypsum rind	645.0-650.0
Dolomite; less than 3 percent anhydrite; trace selenite	650.0-660.0
Dolomite; about 1 percent selenite; 1 percent red silt	660.0-670.0
Mudstone, dark-gray; dolomite, pitted; red siltstone; anhydrite	670.0-675.0
Dolomite, light-gray to gray-green, fine crystalline, pitted	675.0-680.0
Gypsum, white, granular, soft; buff, dense, fine crystalline anhydrite	680.0-695.0
Clay, dark-brown, halitic; contains clear halite	695.0-700.0
Clay, brown, halitic; white to buff anhydrite	700.0-705.0
Anhydrite, white to buff; clear halite; brown clay	705.0-715.0
Same as above; contains some gray mudstone chips	715.0-720.0
Siltstone, dark-brown; gray mudstone	720.0-725.0

Table 3C.--Lithologic log--(Continued)

Description	Depth (feet)
Siltstone, dark-brown; gray mudstone; brown halitic clay	725.0- 730.0
Same as above; also off-white anhydrite	730.0- 740.0
Mudstone, gray; some dark-brown siltstone; veined selenite	740.0- 745.0
Same as above; halite	745.0- 755.0
Clay, dark-blue-gray, halitic	755.0- 785.0
Clay, dark-brown	785.0- 790.0
Clay, gray to dark-brown; halite	790.0- 800.0
No sample	800.0- 810.0
Halite, clear; salmon polyhalite	810.0- 815.0
Same as above; brown mudstone increasing	815.0- 820.0
Siltstone, brown-red, halitic	820.0- 825.0
Same as above; also anhydrite	825.0- 830.0
Anhydrite; caliche; gray-red siltstone, with gray-green reduction spots; halite	830.0- 845.0
Same as above; increasing halite	845.0- 850.0
Same as above; also caliche; red siltstone; well-indurated, red limestone	850.0- 860.0
Halite, clear; salmon polyhalite; white anhydrite	860.0- 900.0
Halite, clear; increasing polyhalite	900.0- 910.0
Halite, clear; decreasing polyhalite; some red-brown mudstone	910.0- 920.0
Halite, clear to salmon; some polyhalite	920.0- 925.0
Same as above; increasing polyhalite; some blue-gray mudstone	925.0- 930.0
Halite, clear (colorless); less than 5 percent polyhalite	930.0- 935.0
Similar to above, slightly more salmon-colored	935.0- 940.0
Halite, clear	940.0- 950.0
Halite, colorless to slightly salmon; approx. 5 percent polyhalite	950.0- 955.0
Same as above, increasing polyhalite	955.0- 970.0
Anhydrite, very light gray; some halite	970.0- 985.0
Halite, clear to slightly salmon; less than 2 percent polyhalite	985.0- 990.0
Halite, clear	990.0-1,005.0
Same as above; approx. 5 percent polyhalite	1,005.0-1,010.0
Halite, clear to salmon; 10 percent polyhalite	1,010.0-1,015.0
Halite, clear	1,015.0-1,020.0
Halite, clear to salmon; approx. 5 percent polyhalite	1,020.0-1,025.0
Halite, clear, some salmon (approx. 2 percent); approx. 1 percent polyhalite	1,025.0-1,040.0
Halite, clear	1,040.0-1,050.0
Halite, clear to slightly salmon; 1-2 percent polyhalite	1,050.0-1,060.0
Halite, salmon; 1-2 percent polyhalite	1,060.0-1,065.0
Halite, clear; 1 percent polyhalite	1,065.0-1,070.0

Table 30 --Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to salmon; 1 percent polyhalite	1,070.0-1,075.0
Halite, clear, some salmon; less than 5 percent polyhalite	1,075.0-1,090.0
Halite, clear to salmon; approx. 5 percent polyhalite	1,090.0-1,095.0
Polyhalite, reddish, and very light gray to white; mixed with clear to salmon halite	1,095.0-1,100.0
Polyhalite, reddish, approx. 50 percent of sample; clear halite	1,100.0-1,105.0
Halite, clear to very light salmon	1,105.0-1,110.0
Polyhalite, reddish, approx. 10 percent of sample; clear to salmon halite	1,110.0-1,115.0
Halite, clear to very light salmon; less than 5 percent polyhalite	1,115.0-1,120.0
Halite, clear	1,120.0-1,125.0
Halite, clear to very light salmon; less than 2 percent polyhalite	1,125.0-1,130.0
Halite, clear	1,130.0-1,155.0
Halite, clear to very light salmon	1,155.0-1,200.0
Halite, light-salmon	1,200.0-1,210.0
Same as above; some polyhalite	1,210.0-1,215.0
Halite, clear	1,215.0-1,260.0
Halite, light-salmon	1,260.0-1,265.0
Halite, clear to very light salmon; approx. 50 percent salmon, light-salmon, and some very light gray polyhalite	1,265.0-1,270.0
Halite, light-salmon	1,270.0-1,275.0
Halite, clear to very light salmon	1,275.0-1,290.0
Halite, clear to salmon; reddish, salmon, and light-salmon polyhalite	1,290.0-1,295.0
Same as above; some brownish mudstone, with blue-green reduction spots (cavings(?))	1,295.0-1,300.0
Halite, salmon, grading to pale-buff, medium-coarse crystalline, polyhalitic, decreasing with depth; polyhalite band at 1,301.8-1,301.9 feet	1,300.0-1,304.2
Halite, brown to light-brown, medium to coarse crystalline, clayey; tan clay parting at 1,305.0 feet	1,304.2-1,306.0
Halite, salmon, coarse crystalline, polyhalitic	1,306.0-1,307.7
Halite, clear to light-brown to brown, coarse crystalline, moderately clayey	1,307.7-1,308.6
Halite, salmon, coarse crystalline, polyhalitic	1,308.6-1,309.4
Halite, gray-brown, medium crystalline, clayey	1,309.4-1,310.4
Halite, salmon to buff, medium crystalline, mildly polyhalitic	1,310.4-1,311.8
Halite, brown-gray, coarse crystalline; minor gray-green clay parting at 1,313.3 feet; disseminated brown clay throughout	1,311.8-1,313.6
Halite, medium-salmon, medium to coarse crystalline, mildly polyhalitic; with indistinct gray clayey halite horizon at 1,315.9-1,317.0 feet	1,313.6-1,322.0

Table 3C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, brown to light-buff, medium to coarse crystalline, mottled, very clayey; minor polyhalite as band at 1,324.8-1,324.9 feet	1,322.0-1,326.0
Halite, light-yellow-gray to red-green, medium to coarse crystalline, mildly polyhalitic; polyhalite bands at 1,329.6-1,329.8 feet and 1,3[illegible].2-1,330.3 feet; green-gray inclusions and seams of clay	1,326.0-1,332.7
Clay, brown to red-brown, with gray-green reduction spots, ha[illegible]tic; grading to dark-brown, fine to medium crystalline, clayey, halite	1,332.7-1,335.5
Halite, salmon-buff, medium to coarse crystalline, polyhalitic; minor leached zone of soluble potash minerals at 1,341.3 feet	1,335.5-1,346.7
Halite, gray-green to brown, mottled, medium crystalline, clayey; minor leached potash minerals; brown clay parting at 1,348.6 feet	1,346.7-1,349.9
Halite, salmon to buff, medium to coarse crystalline, mildly polyhalitic; with halitic polyhalite band at 1,357.4 feet	1,349.9-1,358.7
Polyhalite, red, dense	1,358.7-1,359.8
Clay bed, green-gray, halitic; few orange polyhalite blebs	1,359.8-1,360.0
Halite, orange, coarse crystalline; numerous polyhalite blebs concentrated toward base	1,360.0-1,365.8
Halite, pink-orange to green-gray, medium to coarse crystalline; occasional polyhalite blebs and abundant green clay in bands	1,365.8-1,367.4
Halite, orange, medium to coarse crystalline; medium-red-brown blebs and stringers of polyhalite; trace of clay	1,367.4-1,368.3
Halite, light- to medium-dark-gray, medium to coarse crystalline; trace of polyhalite blebs; occasional stringers of green-gray clay	1,368.3-1,369.7
Halite, medium-gray to gray-orange, coarse crystalline; polyhalite blebs and stringers of green-brown clay	1,369.7-1,374.8
Halite, orange, coarse crystalline; numerous blebs and stringers of polyhalite; increase of green-gray clay near base; polygonal leached cavities	1,374.8-1,378.8
Halite, light- to medium-orange, coarse crystalline; large blebs of polyhalite	1,378.8-1,381.6
Polyhalite, red, dense	1,381.6-1,384.1
Halite, clear to gray, medium to coarse crystalline; occasional polyhalite blebs; green-gray clay	1,384.1-1,385.3
Halite, light- to medium-orange, medium to coarse crystalline; polyhalite bands at 1,386.4, 1,388.2, 1,388.7 feet;0.2 foot of polyhalite and anhydrite at 1,387.8 feet	1,385.3-1,389.7
Polyhalite, red, dense, leached, large crystalline; halite layer in center of unit	1,389.7-1,390.3

Table 3C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, light- to medium-green-gray to light- to medium-orange, medium crystalline; much leaching; much clay; sparse blebs of intergranular polyhalite; clay bands at 1,390.8 and 1,393.0 feet	1,390.3-1,393.9
Halite, clear, coarse crystalline; up to 15 percent brown and green-gray clay bands; clay band at 1,396.6 feet	1,393.9-1,398.7
Halite, clear to light-orange, coarse crystalline	1,398.7-1,403.2
Halite, dark- to medium-orange, medium to coarse crystalline; numerous polyhalite bands at 1,405.2, 1,405.6, 1,406.7, and 1,407.2 feet	1,403.2-1,407.8
Polyhalite, red, dense; gray-green laminated clay; some leached areas	1,407.8-1,409.1
Clay, green-gray, halitic	1,409.1-1,410.0
Halite, clear to light-medium-salmon, medium to coarse crystalline; sulfate minerals (langbeinite)	1,410.0-1,416.7
Clay, gray-green, halitic, medium crystalline; 0.01-foot-thick band of polyhalite at top	1,416.7-1,417.0
Halite, clear to medium-red-brown, coarse crystalline; numerous polyhalite blebs; masses of red-brown clay, decreasing downward	1,417.0-1,423.3
Halite, clear to medium-orange, medium to coarse crystalline; occasional polyhalite blebs	1,423.3-1,426.9
Halite, orange, medium to coarse crystalline; bands of polyhalite in top 0.5 foot; band 1,427.9 feet	1,426.9-1,428.0
Polyhalite, red, dense; medium to coarse crystalline halite at 1,428.4-foot depth	1,428.0-1,428.9
Clay, green to gray, halitic	1,428.9-1,429.4
Halite, orange, medium to coarse crystalline	1,429.4-1,433.0
Halite, gray to dark-gray, mottled, medium to coarse crystalline; red-brown and gray-green clay	1,433.0-1,439.0
Halite, clear to light-orange, coarse crystalline; sparse blebs and stringers of polyhalite	1,439.0-1,443.3
Polyhalite, red, dense; polyhalite and anhydrite mixture at base	1,443.3-1,445.1
Halite, clear to light-gray and gray-orange, coarse crystalline; sparse polyhalite; concentrated zone of polyhalite bands at 1,447.7 feet	1,445.1-1,451.3
Polyhalite, gray-red, dense; anhydrite	1,451.3-1,452.1
Halite, clear to light-orange, medium to coarse crystalline; sparse blebs of polyhalite	1,452.1-1,452.9
Clay, green-gray, halitic	1,452.9-1,453.2

Table 3C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to orange, medium to coarse crystalline; brown clay parting at 1,453.9 feet; clay concentrated at base	1,453.2-1,460.0
Halite, clear to light-brown, medium to coarse crystalline, mottled; clay partings at 1,460.2 and 1,460.3 feet	1,460.0-1,460.6
Clay, gray-green, halitic	1,460.6-1,460.9
Halite, clear, grading to white and pale-orange; bands of clay-rich polyhalite	1,460.9-1,462.3
Halite, medium-orange, medium crystalline; bands and blebs of polyhalite	1,462.3-1,464.4
Halite, pale-orange, grading down to clear and white, fine to medium crystalline; brown clay seam at base	1,464.4-1,465.0
Halite, clear and light-gray to pale-orange, medium to coarse crystalline, mottled, clay-rich; intergranular red-brown clay; clay seams at 1,466.5, 1,466.9, 1,467.2, 1,467.8, and 1,470.4 feet	1,465.0-1,470.4
Halite, light-gray to clear, mottled, fine crystalline; minor polyhalite blebs at base	1,470.4-1,471.5
Halite, light-gray to pale-red-brown, coarse crystalline; bands of light-gray halite alternating with mottled red-brown and light-gray halite; polyhalite blebs throughout	1,471.5-1,473.5
Halite, medium-gray and clear, medium to coarse crystalline, mottled; no polyhalite; green-gray clayey unit	1,473.5-1,474.8
Halite, light-gray to pale-orange, very coarse crystalline; tiny polyhalite blebs; minor tiny leached vugs	1,474.8-1,475.1
Anhydrite, medium-gray, dense, laminated; upper 0.5 foot is brecciated and rehealed with polyhalite; anhydrite	1,475.1-1,482.9
Halite, light-orange to clear, coarse crystalline; occasional bands of gray-green clay; sparse polyhalite blebs	1,482.9-1,491.0
Halite, medium-light-orange to light-gray, medium t. coarse crystalline; traces of polyhalite and sulfate minerals	1,491.0-1,491.5
Halite, gray-green, medium to coarse crystalline; irregular orange polyhalite blebs; abundant clay; clay-rich at top and at 1,492.4-foot depth	1,491.5-1,493.9
Halite, light-orange to medium-orange, medium to coarse crystalline; numerous stringers and blebs of polyhalite, decreasing downward	1,493.9-1,4[illegible]5.8
Halite, clear to medium-gray-green; abundant clay; clay stringer at 1,496.3 feet	1,495.8-1,496.4
Halite, orange, coarse crystalline; sparse polyhalite blebs	1,496.4-1,497.9
Halite, light-gray to dark-gray, medium to coarse crystalline; abundant clay; clay partings at 1,498.0 and 1,499.1 feet	1,497.9-1,499.2

Table 3C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, medium to coarse crystalline; moderate amount of polyhalite; clay at 1,499.5 feet	1,499.2-1,500.0
Clay, gray-green, medium crystalline, halitic	1,500.0-1,500.3
Halite, light-gray to light-medium-salmon, medium to coarse crystalline; partings of brown clay at 1,500.5, 1,500.9, 1,501.5, 1,502.4, 1,503.8, 1,504.4, and 1,505.1 feet; occasional polyhalite blebs at 1,502.7 feet	1,500.3-1,505.1
Halite, clear to medium-dark-brown-gray; sparse polyhalite blebs; brown and green-gray clay	1,505.1-1,507.0
Halite, white to light-orange, medium to coarse crystalline; small amounts of polyhalite and clay; few polygonal vugs	1,507.0-1,508.2
Halite, smoky—gray, medium to coarse crystalline; clay masses	1,508.2-1,508.7
Halite, orange, medium to coarse crystalline; stringers and blebs of polyhalite; clay areas at 1,510.2 and 1,512.0 feet	1,508.7-1,515.6
Halite, light- to dark-gray, medium to coarse crystalline; abundant gray-green and brown clay; polyhalite stringers	1,515.6-1,516.9
Halite, clear to light-gray, coarse crystalline; polyhalite stringers, intergranular masses of gray-green clay	1,516.9-1,518.8
Halite, light-gray to gray-green, coarse crystalline; one large band (0.05 ft) of gray-green clay at 1,518.8 feet	1,518.8-1,521.8
Halite, light-pink-gray to light-medium-orange, medium to coarse crystalline; polyhalite blebs near base	1,521.8-1,523.4
Halite, clear to very light orange, medium crystalline; sparse polyhalite blebs	1,523.4-1,525.4
Halite, dark-gray to gray-brown, medium crystalline; occasional polyhalite blebs; clayey; brown clay partings at 1,525.6, 1,526.2, and 1,528.1 feet	1,525.4-1,533.8
Halite, white to light-pink-gray	1,533.8-1,534.9
Halite, clear to very light green, medium crystalline; occasional polyhalite blebs; green-gray masses of clay	1,534.9-1,535.2
No sample	1,535.2-1,536.0
Halite, clear to very light orange, coarse crystalline, concentration of polyhalite and clay; polyhalite concentrated at 1,536.9 and 1,537.4 feet; gray-green clay at 1,536.3 feet	1,536.0-1,541.8
Halite, clear, grading down to light-gray, coarse crystalline to medium crystalline, clayey; brown clay parting at 1,542.2 feet; minor polyhalite blebs	1,541.8-1,544.3
Halite, clear to light-gray, medium to coarse crystalline; pods of fine crystalline halite; stringers and blebs of medium-orange polyhalite	1,544.3-1,547.3

Table 3C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, medium-orange to clear, coarse crystalline; stringers of polyhalite	1,547.3-1,548.4
Halite, light-gray to pale-orange, coarse crystalline; pods of fine crystalline halite; light-green clay parting at 1,549.0 feet	1,548.4-1,550.0
Halite, light-gray to clear, fine to medium crystalline; minor polyhalite blebs	1,550.0-1,550.7
Halite, pale-orange to clear, medium to coarse crystalline; orange polyhalite blebs	1,550.7-1,551.9
Halite, pale- to medium-orange and clear, coarse crystalline; medium-orange polyhalite blebs	1,551.9-1,554.2
Halite, pale-yellow to clear, coarse crystalline; no polyhalite	1,554.2-1,556.6
Halite and anhydrite mixture, medium-yellow-brown to white	1,556.6-1,557.0
Anhydrite, light-gray to light-red-brown, dense, some laminations	1,557.0-1,564.6
Halite, red-brown to clear, coarse crystalline; white anhydrite bands	1,564.6-1,565.5
Halite, pale-yellow to clear, medium to coarse crystalline	1,565.5-1,566.3
Halite, pale-red-brown to clear, medium to coarse crystalline	1,566.3-1,566.9
Halite, pale-yellow to white, medium crystalline; polyhalite bands at 1,567.3, 1,568.0, and 1,568.4 feet	1,566.9-1,569.4
Halite, medium- to pale-red-brown, medium crystalline; polyhalite blebs; pink polyhalite bleb at 1,570.9 feet	1,569.4-1,571.0
Halite, red-brown, medium crystalline; light-gray bands of anhydrite	1,571.0-1,571.3
Halite, medium-yellow-brown, medium crystalline, light-gray anhydrite band at 1,571.9 feet	1,571.3-1,572.7
Anhydrite, medium- to dark-gray, laminated	1,572.7-1,579.2
Mudstone, dark-gray	1,579.2-1,579.5
Polyhalite, medium-red-brown, dense; cavities filled with gray clay	1,579.5-1,580.5
Clay and polyhalite, medium-pink	1,580.5-1,581.0
Halite, pale-yellow to medium-red, coarse crystalline; polyhalite bands and blebs	1,581.0-1,585.5
Halite, light-gray to yellow-brown, medium to coarse crystalline; polyhalite blebs; gray-green clay seam at top; clear, coarse crystalline halite at base	1,585.5-1,586.0
Halite, pale-orange to pale-yellow, medium to clear crystalline; few polyhalite blebs	1,586.0-1,592.9
Halite, medium-gray, pale-yellow, fine to medium crystalline, clayey; leached zones; light-gray clay seam at base	1,592.9-1,594.2
Halite, red-brown, mottled, medium crystalline; polyhalite stringers; langbeinite crystals; clayey; light-brown clay seam at top	1,594.2-1,596.4

Table 3C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-yellow-gray, grading down to red-brown at 1,598.7 feet; contains stringers and blebs of pale-yellow langbeinite	1,596.4-1,600.1
Halite, pale-red to clear, coarse crystalline; minor polyhalite blebs in upper half	1,600.1-1,600.6
Halite, medium-gray to white, medium crystalline, clay-rich; brown clay seams throughout unit; minor polyhalite stringers at base	1,600.6-1,601.4
Halite, light-brown to clear, medium to coarse crystalline; blebs and stringers of polyhalite at base and top	1,601.4-1,602.1
Halite, medium-red to white, coarse crystalline; pink polyhalite stringers and blebs	1,602.1-1,603.3
Halite, medium-gray to white, coarse crystalline; light-brown clay parting at 1,603.9 feet	1,603.3-1,604.4
Halite, light-gray to clear, coarse crystalline; minor polyhalite blebs	1,604.4-1,604.9
Halite, light-brown to white and clear, coarse crystalline; numerous polyhalite blebs and stringers	1,604.9-1,605.7
Halite, light- to medium-gray, medium to coarse crystalline, alternating with light-gray to clear, coarse crystalline; scattered blebs of polyhalite	1,605.7-1,613.1
Halite, light-orange, coarse crystalline; blebs and stringers of polyhalite	1,613.1-1,614.7
Halite, red-brown to clear, polyhalitic; light-pink stringers of polyhalite	1,614.7-1,615.1
Halite, pale-yellow, coarse crystalline	1,615.1-1,615.3
Halite, light-gray to white, coarse crystalline; stringers of polyhalite; clayey	1,615.3-1,615.6
Halite, light- to dark-gray, fine to medium crystalline, clayey	1,615.6-1,617.0
Halite, light-yellow to pale-orange, medium to coarse crystalline	1,617.0-1,617.6
Halite, medium-orange, coarse crystalline; pink blebs of polyhalite	1,617.6-1,617.9
Halite, light- to medium-gray, coarse crystalline, clayey	1,617.9-1,618.3
Halite, light-yellow, clear, and pink-orange, coarse crystalline; red-brown polyhalite stringers	1,618.3-1,622.5
Halite, dark-gray to light-gray, medium to coarse crystalline, clayey	1,622.5-1,623.0
Halite, light-pink to light-orange, coarse crystalline; polyhalite blebs	1,623.0-1,625.4
Halite, light-green-gray to medium-gray, medium crystalline; light-gray-green clay band at 1,626.9 feet; clayey	1,625.4-1,627.2
Halite, light-gray, coarse crystalline, clayey	1,627.2-1,627.9
Halite, light-gray to light-brown, coarse crystalline, clayey; clay partings at top, 1,628.6 and 1,629.1 feet	1,627.9-1,629.6
Halite, light-gray to clear, coarse crystalline; minor polyhalite blebs	1,629.6-1,630.1

Table 3C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, medium- to dark-orange, coarse crystalline, polyhalitic; medium-orange polyhalite	1,630.1-1,633.8
Halite, clear, coarse crystalline	1,633.8-1,634.4
Halite, pale-orange to clear, coarse crystalline, polyhalitic near top; brown clay seam at 1,635.5 feet	1,634.4-1,636.3
Halite, light-gray, clear, and light-orange, coarse crystalline, slightly polyhalitic	1,636.3-1,638.3
Halite, light-orange, medium-gray, mottled, clayey; brown clay seams at 1,638.7, 1,639.1, 1,639.3, and 1,640.8 feet	1,638.3-1,641.1
Halite, light- to medium-gray, coarse crystalline, clayey; light-pink polyhalite blebs and stringers	1,641.1-1,648.1
Halite, clear to light-pink, polyhalitic in lower part	1,648.1-1,652.9
Halite, light- to medium-gray, medium to coarse crystalline, clayey; polyhalite stringers	1,652.9-1662.5
Halite, light-green to clear to light-gray fine to medium crystalline; brown clay seams at top and at 1,663.3, 1,663.5, and 1,664.2 feet; polyhalitic at base	1,662.5-1,664.7
Halite, light-gray to clear; polyhalite stringers and blebs; green clay seam at 1,665.9 feet	1,664.7-1,666.1
Halite, light-orange to clear, coarse crystalline; medium-orange polyhalite stringers and blebs	1,666.1-1,670.5
Halite, clear to light-gray, medium crystalline, polyhalitic; light-green clay seam at 1,671.8 feet	1,670.5-1,671.9
Halite, clear, coarse crystalline; minor polyhalite	1,671.9-1,673.9
Halite, light-gray to clear; brown clay and medium-red-brown polyhalite stringers; clayey	1,673.9-1,675.4
	1,676.0 Total depth

Table 3D.--Mineralogical and chemical analyses of core samples from potash ore zones and mineralized salt beds in drill hole P-3

[oz, ore zone; lm, lower member; sb, salt bed; tr, trace; Ha, halite; Ka, kainite; La, langbeinite; Le, leonite; Po, polyhalite. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mineralogy	Chemical analysis (weight percent)								
				X-ray diffraction analysis[1]	Ca	K	Mg	Na	Cl	SO_4	H_2O+	H_2O-	Water insoluble
P-3/1	1,594.40-1,595.20	0.80	4th oz, lm	>8 Ha;>1 Po; tr Le	0.84	0.84	0.45	34.0	56.4	4.0	0.5	0.34	2.6
P-3/2	1,595.20-1,596.30	1.10		8 Ha;>1 Po; tr Ka, Le	.96	1.6	1.0	31.5	53.2	7.2	1.5	.33	2.8
P-3/3	1,596.30-1,597.60	1.30	sb	>8 Ha; 1 La;<1 Po	.26	4.9	3.1	28.5	45.8	18.0	.44	.06	.27
P-3/4	1,597.60-1,598.70	1.10		>7 Ha; 2 La;<1 Po; tr Le	.30	5.5	3.5	24.2	42.4	22.0	.23	.07	.20
[2]P-3/5	1,598.70-1,599.53	.83		>4 Ha; 3 Po; 2 La; tr, Le	4.5	8.8	4.5	15.0	25.8	39.0	.5	.04	.60
[2]P-3/5					6.4	8.0	4.6	16.0	27.0	38.5	.59	.06	.25
P-3/6	1,599.53-1,600.03	.50		9 Ha;<1 Po; tr La, Le	1.4	2.0	.93	31.0	54.2	8.4	.20	<.01	.16

[1]Estimate of amount reported on a scale of 0-10.
[2]Replicate analyses.

Table 3E.--Calculated mode (mineral content) and potash distribution by mineral in core samples from potash ore zones and mineralized salt beds in drill hole P-3

[oz, ore zone; lm, lower member; sb, salt bed; Ha, halite; Ka, kainite; La, langbeinite; Le, leonite; Po, polyhalite; Insol., clay and silt; leaders (---), not present. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mode (weight percent mineral)						K_2O distribution by minerals				
				La	Ka	Le	Ha	Po	Insol.	La	Ka	Le	Po	Total
P-3/1	1,594.40-1,595.20	0.80	4th oz, lm	---	---	0.1	92.9	6.3	2.6	---	---	<0.1	1.0	1.0
P-3/2	1,595.20-1,596.30	1.10		---	3.5	.6	86.9	7.2	2.8	---	0.7	.1	1.1	1.9
P-3/3	1,596.30-1,597.60	1.30		24.7	---	---	72.5	1.9	.3	5.6	---	---	.3	5.9
P-3/4	1,597.60-1,598.70	1.10		26.4	---	1.1	69.9	2.3	.2	6.0	---	.3	.3	6.6
[1]P-3/5	1,598.70-1,599.53	.83	sb	23.1	---	.3	42.5	33.9	.6	5.3	---	<.1	5.3	10.6
[1]P-3/5				5.9	---	3.0	44.5	48.1	.3	1.4	---	.8	7.5	9.7
P-3/6	1,599.53-1,600.03	.50		2.3	---	1.0	89.3	10.5	.2	.5	---	.2	1.7	2.4

[1]Replicate analyses.

TABLES 4A-4G

Basic data from drill hole P-4
Waste Isolation Pilot Plant area, Eddy County, New Mexico

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4G.--Gamma-ray and neutron logs of drill hole	foldout

Table 4A.--Abridged drill-hole history

LOCATION: Sec. 28, T. 22 S., R. 31 E.
45 m (146 ft) from south line
453 m (1,487 ft) from east line

ALTITUDE (LAND SURFACE): 1,049 m (3,441.2 ft). Datum for depth measurements in drilling and logging operations.

LITHOLOGIC LOG PREPARED BY: R. J. Cheeseman, G. S. Corchary, B. R. Orr, and R. P. Snyder, August 30 to September 6, 1976.

DRILLING CONTRACTOR: Boyles Bros. Drilling Co.

DRILLING RECORD: Commenced drilling on August 28, and completed on September 4, 1976, at 566 m (1,857 ft) below land surface.

Drilled with air foam to 292 m (958 ft) below land surface. Driller reported water at 259 m (850 ft).

Recovered all casing, and plugged with cement.

REMARKS: Top of salt in Rustler Formation at 252 m (826 ft) below land surface.

Table 4B.--Stratigraphic summary

Rock unit	Depth interval[1] feet	meters
Holocene deposits	0-8	0-2
Triassic rocks:		
Santa Rosa Sandstone	8-99	2-30
Permian rocks:		
Dewey Lake Red Beds	99-609	30-186
Rustler Formation	609-930	186-283
Magenta Dolomite Member	662-686	202-209
Culebra Dolomite Member	775-802	236-244
Salado Formation	930-1,857	283-566
Upper member	930-1,446	283-441
McNutt potash zone	1,446-1,853	441-565
Vaca Triste Sandstone Member[2]	1,446-1,452	441-443
11th ore zone	1,506-1,509	459-460
Marker bed 117	1,519-1,521	463-464
Marker bed 118	1,544-1,547	471-472
Marker bed 119	1,570-1,572	479-479
10th ore zone	1,581-1,589	482-484
Marker bed 120	1,596-1,597	486-487
9th ore zone	1,603-1,607	489-490
Marker bed 121	1,610-1,612	491-491
Marker bed 122	1,620-1,621	494-494
8th ore zone	1,628-1,637	496-499
Union anhydrite[3]	1,646-1,659	502-506
7th ore zone	1,667-1,671	508-509
6th ore zone	1,683-1,686	513-514
5th ore zone	1,690-1,700	515-518
Marker bed 123	1,728-1,735	527-529
Marker bed 124	1,742-1,752	531-534
4th ore zone	1,756-1,768	535-539
3d ore zone	1,777-1,792	542-546
2d ore zone	1,798-1,803	548-550
1st ore zone	1,824-1,835	556-559
Marker bed 126	1,852-1,853	564-565
Maximum depth recorded	1,858	566

[1]Depth interval recorded from geophysical logs.
[2]Of Adams, 1944.
[3]Informal unit of Salado Formation.

Table 4C.--Lithologic log

Description	Depth (feet)
Sand, dune	0.0- 5.0
Sandstone, light-brown, fine-grained, rounded; siltstone	5.0- 15.0
Sandstone, red-brown, with gray-green reduction spots, fine-grained; calcareous cement	15.0- 30.0
Similar to above with 10 percent green-gray, fine- to medium-grained sandstone	30.0- 35.0
Sandstone, pale-red, fine- to medium-grained, angular; contains trace of black mineral (not biotite)	35.0- 40.0
Sandstone and siltstone, red-brown to pale-red; pale, fine-grained, siltstone; red-brown siltstone	40.0- 45.0
Sandstone, red-brown, very fine grained to fine-grained; trace of pale-red fine-grained sandstone	45.0- 70.0
Sandstone, red-br fine-grained, speckled white; trace of clear quartz	70.0- 75.0
Sandstone, pale-red, mottled, fine- to medium-grained	75.0- 95.0
Sandstone, light-gr , salt and pepper texture, subrounded	95.0- 100.0
Sandstone, red-brown, very fine grained; some color blobs of light green	100.0- 125.0
Same as above, but cuttings very fine (approx. 0.5 - 1mm)	125.0- 130.0
Sandstone, red-brown, very fine grained; some color blobs of light green	130.0- 205.0
Siltstone, red-brown; trace of fine sand-size grains	205.0- 220.0
Siltstone, red-brown; increasing amounts of very fine to fine-grained sandstone	220.0- 245.0
Siltstone and sandstone, red-brown; selenite veins	245.0- 250.0
Sandstone and siltstone, red-brown; sandstone is very fine grained to fine grained	250.0- 255.0
Sandstone and siltstone, red-brown; selenite veins	255.0- 260.0
Sandstone and siltstone, red-brown; sandstone is very fine grained to fine grained	260.0- 300.0
Sandstone, red-brown, with light-green spots, very fine grained to fine grained; minor red-brown siltstone	300.0- 305.0
Similar to above; trace of selenite and light-gray sandstone	305.0- 310.0
Sandstone, red-brown, very fine grained to fine-grained; increasing red-brown siltstone; trace of light-gray sandstone	310.0- 315.0
Sandstone and siltstone, red-brown; sandstone is very fine grained; trace selenite and pale-green siltstone	315.0- 320.0
Same as above; trace massive gypsum	320.0- 335.0

Table 4C.--Lithologic log--(Continued)

Description	Depth (feet)
Same as above; no gypsum	335.0- 350.0
Sandstone (increasing) light-green and light-gray	350.0- 370.0
Sandstone, red-brown; minor red-brown siltstone; trace green siltstone	370.0- 375.0
Same as above, plus trace of gypsum	375.0- 380.0
Sandstone and siltstone, red-brown; trace of selenite	380.0- 385.0
Sandstone, red-brown, with light-green and light-gray reduction spots, very fine grained to fine-grained; trace of green siltstone	385.0- 400.0
Sandstone, red-brown, with numerous light-green reduction spots, very fine grained to fine-grained; minor red-brown siltstone; trace selenite	400.0- 405.0
Sandstone, red-brown, trace of reduction spots, very fine grained; minor light-green siltstone	405.0- 415.0
Same as above; no light-green siltstone	415.0- 420.0
Same as above; trace selenite	420.0- 425.0
Same as above; no selenite	425.0- 435.0
Same as above; selenite trace	435.0- 440.0
Same as above; approx. 2 percent light-green, medium-grained sandstone	440.0- 445.0
Same as above; no light-green sandstone	445.0- 460.0
Same as above; selenite increasing from trace	460.0- 475.0
Sandstone and siltstone, red-brown, with light-green reduction spots; trace selenite; trace black mudstone	475.0- 490.0
Same as above; no mudstone	490.0- 565.0
Sandstone, red-brown, with green reduction spots, very fine grained to fine-grained; trace selenite	565.0- 610.0
Sandstone, red-brown, very fine grained, approx. 15 percent light-gray anhydrite; selenite	610.0- 615.0
Same as above; as much as 50 percent anhydrite	615.0- 625.0
Same as above; as much as 65 percent anhydrite	625.0- 630.0
Same as above; as much as 90 percent anhydrite	630.0- 640.0
Anhydrite; siltstone; gypsum	640.0- 645.0
Anhydrite, 40 percent; gypsum, 30 percent; siltstone 30 percent	645.0- 650.0
Anhydrite; siltstone; decreasing gypsum	650.0- 660.0
Anhydrite; gray-red siltstone, 10 percent; gypsum less than 2 percent	660.0- 665.0
Anhydrite; gypsum, 2 percent; dolomite, 2 percent	665.0- 670.0
Dolomite, very light gray, very fine grained; less than 5 percent anhydrite, gypsum, and siltstone	670.0- 685.0

Table 4C.--Lithologic log--(Continued)

Description	Depth (feet)
Dolomite, very light gray, very fine grained; siltstone, 15 percent; anhydrite, 15 percent	685.0- 690.0
Anhydrite, light- to medium-gray; gypsum; siltstone; dolomite	690.0- 695.0
Anhydrite; dolomite; siltstone; decreasing gypsum	695.0- 700.0
Anhydrite, light- to medium-gray; dolomite; gypsum; siltstone	700.0- 710.0
Same as above; increasing siltstone	710.0- 715.0
Same as above; decreasing gypsum, dolomite	715.0- 720.0
Anhydrite, light- to medium-gray; dolomite less than 2 percent; siltstone, 5 percent	720.0- 730.0
Same as above; increasing siltstone	730.0- 745.0
Siltstone; dolomite, 2 percent	745.0- 750.0
Siltstone, gray-red; anhydrite, medium- to light-gray; minor dolomite	750.0- 755.0
Same as above; increasing anhydrite	755.0- 760.0
Anhydrite; siltstone; dolomite	760.0- 765.0
Same as above; but no dolomite	765.0- 770.0
Anhydrite; siltstone; gypsum	770.0- 775.0
Same as above; less siltstone	775.0- 780.0
Anhydrite; gypsum	780.0- 785.0
Dolomite, light-gray; gypsum; siltstone	785.0- 790.0
Same as above; less gypsum and siltstone	790.0- 795.0
Dolomite, light-gray; gypsum; siltstone	795.0- 800.0
Mudstone, dark-gray; siltstone; dolomite	800.0- 810.0
Dolomite; mudstone; anhydrite	810.0- 815.0
Same as above; increasing anhydrite	815.0- 820.0
Anhydrite; mudstone; siltstone	820.0- 825.0
Mudstone; gypsum; anhydrite	825.0- 830.0
Siltstone, red and green, 50 percent; anhydrite, 30 percent; mudstone, and selenite	830.0- 835.0
Same as above; less siltstone; dolomite; minor selenite	835.0- 840.0
Anhydrite, with gypsum rind; siltstone; dolomite, regular	840.0- 845.0
Siltstone, halitic; anhydrite, with gypsum rind	845.0- 855.0
Same as above; minor selenite	855.0- 860.0
Siltstone, gray-red, halitic; anhydrite; minor selenite	860.0- 870.0
Same as above; with some medium-dark-gray and medium-blue-gray siltstone	870.0- 875.0
Same as above; with 12 percent medium-gray to medium-dark-gray mudstone	875.0- 880.0
Same as above; with increasing gray to blue-gray mudstone	880.0- 895.0

Table 4C.--Lithologic log--(Continued)

Description	Depth (feet)
Siltstone, mostly dark-gray to blue-gray; anhydrite	895.0- 900.0
Siltstone, medium-dark-gray to blue-gray; anhydrite; green-red siltstone; selenite less than 2 percent	900.0- 905.0
Siltstone (approx. 80 percent) dark-gray to blue-gray; anhydrite; green-red siltstone	905.0- 915.0
Same as above; increasing anhydrite	915.0- 930.0
Halite; approx. 15 percent anhydrite and siltstone	930.0- 935.0
Siltstone, red-gray; approx. 15 percent anhydrite and halite	935.0- 950.0
Halite, medium-crystalline, clayey	950.0- 955.0
Siltstone, medium-gray-red; anhydrite and selenite	955.0- 960.0
Halite, clayey; less than 2 percent polyhalite	960.0- 970.0
Halite; fairly clean, with blebs of polyhalite	970.0- 975.0
Same as above; finer and cleaner; salt is light-pinkish-white	975.0- 980.0
Halite, pink to white; contains less than 1 percent polyhalite	980.0- 985.0
Halite, white, finely crystalline; contains scattered blebs of polyhalite	985.0- 990.0
Same as above, only a little pinker	990.0- 995.0
Halite, pink to white; less than 1 percent polyhalite	995.0-1,000.0
Halite, white, fine crystalline; contains less than 1 percent scattered blebs polyhalite	1,000.0-1,005.0
Halite, light-gray tinged to pink, slightly coarse; contains polyhalite blebs	1,005.0-1,010.0
Halite, clear, fine crystalline; less than 1 percent polyhalite	1,010.0-1,015.0
Same as above; polyhalite increasing	1,015.0-1,020.0
Halite, very light orange; approx. 2 percent polyhalite	1,020.0-1,025.0
Halite, white, very fine, clean	1,025.0-1,030.0
Same as above; contains less than 2 percent polyhalite	1,030.0-1,040.0
No sample	1,040.0-1,045.0
Halite, orange-brown; approx. 5 percent polyhalite (one piece polyhalite ½ inch diameter)	1,045.0-1,050.0
Halite, light-gray to light-pink; less than 2 percent polyhalite	1,050.0-1,060.0
Same as above, a little whiter in color	1,060.0-1,065.0
Halite, clear to white; less than 1 percent polyhalite	1,065.0-1,070.0
Halite, light-gray, crystalline	1,070.0-1,075.0
Same as above; scattered polyhalite	1,075.0-1,080.0
Same as above, whiter in color	1,080.0-1,090.0
Halite; contains much more polyhalite and clay (together approx. 5 percent)	1,090.0-1,095.0

Table 4C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, medium-gray to light-red-orange; polyhalite and clay	1,095.0-1,100.0
Halite, light-gray to salmon; less than 2 percent polyhalite	1,100.0-1,105.0
Same as above, lighter in color	1,105.0-1,115.0
Halite, beige overall, with medium-gray streaks; pink polyhalite	1,115.0-1,130.0
Same as above, lighter in color	1,130.0-1,135.0
Same as above, very light gray	1,135.0-1,140.0
Halite, gray to white; approx. 1 percent clay and polyhalite	1,140.0-1,145.0
Halite, white; contains polyhalite blebs	1,145.0-1,150.0
Halite, pink, fine-grained; polyhalite increasing	1,150.0-1,155.0
Same as above, medium-light-salmon-pink; approx. 2-3 percent polyhalite	1,155.0-1,160.0
Halite, pale- to medium-pink to clear; less than 2 percent polyhalite	1,160.0-1,165.0
Halite, very light gray to clear to white	1,165.0-1,170.0
Halite, white to clear, fine-grained; contains sparse blebs of polyhalite	1,170.0-1,180.0
Halite, salmon; polyhalite increasing	1,180.0-1,185.0
Same as above; approx. 1 percent polyhalite	1,185.0-1,200.0
Halite, clear to light-salmon, crystalline; contains scattered blebs of polyhalite	1,200.0-1,210.0
Same as above; less than 2 percent polyhalite	1,210.0-1,215.0
Same as above; polyhalite increasing	1,215.0-1,230.0
Halite, clear to white, fine-grained, crystalline	1,230.0-1,235.0
Same as above; contains less than 1 percent scattered polyhalite blebs	1,235.0-1,245.0
Halite, very light pink to light-gray; contains less than 2 percent polyhalite	1,245.0-1,250.0
Halite, lighter; less polyhalite	1,250.0-1,255.0
Halite, white, very clean; less than 1 percent polyhalite	1,255.0-1,265.0
Halite, light-medium-pink; less than 2 percent polyhalite	1,265.0-1,300.0
Halite, clear to white; less than 1 percent polyhalite	1,300.0-1,335.0
Same as above; polyhalite increasing approx. 1-3 percent	1,335.0-1,350.0
Same as above; approx. 2 percent polyhalite	1,350.0-1,360.0
Same as above; polyhalite increasing approx. 1-2 percent	1,360.0-1,380.0
Same as above; polyhalite increasing to 2-3 percent	1,380.0-1,385.0
Same as above; about 5 percent polyhalite	1,385.0-1,390.0
Halite, 90 percent; 5-10 percent polyhalite	1,390.0-1,400.0
Halite, very light pink to clear; contains polyhalite blebs	1,400.0-1,410.0
Same as above; less than 1 percent polyhalite	1,410.0-1,420.0

Table 4C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, white, clean; less than 1 percent polyhalite	1,420.0-1,425.0
Halite, gray-white; less than 2 percent polyhalite	1,425.0-1,435.0
Halite, gray to pink; contains scattered polyhalite blebs	1,435.0-1,440.0
Halite, very dirty; polyhalite; approx. 25 percent clay and medium-coarse-grained sandstone	1,440.0-1,445.0
Sand, halitic	1,445.0-1,450.0
Halite, clear to medium-brown, crystalline, waxy luster; brown siltstone less than 0.1 foot thick at top of unit; contains stringers of polyhalite and blebs of gray-green clay	1,450.0-1,455.6
Halite, clear to medium-salmon-red, very coarse crystal; contains stringers and bands of polyhalite and bands of green-gray clay	1,455.6-1,461.1
Halite, clear to light-gray-green, medium to coarse crystalline; contains sparse stringers of polyhalite and clay	1,461.1-1,463.2
Halite, clear to light-medium-orange, coarse crystalline; moderate concentration of polyhalite stringers near top	1,463.2-1,463.8
Halite, medium-brown to clear, medium to coarse crystalline; contains sparse vugs, blebs, and stringers of polyhalite, and clay partings at 1,463.8 and 1,465.8 feet; (core leached)	1,463.8-1,468.2
Halite, orange, medium to coarse crystalline; contains polyhalite stringers; very little clay	1,468.2-1,476.1
Halite, medium-brown to dark-brown, medium to coarse crystalline; intergrowths of polyhalite; abundant clay; brown clay blob at 1,477.3 feet	1,476.1-1,481.7
Halite, light-orange to medium-red-orange, coarse crystalline; 0.8-foot thick polyhalite band at base; clay mass at 1,483.5 feet	1,481.7-1,485.8
Halite, clear to dark-brown, medium crystalline; polyhalite stringer at base; abundant clay	1,485.8-1,487.8
Halite-polyhalite mix, red-brown, medium crystalline	1,487.8-1,489.3
Halite, medium-dark-salmon-pink, coarse crystalline	1,489.3-1,494.5
Halite, light-orange to medium-orange, coarse crystalline, leached indentations; sparse polyhalite blebs; gray-green clay at top	1,494.5-1,501.5
Halite, pink to brown, medium to coarse crystalline; polyhalite blebs; interstitial brown-red clay	1,501.5-1,505.9
Halite, light-yellow-orange to pink-red, coarse crystalline; polyhalite blebs; a few irregular masses of gray-green clay	1,505.9-1,507.2
Halite, clear to light-gray, medium to coarse crystalline; red polyhalite bands at top	1,507.2-1,508.9

Table 4C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, light-medium-red, coarse crystalline; two bands polyhalite at 1,512.8 and 1,514.2 feet; abundant polyhalite blebs; sparse gray-green to brown clay	1,508.9-1,514.3
Polyhalite, pink bands in dense matrix; green-gray clay; medium crystalline halite; clay partings at 1,515.5 and 1,515.8 feet	1,514.3-1,515.8
Halite, clear to light-pink-gray, medium to coarse crystalline; green interstitial clay; white gypsum coating on polyhalite stringers	1,515.8-1,516.7
Halite, orange, medium to coarse crystalline; numerous polyhalite blebs	1,516.7-1,520.0
Halite, clear to light-pink-gray, coarse crystalline; sparse polyhalite blebs; two irregular masses of clay at 1,521.0 and 1,521.4 feet	1,520.0-1,522.8
Halite, light-medium-pink to green-gray, medium to coarse crystalline; clay mass 0.1 foot from top; clay parting at 1,523.8 feet	1,522.8-1,523.9
Halite, orange, medium to coarse crystalline; sparse blebs of polyhalite	1,523.9-1,525.2
Halite, dark-gray mottled with dark-red; abundant clay; leachings around polygonal sulfates near base of interval	1,525.2-1,529.7
Halite, clear to light-gray, coarse crystalline; irregular masses of polyhalite encircle triangular crystals (langbeinite); sulfates mostly near top	1,529.7-1,531.8
Halite, orange, coarse crystalline, band of polyhalite at 1,533.1 feet	1,531.8-1,534.0
Halite, light- to medium-dark-gray, coarse crystalline; sparse red-brown polyhalite stringers; small triangular minerals have been leached	1,534.0-1,535.9
Halite, light-medium-orange, medium to coarse crystalline; polyhalite blebs and, near base, 0.4 foot concentration of polyhalite	1,535.9-1,540.0
Polyhalite, brick-red, fine crystalline; scattered halite crystal inclusions; sparse langbeinite near top	1,540.0-1,542.5
Halite, buff to dark-salmon, medium to coarse crystalline; indistinct polyhalite band and sparse leached potash crystals near base	1,542.5-1,547.1
Polyhalite, red-brown, fine crystalline, massive	1,547.1-1,547.8
Halite, buff to light-gray, medium crystalline; contains salmon polyhalite-rich halite at base; gray clay parting at 1,548.5 feet	1,547.8-1,551.0
Halite, gray to brown, medium-fine crystalline, clayey; contains minor disseminated polyhalite; clay decreases with depth; clay partings at 1,551.4, 1,552.0, and 1,552.9 feet	1,551.0-1,556.9

Table 4C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, light-medium-salmon, medium-coarse crystalline, polyhalitic, with polyhalite increasing with depth; distinct red-brown polyhalite bands in lower 2 feet	1,556.9-1,565.5
Polyhalite, red-brown, fine crystalline, massive; gray clay partings in lower third of core	1,565.5-1,566.8
Clay, gray, halitic to gray halite; clayey with indistinct polyhalite band between clay and halite	1,566.8-1,567.6
Halite, buff to light-salmon to light-gray; minor disseminated polyhalite throughout; varying clay content	1,567.6-1,571.6
Clay, gray halitic; minor disseminated polyhalite	1,571.6-1,571.9
Halite, salmon to brick-red to light-gray-buff, medium crystalline; very polyhalitic; leached sylvite common	1,571.9-1,578.4
Halite, light-gray to light-brown, medium crystalline; decreasing clay with depth; gray clay 0.1 foot thick at upper contact; brown clay parting at 1,580.1, 1,582.3, and 1,583.3 feet	1,578.4-1,585.9
Halite, light-salmon, coarse crystalline; increasing polyhalite with depth; prominent langbeinite band at 1,589.8 feet	1,585.9-1,591.3
Polyhalite, dark-salmon to brick-red, fine crystalline, dense	1,591.3-1,592.0
Halite, dark-red to medium-gray, medium crystalline, clayey	1,592.0-1,593.5
Halite, salmon to dark-orange, medium crystalline, polyhalitic	1,593.5-1,596.7
Halite, dark-brown, fine to medium crystalline, clayey; red clay parting at 1,597.3 feet; polyhalitic at base	1,596.7-1,603.3
Halite, buff to salmon, medium to coarse crystalline, polyhalitic	1,603.3-1,606.0
Polyhalite, brick-red to buff, fine crystalline, halitic at base	1,606.0-1,607.7
Halite, clear to light-salmon, coarse crystalline; prominent polyhalitic band at base	1,607.7-1,608.2
Clay, gray; halitic; altered polyhalite streaks	1,608.2-1,608.8
Halite, salmon to medium-red-orange, medium to coarse crystalline, polyhalitic	1,608.8-1,614.6
Polyhalite, buff-gray to salmon, fine crystalline, halitic at top	1,614.6-1,615.4
Halite, medium-gray to salmon, clayey and polyhalitic; clay partings at 1,616.4 (gray) and 1,617.3 (brown) feet	1,615.4-1,620.1
Halite, buff to light-salmon, medium crystalline, polyhalitic at top	1,620.1-1,623.7
Halite, brown to orange, clayey, polyhalitic at base; brown clay band at 1,624.3 feet	1,623.7-1,625.6
Halite, buff to salmon, medium crystalline, slightly polyhalitic at base	1,625.6-1,629.4
Halite, red-brown to medium-gray, fine to medium crystalline, clayey; clay partings at 1,632.5 (brown) and 1,634.2 (gray) feet	1,629.4-1,642.6

Table 4C.--Lithologic log--(Continued)

Description	Depth (feet)
Anhydrite, gray, fine crystalline, polyhalitic	1,642.6-1,643.2
Halite, clear, coarse crystalline	1,643.2-1,643.5
Anhydrite, gray, fine crystalline, polyhalitic	1,643.5-1,646.4
Anhydrite, gray, fine crystalline, banded; prominent partings at banding	1,646.4-1,655.2
Halite, buff to light-orange, medium crystalline	1,655.2-1,658.3
Halite, gray to light-brown, medium crystalline, clayey; gray clay parting at top	1,658.3-1,659.3
Halite, buff to salmon, medium crystalline, polyhalitic	1,659.3-1,661.8
Halite, medium-gray to reddish-gray, medium crystalline, clayey; gray clay partings at 1,662.0 feet	1,661.8-1,662.6
Halite, red-orange, medium crystalline, polyhalitic	1,662.6-1,663.4
Halite, medium-gray, medium to coarse crystalline, clayey; gray clay parting at 1,663.7 feet	1,663.4-1,664.5
Halite, red-brown, medium crystalline, clayey and polyhalitic	1,664.5-1,665.4
Halite, light- to medium-gray, medium crystalline, clayey; gray clay band at top	1,665.4-1,666.0
Halite, light-brown to dark-red-brown, medium to coarse crystalline; clay partings at 1,666.1, 1,667.8, 1,668.8, 1,669.9, and 1,670.7 feet	1,666.0-1,673.7
Halite, red-orange to light-orange, medium to coarse crystalline, polyhalitic at top and base; clay parting at 1,680.1 feet	1,673.7-1,686.8
Halite, dark-red-brown, medium crystalline, clayey and polyhalitic; brown and gray clay partings at top	1,686.8-1,689.6
Halite, buff to salmon, medium to coarse crystalline; increasing polyhalite to base	1,689.6-1,692.9
Halite, red-brown, fine to medium crystalline, clayey; brown clay partings at 1,693.4, 1,695.3, and 1,698.7 feet	1,692.9-1,701.7
Halite, buff to salmon, coarse crystalline; increasing polyhalite to base	1,701.7-1,705.7
Halite, dark-reddish-gray to reddish-orange, medium crystalline, clayey and polyhalitic	1,705.7-1,713.8
Halite, salmon-orange, coarse crystalline, polyhalitic	1,713.8-1,715.5
Halite, red-brown, medium to coarse crystalline, slightly clayey and polyhalitic	1,715.5-1,718.9
Halite, clear to light-orange, coarse crystalline	1,718.9-1,724.6
Polyhalite and minor anhydrite, gray to red-brown, medium crystalline; halite "ghost" crystals etched out; indistinct banding	1,724.6-1,731.7

Table 4C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to salmon, medium crystalline; polyhalite bands near top and base	1,731.7-1,736.4
Polyhalite and anhydrite (grading from top to base), light- to dark-gray, fine crystalline; prominent banding near base	1,736.4-1,744.1
Clay and halitic clay, dark-gray to medium-gray	1,744.1-1,746.3
Clay and polyhalite, gray to red-brown, fine crystalline	1,746.3-1,746.6
Halite, buff to salmon, medium crystalline, polyhalitic	1,746.6-1,751.7
Halite, clear to buff, coarse crystalline	1,751.7-1,753.9
Halite, gray to red-gray, medium crystalline, clayey	1,753.9-1,756.5
Halite, clear to light-salmon, medium to coarse crystalline; contains minor polyhalite	1,756.5-1,76[illegible].3
Halite, gray to red-gray, medium to coarse crystalline; contains minor polyhalite; prominent langbeinite crystal at 1,763.3 feet	1,762.3-1,766.4
Halite, buff to salmon, medium crystalline, polyhalitic; prominent langbeinite crystal at 1,768.9 feet	1,766.4-1,769.5
Halite, red-brown, mottled, medium crystalline, polyhalitic; recrystallized halite at top	1,769.5-1,771.2
Halite, salmon, medium crystalline; contains minor polyhalite	1,771.2-1,772.
Halite, mottled red-brown to indistinct gray, medium crystalline, clayey and polyhalitic	1,772.4-1,781.8
Halite, salmon, medium to coarse crystalline, polyhalitic	1,781.8-1,786.3
Halite, red-brown to gray, medium crystalline, clayey; contains minor polyhalite	1,786.3-1,788.6
Halite, clear to light-salmon, medium crystalline; polyhalite increasing to base	1,788.6-1,795.6
Halite, gray to red-gray, medium crystalline, clayey; gray clay parting at 1,796.5 feet; contains minor polyhalite	1,795.6-1,801.3
Halite, reddish-brown to dark-salmon, medium crystalline, polyhalitic	1,801.3-1,811.1
Halite, gray to reddish-brown, medium crystalline, clayey; high content brown clay at top, decreasing to base	1,811.1-1,823.7
Halite, clear to mottled salmon, medium to coarse crystalline; polyhalite increasing to base	1,823.7-1,827.5
Halite, gray to reddish-brown, medium crystalline, clayey; prominent brown clay band at 1,840.0 feet	1,827.5-1,843.0
Halite, mottled red-brown, medium crystalline, polyhalitic	1,843.0-1,847.4
Polyhalite, red-brown, fine crystalline; indistinct banding with lenticular halite replacement in center	1,847.4-1,848.0

Table 4C.--Lithologic log--(Continued)

Description	Depth (feet)
Clay and halitic clay, gray and greenish-gray, fine to medium crystalline	1,848.0-1,848.6
Halite, clear to buff and mottled red-brown, fine to medium crystalline, clayey; brown clay band at 1,849.4 feet	1,848.6-1,851.6
Halite, gray to reddish-brown, medium crystalline, clayey; brown clay parting at 1,852.7 feet; clay toward base decreases	1,851.6-1,855.8
Halite, mottled red-brown to buff, medium crystalline; contains numerous brown clay partings to total depth	1,855.8-1,857.0 Total depth

Table 4D.--Mineralogical and chemical analyses of core samples from potash ore zones and mineralized salt beds in drill hole P-4

[oz, ore zone; sb, salt bed; tr, trace; Ca, carnallite, Ha, halite; Ka, kainite; Po, polyhalite; Sy, sylvite. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mineralogy: X-ray diffraction analysis[1]	Chemical analysis (weight percent): Ca	K	Mg	Na	Cl	SO_4	H_2O+	H_2O-	Water insoluble
P-4/1	1,572.10-1,572.60	0.50	sb	9 Ha, 1 Po, tr Sy	1.3	1.7	0.37	33.5	57.5	5.0	0.20	0.08	0.47
[2] P-4/2	1,572.60-1,574.97	2.37		5 Ha, 5 Sy	.11	24.0	.04	19.5	55.3	.20	.24	<.01	.36
[2] P-4/2					.09	24.5	.03	22.0	56.0	.16	.04	.02	.14
P-4/3	1,574.97-1,576.17	1.20	10th oz	6 Ha, 4 Sy, tr Po	.50	15.0	.15	25.0	56.4	1.3	.22	.27	1.1
P-4/4	1,576.17-1,577.77	1.60		8 Ha, 1 Po, 1 Sy	.46	4.0	.12	34.0	59.7	1.4	.12	.11	.24
P-4/5	1,577.77-1,578.69	.92		6 Ha, >3 Sy, <1 Po	.55	15.0	.15	25.0	55.8	1.9	.09	.11	.60
P-4/6	1,578.69-1,580.29	1.60		5 Ha, 3 Ca, 1 Sy, <1 Po, Tr Ka	.76	5.4	.54	25.4	50.0	2.6	.84	3.3	10.6
P-4/7	1,580.29-1,580.84	.55		>6 Ha, >3 Ca, <1 Po	.75	2.0	.52	30.0	53.0	2.7	.84	2.4	6.7

[1]Estimate of amount reported on scale of 0-10.
[2]Replicate analyses.

Table 4E.--Calculated mode (mineral content) and potash distribution by mineral in core samples from potash ore zones and mineralized salt beds in drill hole P-4

[oz, ore zone; sb, salt bed; Ca, carnallite; Ha, halite; Ka, kainite; Po, polyhalite; Sy, sylvite; Insol., clay and silt; leaders (---), not present. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mode (weight percent mineral)						K_2O distribution by minerals				
				Sy	Ka	Ca	Ha	Po	Insol.	Sy	Ka	Ca	Po	Total
P-4/1	1,572.10-1,572.60	0.50	sb	1.3	---	---	93.8	7.8	0.5	0.8	---	---	1.2	2.0
[1]P-4/2	1,572.60-1,574.97	2.37	sb	45.7	---	---	55.3	.3	.4	28.9	---	---	.1	28.9
[1]P-4/2			sb	46.7	---	---	55.7	.2	.1	29.5	---	---	<.1	29.5
P-4/3	1,574.97-1,576.17	1.20	10th oz	28.1	---	---	70.9	2.0	1.1	17.8	---	---	.3	18.1
P-4/4	1,576.17-1,577.77	1.60	10th oz	7.1	---	---	92.8	2.2	.2	4.5	---	---	.3	4.8
P-4/5	1,577.77-1,578.69	.92	10th oz	28.0	---	---	70.1	3.0	.6	17.6	---	---	.5	18.1
P-4/6	1,578.69-1,580.29	1.60	10th oz	8.3	1.1	2.4	73.9	2.6	10.6	5.3	0.4	0.4	.4	6.5
P-4/7	1,580.29-1,580.[illegible]	.55	10th oz	1.9	---	4.6	82.9	2.8	6.7	1.2	---	.8	.4	2.4

[1]Replicate analyses.

TABLES 5A-5G

Basic data from drill hole P-5,
Waste Isolation Pilot Plant area, Eddy County, New Mexico

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5G.--Gamma-ray and neutron logs of 1 hole	foldout

Table 5A.--Abridged drill-hole history

LOCATION: Sec. 17, T. 22 S., R. 31 E.
62 m (202 ft) from south line
50 m (165 ft) from east line

ALTITUDE (LAND SURFACE): 1,058 m (3,471.8 ft). Datum for depth measurements in drilling and logging operations.

LITHOLOGIC LOG PREPARED BY: P. C. Aguilar, J. D. Kibler, J. C. Lorenz, Florian Maldonado, J. W. Mercer, B. R. Orr, L. A. Rives, R. P. Snyder, and R. W. Spengler, September 13-21, 1976.

DRILLING CONTRACTOR: Pennsylvania Drilling Co.

DRILLING RECORD: Commenced drilling on September 10, and completed on September 21, 1976, at 558 m (1,830 ft) below land surface.

173 m (568 ft) of 11-cm (4 1/2-in.) casing left in hole between 133 and 306 m (435-1,003 ft) below land surface.

Plugged with cement.

REMARKS: Top of salt in Rustler Formation at 259 m (850 ft) below land surface.

Table 5B.--Stratigraphic summary

Rock unit	Depth interval[1] feet	meters
Holocene deposits	0-13	0-4
Triassic rocks:		
Santa Rosa Sandstone	13-146	4-45
Permian rocks:		
Dewey Lake Red Beds	146-623	45-190
Rustler Formation	623-947	190-289
Magenta Dolomite Member	686-711	209-217
Culebra Dolomite Member	804-827	245-252
Salado Formation	947-1,830	289-558
Upper member	947-1,429	289-436
McNutt potash zone	1,429-1,785	436-544
Vaca Triste Sandstone Member[2]	1,429-1,436	436-438
11th ore zone	1,482-1,486	452-453
Marker bed 117	1,492-1,494	455-455
Marker bed 118	1,514-1,517	461-462
Marker bed 119	1,541-1,543	470-470
10th ore zone	1,550-1,556	472-474
Marker bed 120	1,560-1,561	475-476
9th ore zone	1,567-1,571	478-479
Marker bed 121	1,573-1,575	479-480
Marker bed 122	1,580-1,582	481-482
8th ore zone	1,589-1,595	484-486
Union anhydrite[3]	1,604-1,611	489-491
7th ore zone	1,623-1,628	495-496
6th ore zone	1,635-1,638	498-499
5th ore zone	1,643-1,659	501-506
Marker bed 123	1,680-1,687	512-514
Marker bed 124	1,695-1,705	517-520
4th ore zone	1,709-1,717	521-523
3d ore zone	1,725-1,737	526-529
1st ore zone	1,742-1,746	531-532
Marker bed 126	1,784-1,785	544-544
Lower member	1,785-1,830	544-558
Marker bed 127	1,810-1,811	552-559
Marker bed 128	1,821-1,822	555-555
Maximum depth recorded	1,830	558

[1]Depth interval recorded from geophysical logs.
[2]Of Adams, 1944.
[3]Informal unit of Salado Formation.

Table 5C.--Lithologic log

Description	Depth (feet)	
Caliche, approx. 50 percent; grayish-red, medium- to fine- to very fine grained, rounded to subangular, poorly sorted sandstone	0.0-	5.0
Caliche	5.0-	10.0
Sandstone, as in interval 0.0-5.0 feet	10.0-	20.0
Sandstone, as above, but with some (less than 5 percent) gray to greenish-gray sandstone	20.0-	65.0
Same as above, about 10 percent of sample; very fine grained, dark-reddish-brown, some greenish-gray sandstone; dark reddish-brown siltstone; dark-reddish-brown, weakly cemented mudstone	65.0-	70.0
Same as above, with increase in greenish-gray sandstone (about 10 percent of sample); the rest is cavings from above 65 feet	70.0-	75.0
Mudstone, predominately; dark-reddish-brown and very fine grained siltstone; dark-reddish-brown sandstone, with greenish-gray reduction spots; greenish-gray siltstone and sandstone	75.0-	80.0
Same as above, micaceous	80.0-	85.0
Mudstone, predominately; dark-reddish-brown sandstone, with greenish-gray reduction spots, very fine grained; dark-reddish-brown siltstone, with reduction spots	85.0-	90.0
Same as above, micaceous	90.0-	100.0
Mudstone, reddish-brown; reddish-brown siltstone, with green reduction spots	100.0-	105.0
Siltstone, reddish-brown, with green reduction spots	105.0-	110.0
Same as above, with trace of frosted quartz grains	110.0-	115.0
Sandstone, reddish-brown, with green reduction spots, very fine grained	115.0-	125.0
Sandstone, reddish-brown, with minor green reduction spots, fine- to medium-grained	125.0-	145.0
Sandstone, white to pale-red and reddish-brown, with green reduction spots, fine-grained, micaceous	145.0-	150.0
Mudstone, reddish-brown	150.0-	155.0
Mudstone and siltstone, reddish-brown, trace of white to pale-red, with green reduction spots, very fine grained	155.0-	170.0
Sandstone, reddish-brown, very fine grained; trace of siltstone	170.0-	180.0
Same as above, with minor green reduction spots	180.0-	185.0
Sandstone, like above (75 percent); reddish-brown siltstone (25 percent)	185.0-	190.0
Siltstone, reddish-brown with green reduction spots	190.0-	195.0
Same as above; minor mudstone	195.0-	205.0

Table 5C.--Lithologic log--(Continued)

Description	Depth (feet)
Sandstone, reddish-brown, with minor green reduction spots, fine-grained	205.0- 210.0
No sample	210.0- 215.0
Sandstone, reddish-brown, very fine to fine-grained	215.0- 220.0
Mudstone, reddish-brown	220.0- 225.0
Mudstone and siltstone, reddish-brown, with trace of green reduction spots	225.0- 230.0
Same as above; minor pale-green, very fine grained sandstone	230.0- 235.0
Siltstone, reddish-brown, with minor green reduction spots; reddish-brown, very fine grained sandstone	235.0- 245.0
Siltstone and mudstone, reddish-brown, with many green reduction spots; trace of reddish-brown, very fine grained sandstone	245.0- 250.0
Siltstone; reddish-brown sandstone,with trace of green reduction spots, very fine grained	250.0- 255.0
Sandstone, reddish-brown, very fine grained	255.0- 265.0
Siltstone; reddish-brown sandstone, with numerous green reduction spots, very fine grained; trace of selenite	265.0- 280.0
Siltstone, reddish-brown, with trace of green reduction spots; selenite	280.0- 285.0
Siltstone, reddish-brown; minor light-greenish-gray, very fine grained sandstone; trace of reddish-brown mudstone	285.0- 290.0
Same as above; increased sandstone	290.0- 295.0
Same as above; selenite	295.0- 300.0
Siltstone and mudstone, reddish-brown; minor selenite	300.0- 305.0
Siltstone, reddish-brown, with numerous green reduction spots; trace of selenite	305.0- 330.0
Same as above; minor mudstone	330.0- 335.0
Siltstone and mudstone, reddish-brown, with trace of green reduction spots	335.0- 340.0
Siltstone, reddish-brown, with green reduction spots	340.0- 345.0
Same as above; selenite	345.0- 375.0
No sample	375.0- 380.0
Siltstone, reddish-brown; minor red mudstone, with green reduction spots; minor selenite	380.0- 400.0
Siltstone, reddish-brown; minor mudstone, with green reduction spots	400.0- 415.0
Same as above; minor selenite	415.0- 420.0
Same as above; red mudstone	420.0- 425.0
Siltstone, reddish-brown, with increasing green reduction spots and selenite	425.0- 510.0

Table 5C.--Lithologic log--(Continued)

Description	Depth (feet)
Siltstone, brownish-red; 15 percent light-green siltstone (or may be green reduction spots)	510.0- 515.0
Like above; decreasing percentage of light-green siltstone	515.0- 520.0
Mudstone, reddish-brown; lesser reddish-brown siltstone, with light-green reduction spots; minor selenite	520.0- 525.0
Mudstone, reddish-brown (80 percent); reddish-brown, very fine grained sandstone (20 percent)	525.0- 530.0
Mudstone, like above; minor amounts of reddish-brown siltstone, with light-green reduction spots	530.0- 535.0
Siltstone, reddish-brown; reddish-brown, very fine grained sandstone, with minor light-green reduction spots; selenite	535.0- 600.0
Siltstone, reddish-brown	600.0- 620.0
Siltstone, like above; trace of pale-red to white, very fine grained sandstone	620.0- 625.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots, micaceous (about 50 percent of sample); white to very light gray and clear (about 50 percent of sample) anhydrite	625.0- 630.0
Anhydrite; some siltstone, as above, ±20 percent	630.0- 635.0
Same as above; less siltstone, ±5 percent	635.0- 640.0
Same as above; less siltstone, ±1 percent	640.0- 660.0
Same as above; some mudstone	660.0- 665.0
Same as above; some grayish-red, medium- to very fine grained, poorly sorted sandstone, contaminants of red beds	665.0- 670.0
Anhydrite, as above, but more medium to light-gray	670.0- 690.0
Same as above; contains about 15 percent grayish-white dolomite, with black flecks like biotite	690.0- 700.0
Same as above; increase in dolomite	700.0- 705.0
Dolomite, light- to medium-dark-gray and greenish-gray, large crystalline; contains flecks of biotite(?)	705.0- 710.0
Dolomite, as above; white to light-gray and clear anhydrite; contaminants of caliche and red beds	710.0- 715.0
Dolomite, as above, ±70 percent anhydrite, as above, 30 percent	715.0- 730.0
Anhydrite, light- to medium-gray, fine crystalline; dolomite, less than 10 percent	730.0- 760.0
Dolomite, light-gray to medium-gray; less than 5 percent anhydrite	760.0- 765.0
Anhydrite, light- to medium-gray, fine crystalline; less than 10 percent dolomite	765.0- 770.0

Table 5C.--Lithologic log--(Continued)

Description	Depth (feet)
Same as above, no dolomite	770.0- 775.0
Anhydrite, light- to medium-gray, as above; 20-30 percent white, fine crystalline dolomite	775.0- 780.0
Same as above; less than 5 percent dolomite; about 2 percent clear gypsum	780.0- 785.0
Same as above; some polyhalite; green mineral; small scattered fragments of red siltstone	785.0- 790.0
Same as above; no polyhalite or siltstone	790.0- 800.0
Anhydrite, light- to medium-gray, fine crystalline	800.0- 810.0
Dolomite, light-gray, fine crystalline	810.0- 830.0
Same as above; 10 percent clear gypsum	830.0- 840.0
Same as above; no gypsum	840.0- 845.0
Same as above; gray clay; some gypsum	845.0- 850.0
Dolomite, less than 5 percent; white anhydrite, 80 percent; red, fine-grained siltstone, 15 percent	850.0- 890.0
Siltstone, red, fine-grained; white anhydrite, 30 percent; no dolomite	890.0- 900.0
Siltstone, red, fine-grained, more than 90 percent; anhydrite and dolomite, less than 10 percent	900.0- 915.0
Siltstone, red, fine-grained, less than 70 percent; bluish-gray siltstone, 5 percent; whitish-gray dolomite, 10 percent; gypsum, clear, 10 percent; halite, clear, 5 percent	915.0- 925.0
Same as above; some polyhalite	925.0- 930.0
Siltstone, blue-gray, fine-grained; some red siltstone and anhydrite chips; few pieces of caliche(?); few pieces of halite	930.0- 955.0
Halite, 80 percent; clear, red siltstone; few specks anhydrite	955.0- 970.0
Halite, clear; few specks red siltstone	970.0- 980.0
Same as above; some (5 percent) white anhydrite	980.0-1,000.0
Halite, clear, 50 percent; red siltstone, 50 percent	1,000.0-1,010.0
Halite, clear, 90 percent; red siltstone; minor anhydrite	1,010.0-1,015.0
Halite, clear, 90 percent; polyhalite, 5 percent; red siltstone, 5 percent	1,015.0-1,030.0
Halite, clear; polyhalite, 85 percent, red siltstone, 15 percent	1,030.0-1,035.0
Halite, clear, 60 percent; red siltstone, 40 percent	1,035.0-1,040.0
Halite, clear, 95 percent; red polyhalite, 5 percent	1,040.0-1,045.0
Halite, clear, 85 percent; red polyhalite, 5 percent; red siltstone, 10 percent	1,045.0-1,055.0
Halite, clear, 95 percent; red polyhalite, 5 percent	1,055.0-1,060.0

Table 5C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear, 75 percent; siltstone, 25 percent	1,060.0-1,070.0
Halite, clear, 75 percent; red polyhalite, 25 percent	1,070.0-1,085.0
Halite, clear, 65 percent; red and white polyhalite, 35 percent	1,085.0-1,090.0
Halite, clear, 85 percent; red and white polyhalite, 15 percent	1,090.0-1,095.0
Halite, clear, 90 percent; red polyhalite, 10 percent	1,095.0-1,120.0
Same as above; minor clay	1,120.0-1,130.0
Same as above; no clay	1,130.0-1,135.0
Halite, clear, 95 percent; red polyhalite, 5 percent	1,135.0-1,140.0
Halite, clear; sparse polyhalite	1,140.0-1,155.0
Halite, clear, 75 percent; red and white polyhalite, 25 percent	1,155.0-1,165.0
Halite, clear, 85 percent; red polyhalite, 15 percent	1,165.0-1,170.0
Halite, clear, 90 percent; red polyhalite, 10 percent	1,170.0-1,175.0
Halite, clear, 75 percent; red polyhalite, 25 percent	1,175.0-1,180.0
Halite, clear, 85 percent; red polyhalite, 15 percent	1,180.0-1,190.0
Halite, clear, 95 percent; red polyhalite, 5 percent	1,190.0-1,195.0
Halite, clear, 85 percent; red polyhalite, 15 percent	1,195.0-1,225.0
Halite, clear; orange polyhalite; some blue-gray siltstone; some red siltstone	1,225.0-1,230.0
Halite, clear; few fragments orange polyhalite	1,230.0-1,240.0
Halite, clear; orange polyhalite (20 percent); white anhydrite (30 percent)	1,240.0-1,260.0
Halite, clear, 60 percent; polyhalite less than 10 percent; anhydrite 30 percent; all are fine grained	1,260.0-1,270.0
Halite, clear, fine-grained, less than 95 percent; fine-grained polyhalite and anhydrite, less than 5 percent	1,270.0-1,280.0
Halite, clear; less than 1 percent orange polyhalite	1,280.0-1,295.0
Halite, clear, fine-grained; contains scattered polyhalite and anhydrite	1,295.0-1,300.0
Halite, clear, 90 percent; orange polyhalite, 10 percent	1,300.0-1,310.0
Same as above; polyhalite less than 5 percent	1,310.0-1,315.0
Halite, clear, fine-grained; contains scattered polyhalite	1,315.0-1,360.0
Halite, clear, 50 percent; orange polyhalite, 50 percent; both are fine grained	1,360.0-1,365.0
Halite, clear, fine-grained	1,365.0-1,370.0
Halite, clear; less than 5 percent polyhalite	1,370.0-1,380.0
Halite, clear; no polyhalite	1,380.0-1,385.0
Halite, clear; 10 percent polyhalite	1,385.0-1,400.0
No sample	1,400.0-1,405.0

Table 5C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear, fine-grained; less than 1 percent orange polyhalite; top of core	1,405.0-1,420.0
Polyhalite, moderate-reddish-brown, dense; pale-yellow-brown, coarse crystalline halite band in lower 0.5 foot	1,420.0-1,422.2
Halite, pale-red, light-yellow-brown, coarse crystalline; gray siltstone layer at top; gray-green clay seam at base	1,422.2-1,422.5
Halite, pale-yellow-brown, clear, coarse crystalline	1,422.5-1,423.2
Halite; light-gray to moderate-red-brown, pale-red-orange, fine to coarse crystalline anhydrite bands; contains pale-yellow-brown blebs and stringers; red-brown polyhalite	1,423.2-1,426.3
Halite, moderate-red-brown to pale-red to pale-yellow-brown, medium to coarse crystalline; contains thin stringers and blebs of moderate-red polyhalite	1,426.3-1,427.8
Halite, pale-red to moderate-red-orange, clear, fine to coarse crystalline, very clayey; numerous gray-green clay blebs and stringers in upper 1.2 feet; brown clay and pale-red-orange polyhalite stringers in lower 3.0 feet; brown clay seam at 1,430.3 feet; very coarse crystalline halite band at 1,429.8 feet	1,427.8-1,432.0
Siltstone and halite, red-brown, pale-red to light-gray; pale-orange polyhalite bands at 1,432.3 and 1,432.7 feet	1,432.0-1,433.0
Halite, pale-red, clear, pale-yellow-brown, fine crystalline, very clayey; intercrystalline brown clay blebs	1,433.0-1,434.7
Halite, pale-red, light-gray, clear, medium to coarse crystalline, clayey; contains brown clay blebs and stringers; numerous, pale-orange polyhalite stringers increase toward base; brown clay partings at 1,435.4 and 1,436.0 feet	1,434.7-1,439.3
Halite, moderate-red-brown, minor pale-yellow-orange, fine to coarse crystalline; numerous blebs and stringers of moderate-orange-pink polyhalite; a 0.2-foot thick moderate-red-brown, dense polyhalite bed at 1,441.5 feet	1,439.3-1,444.4
Halite, pale-red, light-gray, clear, coarse crystalline grading to fine, brown intercrystalline clay; contains minor light-pink polyhalite stringers	1,444.4-1,445.0
Halite, moderate-red-brown, pale-yellow-orange, and clear, very coarse crystalline; contains numerous stringers and blebs of red-brown polyhalite	1,445.0-1,447.0
Halite, light-gray to pale-red, clear, very coarse crystalline; contains brown clay blebs	1,447.0-1,448.1

Table 5C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red to light-gray, medium to coarse crystalline, clayey; contains large amounts of brown intercrystalline clay, minor light-orange polyhalite	1,448.1-1,448.6
Clay, dark-brown; pale-red to clear, medium crystalline halite	1,448.6-1,449.4
Halite, pale-red to moderate-red-brown, fine to coarse crystalline; contains minor gray-green clay, light-pink blebs of polyhalite	1,449.4-1,449.6
No sample	1,449.6-1,450.0
Halite, clear, coarse crystalline; red-brown polyhalite blebs and stringers	1,450.0-1,450.4
Halite, moderate-red-orange to moderate-red-brown, medium to coarse crystalline; disseminated polyhalite throughout; gray clay seams at 1,452.9 and 1,453.7 feet; zone of least amount of polyhalite at 1,457.4-1,457.8 feet	1,450.4-1,459.2
Halite, clear, medium to coarse crystalline; 25 percent intercrystalline brown clay, with very minor polyhalite banding; polyhalite increases at 1,460.8-1,461.7 feet; brown clay seam at 1,461.2 feet	1,459.2-1,461.7
Halite, clear, coarse crystalline; polyhalite blebs and increasingly disseminated red-brown polyhalite at depth; polyhalite band at 1,462.3-1,462.4 feet	1,461.7-1,462.7
Halite, clear, medium to coarse crystalline; less than 10 percent brown intercrystalline clay, with red-brown polyhalite blebs disseminated throughout; gray clay partings at 1,462.7 and 1,463.2 feet; brown clay partings at 1,463.4, 1,464.0, and 1,465.7 feet	1,462.7-1,465.8
Halite, moderate-red-orange to red-brown, fine to medium crystalline; polyhalite; polyhalite band at 1,466.7-1,466.9 feet	1,465.8-1,467.5
Halite, mottled gray to red-brown, medium crystalline, clayey; gray clay parting at 1,467.8 feet	1,467.5-1,468.6
Halite, clear to moderate-red-orange, medium crystalline; polyhalite finely disseminated throughout	1,468.6-1,471.0
Halite, brown mottled, clayey, medium to coarse crystalline, scattered polyhalite blebs throughout; gray-green clay partings at 1,471.0 and 1,471.3 feet; brown clay partings at 1,472.2 and 1,472.8 feet	1,471.0-1,472.8
Halite, moderate-red-orange to red-brown, medium to coarse crystalline; minor polyhalite blebs	1,472.8-1,474.8
Halite, pale-red to yellow-brown, medium to coarse crystalline; intercrystalline gray and brown clays	1,474.8-1,476.7
Halite, moderate-red-orange to red-brown, medium crystalline; minor intergranular polyhalite; stray sylvite mineralization at 1,479.1-1,480.0 feet	1,476.7-1,481.6

Table 5C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, mottled gray and red; prominent crystals of sylvite; disseminated light-gray clay	1,481.6-1,483.3
Halite, brown, clayey, medium crystalline; brown clay, ±10 percent; less than 2 percent red-brown sylvite crystals, grading down to more polyhalitic gray clay	1,483.3-1,486.4
Halite, medium-dark-gray, clayey; contains red-brown polyhalite and sylvite blebs; ±20 percent gray clay	1,486.4-1,487.0
Halite, clear, medium crystalline; red-brown polyhalite blebs; intercrystalline gray clay; less than 1 percent soluble K_2O minerals at 1,488.6 feet	1,487.0-1,490.0
Halite, medium-red-orange, medium to coarse crystalline; minor sylvite and red-brown polyhalite bands and blebs in 1,488.6-1,492.6-foot zone	1,490.0-1,492.6
Polyhalite, red-brown, fine crystalline; halite blebs throughout	1,492.6-1,494.4
Clay seam, gray-green, halitic	1,494.4-1,494.5
Halite, light-red-orange to clear, medium crystalline; very minor disseminated polyhalite	1,494.5-1,496.4
Halite, clear to red-orange, medium to coarse crystalline, sylvite and sulfate mineralization down to 1,502.1 feet; gray, clayey halite bands at 1,500.8-1,501.0, and 1,502.1-1,502.2 feet; sylvite leaching prevalent at 1,498.6-1,499.0 feet	1,496.4-1,503.4
Halite, mottled gray, medium crystalline; less than 1 percent gray intercrystalline clay, with minor polyhalite blebs; gray clay partings at 1,504.7 feet; lower 0.5 foot gradational to brown, clayey halite; contains minor sulfate minerals	1,503.4-1,505.2
Halite, mottled brown, medium to coarse crystalline; from 5 percent intercrystalline clay at top to less than 1 percent at base; brown clay partings at 1,506.3 and 1,507.2 feet; some sulfate mineralization	1,505.2-1,509.7
Halite, light-red-orange to red-brown, mottled, coarse crystalline; contains disseminated polyhalite blebs; mineralized zone at 1,511.0-1,514.6 feet; gray-green clay parting at 1,512.7 feet; polyhalite band at 1,513.1-1,513.2 feet; contains minor potassium sulfate	1,509.7-1,514.6
Polyhalite, red-brown, fine crystalline; contains halite blebs and minor sulfate mineralization; gray-green clay partings at base	1,514.6-1,517.1
Halite, clear to light-red-orange, coarse crystalline; polyhalite stringers concentrated at 1,519.0 feet	1,517.1-1,520.2
Halite, light-red-orange, medium crystalline; polyhalite; polyhalite bands and blebs; polyhalite band at 1,520.4 feet	1,520.2-1,522.1

Table 5C.--Lithologic log--(Continued)

Description	Depth (feet)
Polyhalite, red-brown, fine crystalline, with halite intergrowth------	1,522.1-1,522.7
Halite, mottled gray to clear, coarse crystalline; contains less than 1 percent gray clay; minor sulfate mineralization at 1,522.9 feet------	1,522.7-1,523.9
Halite, light-red-orange, medium crystalline; contains red-brown polyhalite blebs; gray clay partings at base----------	1,523.9-1,526.2
Halite, gray, medium crystalline, clayey; 10 percent gray intercrystalline clay; red-brown disseminated polyhalite blebs----------	1,526.2-1,526.9
Halite, brown, medium to coarse crystalline, clayey; contains minor polyhalite blebs; brown clay partings at 1,527.3, 1,527.7, 1,528.4, 1,528.9, 1,529.5, 1,529.9, 1,530.2, and 1,531.2 feet----------	1,526.9-1,532.7
Halite, buff to clear, medium to coarse crystalline; contains very minor polyhalite blebs and stringers; minor sulfate mineralization throughout; sylvite also present----------	1,532.7-1,537.5
Polyhalite, gray, fine crystalline, dense; interbedded with buff halite; minor orange sylvite as blebs in halite----------	1,537.5-1,540.0
Halite, light-red-orange, medium crystalline; polyhalite band at 1,540.7 feet; minor sulfate mineralization at base----------	1,540.0-1,541.6
Polyhalite, red-brown, fine crystalline; minor halite; gray clay and sylvite in lower part----------	1,541.6-1,542.7
Clay, gray, halitic; contains polyhalite blebs----------	1,542.7-1,542.9
Halite, light-red-orange to gray-green, medium crystalline, clayey; 2-3 percent clay----------	1,542.9-1,543.9
Halite, buff to clear, medium to coarse crystalline; heavy potassium mineralization from 1,546.4-1,549.2 feet (sylvite, sulfates); gray clay partings at base----------	1,543.9-1,549.2
Halite, gray-green clayey to brown clayey, mottled, medium crystalline; minor sylvite mineralization; clay content less than 3 percent; gray-green partings at 1,549.7 and 1,550.3 feet; brown clay partings at 1,550.9 and 1,551.3 feet; clay content decreases with depth----------	1,549.2-1,554.3
Halite, buff to clear, coarse crystalline; minor mineralization; narrow polyhalite bands throughout; polyhalite band at 1,560.3-1,560.5 feet; disseminated polyhalite increases with depth----------	1,554.3-1,561.1
Polyhalite, red-brown, fine crystalline; banded with halite and gray clay; gray clay partings at base----------	1,561.1-1,561.5
Halite, clear to light-red-orange, medium to coarse crystalline; very minor potassium mineralization (sylvite)----------	1,561.5-1,565.1
Halite, pale-red and light-gray, medium crystalline; very rich in sylvite; medium amounts of gray-green clay----------	1,565.1-1,566.1

Table 5C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red to clear, fine to medium crystalline; gray-green intergranular clay; sylvite stringers at base of unit----------	1,566.1-1,567.0
Halite, pale-red and pale-yellow-brown, fine to medium crystalline, clayey; large amount gray-green intergranular clay; brown clay seam at 1,568.5 feet; clay increases downward----------	1,567.0-1,568.8
Halite, pale-red, basal 0.2 foot is pale yellow brown; contains minor blebs of orange-pink polyhalite; numerous clay stringers and blebs---	1,568.8-1,570.0
Halite, pale-red to clear, coarse crystalline; contains minor blebs of moderate-orange-pink and moderate-reddish-orange polyhalite; polyhalite increases downward----------	1,570.0-1,572.7
Polyhalite, moderate-orange-pink and pale-reddish-brown, massive; 0.2-foot band of anhydrite at 1,572.9 feet; light-gray and moderate-reddish-brown mottled polyhalite unit in middle of interval; 0.2-foot band of gray-green clay at base----------	1,572.7-1,575.0
Halite, moderate-reddish-orange and pale-red, medium crystalline; contains sparse moderate-orange-pink and moderate-reddish-brown polyhalite blebs----------	1,575.0-1,578.9
Halite, moderate-reddish-brown, minor moderate-reddish-orange, fine to medium crystalline; numerous moderate-orange-pink polyhalite blebs in upper half of unit; finely disseminated moderate-reddish-brown polyhalite blebs throughout unit----------	1,578.9-1,581.0
Polyhalite, moderate-reddish-brown, dense, massive----------	1,581.0-1,581.8
Halite, moderate-reddish-brown and pale-red, fine to coarse crystalline; contains numerous stringers of moderate-orange-pink polyhalite; lower half of interval contains gray-green intercrystalline clay-----	1,581.8-1,583.2
Halite, green-gray and moderate-red-brown, fine to medium crystalline, clayey; contains abundant gray-green and red-brown clay stringers and minor moderate-red-orange polyhalite blebs----------	1,583.2-1,584.1
Halite, moderate-red-orange and green-gray, medium to coarse crystalline; contains minor pale-pink clay blebs; minor tiny holes in core--	1,584.1-1,585.9
Halite, clear to moderate-red-brown, medium to very coarse crystalline; minor intercrystalline dark-red-brown polyhalite----------	1,585.9-1,586.8
Halite, moderate-red-orange to moderate-red-brown, fine to coarse crystalline; contains abundant blebs of moderate-orange-pink to moderate-red-orange polyhalite; lower 0.2 foot medium-gray, coarse crystalline halite----------	1,586.8-1,588.9

Table 5C.--Lithologic log--Continued)

Description	Depth (feet)
Halite, gray-red, medium-gray, and moderate-red-gray, fine crystalline, clayey; contains minor gypsum stringers with clay; gray-red clay partings at 1,589.2 feet; top has green-gray clay parting; minor moderate-orange-pink polyhalite blebs	1,588.9-1,589.8
Halite, moderate-orange-pink to moderate-red-orange, fine to coarse crystalline; contains minor moderate-orange-pink polyhalite blebs, minor sylvite blebs; polyhalite blebs increase in lower 0.6 foot	1,589.8-1,593.2
Halite, green-gray to medium-bluish-gray, fine to medium crystalline, clayey; clay seams at 1,593.5, 1,593.8, and 1,594.2 feet; minor amount of moderate-red-brown polyhalite blebs, increase downward; thick, gray-red clay partings at base 0.05 foot	1,593.2-1,594.8
Halite, moderate-orange-pink to moderate-red-brown, fine to medium crystalline, clayey; contains minor moderate-orange-pink polyhalite blebs; moderate-red-brown clay seams at 1,595.2 and 1,596.0 feet	1,594.8-1,596.1
Halite, pale-red-brown and moderate-orange-pink, fine to coarse crystalline, clayey; abundant clay at 1,596.7 feet; contains abundant moderate-red-brown clay stringers and sparse moderate-orange-pink polyhalite blebs	1,596.1-1,597.5
Halite, light-brown to moderate-reddish-brown, medium to coarse crystalline; 1 percent pale-brown clay; pale-brown clay parting at 1,597.7 feet; gray clay parting at 1,600.4 feet; clay content increases with depth	1,597.5-1,601.0
Halite, greenish-gray, coarse crystalline, clayey; moderate-red-orange polyhalite blebs; ±1 percent clay content	1,601.0-1,601.5
Halite, greenish-gray to reddish-brown, coarse to very coarse crystalline; reddish-brown polyhalite blebs and stringers, increasing with depth	1,601.5-1,603.0
Anhydrite, greenish-gray, massive; upper 0.8 foot contains abundant moderate-orange-pink to moderate-red-brown polyhalite stringers; abundant bands and stringers of halite, clear to pale-red at 1,605.1 and 1,605.5-1,608.8 feet; abundant grayish-orange-pink polyhalite from 1,609.2 to 1,610.2 feet	1,603.0-1,610.2
Halite, light-gray and pale-red, medium crystalline, clayey; ±1 percent medium-gray clay disseminated throughout; minor grayish-orange-pink polyhalite blebs throughout; lower 0.2 foot has abundant polyhalite stringers	1,610.2-1,611.6
Halite, moderate-orange-pink to pale-reddish-brown, fine to medium crystalline; grayish-orange-pink polyhalite blebs and stringers scattered throughout unit	1,611.6-1,613.1

Table 5C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red, fine to medium crystalline; medium-dark-gray clay disseminated throughout unit; contains minor grayish-orange-pink polyhalite blebs	1,613.1-1,613.5
Halite, pale-red, moderate-reddish-orange, and medium-gray, fine to medium crystalline; scattered stringers and blebs of grayish-orange-pink polyhalite; stringers of medium-gray clay at 1,614.0 feet	1,613.5-1,615.3
Halite, clear, moderate-orange-pink and moderate-reddish-orange, medium to very coarse crystalline	1,615.3-1,617.1
Halite, moderate-reddish-orange, medium crystalline; contains disseminated medium-reddish-brown polyhalite blebs and stringers	1,617.1-1,620.2
Halite, moderate-orange-pink, medium crystalline; less than 2 percent medium-dark-gray intercrystalline clay, grades into coarse crystalline halite in lower 0.4 foot; gray-green clay parting at 1,620.8 feet	1,620.2-1,621.2
Halite, moderate-reddish-orange, medium to coarse crystalline; vertical and horizontal partings filled with gray-green clay; disseminated blebs of moderate-red-brown polyhalite; gray-green clay parting at 1,623.0 feet	1,621.2-1,623.4
Halite, clear to moderate-orange-pink, medium to coarse crystalline; upper 0.4 foot contains 1 percent gray-green clay with parting at 1,623.8 feet; 1,623.8-1,624.2-foot zone contains reddish-brown blebs of polyhalite	1,623.4-1,625.0
Clay parting, very dusky red, at 1,625.0 feet; clear to pale-red, medium to coarse crystalline halite; sparse moderate-red-orange polyhalite blebs; intercrystalline greenish-gray clay; upper 0.1 foot contains clear to pale-red, coarse to very coarse halite crystals; green-gray clay parting at 1,625.1 feet	1,625.0-1,625.7
Halite, clear to grayish-red, medium crystalline; less than 1 percent intercrystalline clay; minor moderate-red-brown disseminated clay blebs; polyhalite stringers in lower 0.8 foot	1,625.7-1,626.8
Halite, clear to medium-orange-pink, fine to coarse crystalline; gray-green intercrystalline clay in upper 0.6 foot; less than 1 percent sparse moderate-red polyhalite blebs; grayish-red clay partings at 1,627.5, 1,628.0, 1,628.1, 1,628.2, 1,628.7, 1,629.3, and 1,629.4 feet	1,626.8-1,629.6
Halite, grayish-red, fine to medium crystalline, clayey	1,629.6-1,630.0

Table 5C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-reddish-orange, fine to medium crystalline; contains minor pale-reddish-brown polyhalite blebs and stringers in lower 0.3 foot of unit	1,630.0-1,631.0
Halite, clear to grayish-red, fine to coarse crystalline; contains intercrystalline medium-light-gray clay and sparse polyhalite blebs	1,631.0-1,633.4
Halite, clear to moderate- to reddish-brown, medium to very coarse crystalline; contains minor moderate-red-orange polyhalite blebs and stringers; moderate-light-gray clay partings at 1,633.5 feet	1,633.4-1,636.0
Halite, clear to moderate-orange to reddish-orange, medium to coarse crystalline; contains minor disseminated pale-reddish-brown polyhalite blebs and stringers; medium-gray clay partings at 1,638.6 feet	1,636.0-1,640.7
Halite, clear to moderate-reddish-brown, medium to coarse crystalline; contains minor disseminated pale-reddish-brown polyhalite blebs and stringers; disseminated grayish-red clay; grayish-red clay partings at 1,641.1, 1,641.7, and 1,641.9 feet	1,640.7-1,642.8
Halite, clear to moderate-red, coarse crystalline; contains moderate-red polyhalite blebs; minor sulfate mineralization; less than 1 percent grayish-red intercrystalline clay	1,642.8-1,644.8
Halite, clear to medium-dark-gray, fine to medium crystalline, clayey; medium-dark-gray partings at 1,644.9 feet; grayish-red partings at 1,645.0 feet	1,644.8-1,645.4
Halite, clear to pale-red, fine crystalline; contains moderate-red polyhalite blebs and stringers; sulfate and potassium crystals in upper 0.8 foot; medium-gray grading to grayish-red intercrystalline clay, less than 1 percent	1,645.4-1,647.6
Halite, clear to moderate-reddish-brown, fine to coarse crystalline; minor mineralization (sulfate and potassium)	1,647.6-1,648.6
Halite, moderate-red-brown and pale-red, coarse crystalline; contains scattered blebs of red-brown polyhalite, very minor leaching of sylvite(?)	1,648.6-1,649.6
Halite, pale-yellow-brown and minor pale-red, coarse crystalline; contains minor blebs of red-brown polyhalite and leached sylvite	1,649.6-1,652.1
Halite, moderate-red-brown, medium-gray, and clear, medium to coarse crystalline at base, clayey; polyhalite and sylvite blebs throughout core; gray-green intercrystalline clay	1,652.1-1,656.7

Table 5C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red, clear, medium crystalline; contains moderate amount of red-brown polyhalite stringers, gray-green intercrystalline clay, moderate-orange-pink clay stringers, and trace of langbeinite and leonite/kainite	1,656.7-1,658.1
Halite, pale-red and moderate-red-brown, medium to coarse crystalline; many red-brown polyhalite stringers and blebs; trace of moderate-orange-pink and gray-green clay	1,658.1-1,659.4
Halite, pale-red and light-gray, medium to coarse crystalline; contains minor amount red-brown polyhalite blebs and stringers; trace of moderate-orange-pink clay	1,659.4-1,660.0
Halite, pale-red, light-gray, clear, and moderate-orange-brown, coarse crystalline; contains moderate amount red-brown polyhalite blebs, trace of langbeinite and leonite/kainite	1,660.0-1,664.4
Halite, very pale red brown, very coarse crystalline	1,664.4-1,665.2
Halite, pale-red, moderate-red-brown, and light-gray, coarse crystalline; contains wide stringers of moderate-orange-pink polyhalite, moderate red polyhalite blebs, and minor amount gray-green clay stringers	1,665.2-1,670.4
Halite, clear and pale-red, fine to medium crystalline; much intercrystalline gray-green clay; minor moderate-orange-pink polyhalite blebs	1,670.4-1,671.3
Halite, moderate-red-orange, coarse crystalline; red-brown polyhalite	1,671.3-1,672.0
Halite, pale-red, medium crystalline, clayey; contains moderate-red-orange and moderate-orange-pink polyhalite blebs; brown and gray-green clay stringers	1,672.0-1,673.0
Halite, pale-red, light-gray, and gray-red, fine to medium crystalline; contains minor red-brown polyhalite blebs; patches of langbeinite and leonite/kainite at 1,674.7 and 1,675.0 feet	1,673.0-1,677.4
Halite, moderate-red-orange grading to gray-orange-pink, fine to coarse crystalline; contains minor blebs and bands of light-gray polyhalite in lower 2.0 feet	1,677.4-1,682.1
Polyhalite and anhydrite, light- to medium-gray, laminated; halite in upper 0.5 foot; minor bands of halite-polyhalite throughout	1,682.1-1,688.8
Halite, very pale orange, coarse crystalline; polyhalite bands in upper 2.0 feet and lower 1.0 foot	1,688.8-1,694.2
Anhydrite, light- to medium-gray, laminated; contains minor halite; polyhalite with anhydrite at 1,697.4-1,699.7 feet; polyhalite band at 1,699.7-1,699.9 feet; anhydrite with polyhalite at 1,699.9-1,701.4 feet; polyhalite with anhydrite at 1,701.4-1,701.9 feet	1,694.2-1,702.1

Table 5C.--Lithologic log--(Continued)

Description	Depth (feet)
Clay, gray-green; moderate red-brown polyhalite	1,702.1-1,703.1
Polyhalite, moderate-red-orange, massive	1,703.1-1,703.7
Clay, olive-gray; contains moderate red-brown polyhalite blebs; massive moderate-orange-pink polyhalite in lower 0.2 foot	1,703.7-1,704.2
Halite, clear to moderate-red-brown, medium to coarse crystalline; high concentration of moderate-red-orange polyhalite blebs in upper 0.7 foot	1,704.2-1,708.5
Halite, clear to moderate-red-orange, medium to coarse crystalline; contains moderate-red-orange polyhalite blebs scattered throughout that increase in abundance downward; dark-green-gray clay partings at 1,708.5 and 1,708.8 feet; zone from 1,714.4 to 1,714.9 feet contains gray-green interstitial clay; abundant in bloedite-vanthoffite and other sulfates at 1,715.1-1,716.3 feet	1,708.5-1,716.3
Halite, clear to pale-yellow-brown, fine to medium crystalline, clayey; ±10 percent interstitial moderate-red-brown clay	1,716.3-1,716.7
Halite, clear to light-greenish-gray, orange-pink to moderate-reddish-brown, fine to coarse crystalline; zone from 1,718.1 to 1,720.9 feet contains abundant moderate-red-brown polyhalite blebs and stringers	1,716.7-1,722.0
Halite, pale-red, fine to medium crystalline, clayey; contains stringers of brown clay; brown clay partings at top and at 1,722.3 and 1,722.9 feet; polyhalite stringers in lower part	1,722.0-1,723.0
Halite, gray-orange-brown, fine to medium crystalline; contains scattered red-pink blebs of polyhalite	1,723.0-1,723.5
Halite, pale-red and clear, medium to very coarse crystalline; contains stringers and blebs of moderate-red-orange to dark-red-brown polyhalite	1,723.5-1,724.9
Halite, gray-red to clear, coarse crystalline, slightly clayey; sparse stringers and blebs of moderate-red-brown polyhalite	1,724.9-1,726.9
Halite, pale-red, medium to coarse crystalline, clayey; stringers of brown clay near top; moderate-red-brown stringers and blebs of polyhalite mostly at top	1,726.9-1,730.4
Halite, pale-red-brown grades to pale-red, medium crystalline; contains moderate-red-orange and moderate-red-brown stringers and blebs of polyhalite	1,730.4-1,731.3
Halite, mottled pale-red, white, and pale-yellow-brown, medium crystalline, clayey; contains blebs of moderate-red-brown polyhalite	1,731.3-1,732.3

Table 5C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, color bands grading from pale-red to pale-red-brown to moderate-red-orange to moderate-red-brown to dark-red-brown, fine to medium crystalline; contains stringers and blebs of moderate-red-brown to moderate-red-orange polyhalite	1,732.3-1,736.1
Halite, pale-red to gray-red, fine to medium crystalline, clayey; brown clay partings near top	1,736.1-1,736.9
Halite, bands of moderate-red-orange, moderate-red-brown, pale-red, pale-red-brown, fine to medium crystalline; contains stringers and blebs of moderate-red-brown and moderate-red-orange polyhalite; two clay-rich pale-red to gray-red units at 1,737.4 and 1,741.8 feet each about 0.5 foot thick	1,736.9-1,743.3
Halite, clear to pale-red, medium crystalline, clayey; contains abundant green-gray intercrystalline clay that masks halite color; green-gray partings at 1,743.8 feet; trace of polyhalite	1,743.3-1,745.3
Halite, clear to pale-red, medium crystalline, clayey; contains abundant brown intercrystalline clay that masks halite color	1,745.3-1,746.3
Halite, clear to moderate-reddish-brown, medium to coarse crystalline; sparse moderate-reddish-orange disseminated polyhalite blebs; minor (less than 1 percent) disseminated pale-red interstitial clay; grayish-olive clay partings at 1,751.3 feet	1,746.3-1,751.3
Halite, clear to medium-light-gray, coarse to very coarse crystalline; contains minor moderate-reddish-brown polyhalite blebs; pale-red-brown clay partings at 1,753.) feet	1,751.3-1,755.9
Halite, clear to pale-red-brown, medium to coarse crystalline, clayey; 2-3 percent of reddish-brown interstitial clay grades to grayish-green in lower 0.3 foot of unit; pale-red-brown clay partings at 1,755.9, 1,756.0, 1,756.2, and 1,756.7 feet	1,755.9-1,758.9
Halite, clear to pale-red-brown and medium-dark-gray, fine to coarse crystalline; contains minor moderate-reddish-orange polyhalite blebs; less than 1 percent grayish-red interstitial clay	1,758.9-1,765.3
Halite, clear to pale-reddish-brown, medium to coarse crystalline; contains sparse moderate-red-brown polyhalite blebs in upper 1.4 feet	1,765.3-1,767.5
Halite, medium-light-gray to light-bluish-gray and light-olive-gray, medium to coarse crystalline; contains minor moderate-reddish-brown polyhalite blebs; less than 1 percent interstitial pale-red-brown clay; pale-red-brown clay partings at 1,769.5 feet	1,767.5-1,774.1

Table 5C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to medium-light-gray, fine to medium crystalline; contains minor moderate-reddish-orange polyhalite blebs and stringers; 2 percent interstitial medium-light-gray clay; medium-light-gray clay partings at 1,774.2 feet	1,774.1-1,775.4
Halite, clear to pale-reddish-brown, fine to coarse crystalline; contains minor moderate-reddish-orange polyhalite blebs; 3 percent pale-red-brown interstitial clay; contains cavities as large as 1/2 inch in diameter; pale-red-brown clay partings at 1,775.5, 1,775.9, 1,777.2, 1,777.5, and 1,777.8 feet	1,775.4-1,778.6
Halite, clear, greenish-gray, and pale-reddish-brown, medium to coarse crystalline; contains moderate-orange polyhalite blebs and stringers, increasing with depth	1,778.6-1,782.7
Halite, clear to moderate-reddish-brown, medium to coarse crystalline; abundant moderate-reddish-orange polyhalite blebs and stringers disseminated throughout	1,782.7-1,784.0
Polyhalite, moderate-reddish-brown, massive; greenish-gray clay band at 1,784.2 feet and partings at 1,784.5 feet	1,784.0-1,784.6
Halite, clear to greenish-gray, fine to coarse crystalline; pale-reddish-brown polyhalite blebs scattered throughout; sparse, disseminated grayish-red clay	1,784.6-1,793.7
Halite, clear to greenish-gray, fine to very coarse crystalline; contains abundant moderate-orange-pink to moderate-reddish-orange polyhalite blebs and stringers; sparse, disseminated grayish-red and greenish-gray clay	1,793.7-1,803.7
Halite, clear to moderate-orange-pink, fine to medium crystalline; contains minor moderate-reddish-orange polyhalite blebs and stringers	1,803.7-1,808.6
Anhydrite, light-gray, massive; mixture of clear to moderate-orange-pink halite and grayish-orange-pink polyhalite in upper 0.3 foot; lower 0.3 foot contains disseminated moderate-orange-pink polyhalite	1,808.6-1,809.5
Halite, clear to moderate-orange-pink, fine to coarse crystalline; contains disseminated moderate-orange-pink polyhalite blebs and stringers; polyhalite band at 1,810.4 feet; polyhalite increases with depth	1,809.5-1,820.1
Polyhalite, moderate-reddish-orange, massive; 0.2-foot band of pale-reddish-brown halite at 1,820.3 feet; dark-gray clay partings at base of unit	1,820.1-1,821.2

Table 5C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to moderate-orange-pink, fine to coarse crystalline; moderate-orange-pink polyhalite blebs scattered throughout unit; dark-gray clay partings at 1,825.7 and 1,826.0 feet----------	1,821.2-1,827.6
Halite, clear to greenish-gray, fine to coarse crystalline; contains moderate reddish-orange disseminated polyhalite blebs; dark-gray and grayish-red clay partings at 1,827.7, 1,827.8, 1,828.4, 1,828.6, and 1,828.8 feet; clays are disseminated throughout the lower 2 feet-----	1,827.6-1,830.6 Total depth

Table 5D.--Mineralogical and chemical analyses of core samples from potash ore zones and mineralized salt beds in drill hole P-5

[oz, ore zone; sb, salt bed; tr, trace; Ha, halite; Ka, kainite; Ki, kieserite; La, langbeinite; Le, leonite; Po, polyhalite; Sy, sylvite; n.d., not determined. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mineralogy: X-ray diffraction analysis[1]	Chemical analysis (weight percent): Ca	K	Mg	Na	Cl	SO_4	H_2O+	H_2O-	Water insoluble
P-5/1	1,[illegible].00-1,481.63	1.63	sb	>9 Ha; <1 Po, Sy	0.63	1.9	0.18	36.5	58.0	n.d.	n.d.	n.d.	n.d.
P-5/2	1,481.63-1,482.44	.81	11th oz	>9 Ha; <1 Sy	.04	3.1	.37	34.0	54.0	0.54	0.84	0.65	3.8
P-5/3	1,482.44-1,483.37	.93		6 Ha; >2 Sy; <1 Po, Le; tr Ka	.51	13.0	1.5	23.0	48.5	9.4	3.3	.24	2.5
P-5/4	1,483.37-1,484.09	.72		>8 Ha; <1 Po, Sy; tr Ka	.49	3.0	.91	32.0	52.0	4.3	1.6	.54	3.1
P-5/5	1,546.03-1,546.69	.66	sb	9 Ha; <1 Po, tr Sy	1.4	1.8	.45	34.5	54.5	n.d.	n.d.	n.d.	n.d.
[2]P-5/6	1,546.69-1,548.65	1.96	10th oz	>5 Ha; >4 Sy; <1 Po	.77	16.0	.28	25.5	54.0	2.6	.23	.05	.87
[2]P-5/6					.77	16.0	.28	25.5	53.5	2.6	.20	.06	.70
P-5/7	1,548.65-1,549.66	1.01		>7 Ha; >2 Sy; <1 Po; tr Ka, Le	.48	7.2	1.2	30.0	51.5	7.1	2.1	.03	.33
P-5/8	1,549.66-1,551.40	1.74		6 Ha; >3 Sy; <1 Po	.46	12.0	.40	23.5	51.0	1.5	.80	1.8	9.3
P-5/9	1,551.40-1,552.75	1.35		>6 Ha; >2 Sy; tr Po	.20	8.3	.38	25.5	48.0	.60	.82	2.3	12.0
P-5/10	1,552.75-1,553.37	.82		9 Ha; <1 Po, Sy	.74	1.0	.22	35.5	54.5	.67	.46	.70	4.3
[2]P-5/11	1,564.10-1,565.10	1.00	sb	9 Ha; <1 Sy; tr Po	.71	1.8	.18	36.0	57.0	n.d.	n.d.	n.d.	n.d.
[2]P-5/11					.71	1.8	.18	36.5	56.5	n.d.	n.d.	n.d.	n.d.
P-5/12	1,565.10-1,565.97	.87	9th oz	7 Ha; <3 Sy; tr Po	.32	13.0	.14	28.5	56.0	.39	.21	.25	1.6
P-5/13	1,565.97-1,567.10	1.13		9 Ha; <1 Sy; tr Po	.17	1.7	.26	34.5	55.5	.16	.69	2.4	4.0
P-5/14	1,651.65-1,652.73	1.08	sb (below 5th oz)	9 Ha; <1 Sy, Ki; tr Po, Ka	.30	2.1	1.2	34.5	55.5	5.4	.94	n.d.	.70
P-5/15	1,652.73-1,654.44	1.71		>8 Ha; 1 Ki; <1 Ka; tr Po, Sy	.29	2.8	2.1	32.0	49.5	8.4	2.0	.22	2.0
P-5/16	1,654.44-1,655.77	1.33		>9 Ha; 1 Po; <1 Sy; tr Ka, Ki	.33	1.3	.62	36.0	56.5	2.1	.35	.13	.58
[2]P-5/17	1,655.77-1,656.90	1.13		>9 Ha; tr Po, Sy, Ka, Ki	.43	1.6	1.0	35.0	54.5	4.5	.85	.26	1.0
[2]P-5/17					.43	1.6	1.0	35.0	54.5	4.5	.88	.28	1.1
P-5/18	1,656.90-1,658.09	1.19		>9 Ha; 1 Po; tr, Ka, Ki	.82	.68	.47	36.0	56.0	2.6	.39	.22	1.3
P-5/19	1,658.09-1,659.12	1.03		>8 Ha; 1 Po; <1 Sy; tr Ka, Le	1.5	2.6	1.4	32.0	49.5	11.0	.40	.10	.60
P-5/20	1,659.12-1,659.97	.85		>9 Ha; 1 Po; La; tr Le	.62	2.0	1.2	34.5	52.0	7.4	.24	.15	.43

[1]Estimate of amount reported on a scale of 0-10.

[2]Replicate analyses.

Table 5E.--Calculated mode (mineral content) and potash distribution by mineral in core samples from potash ore zones and mineralized salt beds in drill hole P-5

[oz, ore zone; sb, salt bed; Ha, halite; Ka, kainite; Ki, kieserite; La, langbeinite; Le, leonite; Po, polyhalite; Sy, sylvite; Insol., clay and silt; n.d., not determined; leaders (---), not present. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mode (weight percent mineral)								K_2O distribution by minerals					
				Sy	La	Ka	Le	Ki	Ha	Po	Insol.	Sy	La	Ka	Le	Po	Total
P-5/1	1,480.00-1,481.63	1.63	sb	2.5	---	---	---	---	92.8	4.7	n.d.	1.6	---	---	---	0.7	2.3
P-5/2	1,481.63-1,482.44	.81	11th oz	5.7	---	---	---	---	86.4	.8	3.8	3.7	---	---	---	<.1	3.7
P-5/3	1,482.44-1,483.37	.93		18.5	---	9.5	6.3	---	58.5	2.9	2.5	11.6	---	1.8	1.6	.6	15.6
P-5/4	1,483.37-1,484.09	.72		3.3	---	5.1	---	---	82.0	3.7	3.1	2.1	---	1.0	---	.6	3.7
P-5/5	1,546.03-1,546.69	.66	sb	.8	---	---	---	---	87.7	10.5	n.d.	.5	---	---	---	1.6	2.1
[1]P-5/6	1,546.69-1,548.65	1.96	10th oz	29.5	---	---	---	---	65.9	4.1	.9	18.6	---	---	---	.6	19.2
[1]P-5/6				29.5	---	---	---	---	65.2	4.1	.7	18.6	---	---	---	.6	19.2
P-5/7	1,548.65-1,549.66	1.01		9.2	---	9.4	2.3	---	75.5	3.3	.3	5.8	---	1.8	.6	.5	8.7
P-5/8	1,549.66-1,551.40	1.74		22.3	---	---	---	---	66.6	2.4	9.3	14.1	---	---	---	.4	14.5
P-5/9	1,551.40-1,552.75	1.35		15.6	---	---	---	---	64.8	.9	12.0	9.9	---	---	---	.1	10.0
P-5/10	1,552.75-1,553.37	.82		1.7	---	---	---	---	90.3	1.0	4.3	1.0	---	---	---	.2	1.2
[1]P-5/11	1,564.10-1,565.10	1.00	sb	2.1	---	---	---	---	92.3	5.3	n.d.	1.3	---	---	---	.8	2.1
[1]P-5/11				2.1	---	---	---	---	92.8	5.3	n.d.	1.3	---	---	---	.8	2.1
P-5/12	1,565.10-1,565.97	.87	9th oz	24.5	---	---	---	---	72.5	1.2	1.6	15.5	---	---	---	.2	15.7
P-5/13	1,565.97-1,567.10	1.13		2.9	---	---	---	---	89.2	1.3	4.0	1.8	---	---	---	.2	2.0
P-5/14	1,651.65-1,652.73	1.08	sb below 5th oz	2.4	---	4.3	---	3.3	87.7	2.2	.7	1.4	---	.8	---	.3	2.5
P-5/15	1,652.73-1,654.44	1.71		2.0	---	9.2	---	5.0	77.8	2.2	2.0	1.3	---	1.7	---	.3	3.3
P-5/16	1,654.44-1,655.77	1.33		1.4	---	1.6	---	---	91.5	2.5	.6	.9	---	.3	---	.4	1.6
[1]P-5/17	1,655.77-1,656.90	1.13		1.1	---	3.9	---	1.4	88.9	3.2	1.0	.7	---	.7	---	.5	1.9
[1]P-5/17				1.1	---	3.9	---	1.4	88.9	3.2	1.1	.7	---	.7	---	.5	1.9
P-5/18	1,656.90-1,658.09	1.19		---	---	3.0	---	.6	91.6	1.6	1.3	---		.6	---	.2	.8
P-5/19	1,658.09-1,659.12	1.03		1.6	---	1.5	.3	---	81.4	11.3	.6	1.0		.3	<.1	1.8	3.1
P-5/20	1,659.12-1,659.97	.85		---	6.2	---	1.1	---	85.7	4.6	.4	---	1.4	---	.3	.7	2.4

[1]Replicate analyses.

TABLES 6A-6G

Basic data from drill hole P-6,
Waste Isolation Pilot Plant area, Eddy County, New Mexico

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6G.--Gamma-ray and neutron log of drill hole	foldout

Table 6A.--Abridged drill-hole history

LOCATION: Sec. 30, T. 22 S., R. 31 E.
843 m (2,767 ft) from south line
61 m (199 ft) from west line

ALTITUDE (LAND SURFACE): 1,022 m (3,353.5 ft). Datum for depth measurements in drilling and logging operations.

LITHOLOGIC LOG PREPARED BY: J. D. Kibler, J. C. Lorenz, L. A. Rives, and R. P. Snyder, September 8-16, 1976.

DRILLING CONTRACTOR: Boyles Bros. Drilling Co.

DRILLING RECORD: Commenced drilling on September 3, and completed on September 16, 1976, at 479 m (1,573 ft) below land surface.

Recovered all casing, and plugged with cement.

REMARKS: Top of salt in Salado Formation at 201 m (661 ft) below land surface.

Table 6B.--Stratigraphy summary

Rock unit	Depth interval[1] feet	meters
Holocene deposits	0-8	0-2
Pleistocene rocks:		
Gatuna Formation	8-18	2-5
Permian rocks:		
Dewey Lake Red Beds	18-357	5-109
Rustler Formation	357-659	109-201
Magenta Dolomite Member	417-443	127-135
Culebra Dolomite Member	537-560	164-171
Salado Formation	659-1,573	201-479
Upper member	659-1,162	201-354
McNutt potash zone	1,162-1,560	354-475
Vaca Triste Sandstone Member[2]	1,162-1,170	354-357
11th ore zone	1,218-1,221	371-372
Marker bed 117	1,231-1,233	375-376
Marker bed 118	1,252-1,256	382-383
Marker bed 119	1,279-1,281	390-390
10th ore zone	1,291-1,296	393-395
Marker bed 120	1,307-1,308	398-399
9th ore zone	1,313-1,317	400-401
Marker bed 121	1,324-1,326	403-404
Marker bed 122	1,332-1,333	406-406
8th ore zone	1,338-1,348	408-411
Union anhydrite[3]	1,357-1,365	414-416
7th ore zone	1,378-1,382	420-421
6th ore zone	1,394-[illegible],396	425-426
5th ore zone	1,400-[illegible],410	427-430
Marker bed 123	1,436-1,443	438-440
Marker bed 124	1,453-1,462	443-446
4th ore zone	1,468-1,481	447-451
3d ore zone	1,489-1,502	454-458
2d ore zone	1,509-1,513	460-461
1st ore zone	1,533-1,543	467-470
Marker bed 126	1,559-1,560	475-475
Maximum depth recorded	1,565	477

[1]Depth recorded from geophysical logs.
[2]Of Adams, 1944.
[3]Informal unit of Salado Formation.

Table 6C.--Lithologic log

Description	Depth (feet)
Sandstone, dark-reddish-brown, very fine grained, micaceous; dark-reddish-brown, with gray-green reduction spots, micaceous siltstone; vein selenite	0.0- 5.0
Siltstone as above; reddish-brown, with reduction spots, medium- to fine-grained, poorly sorted, micaceous sandstone	5.0- 10.0
Sandstone as above	10.0- 35.0
Same as above; some dark-reddish-brown, micaceous siltstone	35.0- 45.0
Same as above; no siltstone	45.0- 65.0
Same as above; some dark-reddish-brown, micaceous siltstone	65.0- 75.0
Same as above; no siltstone	75.0- 85.0
Same as above; siltstone; dark-reddish-brown, with gray-green reduction spots, very fine grained, micaceous sandstone	85.0- 105.0
Same as above; selenite	105.0- 115.0
Siltstone; dark-reddish-brown, with reduction spots, very fine grained, micaceous sandstone; some vein selenite; weakly cemented	115.0- 120.0
Siltstone, dark-reddish-brown, with reduction spots, micaceous; selenite	120.0- 125.0
Sandstone, dark-reddish-brown, with reduction spots, very fine grained; selenite	125.0- 145.0
Same as above, some light-gray color	145.0- 150.0
Same as above, no light-gray; dark-reddish-brown, micaceous siltstone	150.0- 155.0
Same as above; no siltstone	155.0- 165.0
Same as above; some dark-reddish-brown, micaceous siltstone	165.0- 170.0
Siltstone, dark-reddish-brown, micaceous; vein selenite; some very fine grained, micaceous sandstone	170.0- 180.0
Siltstone, dark-reddish-brown, with reduction spots, micaceous; vein selenite	180.0- 185.0
No sample	185.0- 200.0
Sandstone, dark-reddish-brown, fine- to very fine grained, micaceous; vein selenite	200.0- 210.0
Siltstone, dark-reddish-brown, micaceous; selenite	210.0- 245.0
Same as above, somewhat lighter in color (moderate-reddish-brown)	245.0- 250.0
Same as above; abundant greenish-gray reduction spots; fewer reduction spots from 260.0 to 265.0 feet	250.0- 280.0
Siltstone, like above; trace of fine-grained sandstone	280.0- 290.0
Same as above	290.0- 295.0
Siltstone, moderate-reddish-brown, with reduction spots; selenite	295.0- 305.0
Siltstone, increase in number of reduction spots	305.0- 330.0

Table 6C.--Lithologic log--(Continued)

Description	Depth (feet)
Siltstone, decrease in reduction spots; 20 percent red-brown, very fine grained sandstone	330.0- 360.0
Siltstone, reddish-brown; 15 percent reddish-brown, very fine grained sandstone; increase in selenite	360.0- 365.0
Same as above; with increase in reduction spots	365.0- 385.0
Siltstone, red-brown; light-gray anhydrite; 10 percent gypsum	385.0- 390.0
Same as above; anhydrite and gypsum increasing	390.0- 395.0
Same as above; anhydrite and gypsum increasing to 50 percent	395.0- 400.0
Anhydrite, light-gray, dense, 60 percent; red-brown, with trace of reduction spots, siltstone	400.0- 410.0
Same as above; with trace of light-green siltstone	410.0- 415.0
Anhydrite, 80 percent; 20 percent siltstone	415.0- 420.0
Same as above; with trace of red-brown, medium-grained sandstone	420.0- 425.0
Anhydrite, light-gray, dense, 85 percent; 15 percent, red-brown, with trace of reduction spots, siltstone	425.0- 430.0
Same as above; with trace of dark-gray anhydrite	430.0- 435.0
Anhydrite, alternating bands of light- and dark-gray, dense, 95 percent; 5 percent red-brown siltstone	435.0- 445.0
Same as above; anhydrite mostly dark-gray	445.0- 455.0
Anhydrite, light-gray to dark-gray, dense, 50 percent; 50 percent reddish-brown siltstone; no reduction spots	455.0- 465.0
Siltstone, reddish-brown, with reduction spots, 60 percent; 40 percent dark-gray anhydrite	465.0- 470.0
Same as above; increase of siltstone to 85 percent	470.0- 475.0
Siltstone, 50 percent; 50 percent medium- to dark-gray, dense anhydrite	475.0- 495.0
Same as above; increase of anhydrite to 65 percent	495.0- 500.0
Anhydrite, dark-gray, dense, 70 percent; 30 percent reddish-brown, with reduction spots, siltstone	500.0- 505.0
Siltstone, 70 percent; 30 percent anhydrite	505.0- 510.0
Siltstone, 50 percent; 50 percent anhydrite	510.0- 515.0
Anhydrite, 80 percent; 20 percent siltstone	515.0- 520.0
Anhydrite, 50 percent; 50 percent siltstone	520.0- 525.0
Anhydrite, 70 percent; 30 percent siltstone	525.0- 540.0
Siltstone, 50 percent; 50 percent anhydrite	540.0- 545.0
Anhydrite, dark-gray, fine-grained, 70 percent; 30 percent siltstone	545.0- 560.0
Dolomite, light-gray, very fine grained; trace of reddish-brown siltstone	560.0- 600.0

Table 6C.--Lithologic log--(Continued)

Description	Depth (feet)
Same as above, 10 percent; white to light-gray anhydrite; some dark-reddish-brown, very fine grained sandstone	600.0- 605.0
Same as above; some dusky-blue-green siltstone	605.0- 620.0
Dolomite, light-gray; white to light-gray anhydrite; some medium-gray to bluish-gray siltstone	620.0- 625.0
Siltstone, medium-gray to bluish-gray; some grayish-red siltstone	625.0- 680.0
Siltstone, grayish-red, about 70 percent; some bluish-gray siltstone; white to light-gray, yellowish-gray, and light-greenish-gray anhydrite	680.0- 685.0
Dolomite, yellowish-gray, very fine crystalline; some (~5 percent) anhydrite as above; grayish-red siltstone	685.0- 690.0
Dolomite, as above; anhydrite as 680-685-foot interval; siltstone as above; 2 percent halite	690.0- 695.0
Siltstone, dark-reddish-brown (cavings?); anhydrite as above; halite (~10 percent), some clear, some with salmon-colored impurities; some polyhalite	695.0- 700.0
Same as above; anhydrite; sparse halite	700.0- 705.0
Clay, red-brown; 50 percent halite; some black shale	705.0- 710.0
Clay, red-brown; 50 percent halite; some black shale and gray shale	710.0- 715.0
Siltstone, red-brown; gray anhydrite; dolomite	715.0- 725.0
Siltstone, red, with gray and black reduction spots; some dolomite	725.0- 730.0
Halite, brown; brown clay	730.0- 740.0
Same as above; sparse gypsum and red siltstone	740.0- 755.0
Halite, orange-brown	755.0- 760.0
Halite, orange-brown; brown clay	760.0- 775.0
Siltstone, reddish-brown, well-cemented; some gray dolomite and gray-black shale	775.0- 780.0
Halite, clear; 10 percent reddish-brown clay	780.0- 785.0
Halite, clear and light-orange; some brown clay	785.0- 790.0
Halite, clear	790.0- 805.0
Halite, clear to pale-orange	805.0- 825.0
Same as above;sparse orange polyhalite	825.0- 855.0
Same as above; possible gypsum	855.0- 870.0
Halite, clear to light-gray	870.0- 875.0
Halite, clear	875.0- 880.0
Halite, clear;sparse orange polyhalite	880.0- 900.0
Halite, clear to light-orange	900.0- 905.0
Halite, clear	905.0- 960.0

Table 6C.--Lithologic log--(Continued)

Description	Depth (feet)
Same as above; sparse orange polyhalite	960.0- 965.0
Same as above; light-brown polyhalite	965.0- 970.0
Halite, clear to sparse orange	970.0- 975.0
Halite, clear	975.0- 980.0
Halite, clear; some orange polyhalite	980.0- 985.0
Halite, clear	985.0- 990.0
Halite, clear; 10 percent whitish-pink polyhalite	990.0- 995.0
Halite, clear	995.0-1,000.0
Halite, clear; ±5 percent bluish-white polyhalite; red siltstone	1,000.0-1,015.0
Halite, clear	1,015.0-1,085.0
Same as above; ±5 percent red siltstone	1,085.0-1,150.0
Halite, pale-red to pale-yellow-brown, medium to coarse crystalline; minor polyhalite blebs	1,150.0-1,152.8
Polyhalite, pale-red to pale-red-brown, fine crystalline; hygroscopic halite	1,152.8-1,154.6
Halite, like 1,150.0-1,152.8 interval; top 0.1 foot is argillaceous; clay partings at 1,154.9 and 1,155.0 feet	1,154.6-1,161.5
Halite, pale-red, gray, medium to coarse crystalline; argillaceous; siltstone at 1,163.2-1,165.3 feet; pale-red-brown to red-brown clay partings at 1,162.4, 1,162.5, 1,162.7, and 1,164.0 feet	1,161.5-1,165.3
Halite, pale-red to moderate-red-brown, fine to medium crystalline, argillaceous; polyhalite; clay partings at 1,167.0, 1,167.8, 1,169.4, 1,169.7, 1,169.8, and 1,170.2 feet	1,165.3-1,170.8
Halite, pale- to gray-red, medium to very coarse crystalline, argillaceous; contains moderate polyhalite blebs	1,170.8-1,174.8
Halite, pale-pink to pale-orange-red, fine to coarse crystalline; contains disseminated polyhalite blebs; polyhalite band at 1,176.3 feet; gray-green clay partings at 1,176.9 feet; minor sylvite	1,174.8-1,178.9
Halite, dusky-red, coarse crystalline, argillaceous; contains intercrystalline polyhalite; brown clay partings at 1,179.8 feet	1,178.9-1,180.0
Halite, moderate-orange-pink, coarse crystalline; contains disseminated orange polyhalite; clear, coarse crystalline halite at bottom 0.4 foot	1,180.0-1,182.5
Halite, medium- to light-gray, medium crystalline, argillaceous; contains disseminated gray-green clay blebs	1,182.5-1,183.8
Halitic clay, gray to moderate-red-brown; clay beds from center to base of unit	1,183.8-1,185.5

Table 6C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear, coarse crystalline; contains minor polyhalite blebs; possible leached vugs after sylvite	1,185.5-1,185.8
Halite, pale-red to light-orange, medium to coarse crystalline; contains disseminated polyhalite; thin, red polyhalite band at top	1,185.8-1,187.1
Halite, light-gray, coarse crystalline; contains disseminated brown clay and orange polyhalite	1,187.1-1,187.8
Halite, red to pale-orange to medium-gray below, medium crystalline; contains disseminated red-orange polyhalite except green in lower part	1,187.8-1,190.1
Halite, clear to moderate-red-orange, medium to coarse crystalline; contains disseminated red-orange polyhalite; clear, very coarse crystalline halite band in lower 0.2 foot; unit may be 0.5 foot thicker	1,190.1-1,195.3
Halite, white to medium-gray, medium crystalline, clayey; brown clay disseminated and in bands; polyhalite blebs at 1,196.7 feet; clay partings at 1,195.9, 1,196.4, 1,196.5, 1,196.9, and 1,197.4 feet	1,195.3-1,197.5
Halite, moderate-orange-pink, medium to coarse crystalline; contains disseminated red-orange polyhalite	1,197.5-1,198.2
Halite, white to clear, fine to medium crystalline; gray-green clay	1,198.2-1,198.9
Halite, moderate-orange-pink to clear or light-gray, medium crystalline; contains disseminated orange polyhalite stringers	1,198.9-1,199.6
Halite, light-gray through moderate-orange-pink, coarse crystalline; contains disseminated brown clay and polyhalite; medium-size, gray-green clay blebs near top	1,199.6-1,200.6
Halite, moderate-red-orange, medium to coarse crystalline; disseminated orange polyhalite decreases downward; polyhalite band at 1,201.3 feet	1,200.6-1,202.0
Polyhalite, moderate-red, medium crystalline	1,202.0-1,202.3
Halite and polyhalite; very coarse crystalline (as large as 1 inch) halite	1,202.3-1,202.6
Halite, white to light-brown-yellow, fine crystalline; gray-green clay partings at top and at 1,202.8 feet; contains disseminated gray-green clay	1,202.6-1,203.0
Halite, white, clear to pale-orange, medium to coarse crystalline; contains disseminated red-orange polyhalite; clear halite crystals at 1,204.2 feet polyhalite band at base	1,203.0-1,204.4
Halite, white to clear, clayey; intercrystalline polyhalite; brown clay disseminated throughout, gray-green partings at 1,206.3 feet	1,204.4-1,207.8

Table 6C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, light-gray to pale-orange, medium to coarse crystalline; contains disseminated red polyhalite	1,207.8-1,208.4
Halite, light-gray to clear, medium to coarse crystalline; contains disseminated red polyhalite; disseminated gray-green clay with partings at 1,208.6 feet	1,208.4-1,209.4
Halite, moderate-red-pink through clear to gray, medium to coarse crystalline; contains disseminated red-orange polyhalite blebs	1,209.4-1,210.8
Halite, moderate-red-orange through clear to gray, medium to coarse crystalline; common orange polyhalite blebs and stringers	1,210.8-1,214.5
Halite, medium-light-gray, coarse crystalline, clayey; thin pale-pink polyhalite stringer at base	1,214.5-1,215.2
Halite, moderate-orange-pink, medium crystalline; contains disseminated red-orange polyhalite blebs; minor leached sulfates at top	1,215.2-1,216.1
Halite, gray-orange-pink through clear to light-gray, coarse crystalline; sparse, orange-red intercrystalline polyhalite	1,216.1-1,218.7
Halite, moderate-red-orange, fine to medium crystalline grades to coarse crystaline downward; sparse, red polyhalite stringers	1,218.7-1,219.3
Halite, white to light-gray, clear to pale-red, gray-green, brown-red, clayey; contains disseminated clay blebs; red-brown clay partings at 1,219.5, gray-green at 1,216.4, brown at 1,217.4, brown at 1,217.7, and brown at 1,218.1 feet; clay blebs near base	1,219.3-1,223.0
Halite, moderate-orange-pink, medium crystalline; minor moderate-red-orange polyhalite stringers near top; crystals coarsen near base	1,223.0-1,224.3
Halite, light-blue-gray, coarse crystalline; contains disseminated gray-green clay blebs; minor disseminated red-orange polyhalite; trace of langbeinite	1,224.3-1,225.6
Halite, moderate-red-orange to moderate-orange-pink, coarse crystalline; moderate-orange-red polyhalite stringers and blebs prominent in upper and lower parts; gypsum stringers at 1,230.0 feet	1,225.6-1,231.3
Polyhalite, moderate-red-brown, dense, massive; halite stringers at top; gray-green clay at bottom	1,231.3-1,233.3
Halite, clear to light-gray, medium to coarse crystalline; contains disseminated pink-orange polyhalite blebs; disseminated sparse, gray-green clay blebs	1,233.3-1,234.0
Halite, pale-yellow-brown to moderate-red-orange, coarse crystalline; contains disseminated red-orange polyhalite blebs and stringers; no polyhalite in middle	1,234.0-1,238.7

Table 6C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, light-blue-gray, coarse crystalline; contains disseminated orange polyhalite; disseminated gray-green clay blebs	1,238.7-1,239.1
Halite, gray-pink to light-gray, coarse crystalline; contains disseminated, sparse, red-orange polyhalite blebs; gray-green clay stringers at base	1,239.1-1,239.8
Halite, moderate-orange-pink through clear to gray-pink, medium to coarse crystalline; contains disseminated red polyhalite blebs	1,239.8-1[illegible].0
Halite, light-gray to pale-red, medium to coarse crystalline, clayey; contains disseminated pink-orange polyhalite; disseminated gray-green clay in upper zone; red-brown clay in lower zone; gray-green clay partings at 1,241.4 and 1,242.2 feet	1,241.0-1,247.0
Halite, moderate-red-orange to clear to light-blue-gray, coarse crystalline; contains disseminated red-orange polyhalite blebs; sparse, gray-green clay blebs	1,247.0-1,248.5
Halite, light-blue-gray to pale-yellow-brown, coarse crystalline, clayey; blotches of yellow-brown fine crystalline halite; contains disseminated red-orange polyhalite blebs; clay blebs	1,248.5-1,251.4
Halite, pale-yellow-brown to moderate-orange-pink, medium to coarse crystalline; contains disseminated red-orange polyhalite and clay in upper 0.6 foot	1,251.4-1,253.1
Polyhalite, moderate-red-orange, massive, upper 2.5 feet, grades into halite above; lower 0.4 foot, gray-green clay	1,253.1-1,256.8
Halite, moderate-pink-orange to gray-orange, fine to coarse crystalline; moderate-pink-orange polyhalite stringers in upper two-thirds, thin polyhalite band at 1,259.4 feet	1,256.8-1,261.1
Polyhalite, moderate-orange-pink, fine crystalline, laminated	1,261.1-1,261.7
Halite, moderate-orange-pink, medium to coarse crystalline; gray-green clay stringer at base	1,261.7-1,262.1
Halite, medium-gray to clear, medium crystalline, clayey; contains disseminated intercrystalline gray-green clay and moderate-orange-pink polyhalite blebs	1,262.1-1,262.7
Halite, clear to light-gray through moderate-pink-orange, coarse crystalline; contains disseminated sparse, gray-orange-pink polyhalite; disseminated clay 0.4 foot thick at 1,264.0 feet	1,262.7-1,264.9
Halite, clear, light-gray to white, medium crystalline, clayey; gray-green and red-brown clay in blebs and stringers; brown partings at 1,265.7, 1,266.1, 1,267.4, 1,267.7, and 1,268.5 feet; gray-green partings at 1,265.1, 1,265.3, and 1,269.2 feet; red-orange polyhalite blebs; lower part of unit grades to medium to fine crystalline; clay content diminishes to less than 1 percent	1,264.9-1,271.3

Table 6C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-red-orange to clear to gray-orange-pink, medium to coarse crystalline; moderate-orange polyhalite stringers and blebs; clay at 1,274.0-1,274.9 feet	1,271.3-1,276.6
Halite, moderate-red-orange, fine to coarse crystalline; numerous moderate-orange-pink polyhalite bands; sparse mottled clay zones; sparse clear halite zones	1,276.6-1,280.5
Polyhalite, pale-red-brown, fine crystalline, laminated; grades to gray-green clay in lower 0.3 foot	1,280.5-1,281.9
Halite, light-gray to pale-red-brown, mottled, fine to medium crystalline; minor polyhalite blebs; brown clay stringers at 1,282.7 feet; partings at 1,282.3 feet	1,281.9-1,283.3
Halite, pale-yellow-gray to clear, medium crystalline; minor light-pink polyhalite in upper half	1,283.3-1,284.8
Halite, pale-yellow-gray to clear, fine to medium crystalline; numerous vugs of leached out sulfate (sylvite?); mineral occurrence from 1,285.0-1,288.5 feet	1,284.8-1,288.5
Halite, clear, light-gray to moderate-red-brown, fine to medium crystalline; numerous leached vugs of sylvite	1,288.5-1,289.8
Halite, medium-gray to clear to moderate-red-orange, clayey; numerous leached sylvite zones; some langbeinite and leonite/kainite	1,289.8-1,290.9
Halite, pale-red-brown to moderate-red, fine crystalline; leached sylvite zones; small blebs of moderate-red polyhalite	1,290.9-1,292.1
Clay, green-gray, halitic; scattered crystals of clear to light-gray halite; blebs of moderate-red-brown polyhalite; minor amounts of sylvite and langbeinite	1,292.1-1,292.9
Halite, moderate-red-brown to pale-red-brown to medium-gray, fine to medium crystalline, clayey; scattered blebs moderate-red-orange polyhalite in upper half; brown clay partings at 1,293.4, 1,295.1, and 1,297.6 feet; scattered blebs of sulfates (minor amounts)	1,292.9-1,297.7
Halite, clear to very light gray to pale-red, medium to coarse crystalline; minor scattered blebs of polyhalite; gray-green clay stringer at 1,298.0 feet; brown clay partings at 1,298.7, 1,298.9, 1,299.2, and 1,299.3 feet	1,297.7-1,302.5
Halite, gray-orange-pink to clear, medium to coarse crystalline	1,302.5-1,304.2
Halite, moderate-red-orange, minor amount pale-yellow, medium crystalline; moderate-red-orange polyhalite stringers near top unit	1,304.2-1,306.5

Table 6C.--Lithologic log--(Continued)

Description	Depth (feet)
Polyhalite, moderate-red-brown to moderate-red-orange, laminated-------	1,306.5-1,307.2
Halite, moderate-red-brown to moderate-red-orange, fine to medium crystalline; polyhalite stringers at 1,307.8 feet; clear halite bands 0.3 foot above base; moderate-red-brown polyhalite 0.2 foot above base----------	1,307.2-1,309.2
Halite, medium-gray to clear, pale-yellow, coarse crystalline; gray-green intercrystalline clay----------	1,309.2-1,311.0
Halite, moderate-orange-red to light-gray, coarse cryatalline; polyhalite stringer at 1,311.9 feet; polyhalite stringers near base--	1,311.0-1,313.2
Halite, pale-yellow to light-gray, medium crystalline----------	1,313.2-1,313.5
Halite, medium-gray to clear, some pale-red, fine to coarse crystalline, clayey; contains disseminated brown clay; brown clay partings at 1,314.2 feet; core badly shattered in upper zone---------	1,313.5-1,321.7
Halite, moderate-red-orange to clear, medium to coarse crystalline; minor scattered blebs of moderate-red-orange polyhalite----------	1,321.7-1,323.2
Halite, moderate-red-brown to pale-red, coarse crystalline; minor amounts light-pink clay----------	1,323.2-1,325.2
Polyhalite, moderate-red-brown, massive, moderate-orange-pink banding at top and base of unit, mottled light-gray lower half----------	1,325.2-1,327.3
Clay, gray-green, with moderate-red-orange halite between two clay layers----------	1,327.3-1,327.5
Halite, clear to light-gray to pale-red, coarse crystalline; gray-green clay blebs----------	1,327.5-1,328.2
Halite, pale-yellow to moderate-red-orange to clear, coarse crystalline; polyhalite blebs at 1,330.0 feet----------	1,328.2-1,331.9
Halite, light-gray to moderate-red-orange, grading downward to moderate-red-orange, coarse crystalline; contains numerous pale-orange-pink polyhalite blebs and stringers----------	1,331.9-1,334.1
Polyhalite, pale-red, laminated, some gray-orange-pink laminations-----	1,334.1-1,335.0
Halite, pale-red-brown, moderate-red-orange, coarse crystalline; contains minor disseminated polyhalite----------	1,335.0-1,335.7
Halite, medium-gray, clear, pale-red, coarse crystalline, clayey; gray-green clay at top and at 1,335.8 feet; parting at 1,335.9 feet--	1,335.7-1,336.2
Halite, pale-red-brown, moderate-red-orange, coarse crystalline; contains minor disseminated polyhalite----------	1,336.2-1,336.6
Halite, medium-gray, white, pale-red, coarse crystalline, with one layer of fine crystalline in middle; contains minor disseminated moderate-red-orange polyhalite blebs; brown clay zone at 1,336.8-1,337.0 feet----------	1,336.6-1,337.4

Table 6C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-yellow to clear, coarse crystalline----------	1,337.4-1,337.7
Halite, pale-red to light-gray to clear, coarse crystalline; numerous brown clay blebs and stringers----------	1,337.7-1,339.0
Halite, moderate-red-orange to clear, medium to coarse crystalline; minor scattered blebs of red-orange polyhalite----------	1,339.0-1,340.8
Halite, clear to light-gray; ±5 percent brown clay; clay partings at 1,340.8, 1,341.0, 1,341.4, 1,341.8, 1,342.9, and 1,343.5; some light-orange halite thinly disseminated throughout interval----------	1,340.8-1,343.9
Halite, clear to moderate-reddish-orange, medium to fine crystalline; contains disseminated polyhalite blebs and bands throughout----------	1,343.9-1,348.4
Halite, clear, medium crystalline; greenish-gray, grading to brown, clay at 1,348.8 feet and back to gray; clay seam at 1,353.8 feet; clay content reduces at 1,356.2-1,359.8 feet; brown clay partings at 1,349.5, 1,350.2, 1,350.7, 1,351.9, 1,352.6, and 1,356.7 feet; gray clay partings at 1,353.8-1,354.3 feet; very high clay content at 1,354.9 feet; 0.2 foot gray clay seam at 1,355.9 feet----------	1,348.4-1,359.8
Anhydrite, white to medium-gray; pink polyhalite blebs in upper 2.5 feet; laminated polyhalite in lower portion----------	1,359.8-1,367.5
Halite, light-gray to clear to pale-red to white, medium crystalline, clayey; moderate-red-brown minor blebs of polyhalite----------	1,367.5-1,368.4
Halite, moderate-red-brown to moderate-red-orange to clear, medium to coarse crystalline; scattered stringers of moderate-red-brown polyhalite----------	1,368.4-1,369.3
Halite, clear to light-gray to pale-yellow-brown, fine to medium crystalline, clayey; medium-gray clay seam at 1,370.1 feet----------	1,369.3-1,370.3
Halite, moderate-red-brown to light-gray, fine to medium crystalline; gray-green clay seams at 1,370.5 and 1,371.2 feet; clear to pale-yellow, coarse crystalline halite patch at 1,373.2 feet----------	1,370.3-1,375.0
Halite, medium-gray to light-gray, scattered patches of white, coarse crystalline, clayey; minor moderate-orange-pink polyhalite blebs-----	1,375.0-1,376.3
Halite, pale-yellow-brown to medium-gray, medium to coarse crystalline; stringers of moderate-orange-pink clay; unit is slightly clayey----------	1,376.3-1,378.3
Halite, moderate-red-orange, to pale-yellow, coarse crystalline; moderate-orange-red polyhalite stringers----------	1,378.3-1,379.4
Halite, dark- to medium-gray, very clayey; minor blebs of moderate-red-orange polyhalite; gray-green clay seam at 1,379.6 feet----------	1,379.4-1,379.9

Table 6C.--Lithologic log-- Continued)

Description	Depth (feet)
Halite, moderate-red-orange, pale-yellow, minor amounts moderate-red-brown, medium-coarse crystalline; moderate-red-brown polyhalite stringers	1,379.9-1,381.2
Halite, medium-dark-gray to pale-yellow-brown, coarse crystalline, very clayey; black clay stringer at top; brown clay stringers at 1,381.7 and 1,381.9 feet	1,381.2-1,382.2
Halite, moderate-red-brown to moderate-red-orange, medium crystalline; minor small stringers of moderate-red-orange polyhalite	1,382.2-1,383.0
Halite, white to moderate-pink, fine crystalline, very clayey; gray-green clay; gray-green seam at 1,383.3 feet	1,383.0-1,383.7
Halite, clear to red-brown, fine crystalline, very clayey; dark-brown, intercrystalline clay; brown clay seam at 1,384.3 feet and at base of unit	1,383.7-1,384.7
Halite, moderate-red-orange to clear to light-gray, fine crystalline; contains numerous stringers of moderate-orange-pink polyhalite and clay; brown clay partings at 1,386.0 feet	1,384.7-1,386.1
Halite, pale-red, very coarse crystalline, slightly clayey; brown clay seam at 1,386.8 feet	1,386.1-1,387.1
Halite, clear to white, coarse crystalline; brown intercrystalline clay gives brown color to most of unit	1,387.1-1,388.8
Halite, pale-red, clear, pale-yellow-brown, slightly clayey; brown clay partings at 1,389.1 feet; basal 0.3 foot is clear, pale-red, coarse crystalline halite	1,388.8-1,390.3
Halite, alternating bands of pale-red, moderate-red-orange, clear to light-gray; pale-reds are slightly clayey; moderate-red-orange polyhalite stringers and blebs generally in lower half of unit	1,390.3-1,396.3
Halite, pale-red to light-gray, coarse crystalline	1,396.3-1,397.5
Halite, pale-red to moderate red-orange, coarse crystalline; contains scattered minor blebs and stringers of moderate-red-brown polyhalite; light-gray, coarse halite at 1,398.2 feet and base of unit	1,397.5-1,400.2
Halite, moderate-red-orange to pale-red, fine to medium crystalline; minor scattered moderate-red-brown polyhalite blebs	1,400.2-1,401.1
Halite, pale-red to pale-yellow-brown, medium to coarse crystalline, slightly clayey, minor blebs of moderate-red-orange polyhalite	1,401.1-1,401.5
Halite, moderate-red-orange to pale-red, coarse crystalline; minor blebs and stringers of moderate-red-orange polyhalite	1,401.5-1,402.4

Table 6C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red to yellow-brown to clear, medium to coarse crystalline, very clayey; brown clay partings at top, 1,402.6, 1,403.4, and 1,404.1 feet; gray-green clay partings at 1,404.8 feet; core shattered in lower 0.2 foot	1,402.4-1,405.0
Halite, pale-red-brown to pale-red, coarse crystalline; large amount of moderate-red-brown polyhalite in stringers and blebs in upper half; leached sylvite (?) zones decreasing downward	1,405.0-1,407.1
Halite, pale-yellow-brown, coarse crystalline	1,407.1-1,408.1
Halite, pale-red to moderate-red-orange, coarse crystalline; large amount of moderate-red-brown polyhalite; vugs of leached sylvite	1,408.1-1,408.8
Halite, pale-red to moderate-red-brown to light-gray, coarse crystalline; contains numerous moderate-red-brown polyhalite blebs; langbeinite crystals; probable leonite/kainite (leached)	1,408.8-1,409.4
Halite, moderate-red-brown to light-gray; brown clay; contains numerous crystals of langbeinite; possible leonite/kainite rims (leached) or clay	1,409.4-1,409.8
Halite, pale-red to light-gray to clear, coarse crystalline, slightly clayey; some langbeinite; possible leonite/kainite; contains numerous moderate-red-brown polyhalite blebs	1,409.8-1,411.0
Halite, moderate-red-brown to moderate-red-orange to pale-red, coarse crystalline; contains numerous moderate-red-brown polyhalite blebs; very minor langbeinite; gray-green intercrystalline clay	1,411.0-1,412.3
Halite, pale-yellow-brown, grading downward to pale-red and moderate-red-brown, fine to medium crystalline; contains some brown intercrystalline clay; pale-red-brown polyhalite stringers; brown clay partings at top	1,412.3-1,413.4
Halite, pale-red to pale-yellow-brown, coarse crystalline; moderate-red-brown polyhalite stringers in upper and lower parts; very minor leached vugs after sylvite	1,413.4-1,418.3
Halite, pale-red to medium-gray to moderate-red-orange, medium to coarse crystalline; light-brown intergranular clay; clay parting at 1,419.6 feet; clay increases below parting	1,418.3-1,420.1
Halite, moderate-red-orange to moderate-red-brown, coarse crystalline; contains finely disseminated polyhalite	1,420.1-1,421.1
Halite, clear to pale-red to light-brown, fine crystalline, very clayey; brown intercrystalline clay; brown clay partings at top, 1,421.6, and 1,422.3 feet	1,421.1-1,422.9

Table 6C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red to light-gray, grading downward to moderate-red-brown, coarse crystalline; few large moderate-red-brown blebs of polyhalite; moderate-red-orange stringers of clay	1,422.9-1,425.1
Halite, moderate-red-orange to light-pale-red, coarse crystalline; contains minor blebs of moderate-red-orange polyhalite	1,425.1-1,426.0
Halite, pale-red to light-gray to moderate-red-orange, fine to medium crystalline; stringers of moderate-red-orange clay and polyhalite	1,426.0-1,426.8
Halite, moderate-red-orange to light-pale-red, medium crystalline; minor langbeinite; probable leonite/kainite; moderate-red-brown polyhalite	1,426.8-1,427.1
Halite, light-gray, clear to pale-red and light-yellow-brown, fine crystalline (some medium), clayey	1,427.1-1,427.5
Halite, pale-red to moderate-red-orange to clear, coarse crystalline; contains minor blebs of moderate-red-brown polyhalite; slightly clayey in center of unit; possible sparse leached sylvite	1,427.5-1,428.9
Halite, gray-orange-pink to light-gray and pale-red, fine to medium crystalline; contains minor disseminated blebs of moderate-orange-pink polyhalite	1,428.9-1,429.7
Halite, moderate-red-orange to pale-red, fine crystalline; contains minor blebs of moderate-red-brown polyhalite	1,429.7-1,430.2
Halite, pale-red to medium-gray, coarse crystalline; contains minor moderate-red-brown polyhalite blebs; minor amounts langbeinite; possible leonite/kainite	1,430.2-1,431.7
Halite, pale-yellow-brown, minor amount pale-red, coarse crystalline; contains minor amounts of leached sulfate mineral	1,431.7-1,433.6
Halite, pale-yellow-brown to gray-orange-pink, coarse crystalline	1,433.6-1,436.0
Halite, gray-orange-pink to pale-yellow-brown, coarse crystalline; pale-yellow-brown polyhalite stringers and polyhalite band 0.2 foot thick at 1,436.4 feet	1,436.0-1,437.0
Anhydrite, gray-green to yellowish-gray, dense, massive; gray-green polyhalite bands	1,437.0-1,444.1
Halite, pale-red to pale-yellow-brown, coarse crystalline; anhydrite band at base	1,444.1-1,444.4
Halite, very pale yellow brown to yellow-gray, fine crystalline; light-gray polyhalite bands at 1,446.0, 1,446.6, 1,446.7, 1,448.3 feet, and at base	1,444.4-1,450.6

Table 6C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-yellow-brown to pale-red, medium crystalline; very light gray polyhalite bands at 1,451.1, 1,451.2, 1,451.4, 1,452.0, and 1,452.5 feet	1,450.6-1,452.7
Halite, moderate-red-brown, pale-red, fine to medium crystalline; light-gray polyhalite band at 1,453.2 feet	1,452.7-1,457.5
Anhydrite, medium-gray; zones of moderate-red-brown laminated polyhalite; possible loss of 0.5 foot of core	1,457.5-1,460.1
Mudstone; dark-gray to gray-orange-pink halite stringers at 1,460.3 feet	1,460.1-1,461.4
Polyhalite, moderate-red-brown to moderate-orange-pink; dark-gray clay; clear to pale-red, coarse crystalline halite	1,461.4-1,462.8
Halite, alternating zones of moderate-red-brown, pale-red-brown, moderate-red-orange, and pale-yellow-brown, coarse crystalline; stringers of gray-orange-pink polyhalite scattered throughout	1,462.8-1,470.4
Halite, clear to pale-red, fine to coarse crystalline, very clayey; brown clay partings in upper 0.2 foot; gray-green clay partings in lower 0.2 foot	1,470.4-1,470.8
Halite, pale-red-brown to pale-red to moderate-red-orange, fine to medium crystalline, grading down to coarse crystalline; numerous small light-gray polyhalite blebs	1,470.8-1,473.7
Halite, pale-yellow-brown, coarse crystalline; small white polyhalite blebs	1,473.7-1,475.0
Halite, pale-yellow-brown to clear, medium crystalline; numerous blebs and stringers of langbeinite; sparse moderate-red-brown polyhalite stringers	1,475.0-1,480.2
Halite, gray-red to moderate-red-brown, medium to coarse crystalline, clayey; gray-green clay zones at 1,480.4, 1,480.9, and 1,481.0 feet; clear halite within clay zones is fine crystalline; brown clay parting at 1,481.4 feet	1,480.2-1,481.7
Halite, moderate-red-brown to moderate-red-orange, medium to coarse crystalline; minor stringers of moderate-orange-pink polyhalite	1,481.7-1,482.5
Halite, moderate-red-brown to moderate-red-orange and pale-red, coarse crystalline, mottled; langbeinite	1,482.5-1,483.1
Halite, pale-red to pale-red-brown, coarse crystalline; moderate amounts of moderate-orange-pink polyhalite stringers; langbeinite crystals	1,483.1-1,483.7

Table 6C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-red-orange, moderate-red-brown, minor amount pale-red, very coarse crystalline; moderate-orange-pink polyhalite stringers in lower half; moderate amount of langbeinite	1,483.7-1,487.0
Halite, pale-red to moderate-red-orange, medium crystalline, very clayey; moderate-red-brown and moderate-red-orange polyhalite blebs and stringers; pale-light-brown intercrystalline clay	1,487.0-1,488.3
Halite, moderate-red-orange to moderate-red-brown, medium crystalline; moderate-orange-pink polyhalite stringers	1,488.3-1,488.8
Halite, moderate-orange-red to pale-red, coarse crystalline; moderate amount of red-orange polyhalite blebs; moderate amount disseminated langbeinite(?)	1,488.8-1,490.1
Halite, clear to light-gray, very coarse crystalline; minor gray-green clay blebs; pink-red polyhalite blebs	1,490.1-1,490.5
Halite, clear to light-gray to pale-red, very coarse crystalline; disseminated gray-green clay blebs; moderate-red-orange polyhalite blebs	1,490.5-1,491.5
Halite, pale-red-brown, coarse crystalline; moderate-red-brown polyhalite blebs; rims around langbeinite blebs	1,491.5-1,492.5
Halite, clear to medium-gray to pale-red, coarse crystalline; disseminated moderate-pink-orange polyhalite blebs and stringers; gray-green intercrystalline clay; moderate amounts amorphous langbeinite	1,492.5-1,495.0
Halite, moderate-red-brown to gray-orange, coarse crystalline; disseminated small red-orange polyhalite blebs; slight clay zone in center; moderate amount langbeinite with polyhalite rims	1,495.0-1,499.2
Halite, pale-yellow-orange, medium to coarse crystalline; sparse red-orange polyhalite blebs; amorphous pale-yellow langbeinite	1,499.2-1,501.1
Halite, moderate-red-orange to moderate-orange-pink; medium amounts disseminated orange polyhalite and amorphous langbeinite	1,501.1-1,501.8
Halite, medium to dark-gray, medium to coarse crystalline; sparse disseminated red-orange polyhalite; gray-green clay	1,501.8-1,502.8
Halite, gray-orange to moderate-pink-orange, coarse crystalline; sparse moderate-orange-pink polyhalite stringers and blebs; clear to light-gray, very coarse crystalline, leached leonite/kainite; zone of halite with langbeinite at 1,509.0-1,509.6 feet	1,502.8-1,510.6
Halite, pale-red to pale-yellow-brown, fine to medium crystalline, clayey; leached leonite/kainite blebs and stringers; gray-green clay stringers	1,510.6-1,512.3

Table 6C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red to white to medium-gray, medium crystalline; large amounts disseminated gray-green clay; langbeinite and leonite/kainite or sylvite	1,512.3-1,512.9
Halite, pale-red-brown to light-blue-gray, coarse crystalline; disseminated fibrous red-orange polyhalite; disseminated gray-green and brown clay stringers; one large langbeinite crystal	1,512.9-1,516.5
Halite, pale-red to light-brown-yellow, coarse crystalline; disseminated pink-orange polyhalite blebs	1,516.5-1,517.5
Halite, moderate-red-orange to clear, very coarse crystalline; large amounts of red-orange polyhalite stringers; several 0.1-foot zones of clear halite	1,51[illegible]-1,522.6
Halite, clear to light-gray, coarse crystalline; disseminated gray clay blebs; gray clay partings at top of unit	1,522.6-1,523.0
Halite, clear to moderate-red-orange, coarse crystalline; disseminated moderate-red-orange polyhalite blebs	1,523.0-1,523.7
Halite, clear to light-yellow-brown; disseminated gray-green clay in upper 0.5 foot; increasing red-orange polyhalite in lower 1.4 feet	1,523.7-1,526.2
Halite, clear to white, fine to medium crystalline; 30 percent brown clay; clay partings at top of unit	1,526.2-1,526.7
Halite, clear to light-gray and light-blue-gray, coarse crystalline; disseminated gray clay blebs and stringers	1,526.7-1,527.5
Halite, clear to white to medium-gray, coarse crystalline, clayey; numerous brown clay blebs and stringers; sparse moderate-red-brown polyhalite blebs	1,527.5-1,529.4
Halite, clear to pale-red to medium-gray, coarse crystalline; disseminated moderate-red-brown polyhalite blebs	1,529.4-1,533.6
Halite, pale-red to clear to medium-gray to white, coarse crystalline; disseminated moderate-red-brown polyhalite blebs in upper and lower quarters; disseminated brown-gray clay stringers; clay partings at 1,533.8, 1,534.4, 1,534.5, 1,534.7, and 1,535.5 feet	1,533.6-1,536.1
Halite, light-yellow to moderate-pink-orange, coarse crystalline; sparse disseminated moderate-red-orange polyhalite blebs; heavy polyhalite zone at 1,537.6 feet	1,536.1-1,540.3
Halite, clear white to medium-gray, coarse crystalline; disseminated brown clay stringers and blebs; sparse red-orange polyhalite in upper part; brown clay partings at 1,541.9 and 1,542.2 feet	1,540.3-1,547.0
Halite, pale-yellow-orange to light-gray, fine crystalline; moderate amounts of moderate-red-brown polyhalite blebs	1,547.0-1,547.7

Table 6C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to light-gray, very coarse crystalline; disseminated intercrystalline gray-green clay; minor amounts of red-orange polyhalite blebs	1,547.7-1,548.8
Halite, light-gray to pale-red to white, medium to coarse crystalline; disseminated brown and green clay blebs; moderate-red-orange polyhalite blebs; gray-green partings at 1,549.2 feet; brown clay partings at 1,549.7, 1,550.1, 1,550.2 feet and base of unit	1,548.8-1,551.0
Halite, pale-red to pale-yellow-brown, fine to medium crystalline; common disseminated gray clay blebs; sparse disseminated moderate-orange-pink polyhalite blebs; sparse gray-green clay inclusions; brown clay partings at 1,551.5, 1,552.1, 1,552.8, 1,553.1, and 1,553.2 feet	1,551.0-1,553.5
Halite, pale-yellow-brown to light-gray, coarse crystalline; disseminated red-orange polyhalite blebs	1,553.5-1,555.4
Halite, clear to pale-yellow and pale-yellow-brown, medium to coarse crystalline; moderate amounts of moderate-red-orange polyhalite blebs and stringers	1,555.4-1,560.4
Polyhalite, dark-red-brown, massive, fine-grained; upper 0.3 foot grades to medium crystalline halite; lower 0.5 foot is gray-green halitic clay	1,560.4-1,561.8
Halite, clear to pale-yellow, coarse crystalline; upper half contains disseminated red-orange polyhalite blebs; brown clay partings at base of unit	1,561.8-1,562.4
Halite, white to medium-gray, pale-yellow-brown, fine to coarse crystalline; disseminated brown clay blebs and intercrystalline clay; sparse moderate-brown polyhalite blebs; brown clay partings at 1,563.1, 1,563.8, 1,564.1, and 1,564.2 feet	1,562.4-1,564.2
Halite, clear to pale-yellow to light-gray, very coarse crystalline; minor amounts of red-brown polyhalite blebs, concentrated toward middle of unit	1,564.2-1,567.5
Halite, moderate-brown and moderate-red-brown, fine crystalline, clayey; brown clay stringers	1,567.5-1,568.3
Halite, clear to medium-brown, fine crystalline, clayey; minor red-brown polyhalite blebs	1,568.3-1,568.6
Halite, light-gray to pale-yellow-brown, fine to medium crystalline; few moderate-red-orange polyhalite blebs	1,568.6-1,569.1

Table 6C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, light-gray, clear and pale-red, coarse crystalline; intercrystalline brown clay	1,569.1-1,569.8
Halite, light-gray to clear, coarse crystalline; bottom 2 feet dropped with 40 feet of pipe down hole; core broken	1,569.8-1,573.0
	Total depth

Table 6D.--Mineralogical and chemical analyses of core samples from potash ore zones and mineralized salt beds in drill hole P-6

[oz, ore zone; mm, middle member; lm, lower member; sb, salt bed; tr, trace; Bl, bloedite, Ha, halite, Ka, kainite; La, langbeinite; Le, leonite; Po, polyhalite; Sy, sylvite; n.d., not determined; leaders (---), not present. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mineralogy: X-ray diffraction analysis[1]	Chemical analysis (weight percent): Ca	K	Mg	Na	Cl	SO_4	H_2O+	H_2O-	Water insoluble
P-6/1	1,288.60-1,289.80	1.20	sb above 10th oz	>8 Ha; 1 Po, Sy; tr Le	0.43	4.3	0.36	34.5	56.6	2.6	0.23	0.04	0.28
P-6/2	1,289.80-1,290.95	1.15	10th oz	>8 Ha; 1 Po; <1 Sy; tr Le	.53	3.2	.36	35.0	57.0	2.7	.37	.06	1.1
P-6/3	1,290.95-1,292.15	1.20		>8 Ha; <1 Sy; tr Po, Le	.41	4.0	.49	34.0	56.8	3.2	.78	.03	.23
[2]P-6/4	1,292.15-1,292.92	.77		>6 Ha; 2 Le; tr, Po, Sy, Ka	.04	4.1	1.8	22.0	35.8	9.7	.19	9.3	16.0
[2]P-6/4					.10	5.2	1.9	23.0	39.0	9.02	4.4	1.9	16.6
P-6/5	1,292.92-1,294.15	1.23		8 Ha; 1 Po; <1 Ka, Le; tr Sy	.71	2.6	1.1	30.0	47.2	6.7	2.4	1.4	6.2
P-6/6	1,407.20-1,408.10	.90	sb below 5th oz	>9 Ha; tr Po, Sy, Le	.30	.56	.17	38.0	60.4	---	---	---	---
P-6/7	1,408.10-1,408.70	.60		8 Ha; 1 Sy; <1 La; tr Po	.26	6.3	2.4	29.0	47.6	13.5	.11	.3	.19
P-6/8	1,408.70-1,409.80	1.10		>7 Ha; <1 Sy, Bl; tr Ka, Le	.06	2.9	2.1	28.5	46.5	12.0	2.3	.49	5.8
P-6/9	1,409.80-1,410.68	.88		>9 Ha; tr, Ka, Le, Po	.24	1.0	.68	35.0	57.2	3.1	.75	.15	2.0
P-6/10	1,474.20-1,474.80	.60	4th oz, mm	>9 Ha; tr Po	.16	.18	.06	37.5	60.7	---	---	---	---
P-6/11	1,474.80-1,476.00	1.20		>8 Ha; <1 Po, La	.45	1.8	1.1	35.0	54.9	7.3	.26	.08	.17
P-6/12	1,476.00-1,477.45	1.45		8 Ha; <1 La; <1 Po	.76	4.9	3.0	29.1	43.5	18.0	.22	.04	.06
P-6/13	1,477.45-1,478.37	.92		>9 Ha; <1 La; tr Po	.12	3.0	2.0	32.5	51.3	11.5	.16	.04	.15
P-6/14	1,478.37-1,480.00	1.63		>8 Ha; <1 La; tr Po	.40	2.7	1.6	33.0	50.9	9.3	.20	.06	1.1
P-6/15	1,480.00-1,480.65	.65	4th oz, lm	>8 Ha; <1 Po, La; tr Le	.33	.88	.57	34.5	54.9	3.2	1.1	.05	4.1
P-6/16	1,480.65-1,481.23	.58		9 Ha; <1 Po	.34	.88	.57	36.0	54.7	---	---	---	4.1
P-6/17	1,509.90-1,510.50	.60	sb above 2d oz	>9 Ha; <1 Po	.47	.64	.30	37.0	57.5	n.d.	---	---	---
[2]P-6/18	1,510.50-1,511.32	.82		>4 Ha; 5 La, tr Po	.14	11.4	7.4	14.5	23.3	44.0	.34	.03	.25
[2]P-6/18					.14	11.4	7.4	14.5	23.3	44.0	.34	.04	.25
P-6/19	1,511.32-1,512.10	.78	2d oz	>5 Ha; 4 La; tr Ka, Le	.05	8.3	5.4	21.0	32.6	30.5	1.2	.11	1.4
P-6/20	1,512.10-1,513.05	.95		>8 Ha; <1 Po; tr Ka, Le	.94	2.4	1.2	31.0	49.0	8.4	2.2	.41	3.6
P-6/21	1,513.05-1,513.70	.65		>9 Ha; tr Po	.15	.22	.18	37.0	57.0	.33	.32	.43	2.9

[1]Estimate of amount reported on a scale of 0-10.
[2]Replicate analyses.

Table 6E.--Calculated mode (mineral content) and potash distribution by mineral in core samples from potash ore zones and mineralized salt beds in drill hole P-6

[oz, ore zone; mm, middle member; lm, lower member; sb, salt bed; Bl, bloedite; Ha, halite; Ka, kainite; La, langbeinite; Le, leonite; Po, polyhalite; Sy, sylvite; Insol., clay and silt; n.d., not determined; leaders (----), not present. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mode (weight percent mineral)								K_2O distribution by minerals					
				Sy	La	Ka	Le	Bl	Ha	Po	Insol.	Sy	La	Ka	Le	Po	Total
P-6/1	1,288.60-1,289.80	1.20	sb above 10th oz	6.3	----	----	2.9	----	87.7	3.2	0.3	3.9	----	----	0.7	0.5	5.1
P-6/2	1,289.80-1,290.95	1.15	10th oz	5.0	----	----	.3	----	89.0	4.0	1.1	3.2	----	----	<.1	.6	3.8
P-6/3	1,290.95-1,292.15	1.20		5.9	----	----	2.4	----	89.0	3.1	.2	3.7	----	----	.6	.5	4.8
[1]P-6/4	1,292.15-1,292.92	.77		.4	----	12.0	9.3	----	55.9	.3	16.0	.2	----	2.3	2.4	<.1	4.9
[1]P-6/4				3.1	----	14.4	5.7	----	58.5	.8	16.6	1.9	----	2.7	1.5	.1	6.2
P-6/5	1,292.92-1,294.15	1.23		1.1	----	[illegible]	2.9	----	76.3	5.3	6.2	.7	----	.9	.7	.8	3.1
P-6/6	1,407.20-1,408.10	.90	sb below 5th oz	<.1	----	----	1.2	----	96.6	2.2	n.d.	<.1	----	----	.3	.3	.6
P-6/7	1,408.10-1,408.70	.60		5.2	17.6	----	----	----	74.4	1.9	.2	3.3	4.0	----	----	.3	7.6
P-6/8	1,408.70-1,409.80	1.10		1.6	----	12.3	.3	11.8	68.3	.4	5.8	1.0	----	2.3	<.1	<.1	3.3
P-6/9	1,409.80-1,410.68	.88		----	----	.9	2.9	----	94.1	1.8	2.0	----	----	.2	.7	.3	1.2
P-6/10	1,474.20-1,474.80	.60	4th oz, mm	----	----	----	----	----	95.3	1.4	n.d.	----	----	----	----	.2	.2
P-6/11	1,474.80-1,476.00	1.20		----	7.2	----	----	----	89.0	3.4	.1	----	1.6	----	----	.5	2.1
P-6/12	1,476.00-1,477.45	1.45		----	22.1	----	----	----	71.7	5.7	<.1	----	5.0	----	----	.9	5.9
P-6/13	1,477.45-1,478.37	92		----	15.3	----	----	----	84.6	.9	.1	----	3.5	----	----	.1	3.6
P-6/14	1,478.37-1,480.00	1.63		----	12.2	----	----	----	83.9	3.0	1.1	----	2.8	----	----	.5	3.3
P-6/15	1,480.00-1,480.65	.65	4th oz, lm	----	1.0	----	1.7	----	90.5	2.5	4.1	----	.2	----	.4	.4	1.0
P-6/16	1,480.65-1,481.23	.58		----	----	----	----	----	90.2	6.8	4.1	----	----	----	----	1.1	1.1
P-6/17	1,509.90-1,510.50	.60	sb above 2d oz	----	----	----	----	----	94.8	4.9	n.d.	----	----	----	----	.8	.8
[1]P-6/18	1,510.50-1,511.32	.82		----	59.8	----	----	----	38.4	1.0	.3	----	13.6	----	----	.2	13.8
[1]P-6/18				----	59.8	----	----	----	38.4	1.0	.3	----	13.6	----	----	.2	13.8
P-6/19	1,511.32-1,512.10	.78		----	38.0	6.0	----	----	53.4	.4	1.4	----	8.8	1.1	----	<.1	9.9
P-6/20	1,512.10-1,513.05	.95	2d oz	----	----	8.1	1.0	----	78.9	7.1	3.6	----	----	1.5	.2	1.1	2.8
P-6/21	1,513.05-1,513.70	.65		----	----	.5	----	----	93.8	1.1	2.9	----	----	<.1	----	.2	.2

[1]Replicate analyses.

TABLES 7A-7G

Basic data from drill hole P-7,
Waste Isolation Pilot Plant area, Eddy County, New Mexico

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Table 7A.--Abridged drill-hole history

LOCATION: Sec. 5, T. 23 S., R. 31 E.
156 m (513 ft) from north line
121 m (396 ft) from west line

ALTITUDE (LAND SURFACE): 1,016 m (3,331.7 ft). Datum for depth measurements in drilling and logging operations.

LITHOLOGIC LOG PREPARED BY: P. C. Aguilar, R. J. Cheeseman, J. D. Kibler, J. C. Lorenz, Florian Maldonado, M. N. Mitchell, B. R. Orr, L. A. Rives, and R. P. Snyder, September 7-21, 1976.

DRILLING CONTRACTOR: Pennsylvania Drilling Co.

DRILLING RECORD: Commenced drilling on September 4, and completed on September 21, 1976, at 480 m (1,574 ft) below land surface.

64 m (210 ft) of 11-cm (4 1/2-in.) casing left in hole between 165 and 226 m (530-740 ft) below land surface.

Plugged with cement.

REMARKS: Encountered air pocket at 299 m (980 ft) below land surface, and lost casing seat.

Encountered several air pockets between 299 and 386 m (980-1,264 ft). Lost mud at 376 m (1,234 ft).

Top of salt in Rustler Formation at 171 m (562 ft) below land surface.

Table 7B.--Stratigraphic summary

Rock unit	Depth interval[1] feet	meters
Holocene deposits	0-11	0-3
Pleistocene rocks:		
Gatuna Formation	11-45	3-14
Permian rocks:		
Dewey Lake Red Beds	45-312	14-95
Rustler Formation	312-630	95-192
Magenta Dolomite Member	373-398	114-121
Culebra Dolomite Member	496-522	151-159
Salado Formation	630-1,574	192-480
Upper member	630-1,155	192-352
McNutt potash zone	1,155-1,566	352-477
Vaca Triste Sandstone Member[2]	1,155-1,162	352-354
11th ore zone	1,215-1,220	370-372
Marker bed 117	1,228-1,230	374-375
Marker bed 118	1,252-1,256	382-383
Marker bed 119	1,277-1,279	389-390
10th ore zone	1,291-1,296	393-395
Marker bed 120	1,307-1,308	398-399
9th ore zone	1,312-1,316	400-401
Marker bed 121	1,326-1,32[illegible]	404-405
Marker bed 122	1,330-1,331	405-405
8th ore zone	1,335-1,346	407-410
Union anhydrite[3]	1,358-1,372	414-418
7th ore zone	1,377-1,382	420-421
6th ore zone	1,391-1,393	424-425
5th ore zone	1,398-1,407	426-429
Marker bed 123	1,433-1,441	437-439
Marker bed 124	1,448-1,459	441-445
4th ore zone	1,467-1,484	447-452
3d ore zone	1,492-1,507	455-459
2d ore zone	1,513-1,518	461-463
1st ore zone	1,537-1,547	468-471
Marker bed 126	1,565-1,566	477-477
Maximum depth recorded	1,569	478

[1]Depth interval recorded from geophysical logs.
[2]Of Adams, 1944.
[3]Informal unit of Salado Formation.

Table 7C.--Lithologic log

Description	Depth (feet)	
Sand; unconsolidated, red-stained quartz	0.0-	10.0
Sandstone, red; quartz; siltstone	10.0-	20.0
Sandstone, red; tan, crystalline, limey siltstone; black mineral(?) specks	20.0-	40.0
Siltstone, red; tan and gray, with green reduction spots, dolomite	40.0-	60.
Sandstone, red, very fine grained; green reduction spots on siltstone	0.0-	70.
Siltstone, red; mudstone; white, with green reduction spots, very fine grained sandstone	70.0-	80.0
Siltstone, red; white disseminated sandstone; limestone	80.0-	90.0
Siltstone, red, with green reduction spots	90.0-	110.0
Siltstone, red, with green reduction spots; tan crystalline limestone	110.0-	120.0
Siltstone, red, with green reduction spots; red clay	120.0-	130.0
Siltstone, red, with green reduction spots; 50-60 percent red clay	130.0-	140.0
Same as above; some tan limestone	140.0-	150.0
Siltstone, red, with green reduction spots; caliche	150.0-	180.0
Siltstone, red, with green reduction spots; 50 percent red clay	180.0-	190.0
Siltstone, red; red clay; caliche	190.0-	210.0
Same as above; less than 1 percent gypsum	210.0-	215.0
Same as above; selenite	215.0-	225.0
Same as above; abundant selenite, shaly	225.0-	230.0
Siltstone, red; red clay; less than 2 percent white gypsum	230.0-	240.0
Same as above; selenite	240.0-	245.0
Siltstone, red, with green reduction spots; 1 percent clay and selenite	245.0-	250.0
Siltstone, red; red clay; trace of selenite	250.0-	280.0
Same as above; trace of light-gray anhydrite	280.0-	290.0
Same as above; no anhydrite	290.0-	295.0
Siltstone, red; red clay; trace of gypsum (less than 2 percent)	295.0-	315.0
Siltstone, red, with green reduction spots; 25 percent light-gray anhydrite with gypsum rinds; selenite	315.0-	320.0
Siltstone, red; increasing anhydrite	320.0-	350.0
Siltstone, red; red mudstone; light-gray anhydrite	350.0-	355.0
Anhydrite; gypsum; red siltstone	355.0-	360.0
Same as above; decreasing red siltstone	360.0-	365.0
Same as above; less than 10 percent red siltstone	365.0-	370.0
Anhydrite; gypsum; 20 percent dolomite; red siltstone	370.0-	375.0
Anhydrite; gypsum; increasing dolomite; less than 5 percent red siltstone	375.0-	380.0

Table 7C.--Lithologic log--(Continued)

Description	Depth (feet)
Dolomite; red siltstone; anhydrite; selenite	380.0- 390.0
Same as above; red clay; red mudstone	390.0- 405.0
Same as above; decreasing dolomite; anhydrite with gypsum rind; red siltstone	405.0- 410.0
Anhydrite; gypsum; red siltstone; less than 1 percent selenite	410.0- 420.0
Anhydrite with gypsum rinds; gypsum; ±1 percent red siltstone	420.0- 445.0
Anhydrite, light-gray, with gypsum rinds; less than 1 percent red siltstone	445.0- 450.0
Anhydrite, light-gray; grayish-red to dark-reddish-brown siltstone	450.0- 455.0
Anhydrite, light-gray, with white gypsum rinds; dark-reddish-brown siltstone; less than 1 percent selenite	455.0- 465.0
Anhydrite, light-gray, with gypsum rinds; abundant, very light gray clay; trace of red siltstone	465.0- 470.0
Anhydrite, light-gray; red, silty clay; white gypsum	470.0- 475.0
Same as above; less than 1 percent selenite	475.0- 485.0
Anhydrite, light-gray, with gypsum rind; gypsum; red siltstone; less than 5 percent dolomite	485.0- 495.0
Same as above; increasing light- to medium-gray dolomite	495.0- 500.0
Anhydrite, light-gray; red siltstone; black mudstone; dolomite	500.0- 505.0
Dolomite, medium-gray; anhydrite with gypsum rind; selenite; red siltstone; gypsum and red silty clay	505.0- 510.0
Dolomite; anhydrite; red siltstone; gypsum	510.0- 515.0
Dolomite, gray; anhydrite; gypsum; some red siltstone	515.0- 520.0
Dolomite, gray, fine-grained; some gypsum and selenite	520.0- 535.0
Dolomite, gray; white gypsum; some red siltstone	535.0- 540.0
Same as above; with more gypsum	540.0- 545.0
Same as above; anhydrite with gypsum rinds	545.0- 550.0
Dolomite, light-gray; anhydrite; gypsum; some selenite and red siltstone	550.0- 555.0
Anhydrite; dolomite; gypsum	555.0- 560.0
Anhydrite, gray; dolomite; gypsum; red siltstone with reduction spots	560.0- 565.0
Anhydrite and gypsum; gray-black siltstone; some selenite and dolomite	565.0- 575.0
Anhydrite; red and gray siltstone	575.0- 580.0
Gypsum, gray-white; anhydrite; gray clay; some red siltstone and selenite	580.0- 585.0
Anhydrite and gray clay; gypsum and selenite; gray siltstone; black shale	585.0- 590.0

Table 7C.--Lithologic log--(Continued)

Description	Depth (feet)
Clay, gray; minor red siltstone in chips	590.0- 595.0
Same as above; minor anhydrite, gypsum, and gray siltstone	595.0- 635.0
Clay, gray; increasing amounts of anhydrite, gypsum, and red and gray siltstone	635.0- 640.0
Anhydrite; gypsum; minor selenite; gray siltstone and gray clay	640.0- 645.0
Same as above; some red siltstone	645.0- 650.0
Anhydrite, gray, with gypsum rinds; red siltstone	650.0- 655.0
Same as above; selenite	655.0- 680.0
Same as above; some halite	680.0- 690.0
Same as above; increasing halite	690.0- 695.0
Same as above; 25 percent halite	695.0- 705.0
Halite, 60 percent; some anhydrite, gypsum, and selenite; red siltstone	705.0- 710.0
Halite, pink to clear	710.0- 720.0
No sample	720.0- 725.0
Siltstone, red; gray anhydrite; caliche (contaminant)	725.0- 730.0
Same as above; minor selenite	730.0- 735.0
No sample	735.0- 740.0
Same as 730.0-735.0-foot interval	740.0- 745.0
Caliche(?)	745.0- 750.0
Halite, pink; red polyhalite; black shale; caliche	750.0- 755.0
Same as above; no caliche	755.0- 760.0
Halite, pink; red polyhalite; black shale; red siltstone	760.0- 765.0
Same as above; caliche	765.0- 775.0
Halite, pink to clear; minor, red polyhalite and black shale	775.0- 785.0
Halite, clear	785.0- 800.0
Same as above, with minor red polyhalite and black shale	800.0- 810.0
Halite, clear	810.0- 815.0
Same as above; minor caliche(?)	815.0- 830.0
Halite, gray to clear	830.0- 840.0
Halite, clear	840.0- 850.0
Halite, clear to pink	850.0- 855.0
Same as above; polyhalite and some caliche	855.0- 870.0
Halite, clear	870.0- 885.0
Same as above; minor, gray anhydrite	885.0- 890.0
Halite, clear to orange	890.0- 895.0
Halite, clear to pink	895.0- 915.0
Same as above; some orange halite	915.0- 925.0
Same as above; some black shale	925.0- 930.0

Table 7C.—Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear	930.0- 935.0
Same as above; some black shale	935.0- 940.0
Halite, clear to pink	940.0- 950.0
Halite, clear; some gypsum	950.0- 955.0
Halite, clear	955.0- 960.0
Halite, pink to orange	960.0- 965.0
Halite, clear	965.0- 975.0
Halite, clear to white, 10 percent; about 20 percent red siltstone; about 35 percent each, gypsum and caliche	975.0- 995.0
No sample	995.0-1,015.0
Halite, mostly clear; some small flecks of gypsum; less than 5 percent red beds	1,015.0-1,035.0
Halite, clear; some small flecks of gypsum; sparse caliche from uphole	1,035.0-1,050.0
Halite, clear; 10-15 percent white, grainy caliche; equal amounts (10 percent) reddish-gray and olive-gray siltstone, both muddy	1,050.0-1,055.0
Halite, as above; caliche about 10 percent as above; 20 percent siltstone	1,055.0-1,075.0
Halite, clear; some orange caliche (contaminant); few flecks of gypsum; less than 10 percent bluish-gray shale	1,075.0-1,080.0
Same as above; 5-10 percent red siltstone	1,080.0-1,105.0
Halite, clear; some bluish-gray flecks, some red flecks, total less than 1 percent; some caliche	1,105.0-1,140.0
Halite, light-orange to clear; minor polyhalite	1,140.0-1,160.0
Halite, clear to pale-orange; minor polyhalite	1,160.0-1,170.0
Halite, clear to brown, medium to coarse crystalline, argillaceous; some polyhalite stringers and blebs at top of unit; gray partings at 1,178.6 and 1,171.5 feet	1,170.0-1,179.5
Halite, clear to orange-red, medium to fine crystalline; contains disseminated polyhalite	1,179.5-1,180.2
Halite, clear to brown, medium to coarse crystalline, argillaceous; polyhalite disseminated throughout; brown partings at 1,180.6 feet	1,180.2-1,182.1
Halite, same as 1,170.0-1,179.5-foot interval	1,182.1-1,182.8
Halite, clear to red-orange, medium to fine crystalline; thin stringers and blebs of polyhalite throughout; green clay at first 0.2 foot	1,182.8-1,191.6
Halite, clear, argillaceous (brown) imparting color to halite; polyhalite bleb at 1,194.6 feet; partings at 1,192.4, 1,193.1, 1,193.3, 1,193.6, 1,194.3, 1,194.7, 1,194.9, and 1,195.2 feet; gray-green clay seam at 1,194.6 feet; less than 2 percent interstitial clay	1,191.6-1,197.4

Table 7C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to orange to brown, medium to coarse crystalline; polyhalite bands and blebs throughout unit; less than 1 percent brown clay at top of unit; polyhalite band (0.1 inch thick) at 1,199.4 feet	1,197.4-1,199.7
Halite, gray-green, medium to fine crystalline; ±1 percent interstitial clay; parting at 1,199.7 feet; trace of polyhalite	1,199.7-1,200.2
Halite, clear to red-orange, medium to fine crystalline; polyhalite blebs and stringers and weak dissemination throughout unit; parting at 1,201.7 feet	1,200.2-1,201.7
Halite, clear, medium to fine crystalline, very argillaceous; ±50 percent gray-green clay; scattered polyhalite blebs	1,201.7-1,203.4
Halite, clear, medium to coarse crystalline; 25-40 percent brown clay; polyhalite blebs and bands throughout unit; partings at 1,204.3 and 1,205.4-1,205.5 feet; clay seam at 1,206.1 and 1,206.5 feet	1,203.4-1,207.1
Halite, clear, medium to coarse crystalline; some interstitial orange polyhalite	1,207.1-1,210.0
Halite, clear, medium to coarse crystalline; interstitial polyhalite blebs and bands; mottled appearance; very thin gray-green clay seams; partings at 1,211.8, 1,212.8, 1,215.1, and 1,217.4 feet (all gray-green)	1,210.0-1,218.6
Halite, clear, fine to medium crystalline; less than 5 percent interstitial clay; clay is gray-green in first 1 foot, grading to brown in lower part; polyhalite blebs disseminated in lower 0.5 foot; partings at 1,219.9 and 1,220.8 feet	1,218.6-1,220.8
Halite, clear to light-orange, fine to coarse crystalline; polyhalite disseminated throughout unit; lower 0.3 foot contains gray-green interstitial clay; parting at 1,221.8 feet	1,220.8-1,222.0
Halite, clear; abundant (40 percent) brown clay; clay seam at 1,222.0 feet; polyhalite blebs throughout unit; partings at 1,222.6 and 1,222.9 feet	1,222.0-1,223.3
Halite, clear, medium to coarse crystalline; polyhalite blebs and bands throughout unit; mottled appearance; clay partings at 1,224.4, 1,226.9, and 1,227.6 feet; less than 1 percent brown interstitial clay	1,223.3-1,227.6
Halite, clear, grading to orange-red at bottom, fine to coarse crystalline; polyhalite bands and blebs throughout unit, increasing toward bottom; green clay partings at 1,228.3 feet	1,227.6-1,232.0

Table 7C.--Lithologic log--(Continued)

Description	Depth (feet)
Polyhalite, red-orange; gray clay banding; halite in upper 0.5 foot----	1,232.0-1,233.5
Clay, gray-green----------	1,233.5-1,234.0
Halite, clear, fine to coarse crystalline; polyhalite blebs and bands in lower two-thirds, increasing in density toward bottom; high concentration of polyhalite bands and blebs between 1,237.9 and 1,238.3 feet; zone of increased interstitial gray-green clay with polyhalite blebs and bands from 1,240.0 to 1,240.5 feet; zone of increased interstitial clay (more than zone above) from 1,243.1 to 1,243.3 feet; partings at 1,240.0, 1,240.2, 1,240.5, 1,241.2, 1,241.4, 1,243.2, and 1,243.5 feet----------	1,234.0-1,243.5
Halite, clear, fine to medium crystalline, mottled appearance; 25-40 percent interstitial clay; clay is gray-green grading to brown; few disseminated polyhalite blebs; partings at 1,243.7, 1,244.3, 1,245.2, and 1,245.8 feet----------	1,243.5-1,247.2
Halite, clear, coarse crystalline; few polyhalite blebs and bands scattered throughout unit, increasing in density in lower 0.5 foot---	1,247.2-1,250.5
Halite, clear, medium to coarse crystalline; polyhalite blebs throughout unit; less than 1 percent gray-green interstitial clay; mottled appearance; parting at 1,252.6 feet----------	1,250.5-1,252.8
Halite, clear to light-red-orange, fine to coarse crystalline; polyhalite blebs disseminated throughout unit----------	1,252.8-1,256.1
Polyhalite, light-pink-orange, massive; halite bands and blebs throughout unit; gray anhydrite in lower 0.2 foot----------	1,256.1-1,259.6
Halite, clear, medium crystalline----------	1,259.6-1,261.4
Halite, orange, fine to medium crystalline, interbedded with orange polyhalite----------	1,261.4-1,262.3
Halite, clear to light-orange, medium crystalline; polyhalite disseminated throughout unit----------	1,262.3-1,263.0
Polyhalite, pinkish-orange, massive; some gray banding----------	1,263.0-1,263.6
Halite, pale-yellow-brown, medium to coarse crystalline----------	1,263.6-1,264.3
Halite, clear to light-gray, medium crystalline; contains disseminated gray-green clay; gray-green stringers with gypsum parting at 1,264.5 feet----------	1,264.3-1,264.8
Halite, pale-light-brown grading to moderate-red-orange, coarse crystalline; orange-red polyhalite blebs increase toward base----------	1,264.8-1,266.3
Halite, clear to medium-gray, coarse crystalline, clayey; gray-green clay partings at 1,266.5 feet----------	1,266.3-1,266.7

Table 7C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-red-orange, fine to medium crystalline; contains disseminated minor amounts of polyhalite	1,266.7-1,266.9
Halite, moderate-pink-orange, very coarse crystalline; contains disseminated red-orange polyhalite blebs	1,266.9-1,267.2
Halite, clear to light-gray to medium-gray, medium to coarse crystalline, clayey; contains disseminated gray-green clay; blebs and stringers at 1,267.3 feet and at base	1,267.2-1,268.0
Halite, clear to light-gray to pale-yellow-brown, coarse crystalline, especially in clay-free bands; brown-red clay bands and stringers at 1,268.5, 1,269.1, 1,269.4, 1,269.8, and 1,270.9 feet; sparse disseminated orange-red polyhalite	1,268.0-1,271.8
Halite, clear to moderate-pink-orange to light-yellow-brown, very coarse crystalline; contains disseminated moderate-pink-orange polyhalite blebs and sparse gray-green clay	1,271.8-1,273.3
Halite, clear to moderate-red-brown, coarse crystalline; contains numerous pink-orange and red-brown polyhalite blebs	1,273.3-1,273.9
Halite, pale-yellow-brown to moderate-pink-orange, coarse crystalline; contains disseminated moderate-pink-orange polyhalite blebs, most numerous in upper half	1,273.9-1,276.1
Halite, moderate-pink-orange and (sparse) pale-yellow-brown, medium crystalline with several coarse crystalline clear halite bands; common moderate-pink-orange polyhalite blebs and bands at 1,277.7, 1,278.0, 1,279.0, 1,279.3, and 1,280.1 feet	1,276.1-1,280.9
Polyhalite, moderate-red-brown, fine crystalline, dense; gradational with halite in upper 0.6 foot; gradational with gray-green clay in lower 0.6 foot; gray-green clay partings at base	1,280.9-1,283.1
Halite, white to medium-gray and pale-yellow-brown, fine to medium crystalline, clayey; disseminated brown intercrystalline clay; sparse disseminated red-orange polyhalite; coarse yellow-brown halite bands at 1,284.1 and 1,285.7 feet	1,283.1-1,286.4
Halite, moderate-pink-orange to pale-yellow-brown to clear, medium to coarse crystalline; disseminated red-orange polyhalite blebs and stringers; several coarse crystalline, clear halite bands; sparse, leached leonite/kainite and amorphous langbeinite	1,286.4-1,293.2
Halite, medium- to dark-gray to white, medium crystalline, clayey; disseminated red-orange polyhalite blebs; disseminated gray-green clay stringers; clay parting at top of unit	1,293.2-1,294.2

Table 7C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-red-orange to moderate-pink-orange, fine to medium crystalline; disseminated red-orange polyhalite blebs; leached sulfates (sylvite)	1,294.2-1,295.5
Clay, gray-green; fine halite crystals	1,295.5-1,296.2
Clay, red-brown; bands and blebs of clear crystalline halite; clay decreases downward	1,296.2-1,298.8
Halite, clear to medium-gray to pale-yellow-brown, coarse crystalline; brown intercrystalline clay; sparse disseminated polyhalite in lower 1.5 feet, grades to unit below	1,298.8-1,302.2
Halite, moderate-pink-orange to pale-yellow-brown, coarse crystalline; disseminated pale-orange-pink polyhalite blebs	1,302.2-1,304.9
Halite, moderate-red-orange to moderate-pink-orange, medium crystalline; disseminated pink-orange polyhalite stringers and blebs; polyhalite bands at 1,306.5, 1,308.1, 1,308.4, and 1,308.6 feet	1,304.9-1,309.2
Polyhalite, moderate-red-brown, fine crystalline, dense, massive; gray-green clay at base	1,309.2-1,309.7
Halite, clear t pale-gray, coarse crystalline; minor disseminated gray-green cl	1,309.7-1,310.0
Halite, moderate-red-orange to moderate-pink-orange, medium to coarse crystalline; several thin bands of coarse crystalline clear halite; disseminated moderate-orange-pink polyhalite blebs	1,310.0-1,313.6
Halite, medium-gray to white to pale-yellow-brown, coarse crystalline; disseminated gray-green polyhalite blebs; clear, coarse crystalline halite and brown clay at base	1,313.6-1,314.2
Halite, medium-gray to white to light-gray, medium to coarse crystalline, clayey; disseminated red-brown clay stringers and blebs; intercrystalline red-brown clay; clay stringers at 1,314.7, 1,315.5, 1,316.2, 1,317.3, and 1,317.9 feet	1,314.2-1,319.6
Halite, pale-red to moderate-red-brown to moderate-pink-orange, coarse crystalline; disseminated red-orange polyhalite blebs and sparse stringers; mottled with clear halite	1,319.6-1,324.0
Polyhalite, moderate-red-brown to moderate-orange-red with light-gray in bottom half, massive, clear; coarse crystalline halite blebs at 1,324.2 feet; lower half contains halite stringers	1,324.0-1,325.8
Halite, pale-red to light-gray to moderate-red-brown, fine to medium crystalline; intercrystalline gray-green clay	1,325.8-1,326.1
Halite, moderate-red-brown, pale-red grading down to moderate-orange-red and pale-yellow-brown, medium to coarse crystalline; contains numerous moderate-red-brown polyhalite blebs in upper half	1,326.1-1,328.8

Table 7C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-yellow, brown, pale-red, minor amounts moderate-red-orange, coarse crystalline	1,328.8-1,329.7
Halite, moderate-red-brown, pale-red, moderate-red-pink (colors in bands), coarse crystalline; thin, pale-red polyhalite bands throughout unit	1,329.7-1,332.0
Polyhalite, moderate-red-brown to medium-gray, dense; contains fine-grained, pale-red to moderate-red-brown halite near top of unit	1,332.0-1,332.8
Halite, moderate-pink-orange and pale-red, coarse crystalline; contains minor amounts of brown clay	1,332.8-1,333.1
Halite, clear to pale-red to moderate-red-brown, fine to coarse crystalline; contains minor moderate-red-brown polyhalite blebs; moderate-red-brown clay stringers and intercrystalline clay	1,333.1-1,334.3
Halite, pale-red to clear and light-gray, fine crystalline, very clayey; brown clay partings at 1,334.4, 1,334.9, and 1,335.3 feet	1,334.3-1,335.6
Halite, pale-red to moderate-red-brown, coarse crystalline; brown intercrystalline clay	1,335.6-1,336.6
Halite, pale-red, pale-yellow-brown, clear, medium to coarse crystalline	1,336.6-1,338.6
Halite, pale-red to light-gray, coarse crystalline; intercrystalline brown clay; brown clay blebs and stringers; 0.3-foot layer of clear, very coarse crystalline halite at 1,340.5 feet; brown partings at 1,339.2, 1,340.4, 1,340.9, 1,341.4, and 1,342.7 feet	1,338.6-1,343.1
Halite, pale-red to moderate-red-brown, fine to coarse crystalline; contains moderate amounts of pale-yellow-brown polyhalite and clay	1,343.1-1,343.6
Halite, pale-yellow-brown, coarse crystalline	1,343.6-1,344.1
Halite, moderate-red-brown, moderate-pink-orange and pale-red, coarse crystalline; contains moderate amounts of red-brown polyhalite blebs and stringers; grades into unit below	1,344.1-1,345.2
Halite, pale-yellow-brown, moderate-orange-pink, coarse crystalline; contains very sparse moderate-red-brown polyhalite blebs	1,345.2-1,346.7
Halite, moderate-orange-pink to pale-yellow-brown, to clear, medium to coarse crystalline; lower 0.1 foot contains some red-brown polyhalite blebs	1,346.7-1,347.6
Halite, pale-red to light-gray, fine crystalline, very clayey; contains large amount of intercrystalline gray-green clay, also clay in stringers	1,347.6-1,349.2

Table 7C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red to clear, fine crystalline in upper part, grading to coarse in center, grading back to fine at base, clayey; contains large amounts of brown intercrystalline clay and clay blebs; brown clay partings at top, 1,350.1, 1,351.6, 1,352.2, 1,352.7, and 1,353.2 feet	1,349.2-1,354.6
Halite, pale-red to clear, coarse crystalline, grading downward to fine crystalline; contains gray-green intercrystalline clay and clay in stringers	1,354.6-1,355.4
Halite, pale-red to moderate-red-brown to pale-yellow-brown to clear, medium crystalline; moderate-red-brown polyhalite stringers at top and bottom; gray-green clay stringers throughout; parting at 1,356.8 feet	1,355.4-1,357.5
Halite, pale-red to light-gray, fine crystalline at top, grading to coarse crystalline in bottom two-thirds; contains minor red-brown polyhalite blebs; gray-green clay in stringers and intercrystalline	1,357.5-1,358.8
Halite, pale-red to clear to moderate-red-brown, coarse crystalline; moderate-red-brown stringers and blebs of polyhalite; lower 0.3 foot has stringers of anhydrite	1,358.8-1,360.6
Anhydrite, medium-gray, laminated; stringer of fine crystalline halite and polyhalite at 1,360.8 feet; 0.1-foot band of moderate-yellow-brown, coarse crystalline halite at 1,361.1 feet; mottled polyhalite and anhydrite zone	1,360.6-1,374.9
Clay, light-gray, halitic	1,374.9-1,376.1
Halite, medium-gray, pale-red, coarse crystalline; silty clay	1,376.1-1,378.0
Halite, moderate-red-brown, pale-red, very coarse crystalline; contains numerous stringers of light-gray anhydrite	1,378.0-1,380.4
Halite, pale-red to clear, coarse crystalline; gray clay stringer at 1,380.5 feet	1,380.4-1,381.2
Halite, pale-yellow-brown and pale-red, coarse crystalline	1,381.2-1,381.8
Halite, moderate-red-brown, very coarse crystalline; polyhalite	1,381.8-1,382.4
Halite, fine to coarse crystalline, very clayey; gray-green intergranular clay; clay stringers at 1,382.7 and 1,383.2 feet	1,382.4-1,383.5
Halite, moderate-red-brown and clear, coarse crystalline; polyhalite	1,383.5-1,384.6
Halite, moderate-red-brown and moderate-red-orange and pale-red, medium to coarse crystalline; contains large amount of intergranular brown clay; gray-green clay seam at top of unit	1,384.6-1,386.3
Clay, fine to medium crystalline, halitic; gray clay seam at top of unit and at 1,387.2 feet	1,386.3-1,387.3

Table 7C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red and moderate-red-brown, coarse crystalline; contains blebs and stringers of moderate-red-orange and moderate-red-brown polyhalite	1,387.3-1,388.3
Clay, fine to coarse crystalline, halitic; brown clay seam at 1,388.6 feet	1,388.3-1,389.7
Halite, pale-red, light-gray, fine to medium crystalline; contains minor amount of brown intergranular clay	1,389.7-1,390.3
Halite, pale-red, light-gray, fine crystalline; contains intergranular gray-green to brown clay	1,390.3-1,390.7
Halite, pale-red to moderate-red-brown, medium to coarse crystalline, polyhalitic	1,390.7-1,392.0
Halite, pale-red, fine to medium crystalline; contains small amount red-brown clay	1,392.0-1,392.7
Halite, pale-red and moderate-red-brown and clear, fine crystalline; contains small amount of gray-green intergranular clay	1,392.7-1,394.1
Halite, pale-yellow-brown, moderate-red-brown, coarse crystalline; contains moderate-red-brown polyhalite blebs	1,394.1-1,394.8
Halite, pale-red, coarse crystalline; contains moderate-orange polyhalite blebs	1,394.8-1,395.5
Halite, gray-orange and pale-red, fine crystalline; contains tiny stringers of red clay	1,395.5-1,395.8
Halite,pale-red, coarse crystalline; contains a few vugs	1,395.8-1,396.9
Halite, pale-red and pale-yellow-brown, coarse crystalline; contains a few stringers of pale-yellow-brown polyhalite	1,396.9-1,397.8
Halite, pale-red, coarse crystalline; contains a few moderate-yellow-brown polyhalite blebs	1,397.8-1,399.1
Halite, pale-yellow-brown and clear, coarse crystalline; contains minor scattered stringers of red polyhalite	1,399.1-1,401.6
Halite, pale-red and light-gray, fine to medium crystalline; contains minor moderate-yellow-orange polyhalite blebs and minor amounts of light-brown clay	1,401.6-1,402.2
Halite, pale-red and clear, medium to coarse crystalline; minor leaching in lower tenth of interval	1,402.2-1,402.6
Halite, pale-red, white, moderate-red-brown, fine to coarse crystalline; contains moderate-red-brown polyhalite blebs	1,402.6-1,403.0
Halite, moderate-red-orange, clear, pale-red, fine to coarse crystalline; contains brown intergranular clay; green-gray seam at top of unit	1,403.0-1,403.9

Table 7C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red, white, fine to coarse crystalline; contains minor amount of red-orange polyhalite stringers	1,403.9-1,405.0
Halite, pale-red, white and light-gray, fine to coarse crystalline; contains minor amount of moderate-red-orange blebs and stringers of polyhalite	1,405.0-1,405.6
Halite, moderate-red-orange, white, fine to medium crystalline; contains moderate amount of moderate-red-orange polyhalite stringers	1,405.6-1,408.9
Halite, pale-red to light-gray, pale-yellow-brown, fine crystalline; contains moderate amount of light-brown clay, also moderate-yellow-orange clay	1,408.9-1,411.1
Halite, pale-red, moderate-red-orange, fine crystalline; gray-green seam at top of unit; contains moderate amount of moderate-red-orange clay; light-brown clay seam at 1,412.6 feet	1,411.1-1,413.4
Halite, pale-red, coarse crystalline	1,413.4-1,413.8
Halite, moderate-red-orange, moderate-red-brown, medium crystalline	1,413.8-1,414.2
Halite, pale-red and white, fine to medium crystalline; contains moderate amount of moderate-red-orange clay stringers; minor moderate-red polyhalite band at 1,415.4 feet	1,414.2-1,418.4
Halite, pale-red and white, fine to medium crystalline; contains minor amount of moderate-red-orange clay blebs and moderate-red-brown polyhalite stringers	1,418.4-1,419.2
Halite, pale-red and light-gray, fine to medium crystalline; contains moderate amounts of moderate-red-orange clay blebs; moderate amounts of red-orange polyhalite at base of unit	1,419.2-1,420.2
Halite, pale-yellow-brown and light-gray, fine to medium crystalline; contains gray-green intergranular clay and moderate-orange-pink clay stringers	1,420.2-1,420.7
Halite, moderate-red-brown and pale-red, fine crystalline; contains stringer of moderate-orange-pink clay; brown clay seam at base of unit	1,420.7-1,421.0
Halite, pale-red and white, pale-yellow-brown, fine to coarse crystalline; brown clay seam at 1,421.7 feet; upper half of unit is gray-green intergranular clay, lower half contains moderate amounts of light-brown clay	1,421.0-1,424.0
Halite, moderate-red-orange and pale-red, medium crystalline; finely disseminated moderate-red polyhalite in upper part of unit	1,424.0-1,425.0
Halite, pale-red to moderate-red-orange to light-gray, medium to coarse crystalline; contains intergranular brown clay; moderate-red-orange diagonal polyhalite stringer at base of unit	1,425.0-1,427.9

Table 7C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-red-orange and pale-red, very fine crystalline	1,427.9-1,428.6
Halite, pale-yellow-brown grading to pale-red, very fine medium crystalline; contains minor amount of green-gray intergranular clay and medium-pale-yellow blebs of polyhalite	1,428.6-1,429.8
Halite, pale-yellow-brown, pale-red, fine to medium crystalline	1,429.8-1,436.3
Polyhalite and anhydrite, gray-red and light-gray and pale-yellow-brown; polyhalite and halite banding common	1,436.3-1,444.4
Halite, pale-yellow-brown, fine to medium crystalline	1,444.4-1,445.3
Anhydrite and halite; anhydrite is very light gray, halite is pale yellow brown	1,445.3-1,446.0
Halite, clear, medium crystalline; white polyhalite disseminated throughout, with one band at 1,447.8 feet	1,446.0-1,449.0
Halite, clear to orange, orange intensity increases with depth, medium crystalline; thin polyhalite bands at 1,450.1, 1,450.3, 1,450.7, 1,451.0, 1,451.4, and 1,451.9 feet; polyhalite disseminated throughout; some medium crystals of polyhalite	1,449.0-1,452.4
Polyhalite, dark-orange, mottled appearance with some gray throughout; halite at lower 0.2 foot	1,452.4-1,453.6
Anhydrite, medium-gray, dense; some disking; halite crystals scattered throughout	1,453.6-1,459.7
Mudstone, medium-gray, soft; 0.05-foot thick halite band at 1,460.5 feet	1,459.7-1,461.1
Polyhalite, light-orange to brown; upper half of zone transitional from mudstone to polyhalite, lower part contains very little mudstone	1,461.1-1,462.1
Polyhalite, orange, and halite, clear, medium crystalline, ±50 percent each	1,462.1-1,462.7
Polyhalite, dark-orange	1,462.7-1,462.8
Clay, blue-gray; some polyhalite	1,462.8-1,462.9
Halite, clear to light-orange, medium crystalline; polyhalite blebs scattered throughout	1,462.9-1,463.5
Halite, clear, medium crystalline; partings at 1,463.7 and 1,464.1 feet	1,463.5-1,464.1
Halite, gradational between clear and orange, medium crystalline; contains minor disseminated polyhalite, some thin banding	1,464.1-1,471.0
Halite, clear, medium crystalline; contains minor polyhalite; blue-gray clay scattered throughout	1,471.0-1,472.1
Halite, clear, medium to coarse crystalline; brown clay parting at top and bottom (1,472.1 and 1,472.4 feet); contains minor brown clay, mottled appearance	1,472.1-1,472.4

Table 7C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to light-orange, fine to coarse crystalline, mottled appearance; contains thin, disseminated, brown and blue-gray clay----	1,472.4-1,473.6
Halite, clear, medium to coarse crystalline; minor blue-green clay at top 0.4 foot of interval; parting at 1,473.6 feet----------	1,473.6-1,474.4
Halite, grades from orange in top 1.5 feet to clear, medium to coarse crystalline----------	1,474.4-1,483.6
Langbeinite, massive; some leonite/kainite----------	1,483.6-1,484.2
Halite, medium crystalline; polyhalite scattered throughout; minor amounts of sulfates; minor blue-gray interstitial clay; clay parting at 1,484.5 feet----------	1,484.2-1,485.1
Halite, clear, medium crystalline; interspersed reddish-brown clay beds throughout; contains minor scattered polyhalite----------	1,485.1-1,488.5
Halite, clear to very light orange, medium crystalline; contains scattered small polyhalite blebs; minor sulfates at bottom of zone---	1,488.5-1,492.7
Polyhalite, dark-orange; some halite; abundant large crystals of langbeinite; some leonite/kainite replacement----------	1,492.7-1,493.7
Halite, clear, fine crystalline; abundant polyhalite; interspersed blue-gray clay; leonite/kainite remnants in upper part; partings at 1,493.9, 1,494.0, 1,494.1, 1,494.2, and 1,494.5 feet----------	1,493.7-1,494.5
Halite, clear to very light orange, fine to coarse crystalline; contains minor scattered polyhalite blebs and thin stringers; very minor blue-gray clay; partings at 1,496.4 feet----------	1,494.5-1,496.4
Halite, clear to very light orange, medium to coarse crystalline; very minor disseminated polyhalite, interspersed blue-gray clay, more than in interval above; very minor sulfates in middle part; clay parting at 1,499.5 feet----------	1,496.4-1,500.1
Halite, clear; minor amounts of orange polyhalite; fairly abundant interspersed sylvite----------	1,500.1-1,502.7
Halite, clear to light-orange, medium crystalline; abundant dark-orange polyhalite and minor sylvite scattered throughout----------	1,502.7-1,503.7
Halite, clear, medium crystalline; disseminated polyhalite and some polyhalite bands throughout; minor, blue-gray clay disseminated throughout; parting at 1,506.1 feet----------	1,503.7-1,508.0
Halite, clear to light-orange, coarse crystalline; thin polyhalite bands at 1,508.4, 1,508.9, 1,509.1, and 1,509.6 feet; blue-gray parting at 1,509.7 feet----------	1,508.0-1,509.7
Halite, clear, medium crystalline; interspersed blue-gray clay; some disseminated polyhalite; minor sulfates----------	1,509.7-1,510.8

Table 7C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to very light orange, fine to medium crystalline; contains very minor, orange polyhalite blebs and thin stringers	1,510.8-1,516.0
Halite, clear to very light brown grading to blue-gray at base owing to interstitial clay; contains minor amounts of white to light-orange polyhalite blebs; minor sylvite throughout unit	1,516.0-1,517.5
Halite, clear, fine crystalline; very minor, white polyhalite, slight gray tint at top and base	1,517.5-1,520.0
Halite, clear, fine to medium crystalline; some white polyhalite; 0.3-foot thick bed of langbeinite, which exhibits leonite/kainite replacement near top of zone; blue-gray parting at 1,520.4 and 1,520.9 feet	1,520.0-1,521.0
Halite, light-red-orange, medium to coarse crystalline, polyhalitic; red-brown polyhalite disseminated interstitially	1,521.0-1,521.7
Halite, light-blue-gray, medium to coarse crystalline, clayey, polyhalitic; gray clay blebs throughout; gray clay partings at 1,521.8 and 1,522.4 feet; brown clay parting at 1,522.0 feet	1,521.7-1,522.8
Halite, light-brown, medium crystalline, mottled, clayey; minor polyhalite; minor potassium mineralization; brown clay partings at 1,522.8, 1,523.2, and 1,523.5 feet	1,522.8-1,524.1
Halite, light-reddish-brown, medium to coarse crystalline, polyhalitic; contains minor soluble potassium minerals; polyhalite decreases with depth	1,524.1-1,525.1
Halite, light-grayish-orange-pink, coarse crystalline; very minor polyhalite	1,525.1-1,527.1
Halite, light-orange-pink to bluish-gray to grayish-orange-pink, medium to coarse crystalline, polyhalitic; red-brown polyhalite in bands and stringers; minerals (sodium sulfates?) in lower third	1,527.1-1,534.8
Halite, light-gray-brown, fine to medium crystalline, mottled, clayey; minor polyhalite; brown clay partings	1,534.8-1,537.3
Halite, brownish-gray mottled to beige, fine to coarse crystalline; minor polyhalite, disseminated interstitially	1,537.3-1,542.1
Halite, pale-red, medium-gray, white, fine to medium crystalline; contains moderate amount of intergranular brown clay; brown clay parting at top of unit	1,542.1-1,543.8
Halite, pale-yellow-brown, clear, coarse crystalline; minor reddish-brown polyhalite stringers near base	1,543.8-1,545.6

Table 7C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-yellow-brown, pale-red, coarse crystalline; contains numerous reddish-brown polyhalite blebs and stringers	1,545.6-1,548.2
Halite, pale-yellow-brown, clear, coarse crystalline	1,548.2-1,549.6
Halite, pale-red, medium-gray, fine to coarse crystalline; contains moderate amount of brown intercrystalline clay; parting at 1,550.7 feet	1,549.6-1,550.8
Halite, moderate-reddish-orange, clear, coarse crystalline; contains minor blebs of reddish-brown polyhalite	1,550.8-1,551.3
Halite, pale-red, clear, fine to coarse crystalline; contains moderate amount of greenish-gray intercrystalline clay; partings at 1,558.1 and 1,558.7 feet (green) and at 1,559.5 feet (brown); lower 0.8 foot contains brown intercrystalline clay; moderate-reddish-brown clay at 1,557.0-1,557.8 feet	1,551.3-1,559.6
Halite, pale-red, coarse crystalline; contains moderate amount of reddish-brown intercrystalline clay	1,559.6-1,560.4
Halite, pale-yellow-brown, pale-red, clear, very coarse crystalline; brown clay seams at top at 1,561.0 feet	1,560.4-1,561.3
Halite, pale-red, light-gray, coarse crystalline; contains numerous blebs and stringers of moderate-reddish-brown polyhalite; gray clay seam at 1,562.3 feet, small amount of intergranular gray-green clay	1,561.3-1,562.5
Halite, pale-yellow-brown, clear, coarse crystalline; minor, pale-reddish-brown polyhalite blebs	1,562.5-1,563.8
Halite, pale-yellow-brown, pale-red, clear, coarse crystalline; contains moderate amounts of reddish-brown polyhalite stringers	1,563.8-1,564.6
Halite, pale-red, pale-yellow-brown, clear, medium to coarse crystalline; contains minor amount of moderate-reddish-brown polyhalite; moderate amount of pale-reddish-orange clay stringers	1,564.6-1,568.5
Halite, moderate-reddish-orange, moderate-reddish-brown, very fine crystalline; contains moderate amount of reddish-brown polyhalite	1,568.5-1,568.7
Polyhalite, moderate-reddish-brown, dense; slightly clayey at base	1,568.7-1,569.4
Clay, greenish-gray; contains blebs of moderate-reddish-brown polyhalite	1,569.4-1,569.9
Halite, pale-red, moderate-reddish-orange, fine to medium crystalline	1,569.9-1,570.2
Polyhalite, moderate-reddish-brown; gray-green clay surrounds polyhalite blebs; halitic stringer at 1,571.1 feet	1,570.2-1,571.3
Halite, pale-red, clear, coarse crystalline grading downward to fine crystalline; contains great amount of moderate-reddish-brown polyhalite stringers and blebs	1,571.3-1,572.4

Table 7C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red, clear, medium crystalline; contains minor amount of moderate-reddish-brown polyhalite stringers and minor amount of brown clay----------	1,572.4-1,575.0 Total depth

Table 7D.--Mineralogical and chemical analyses of core samples from potash ore zones and mineralized salt beds in drill hole P-7

[oz, ore zone; mm, middle member; lm, lower member; tr, trace; Bl, bloedite; Ha, halite; Ka, kainite; La, langbeinite; Le, leonite; Po, polyhalite; n.d., not determined. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mineralogy: X-ray diffraction analysis[1]	Chemical analysis (weight percent): Ca	K	Mg	Na	Cl	SO_4	H_2O^+	H_2O^-	Water insoluble
P-7/1	1,479.05-1,479.73	0.68	4th oz, mm	9 Ha; <1 Po; 1 La	0.50	1.7	1.0	35.5	60.0	n.d.	n.d.	n.d.	n.d.
P-7/2	1,479.73-1,481.20	1.47		7 Ha; >2 La; <1 Po	.23	6.4	4.1	25.5	40.0	24.0	0.12	0.06	0.14
P-7/3	1,481.20-1,483.00	1.80		>8 Ha; >1 La, tr Po	.04	1.8	1.2	35.0	60.0	6.5	.17	.10	.08
P-7/4	1,483.00-1,483.48	.48	4th oz, lm	>7 Ha; 1 Ka; <1 Bl, Le, Po	.40	4.5	3.0	27.0	42.5	16.0	5.9	.47	1.4
P-7/5	1,483.48-1,484.78	1.30		>9 Ha; <1 Po	.80	.88	.45	35.0	57.0	3.7	.50	.51	2.6
P-7/6	1,518.48-1,519.00	.52	2nd oz	>9 Ha; tr La	.06	.60	.39	38.0	60.0	n.d.	n.d.	n.d.	.22
[2] P-7/7	1,519.00-1,519.81	.81		>6 Ha; <1 La, Ka, Le, Bl	.06	6.1	3.9	22.0	35.0	22.0	4.28	.96	5.7
[2] P-7/7					.07	6.1	3.3	22.0	35.5	20.0	4.0	1.1	5.0
P-7/8	1,519.81-1,520.25	1.04		>8 Ha; >1 Po; tr Ka	1.2	1.7	.78	34.0	53.5	n.d.	n.d.	n.d.	1.5

[1]Estimate of amount reported on a scale of 0-10.
[2]Replicate analyses.

Table 7E.--Calculated mode (mineral content) and potash distribution by mineral in core samples from potash ore zones and mineralized salt beds in drill hole P-7

[oz, ore zone; mm, middle member; lm, lower member; Bl, bloedite; Ha, halite; Ka, kainite; La, langbeinite; Le, leonite; Po, polyhalite; Insol., clay and silt; n.d., not determined; leaders (---), not present. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mode (weight percent mineral)							K_2O distribution by minerals				
				La	Ka	Le	Bl	Ha	Po	Insol.	La	Ka	Le	Po	Total
P-7/1	1,479.05-1,479.73	0.68	4th oz, mm	6.4	---	---	---	90.3	3.7	n.d.	1.4	---	---	0.6	2.0
P-7/2	1,479.73-1,481.20	1.47		32.8	---	---	---	64.8	1.7	0.1	7.4	---	---	.3	7.7
P-7/3	1,481.20-1,483.00	1.80		9.3	---	---	---	89.0	.3	.1	2.1	---	---	.1	2.2
P-7/4	1,483.00-1,483.48	.48	4th oz, lm	---	18.2	5.9	4.0	67.3	3.0	1.4	---	3.4	1.5	.5	5.4
P-7/5	1,483.48-1,484.78	1.30		---	.6	---	---	93.7	6.0	2.6	---	.1	---	.9	1.0
P-7/6	1,518.48-1,519.00	.52	2d oz	2.9	---	---	---	96.6	.4	.2	.6	---	---	.1	.7
[1]P-7/7	1,519.00-1,519.81	.81		18.4	12.3	3.0	4.5	54.8	.4	5.7	4.2	2.3	.8	.1	7.4
[1]P-7/7				15.2	7.1	9.6	2.3	56.9	.5	5.0	3.4	1.3	2.5	.1	7.3
P-7/8	1,519.81-1,520.85	1.04		---	3.4	---	---	86.5	9.0	1.5	---	.6	---	1.4	2.0

[1]Replicate analyses.

TABLES 8A-8G

Basic data from drill hole P-8,
Waste Isolation Pilot Plant area, Eddy County, New Mexico

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8G.--Gamma-ray and neutron logs of drill hole	foldout

Table 8A.--Abridged drill-hole history

LOCATION: Sec. 4, T. 23 S., R. 31 E.
196 m (642 ft) from north line
29 m (96 ft) from west line

ALTITUDE (LAND SURFACE): 1,017 m (3,336.4 ft). Datum for depth measurements for drilling and logging operations.

LITHOLOGIC LOG PREPARED BY: R. J. Cheeseman, J. C. Lorenz, J. W. Mercer, and L. A. Rives, September 9-15, 1976.

DRILLING CONTRACTOR: Boyles Bros. Drilling Co.

DRILLING RECORD: Commenced drilling on September 8, and completed on September 15, 1976, at 506 m (1,660 ft) below land surface.

Drilled with air mist to 150 m (493 ft) below land surface. No water reported by driller.

Recovered all casing, and plugged with cement.

REMARKS: Top of salt in Rustler Formation at 185 m (606 ft) below land surface.

Table 8B.--Stratigraphic summary

Rock unit	Depth interval[1] feet	meters
Holocene deposits	0-9	0-3
Pleistocene rocks:		
Gatuna Formation	9-39	3-12
Permian rocks:		
Dewey Lake Red Beds	39-391	12-119
Rustler Formation	391-715	119-218
Magenta Dolomite Member	450-474	137-144
Culebra Dolomite Member	563-585	172-178
Salado Formation	715-1,660	218-506
Upper member	715-1,237	218-377
McNutt potash zone	1,237-1,652	377-504
Vaca Triste Sandstone Member[2]	1,237-1,245	377-379
11th ore zone	1,297-1,301	395-397
Marker bed 117	1,308-1,310	399-399
Marker bed 118	1,333-1,337	406-408
Marker bed 119	1,360-1,362	414-415
10th ore zone	1,373-1,380	418-421
Marker bed 120	1,389-1,390	423-424
9th ore zone	1,395-1,399	425-426
Marker bed 121	1,405-1,407	428-429
Marker bed 122	1,413-1,414	431-431
8th ore zone	1,421-1,430	433-436
Union anhydrite[3]	1,440-1,455	439-443
7th ore zone	1,461-1,465	445-447
6th ore zone	1,472-1,475	449-450
5th ore zone	1,481-1,492	451-455
Marker bed 123	1,517-1,524	462-464
Marker bed 124	1,537-1,545	468-471
4th ore zone	1,554-1,567	474-478
3d ore zone	1,577-1,596	481-486
2d ore zone	1,601-1,604	488-489
1st ore zone	1,624-1,633	495-498
Marker bed 126	1,661-1,662	506-507
Maximum depth recorded	1,662	507

[1]Depth interval recorded from geophysical logs.
[2]Of Adams, 1944.
[3]Informal unit of Salado Formation.

Table 8C.--Lithologic log

Description	Depth (feet)	
Sand, red, friable quartz	0.0-	5.0
Caliche; sand; pink siltstone	5.0-	10.0
Same as above	10.0-	15.0
Same as above	15.0-	20.0
Caliche, red sandstone	20.0-	25.0
Caliche; pink sandstone and siltstone	25.0-	30.0
Same as above	30.0-	35.0
Sand, red, friable; siltstone; clay	35.0-	40.0
Siltstone, red, with reduction spots	40.0-	45.0
Same as above	45.0-	50.0
Siltstone, red, with green reduction spots; friable	50.0-	55.0
Same as above	55.0-	60.0
Same as above	60.0-	65.0
Same as above	65.0-	70.0
Same as above	70.0-	75.0
Same as above	75.0-	80.0
Same as above	80.0-	85.0
Same as above	85.0-	90.0
Same as above	90.0-	95.0
Same as above	95.0-	100.0
Siltstone, red, friable; sand	100.0-	105.0
Same as above	105.0-	110.0
Same as above	110.0-	115.0
Same as above	115.0-	120.0
Same as above	120.0-	125.0
Same as above	125.0-	130.0
Same as above	130.0-	135.0
Same as above	135.0-	140.0
Same as above	140.0-	145.0
Same as above	145.0-	150.0
Same as above	150.0-	155.0
Same as above	155.0-	160.0
Same as above	160.0-	165.0
Same as above	165.0-	170.0
Same as above	170.0-	175.0
Same as above	175.0-	180.0
Siltstone and sandstone, red, friable	180.0-	185.0
Siltstone, red; some gray siltstone	185.0-	190.0

Table 8C.--Lithologic log--(Continued)

Description	Depth (feet)
Siltstone, red	190.0- 195.0
Siltstone, red; some gray-green limestone chips	195.0- 200.0
Siltstone, red, fine-grained, slightly limy; some (>5 percent) gypsum chips	200.0- 205.0
Same as above	205.0- 210.0
Same as above	210.0- 215.0
Same as above	215.0- 220.0
Same as above	220.0- 225.0
Same as above	225.0- 230.0
Same as above	230.0- 235.0
Same as above; possible caliche, 1 percent	235.0- 240.0
Same as above	240.0- 245.0
Same as above	245.0- 250.0
Siltstone, red, fine-grained, very slightly limy	250.0- 255.0
Same as above	255.0- 260.0
Same as above; slightly gypsiferous	260.0- 265.0
Same as above	265.0- 270.0
Same as above; no gypsum	270.0- 275.0
Siltstone, red, fine-grained, very slightly limy; no gypsum	275.0- 280.0
Same as above	280.0- 285.0
Same as above	285.0- 290.0
Same as above	290.0- 295.0
Same as above; slightly gypsiferous	295.0- 300.0
Siltstone, dark-red-brown; red clay with green reduction spots	300.0- 305.0
Same as above	305.0- 310.0
Same as above	310.0- 315.0
Same as above	315.0- 320.0
Siltstone, reddish-brown; abundant, yellowish-clear to clear selenite; <1 percent calciferous material	320.0- 325.0
Same as above	325.0- 330.0
Same as above; selenite decreasing	330.0- 335.0
Siltstone, medium-dark-red-brown, with green reduction spots; abundant selenite	335.0- 340.0
Siltstone, medium-dark-red-brown; <2 percent selenite; white, granular gypsum	340.0- 345.0
Same as above	345.0- 350.0
Same as above	350.0- 355.0
Same as above	355.0- 360.0

Table 8C.--Lithologic log--(Continued)

Description	Depth (feet)
Siltstone, medium-dark-red-brown; <2 percent selenite; white, granular gypsum	360.0- 365.0
Same as above	365.0- 370.0
Siltstone, dark-medium-reddish-brown, with green reduction spots; approx. 2-3 percent selenite	370.0- 375.0
Same as above	375.0- 380.0
Same as above	380.0- 385.0
Same as above	385.0- 390.0
Same as above	390.0- 395.0
Same as above	395.0- 400.0
Siltstone, dark-red-brown, about 60 percent; approx. 40 percent light-gray anhydrite with gypsum rinds	400.0- 405.0
Same as above	405.0- 410.0
Same as above; with about 1-2 percent clear selenite	410.0- 415.0
Same as above; with some greenish-blue siltstone	415.0- 420.0
Same as above	420.0- 425.0
Same as above	425.0- 430.0
Same as above	430.0- 435.0
Siltstone, dark-red-brown, 60 percent; 30-35 percent light-gray to medium-gray anhydrite; <5 percent clear to yellow selenite	435.0- 440.0
Same as above	440.0- 445.0
Same as above	445.0- 450.0
Siltstone, dark-red-brown; light-gray anhydrite; 10-20 percent light to medium-gray dolomite	450.0- 455.0
Same as above; dolomite increasing	455.0- 460.0
Same as above	460.0- 465.0
Same as above	465.0- 470.0
Same as above; anhydrite increasing	470.0- 475.0
Siltstone, red; anhydrite; light-medium-gray dolomite; clear selenite	475.0- 480.0
Dolomite, light-gray; red-brown siltstone; light-gray anhydrite	480.0- 485.0
Anhydrite, light-gray; light-medium-gray dolomite; dark-red-brown siltstone; white gypsum	485.0- 490.0
Anhydrite, light-gray, with white gypsum rinds; dark-red-brown siltstone; dolomite; light-medium gypsum; clear selenite	490.0- 495.0
Same as above; anhydrite with gypsum rinds increasing	495.0- 500.0
Anhydrite, light-gray, with white gypsum rinds; dark-red-brown siltstone; gypsum; selenite; medium-gray, mottled dolomite	500.0- 505.0
Anhydrite, red; siltstone; gray selenite; siltstone	505.0- 510.0

Table 8C.--Lithologic log--(Continued)

Description	Depth (feet)
Gypsum, white; gray anhydrite; red siltstone; selenite	510.0- 515.0
Gypsum, white; some anhydrite; red siltstone	515.0- 520.0
Gypsum, white; anhydrite with gypsum rinds; some red siltstone	520.0- 525.0
Anhydrite, gray; white gypsum	525.0- 530.0
Same as above	530.0- 535.0
Same as above	535.0- 540.0
Same as above; with gray and red siltstone	540.0- 545.0
Same as above	545.0- 550.0
Same as above	550.0- 555.0
Same as above	555.0- 560.0
Same as above	560.0- 565.0
Same as above	565.0- 570.0
Same as above	570.0- 575.0
Same as above	575.0- 580.0
Dolomite; anhydrite	580.0- 585.0
Dolomite, gray; anhydrite; some red siltstone	585.0- 590.0
Same as above	590.0- 595.0
Same as above	595.0- 600.0
Dolomite, gray; gray anhydrite; gypsum; red siltstone	600.0- 605.0
Anhydrite; gray dolomite; white, crystalline gypsum	605.0- 610.0
Same as above	610.0- 615.0
Dolomite, gray, crystalline; gray to white anhydrite	615.0- 620.0
Same as above	620.0- 625.0
Same as above	625.0- 630.0
Same as above; with gray shale and siltstone	630.0- 635.0
Same as above; with selenite	635.0- 640.0
Dolomite, gray; gypsum; red siltstone	640.0- 645.0
Same as above	645.0- 650.0
Same as above	650.0- 655.0
Same as above	655.0- 660.0
Dolomite, gray; gypsum; red siltstone; gray anhydrite	660.0- 665.0
Siltstone, red; white gypsum; some dolomite and anhydrite	665.0- 670.0
Same as above; with more dolomite	670.0- 675.0
Clay/shale, gray to black; some red siltstone; gray dolomite	675.0- 680.0
Clay/shale, gray to black; some red mudstone	680.0- 685.0
Same as above	685.0- 690.0
Same as above; some dolomite and anhydrite	690.0- 695.0
Same as above; with some selenite	695.0- 700.0

Table 8C.--Lithologic log--(Continued)

Description	Depth (feet)
Clay, gray to red; black shale; red siltstone; gray anhydrite	700.0- 705.0
Same as above; with sparse selenite	705.0- 710.0
Same as above	710.0- 715.0
Same as above	715.0- 720.0
Same as above	720.0- 725.0
Clay, gray to red; black shale; red siltstone; gray anhydrite	725.0- 730.0
Same as above; with selenite	730.0- 735.0
Same as above; with sparse selenite	735.0- 740.0
Siltstone, red; black and red shale; selenite; gypsum and anhydrite	740.0- 745.0
Same as above	745.0- 750.0
Same as above	750.0- 755.0
Same as above; without selenite	755.0- 760.0
Same as above; with selenite	760.0- 765.0
Same as above	765.0- 770.0
Same as above; with red mudstone	770.0- 775.0
Same as above	775.0- 780.0
Same as above	780.0- 785.0
Same as above	785.0- 790.0
Siltstone, red; gray anhydrite; gypsum; sparse black shale	790.0- 795.0
Same as above	795.0- 800.0
Halite, clear; some red to gray siltstone	800.0- 805.0
Halite, pink; red siltstone; (possible red polyhalite); some black shale	805.0- 810.0
Siltstone, red; clear halite; gray gypsum; some black shale	810.0- 815.0
Same as above; with gypsum and selenite	815.0- 820.0
Same as above	820.0- 825.0
Siltstone, red; clear halite; red polyhalite; sparse gray anhydrite, contaminated with red mud	825.0- 830.0
Polyhalite, red; red siltstone	830.0- 835.0
Halite, clear; red polyhalite, contaminated with red mud	835.0- 840.0
Polyhalite, red; some clear halite; gray anhydrite	840.0- 845.0
Halite, clear; minor red polyhalite	845.0- 850.0
Polyhalite, red; clear halite; gray anhydrite with gypsum rinds	850.0- 855.0
Halite, clear; contaminated with gray mud	855.0- 860.0
Same as above	860.0- 865.0
Same as above	865.0- 870.0
Same as above; with some red polyhalite	870.0- 875.0

Table 8C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear; some red polyhalite; contaminated with brown and gray mud from above	875.0- 880.0
Same as above; with some sandstone	880.0- 885.0
Halite, clear; some red polyhalite; contaminated with brown and gray mud from above	885.0- 890.0
Halite, clear; contaminated with brown and gray mud from above	890.0- 895.0
Same as above	895.0- 900.0
Siltstone; sparse halite and polyhalite; sparse black shale; contaminated with brown mud from above	900.0- 905.0
Halite, gray; some gray clay	905.0- 910.0
Same as above	910.0- 915.0
Halite, gray to brown; some gray clay	915.0- 920.0
Same as above	920.0- 925.0
Same as above	925.0- 930.0
Same as above	930.0- 935.0
Same as above	935.0- 940.0
Same as above	940.0- 945.0
Same as above	945.0- 950.0
Halite, clear to light-brown	950.0- 955.0
Halite, brown; clay	955.0- 960.0
Same as above	960.0- 965.0
Same as above	965.0- 970.0
Same as above	970.0- 975.0
Same as above	975.0- 980.0
Same as above	980.0- 985.0
Same as above; some red clay	985.0- 990.0
Halite, light-brown; clay	990.0- 995.0
Halite, light-brown to clear	995.0-1,000.0
Halite, light-brown; clay	1,000.0-1,005.0
Halite, clear	1,005.0-1,010.0
Halite, light-brown to clear	1,010.0-1,015.0
Same as above; with minor, red polyhalite	1,015.0-1,020.0
Halite, light-brown to clear	1,020.0-1,025.0
Halite, light-brown	1,025.0-1,030.0
Halite, light-brown; clay	1,030.0-1,035.0
Same as above	1,035.0-1,040.0
Same as above	1,040.0-1,045.0
Same as above	1,045.0-1,050.0

Table 8C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, light-brown; clay	1,050.0-1,055.0
Same as above	1,055.0-1,060.0
Same as above	1,060.0-1,065.0
Same as above	1,065.0-1,070.0
Same as above	1,070.0-1,075.0
Same as above	1,075.0-1,080.0
Same as above	1,080.0-1,085.0
Same as above	1,085.0-1,090.0
Same as above	1,090.0-1,095.0
Same as above	1,095.0-1,100.0
Same as above	1,100.0-1,105.0
Same as above	1,105.0-1,110.0
Halite, clear to light-brown	1,110.0-1,115.0
Same as above	1,115.0-1,120.0
Same as above	1,120.0-1,125.0
Same as above	1,125.0-1,130.0
Halite, light-brown; clay	1,130.0-1,135.0
Halite, clear to light-brown, clay	1,135.0-1,140.0
Same as above	1,140.0-1,145.0
Same as above	1,145.0-1,150.0
Same as above	1,150.0-1,155.0
Same as above	1,155.0-1,160.0
Same as above	1,160.0-1,165.0
Same as above	1,165.0-1,170.0
Same as above	1,170.0-1,175.0
Same as above	1,175.0-1,180.0
Halite, brown to orange; possible polyhalite	1,180.0-1,185.0
Halite, clear to light-brown or gray	1,185.0-1,190.0
Same as above	1,190.0-1,195.0
Same as above	1,195.0-1,200.0
Halite, clear to light-brown or orange	1,200.0-1,205.0
Halite, clear to gray	1,205.0-1,210.0
Same as above	1,210.0-1,215.0
Same as above; with some polyhalite	1,215.0-1,220.0

Table 8C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to gray	1,220.0-1,225.0
Same as above	1,225.0-1,230.0
Same as above	1,230.0-1,235.0
Same as above	1,235.0-1,240.0
Polyhalite, gray to orange, medium crystalline, massive, waxy	1,240.0-1,240.3
Halite, dark-brown, medium to coarse grained; waxy clay partings at 1,240.5 and 1,243.2 feet; some red polyhalite blebs	1,240.3-1,244.2
Halite, pale-red to medium-red or orange, medium to coarse crystalline; contains scattered polyhalite blebs; 0.15-foot thick, fine-grained, massive polyhalite band at 1,246.1 feet	1,244.2-1,248.1
Halite, with disseminated clay, gray to yellow-brown, medium to coarse crystalline; thin clay parting at 1,248.4 feet	1,248.1-1,249.5
Halite, pale-red to orange, medium to coarse crystalline; contains scattered polyhalite blebs	1,249.5-1,252.2
Halite, with disseminated clay, gray to pale-red, medium to coarse crystalline; clay partings at 1,252.5, 1,253.0, 1,253.7, 1,254.5, and 1,257.7 feet; scattered polyhalite blebs	1,252.2-1,257.8
Halite, pale-red to pale-orange, medium to coarse crystalline; contains scattered polyhalite blebs; minor clay partings at 1,262.8 and 1,263.0 feet	1,257.8-1,265.4
Halite, with disseminated clay, gray to pale-red to brown, medium to coarse crystalline; contains scattered polyhalite blebs; minor brown clay partings at 1,265.9, 1,266.6, 1,266.9, 1,267.7, and 1,270.0 feet; major, red to brown clay partings (with halite) at 1,267.0 and 1,267.1 feet	1,265.4-1,270.9
Halite, pale-red to orange, medium to coarse crystalline; contains orange polyhalite blebs; prominent, massive, red, granular polyhalite band at 1,272.0 and 1,272.1 feet	1,270.9-1,274.7
Halite, with disseminated clay, gray-green to pale-red-brown, medium to coarse crystalline; contains sparse scattered polyhalite blebs, very argillaceous; gray-green clay parting at 1,275.7 feet; red-brown clay parting at 1,276.5, 1,277.4, 1,277.7, 1,277.8, 1,278.2, and 1,280.0 feet	1,274.7-1,281.1
Halite, clear to pink to pale-red, medium to coarse crystalline; contains scattered gray clay blebs and small polyhalite blebs	1,281.1-1,285.5
Halite, clear, very coarse crystalline	1,285.5-1,287.7
Halite, pale-red to pale-orange-brown, medium to coarse crystalline; contains scattered polyhalite blebs; minor, gray to clear blebs (sparse leached sylvite?)	1,287.7-1,292.2

Table 8C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, with disseminated clay, gray-green to pale-red-brown, medium to coarse crystalline; contains scattered polyhalite blebs, very argillaceous; brown clay partings at 1,293.1, 1,293.5, 1,294.7, 1,294.9, and 1,300.4 feet; contains scattered gray-green clay blebs	1,292.2-1,300.4
Halite, moderate-reddish-orange, medium to coarse crystalline; contains medium amounts of scattered red polyhalite blebs; sparse leached sylvite	1,300.4-1,302.8
Polyhalite, red, fine crystalline, massive (0.7 foot alternating polyhalite/halite);0.2 foot of pale-brown clay with polyhalite at base	1,302.8-1,305.0
Halite, clear; sparse pink-red, coarse crystalline polyhalite; disseminated clay zones at 1,305.1, 1,306.7, 1,311.5, and 1,312.3-1,313.2 feet	1,305.0-1,314.7
Halite, gray-green to brick-red, coarse to medium crystalline; 0.2 foot disseminated polyhalite band at top; leached sylvite; leached langbeinite pseudomorph after leonite/kainite(?); free langbeinite; brown clay blebs; red polyhalite blebs; clay partings at 1,317.0 and 1,319.7 feet	1,314.7-1,328.5
Polyhalite, red-orange, with thin halite lenses; leached leonite/kainite zone at 1,330.2-1,330.5 feet; 0.1 foot gray clay at base	1,328.5-1,332.0
Halite, clear-orange to [illegible]ge-red, medium coarse crystalline; undulating thin pink polyhalite band at 1,334.6 feet; red polyhalite band at 1,335.0-1,335.4 feet (massive on bottom, disseminated with halite on top); contains leached, disseminated leonite	1,332.0-1,336.4
Polyhalite, red-orange, massive; thin halite lenses and blebs; 0.1 foot gray clay/halite parting at base	1,336.4-1,337.2
Halite, pale-orange to gray, medium to coarse crystalline; gray clay parting at 1,337.9 feet; gray disseminated clay zone at 1,339.1-1,339.4 feet; contains orange polyhalite blebs	1,337.2-1,340.2
Halite, gray to brown, medium to coarse crystalline; contains disseminated gray and brown clay; sparse light-orange polyhalite; clay partings at 1,341.2, 1,341.8, 1,343.0, and 1,345.4 feet	1,340.2-1,346.4
Halite, pale-red to moderate-reddish-orange, medium to coarse crystalline; disseminated blebs and disseminated bands of polyhalite in upper part; disseminated leached sulfates at 1,348.8 feet; thin polyhalite bands at 1,35[illegible].4, 1,352.4, 1,352.9, 1,[illegible].3, 1,353.8 feet and 0.3-foot thick polyhalite band at 1,354.2 feet; alternating polyhalite and halite downward	1,346.4-1,355.0

Table 8C.--Lithologic log--(Continued)

Description	Depth (feet)
Polyhalite, moderate-orange-pink, fine-grained; upper part is massive, lower part is alternating polyhalite and gray clay in bands----------	1,355.0-1,356.5
Halite, pale-red to pale-brown, medium to coarse crystalline; contains some disseminated clay; more clay in lower 0.8 foot; brown clay parting at 1,360.4 feet----------	1,356.5-1,360.8
Halite, clear to gray to gray-orange, medium to coarse crystalline; mineralized from 1,362.8 to 1,366.5 feet; leached leonite/kainite and sylvite, moderate to heavy below 1,363.8 feet; 0.3-foot band of sylvite at 1,364.8 feet----------	1,360.8-1,366.5
Halite, with disseminated clay, gray-green to pale-red-brown, medium to coarse crystalline; contains sparse scattered polyhalite blebs, very argillaceous, red and clear sylvite; leonite/kainite pseudomorphs after langbeinite; brown-red clay partings at 1,371.6, 1,371.9, and 1,372.6 feet; gray-green clay zone at 1,370.2-1,370.8 feet----------	1,366.5-1,374.2
Halite, pale-red to gray-brown, medium to coarse crystalline; contains disseminated clay and disseminated red polyhalite----------	1,374.2-1,377.6
Halite, clear-orange to orange-red, medium to coarse crystalline; contains pink blebs of polyhalite; red-orange polyhalite bands at 1,382.2 and 1,383.5 feet; 0.3-foot thick band of polyhalite at 1,383.8 feet----------	1,377.6-1,384.5
Polyhalite, red, fine crystalline, massive; gray, argillaceous halite at bottom 0.2 foot----------	1,384.5-1,385.1
Halite, pale-orange to pale-red, medium to coarse crystalline; gray-green clay parting at 1,388.6 feet----------	1,385.1-1,389.1
Halite, pale-brown-gray to pale-red, fine to coarse crystalline (fine to medium crystalline in upper part, medium to coarse crystalline in lower part); contains disseminated gray-green clay and red-brown clay blebs; disseminated sparse red polyhalite----------	1,389.1-1,395.5
Halite, pale-orange to pale-red, medium to coarse crystalline; contains sparse disseminated red polyhalite; moderate to heavy polyhalite in lower 0.7 foot----------	1,395.5-1,399.2
Polyhalite, pale-red-brown, fine crystalline, massive; anhydrite blebs and red to clear halite----------	1,399.2-1,401.6
Halite, pale-orange to pale-red, medium to coarse crystalline; contains sparse disseminated red polyhalite----------	1,401.6-1,405.0
Halite, orange; moderate to abundant red-orange polyhalite in bands (30 percent)----------	1,405.0-1,407.5

Table 8C.--Lithologic log--(Continued)

Description	Depth (feet)
Polyhalite, orange-red	1,407.5-1,408.5
Halite, red-orange, medium to coarse crystalline; contains disseminated polyhalite blebs; gray-green clay partings at 1,409.0 and 1,409.2 feet	1,408.5-1,410.2
Halite, clear to pale-red, fine to medium crystalline; 30 percent brown clay, silty band at top 0.2 foot; less silty towards bottom	1,410.2-1,412.9
Halite, pale-orange-red to light-gray; contains disseminated red, medium to coarse crystalline polyhalite; gray, very coarse crystalline halite in bottom 0.8 foot; red-brown clay parting at 1,417.8 feet	1,412.9-1,418.5
Halite, pale-orange to pale-red, medium crystalline; contains pink polyhalite blebs and indistinct bands	1,418.5-1,423.2
Halite, pale-brown to gray-brown, fine to medium crystalline, very argillaceous, contains sparse disseminated fibrous red polyhalite; gray clay partings at 1,424.5, 1,425.6, 1,427.3, 1,428.2, 1,429.0, [illegible] 1,435.3 feet	1,423.2-1,436.3
Anhydrite, light-gray to medium-light-gray, well banded in lower part, halitic; contains polyhalite blebs at base	1,436.3-1,451.0
Halite, dark-gray to pale-orange, medium to coarse crystalline; gray-green clay parting at top; contains sparse disseminated pink polyhalite	1,451.0-1,456.9
Halite, light-gray to medium-gray to pale-red, medium to coarse crystalline; contains gray-green and brown clays; common disseminated gray-green clay parting at 1,456.9 and 1,459.3-1,459.8 feet; barren red-brown clay partings at 1,457.3, 1,458.2, 1,450.5, 1,460.9, 1,461.4, 1,462.4, 1,463.1, 1,464.4, and 1,465.1 feet; abundance of gray-green clay below 1,465.0 feet	1,456.9-1,465.9
Halite, brown-gray to pale-orange, medium to coarse crystalline; possible sparse leached sylvite; sparse disseminated red polyhalite; clay parting at 1,477.9 feet	1,465.9-1,478.9
Halite, gray to pale-red, fine to medium crystalline; contains sparse pink-red polyhalite; sparse leached sylvite around 1,481.0 feet	1,478.9-1,481.9
Halite, clear to pale-red-orange, medium to coarse crystalline; contains indistinct pink polyhalite bands	1,481.9-1,485.6
Halite, gray to pale-red, fine to medium crystalline; contains sparse pale-red polyhalite blebs; red-brown clay partings at 1,485.7, 1,485.9, 1,486.4, 1,489.2, and 1,489.8 feet (last one is 0.2 foot thick); gray-green clay parting at 1,488.3 feet	1,485.6-1,490.2

Table 8C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red to pale-reddish-brown to light-gray, medium to coarse crystalline; contains sparse pale-red-orange polyhalite blebs--------	1,490.2-1,495.2
Halite, light-gray, salmon, brown, medium to fine crystalline, mottled; <1 percent gray-green clay, grades to salmon-colored, fine crystalline halite, then back to mottled to salmon; polyhalite disseminated throughout with blebs in upper 5.5 feet; 3-4 percent clay in localized zones at 1,495.2-1,496.5 feet and 1,498.0-1,500.0 feet; clay partings at 1,495.5, 1,496.7, 1,500.0, 1,500.3, 1,500.5, 1,500.7, 1,501.8, 1,506.4, and 1,507.8 feet----------	1,495.2-1,516.3
Anhydrite, medium-gray; upper and lower parts contain halite banding; polyhalite banding at approx. 1,521.0 feet----------	1,516.3-1,523.2
Halite, clear to light-brown, medium to coarse crystalline; contains bands of light-gray anhydrite at 1,524.0 feet (~0.1 inch) and 1,525.3 feet (~0.05 inch); entire unit has thin bands of anhydrite----------	1,523.2-1,529.3
Anhydrite, medium-gray, with halite blebs in upper 2.4 feet and in middle; grades into gray clay in lower 1.3 feet; thin (0.01 inch) halite band at 1,536.5 feet----------	1,529.3-1,537.6
Halite, clear to light-gray and brown, medium to coarse crystalline, mottled; contains abundant (>3 percent) greenish-gray clay; blebs and concentrated bands of polyhalite throughout; clay partings at 1,538.15, 1,538.5, 1,538.85, 1,540.0 (~0.1 inch thick), and 1,540.7 feet----------	1,537.6-1,540.7
Halite, brown to orange to clear, coarse crystalline, grading to medium crystalline, mottled; polyhalite disseminated throughout; high concentration of polyhalite in middle of unit----------	1,540.7-1,543.7
Halite, clear, medium crystalline; color grades to orange as polyhalite increases with depth----------	1,543.7-1,549.7
Halite, brown to orange, medium crystalline with some coarse crystals; minor polyhalite blebs; brown to orange interstitial clays----------	1,549.7-1,553.1
Halite, with interstitial clay, grading from gray-green at top to brown at bottom, medium crystalline; clay partings at 1,561.4, 1,562.6, 1,564.1, and 1,564.9 feet; contains minor disseminated langbeinite crystals; mineralized to 1,564.1 feet----------	1,553.1-1,564.9
Halite, grayish-orange to moderate-orange, medium to coarse crystalline; polyhalite blebs increase with depth----------	1,564.9-1,569.5
Halite, light-orange, medium crystalline; approx. 30-40 percent dark-orange polyhalite; langbeinite inclusion----------	1,569.5-1,570.0

Table 8C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, medium crystalline with interstitial clay (>5 percent); medium-gray clay partings at 1,570.2, 1,570.7, and 1,570.9 feet----------	1,570.0-1,571.0
Halite, light-gray to light-orange, medium crystalline; stray mineralized zone between 1,572.0 and 1,573.2 feet; polyhalite bands and blebs throughout interval----------	1,571.0-1,573.2
Halite, with interstitial brown clay, grades to clear halite at bottom of interval, coarse crystalline----------	1,573.2-1,574.5
Halite; clay partings at 1,573.2 and 1,574.5 feet; minor sulfate mineralization (langbeinite) from 1,573.2 to 1,576.3 feet; minor polyhalite blebs disseminated throughout interval----------	1,574.5-1,576.3
Halite, grayish-brown, coarse crystalline, mottled; contains bands and blebs of polyhalite----------	1,576.3-1,583.3
Halite, very pale orange to grayish-orange, medium crystalline; polyhalite blebs increasing toward base; no visible mineralization-------	1,583.3-1,588.8
Halite, moderate-red-orange to light-gray to gray-orange, medium crystalline; contains numerous moderate-red-brown polyhalite blebs and stringers; gray-orange-pink clay zone 0.3-foot thick at 1,590.0 feet----------	1,588.8-1,593.7
Halite, medium-gray, medium coarse crystalline; contains minor moderate-red-orange polyhalite blebs----------	1,593.7-1,594.1
Halite, light-gray to moderate-red-orange, coarse crystalline; moderate-red-brown polyhalite blebs----------	1,594.1-1,596.0
Halite, moderate-gray, light-grayish-orange, fine- to medium-grained, clayey; contains minor moderate-red-orange polyhalite----------	1,596.0-1,598.1
Halite, medium-gray and pale-brown, medium to coarse crystalline, clayey; contains minor red-brown polyhalite; brown clay partings at 1,598.6, 1,599.4, 1,599.6, 1,599.9, 1,600.5, and 1,600.9 feet--------	1,598.1-1,601.2
Halite, moderate-red-orange to grayish-orange, pink to light yellow, medium to coarse crystalline; contains minor red-brown polyhalite blebs at top and bottom; polyhalite stringers at base; minor leaching----------	1,601.2-1,603.4
Halite, moderate-red-orange to light-brown, coarse crystalline; contains numerous moderate-red-brown to orange polyhalite stringers; greenish-gray clay parting at base----------	1,603.4-1,608.3
Halite, pale-yellow-brown to clear, fine to medium crystalline; minor blebs of red-brown polyhalite; minor leaching----------	1,608.3-1,609.8
Halite, clear to pale-yellow-brown, coarse crystalline; contains numerous red-brown polyhalite bands----------	1,609.8-1,610.8

Table 8C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, light-brown to moderate-red-orange, fine to medium crystalline, mottled, clayey; contains minor blebs of red-brown polyhalite; brown clay partings at top, 1,611.3 and 1,612.0 feet	1,610.8-1,613.2
Halite, alternating zones pale-brown, fine crystalline, minor polyhalite and clear to brown-gray, coarse crystalline	1,613.2-1,618.9
Halite, moderate-red-orange to gray-orange-pink, medium crystalline; contains numerous red-brown polyhalite stringers and blebs	1,618.9-1,619.9
Halite, grayish-red to medium-gray, coarse crystalline, argillaceous; contains red-orange polyhalite blebs; brown clay stringers at 1,620.1 feet and base of unit; greenish-gray clay blebs at 1,620.5 feet	1,619.9-1,620.9
Halite, moderate-red-orange to brown-gray, coarse crystalline, clayey; polyhalite blebs in upper part of unit	1,620.9-1,621.6
Halite, pale-yellow-brown, grading down to clear and pale-yellow, medium to coarse crystalline (upper part), becomes fine crystalline in lower 0.8 foot; numerous red-brown polyhalite stringers and blebs in upper and lower thirds	1,621.6-1,626.8
Halite, pale-red to pale-yellow-brown, medium to coarse crystalline, clayey; mottled brown polyhalite blebs; greenish-gray clay parting at 1,627.5 feet; brown clay partings at 1,627.9, 1,628.1, 1,628.7, and 1,629.8 feet	1,626.8-1,632.0
Halite, pale-yellow-brown to pale-red, coarse crystalline; red-brown polyhalite stringers and blebs; intercrystalline clay	1,632.0-1,633.6
Halite, very pale orange to pale-red-brown to medium-gray, fine crystalline to coarse crystalline near base, mottled; gray and brown clay seam at base; polyhalite stringer at 1,634.8 feet; very clayey	1,633.6-1,635.4
Halite, pale-yellow-brown to medium-gray, fine grading to coarse crystalline, clayey; minor moderate-red-orange polyhalite stringers near top of unit	1,635.4-1,636.4
Halite, clear to pale-brown, fine to coarse crystalline, very clayey; brown clay partings at 1,637.2 and 1,638.0 feet; sparse orange polyhalite blebs	1,636.4-1,638.4
Halite, clear, light-gray, and pale-red-brown, coarse crystalline, clayey; brown clay parting at top of unit	1,638.4-1,639.4
Halite, pale-red-brown, pale-red, and clear, very coarse crystalline; numerous moderate-red-brown stringers and blebs of polyhalite	1,639.4-1,642.0

Table 8C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, grayish-orange-pink to clear, medium crystalline; contains moderate amount of red polyhalite stringers in a layered effect------	1,642.0-1,645.0
Halite, clear and gray-red, coarse crystalline; moderate-red-brown, massive polyhalite----------	1,645.0-1,646.2
Polyhalite, grading down to clay; pale-yellow-brown clay; clear, coarse crystalline halite in top 0.1 foot----------	1,646.2-1,646.9
Halite, clear, light-gray, and pale-red, coarse crystalline with minor amounts of medium crystalline; contains moderate-red-brown polyhalite stringers, grading down to moderate-red-orange; brown clay blebs in seams at 1,647.4 and 1,649.7 feet; greenish-gray clay parting at 1,650.2 feet----------	1,646.9-1,651.4
Halite, pale-red-brown to clear, medium crystalline; contains moderate gray-orange polyhalite stringers----------	1,651.4-1,652.5
Halite, wedges and patches of moderate-reddish-brown; two-toned red-brown polyhalite; clayey at 1,652.6 feet----------	1,652.5-1,653.1
Halite, pale-red and clear, medium to coarse crystalline; fine crystals are pale-reddish-orange; contains minor amounts of red-brown polyhalite stringers----------	1,653.1-1,654.5
Halite, pale-red to clear, fine crystalline in upper 0.5 foot, grading to coarse crystalline below; possible minor leached sylvite----------	1,654.5-1,656.8
Halite, clear to light-brown to medium-gray, coarse crystalline, clayey; brown clay seams at top and 1,657.5 feet, below which core is shattered and broken; very few moderate-red-brown polyhalite blebs---	1,656.8-1,660.0 Total depth

Table 8D.--Mineralogical and chemical analyses of core samples from potash ore zones and mineralized salt beds in drill hole P-8

[oz, ore zone; um, upper member; mm, middle member; lm, lower member; sb, salt bed; tr, trace; n.d., not determined; Bl, bloedite; Ha, halite, Ka, kainite; La, langbeinite; Le, leonite; Po, polyhalite; Sy, sylvite; Insoluble, clay and silt. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mineralogy: X-ray diffraction analysis[1]	Chemical analysis (weight percent): Ca	K	Mg	Na	Cl	SO_4	H_2O+	H_2O-	Water insoluble
P-8/1	1,363.20-1,363.70	0.50		>9 Ha; <1 Po	0.26	0.60	0.28	----	57.5	n.d.	n.d.	n.d.	n.d.
P-8/2	1,363.70-1,365.00	1.30	sb	4 Ha, Sy; 2 La	.02	20.0	2.0	20.5	45.5	11.0	0.15	0.02	0.21
P-8/3	1,365.00-1,366.72	1.72		5 Ha; >4 La; tr Po, Sy, Ka,Le	.08	10.0	6.2	18.0	29.0	35.0	2.3	.07	.23
P-8/4	1,366.72-1,368.05	1.33		>8 Ha; <1 La; tr Po, Ka	.12	2.8	1.7	34.0	50.0	8.7	.61	.03	1.2
[2]P-8/5	1,368.05-1,368.75	.70		>8 Ha; <1 Po, La	.28	2.1	1.1	35.0	54.0	6.2	.32	.01	.45
[2]P-8/5					.33	2.6	1.2	36.5	53.5	6.2	.11	.14	.59
[2]P-8/6	1,368.75-1,370.25	1.50	10th oz	>5 Ha; 2 Sy, Le; <Po; tr Ka	.69	7.0	2.3	20.0	32.5	15.5	5.7	2.7	12.0
[2]P-8/6					.81	7.6	2.5	20.5	33.0	15.5	5.1	1.0	12.6
P-8/7	1,370.25-1,371.73	1.48		>8 Ha; tr Po, La, Ka	.35	2.0	.84	29.0	46.5	3.3	2.0	2.4	11.0
P-8/8	1,371.73-1,372.47	.74		>9 Ha; <1 Po; tr Sy, Ka	.46	1.1	.53	32.0	50.5	1.7	1.1	1.8	8.3
P-8/9	1,548.65-1,549.70	1.05	sb	>9 Ha; <1 Po; tr Le	.72	.48	.20	n.d.	n.d.	n.d.	n.d.	n.d.	.16
[2]P-8/10	1,549.70-1,551.21	1.51	4th oz, um	>5 Ha; 3 La; <1 Ka; tr Po, Bl	.11	8.4	5.9	19.0	29.0	33.0	1.7	.20	2.7
P-8/10					.11	8.4	5.9	19.0	29.0	33.0	1.7	.21	2.7
P-8/11	1,551.21-1,551.97	.76	4th oz, mm	>9 Ha; <1 Po	.26	.48	.36	36.5	57.0	1.5	.30	.09	.86
P-8/12	1,560.02-1,560.92	.90	4th oz, mm	>9 Ha; <1 La; tr Po	.12	.60	.42	n.d.	56.5	n.d.	n.d.	n.d.	.10
P-8/13	1,560.92-1,562.03	1.11		9 Ha; <1 Po; tr Ka	.24	.56	.53	33.0	56.5	1.9	1.0	.05	6.3
P-8/14	1,562.03-1,562.58	.55	4th oz, lm	9 Ha; <1 Po	1.2	1.2	.46	34.0	52.0	4.9	.39	.20	2.7
P-8/15	1,562.58-1,563.47	.89		9 Ha; <1 Po	.36	.40	.42	33.0	52.0	1.3	.96	.86	6.3
P-8/16	1,563.47-1,564.66	1.19		>9 Ha; <1 Po, tr Ka	.30	.72	.59	32.0	55.0	2.2	1.2	.89	6.4
P-8/17	1,564.66-1,565.49	.83	sb	>9 Ha, <1 Po	.60	.44	.26	36.5	57.0	1.9	.29	.15	.86

[1] Estimate of amount reported on a scale of 0-10.

[2] Replicate analyses.

Table 8E.--Calculated mode (mineral content) and potash distri[illegible] by mineral in core samples from potash ore zones and mineralized salt beds in drill hole P-8

[oz, ore zone; um, upper member; mm, middle member; lm, lower member; sb, salt bed; n.d., not determined; leaders (----), not present; Bl, bloedite; Ha, halite; Ka, kainite; La, langbeinite; Le, leonite; Po, polyhalite; Sy, sylvite; Insol., clay and silt. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mode (weight percent mineral)								K_2O distribution by minerals					
				Sy	La	Ka	Le	Bl	Ha	Po	Insol.	Sy	La	Ka	Le	Po	Total
P-8/1	1,363.20-1,363.70	0.50	sb	----	----	----	----	----	94.8	4.7	n.d.	----	----	----	----	0.7	0.7
P-8/2	1,363.70-1,365.00	1.30		32.5	15.7	----	----	----	52.1	.1	0.2	20.5	3.6	----	----	<.1	24.1
P-8/3	1,365.00-1,366.72	1.72		.1	43.2	10.0	0.8	----	45.8	.6	.2	.1	9.8	1.9	0.2	.1	12.1
P-8/4	1,366.72-1,368.05	1.33	10th oz	----	6.6	6.5	.7	----	86.4	.9	1.2	----	1.5	1.7	.1	.1	3.4
[1] P-8/5	1,368.05-1,368.75	.70		----	9.7	----	----	----	89.0	2.1	.4	----	2.2	----	----	.3	2.5
[1] P-8/5				----	12.1	----	----	----	88.2	2.5	.6	----	2.7	----	----	.4	3.1
[1] P-8/6	1,368.75-1,370.25	1.50		2.6	----	11.2	15.0	----	50.9	5.2	12.0	1.6		2.1	3.9	.8	8.4
[1] P-8/6				4.0	----	16.4	10.1	----	47.4	6.1	12.6	2.5		3.1	2.6	.9	9.1
P-8/7	1,370.25-1,371.73	1.48		2.1	1.7	1.4	----	----	74.6	2.6	11.0	1.4	[illegible]	.2	----	.4	2.4
P-8/8	1,371.73-1,372.47	.74		.1	----	4.1	----	----	81.4	3.4	8.3	<.1	----	.8	----	.5	1.3
P-8/9	1,548.65-1,549.[illegible]	1.05	sb	----	----	----	----	----	n.d.	3.7	n.d.	----	-	----	----	.6	.6
[1] P-8/10	1,549.70-1,551.21	1.51	4th oz, um	----	38.4	6.8	----	3.7	47.8	.8	2.7	----	8.7	1.3	----	.1	10.1
[1] P-8/10				----	38.4	6.8	----	3.7	47.8	.8	2.7	----	8.7	1.3	----	.1	10.1
P-8/11	1,551.21-1,551.97	.76	4th oz, mm	----	----	----	----	----	92.8	3.7	.9	----	[illegible]	----	----	.6	.6
P-8/12	1,560.02-1,560.92	.90	4th oz, mm	----	2.6	----	----	----	93.1	.9	.1	----	.6	----	----	.1	.7
P-8/13	1,560.92-1,562.03	1.11	4th oz, lm	----	----	1.0	----	----	92.6	1.8	6.3	----	----	.4	----	.3	.7
P-8/14	1,562.03-1,562.58	.55		----	----	----	----	----	85.7	9.3	2.7	----	----	----	----	1.4	1.4
P-8/15	1,562.58-1,563.47	.89		----	----	----	----	----	85.7	3.1	6.3	----	----	----	----	.5	.5
P-8/16	1,563.47-1,564.66	1.19		----	----	2.7	----	----	90.0	2.2	6.4	----	----	.5	----	.4	.9
P-8/1[illegible]	1,564.66-1,565.49	.83	sb	----	----	----	----	----	93.5	3.4	.9	----	----	----	----	.5	.5

[1] Replicate analyses.

TABLES 9A-9G

Basic data from drill hole P-9,
Waste Isolation Pilot Plant area, Eddy County, New Mexico

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Table 9A.--Abridged drill-hole history

LOCATION: Sec. 33, T. 22 S., R. 31 E.
455 m (1,493 ft) from south line
44 m (143 ft) from east line

ALTITUDE (LAND SURFACE): 1,039 m (3,408.6 ft). Datum for depth measurements in drilling and logging operations.

LITHOLOGIC LOG PREPARED BY: R. J. Cheeseman, J. C. Lorenz, Florian Maldonado, M. N. Mitchell, B. R. Orr, L. A. Rives, and R. P. Snyder, September 17-26, 1976.

DRILLING CONTRACTOR: Boyles Bros. Drilling Co.

DRILLING RECORD: Commenced drilling on September 16, and completed on September 25, 1976, at 547 m (1,796 ft) below land surface.

Drilled with air foam to 225 m (738 ft) below land surface. Driller reported water at 67 m (220 ft) below land surface, making about 95 lpm (25 gpm).

Recovered all casing, and plugged with cement.

REMARKS: Top of salt in Rustler Formation at 237 m (778 ft) below land surface.

Table 9B.--Stratigraphic summary

Rock unit	Depth interval[1] feet	meters
Holocene deposits	0-11	0-3
Triassic rocks:		
Santa Rosa Sandstone	11-66	3-20
Permian rocks:		
Dewey Lake Red Beds	66-562	20-171
Rustler Formation	562-881	171-269
Magenta Dolomite Member	617-644	188-196
Culebra Dolomite Member	734-757	224-231
Salado Formation	881-1,796	269-547
Upper member	881-1,401	269-427
McNutt potash zone	1,401-1,796	4[illegible]-547
Vaca Triste Sandstone Member[2]	1,401-1,410	427-430
11th ore zone	1,458-1,462	444-446
Marker bed 117	1,471-1,473	448-449
Marker bed 118	1,496-1,499	456-457
Marker bed 119	1,519-1,521	463-464
10th ore zone	1,530-1,538	466-469
Marker bed 120	1,546-1,547	471-472
9th ore zone	1,552-1,555	473-474
Marker bed 121	1,561-1,563	476-476
Marker bed 122	1,569-1,570	478-479
8th ore zone	1,577-1,585	481-484
Union anhydrite[3]	1,597-1,608	487-490
7th ore zone	1,613-1,618	492-493
6th ore zone	1,626-1,629	496-497
5th ore zone	1,634-1,643	498-501
Marker bed 123	1,668-1,676	508-511
Marker bed 124	1,686-1,695	514-517
4th ore zone	1,699-1,714	518-522
3d ore zone	1,723-1,738	525-530
2d ore zone	1,744-1,748	532-533
1st ore zone	1,769-1,778	540-542
Marker bed 126	1,795-1,796	547-547
Maximum depth recorded	1,796	547

[1]Depth interval [illegible]corded from geophysical logs.
[2]Of Adams, 1944.
[3]Informal unit o[illegible] [illegible]o Formation.

Table 9C.--Lithologic log

Description	Depth (feet)	
Sand, red, very fine grained, rounded, poorly sorted	0.0-	5.0
Caliche, about 70 percent of sample; 30 percent red sandstone	5.0-	10.0
Caliche, 50 percent; 50 percent red sandstone	10.0-	15.0
Sandstone, red, very fine grained, poorly sorted; greenish-gray, very fine grained sandstone; each about 50 percent of sample	15.0-	25.0
Sandstone, dark-brownish-red, very fine grained, poorl sorted, angular; contaminated mud	25.0-	35.0
Same as above; with ±2 percent greenish-gray sandstone	35.0-	40.0
No sample	40.0-	50.0
Sandstone, dark-brownish-red, very fine grained, poorly sorted, angular; with 10 percent gray sandstone	50.0-	60.0
Same as above; with less than 1 percent gray sandstone	60.0-	100.0
Sandstone, dark-reddish-brown, very fine grained, subrounded; contaminated mud	100.0-	115.0
Sandstone, dark-reddish-brown, very fine grained, 80 percent; gray, very fine grained, 20 percent sandstone	115.0-	125.0
Sandstone, dark reddish-brown, very fine grained, subrounded; contaminated mud	125.0-	150.0
Same as above; less than 5 percent greenish-brown subangular sandstone	150.0-	160.0
Siltstone, dark-reddish-brown; very fine grained, mudstone	160.0-	165.0
Same as above; with 5 percent greenish-brown sandstone in blebs	165.0-	190.0
Same as above; no sandstone	190.0-	200.0
Siltstone and clay, brownish-red; sparse reduction zones	200.0-	210.0
Same as above; (more common, but still sparse reduction zone)	210.0-	215.0
Siltstone and clay, brownish-red; sparse reduction zones	215.0-	225.0
Siltstone, brownish-red; sparse clay	225.0-	240.0
Same as above; no clay	240.0-	245.0
Same as above; with sparse reduction zones	245.0-	250.0
Same as above; some selenite	250.0-	255.0
Same as above; no selenite	255.0-	260.0
Same as above; some selenite	260.0-	265.0
Same as above; no selenite	265.0-	285.0
Same as above; some red clay	285.0-	290.0
Same as above; some selenite	290.0-	300.0
Siltstone, reddish-brown, with reduction spots	300.0-	310.0
Siltstone, reddish-brown, with reduction spots; some grayish-green siltstone	310.0-	320.0

Table 9C.--Lithologic log--(Continued)

Description	Depth (feet)
Siltstone, reddish-brown, with reduction spots; some grayish-green siltstone; sparse selenite	320.0- 325.0
Same as above; no siltstone or selenite	325.0- 330.0
Same as above; siltstone and selenite	330.0- 335.0
Same as above; no siltstone	335.0- 340.0
Same as above; no siltstone or selenite	340.0- 345.0
Same as above; siltstone and selenite	345.0- 350.0
Same as above; some red clay	350.0- 355.0
Siltstone, reddish-brown, with reduction spots; increasing red clay	355.0- 360.0
Same as above; some selenite	360.0- 365.0
Same as above; some selenite; 20 percent red clay	365.0- 370.0
Same as above; no selenite; 10 percent red clay	370.0- 375.0
Same as above; selenite; 30 percent red clay	375.0- 380.0
Siltstone, reddish-brown, with reduction spots, well-cemented; selenite; sparse gray-black siltstone	380.0- 385.0
Siltstone, reddish-brown, well-cemented, with reduction spots	385.0- 390.0
Same as above; sparse gypsum	390.0- 395.0
Same as above; increasing red clay	395.0- 400.0
Siltstone, reddish-brown, with reduction spots, well-cemented	400.0- 4[illegible]0
Siltstone, reddish-brown, with reduction spots, well-cemented	405.0- 4[illegible].0
Same as above	410.0- 420.0
Same as above; gypsum; selenite	420.0- 425.0
Same as above; no gypsum or selenite	425.0- 435.0
Same as above; gypsum; selenite	435.0- 455.0
Same as above; increasing selenite; gray, sandy siltstone	455.0- 460.0
Same as above; selenite; gray, sandy siltstone	460.0- 465.0
Same as above; selenite	465.0- 470.0
Same as above; selenite; gray, sandy siltstone	470.0- 480.0
Same as above; selenite	480.0- 485.0
Same as above; selenite; gray, sandy siltstone	485.0- 490.0
Same as above; selenite	490.0- 495.0
Same as above; selenite; gray, sandy siltstone	495.0- 500.0
Siltstone, reddish-brown, with reduction spots, well-cemented; some selenite	500.0- 515.0
Same as above; sparse gray siltstone with quartz sand	515.0- 520.0
Same as above; no quartz sand	520.0- 530.0
Same as above; no selenite; no gray siltstone; no quartz sand	530.0- 535.0
Same as above; some selenite	535.0- 570.0
Same as above; increasing selenite	570.0- 585.0

Table 9C.--Lithologic log--(Continued)

Description	Depth (feet)
Siltstone, reddish-brown, with reduction spots, well-cemented; some selenite; gray anhydrite	585.0- 600.0
Siltstone, reddish-brown, subrounded; light-gray anhydrite; scattered selenite	600.0- 615.0
Anhydrite, pinkish-gray; more than 10 percent reddish-brown siltstone	615.0- 620.0
Anhydrite, as above, 50 percent; reddish-brown siltstone 50 percent; both very fine grained; contaminated with mud	620.0- 625.0
Same as above; siltstone has reduction spots	625.0- 630.0
Gypsum, whitish-gray, very fine grained; scattered red siltstone	630.0- 645.0
Dolomite, light-gray, subrounded; small amount fine-grained anhydrite	645.0- 650.0
Dolomite, light-gray, subrounded, fine-grained; more than 10 percent red silty sandstone	650.0- 655.0
Same as above; more than 2 percent sandstone	655.0- 660.0
Dolomite, as above, 20 percent; anhydrite, 80 percent	660.0- 665.0
Anhydrite, pinkish-white; red siltstone	665.0- 685.0
Same as above; red siltstone increasing	685.0- 690.0
Same as above; red siltstone decreasing	690.0- 695.0
Same as above, anhydrite, 50 percent; siltstone, 50 percent	695.0- 700.0
Anhydrite, 50 percent; red siltstone, 50 percent	700.0- 715.0
Siltstone, red, fine-grained, about 70 percent; 30 percent anhydrite	715.0- 720.0
Siltstone, red, fine-grained, 85 percent; 15 percent anhydrite	720.0- 750.0
Anhydrite, pinkish-gray, 80 percent; 20 percent reddish-brown siltstone (with trace gypsum)	750.0- 760.0
Dolomite, light-gray, fine crystalline, pitted	760.0- 765.0
Gypsum, white, very fine crystalline; about 20 percent dolomite as above and 5 percent red siltstone	765.0- 775.0
Dolomite, light-gray, fine granular, pitted; white gypsum; some red siltstone	775.0- 800.0
Dolomite, light-gray, fine-grained; white anhydrite	800.0- 805.0
Same as above; with scattered fragments of red siltstone	805.0- 810.0
Same as above; little anhydrite and siltstone	810.0- 815.0
Anhydrite, light-gray; some gray, pitted dolomite	815.0- 825.0
Anhydrite; some dolomite and red siltstone	825.0- 840.0
Same as above; with gypsum	840.0- 845.0
Anhydrite, light-gray, fine-grained; pitted, light-gray dolomite; red friable siltstone	845.0- 850.0

Table 9C.—Lithologic log--(Continued)

Description	Depth (feet)
Dolomite, light-gray, pitted; light-gray anhydrite	850.0- 865.0
Dolomite; anhydrite; red siltstone	865.0- 875.0
Anhydrite, white; with scattered dolomite	875.0- 880.0
Siltstone, dark-reddish-brown, 40-50 percent; black to gray mudstone; light-gray anhydrite with gypsum rinds; 1 percent clear selenite	880.0- 885.0
Same as above; ±5 percent black mudstone, decreasing; contains some light- to medium-gray, pitted dolomite	885.0- 890.0
Siltstone, dark-reddish-brown; medium-grained sandstone; light-gray anhydrite; white to gray, granular gypsum; dolomite	890.0- 895.0
Siltstone, dark-reddish-brown; black mudstone; light-gray anhydrite; light-medium-gray dolomite and white granular gypsum	895.0- 900.0
Siltstone, dark-reddish-brown; black mudstone; light-gray anhydrite with white gypsum rinds; light- to medium-gray dolomite; abundant clear, crystalline selenite; white to grayish-clear, granular gypsum	900.0- 905.0
Same as above; selenite decreasing	905.0- 910.0
Same as above; ±1 percent clear, crystalline selenite	910.0- 925.0
Siltstone, dark-reddish-brown; black mudstone; light-gray anhydrite with gypsum rinds; abundant selenite	925.0- 935.0
Siltstone, dark-reddish-brown; light-gray anhydrite with gypsum rinds; light- to medium-gray dolomite; sparse black mudstone (cavings)	935.0- 950.0
Siltstone, mainly dark-reddish-brown, with clear, crystalline selenite; some black mudstone; light- to medium-gray dolomite; light-gray anhydrite with gypsum rinds (probably cavings from upper part of hole)	950.0- 960.0
Same as above; minor, light- to medium-gray-blue siltstone	960.0- 965.0
Siltstone, dark-reddish-brown; dark-reddish-brown, medium-grained sandstone; light-blue-gray siltstone; 2-5 percent light-gray anhydrite; selenite	965.0- 975.0
Halite, ±50 percent, clear to red; dark-reddish-brown siltstone; light-gray anhydrite; white gypsum	975.0- 980.0
Halite, clear; red siltstone and black mudstone less than 10 percent	980.0- 985.0
Same as above; polyhalite	985.0- 990.0
Same as above, with white, granular gypsum; salmon polyhalite (approximately 5 percent)	990.0- 995.0
Halite, clear to pink, with approximately 5 percent polyhalite; some dark-reddish-brown siltstone; black mudstone (cavings?)	995.0-1,000.0

Table 9C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to pink, with approximately 5 percent polyhalite; minor, dark-reddish-brown siltstone; sparse black mudstone	1,000.0-1,005.0
Same as above; minor, light-gray anhydrite	1,005.0-1,010.0
Polyhalite, reddish-salmon to light-salmon-orange; clear halite, about 20 percent; dark-reddish-brown siltstone	1,010.0-1,015.0
Same as above; white gypsum and light-gray anhydrite, ±5 to 10 percent	1,015.0-1,020.0
Halite, grayish-orange-pink, with very minor light pink polyhalite and clay	1,020.0-1,030.0
Same as above; increasing clay	1,030.0-1,040.0
Same as above; increasing light-orange-red polyhalite (3 percent)	1,040.0-1,045.0
Halite, light-brown; minor polyhalite; brown clay	1,045.0-1,050.0
Halite, grayish-orange-pink; light-pink polyhalite	1,050.0-1,060.0
Halite, light-brown, clayey	1,060.0-1,065.0
Halite, moderate-brown; [illegible] percent brown clay	1,065.0-1,075.0
Halite, light-brown; clay content decreasing	1,075.0-1,080.0
Halite, grayish-orange-pink; less than 1 percent polyhalite	1,080.0-1,090.0
Halite, light-brown	1,090.0-1,100.0
Halite, light-grayish-orange-pink; less than 1 percent polyhalite	1,100.0-1,105.0
Halite, light-brown, clayey	1,105.0-1,110.0
Halite, grayish-orange-pink, less than 1 percent polyhalite	1,110.0-1,115.0
Halite, light-grayish-orange-pink	1,115.0-1,125.0
Halite, light-brown; ±2 percent clay	1,125.0-1,140.0
Same as above; decreasing clay	1,140.0-1,165.0
Halite, moderate-reddish-orange; 1 percent brown clay; 3 percent polyhalite	1,165.0-1,170.0
Halite, light-brown; less than 1 percent polyhalite	1,170.0-1,175.0
Same as above; increasing brown clay	1,175.0-1,180.0
Halite, medium-brown, clayey; minor polyhalite	1,180.0-1,185.0
Halite, grayish-orange-pink; minor, pink polyhalite	1,185.0-1,195.0
Same as above; increasing polyhalite	1,195.0-1,200.0
Halite, light-brown, clayey; less than 1 percent polyhalite; less than 1 percent brown clay	1,200.0-1,205.0
Same as above; increasing polyhalite	1,205.0-1,215.0
Halite, grayish-orange-pink; 2 percent dark-brown polyhalite	1,215.0-1,255.0
Halite, light-brown, clayey	1,255.0-1,265.0
Halite, grayish-orange-pink; less than 1 percent polyhalite	1,265.0-1,275.0
Halite, light-brown, clayey; less than 1 percent brown clay	1,275.0-1,285.0

Table 9C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, light-brown to medium-brown, clay increasing to 2 percent-------	1,285.0-1,300.0
Same as above; 1 percent brown clay----------	1,300.0-1,310.0
Halite, grayish-orange-pink; less than 1 percent polyhalite----------	1,310.0-1,315.0
Halite, light-brown to reddish-brown; 2 percent polyhalite----------	1,315.0-1,320.0
Halite, light-brown, decreasing polyhalite----------	1,320.0-1,330.0
Halite, light-brown (pale-reddish-brown) to pale-red; less than 1 percent polyhalite----------	1,330.0-1,335.0
Halite, pale-red to pale-reddish-brown; trace (2 percent) of brown clay-	1,335.0-1,340.0
Halite, pale-red to pale-reddish-brown; 2 percent polyhalite; minor pale-reddish-brown clay----------	1,340.0-1,345.0
Halite, moderate-orange-pink; trace of moderate-reddish-orange polyhalite; trace of moderate-reddish-brown clay----------	1,345.0-1,350.0
Halite, clear to moderate-orange-pink; minor, moderate-orange-pink polyhalite; minor, moderate-reddish-brown clay----------	1,350.0-1,365.0
Halite, clear to moderate-orange-pink; minor, moderate-orange-pink polyhalite; minor, moderate-reddish-brown and greenish-gray clay------	1,365.0-1,380.0
Halite, clear to moderate-orange-pink----------	1,380.0-1,390.0
Same as above; minor, moderate-orange-pink polyhalite----------	1,390.0-1,405.0
Halite, moderate-reddish-brown----------	1,405.0-1,410.0
Halite, pale-red to pale-reddish-brown, coarse crystalline, polyhalitic; lower 1.0 foot contains minor interstitial brown clay; irregular dark-greenish-gray clay seam at 1,415.0 feet----------	1,410.0-1,415.9
Halite, moderate-brown to moderate-reddish-brown, medium-to coarse-grained, clayey; 2-5 percent moderate-brown clay, polyhalitic; moderate brown clay parting at 1,415.9, 1,416.8 feet----------	1,415.9-1,418.2
Halite, moderate-reddish-orange, medium to coarse crystalline, polyhalitic----------	1,418.2-1,427.5
Halite, mottled pale-reddish-brown and moderate-brown, medium to coarse crystalline; contains 3-5 percent intergranular, brown, polyhalitic clay; moderate-brown clay partings at 1,428.8, 1,428.9, and 1,429.1 feet; one-quarter inch diameter polyhalite nodule at 1,429.5 feet----------	1,427.5-1,430.2
Halite, mottled pale-red and moderate-orange-pink, medium to coarse crystalline; minor polyhalite----------	1,430.2-1,433.3
Halite, moderate-reddish-orange to moderate-reddish-brown, medium to coarse crystalline; polyhalite; 0.2 foot moderate-reddish-brown, fine crystalline polyhalite bed at 1,433.9 feet; from 1,434.3 to 1,435.0 feet medium- to light-gray clay and pale-yellowish-brown halite----------	1,433.3-1,436.3

Table 9C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-brown, fine to medium crystalline, clayey; 5 percent moderate-brown clay, minor polyhalite; moderate-brown clay partings at 1,436.3 and 1,436.5 feet; grayish-red clay partings at 1,437.6, 1,439.1, and 1,440.1 feet	1,436.3-1,440.4
Halite, moderate-orange-pink to moderate-reddish-orange, medium to coarse crystalline; minor polyhalite; olive-gray clay parting at 1,447.3 feet; sparse mineralized zone in lower 3.0 feet	1,440.4-1,451.8
Halite, brown-gray to moderate-orange, medium to coarse crystalline; abundant brown clay; some gray-green clay; abundant reddish-brown polyhalite; irregularly shaped leached cavities, some contain langbeinite/leonite/kainite, some sylvite; weak to moderate mineralization, disseminated throughout	1,451.8-1,456.3
Halite, moderate-orange-pink to moderate-red-orange, medium to coarse crystalline; contains numerous blebs of polyhalite; very little green clay; disseminated leonite/kainite pseudomorphs after langbeinite; very sparse langbeinite	1,456.3-1,463.8
Polyhalite, moderate-reddish-brown, dense; grayish-green clay in seamlike bands and also in slightly leached cavities, possibly after leonite/kainite	1,463.8-1,465.4
Halite, moderate-orange-pink to moderate-reddish-orange, coarse crystalline; sparse polyhalite blebs; small amount of gray-green clay	1,465.4-1,466.2
Halite, moderate-red-pink to moderate-red-orange, coarse crystalline; contains numerous blebs of polyhalite	1,466.2-1,467.4
Halite, clear to gray-orange-pink, medium to coarse crystalline; contains sparse blebs of orange polyhalite; small amounts of interstitial gray clay; sparse, angular, leached cavities	1,467.4-1,468.6
Halite, very light gray to light-gray-red, medium to coarse crystalline; contains small gray-green clay inclusions, scattered blebs of moderate-red polyhalite	1,468.6-1,469.6
Halite, clear to moderate-red-orange, medium to coarse crystalline; contains band of gray-green clay, numerous blebs of moderate-red polyhalite, some rectangular cavities at 1,473.9 feet; several crystals of langbeinite	1,469.6-1,475.2
Halite, moderate-orange-pink to medium gray, coarse crystalline; abundant gray-green clay; sparse blebs of orange polyhalite; weak mineralization of disseminated leonite/kainite	1,475.2-1,479.4

Table 9C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-orange-pink to moderate-orange, medium to coarse crystalline; contains numerous orange blebs	1,479.4-1,480.8
Halite, light- to medium-gray, coarse crystalline; abundant gray-green clay; occasional blebs and large aggregates of polyhalite as large as 0.07 foot across; weak to moderate mineralization of disseminated leonite/kainite; very tiny crystal of langbeinite	1,480.8-1,482.1
Halite, moderate-red-orange, medium to coarse crystalline; occasional blebs and aggregates of polyhalite; small, pale-red-brown crystals of disseminated langbeinite	1,482.1-14,82.3
Halite, medium to coarse crystalline; contains abundant blebs, stringers, and bands of polyhalite (one at 1,483.0 feet); abundant gray-green clay; fairly dense mineralization of leonite/kainite in partially leached triangular cavities, probably after langbeinite; sparse langbeinite crystals toward base	1,482.8-1,485.3
Halite, moderate-orange-pink to moderate-pink, coarse crystalline; occasional blebs of polyhalite; sparse langbeinite crystals	1,485.3-1,487.2
Halite, moderate-orange-pink to light-gray-red, medium to coarse crystalline; contains small amount of polyhalite; moderate amount of disseminated leonite/kainite/langbeinite; polyhalite band at 1,487.6 feet	1,487.2-1,487.8
Polyhalite, moderate-red-brown, dense; some interbedded halite in upper part	1,487.8-1,491.0
Halite, clear to very light yellow, medium to coarse crystalline; a few very small crystals of sulfate minerals; angular leached cavities toward base	1,491.0-1,494.0
Halite, medium to coarse crystalline; contains abundant blebs of polyhalite, one 0.2 foot thick polyhalite band at 1,495.2 feet	1,494.0-1,496.0
Polyhalite, medium-red-brown, marker bed, dense; very small amount gray-green clay	1,496.0-1,496.4
Halite, moderate-red-pink to medium-gray, coarse crystalline; blebs of polyhalite mostly in top half; gray-green clay in bottom half	1,4[illegible]4-1,497.5
Halite, moderate-orange-pink to moderate-red-orange, medium to coarse crystalline; abundant blebs of polyhalite; some gray-green clay toward base	1,497.5-1,499.5
Halite, medium to coarse crystalline; considerable amount of moderate-orange polyhalite	1,499.5-1,499.9

Table 9C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, gray-green to green-gray, medium to coarse crystalline; gray-green and brown clay; abundant sparse polyhalite blebs; some clay-filled leached (after leonite/kainite(?)) cavities toward base---	1,499.9-1,503.3
Halite, moderate-orange-pink to moderate-red-pink, medium crystalline; small amount gray-green clay; some brown clay, small amounts in cavities; two polyhalite bands at 1,509.3 and 1,509.8 feet----------	1,503.3-1,510.3
Polyhalite-halite mixture, mostly polyhalite, moderate red-brown, dense-	1,510.3-1,511.3
Polyhalite, moderate-red-brown, dense; some interbedded halite toward top; abundant gray-green clay at 1,513.4 feet----------	1,511.3-1,513.6
Clay, gray-green; abundant blebs of moderate-red-brown polyhalite-------	1,513.6-1,514.1
Halite, moderate-orange-pink to moderate-red-orange, medium crystalline; moderate amount of polyhalite blebs and stringers--------	1,514.1-1,515.2
Halite, moderate-red-orange to pale-red, medium to coarse crystalline; moderate amount polyhalite blebs; gray-green clay increasing toward base----------	1,515.2-1,516.1
Halite, moderate-red-brown to gray-red, medium grading to coarse crystalline; blebs of gray-green polyhalite toward top----------	1,516.1-1,517.0
Halite, pale-red to moderate-red-brown, medium to coarse crystalline; blebs and stringers of moderate-red-brown polyhalite----------	1,517.0-1,519.9
Halite, clear to moderate-red-brown to gray-red, medium to coarse crystalline; clay at 1,520.4 and 1,521.0 feet in seams; moderate-red-brown polyhalite blebs and stringers at 1,521.4 and 1,522.3 feet; moderate to strong mineralization of langbeinite; disseminated weak, moderate amounts of sylvite, milky clear and dark-red-brown toward base----------	1,519.9-1,523.5
Halite, pale-red to moderate-red-brown, medium to coarse crystalline; green-gray clay toward top; scattered stringers and blebs of moderate-red polyhalite; bands of dense, massive langbeinite at 1,524.0-1,526.7 feet; disseminated langbeinite throughout interval; leonite/kainite after langbeinite----------	1,523.5-1,526.7
Halite, color generally moderate-dark-red-brown, pale-red, and clear, medium to coarse crystalline, clayey; bands of gray-green clay; blebs and stringers of dark-red-brown polyhalite; leonite/kainite leached cavities, some filled with clay, more common toward top; dark-brown clay toward base; langbeinite mineralization, large crystals in places; brown clay in partings----------	1,526.7-1,531.5

Table 9C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red to clear, medium to coarse crystalline; scattered blebs and stringers of moderate-red-brown polyhalite; gray-green clay near top of interval	1,531.5-1,533.7
Halite, clear to moderate-red-orange, medium to coarse crystalline; scattered stringers and blebs of moderate-red-brown polyhalite	1,533.7-1,537.0
Halite, red to pale-brown, medium to coarse crystalline; thin polyhalite bands at top and bottom of interval	1,537.0-1,537.4
Halite, moderate-red-orange to moderate-red-brown, medium to coarse crystalline; blebs of moderate-red-brown polyhalite	1,537.4-1,538.5
Halite, moderate-red-brown grading into polyhalite at base, medium to coarse crystalline; stringers and blebs of polyhalite throughout	1,538.5-1,539.0
Polyhalite, pale-red-brown to moderate-red-brown, dense; pale-red-brown, fine to medium crystalline halite, 0.02 foot thick at center; gray-green clay partings at base	1,539.0-1,539.9
Halite, clear to moderate-red-brown, pale-red toward top and base, medium to coarse crystalline; blebs of moderate-red-brown polyhalite; yellow and gray-green clay seam at base of interval	1,539.9-1,544.2
Halite, pale-red-green and red, medium to coarse crystalline, clayey; gray-green clay at top; medium clay at bottom; leonite/kainite leached cavities filled with brown clay	1,544.2-1,549.0
Halite, clear to moderate-red-orange, medium to coarse crystalline; scattered blebs of moderate-red-brown polyhalite	1,549.0-1,552.8
Halite, moderate-red-orange to moderate-red-brown, medium to coarse crystalline; stringers and blebs of moderate-red-brown polyhalite	1,552.8-1,553.3
Polyhalite, moderate-red-brown, dense; minor halite stringers; gray clay at base	1,553.3-1,555.5
Halite, moderate-red-orange, pale-red, and clear, medium to coarse crystalline; minor, moderate-red polyhalite stringers near top and base	1,555.5-1,559.1
Halite, moderate-red-orange and pale-red, medium to coarse crystalline; polyhalite bands at 1,559.4, 1,559.7, and 1,559.9 feet; minor, brown and gray-green clay at base	1,559.1-1,561.4
Polyhalite, dark-reddish-brown, dense, massive; minor interbedded halite at top	1,561.4-1,562.1
Halite, moderate-red-orange to medium-gray, medium to coarse crystalline; numerous blebs and stringers of polyhalite; abundant brown clay in center	1,562.1-1,563.5

Table 9C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red, moderate-red-brown, medium to coarse crystalline; brown and gray-green intercrystalline clay; minor polyhalite blebs----	1,563.5-1,565.6
Halite, moderate-orange-pink, moderate-red-orange, medium to coarse crystalline; minor, gray-green intercrystalline clay; occasional polyhalite blebs; minor gypsum on anhydrite----------	1,565.6-1,568.7
Halite, medium-gray, pale-red, moderate-red-orange, coarse crystalline; much gray-green clay; minor polyhalite near base----------	1,568.7-1,570.1
Halite, clear to grayish-red, fine to medium crystalline, clayey; grayish-red interstitial clay; grayish-red clay parting at 1,570.4 feet----------	1,570.1-1,570.6
Halite, clear to moderate-reddish-orange, medium crystalline; grayish-red and very dark red interstitial clay----------	1,570.6-1,571.6
Halite, clear to moderate-reddish-orange, fine to medium crystalline----	1,571.6-1,575.7
Halite, clear to olive-gray, fine to medium crystalline; contains minor interstitial olive-gray clay; olive-gray clay parting at 1,576.1 feet----------	1,575.7-1,576.2
Halite, clear to grayish-red and pale-olive, fine to medium crystalline, clayey; grayish-red interstitial clay (2 percent); grayish-red clay partings at 1,576.5, 1,576.6, 1,577.1, 1,578.1, 1,578.7, and 1,579.9 feet; medium-gray parting at 1,581.9 feet----------	1,576.2-1,581.9
Halite, clear to moderate-reddish-orange, fine crystalline; minor moderate-reddish-orange disseminated polyhalite blebs----------	1,581.9-1,583.4
Halite, clear to medium-dark-gray, medium to coarse crystalline; medium-reddish-orange, minor disseminated polyhalite blebs; medium-dark-gray interstitial clay (2 percent); medium-dark-gray partings at 1,584.3, 1,585.5, and 1,586.7 feet----------	1,583.4-1,586.7
Polyhalite, moderate-orange-pink, massive, mixed with clear halite, fine to medium crystalline----------	1,586.7-1,587.6
Anhydrite, medium-light-gray, fine to medium crystalline, massive; upper 7.1 feet contains disseminated clear crystals; lower 0.4 foot contains moderate-reddish-orange, massive polyhalite----------	1,587.6-1,599.8
Halite, clear to moderate-reddish-orange and greenish-gray, fine to coarse crystalline; contains minor red-orange disseminated polyhalite blebs; dark-gray clay partings at 1,599.8, 1,600.5, 1,604.1 1,604.2, 1,606.3, and 1,606.9 feet----------	1,599.8-1,607.9

Table 9C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, to clayey halite, clear to pale-reddish-brown; contains minor disseminated moderate-reddish-brown polyhalite blebs; minor grayish-red, medium-light-gray interstitial clay (±2 percent); medium-light-gray partings at 1,607.9, 1,608.0, and 1,608.2 feet; grayish-red at 1,609.2, 1,610.0, 1,610.1, 1,611.0, 1,612.0, 1,612.2, and 1,612.7 feet	1,607.9-1,612.7
Halite, clear to moderate-reddish-orange and pale-red, medium to coarse crystalline; contains minor disseminated moderate-reddish-orange polyhalite blebs; minor interstitial grayish-red clay; clay partings at 1,613.0, 1,621.4, and 1,623.1 feet	1,612.7-1,627.7
Halite, clear to pale-red, medium to coarse crystalline; contains minor, grayish-red interstitial clay; medium-dark-gray clay parting at 1,627.9 feet; grayish-red parting at 1,628.5 and 1,628.8 feet	1,627.7-1,629.3
Halite, clear to moderate-orange-pink and pale-red, fine to coarse crystalline; minor interstitial pale-red clay, less than 1 percent; sparse disseminated moderate-reddish-orange polyhalite	1,629.3-1,633.6
Halite, clear to greenish-gray and pale-red, fine to medium crystalline; contains minor interstitial gray-red and medium-light-gray clay; grayish-red partings at 1,633.6 and 1,634.0 feet; medium-light-gray at 1,634.7, 1,636.5, and 1,636.9 feet; minor moderate-reddish-orange polyhalite blebs	1,633.6-1,637.9
Halite, clear to pale-red and greenish-gray, medium to coarse crystalline; contains minor disseminated moderate-reddish-orange polyhalite blebs and stringers; minor grayish-red and greenish-gray interstitial clay; greenish-gray parting at 1,643.0 feet	1,637.9-1,645.6
Halite, clear to pale-red, fine to coarse crystalline; contains sparse disseminated moderate-reddish-orange polyhalite blebs; more than 3 percent greenish-gray and grayish-red interstitial clay in upper 0.7 foot; greenish-gray parting at 1,646.3 feet; grayish-red parting at 1,647.5 feet	1,645.6-1,647.9
Halite, pale-red and pale-yellow-brown, medium to coarse crystalline; minor amount of brown intercrystalline clay, decreasing downward	1,647.9-1,650.1
Halite, moderate-red-orange, moderate-pink-orange, moderate red-brown, and pale yellow-brown, medium to coarse crystalline; moderate amount intergranular gray-green clay in patches; minor, scattered blebs and stringers of red-brown polyhalite	1,650.1-1,657.2

Table 9C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-red-brown to pale-red, coarse crystalline; moderate amount moderate-reddish-brown polyhalite stringers; 0.2 foot thick layer of pale-red polyhalite at 1,657.9 feet	1,657.2-1,658.3
Halite, pale-yellow-brown, pale-red, moderate-red-brown, coarse crystalline; slight amount red-brown polyhalite stringers	1,658.3-1,662.2
Halite, pale-red, pale-yellow-brown, very coarse crystalline; moderate amount pale-yellow polyhalite stringers	1,662.2-1,662.9
Anhydrite-polyhalite mixed, light to medium crystalline, laminated, dense; moderate-pink-orange to pale-red, fine to medium crystalline halite bed in middle at 1,668.5-1,668.9 feet; basal 0.5 foot of unit contains some halite	1,662.9-1,670.5
Halite, moderate-orange-pink to pale-red, fine to medium crystalline; very minor polyhalite blebs and stringers; grayish-orange-pink polyhalite band at 1,671.7 feet; medium-gray anhydrite banding at 1,673.7-1,674.0 feet	1,670.5-1,674.6
Anhydrite-polyhalite, mixed with halite pseudomorphs in upper 3.0 feet, laminated	1,674.6-1,681.9
Mudstone, medium-gray	1,681.9-1,682.3
Polyhalite, moderate-red-brown, dense, clayey; moderate amount gray-green clay with minor halite bands in lower 0.5 foot	1,682.3-1,683.9
Halite, pale-red to moderate-red-brown, medium crystalline; moderate amount polyhalite blebs; 0.2 foot band red polyhalite at 1,686.2 feet	1,683.9-1,687.4
Halite, pale-red-brown to pale-red, fine to medium crystalline, clayey; moderate amount moderate-red-orange polyhalite stringers; gray-green interstitial clay; grayish-green parting at 1,688.8 feet	1,687.4-1,688.9
Halite, pale-red to moderate-red-orange, medium to coarse crystalline; minor stringers and blebs of moderate-red-brown polyhalite; grayish-green clay parting at 1,692.6 feet; band rich in polyhalite at 1,692.7-1,693.1 feet	1,688.9-1,694.1
Halite, pale-red to clear to moderate-red-orange; upper and lower 0.4 foot are nearly clay-free, center portion of unit has moderate amount brown and green clay; partings at 1,694.6 feet	1,694.1-1,695.6
Halite, pale-red to light-gray, clayey; large amount of intercrystalline brown clay; clay seams at 1,695.8 feet	1,695.6-1,697.8
Halite, moderate-red-orange, pale-yellow-brown, medium to coarse crystalline; minor pale-red polyhalite blebs; lower 2.0 feet have minor amount sulfate; lower 0.3 foot is clayey halite and gray-green clay	1,697.8-1,705.3

Table 9C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red to light-gray, fine to medium crystalline, clayey; large amount brown intercrystalline clay; partings at top and at 1,706.9, 1,707.4, and base	1,705.3-1,707.9
Halite, pale-red to clear, medium to coarse crystalline; moderate amount moderate-red-brown polyhalite in top 0.4 foot	1,707.9-1,709.2
Halite, moderate-red-orange, medium to coarse crystalline; moderate amount of moderate-red-brown polyhalite stringers and blebs in upper two-thirds; minor amount in lower one-third	1,709.2-1,712.1
Polyhalite, moderate-orange-brown to gray-red, dense; moderate amount pale-red halite banding	1,712.1-1,712.5
Halite, pale-yellow-brown to pale-red, coarse crystalline; moderate amounts of moderate-red-brown polyhalite stringers in lower half	1,712.5-1,713.0
Halite, pale-red, medium to coarse crystalline, clayey; minor amount moderate-red-brown polyhalite stringers in center of unit; large amount of brown intercrystalline clay	1,713.0-1,714.0
Halite, pale-yellow-brown, pale-red, clear, very coarse crystalline; moderate amount moderate-red-brown polyhalite stringers	1,714.0-1,715.7
Halite, pale-red, light-gray, clayey; minor amount of moderate-red-brown polyhalite stringers and blebs; large amount of brown intercrystalline clay	1,715.7-1,719.9
Halite, pale-red to moderate-red-orange to light-gray, coarse crystalline; minor amount moderate-red-brown polyhalite stringers and blebs; minor amount brown intercrystalline clay	1,719.9-1,722.6
Halite, pale-red grading downward to moderate-red-orange, medium to coarse crystalline; moderate amount moderate-red-brown polyhalite stringers and blebs; lower 0.5 foot contains minor amounts of disseminated small crystals of langbeinite	1,722.6-1,724.0
Halite, pale-red to light-gray, medium to coarse crystalline; minor amount moderate-red-brown polyhalite blebs; minor amount of brown intercrystalline clay, minor amount of disseminated small crystals of langbeinite	1,724.0-1,724.5
Halite, pale-red to moderate-red-orange, coarse crystalline; moderate amount of moderate-reddish-brown polyhalite stringers and blebs; minor amount of gray-green intercrystalline clay	1,724.5-1,725.9
Halite, moderate-red-orange to pale-red to clear, coarse crystalline; moderate amount moderate-red-brown polyhalite stringers and blebs	1,725.9-1,729.7

Table 9C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red to gray-green and clear, medium to coarse crystalline; moderate amount moderate-red-brown polyhalite near top; moderate amount gray-green clay near center; clear halite toward base----------	1,729.7-1,733.3
Halite, pale-red to moderate-red-orange, medium to coarse crystalline; scattered blebs of polyhalite----------	1,733.3-1,736.7
Halite, clear to light-gray, medium to coarse crystalline; occasional stringers and bands of polyhalite; one large crystal of langbeinite at 1,736.9 feet; gray-green clay with langbeinite----------	1,736.7-1,737.5
Halite, clear to moderate-red-orange, medium to coarse crystalline; occasional blebs of polyhalite----------	1,737.5-1,738.8
Halite, light-gray to medium-gray, medium to coarse crystalline, langbeinitic; some gray-green clay----------	1,738.8-1,739.4
Halite, medium- to dark-gray, coarse crystalline; abundant gray-green clay; sparse blebs of polyhalite; some partially leached vugs with langbeinite in top half	1,739.4-1,740.5
Halite, brown-gray, rarely clear, coarse crystalline; abundant brown clay with some greenish-gray clay; greenish-gray clay seams at 1,741.9 and 1,742.2 feet; minor polyhalite blebs; polyhalite band at 1,742.8 feet----------	1,740.5-1,744.0
Halite, clear to very light-gray, medium to coarse crystalline; prominent moderate-red-orange polyhalite bands at 1,745.8 and 1,746.7 feet----------	1,744.0-1,748.6
Halite, clear to very light-gray, medium to coarse crystalline; prominent polyhalite band at 1,748.7 feet; very minor amount gray-green clay----------	1,748.6-1,754.4
Halite, medium- to gray-brown, fine to coarse crystalline, clayey; abundant brown clay; sparse blebs of polyhalite----------	1,754.4-1,756.2
Halite, clear to medium-brown-gray, coarse crystalline; scattered polyhalite blebs; abundant brown intercrystalline clay; small amount gray-green clay; clay parting at 1,756.4 feet----------	1,756.2-1,760.6
Halite, clear to very light-gray, coarse crystalline; small amount brown and gray-brown clay; sparse blebs of red-brown polyhalite; few small angular leached cavities in middle of unit----------	1,760.6-1,761.4
Halite, pale-red to very light gray, medium to coarse crystalline; scattered blebs of moderate-red-brown polyhalite; small amount of intercrystalline gray-green clay; brown clay at base----------	1,761.4-1,762.4
Halite, medium-gray to brown-gray, medium to coarse crystalline; contains abundant brown clay; sparse polyhalite blebs and stringers; brown clay partings at 1,764.2 feet----------	1,762.4-1,764.5

Table 9C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, light- to medium-gray, medium to very coarse crystalline; minor amount brown intercrystalline clay; sparse small polyhalite blebs; few angular leached cavities	1,764.5-1,765.7
Halite, very light-yellow to moderate-orange-pink, medium to coarse crystalline; very small amount brown and gray-green clay; scattered polyhalite stringers concentrated near base	1,765.7-1,769.2
Halite, medium-gray, medium to coarse crystalline, clayey; abundant gray-green clay, parting near top of unit; sparse polyhalite; sparse brown intercrystalline clay	1,769.2-1,771.0
Halite, brown-gray, medium crystalline, clayey; contains sparse blebs polyhalite; abundant brown clay	1,771.0-1,772.1
Halite, pale-red to gray-red, very fine to medium crystalline; moderate amount polyhalite blebs and stringers; abundant brown and gray-green clay; clay partings at 1,772.5, 1,775.9, and 1,777.0 feet	1,772.1-1,777.4
Halite, pale-red, gray-red, and moderate-red-brown, medium to coarse crystalline; abundant dark-red-brown clay, especially in lower part; numerous blebs and stringers of polyhalite concentrated near base; brown clay partings at 1,777.6, 1,778.9, 1,779.9, and 1,780.5 feet	1,777.4-1,781.9
Halite, moderate-red-orange to clear, medium to coarse crystalline; abundant polyhalite blebs and stringers	1,781.9-1,784.6
Halite, clear to moderate-red-orange, medium to coarse crystalline; numerous blebs and stringers of polyhalite; very minor amount gray-green clay	1,784.6-1,786.7
Halite, clear to moderate-red-orange, medium to coarse crystalline; numerous blebs and stringers of polyhalite, clear toward base	1,786.7-1,787.4
Halite, moderate-red-orange, medium to coarse crystalline; numerous polyhalite stringers, grades to polyhalite at base	1,787.4-1,788.3
Polyhalite, moderate-red-brown, dense; small amount gray-green clay; moderate amount fine to medium crystalline, interbedded halite	1,788.3-1,788.9
Mudstone, light- to medium-gray-green	1,788.9-1,789.1
Halite, clear to very light-gray, medium to coarse crystalline; small amount polyhalite blebs near top	1,789.1-1,789.9
Halite, gray-red, clear in places, medium to coarse crystalline, clayey; abundant brown clay; some gray-green clay; 0.4 foot brown clay at top of unit	1,789.9-1,790.9

Table 9C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, gray-red to moderate-red-orange, medium to coarse crystalline; abundant blebs and stringers of polyhalite; minor brown and gray-green intercrystalline clay; brown clay parting at 1,793.6 feet; leached cavities	1,790.9-1,795.0
Halite, pale-red and moderate-red-orange, very fine to medium crystalline; moderate-red-brown polyhalite	1,795.0-1,796.0
	Total depth

Table 9b.--Mineralogical and chemical analyses of core samples from potash ore zones and mineralized salt beds in drill hole P-9

[oz, ore zone; mm, middle member; lm, lower member; sb, salt bed; tr, trace; Bl, bloedite; Ha, halite; Ka, kainite; La, langbeinite; Le, leonite; Po, polyhalite; Sy, sylvite; n.d., not determined. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mineralogy: X-ray diffraction analysis[1]	Chemical analysis (weight percent): Ca	K	Mg	Na	Cl	SO_4	H_2O+	H_2O-	Water insoluble
P-9/1	1,451.14-1,451.80	0.66	sb	>8 Ha;<1 Po; tr Sy, La, Le	0.49	2.0	0.80	35.0	54.5	4.7	0.38	0.03	0.25
P-9/2	1,451.80-1,452.62	.82	11th oz	7 Ha;>1 Ka; 1 Le; tr Po, Sy	.24	4.8	2.3	26.5	42.0	11.5	4.7	.66	7.0
[2]P-9/3	1,452.62-1,453.92	1.30		7 Ha; 1 Ka, Le,<1 Po, Sy	1.0	4.4	1.9	30.0	47.5	11.5	2.8	.08	1.6
[2]P-9/3					1.0	4.4	1.9	30.0	47.5	11.5	2.8	.10	1.5
P-9/4	1,453.92-1,454.99	1.07		7 Ha;>2 Ka; tr Le	.16	3.7	2.0	27.5	46.0	8.8	3.9	.65	6.2
P-9/5	1,454.99-1,455.65	.66		>8 Ha;<1 Po; tr Ka, Le	.52	1.1	.60	34.5	54.0	3.0	.86	.36	2.8
P-9/6	1,455.65-1,456.50	.85	sb	>8 Ha;<1 Po; tr, Ka, Le	1.6	1.7	.60	34.0	n.d.	6.7	.39	.06	1.0
P-9/7	1,521.68-1,522.56	.88	sb	>9 Ha; tr Po, La	.16	.20	.08	38.0	n.d.	.33	.15	.06	.50
[2]P-9/8	1,522.56-1,523.41	.85	10th oz	5 Ha;>4 La;<1 Sy; tr Po, Ka	.08	13.0	6.0	16.5	29.0	35.0	.42	.04	.23
[2]P-9/8					.08	13.0	6.1	16.5	29.0	35.0	.42	.03	.31
P-9/9	1,523.41-1,524.07	.66		>9 Ha; tr Po, La	.13	.76	.45	36.5	57.0	2.4	.27	.07	.84
[2]P-9/10	1,524.07-1,524.70	.63		>2 Ha; 6 La;<1 Sy, tr Po,Ka,Le	.20	16.0	8.8	6.8	14.0	53.0	.70	.07	1.2
[2]P-9/10					.20	16.0	8.6	6.8	14.0	52.5	.70	.05	1.3
P-9/11	1,524.70-1,526.04	1.34		9 Ha;<1 Po; tr La	.37	.56	.29	37.5	57.5	2.0	.15	.06	.05
P-9/12	1,526.04-1,526.74	.70		>7 Ha;>2 La; tr Po, Ka	.21	6.3	4.0	25.5	39.5	23.5	.59	.02	.42
P-9/13	1,526.74-1,528.50	1.76		6 Ha;>1 Po, Ka;<1 Le	.92	4.4	2.4	25.5	40.5	12.5	4.8	1.0	7.1
P-9/14	1,528.50-1,529.47	.97		>6 Ha;<1 Po, Ka; tr Bl	.44	1.4	1.2	30.0	46.5	6.0	2.8	1.5	8.5
P-9/15	1,529.47-1,530.45	.98		>9 Ha; tr Po	.12	.32	.43	34.0	52.5	.86	1.8	1.4	8.2
P-9/16	1,702.94-1,703.65	.71	4th oz, mm	>9 Ha; tr Po, La	.14	.40	.29	38.5	58.0	1.6	.27	.05	.08
[2]P-9/17	1,703.65-1,705.23	1.58		>7 Ha;<3 La; tr Po	.20	5.6	3.7	27.5	42.0	20.5	.26	.06	.20
[2]P-9/17					.20	5.6	3.7	27.5	42.5	20.5	.26	.07	.18
P-9/18	1,705.23-1,705.65	.42		>9 Ha; tr Po, La, Ka, Le, Bl	.12	1.4	.96	35.0	55.0	5.1	.63	.05	.11
P-9/19	1,705.65-1,706.38	.73	4th oz, lm	>9 Ha;<1 Po; tr Ka	.34	.24	.24	36.5	57.0	1.0	.50	.16	3.1

[1]Estimate of amount reported on a scale of 0-10.

[2]Replicate analyses.

Table 9E.--Calculated mode (mineral content) and potash distribution by mineral in core samples from potash ore zones and mineralized salt beds in drill hole P-9

[oz, ore zone; mm, middle member; lm, lower member; sb, salt bed; Bl, bloedite; Ha, halite; Ka, kainite; La, langbeinite; Le, leonite; Po, polyhalite; Sy, sylvite; Insol., clay and silt; leaders (---), not present. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mode (weight percent mineral)								K_2O distribution by minerals					
				Sy	La	Ka	Le	Bl	Ha	Po	Insol.	Sy	La	Ka	Le	Po	Total
P-9/1	1,451.14-1,451.80	0.66	sb	1.1	2.9	---	1.9	---	88.9	3.7	0.3	0.7	0.6	---	0.5	0.6	2.4
P-9/2	1,451.80-1,452.62	.82		1.0	---	17.7	5.9	---	67.4	1.8	7.0	.7	---	3.3	1.5	.3	5.8
[1]P-9/3	1,452.62-1,453.92	1.30		2.4	---	11.6	1.5	---	76.3	7.5	1.6	1.5	---	2.2	.4	1.2	5.3
[1]P-9/3			11th oz	2.4	---	11.6	1.5	---	76.3	7.5	1.5	1.5	---	2.2	.4	1.2	5.3
P-9/4	1,453.92-1,454.99	1.07		---	---	20.9	1.2	---	69.9	1.2	6.2	---	---	4.0	.3	.2	4.5
P-9/5	1,454.99-1,455.65	.66		---	---	2.5	1.0	---	87.7	3.9	2.8	---	---	.5	.2	.6	1.3
P-9/6	1,455.65-1,456.50	.85	sb	---	---	1.5	2.1	---	86.5	7.9	1.0	---	---	.3	.5	1.2	2.0
P-9/7	1,521.68-1,522.56	.88	sb	---	.3	---	---	---	96.6	1.1	.5	---	<.1	---	---	.2	.2
[1]P-9/8	1,522.56-1,523.41	.85		6.3	47.6	4.1	---	---	41.9	.6	.2	4.0	10.8	.8	---	.1	15.7
[1]P-9/8				6.0	45.8	7.3	---	---	41.4	.6	.3	3.8	10.4	1.4	---	.1	15.7
P-9/9	1,523.41-1,524.07	.66		---	3.4	---	---	---	92.8	1.0	.8	---	.8	---	---	.1	.9
[1]P-9/10	1,524.07-1,524.70	.63		2.8	72.6	.6	2.7	---	17.3	1.5	1.2	1.8	16.5	.1	.7	.2	19.3
[1]P-9/10			10th oz	2.3	67.7	.7	8.1	---	17.3	1.5	1.3	1.4	15.4	.1	2.1	.2	19.3
P-9/11	1,524.70-1,526.04	1.34		---	1.1	---	---	---	94.8	2.8	<.1	---	.2	---	---	.4	.6
P-9/12	1,526.04-1,526.74	.70		---	30.1	2.7	---	---	64.8	1.6	.4	---	6.8	.5	---	.2	7.5
P-9/13	1,526.74-1,528.50	1.76		---	---	21.1	.9	---	61.5	6.9	7.1	---	---	4.0	.2	1.1	5.3
P-9/14	1,528.50-1,529.47	.97		---	---	6.2	---	2.6	75.4	3.3	8.5	---	---	1.2	---	.5	1.7
P-9/15	1,529.47-1,530.45	.98		---	---	---	---	---	86.5	2.5	8.2	---	---	---	---	.4	.4
P-9/16	1,702.94-1,703.65	.71		---	1.4	---	---	---	97.9	1.0	<.1	---	.3	---	---	.2	.5
[1]P-9/17	1,703.65-1,705.23	1.58		---	28.7	---	---	---	69.9	1.5	.2	---	6.5	---	---	.2	6.7
[1]P-9/17			4th oz, mm	---	28.7	---	---	---	69.9	1.5	.2	---	6.5	---	---	.2	6.7
P-9/18	1,705.23-1,705.65	.42		---	1.7	3.6	1.9	1.7	88.4	.9	.2	---	6.4	.7	.5	.1	1.7
P-9/19	1,705.65-1,706.38	.73	4th oz, lm	---	---	<.1	---	---	93.8	1.3	3.1	---	---	.1	---	.2	.3

[1]Replicate analyses.

TABLES 10A-10G

Basic data from drill hole P-10,
Waste Isolation Pilot Plant area, Eddy County, New Mexico

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Table 10A.--Abridged drill-hole history

LOCATION: Sec. 26, T. 22 S., R. 31 E.
706 m (2,315 ft) from north line
103 m (339 ft) from west line

ALTITUDE (LAND SURFACE): 1,069 m (3,508.4 ft). Datum for depth measurements in drilling and logging operations.

LITHOLOGIC LOG PREPARED BY: J. C. Lorenz, Florian Maldonado, B. R. Orr, L. A. Rives, R. P. Snyder, and R. W. Spengler, September 26 to October 16, 1976.

DRILLING CONTRACTOR: Pennsylvania Drilling Co.

DRILLING RECORD: Commenced drilling on September 24, and completed on October 15, 1976, at 612 m (2,009 ft) below land surface.

Recovered all casing, and plugged with cement.

REMARKS: Top of salt in Rustler Formation at 217 m (712 ft) below land surface.

Table 10B.--Stratigraphic summary

Rock unit	Depth interval[1] feet	meters
Holocene deposits	0-8	0-2
Triassic rock:		
Santa Rosa Sandstone	8-151	2-46
Permian rocks:		
Dewey Lake Red Beds	151-686	46-209
Rustler Formation	686-1,086	209-331
Magenta Dolomite Member	757-781	231-238
Culebra Dolomite Member	931-957	284-292
Salado Formation	1,086-2,009	331-612
Upper member	1,086-1,594	331-486
McNutt potash zone	1,594-1,983	486-604
Vaca Triste Sandstone Member[2]	1,594-1,603	486-489
11th ore zone	1,652-1,655	504-504
Marker bed 117	1,662-1,664	507-507
Marker bed 118	1,686-1,688	514-515
Marker bed 119	1,710-1,712	521-522
10th ore zone	1,717-1,725	523-526
Marker bed 120	1,733-1,734	528-529
9th ore zone	1,740-1,744	530-532
Marker bed 121	1,751-1,753	534-534
Marker bed 122	1,759-1,760	536-536
8th ore zone	1,765-1,775	538-541
Union anhydrite[3]	1,784-1,798	544-548
7th ore zone	1,807-1,811	551-552
6th ore zone	1,822-1,825	555-556
5th ore zone	1,831-1,841	558-561
Marker bed 123	1,868-1,875	569-572
Marker bed 124	1,880-1,888	573-575
4th ore zone	1,892-1,905	577-581
3d ore zone	1,913-1,929	583-588
2d ore zone	1,934-1,938	589-591
1st ore zone	1,961-1,969	598-600
Marker bed 126	1,982-1,983	604-604
Lower member	1,983-2,009	604-612
Marker bed 127	2,005-2,008	611-612
Maximum depth recorded	2,010	613

[1]Depth interval recorded from geophysical logs.
[2]Of Adams, 1944.
[3]Informal unit of Salado Formation.

Table 10C.--Lithologic log

Description	Depth (feet)	
Caliche; some reddish-brown sandstone	0.0-	10.0
Same as above; with increase in reddish-brown sandstone	10.0-	15.0
Caliche; with reddish-brown sandstone; approximately 50 percent caliche, approximately 50 percent sandstone	15.0-	20.0
Sandstone, dark-reddish-brown; minor caliche	20.0-	25.0
Sandstone, dark-reddish-brown, medium-grained	25.0-	30.0
Sandstone, reddish-brown, fine-grained; calcite cement	30.0-	35.0
Same as above; with sparse, gray sandstone; caliche	35.0-	55.0
Same as above; no gray sandstone	55.0-	75.0
Sandstone, reddish-brown, very fine grained; sparse caliche	75.0-	80.0
Sandstone, reddish-brown, very fine grained; red mudstone, with sparse, green reduction spots	80.0-	95.0
Sandstone, reddish-brown, very fine grained; heavy contamination of sandy, red mud	95.0-	100.0
Sandstone, reddish-brown, with reduction spots, silty; heavy contamination of silty, red mud	100.0-	105.0
Same as above; increasing green siltstone; decreasing contamination by mud	105.0-	115.0
Siltstone, reddish-brown, with green reduction spots; heavy contamination of silty, red mud	115.0-	135.0
Same as above; decreasing contamination of mud; sparse caliche	135.0-	140.0
Same as above; increasing contamination of mud; more caliche	140.0-	145.0
Same as above; some contamination of white mud	145.0-	150.0
Same as above; no white mud	150.0-	155.0
Siltstone, reddish-brown, some green reduction spots	155.0-	165.0
Same as above; with some caliche	165.0-	170.0
Shale, reddish-brown, some green reduction spots; some caliche	170.0-	175.0
Same as above; no caliche	175.0-	180.0
Same as above; some caliche	180.0-	195.0
Shale, reddish-brown, fewer green reduction spots; with some caliche	195.0-	200.0
Siltstone, reddish-brown, with green reduction spots	200.0-	255.0
Siltstone, reddish-brown, with green reduction spots; minor gypsum	255.0-	275.0
Siltstone, reddish-brown, with green reduction spots; minor gypsum; trace of clear halite	275.0-	300.0
Siltstone, reddish-brown, green reduction spots; minor gypsum; sparse halite	300.0-	340.0
Siltstone, reddish-brown, green reduction spots; minor gypsum; sparse black shale	340.0-	345.0
Siltstone, reddish-brown, fine, sandy; minor gypsum	345.0-	360.0

Table 10C.--Lithologic log--(Continued)

Description	Depth (feet)
Siltstone, reddish-brown, with green reduction spots; minor gypsum----	360.0- 375.0
Siltstone, reddish-brown, minor green reduction spots----------	375.0- 385.0
Same as above; trace of selenite----------	385.0- 400.0
Siltstone, reddish-brown, with green reduction spots; trace of selenite----------	400.0- 430.0
Same as above; increase in reduction spots----------	430.0- 445.0
Same as above; minor amount of reddish-brown claystone----------	445.0- 455.0
Siltstone, reddish-brown, with green reduction spots; trace of selenite----------	455.0- 470.0
Same as above; minor reddish-brown claystone----------	470.0- 475.0
Siltstone, reddish-brown, with green reduction spots; 20 percent claystone; trace of selenite----------	475.0- 495.0
Same as above; trace of black claystone----------	495.0- 500.0
Siltstone, reddish-brown, with green reduction spots; sparse reddish-brown claystone; minor gypsum----------	500.0- 600.0
Siltstone, reddish-brown, with light-green reduction spots; little claystone; minor gypsum----------	600.0- 610.0
Sandstone, moderate-reddish-brown, very fine grained, medium to well sorted; moderate-reddish-brown siltstone----------	610.0- 635.0
Sandstone, moderate-reddish-brown, fine-grained, subrounded to rounded, well-sorted; minor gypsum----------	635.0- 655.0
Sandstone, moderate-reddish-brown, fine-grained, subrounded to rounded, well-sorted; minor gypsum----------	655.0- 660.0
Sandstone, moderate-reddish-brown, fine- to medium-grained, subrounded to rounded, well-sorted; minor gypsum; minor moderate-reddish-brown siltstone----------	660.0- 670.0
Sandstone, moderate-reddish-brown, fine- to medium-grained, subrounded to rounded, well-sorted; minor gypsum----------	670.0- 680.0
Sandstone, moderate-reddish-brown, fine-grained, subrounded to rounded, well-sorted; minor anhydrite----------	680.0- 685.0
Sandstone, moderate-reddish-brown, fine- to medium-grained, subrounded to rounded, well-sorted; sparse anhydrite----------	685.0- 690.0
Anhydrite, grayish-orange-pink; some moderate-reddish-brown, fine-grained, well-sorted sandstone----------	690.0- 695.0
Anhydrite, grayish-orange-pink; some moderate-reddish-brown, fine-grained, well-sorted sandstone----------	695.0- 700.0

Table 10C.--Lithologic log--(Continued)

Description	Depth (feet)
Anhydrite, grayish-orange-pink, massive; minor medium-reddish-brown, fine-grained, well-sorted sandstone	700.0- 730.0
Anhydrite, very light gray; trace of moderate-reddish-brown siltstone	730.0- 745.0
Anhydrite, very light gray; trace of moderate-reddish-brown siltstone	745.0- 755.0
Dolomite, medium-gray, crystalline, with minute vugs; gray anhydrite with gypsum rinds; grayish-white gypsum; some reddish-brown siltstone	755.0- 760.0
Dolomite, medium-gray; some anhydrite and gypsum; some reddish-brown siltstone	760.0- 770.0
Dolomite, medium-gray, fine crystalline	770-0- 780.0
Anhydrite, medium-gray; gypsum; some dolomite	780.0- 790.0
Same as above; some reddish-brown siltstone	.790.0- 795.0
Same as above; no dolomite	795.0- 800.0
No sample	800.0- 810.0
Anhydrite, medium-gray with gypsum rinds; white gypsum; some reddish-brown siltstone	810.0- 860.0
Same as above; increasing white gypsum	860.0- 865.0
Anhydrite, medium-gray with gypsum rinds; some white gypsum; reddish-brown siltstone; trace of selenite	865.0- 880.0
Anhydrite, medium-gray with gypsum rinds; trace of salt	880.0- 885.0
Halite and anhydrite; trace of bluish-gray clay; some reddish-brown siltstone	885.0- 890.0
Halite; some anhydrite; reddish-brown siltstone	890.0- 900.0
Halite; some reddish-brown siltstone; anhydrite	900.0- 910.0
Same as above; trace of white gypsum	910.0- 915.0
Anhydrite; some halite; reddish-brown siltstone common	915.0- 920.0
Anhydrite, white; scattered reddish-brown siltstone	920.0- 930.0
Dolomite, grayish-white, fine-grained; scattered reddish-brown siltstone	930.0- 945.0
Same as above; less than 1 percent anhydrite	945.0- 950.0
Same as above; no anhydrite	950.0- 955.0
Same as above; less than 5 percent anhydrite	955.0- 960.0
Dolomite, white-gray, fine-grained; 20 percent reddish-brown siltstone; scattered bluish-gray shale	960.0- 965.0

Table 10C.--Lithologic log--(Continued)

Description	Depth (feet)
Siltstone, reddish-brown, very fine grained; 5-10 percent halite; less than 1 percent anhydrite	965.0- 970.0
Siltstone, reddish-brown, very fine grained; increasing halite and anhydrite; some bluish-gray shale	970.0- 975.0
Anhydrite and gypsum, white; contains disseminated reddish-brown siltstone; some disseminated gypsum	975.0- 995.0
Anhydrite and gypsum, grayish-white; selenite; some halite; black shale; red siltstone	995.0-1,000.0
No sample	1,000.0-1,005.0
Halite, clear; white gypsum; black shale; red siltstone	1,005.0-1,015.0
Same as above; increasing halite	1,015.0-1,030.0
Same as above; some gray anhydrite	1,030.0-1,050.0
Same as above; trace of dolomite	1,050.0-1,055.0
Shale, grayish-black; reddish-brown siltstone; some anhydrite, white gypsum, and dolomite; trace of halite	1,055.0-1,060.0
Same as above; some grayish-blue mudstone and reddish-brown sandstone	1,060.0-1,065.0
Mudstone, grayish-blue	1,065.0-1,080.0
Halite, clear; some reddish-brown sandstone and siltstone	1,080.0-1,095.0
Halite, clear; trace of polyhalite	1,095.0-1,100.0
Halite, clear; trace of polyhalite, white gypsum, and reddish-brown siltstone	1,100.0-1,115.0
Same as above; increasing polyhalite	1,115.0-1,120.0
Halite; trace of polyhalite, reddish-brown siltstone, light-greenish-gray sandstone, and black shale	1,120.0-1,125.0
Halite, polyhalite common; trace of reddish-brown siltstone	1,125.0-1,135.0
Same as above; reddish-brown siltstone more common	1,135.0-1,140.0
No sample	1,140.0-1,155.0
Halite, clear; trace of polyhalite, reddish-brown siltstone, and black shale	1,155.0-1,160.0
Halite, clear; cavings	1,160.0-1,200.0
Caliche, anhydrite, red siltstone, salt; cavings	1,200.0-1,210.0
Same as above; abundance of reddish-orange polyhalite	1,210.0-1,215.0
Same as above; increasing halite (less contamination?)	1,215.0-1,225.0
Caliche; clear salt; reddish-orange polyhalite; contaminated	1,225.0-1,240.0
Halite, clear; caliche; siltstone; contaminated	1,240.0-1,255.0
Halite, clear; reddish-orange polyhalite	1,255.0-1,260.0

Table 10C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear	1,260.0-1,265.0
Halite, clear; contaminated with siltstone, sandstone, and caliche	1,265.0-1,270.0
Halite; anhydrite; gypsum; contaminated sample	1,270.0-1,275.0
Same as above; with caliche and sandstone	1,275.0-1,290.0
Halite, clear and moderate-reddish-orange; some contamination	1,290.0-1,305.0
Same as above; with minor moderate-reddish-brown polyhalite	1,305.0-1,360.0
Halite, clear; minor amount of moderate-reddish-brown polyhalite	1,360.0-1,370.0
Halite, clear; moderate amount of polyhalite	1,370.0-1,375.0
Halite, clear; minor amount of reddish-brown polyhalite	1,375.0-1,395.0
Halite, clear to pale-red; minor amounts of reddish-brown polyhalite and brown clay	1,395.0-1,400.0
Halite, clear and moderate-reddish-orange; some contamination of reddish-brown siltstone from uphole	1,400.0-1,410.0
Halite, clear and moderate-reddish-orange; minor moderate-reddish-brown polyhalite; contaminated	1,410.0-1,415.0
Halite, clear and moderate-reddish-orange	1,415.0-1,435.0
Same as above; contaminated	1,435.0-1,445.0
Halite, clear; minor polyhalite	1,445.0-1,455.0
Same as above; with minor brown clay	1,455.0-1,460.0
Halite, clear; minor reddish-brown polyhalite	1,460.0-1,545.0
Halite, clear and pale-yellowish-brown	1,545.0-1,550.0
Same as above; with light- to moderate-reddish-brown polyhalite	1,550.0-1,570.0
Halite, clear	1,570.0-1,580.0
Halite, clear and pale-red, very minor reddish-brown polyhalite	1,580.0-1,620.0
Halite, light-brown, medium to coarse crystalline; contains stringers of moderate reddish-orange polyhalite; very coarse crystalline halite toward base, very fine crystalline at base	1,620.0-1,624.3
Clay, halitic; brown, medium to coarse crystalline white halite; granular polyhalite increasing downward	1,624.3-1,630.4
Halite, mottled light-brown, medium crystalline; contains moderate-reddish-brown polyhalite stringers	1,630.4-1,631.2
Halite, mottled grayish-brown, fine to medium crystalline; intercrystalline gray clay; 0.1 foot thick moderate-reddish-brown polyhalite band at base	1,631.2-1,631.7
Halite, light-brown, fine to medium crystalline; contains minor polyhalite blebs	1,631.7-1,632.2

Table 10C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, light-brown, mottled; medium crystalline, clayey; contains minor polyhalite blebs; brown clay partings at 1,632.5 and 1,632.6 feet	1,632.2-1,633.0
Halite, light-brown to moderate-reddish-orange, fine to medium crystalline; moderate-reddish-orange intercrystalline polyhalite, increasing with depth	1,633.0-1,634.9
Polyhalite, moderate-reddish-brown, dense	1,634.9-1,635.0
Halite, light-orange-pink, medium crystalline; contains moderate-reddish-orange polyhalite stringers	1,635.0-1,635.8
Halite, light-brown, mottled, medium crystalline; brown clay increases downward; contains minor intercrystalline polyhalite	1,635.8-1,636.8
Halite, moderate-reddish-orange, medium crystalline; finely disseminated polyhalite increases downward; dissolved sylvite vugs near base	1,636.8-1,639.2
Clay, gray to brown, halitic; contains triangular-shaped crystals; at base are polyhalite bands; polyhalite band at 1,640.6 to 1,640.9 feet	1,639.2-1,642.1
Halite, light-brown to clear, medium to very coarse crystalline; very minor brown clay; contains moderate-reddish-brown polyhalite blebs	1,642.1-1,644.6
Halite, light-brown to moderate-reddish-orange, medium crystalline, polyhalitic	1,644.6-1,645.3
Halite, light-orange-pink to light-brown, medium to very coarse crystalline; contains minor moderate-reddish-brown polyhalite stringers and blebs	1,645.3-1,648.1
Halite, light-reddish-orange, coarse crystalline; upper 0.4 foot contains gray clay, moderate-reddish-orange disseminated intercrystalline polyhalite and blebs	1,648.1-1,650.6
Halite, light-brown, fine to medium crystalline; sylvite vugs in lower 0.6 foot; moderate amount of greenish-gray clay parting at base	1,650.6-1,652.1
Halite, mottled pale-red, medium to coarse crystalline; moderate reddish-brown sylvite; iron-stained vugs; gray clay parting at 1,652.8 and 1,653.0 feet	1,652.1-1,653.9
Halite, light-brown, medium to coarse crystalline; contains moderate-reddish-brown polyhalite bleb at 1,653.9 feet and very minor polyhalite throughout unit	1,653.9-1,655.0

Table 10C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-yellowish-brown, medium to coarse crystalline; contains intercrystalline polyhalite and blebs	1,655.0-1,655.6
Halite, light-brown, medium to coarse crystalline, polyhalitic; contains moderate-reddish-orange polyhalite blebs and stringers	1,655.6-1,659.6
Halite, moderate-reddish-brown, medium to coarse crystalline, polyhalitic; polyhalite band at 1,660.3 feet; sylvite vugs at 1,659.9 feet	1,659.6-1,661.3
Polyhalite, moderate-reddish-brown, dense; 0.2 foot-thick gray clay seam at base	1,661.3-1,662.8
Halite, light-gray, mottled, medium to coarse crystalline; minor gray clay seams and intercrystalline clay	1,662.8-1,664.5
Halite, light-reddish-orange to beige, coarse crystalline; contains minor disseminated polyhalite	1,664.5-1,667.0
Halite, light-olive-gray, medium to coarse crystalline; minor gray clay; minor reddish-brown polyhalite blebs; minor leached sylvite	1,667.0-1,667.6
Halite, moderate-reddish-orange, coarse crystalline, polyhalitic; gray clayey zone at 1,668.4 feet	1,667.6-1,669.1
Halite, light-olive-gray, medium to coarse crystalline; contains minor intercrystalline clay	1,669.1-1,669.5
Halite, light-reddish-orange, medium crystalline, polyhalitic; contains moderate-red polyhalite blebs	1,669.5-1,670.9
Halite, clear, pale-red, medium to coarse crystalline; contains minor to moderate amounts of moderate-reddish-orange, moderate-reddish-brown, and moderate-orange-pink blebs of polyhalite; top 5.0 feet is argillaceous halite; grayish-red clay partings at 1,671.9, 1,672.6, 1,674.4, and 1,675.3 feet; minor to moderate amounts of disseminated sulfates (langbeinite); minor amounts of disseminated sylvite (leached areas)	1,670.9-1,683.3
Polyhalite, moderate-reddish-brown, massive; contains minor amounts of blebs and stringers of clear halite; greenish-gray clay parting at base	1,683.3-1,685.5
Halite, clear, pale-red, medium to coarse crystalline; contains minor amounts of grayish-orange-pink polyhalite blebs; pale-red polyhalite band at 1,689.7 feet; minor amounts of disseminated sodium sulfates	1,685.5-1,690.5
Polyhalite, pale-red, massive; contains minor amounts of clear halite	1,690.5-1,691.2

Table 10C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear, pale-red, medium crystalline; moderate amounts of disseminated moderate-reddish-brown polyhalite blebs and stringers; greenish-gray parting at 1,692.0 feet; minor disseminated greenish-gray clay	1,691.2-1,694.7
Halite, clear, pale-red, medium crystalline, argillaceous; contains minor disseminated moderate-reddish-orange polyhalite blebs; moderate to large amounts of interstitial grayish-green clay at top, with increase in grayish-red interstitial clay toward base; grayish-green clay parting at 1,695.3 feet; grayish-red clay parting at 1,696.0 feet; grayish-red clay bed at 1,697.5-1,697.9 feet	1,694.7-1,699.7
Halite, clear, pale-red, medium to coarse crystalline; minor moderate-reddish-brown and grayish-orange-pink polyhalite blebs and some stringers; polyhalite increasing toward base	1,699.7-1,705.8
Halite, clear, medium to coarse crystalline; moderate-reddish-brown stringers, bands, and blebs of polyhalite very common throughout unit; 0.3 foot-thick polyhalite band at 1,707.2 feet	1,705.8-1,708.9
Polyhalite, moderate-reddish-brown, massive; trace of clear halite; grayish-green clay parting toward base	1,708.9-1,710.3
Halite, clear, pale-red, medium to coarse crystalline; contains minor to moderate amounts of moderate-reddish-brown blebs and stringers of polyhalite; minor amounts of grayish-green interstitial clay at top; grayish-red interstitial clay toward base	1,710.3-1,718.7
Halite, clear, coarse crystalline; contains trace amounts of moderate-reddish-orange polyhalite blebs	1,718.7-1,720.7
Halite, clear, pale-red, medium to coarse crystalline, argillaceous; contains moderate amounts of moderate-reddish-orange and moderate-reddish-brown polyhalite blebs; moderate to large amounts of grayish-green interstitial clay at top of unit; grayish-green clay partings at 1,722.6 and 1,723.0 feet; minor amounts of interstitial grayish-green clay toward base; grayish-red clay parting at base	1,720.7-1,726.3
Halite, clear, pale-red, moderate-reddish-orange, medium to coarse crystalline; contains minor to moderate amounts of moderate-orange-pink, moderate-reddish-orange polyhalite blebs, stringers, and band	1,726.3-1,731.5
Polyhalite, moderate-reddish-brown, massive; trace of halite toward base	1,731.5-1,732.2

Table 10C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear, pale-red; contains minor moderate-reddish-brown polyhalite blebs; trace amounts of grayish-green interstitial clay	1,732.2-1,732.7
Halite, clear, moderate-reddish-orange, medium to coarse crystalline; minor to moderate amounts of moderate-reddish-brown polyhalite blebs; minor grayish-green interstitial clay at top; 1,737.2 feet to base of unit increase in interstitial grayish-green clay; grayish-red clay parting at 1,737.1 and at top of unit; grayish-red clay parting at base	1,732.7-1,740.6
Halite, clear, pale-red, medium to coarse crystalline, argillaceous; trace amounts of moderate-orange-pink polyhalite blebs; moderate amounts of grayish-red interstitial clay	1,740.6-1,743.8
Halite, clear, pale-red, medium to coarse crystalline; trace amounts of moderate-orange-pink and moderate-reddish-brown polyhalite blebs, increasing to moderate amounts toward base	1,743.8-1,749.2
Polyhalite, moderate-reddish-orange, moderate-orange-brown, massive; trace of clear halite; grayish-green clay parting at base	1,749.2-1,751.0
Halite, clear, pale-red, moderate-reddish-orange, medium to coarse crystalline; moderate amounts of moderate-reddish-brown and moderate orange-pink polyhalite blebs and stringers	1,751.0-1,757.0
Polyhalite, pale-red, moderate-reddish-brown, massive	1,757.0-1,757.7
Halite, clear, pale-red, moderate-reddish-orange, medium crystalline: moderate amount of moderate-reddish-brown and moderate-orange-pink polyhalite blebs and stringers; minor amounts of interstitial grayish-green clay toward base	1,757.7-1,758.7
Halite, clear, pale-red, medium to coarse crystalline; minor amounts of moderate-reddish-brown polyhalite blebs; upper 2.0 feet of unit contain moderate amounts grayish-red interstitial clay and minor amounts of grayish-green clay; lower 1.0 foot of unit contains moderate amounts of grayish-red interstitial clay; grayish-green clay partings at 1,758.7, 1,759.7, and 1,764.4 feet	1,758.7-1,764.4
Halite, clear, pale-red, moderate-reddish-brown, medium to coarse crystalline; minor to moderate amounts of moderate-reddish-brown polyhalite blebs and stringers; moderate amounts of grayish-red interstitial clay in upper 1.5 feet of unit	1,764.4-1,770.6

Table 10C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear, pale-red, medium crystalline, argillaceous; minor amounts of moderate-reddish-orange polyhalite blebs; large amount of grayish-green interstitial clay at 1,770.6-1,771.3 feet; large amount of grayish-red interstitial clay from 1,771.3 to base; grayish-green clay partings at 1,771.0 and 1,771.3 feet; grayish-red clay partings at 1,772.0, 1,773.5, 1,774.0, 1,775.3, and 1,776.7 feet	1,770.6-1,777.5
Halite, clear, pale-red, medium to coarse crystalline, argillaceous; moderate amounts of moderate-reddish-brown polyhalite blebs, decreasing toward base; minor to moderate amounts of interstitial grayish-green clay; grayish-green clay partings at 1,778.5, 1,779.0, and 1,779.4 feet	1,777.5-1,783.8
Anhydrite, light- to medium-gray, laminated; secondary halite growths in lower part	1,783.8-1,797.6
Halite, pale-red to pale-yellowish-brown, fine to medium crystalline; contains very minor polyhalite bands	1,797.6-1,800.9
Halite, pale-red and clear, medium crystalline; contains very minor polyhalite stringers; slightly clayey, grayish-green parting at top	1,800.9-1,802.8
Halite, moderate-reddish-orange and pale-red, fine crystalline; contains minor polyhalite stringers	1,802.8-1,803.6
Halite, light-gray and pale-red, medium to coarse crystalline, argillaceous; dark-gray clay parting at 1,804.8 feet	1,803.6-1,804.9
Halite, pale-red, moderate-reddish-orange, and moderate reddish-brown, fine to medium crystalline; moderate amount of moderate-reddish-orange polyhalite stringers	1,804.9-1,805.7
Halite, medium-gray to pale-red to grayish-green, fine crystalline, argillaceous; concentration of polyhalite stringers at 1,807.4-1,807.7 feet; brown clay parting at 1,807.1 feet; grayish-green parting at 1,807.9 feet	1,805.7-1,808.3
Halite, light-brown and pale-red, fine to medium crystalline, argillaceous; brown clay partings at 1,808.6, 1,809.2, 1,809.8, and 1,810.6 feet; grayish-green parting at top of unit	1,808.3-1,811.0
Halite, pale-red, light-brown and moderate-reddish-orange, fine crystalline, argillaceous; moderate amount of moderate-reddish-orange polyhalite stringers	1,811.0-1,812.1
Clay, moderate-brown, very fine crystalline, halitic; clear halite	1,812.1-1,812.5

Table 10C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-reddish-brown and moderate-reddish-orange, fine to medium crystalline; minor greenish-gray clay intercrystalline near base; polyhalitic	1,812.5-1,813.5
Clay, moderate-brown, halitic; very fine crystalline clear halite; brown clay partings at 1,814.0, 1,814.3, and 1,814.6 feet	1,813.5-1,815.0
Halite, clear, medium crystalline; contains minor polyhalite blebs	1,815.0-1,816.5
Halite, medium-gray, medium to coarse crystalline; brown intercrystalline clay	1,816.5-1,817.6
Halite, clear to moderate-reddish-orange, coarse crystalline; contains minor polyhalite stringers	1,817.6-1,819.8
Halite, clear, medium to coarse crystalline; minor reddish-brown polyhalite and clay	1,819.8-1,820.8
Halite, clear to moderate-reddish-orange, medium crystalline, with scattered coarse crystalline; some blebs of reddish-orange polyhalite	1,820.8-1,821.8
Halite, clear to moderate-reddish-brown, medium crystalline; large amount of intercrystalline polyhalite	1,821.8-1,822.5
Halite, clear to reddish-brown, medium crystalline; moderate amount of reddish-brown clay and polyhalite in scattered masses; halite grades to clear in lower part	1,822.5-1,825.7
Halite, clear and light-reddish-orange, grading to clear at 1,826.0 feet, medium crystalline; disseminated polyhalite blebs; polyhalite intense at 1,827.3 feet	1,825.7-1,830.9
Halite, clear to dark-reddish-brown, medium crystalline; blebs of moderate-red polyhalite throughout; brown clay seams at 1,830.9 and 1,831.2 feet; moderate amount of intercrystalline clay	1,830.9-1,833.6
Halite, clear with scattered intercrystalline orange-red polyhalite	1,833.6-1,836.4
Halite, moderate-reddish-brown, medium crystalline; moderate-reddish-brown polyhalite	1,836.4-1,837.2
Halite, clear to moderate-brown, very coarse crystalline; moderate amount of dark-reddish-brown and bluish-gray clay	1,837.2-1,838.2
Halite, clear to pale-red, medium to coarse crystalline; minor intercrystalline reddish-brown clay, crystals grade to fine; thin pale-orange clay seams at 1,839.0 and 1,840.4 feet	1,838.2-1,840.9
Halite, clear to moderate-reddish-brown, fine crystalline; moderate amount of brown intercrystalline clay; clay seam at 1,842.6 feet	1,840.9-1,844.8
Halite, clear, fine to medium crystalline; numerous stringers of moderate-orange-red polyhalite	1,844.8-1,845.7

Table 10C.--Lithologic log--(Continued)

Description	Depth (feet)
Halit , clear to dark-reddish-brown, medium crystalline; clear hal te has orange intercrystalline polyhalite and clay----------	1,845.7-1,846.2
Halite, clear, medium crystalline; contains blebs and stringers of orange-red polyhalite----------	1,846.2-1,848.7
Halite, clear to dark-reddish-brown, fine to medium crystalline; moderate amount reddish-brown clay; scattered greenish-gray clay; thin dark-blue clay seam at 1,848.7 feet----------	1,848.7-1,849.9
Halite, clear and moderate-reddish-orange, fine crystalline; minor amount of reddish-orange polyhalite blebs----------	1,849.9-1,851.1
Halite, clear to dark-reddish-brown, coarse crystalline; much reddish-brown intercrystalline clay; reddish-brown clay partings at 1,851.6 and 1,852.1 feet----------	1,851.1-1,852.9
Halite, clear to light-reddish-brown, fine crystalline; thin stringers of light-orange polyhalite in upper part of unit; scattered polyhalite blebs in lower part----------	1,852.9-1,854.8
Halite, clear, medium crystalline----------	1,854.8-1,855.6
Halite, clear to moderate-reddish-brown, very fine to fine crystalline; scattered polyhalite blebs----------	1,855.6-1,856.4
Halite, moderate-brown to dark-reddish-brown, very fine crystalline; minor amounts of intercrystalline polyhalite----------	1,856.4-1,857.6
Halite, pale-brown and pale-yellowish-brown, fine to medium crystalline; minor amount of moderate-reddish-orange polyhalite blebs----------	1,857.6-1,858.7
Halite, pale-yellowish-brown and minor moderate-reddish-brown, fine crystalline; minor reddish-brown polyhalite stringers----------	1,858.7-1,859.4
Halite, pale-red, clear and moderate-reddish-brown, fine to medium crystalline; polyhalite disseminated throughout unit---------	1,859.4-1,866.2
Polyhalite and halite; medium-gray polyhalite; pale-red, coarse crystalline halite----------	1,866.2-1,866.7
Anhydrite, light- to medium-gray; upper 1.5 feet contains numerous secondary halite bands, also from 1,870.7-1,872.7 and 1,873.2-1,873.8 feet----------	1,866.7-1,873.8
Halite, clear to pale-orange, medium crystalline, thin polyhalite stringers----------	1,873.8-1,875.8
Halite and polyhalite; clear to moderate orange, coarse crystalline, halite; moderate-reddish-orange polyhalite; unit banded----------	1,875.8-1,877.6
Anhydrite and polyhalite; laminated; halite pseudomorphs----------	1,877.6-1,883.0

Table 10C.--Lithologic log--(Continued)

Description	Depth (feet)
Anhydrite, medium-gray, very fine grained, laminated; halite crystals throughout unit	1,883.0-1,884.9
Mudstone, medium-gray, silty, laminated	1,884.9-1,885.8
Polyhalite, moderate-reddish-brown; much bluish-gray clay; reddish-brown halite seam at top	1,885.8-1,887.1
Halite, moderate-reddish-orange, medium to coarse crystalline, polyhalitic	1,887.1-1,888.3
Halite, clear, moderate-reddish-orange, pale-red, medium to coarse crystalline; moderate amounts of moderate-reddish-brown polyhalite blebs toward top	1,888.3-1,889.9
Halite, clear, moderate-reddish-orange, medium to coarse crystalline; moderate amounts of moderate-orange-pink and moderate-reddish-brown polyhalite blebs and stringers	1,889.9-1,891.8
Halite, clear, pale-red, medium crystalline, argillaceous; minor amounts of moderate-reddish-orange polyhalite blebs; minor to moderate amounts of grayish-green interstitial clay	1,891.8-1,894.6
Halite, clear, pale-red, medium to coarse crystalline; minor amounts of moderate-reddish-orange polyhalite blebs	1,894.6-1,898.6
Halite, clear, pale-red; moderate amounts of moderate reddish-orange polyhalite blebs and stringers	1,898.6-1,899.9
Halite, clear, medium to coarse crystalline; sparse amounts of moderate-reddish-orange polyhalite blebs	1,899.9-1,900.8
Halite, pale-red, fine to medium crystalline, argillaceous; moderate amounts of interstitial grayish-green clay; grayish-green clay seams in middle of interval	1,900.8-1,901.2
Halite, clear to pale-red, medium to coarse crystalline, argillaceous; sparse moderate-orange-pink polyhalite; moderate to heavy grayish-red interstitial clay; grayish-red clay partings at 1,901.2, 1,901.5, and 1,902.3 feet	1,901.2-1,902.7
Halite, clear to pale-red, medium to coarse crystalline; minor to moderate amounts of moderate-orange-pink polyhalite blebs; minor grayish-green interstitial clay; grayish-green clay parting at 1,902.9 feet	1,902.7-1,906.1
Halite, clear, moderate-reddish-orange, medium to coarse crystalline; minor to moderate amounts of moderate-reddish-brown and moderate-reddish-orange polyhalite blebs; moderate to heavy disseminated sodium sulfates	1,906.1-1,908.6

Table 10C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear, fine crystalline, argillaceous; sparse moderate-reddish-orange polyhalite blebs; heavy grayish-green interstitial clay; grayish-green clay partings at 1,908.7 and 1,909.2 feet--------	1,908.6-1,909.3
Halite, clear, moderate-reddish-orange, medium to coarse crystalline; moderate amounts of moderate reddish-brown polyhalite blebs----------	1,909.3-1,911.1
Halite, clear, pale-red, medium to coarse crystalline, argillaceous; minor amounts of moderate-reddish-orange polyhalite blebs; moderate interstitial grayish-green clay; moderate to heavy disseminated sodium sulfates----------	1,911.1-1,912.7
Halite, clear, pale-red, medium to coarse crystalline; minor to moderate amounts polyhalite; moderate amounts disseminated sodium sulfate minerals toward base----------	1,912.7-1,913.4
Halite, clear, pale-red, medium to coarse crystalline, argillaceous, minor moderate-orange-pink polyhalite blebs; minor to moderate-grayish-green interstitial clay; moderate to heavy disseminated sodium sulfates----------	1,913.4-1,917.8
Halite, clear, pale-red, medium crystalline; minor moderate-reddish-orange polyhalite blebs; moderate to heavy disseminated sodium sulfates----------	1,917.8-1,918.9
Halite, clear to pale-red, medium to coarse crystalline, argillaceous; minor moderate-orange-pink polyhalite blebs; minor grayish-green interstitial clay; moderate to heavy disseminated sodium sulfates----------	1,918.9-1,922.6
Halite, clear, pale-red, medium to coarse crystalline; moderate amounts of moderate-orange-pink, moderate-reddish-orange polyhalite stringers and blebs----------	1,922.6-1,925.5
Halite, clear, pale-red, medium crystalline, argillaceous; sparse moderate-orange-pink polyhalite blebs; moderate amounts of grayish-green interstitial clay----------	1,925.5-1,926.4
Halite, clear, pale-red, fine to medium crystalline; minor to moderate amounts of moderate-orange-pink; moderate-reddish-brown polyhalite blebs and stringers; grayish-green interstitial clay at 1,930.9 feet; minor to moderate disseminated sodium sulfates---------	1,926.4-1,933.3
Halite, medium-gray, grading to pale-red, very coarse crystalline, grading to fine to medium crystalline; very argillaceous; light-brown and grayish-green clay; contains disseminated sodium sulfate minerals at 1,933.3-1,935.3 feet----------	1,933.3-1,937.0

Table 10C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-reddish-orange, pale-red, and moderate-reddish-brown, fine to medium crystalline; minor zones of coarse crystalline, moderately argillaceous halite; moderate reddish-brown and light brown stringers of clay	1,937.0-1,940.8
Halite, moderate-orange-pink and moderate-reddish-brown, fine to medium crystalline; scattered reddish-brown polyhalite blebs	1,940.8-1,943.5
Polyhalite, moderate-reddish-orange, dense	1,943.5-1,943.6
Halite, moderate-reddish-brown to moderate-orange-pink, fine to medium crystalline; slightly polyhalitic	1,943.6-1,944.1
Halite, clear and moderate-orange-pink, medium crystalline; minor moderate-reddish-brown polyhalite blebs	1,944.1-1,944.7
Halite, pale-red, light-brown and grayish-orange-pink, fine to medium crystalline, slightly argillaceous; minor blebs of reddish-brown polyhalite; brown clay parting at 1,948.1 feet	1,944.7-1,948.1
Halite, pale-yellowish-brown and light-brown, fine to coarse crystalline, argillaceous; brown clay partings at 1,948.1, 1,948.5, 1,949.1, 1,949.7, and 1,949.8 feet	1,948.1-1,950.4
Halite, grayish-red and pale-red, fine to medium crystalline; moderate amount of dark-brown intercrystalline clay	1,950.4-1,952.6
Halite, grayish-red and pale-red, fine to coarse crystalline; minor zones of clear, medium crystalline halite; minor reddish-brown polyhalite stringers and blebs; minor clay	1,952.6-1,961.7
Halite, light-brown and clear, fine crystalline, grading downward to coarse crystalline; very minor reddish-brown polyhalite blebs	1,961.7-1,962.7
Halite, pale-red to grayish-red, medium crystalline; very minor reddish-brown polyhalite stringers; minor reddish-brown clay	1,962.7-1,963.4
Halite, pale-brown, pale-red, and clear, fine crystalline; moderate amount of greenish-gray and brown clay; greenish-gray clay seam at top; brown clay seam at 1,964.2 feet	1,963.4-1,965.1
Halite, pale-red, clear, and white mottled, fine to medium crystalline; very minor reddish-brown polyhalite; minor intercrystalline light-yellowish-brown clay	1,965.1-1,968.1
Halite, pale-red and clear, medium to coarse crystalline; moderate-reddish-brown polyhalite stringers in center of unit; grayish-green and brown intercrystalline clay, minor	1,968.1-1,969.4
Halite, pale-red and clear, medium to coarse crystalline; minor amounts of moderate-reddish-brown polyhalite and reddish-brown clay	1,969.4-1,970.0

Table 10C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, gray and grayish-green, fine to medium crystalline; moderate amount of grayish-green clay; minor moderate-reddish-orange polyhalite	1,970.0-1,970.4
Halite, pale-red and clear, medium to coarse crystalline; minor moderate-reddish-orange clay	1,970.4-1,971.4
Halite, pale-red and reddish-gray, fine to medium crystalline; contains minor blebs of moderate reddish-orange polyhalite; minor brown intercrystalline clay	1,971.4-1,972.8
Halite, pale-red and grayish-red, fine to medium crystalline; moderate amount of moderate-reddish-brown polyhalite and brown intercrystalline clay; brown clay parting at top	1,972.8-1,974.1
Halite, grayish-red, pale-red and clear, fine to medium crystalline; moderate amount of moderate-reddish-brown polyhalite stringers and brown clay	1,974.1-1,975.6
Halite, clear and moderate-reddish-brown, medium to coarse crystalline; reddish-brown polyhalite stringers increase in amount downward	1,975.6-1,979.8
Halite, moderate-reddish-orange, medium crystalline; much reddish-brown polyhalite	1,979.8-1,981.0
Polyhalite, moderate-reddish-brown, dense; very high bluish-gray clay content; bluish-gray clay seam at 1,981.5 feet	1,981.0-1,981.9
Halite, clear, medium to coarse crystalline; some reddish-brown stringers and blebs of polyhalite	1,981.9-1,987.5
Halite, clear to light-reddish-orange to moderate reddish-orange, fine crystalline; 0.1 foot clay seam at 1,987.5 feet	1,987.5-1,988.8
Halite, clear to pale-orange, medium crystalline; few polyhalite stringers throughout unit; minor red clay at base	1,988.8-1,990.7
Halite, clear to grayish-orange, fine crystalline; moderate orange blebs and stringers of polyhalite	1,990.7-1,992.4
Halite, clear to grayish-red, fine to medium crystalline; much reddish-brown clay; minor amount of moderate-reddish-orange polyhalite	1,992.4-1,997.4
Halite, clear to grayish-red, fine crystalline; much reddish-brown clay	1,997.4-2,000.1
Halite, clear to light-red, medium crystalline; thin light-orange polyhalite stringers	2,000.1-2,002.0

Table 10C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to light-reddish-orange, medium crystalline; minor polyhalite	2,002.0-2,006.0
Polyhalite, pale- to moderate-red, dense; clear to pale-red halite at 2,006.3-2,006.5 feet	2,006.0-2,007.7
Halite, clear, fine to medium crystalline; minor polyhalite blebs and stringers	2,00[illegible].7-2,[illegible].6
Polyhalite, red, dense	2,008.6-2,008.9
Halite, clear to pale-grayish-red, coarse crystalline; moderate amount of disseminated polyhalite; minor clay; thin reddish-gray clay seam at top	2,008.9-2,010.3
	Total depth

Table 10D.--Mineralogical and chemical analyses of core samples from potash ore zones and mineralized salt beds in drill hole P-10

[oz, ore zone; sb, salt bed; tr, trace; Ha, halite; Ka, kainite; La, langbeinite; Le, leonite; Po, polyhalite; n.d., not determined. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mineralogy	Chemical analysis (weight percent)								
				X-ray diffraction analysis[1]	Ca	K	Mg	Na	Cl	SO_4	H_2O+	H_2O-	Water insoluble
P-10/1	1,650.38-1,651.22	0.84	sb	>9 Ha; <1 Po; tr La, Le	0.76	2.0	0.88	35.0	n.d.	6.3	n.d.	n.d.	n.d.
P-10/2	1,651.22-1,652.03	.81		>9 Ha; <1 Po; tr Sy, La, Le, Ka	.88	3.8	1.1	32.0	52.0	8.1	.80	0.09	0.54
P-10/3	1,652.03-1,653.83	1.80	11th oz	>8 Ha; 1 Sy; <1 Po; tr Le	.65	4.7	.22	33.5	55.0	1.8	.42	.41	3.64
P-10/4	1,653.83-1,654.58	.75	sb	>9 Ha; tr Po, Sy	.83	.68	.15	37.0	n.d.	2.0	n.d.	n.d.	n.d.

[1]Estimate of amount reported on a scale of 0-10.

Table 10E.--Calculated mode (mineral content) and potash distribution by mineral in core samples from potash ore zones and mineralized salt beds in drill hole P-10

[oz, ore zone; sb, salt bed; Ha, halite; Ka, kainite; La, langbeinite; Le, leonite; Po, polyhalite; Insol., clay and silt; n.d., not determined; leaders (---), not present. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mode (weight percent mineral)							K_2O distribution by minerals					
				Sy	La	Ka	Le	Ha	Po	Insol.	Sy	La	Ka	Le	Po	Total
P-10/1	1,650.38-1,651.22	0.84	sb	0.8	2.3	---	2.0	89.0	5.7	n.d.	0.5	0.5	---	0.5	0.9	2.4
P-10/2	1,651.22-1,652.03	.81		3.3	3.8	1.7	1.1	82.7	6.6	.5	2.1	.9	.3	.3	1.0	4.6
P-10/3	1,652.03-1,653.83	1.80	11th oz	8.0	---	---	1.1	85.2	1.9	3.6	5.1	---	---	.3	.3	5.7
P-10/4	1,653.83-1,654.58	.75	sb	.5	---	---	---	94.1	3.1	n.d.	.3	---	---	---	.5	.8

TABLES 11A-11G

Basic data from drill hole P-11,
Waste Isolation Pilot Plant area, Eddy County, New Mexico

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11G.--Gamma-ray and neutron logs of drill hole	foldout

Table 11A.--Abridged drill-hole history

LOCATION: Sec. 23, T. 22 S., R. 31 E.
53 m (175 ft) from north line
54 m (177 ft) from west line

ALTITUDE (LAND SURFACE): 1,069 m (3,505.8 ft). Datum for depth measurements in drilling and logging operations.

LITHOLOGIC LOG PREPARED BY: R. J. Cheeseman, J. C. Lorenz, Florian Maldonado, M. N. Mitchell, R. P. Snyder, and R. W. Spengler, September 27 to October 16, 1976.

DRILLING CONTRACTOR: Pennsylvania Drilling Co.

DRILLING RECORD: Commenced on September 24, completed on October 16, 1976 at 591 m (1,9[illegible] ft) below land surface.

Recovered all casing, and plugged with cement.

REMARKS: Top of salt in Rustler Formation at 292 m (958 ft) below land surface.

Table 11B.--Stratigraphic summary

Rock unit	Depth interval[1] feet	meters
Holocene	0-9	0-3
Triassic rocks:		
Santa Rosa Sandstone	9-224	3-68
Permian rocks:		
Dewey Lake Red Beds	224-745	68-227
Rustler Formation	745-1,058	227-322
Magenta Dolomite Member	798-823	243-251
Culebra Dolomite Member	912-938	278-286
Salado Formation	1,058-1,942	322-592
Upper member	1,058-1,550	322-472
McNutt potash zone	1,550-1,917	472-584
Vaca Triste Sandstone Member[2]	1,550-1,557	472-475
11th ore zone	1,604-1,608	489-490
Marker bed 117	1,616-1,618	493-493
Marker bed 118	1,640-1,642	500-500
Marker bed 119	1,664-1,666	507-508
10th ore zone	1,674-1,682	510-513
Marker bed 120	1,687-1,688	514-515
9th ore zone	1,693-1,698	516-518
Marker bed 121	1,702-1,704	519-519
Marker bed 122	1,711-1,712	522-522
8th ore zone	1,717-1,724	523-525
Union anhydrite[3]	1,735-1,740	529-530
7th ore zone	1,754-1,759	535-536
6th ore zone	1,767-1,770	539-539
5th ore zone	1,775-1,785	541-544
Marker bed 123	1,811-1,818	552-554
Marker bed 124	1,824-1,833	556-559
4th ore zone	1,837-1,846	560-563
3d ore zone	1,853-1,866	565-569
2d ore zone	1,871-1,874	570-571
1st ore zone	1,890-1,901	576-579
Marker bed 126	1,916-1,917	583-584
Lower member	1,917-1,942	584-592
Marker bed 127	1,940-1,941	591-592
Maximum depth recorded	1,942	592

[1]Depth interval recorded from geophysical logs.
[2]Of Adams, 1944.
[3]Informal unit of Salado Formation.

Table 11C.--Lithologic log

Description	Depth (feet)	
Caliche, blow sand	0.0-	5.0
Sandstone, brown, very fine grained; caliche	5.0-	10.0
Same as above; brown-black chert	10.0-	20.0
Same as above; green siltstone	20.0-	30.0
Siltstone, reddish-brown and grayish-green, very fine grained; caliche; sand; sparse chert	30.0-	35.0
Siltstone, reddish-brown and grayish-green, very fine grained; sandstone; caliche	35.0-	40.0
Sandstone, reddish-brown, fine-grained; sparse grayish-green chips	40.0-	45.0
Clay and siltstone, reddish-brown	45.0-	50.0
Same as above, with some green reduction spots	50.0-	60.0
Same as above; increasing clay	60.0-	65.0
Sandstone, grayish-brown, salt-and-pepper texture; reddish-brown shale; sparse caliche	65.0-	70.0
Same as above; sparse reduction spots in sandstone	70.0-	75.0
Clay, reddish-brown, sandy; shale chips	75.0-	85.0
Same as above; increasing clay	85.0-	90.0
Same as above; decreasing clay	90.0-	95.0
Clay, red; brownish-gray sandstone with reduction spots	95.0-	100.0
Clay, brownish-red, sandy	100.0-	105.0
Sandstone, brownish-gray, salt-and-pepper texture; moderate amounts of reddish-brown clay	105.0-	120.0
Same as above; (friable sandstone)	120.0-	135.0
Same as above; some reddish-brown shale	135.0-	140.0
Same as above; with reduction zones; decreasing reddish-brown clay	140.0-	145.0
Same as above; moderate amounts of reddish-brown clay	145.0-	150.0
Clay, reddish-brown, some grayish-white; friable, salt-and-pepper textured sandstone	150.0-	155.0
Clay, reddish-brown, some grayish-green; friable, salt-and-pepper textured sandstone	155.0-	165.0
Clay, reddish-brown, silty, with grayish-green reduction spots	165.0-	190.0
Clay, reddish-brown and grayish-green, silty	190.0-	200.0
Clay, reddish-brown, with sparse grayish-green reduction spots, silty	200.0-	205.0
Clay, reddish-brown, with increasing but sparse grayish-green reduction spots, silty	205.0-	210.0
Clay, reddish-brown, with common grayish-green reduction spots, silty	210.0-	215.0
Clay, reddish-brown, with increasing grayish-green reduction spots, silty; clay	215.0-	220.0

Table 11C.--Lithologic log--(Continued)

Description	Depth (feet)
Sand, brown, loose; grayish-green and brownish-red shale chips	220.0- 225.0
Clay and shale, reddish-brown; grayish-green shale chips	225.0- 230.0
Same as above; increasing reddish-brown clay	230.0- 235.0
Clay and shale, reddish-brown; some grayish-green shale	235.0- 260.0
Shale and siltstone, dark-reddish-brown, with greenish-gray reduction spots	260.0- 300.0
Shale and siltstone, dark-reddish-brown, with greenish-gray reduction spots	300.0- 310.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots; contains minor, brownish-gray, very fine grained sandstone	310.0- 315.0
Siltstone, dark-reddish-brown with greenish-gray reduction spots	315.0- 350.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots, minor selenite	350.0- 400.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots, sparse selenite	400.0- 450.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots; sparse selenite	450.0- 480.0
Same as above; trace of white gypsum	480.0- 500.0
Siltstone, reddish-brown, with grayish-green reduction spots, micaceous; sparse amounts of selenite and white gypsum	500.0- 505.0
Same as above; no selenite or gypsum	505.0- 510.0
Same as above; no selenite	510.0- 515.0
Same as above; no selenite	515.0- 520.0
Same as above; no gypsum or selenite	520.0- 525.0
Same as above; no selenite	525.0- 530.0
Same as above; no selenite or white gypsum	530.0- 535.0
Same as above; no gypsum	535.0- 540.0
Same as above; no selenite or white gypsum	540.0- 545.0
Same as above; no selenite	545.0- 550.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots; minor amounts of selenite	550.0- 600.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots; minor amounts of selenite; minor caliche contamination at 675.0-680.0 feet	600.0- 700.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots; minor amounts of selenite	700.0- 745.0
Siltstone, reddish-brown, with reduction spots; white gypsum and selenite	745.0- 750.0

Table 11C.--Lithologic log--(Continued)

Description	Depth (feet)
Anhydrite, light-gray, with gypsum rinds; gypsum; reddish-brown siltstone	750.0- 755.0
Gypsum, white; some anhydrite; some reddish-brown siltstone	755.0- 765.0
Same as above; increasing anhydrite	765.0- 770.0
Same as above; sparse gray shale	770.0- 775.0
Same as above; gray anhydrite	775.0- 780.0
Anhydrite, gray, with gypsum rinds; white gypsum; some reddish-brown siltstone; sparse gray shale	780.0- 785.0
Same as above; with sparse gray and grayish-green shale	785.0- 795.0
Same as above; no sparse gray and grayish-green shale	795.0- 800.0
Dolomite, dark-gray, crystalline; gray anhydrite; white gypsum with some selenite; some reddish-brown siltstone	800.0- 805.0
Dolomite, dark-gray, crystalline; gray anhydrite	805.0- 810.0
Dolomite, dark-gray, crystalline; sparse anhydrite; sparse siltstone	810.0- 815.0
Dolomite, dark-gray, crystalline; sparse siltstone	815.0- 825.0
Dolomite, dark-gray, crystalline; 50 percent gray anhydrite; white gypsum; sparse siltstone	825.0- 835.0
Anhydrite, gray, with gypsum rinds; some dolomite and red siltstone	835.0- 845.0
Anhydrite, gray, with gypsum rinds; sparse dolomite	845.0- 850.0
Same as above; sparse selenite	850.0- 855.0
Same as above; no dolomite; sparse selenite	855.0- 860.0
Anhydrite, gray, with gypsum rinds; white gypsum; sparse selenite; reddish-brown siltstone	860.0- 865.0
Anhydrite, gray, with gypsum rinds; white gypsum	865.0- 870.0
Same as above; sparse selenite; reddish-brown siltstone	870.0- 875.0
Same as above; sparse selenite; no siltstone	875.0- 880.0
Same as above; common selenite; no siltstone	880.0- 890.0
Same as above; sparse selenite	890.0- 900.0
Anhydrite and gypsum, grayish-white; selenite; reddish-brown siltstone	900.0- 910.0
Anhydrite, grayish-white; white gypsum	910.0- 920.0
Dolomite, medium-gray, fine-grained; some anhydrite and gypsum	920.0- 925.0
Same as above; some selenite	925.0- 930.0
Same as above; no selenite	930.0- 945.0
Anhydrite, gray; white gypsum; red siltstone; some dolomite	945.0- 950.0
Anhydrite, gray; white gypsum; sparse red siltstone, increasing dolomite	950.0- 955.0
Same as above; no dolomite	955.0- 960.0

Table 11C.--Lithologic log--(Continued)

Description	Depth (feet)
Gypsum, white; gray anhydrite; some white crystalline dolomite	960.0- 975.0
Same as above; sparse, white, crystalline dolomite	975.0- 980.0
Same as above; red siltstone; no dolomite	980.0- 995.0
Gypsum, white; gray anhydrite; some dolomite; very common reddish-brown siltstone	995.0-1,000.0
Anhydrite and gypsum, gray and white; reddish-brown siltstone; white, crystalline dolomite; sparse, black siltstone	1,000.0-1,015.0
Anhydrite, gray, with white gypsum rinds; sparse black siltstone; reddish-brown siltstone	1,015.0-1,025.0
Same as above; reddish-brown siltstone; gray mudstone	1,025.0-1,035.0
Same as above; no gray mudstone	1,035.0-1,045.0
Mudstone, grayish-blue; anhydrite; gypsum; red siltstone	1,045.0-1,065.0
Anhydrite; gypsum; reddish-brown siltstone; selenite; some gray mudstone (contaminated sample)	1,065.0-1,075.0
Same as above; some dolomite	1,075.0-1,080.0
Same as above; increasing dolomite	1,080.0-1,090.0
Same as above; with caliche	1,090.0-1,100.0
Siltstone, reddish-brown; anhydrite; caliche; gypsum; dolomite; black siltstone (contaminated sample)	1,100.0-1,105.0
Same as above; with increasing dolomite (contaminated sample)	1,105.0-1,115.0
Same as above; increasing dolomite	1,115.0-1,120.0
Dolomite, mostly; (contaminated sample)	1,120.0-1,125.0
Anhydrite; dolomite; gypsum; red siltstone; (contaminated sample)	1,125.0-1,130.0
Halite, clear; reddish-brown siltstone	1,130.0-1,155.0
Halite, clear; reddish-brown siltstone; sparse, reddish-orange polyhalite	1,155.0-1,165.0
Halite, clear; reddish-brown siltstone; sparse, but increasing, reddish-orange polyhalite	1,165.0-1,180.0
Halite, clear; sparse, moderate-reddish-orange polyhalite	1,180.0-1,185.0
Halite, clear; reddish-orange polyhalite; reddish-brown siltstone; gray anhydrite	1,185.0-1,190.0
Halite; red siltstone; caliche; anhydrite (contaminated sample)	1,190.0-1,200.0
Halite, clear; reddish-orange polyhalite	1,200.0-1,205.0
Halite, clear; pink polyhalite; red siltstone	1,205.0-1,210.0
Halite, clear; pink polyhalite	1,210.0-1,220.0
Same as above; sparse polyhalite	1,220.0-1,230.0
Halite, clear; light-gray anhydrite; contaminated with red siltstone and caliche	1,230.0-1,235.0

Table 11C.--Lithologic log--(Continued)

Description	Depth (feet)
Anhydrite, gray; white gypsum; some halite, caliche and red siltstone; (contaminated sample)	1,235.0-1,240.0
Halite, clear	1,240.0-1,265.0
Same as above; red siltstone	1,265.0-1,270.0
Same as above; sparse, reddish-orange polyhalite	1,270.0-1,280.0
Halite, clear	1,280.0-1,290.0
Halite, clear; grayish-green shale, red siltstone and caliche; (contaminated sample)	1,290.0-1,295.0
Halite, clear; sparse reddish-orange polyhalite	1,295.0-1,300.0
Halite, clear; reddish-orange polyhalite; contaminated with caliche, reddish-brown siltstone, and green shale	1,300.0-1,320.0
Halite, clear; minor, moderate-reddish-orange polyhalite	1,320.0-1,340.0
Halite, clear; sparse, moderate-reddish-orange polyhalite	1,340.0-1,350.0
Halite, clear; minor, moderate-reddish-orange polyhalite	1,350.0-1,355.0
Halite, clear; minor to moderate amount of moderate-reddish-orange polyhalite	1,355.0-1,380.0
Halite, clear; sparse, moderate-reddish-orange polyhalite	1,380.0-1,415.0
Halite, clear; minor, moderate-reddish-orange polyhalite	1,415.0-1,420.0
Halite, clear; sparse, reddish-orange polyhalite	1,420.0-1,440.0
Halite, clear; some moderate-reddish-orange polyhalite	1,440.0-1,455.0
Halite, clear; minor, moderate-reddish-orange polyhalite	1,455.0-1,470.0
Halite, clear; sparse, moderate-reddish-orange polyhalite	1,470.0-1,485.0
Halite, clear; grayish-red clay; sparse, white gypsum; trace of greenish-gray mudstone	1,485.0-1,495.0
Halite, clear to moderate-orange-pink; sparse, moderate-reddish-orange polyhalite	1,495.0-1,500.0
Halite, clear to moderate-orange-pink; minor, moderate-orange-pink polyhalite	1,500.0-1,510.0
Halite, clear; minor, moderate-reddish-brown clay	1,510.0-1,515.0
Halite, clear to grayish-orange-pink; sparse moderate-orange-pink polyhalite	1,515.0-1,525.0
Halite, clear to grayish-orange-pink; minor to moderate-reddish-orange-pink polyhalite	1,525.0-1,545.0
Halite, clear to grayish-orange-pink; sparse, moderate-orange-pink polyhalite	1,545.0-1,555.0
Halite, clear to grayish-orange-pink; sparse, moderate-orange-pink polyhalite; sparse moderate-reddish-brown clay	1,555.0-1,570.0

Table 11C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear; sparse, moderate-orange-pink polyhalite----------	1,570.0-1,580.0
Halite, pale-brown and pale-red, fine to medium crystalline; much brown intercrystalline clay----------	1,580.0-1,581.3
Halite, moderate-reddish-brown and moderate-reddish-orange, fine to medium crystalline (a few coarse crystals), polyhalitic; polyhalite stringers at 1,583.0-1,583.1 feet----------	1,581.3-1,583.5
Halite, grayish-red and grayish-brown, medium crystalline; moderate amount brown intercrystalline clay and stringers of reddish-brown polyhalite; polyhalite bands at 1,586.0-1,586.1 and 1,586.6-1,586.7 feet----------	1,583.5-1,586.7
Halite, moderate-reddish-brown and grayish-red, medium to coarse crystalline; moderate-reddish-orange polyhalite stringers; minor reddish-brown clay----------	1,586.7-1,590.3
Halite, pale-olive to greenish-gray, fine to medium crystalline, clayey; contains minor, moderate-red polyhalite blebs; abundant greenish-gray clay----------	1,590.3-1,590.7
Halite, clear to grayish-red, medium to coarse crystalline; contains moderate amount of moderate-red to pale-reddish-brown polyhalite blebs; minor, brown and grayish-green clays; clay parting; moderate-reddish-brown to dark-reddish-brown clay at 1,591.1 feet----------	1,590.7-1,594.8
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; minor amount of interstitial greenish-gray clay; small amount of moderate-reddish-brown polyhalite blebs and stringers; large and small angular leached vugs in upper two-thirds of unit, some contain sylvite----------	1,594.8-1,601.9
Halite, clear to moderate-red and grayish-red, medium to coarse crystalline; abundant greenish-gray clay; moderate amount of brown clay (dark-reddish-brown); brown clay concentrated in bands at 1,602.9 and 1,606.7 feet; moderate amount of moderate-red polyhalite blebs; moderate mineralization of langbeinite; some disseminated crystals, upper two-thirds of unit (possibly sylvite); leached vugs as large as 0.04 foot across, empty or partly clay-filled----------	1,601.9-1,606.8
Halite, moderate-reddish-orange to clear, medium to coarse crystalline; sparse, moderate-red polyhalite blebs; sparse greenish-gray interstitial clay----------	1,606.8-1,607.8
Halite, clear, greenish-gray, and pale-red, coarse crystalline; moderate-red polyhalite blebs, increasing with depth from sparse to moderate amount; abundant greenish-gray clay; minor amount of small sylvite crystals at 1,608.8 feet; moderate amount of very small leached vugs, most are clay filled----------	1,607.8-1,609.1

Table 11C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-reddish-orange, medium to coarse crystalline; very small amount greenish-gray interstitial clay; numerous moderate-reddish-brown polyhalite blebs and stringers, increasing with depth; 0.01-foot polyhalite band at 1,613.[illegible] feet; langbeinite crystal(?) at 1,610.8 feet	1,609.1-1,613.9
Polyhalite, moderate-reddish-brown, dense, massive; greenish-gray interstitial clay; also interstitial halite; greenish-gray clay parting at base	1,613.9-1,616.0
Halite, moderate-reddish-orange to pale-red, medium to coarse crystalline; abundant greenish-gray clay, decreasing with depth; moderate amount of moderate-reddish-orange to moderate-reddish-brown polyhalite blebs	1,616.0-1,617.1
Halite, moderate-reddish-orange, medium to coarse crystalline; some greenish-gray clay in stringers in three concentrated areas in unit, at 1,620.3, 1,621.3, and 1,623.3 feet; moderate amount of moderate-reddish-brown polyhalite blebs	1,617.1-1,623.8
Halite, moderate-reddish-brown to dark-reddish-brown, medium to coarse crystalline, argillaceous; numerous reddish-orange to moderate-reddish-brown polyhalite blebs; abundant grayish-red to dark-reddish-brown clay; moderate amount of greenish-gray clay; weak mineralization of langbeinite, small crystals disseminated in upper third of unit; leached areas contain possible sylvite(?)	1,623.8-1,629.5
Halite, clear to pale-red and light-red, medium to coarse crystalline; moderate amount of moderate-red polyhalite blebs; small amount of greenish-gray interstitial clay; moderate amount of medium-sized leached areas, possibly containing residual sylvite; a few small langbeinite crystals toward base	1,629.5-1,632.6
Halite, moderate-red to grayish-red to clear, medium to coarse crystalline, argillaceous; moderate amount of moderate-reddish-orange to moderate-reddish-brown polyhalite blebs and aggregates; abundant greenish-gray clay in partially leached areas, some contain very minor residual sylvite	1,632.6-1,633.5
Halite, grayish-red, coarse crystalline; minor blebs of gray clay and reddish-brown polyhalite	1,633.5-1,634.4
Halite, moderate-reddish-orange, coarse crystalline, polyhalitic; scattered reddish-brown polyhalite blebs and stringers	1,634.4-1,638.3
Halite, moderate-reddish-brown, coarse to very coarse crystalline; numerous blebs of sugary, white polyhalite; reddish-brown polyhalite, increasing at base	1,638.3-1,638.6

Table 11C.--Lithologic log--(Continued)

Description	Depth (feet)
Anhydrite, light-gray, dense; some halite intergrowth----------	1,638.6-1,639.7
Halite, clear to pale-red, coarse crystalline; sparse moderate-reddish-orange to moderate-reddish-brown polyhalite blebs; some greenish-gray interstitial clay; moderate-sized, cubic-shaped leached areas--------	1,639.7-1,641.3
Halite, clear to moderate-red, medium to coarse crystalline; moderate amount of moderate-red polyhalite blebs; some stringers of white polyhalite; very little greenish-gray clay; large, moderate to abundant leached areas occur throughout unit----------	1,641.3-1,643.5
Polyhalite and anhydrite, light-medium-gray, dense, massive; clear, fine to medium crystalline, disseminated halite near base----------	1,643.5-1,644.2
Halite, moderate-reddish-orange to grayish-red to clear; minor greenish-gray, interstitial clay; sparse, moderate-red polyhalite blebs; some large leached cavities toward base----------	1,644.2-1,645.8
Halite, clear to moderate-red to moderate-reddish-orange, medium to coarse crystalline; sparse, moderate-reddish-orange polyhalite blebs concentrated at center; minor greenish-gray clay toward base; some weak sylvite mineralization in a single large crystal near top of unit----------	1,645.8-1,647.7
Halite, dark-reddish-brown to clear to pale-red, medium to coarse crystalline, argillaceous; very abundant brown clay, somewhat lesser greenish-gray clay; sparse, moderate-reddish-orange polyhalite blebs; a few leached cavities, mostly partially clay-filled; clay partings at 1,647.9-1,648.2 feet----------	1,647.7-1,650.7
Halite, moderate-pink to moderate-reddish-orange to grayish-red, medium to coarse crystalline; moderate to abundant dark-reddish-brown clay, increasing toward base; sparse, moderate-red polyhalite blebs--------	1,650.7-1,651.5
Halite, clear to moderate-reddish-orange, medium to coarse crystalline, mostly coarse crystalline; moderate to abundant, moderate-reddish-orange to moderate reddish-brown polyhalite; sparse, greenish-gray interstitial clay; one concentration of greenish-gray clay at 1,653.2 feet----------	1,651.5-1,655.5
Halite, moderate-reddish-orange to moderate-pink, medium to coarse crystalline; abundant, large, moderate-pink polyhalite blebs; some small interstitial moderate-red blebs; some greenish-gray and brown interstitial clay; some large leached areas contain possible kainite/leonite----------	1,655.5-1,657.3

Table 11C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-reddish-orange to moderate-reddish-brown, medium to coarse crystalline; light-medium-gray bands of anhydrite throughout unit, one [illegible] top; very little greenish-gray clay; moderate amount of dark-moderate-red polyhalite in blebs; leached area near base contain residual sylvite and kainite/leonite----------	1,657.3-1,659.3
Halite, moderate- to dark-reddish-brown, medium to coarse crystalline; contains abundant (nearly 20 percent), moderate- to dark-reddish-brown polyhalite; 0.05-foot thick polyhalite band at 1,660.2 feet; very little greenish-gray interstitial clay----------	1,659.3-1,660.5
Polyhalite, moderate-reddish-brown, dense, massive; heavy concentration of greenish-gray clay in lower 0.4 foot; some disseminated fine- to medium-grained halite toward base----------	1,660.5-1,662.0
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; sparse greenish-gray interstitial clay toward top, decreasing with depth; contains moderate amount of light-red to moderate-reddish-orange polyhalite blebs----------	1,662.0-1,664.7
Halite, clear to pale-red to moderate-red, medium to coarse crystalline; moderate to abundant amount of moderate-reddish-brown polyhalite blebs, some stringers; abundant greenish-gray interstitial clay; brown clay parting at 1,667.0 feet; some small leached, clay-filled cavities----------	1,664.7-1,667.1
Halite, moderate-reddish-orange, medium to coarse crystalline; moderate amount of moderate-reddish-orange polyhalite blebs; small amount of greenish-gray interstitial clay, decreasing with depth; large leached sylvites near base of unit----------	1,667.1-1,670.7
Halite, grayish-green to moderate-reddish-orange to dark-reddish-brown, medium to coarse crystalline, argillaceous; minor amount of moderate-reddish-orange polyhalite blebs; abundant greenish-gray and brown clay throughout, except from 1,671.7 to 1,672.2 feet; top third of unit contains strong mineralization of sylvite (much has been leached)----------	1,670.7-1,678.4
Halite, moderate-reddish-orange to clear, medium to coarse crystalline; very little greenish-gray clay occurs in one stringer at 1,680.2 feet; minor light-red polyhalite blebs, one band 0.1-foot thick at 1,682.5 feet; sylvite occurs in one large zone at 1,683.2 feet, and in small cavities below 1,682.5-foot band----------	1,678.4-1,684.0

Table 11C.--Lithologic log--(Continued)

Description	Depth (feet)
Polyhalite, light-red, dense, massive; some moderate-reddish-orange halite at top; small amount of greenish-gray clay	1,684.0-1,684.8
Halite, clear to greenish-gray and grayish-red, coarse-grained; numerous, small, moderate-reddish-orange polyhalite blebs; moderate amount of grayish-green clay; greenish-gray clay parting at 1,684.9 feet; sylvite in cavities at center of unit; weak, disseminated mineralization	1,684.8-1,685.9
Halite, mostly clear, moderate-reddish-orange at top and base, medium to coarse crystalline; greenish-gray interstitial clay, top and base only; moderate-dark-red polyhalite blebs, mainly top and base; disseminated sylvite throughout; fairly strong, massive sylvite from 1,688.7 to 1,689.5 feet, weak at top and center	1,685.9-1,689.5
Halite, grayish-red, greenish-gray, coarse crystalline; moderate-red sylvite; moderate amount of greenish-gray clay; greenish-gray clay parting at base; moderate amount of moderate-red polyhalite blebs; sylvite approximately 25-35 percent except in clayey halite zone, basal 0.6 foot	1,689.5-1,692.3
Halite, clear to light-gray to pale-red, medium to coarse crystalline; contains moderate amount of brown clay; some minor greenish-gray interstitial clay; sparse, moderate-reddish-orange polyhalite in small blebs; small sylvite crystals, partially leached, toward base	1,692.3-1,694.2
Halite, light-gray to pale-red to clear, coarse crystalline; contains moderate amount of greenish-gray and brown interstitial clay; sparse polyhalite in large masses as wide as 0.08 foot across; angular sylvite in moderate-size, leached cavities at 1,695.7-1,695.9 feet	1,694.2-1,695.9
Halite, pale-red to moderate-reddish-orange, medium to coarse crystalline; contains moderate amount of moderate-reddish-orange polyhalite blebs; sparse, greenish-gray, interstitial clay; sylvite, weakly to moderately disseminated throughout unit	1,695.9-1,700.4
Polyhalite and anhydrite mixture, laminated, dense, massive; clear, medium to coarse crystalline, disseminated halite in central part; moderate-red polyhalite; bands of light- to medium-gray anhydrite; greenish-gray clay parting at base	1,700.4-1,702.4
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; sparse, moderate-red polyhalite throughout, relatively abundant at top of unit; leached cavities containing sylvite occur mostly in lower half of unit	1,702.4-1,706.4

Table 11C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; abundant, moderate-pink polyhalite blebs throughout; very little brown interstitial clay; several polyhalite stringers in uppermost 1.0 foot	1,706.4-1,708.8
Polyhalite, moderate-red, dense, massive	1,708.8-1,709.5
Halite, moderate-reddish-orange, medium to coarse crystalline; moderate-pink polyhalite blebs throughout; sparse greenish-gray interstitial clay; moderate-pink polyhalite band at 1,709.6 feet	1,709.5-1,710.6
Halite, grayish-green, light-brown and pale-red, fine crystalline, argillaceous; grayish-green and brown intercrystalline clay; brown clay parting at 1,711.0 feet; grayish-green at 1,711.5 feet	1,710.6-1,712.1
Halite, pale-red and clear, coarse crystalline; minor amount intercrystalline clay near base	1,712.1-1,714.3
Halite, moderate-brown, pale-red, and white, very coarse crystalline in top 0.2 foot, fine crystalline in lower 0.7 foot, argillaceous; contains stringers of moderate-reddish-orange clay	1,714.3-1,715.2
Halite, moderate-reddish-brown, minor pale-red and moderate-reddish-orange, fine to medium crystalline, polyhalitic	1,715.2-1,717.3
Halite, moderate-reddish-orange, with minor amounts of clear and moderate-reddish-brown, very fine crystalline halite; moderate amounts of scattered polyhalite blebs; polyhalite band at base	1,717.3-1,718.5
Halite, pale-red and clear, medium crystalline; minor polyhalite stringers	1,718.5-1,719.2
Halite, moderate-brown, with minor grayish-green and pale-red, fine crystalline, argillaceous; grayish-green clay parting at 1,719.5 feet; brown clay parting at 1,720.5 feet and at base	1,719.2-1,721.3
Halite, pale-red, clear, and moderate-brown, fine to medium crystalline, argillaceous; contains brown clay stringers and blebs	1,721.3-1,724.0
Halite, pale-red and moderate-reddish-orange, fine to medium crystalline; moderate amount of brown intercrystalline clay; brown clay parting at 1,724.2 feet; minor, moderate-reddish-orange polyhalite	1,724.0-1,724.7
Halite, grayish-[illegible] and pale-red, fine t medium crystalline; moderate amount of brown intercrystalline clay	1,724.7-1,729.0
Halite, moderate-reddish-brown and pale-red, medium crystalline; minor, moderate-orange-pink polyhalite stringers near base	1,729.0-1,729.7
Halite, pale-red and moderate-reddish-brown, medium to coarse crystalline; contains moderate amount of grayish-orange-pink polyhalite blebs; concentrated zone of polyhalite at 1,730.3-1,730.5 feet	1,729.7-1,730.7

Table 11C.--Lithologic log--(Continued)

Description	Depth (feet)
Polyhalite, moderate-reddish-brown, dense; halite crystals scattered throughout unit	1,730.7-1,731.3
Anhydrite, light- to medium-gray, laminated; secondary halite crystals scattered throughout unit	1,731.3-1,736.7
Mudstone, medium-gray; moderate-reddish-brown polyhalite unit near top	1,736.7-1,737.3
Halite, pale-red and clear, fine to medium crystalline; minor grayish-green intercrystalline clay in upper 0.4 foot; clay stringer at 1,737.6 feet	1,737.3-1,738.4
Halite, grayish-red and pale-red, coarse crystalline; minor amount of brown clay in blebs and stringers	1,738.4-1,739.4
Halite, moderate-reddish-orange and moderate-reddish-brown, medium to very coarse crystalline; numerous moderate-reddish-orange polyhalite stringers; zones of clear, very coarse crystalline halite	1,739.4-1,747.1
Halite, grayish-red and pale-red, fine to medium crystalline, argillaceous	1,747.1-1,747.6
Halite, grayish-red, grading to moderate-reddish-brown, moderate-reddish-orange, and clear, fine crystalline, grading to coarse crystalline, polyhalitic	1,747.6-1,749.6
Halite, medium-dark-gray and grayish-red, fine to medium crystalline, slightly argillaceous	1,749.6-1,750.5
Halite, pale-red, grading to moderate-reddish-brown, coarse crystalline, polyhalitic in lower 0.3 foot	1,750.5-1,751.3
Halite, pale-red and grayish-red, medium crystalline, grading to fine crystalline, argillaceous; brown clay parting at 1,752.0 feet; minor amount of polyhalite stringers	1,751.3-1,753.2
Clay, greenish-gray, halitic; halite content increases downward; contains minor moderate-reddish-orange polyhalite blebs	1,753.2-1,754.4
Halite, moderate-brown and grayish-red, fine to medium crystalline, argillaceous; abundant brown clay; brown clay partin. at 1,754.6 feet; sparse greenish-gray interstitial clay; two brown-green-gray clay partings at 1,758.6 and 1,758.9 fee	1,754.4-1,760.8
Halite, clear to pale-red to grayish-red, medium to coarse crystalline; moderate amount of moderate-red polyhalite blebs and stringers; moderate amount of grayish-green clay; sparse brown clay, increasing with depth	1,760.8-1,763.2
Halite, clear to moderate-red, medium to coarse crystalline; moderate amount of moderate-reddish-orange polyhalite blebs; abundant dark-reddish-brown clay; moderate amount of greenish-gray clay; a few very small leached cavities	1,763.2-1,763.5

Table 11C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; moderate amount of moderate-red polyhalite blebs; very little greenish-gray clay at top, disappearing with depth; very small leached cavities throughout unit	1,763.5-1,765.4
Halite, moderate-red to moderate-reddish-brown to clear, medium to coarse crystalline, argillaceous; moderate amount of moderate-red polyhalite blebs; abundant brown clay; a few leached, triangular cavities	1,765.4-1,768.0
Halite, clear to pale-red to moderate-reddish-orange, medium to coarse crystalline; moderate amount of light-red to moderate-red polyhalite blebs; some brown and greenish-gray clay at top, decreasing with depth	1,768.0-1,773.2
Halite, pale-red to dark-reddish-brown, medium to coarse crystalline, argillaceous; abundant brown clay; clay parting at 1,774.6 feet; moderate amount of greenish-gray clay at base; sparse, moderate-red polyhalite blebs; a few small leached cavities throughout unit	1,773.2-1,775.9
Halite, pale-red to light-moderate-reddish-orange, coarse crystalline; moderate amount of moderate-red polyhalite blebs, decreasing with depth; sparse dark-reddish-brown and greenish-gray interstitial clay; a few small leached cavities	1,775.9-1,780.8
Halite, clear to grayish-red and pale-red, medium to coarse crystalline; abundant grayish-red interstitial clay; moderate amount of greenish-gray interstitial clay; sparse, moderate-reddish-brown polyhalite blebs; grayish-red clay parting at 1,782.3 feet; moderate to heavy disseminated sulfate (langbeinite) mineralization in lower third of unit	1,780.8-1,787.6
Halite, clear to moderate-reddish-orange and pale-red, medium to coarse crystalline; moderate amount of greenish-gray interstitial clay, decreasing with depth; moderate amount of moderate-reddish-orange to moderate-reddish-brown polyhalite blebs and stringers; trace of white stringers of polyhalite near base; weakly to medium disseminated sulfate (langbeinite(?)) mineralization in upper third of unit	1,787.6-1,791.9
Halite, clear to moderate-reddish-orange and grayish-yellow, medium to coarse crystalline; sparse greenish-gray interstitial clay; sparse grayish-yellow polyhalite blebs and stringers	1,791.9-1,795.1

Table 11C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to grayish-red, pale-red, moderate-reddish-orange and light-gray, medium to coarse crystalline; moderate amount of greenish-gray interstitial clay; sparse, grayish-red to brown clay concentrated near base; sparse, moderate-reddish-orange to moderate-reddish-brown polyhalite blebs concentrated in middle of unit; moderate mineralization of sulfates in lower 0.2 foot of unit--------	1,795.1-1,797.0
Halite, clear to light-moderate-reddish-orange, medium to coarse crystalline; sparse moderate-reddish-brown polyhalite blebs; sparse, grayish-red to brown interstitial clay in upper 0.1 foot of unit-----	1,797.0-1,797.7
Halite, clear to grayish-red, medium to coarse crystalline; sparse, moderate-reddish-brown polyhalite blebs; abundant, grayish-red to brown interstitial clay; sparse, greenish-gray interstitial clay; weak to moderate mineralization of sulfates (langbeinite) and possible kainite/leonite in upper 0.6 foot of unit----------	1,797.7-1,800.3
Halite, clear to grayish-red and pale-red and greenish-gray, medium to coarse crystalline; moderate amount of greenish-gray interstitial clay in lower third of unit; sparse grayish-red interstitial clay; sparse moderate-reddish-brown polyhalite blebs; some small leached cavities----------	1,800.8-1,805.5
Halite, clear to grayish-yellow and moderate-reddish-orange, medium to coarse crystalline; abundant, light-red to moderate-reddish-brown polyhalite blebs, decreasing with depth; sparse greenish-gray interstitial clay, decreasing with depth; trace of grayish-red interstitial clay; numerous blebs, stringers, and band of light-gray anhydrite, increasing toward base----------	1,805.5-1,811.5
Polyhalite and anhydrite mixture, light- to reddish-gray, dense, massive; disseminated, fine to medium crystalline, clear halite, concentrated in upper 1.6 feet of unit; clear, medium to coarse halite in bands at 1,816.7 feet; unit is laminated----------	1,811.5-1,818.1
Halite, clear to very light grayish yellow, medium to coarse crystalline; light- to medium-gray anhydrite concentrated in bands in uppermost 1.0 foot of unit, but anhydrite continues throughout unit, one noticeable band, 0.2-foot thick, at 1,822.5 feet; scattered moderate-reddish-orange polyhalite blebs, increasing with depth; very minor interstitial greenish-gray and grayish-red clay----------	1,818.1-1,822.9

Table 11C.--Lithologic log--(Continued)

Description	Depth (feet)
Anhydrite and polyhalite mixture, light-medium-gray to grayish-red to clear, fine to coarse crystalline, dense, massive, laminated; clear halite disseminated throughout upper half of unit; very sparse moderate-reddish-brown polyhalite blebs in upper half of unit only; very small amount of medium-gray mudstone in lower 1.7 foot of unit; moderate-reddish-orange to moderate-reddish-brown polyhalite interbedded at 1,830.5-1,830.8 feet; polyhalite band at 1,830.1 feet------	1,822.9-1,831.8
Halite, moderate-reddish-orange to clear, medium to coarse crystalline; greenish-gray clay parting at 1,831.9 feet; moderate amount of moderate-reddish-orange to moderate-reddish-brown polyhalite throughout unit, mostly toward top; greenish-gray clay only in upper 0.5 foot; some small, leached cavities in center of unit; no mineralization----------	1,831.8-1,836.2
Halite, greenish-gray to moderate-reddish-orange, medium to coarse crystalline; sparse moderate-reddish-brown polyhalite blebs; greenish-gray clay concentrated in upper 0.9 foot; greenish-gray clay parting at 1,836.3 feet; brown to grayish-red sparse interstitial clay in upper 0.9 foot of unit; some leached cavities--------	1,836.2-1,840.6
Halite, moderate-reddish-orange to moderate-reddish-brown to clear, fine to coarse crystalline; moderate amount of moderate-reddish-brown polyhalite blebs; abundant greenish-gray interstitial clay; brown interstitial clay, increasing toward base; weak to moderate mineralization of disseminated langbeinite; number of moderate to large langbeinite crystals increasing with depth----------	1,840.6-1,842.3
Halite, moderate-red, pale-red, clear, medium to coarse crystalline; abundant, brown interstitial clay; some greenish-gray clay; minor, moderate-reddish-brown polyhalite blebs; some leaching, possibly kainite/leonite; minor (langbeinite?) sulfate mineralization---------	1,842.3-1,843.5
Halite, moderate-reddish-orange, pale-red, clear, coarse crystalline; moderate amount of moderate-reddish-brown to light-red polyhalite blebs; minor amount of grayish-green interstitial clay; sparse brown to grayish-red interstitial clay; a few leached cavities; no mineralization----------	1,843.5-1,846.5
Halite, moderate-reddish-orange, clear, pale-red, medium to coarse crystalline, mostly coarse; moderate-reddish-brown polyhalite blebs, decreasing with depth; very little greenish-gray clay concentrated in upper 0.3 foot; weakly disseminated mineralization of small crystal sylvite in basal 0.7 foot; large crystals of langbeinite in upper 0.5 foot----------	1,846.5-1,848.1

Table 11C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to light-gray to moderate-reddish-brown, medium to coarse crystalline; abundant brown clay, concentrated in upper 0.8 foot; sparse interstitial greenish-gray clay disseminated throughout unit; moderate-reddish-brown polyhalite band 0.1-foot thick at top; disseminated large and small crystals of langbeinite, mostly in upper 1.0 foot; moderate mineralization----------	1,848.1-1,851.1
Halite, pale-red to moderate-reddish-brown, coarse crystalline; abundant interstitial greenish-gray clay, increasing with depth; sparse, moderate-reddish-brown polyhalite blebs throughout unit; small amount of interstitial brown clay; weak, disseminated mineralization of small crystals of langbeinite throughout, in partially leached cavities, possibly after kainite/leonite; lesser amount of sylvite mineralization, very weak, in lower half of unit----------	1,851.1-1,856.1
Halite, moderate-reddish-brown to light-gray to clear, medium to coarse crystalline; small amounts of brown to grayish-red and some greenish-gray clay in leached cavities and interstitially; moderate amount of moderate-reddish-orange to moderate-reddish-brown polyhalite blebs and a few stringers throughout unit; very weak mineralization of langbeinite, mostly small crystals, one large langbeinite crystal at 1,857.3 feet; also weak, disseminated, sylvite mineralization--------	1,856.1-1,858.4
Halite, moderate-reddish-orange to moderate-reddish-brown, some clear, coarse crystalline; moderate amount of moderate-reddish-orange to moderate-reddish-brown polyhalite blebs throughout unit; very little greenish-gray interstitial clay; concentration of brown to grayish-red clay at 1,859.2 feet; moderate sylvite mineralization from 1,853.0 to 1,864.0 feet; disseminated large crystals in partly leached cavities----------	1,858.4-1,864.0
Halite, moderate-reddish-orange to clear, some light-gray; moderate amount of moderate-reddish-brown polyhalite blebs; minor grayish-green interstitial clay, decreasing with depth; weak to moderate mineralization of langbeinite in upper quarter of unit; moderate mineralization of sylvite, disseminated large and small crystals, increasing with depth----------	1,864.0-1,867.4
Halite, clear to light-grayish-yellow, coarse crystalline; sparse light-red, small, interstitial blebs of polyhalite; small amount of greenish-gray and grayish-red to brown clay at base of unit----------	1,867.4-1,868.8

Table 11C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite and langbeinite, light-gray to light-grayish-yellow, some smoky-clear, greenish-gray at top; moderate amount, decreasing with depth, of coarse crystals; very sparse moderate-reddish-brown polyhalite, decreasing with depth; coarse halite in upper half of unit; strong mineralization of massive langbeinite in lower half of unit---	1,868.8-1,870.1
Halite, clear to light-gray to pale-red, medium to coarse crystalline; brown to grayish-red clay parting at 1,872.8 feet; grayish-red and brown clay abundant in lower half of unit; moderate amount of greenish-gray interstitial clay in upper half of unit; heavy mineralization of large langbeinite crystals at 1,871.0-1,872.2 feet, some surrounded by leached areas (possibly kainite/leonite); a few light-red polyhalite blebs at base----------	1,870.1-1,874.4
Halite, clear to pale-red, some moderate-reddish-orange, medium to coarse crystalline; moderate amount of light-red to moderate-reddish-orange polyhalite blebs; brown clay parting at 1,879.7 feet and at base; minor greenish-gray and brown interstitial clay----------	1,874.4-1,882.3
Halite, clear to pale-red to moderate-reddish-orange, medium to coarse crystalline; sparse moderate-reddish-brown polyhalite, decreasing with depth; very little grayish-red clay in upper part of unit-------	1,882.3-1,884.5
Halite, light-gray to clear, argillaceous, except massive grayish-red clay in top 0.7 foot of interval; grayish-red clay parting at 1,886.7 feet; grayish-red interstitial clay throughout unit; very sparse, very small polyhalite blebs----------	1,884.5-1,888.5
Halite, clear to light-gray, medium to coarse crystalline; moderate amount of grayish-red to brown interstitial clay; very sparse greenish-gray interstitial clay; sparse, small moderate-reddish-brown polyhalite blebs; a few small angular leached cavities---------	1,888.5-1,893.4
Halite, clear to very light grayish red, fine to coarse crystalline; moderate amount of moderate-reddish-brown polyhalite blebs and stringers; sparse greenish-gray interstitial clay; brown clay partings at 1,898.8 and 1,897.7 feet; minor amount of brown interstitial clay----------	1,893.4-1,899.5
Halite, clear to very light pale red, medium to coarse crystalline; moderate amount of moderate-reddish-brown polyhalite blebs and stringers; moderate amount of grayish-red clay; grayish-red clay partings at 1,901.0 and 1,901.5 feet; very sparse, interstitial, greenish-gray clay; clear halite in top 0.15 foot----------	1,899.5-1,904.7

Table 11C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to pale-red to greenish-gray, medium to coarse crystalline; concentrated greenish-gray clay in lower 1.0 foot of unit; sparse, greenish-gray interstitial clay, increasing with depth; moderate amount of moderate-reddish-orange polyhalite blebs; clear halite in top 0.2 foot of interval; sparse grayish-red clay toward top	1,904.7-1,907.1
Halite, clear to light-gray, medium to coarse crystalline; sparse moderate-reddish-brown small polyhalite blebs; moderate amount of interstitial brown clay; moderate amount of grayish-green clay; brown to grayish-red clay parting at 1,903.4 feet	1,907.1-1,909.0
Halite, clear to pale-red, medium to coarse crystalline; moderate amount of moderate-reddish-brown polyhalite blebs and stringers; moderate amount of grayish-red interstitial clay; sparse greenish-gray clay at top of interval, increasing with depth	1,909.0-1,912.7
Halite, clear to moderate-reddish-orange, coarse crystalline; moderate amount of moderate-reddish-brown polyhalite blebs and stringers; very little grayish-green interstitial clay; some small leached areas	1,912.7-1,914.8
Polyhalite, mixed with halite and mudstone, moderate-reddish-brown to greenish-gray at base; halite, fine to coarse crystalline, interbedded with moderate reddish-brown polyhalite stringers; greenish-gray clay at base, 0.4-foot thick	1,914.8-1,915.8
Halite, moderate-reddish-orange to clear, fine to coarse crystalline, mainly coarse; abundant grayish-red to brown clay; halitic grayish-red clay band at 1,916.7-1,917.1 feet and at base; sparse greenish-gray disseminated clay; minor moderate-reddish-brown polyhalite blebs	1,915.8-1,921.7
Halite, medium-light-gray to pale-red, medium to coarse crystalline; abundant moderate-reddish-brown polyhalite blebs and stringers; abundant grayish-red clay partings at 1,922.4, 1,923.0, and 1,923.7 feet; sparse greenish-gray clay	1,921.7-1,925.6
Halite, clear to medium-gray and pale-red, coarse crystalline; moderate amounts of moderate-reddish-brown polyhalite blebs and stringers; moderate amount of grayish-red interstitial clay partings at 1,931.5 and 1,930.7 feet; vugs filled with grayish-red clay	1,925.6-1,934.0

Table 11C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear, pale-red, moderate-reddish-orange, medium to coarse crystalline, mostly coarse in upper 1.0 foot of unit; grayish-red clay, decreasing toward base; recrystallized halite at base; sparse moderate-reddish-brown polyhalite blebs----------	1,934.0-1,939.0
Polyhalite, moderate-red to moderate-reddish-brown, dense, massive-----	1,939.0-1,940.4
Halite, light-moderate-reddish-orange to pale-red to clear, medium to coarse crystalline; abundant moderate-reddish-brown polyhalite blebs and stringers, two prominent polyhalite bands at 1,941.3 and 1,941.6 feet; minor greenish-gray interstitial clay, increasing with depth---	1,940.4-1,943.1 Total depth

Table 11D.--Mineralogical and chemical analyses of core samples from potash ore zones and mineralized salt beds in drill hole P-11

[oz, ore zone; mm, middle member; lm, lower member; sb, salt bed; tr, trace; Bl, bloedite; Ha, halite; Ka, kainite; Ki, kieserite; La, langbeinite; Lo, loeweite; Po, polyhalite; Sy, sylvite; n.d., not determined. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mineralogy: X-ray diffraction analysis[1]	Chemical analysis (weight percent): Ca	K	Mg	Na	Cl	SO_4	H_2O+	H_2O-	Water insoluble
P-11/1	1,600.95-1,601.90	0.95	sb	>9 Ha; <1 Po; tr Sy	0.44	0.52	0.27	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
P-11/2	1,601.90-1,603.56	1.66	11th oz	>6 Ha; >1 Sy, Ki; 1 Ka; tr Po	.06	8.3	3.6	22.0	41.5	14.0	3.4	0.67	5.7
P-11/3	1,603.56-1,604.64	1.08		7 Ha; <1 Sy, Ki, Po; 1 Ka	.34	6.3	3.4	24.0	42.5	13.5	3.8	.57	4.5
P-11/4	1,604.64-1,605.38	.74		>8 Ha; <1 Sy, Ka, Ki; tr Sy	.50	2.1	1.0	33.0	53.5	5.0	1.4	.46	3.1
P-11/5	1,605.38-1,606.10	.72		8 Ha; <1 Ka; tr Ki, Po, Sy	.05	2.3	1.4	27.0	48.0	3.3	2.9	2.17	13.7
P-11/6	1,669.87-1,670.70	.83	sb	>9 Ha; <1 Sy; tr Po	.15	2.1	.24	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
P-11/7	1,670.70-1,671.84	1.14	10th oz	>7 Ha; >2 Sy; <1 La; tr Po	.11	11.4	1.2	28.0	52.0	7.0	.44	.08	1.6
P-11/8	1,671.84-1,673.42	1.58		>7 Ha; <1 La, Sy, Po	.29	9.0	3.0	26.0	45.0	18.5	.22	.01	.18
P-11/9	1,673.42-1,674.70	1.28		7 Ha; >2 Sy; <1 Po	.40	9.4	.29	28.0	52.0	1.5	.48	.97	8.0
P-11/10	1,674.70-1,675.95	1.25		8 Ha; >1 Sy; tr Po	.16	6.0	.27	31.0	54.0	.82	.51	1.2	8.0
P-11/11	1,675.95-1,676.83	.88		>8 Ha; <1 Po; 1 Sy; tr La	.16	3.9	.26	32.5	54.0	.84	.67	.77	7.05
P-11/12	1,676.83-1,677.99	1.16		>9 Ha; <1 Po, Sy	.25	1.7	.23	34.0	58.5	1.0	.28	.83	5.6
P-11/13	1,688.07-1,688.72	.65	sb	>9 Ha; tr Po, Sy	.64	1.3	.17	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
P-11/14	1,688.72-1,689.60	.88	9th oz	7 Ha; >2 Sy; tr Po	.40	12.0	.10	30.0	54.5	1.3	.09	.01	.11
P-11/15	1,689.60-1,690.89	1.29		6 Ha; >3 Sy; tr Po	.09	19.5	.07	25.0	55.0	.16	.07	.23	2.0
P-11/16	1,690.89-1,691.95	1.06		>7 Ha; >2 Sy; tr Po	.13	11.5	.18	28.0	54.0	.33	.34	.96	4.7
P-11/17	1,691.95-1,693.28	1.33		>9 Ha; <1 Sy; tr Po	.29	1.4	.14	36.0	59.0	.80	.24	.31	2.5
P-11/18	1,839.52-1,840.60	1.08	4th oz, mm	>9 Ha; <1 Sy; tr Po	.11	.08	.05	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
[2]P-11/19	1,840.60-1,842.35	1.75	4th oz, lm	>6 Ha; >3 Sy; tr Po	.13	8.5	4.7	23.0	34.5	29.0	.29	.05	.71
[2]P-11/19					.18	7.8	5.7	23.0	35.5	29.0	5.2	1.0	.63
P-11/20	1,842.35-1,843.40	1.05		>8 Ha; <1 La, Po; tr Sy	.49	2.1	1.1	30.0	48.5	6.5	.65	.93	9.7
P-11/21	1,867.93-1,868.67	.74	sb	>8 Ha; <1 La, Po	.59	2.1	.94	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
[2]P-11/22	1,868.67-1,870.28	1.61		5 Ha; >4 La; tr Po	.07	13.0	7.0	14.5	24.5	44.0	.09	.07	.30
[2]P-11/22					.11	12.4	7.4	15.0	24.0	44.0	.01	.10	.32
P-11/23	1,870.28-1,871.10	.82		>6 Ha; >3 La; tr Ki, Po	.06	9.2	5.6	19.0	31.5	33.5	.11	.02	.38
P-11/24	1,871.10-1,872.30	1.20	2d oz	>5 La; >3 Ha; 1 Ka; tr Bl, Lo, Po	.04	13.0	7.7	10.5	16.5	48.0	2.9	.72	1.4
P-11/25	1,872.30-1,873.10	.80		>8 Ha; >1 Po; tr, Ki, Sy	.23	.28	.37	35.0	54.5	1.4	.73	.79	6.6

[1]Estimate of amount reported on a scale of 0-10.

[2]Replicate analyses.

Table 11E.--Calculated mode (mineral content) and potash distribution by mineral in core samples from potash ore zones and mineralized salt beds in drill hole P-11

[oz, ore zone; mm, middle member; lm, lower member; sb, salt bed; Bl, bloedite, Ha, halite; Ka, kainite; Ki, kieserite; La, langbeinite; Lo, loeweite; Po, polyhalite; Sy, sylvite; Insol., clay and silt; n.d., not determined; leaders (---), not present. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mode (weight percent mineral)									K_2O distribution by minerals				
				Sy	La	Ka	Ki	Bl	Lo	Ha	Po	Insol.	Sy	La	Ka	Po	Total
P-11/1	1,600.95-1,601.90	0.95	sb	0.2	---	---	---	---	---	n.d.	3.0	n.d.	0.1	---	---	0.5	0.6
P-11/2	1,601.90-1,603.56	1.66	11th oz	13.4	---	7.8	15.4	---	---	55.9	.4	5.7	8.5	---	1.5	<.1	10.0
P-11/3	1,603.56-1,604.64	1.08		8.8	---	8.7	12.2	---	---	61.1	2.5	4.5	5.5	---	1.7	.4	7.6
P-11/4	1,604.64-1,605.38	.74		2.2	---	3.2	1.7	---	---	85.8	3.7	3.1	1.3	---	.6	.6	2.5
P-11/5	1,605.38-1,606.10	.72		2.9	---	6.7	.7	---	---	75.7	.4	13.7	1.4	---	1.3	<.1	2.7
P-11/6	1,669.87-1,670.70	.83	sb	3.7	---	---	---	---	---	n.d.	1.1	n.d.	2.3	---	---	.2	2.5
P-11/7	1,670.70-1,671.84	1.14	10th oz	18.2	9.3	---	---	---	---	71.4	.8	1.6	11.5	2.1	---	.1	13.7
P-11/8	1,671.84-1,673.42	1.58		7.8	24.6	---	---	---	---	68.1	2.2	.2	4.9	5.6	---	.3	10.8
P-11/9	1,673.42-1,674.70	1.28		17.3	---	---	---	---	---	72.1	2.3	8.0	10.9	---	---	.4	11.3
P-11/10	1,674.70-1,675.95	1.25		11.1	---	---	---	---	---	80.3	1.3	8.0	7.0	---	---	.2	7.2
P-11/11	1,675.95-1,676.83	.88		7.1	<0.1	---	---	---	---	83.4	1.2	7.0	4.5	<0.1	---	.2	4.6
P-11/12	1,676.83-1,677.[illegible]	1.16		2.8	---	---	---	---	---	94.2	1.6	5.6	1.8	---	---	.2	2.0
P-11/13	1,688.07-1,688.72	.65	sb	1.3	---	---	---	---	---	n.d.	4.8	n.d.	.8	---	---	.8	1.6
P-11/14	1,688.72-1,68[illegible]	.88	9th [illegible]	22.4	---	---	---	---	---	76.3	2.1	.1	14.1	---	---	.3	14.4
P-11/15	1,689.60-1,690.89	1.29		37.0	---	---	---	---	---	61.6	.7	2.0	23.4	---	---	.1	23.5
P-11/16	1,690.89-1,691.95	1.06		21.8	---	---	---	---	---	71.9	.5	4.7	13.8	---	---	<.1	13.9
P-11/17	1,691.95-1,693.28	1.33		2.4	---	---	---	---	---	95.4	1.3	2.5	1.5	---	---	.2	1.7
P-11/18	1,839.52-1,840.60	1.08	4th oz, mm	<.1	---	---	---	---	---	n.d.	.6	n.d.	<.1	---	---	<.1	<.1
[1] P-11/19	1,840.60-1,842.35	1.75	4th oz, lm	---	44.4	---	---	---	---	56.5	1.0	.7	---	10.1	---	.1	10.2
[1] P-11/19				---	40.5	---	---	---	---	58.5	1.3	.6	---	9.2	---	.2	9.4
P-11/20	1,842.35-1,843.40	1.05		.9	6.0	---	---	---	---	79.2	3.7	9.7	.6	1.4	---	.6	2.6
P-11/21	1,867.93-1,868.67	.74		---	8.1	---	---	---	---	n.d.	4.4	n.d.	---	1.8	---	.7	2.5
[1] P-11/22	1,868.67-1,870.28	1.61		---	68.6	---	---	---	---	36.9	.5	.3	---	15.6	---	<.1	15.6
[1] P-11/22				---	65.3	---	---	---	---	38.1	.8	.3	---	14.8	---	.1	14.9
P-11/23	1,870.28-1,871.10	.82		---	48.6	---	<.1	---	---	48.3	.4	.3	---	11.0	---	<.1	11.0
P-11/24	1,871.10-1,872.30	1.20		---	64.6	5.1	---	1.8	0.3	26.0	.3	1.4	---	14.7	1.0	<.1	15.7
P-11/25	1,872.30-1,873.10	.80		.1	---	---	.4	---	---	89.7	1.7	6.6	<.1	---	---	.3	.3

[1]Replicate analyses.

TABLES 12A-12G

Basic data from drill hole P-12,
Waste Isolation Pilot Plant area, Eddy County, New Mexico

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12G.--Gamma-ray and neutron logs of drill hole	foldout

Table 12A.--Abridged drill-hole history

LOCATION: Sec. 24, T. 22 S., R. 30 E.
51 m (167 ft) from north line
59 m (195 ft) from east line

ALTITUDE (LAND SURFACE): 1,029 m (3,376.0 ft). Datum for depth measurements in drilling and logging operations.

LITHOLOGIC LOG PREPARED BY: R. J. Cheeseman, J. C. Lorenz, Florian Maldonado, J. W. Mercer, L. A. Rives, R. P. Snyder, and R. W. Spengler, September 18 to October 20, 1976.

DRILLING CONTRACTOR: Pennsylvania Drilling Co.

DRILLING RECORD: Commenced drilling on September 17, and completed on October 20, 1976, at 487 m (1,598 ft) below land surface.

Lost circulation at 226 m (742 ft) and 248 m (813 ft) below land surface.

Recovered all casing, and plugged with cement.

REMARKS: Top of salt in Salado Formation at 229 m (752 ft) below land surface.

Table 12B.--Stratigraphic summary

Rock unit	Depth interval[1] feet	meters
Holocene deposits	0-8	0-2
Permian rocks:		
Dewey Lake Red Beds	8-461	2-141
Rustler Formation	461-749	141-228
Magenta Dolomite Member	519-543	158-166
Culebra Dolomite Member	633-656	193-200
Salado Formation	749-1,598	228-487
Upper member	749-1,226	228-374
McNutt potash zone	1,226-1,597	374-487
Vaca Triste Sandstone Member[2]	1,226-1,288	374-376
11th ore zone	1,280-1,284	390-391
Marker bed 117	1,290-1,292	393-394
Marker bed 118	1,314-1,317	401-401
Marker bed 119	1,338-1,340	408-408
10th ore zone	1,346-1,353	410-412
Marker bed 120	1,361-1,362	415-415
9th ore zone	1,367-1,370	417-418
Marker bed 121	1,376-1,378	419-420
Marker bed 122	1,384-1,385	422-422
8th ore zone	1,390-1,398	424-426
Union anhydrite[3]	1,407-1,417	429-432
7th ore zone	1,432-1,436	436-438
6th ore zone	1,442-1,445	439-440
5th ore zone	1,450-1,459	442-445
Marker bed 123	1,486-1,492	453-455
Marker bed 124	1,494-1,509	455-460
4th ore zone	1,514-1,523	461-464
3d ore zone	1,533-1,546	467-471
2d ore zone	1,550-1,555	472-474
1st ore zone	1,572-1,582	479-482
Marker bed 126	1,596-1,597	486-487
Maximum depth recorded	1,598	487

[1]Depth interval recorded from geophysical logs.
[2]Of Adams, 1944.
[3]Informal unit of Salado Formation.

Table 12C.--Lithologic log

Description	Depth (feet)	
Sandstone, reddish; caliche	0.0-	15.0
Siltstone, reddish; some caliche	15.0-	30.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots	30.0-	60.0
Siltstone, dark-reddish-brown; white to light-gray, granular gypsum; very light green siltstone	60.0-	70.0
Same as above; increasing gray to light-reddish-brown sandstone	70.0-	80.0
Siltstone, dark-reddish-brown to grayish-red, with grayish-green reduction spots; very light gray to very light yellow granular gypsum	80.0-	85.0
Siltstone, dark-reddish-brown, with grayish-green reduction spots; medium-reddish-brown, medium-grained sandstone; very light gray, granular gypsum; very light green siltstone	85.0-	100.0
Siltstone, dark-reddish-brown, with grayish-green reduction spots; very light grayish green siltstone; light-gray, granular gypsum; light-reddish-brown, fine- to medium-grained sandstone	100.0-	120.0
Siltstone, dark-reddish-brown; dark-reddish-brown mudstone; very light gray, granular gypsum	120.0-	135.0
Same as above; with a few grains of grayish-red to medium-reddish-brown, medium-grained sandstone (cavings?)	135.0-	150.0
Siltstone, dark-reddish-brown; white, granular gypsum; very light grayish green siltstone	150.0-	155.0
Same as above; with sparse, clear, crystalline selenite	155.0-	160.0
Siltstone, dark-reddish-brown, with grayish-green reduction spots; white, granular gypsum; clear, crystalline vein selenite; small amount of red mudstone	160.0-	185.0
Same as above; increasing red mudstone	185.0-	190.0
Siltstone, dark-reddish-brown, with grayish-green reduction spots; clear, crystalline selenite; red mudstone	190.0-	195.0
Same as above; with small amount of white, granular gypsum	195.0-	200.0
Siltstone, dark-reddish-brown, with grayish-green reduction spots; reddish-brown mudstone; clear selenite	200.0-	210.0
Same as above; with some clear, crystalline selenite in vein form	210.0-	220.0
Siltstone, dark-reddish-brown, with grayish-green reduction spots; approx. 1 percent clear to white, crystalline, veinlike selenite; white gypsum	220.0-	250.0
Siltstone, dark-reddish-brown, with grayish-green reduction spots, micaceous, selenitic; granular white gypsum	250.0-	270.0

Table 12C.--Lithologic log--(Continued)

Description	Depth (feet)
Siltstone, dark-reddish-brown, with grayish-green reduction spots, micaceous, selenitic; traces of white, granular gypsum	270.0- 290.0
Same as above; trace of selenite	290.0- 295.0
Same as above; selenite more common	295.0- 300.0
Siltstone, dark-reddish-brown, with grayish-green reduction spots, micaceous; selenite common; trace of white gypsum; abundant red clay	300.0- 310.0
Same as above; with white gypsum more common; no red clay	310.0- 320.0
Siltstone, dark-reddish-brown, with grayish-green reduction spots; trace of selenite and white gypsum	320.0- 335.0
Same as above; with trace of selenite in vein	335.0- 340.0
Siltstone, dark-reddish-brown, with grayish-green reduction spots; trace of selenite and white gypsum	340.0- 345.0
Same as above; selenite more common; trace of selenite in vein(?)	345.0- 350.0
Siltstone, dark-reddish-brown, with grayish-green reduction spots; trace of selenite and white gypsum; occasional selenite in vein(?)	350.0- 355.0
Same as above; no selenite in vein	355.0- 365.0
Same as above; occasional selenite in vein; some red clay	365.0- 370.0
Siltstone, dark-reddish-brown, with grayish-green reduction spots; trace of selenite and white gypsum; abundant red clay	370.0- 375.0
Same as above; no red clay	375.0- 380.0
Same as above; some red clay	380.0- 385.0
Same as above; no red clay	385.0- 400.0
Siltstone, dark-reddish-brown, with grayish-green reduction spots; trace of selenite and white granular gypsum; abundant red clay	400.0- 410.0
Same as above; no red clay	410.0- 420.0
Same as above; red clay	420.0- 465.0
Anhydrite; some selenite and white gypsum; some reddish-brown siltstone	465.0- 475.0
Siltstone and anhydrite; approx. 70 percent siltstone; approx. 30 percent anhydrite; some selenite	475.0- 480.0
Same as above; selenite more common	480.0- 485.0
Same as above; approx. 90 percent siltstone; approx. 10 percent anhydrite; selenite common	485.0- 490.0
Siltstone, reddish-brown; anhydrite; selenite common	490.0- 500.0
Siltstone and anhydrite; approx. 85 percent siltstone; approx. 15 percent anhydrite; selenite common	500.0- 505.0

Table 12C.--Lithologic log--(Continued)

Description	Depth (feet)
Siltstone and anhydrite; approx. 70 percent siltstone; approx. 30 percent anhydrite	505.0- 515.0
Same as above; approx. 85 percent siltstone; approx. 15 percent anhydrite	515.0- 520.0
Anhydrite and siltstone; approx. 90 percent anhydrite; approx. 10 percent siltstone; selenite common	520.0- 525.0
Same as above; approx. 95 percent anhydrite; approx. 5 percent siltstone	525.0- 545.0
Anhydrite, approx. 95 percent; approx. 5 percent siltstone; granular anhydrite coated with gypsum (gypsum rinds)	545.0- 560.0
Same as above; increasing reddish-brown siltstone	560.0- 565.0
Same as above; 30 percent siltstone	565.0- 580.0
Anhydrite, gray, 50 percent; 25 percent gypsum; 25 percent red siltstone	580.0- 585.0
Same as above; some green shale; some selenite	585.0- 600.0
Siltstone, reddish-brown, with grayish-green reduction spots; white gypsum and selenite; gray anhydrite; sparse green shale	600.0- 620.0
Gypsum and selenite, clear to white; minor gray anhydrite; moderate-reddish-brown siltstone	620.0- 660.0
No sample	660.0- 665.0
Gypsum and selenite, clear to white; minor, gray anhydrite; moderate-reddish-brown siltstone	665.0- 675.0
Same as above; trace of black shale	675.0- 680.0
Siltstone, increasing, moderate-reddish-brown; white gypsum; selenite; anhydrite common; trace of black shale	680.0- 700.0
Gypsum and anhydrite, clear to white; some moderate-reddish-brown siltstone; sparse fragments of black shale (contamination)	700.0- 740.0
No sample	740.0- 830.0
Sandstone, reddish-brown, very fine grained; some white gypsum and some clear halite	830.0- 835.0
Halite, clear	835.0- 840.0
Halite, clear; orange polyhalite	840.0- 855.0
Polyhalite, orange; 15 percent clear halite	855.0- 865.0
Halite, clear; orange polyhalite; scattered gypsum	865.0- 875.0
Halite, clear	875.0- 885.0
Same as above; 10 percent orange polyhalite	885.0- 890.0
Same as above; less than 5 percent orange polyhalite	890.0- 895.0

Table 12C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear	895.0- 900.0
Halite, clear; less than 1 percent white anhydrite	900.0- 905.0
Halite, clear	905.0- 920.0
Halite, clear; less than 1 percent white anhydrite	920.0- 930.0
Same as above; with 5 percent orange polyhalite	930.0- 935.0
Halite, clear; less than 1 percent orange polyhalite	935.0- 940.0
Halite, clear	940.0-1,035.0
No sample	1,035.0-1,040.0
Halite, clear	1,040.0-1,250.0
Halite, clear; 5-10 percent orange polyhalite	1,250.0-1,255.0
Halite, clear	1,255.0-1,280.0
Halite, clear to pale-reddish-brown, medium crystalline; minor amount of moderate-reddish-brown polyhalite blebs; minor, disseminated sulfate mineralization	1,280.0-1,280.7
Halite, clear to grayish-red, medium to coarse crystalline; minor, moderate-orange-pink polyhalite blebs; abundant greenish-gray and grayish-red interstitial clay in upper 1.3 feet, decreasing with depth to moderate amount; minor to moderate disseminated sulfate mineralization, moderate in lower 0.6 foot of unit	1,280.7-1,284.5
Halite, clear to grayish-red, medium to coarse crystalline; minor, grayish-red interstitial clay; minor to moderate reddish-orange polyhalite blebs and stringers, increasing with depth; minor disseminated sulfate mineralization	1,284.5-1,288.9
Polyhalite, moderate-reddish-orange, dense, massive; disseminated halite crystals in upper 0.7 foot of unit; 0.1 foot of greenish-gray clay at base of unit	1,288.9-1,290.5
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; trace of greenish-gray interstitial clay; minor, moderate-orange-pink polyhalite blebs	1,290.5-1,292.0
Halite, clear to greenish-gray and pale-red and grayish-red, medium to coarse crystalline; sparse moderate-reddish-orange polyhalite blebs; minor, greenish-gray interstitial clay	1,292.0-1,292.7
Halite, clear to moderate-orange-pink to pale-red, medium to coarse crystalline; trace of sulfate mineralization in upper 0.5 foot	1,292.7-1,294.3
Halite, clear to pale-red and pale-reddish-orange, medium to coarse crystalline; minor to moderate disseminated sulfate and sylvite mineralization	1,294.3-1,299.0

Table 12C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to moderate-reddish-orange, grayish-red and minor greenish-gray. medium to coarse crystalline; moderate amount of grayish-red to greenish-gray interstitial clay; minor, moderate-reddish-orange polyhalite blebs; minor to moderate sulfate and sylvite mineralization in upper half of unit	1,299.0-1,304.1
Halite, clear to moderate-orange-pink to pale-red, medium to coarse crystalline; minor, grayish-red and greenish-gray interstitial clay; minor, moderate-reddish-orange polyhalite blebs; minor sulfate mineralization	1,304.1-1,307.7
Halite, clear to pale-reddish-brown and grayish-red, medium to coarse crystalline; minor, moderate-orange-pink polyhalite blebs; minor, grayish-red and greenish-gray interstitial clay; heavy sulfate mineralization	1,307.7-1,311.7
Halite, clear to moderate-reddish-brown and moderate-reddish-orange, medium to coarse crystalline; minor, moderate-orange-pink polyhalite blebs; moderate amount of pale-red anhydrite blebs and stringers, increasing toward base; trace of vugs, possibly owing to sulfate leaching	1,311.7-1,313.8
Anhydrite and polyhalite mixture, light-gray to pale-red, massive, dense; disseminated halite crystals in upper 1.6 feet of unit; halite and greenish-gray clay in lower 0.2 foot of unit	1,313.8-1,316.4
Halite, clear to moderate-orange-pink to pale-reddish-brown, medium to coarse crystalline; minor disseminated grayish-orange-pink polyhalite blebs; 0.1 inch pale-red anhydrite band at 1,318.8 feet; minor greenish-gray interstitial clay in upper 0.2 foot of unit	1,316.4-1,320.3
Anhydrite, light-gray and pale-red, dense, massive; disseminated clear halite crystals	1,320.3-1,321.0
Halite, clear to pale-red and moderate-reddish-orange, fine to coarse crystalline; minor greenish-gray interstitial clay; trace of grayish-orange-pink polyhalite blebs	1,321.0-1,324.3
Halite, clear to grayish-red and greenish-gray, fine to medium crystalline, argillaceous; abundant greenish-gray and grayish-red interstitial clay, decreasing toward base; minor, moderate-reddish-orange polyhalite blebs; medium-dark-gray clay parting at 1,324.8 feet; grayish-red clay partings at 1,325.5, 1,325.8, and 1,327.3 feet	1,324.3-1,329.2
Halite, clear to moderate-orange-pink to pale-red, medium to coarse crystalline; trace of moderate-orange-pink polyhalite blebs	1,329.2-1,332.2

Table 12C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to moderate-reddish-orange, fine to medium crystalline; pale- to moderate-grayish-orange-pink polyhalite, decreasing toward base; pale- to moderate-light-gray anhydrite blebs, stringers, and bands, increasing with depth; minor disseminated sylvite and sulfate mineralization----------	1,332.2-1,338.4
Polyhalite, moderate-reddish-brown, dense, massive; greenish-gray clay parting at 1,338.8 feet; greenish-gray clay seam in lower 0.4 foot of unit----------	1,338.4-1,339.8
Halite, clear to moderate-reddish-orange, pale-red and grayish-red, medium to coarse crystalline, argillaceous; moderate amount of greenish-gray and grayish-red interstitial clay; minor to moderate sulfate mineralization decreasing toward base----------	1,339.8-1,340.8
Halite, clear to pale-reddish-brown, fine to medium crystalline; minor disseminated moderate-orange-pink polyhalite blebs; minor sylvite and sulfate mineralization in upper 1.4 feet of unit----------	1,340.8-1,343.2
Halite, clear to light-olive-gray, medium to coarse crystalline; moderate to heavy mineralization (kieserite and sylvite) throughout unit; massive sulfate and sylvite in lower 1.0 foot of unit; pale-red anhydrite band 0.1-foot thick at 1,343.5 feet----------	1,343.2-1,345.9
Halite, clear to dark-greenish-gray and moderate-reddish-orange, medium to coarse crystalline; minor dark-greenish-gray interstitial clay in upper half of unit; heavy sulfate and sylvite mineralization throughout unit; massive sulfates in places----------	1,345.9-1,349.0
Halite, clear to greenish-gray and moderate-reddish-orange, medium to coarse crystalline, argillaceous; abundant greenish-gray interstitial clay; medium to heavy disseminated sulfate and sylvite mineralization, decreasing toward base----------	1,349.0-1,352.5
Halite, clear to pale-reddish-brown and greenish-gray, fine to coarse crystalline; minor greenish-gray interstitial clay; minor disseminated sylvite mineralization----------	1,352.5-1,354.2
Halite, clear to moderate-reddish-orange and light-olive-gray, coarse crystalline; minor grayish-orange-pink anhydrite and polyhalite blebs, stringers and bands in lower 1.0 foot of unit; moderate to heavy disseminated sylvite throughout unit, decreasing toward base---------	1,354.2-1,360.0
Polyhalite, moderate-reddish-brown, mixed with halite in upper half of unit; light-medium-gray clay parting at base of unit----------	1,360.0-1,361.4

Table 12C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-reddish-brown, greenish-gray, and clear, fine to medium crystalline; moderate amount of greenish-gray interstitial clay; moderate amount of disseminated sylvite mineralization	1,361.4-1,362.0
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; minor disseminated sylvite mineralization throughout unit	1,362.0-1,365.6
Halite, clear to grayish-red and greenish-gray, fine to coarse crystalline; moderate amount of greenish-gray and grayish-red interstitial clay; greenish-gray clay parting at 1,367.3 feet; moderate to heavy sylvite mineralization throughout unit, decreasing toward base	1,365.6-1,369.6
Halite, clear to pale-red to grayish-red, medium to coarse crystalline; minor grayish-red interstitial clay; minor disseminated sylvite mineralization	1,369.6-1,370.9
Halite, clear to moderate-orange-pink to moderate-reddish-orange, fine to coarse crystalline; minor moderate-orange-pink polyhalite blebs in lower 0.2 foot of unit; minor to moderate disseminated sylvite mineralization; minor sulfate mineralization	1,370.9-1,375.5
Polyhalite, pale-red to dark-reddish-brown, dense, massive; trace of disseminated halite crystals; greenish-gray clay seam in lower 0.2 foot of unit	1,375.5-1,377.6
Halite, clear to moderate-orange-pink to moderate-reddish-orange, fine to coarse crystalline; greenish-gray interstitial clay in upper 1.6 feet of unit; minor moderate-orange-pink polyhalite blebs; minor disseminated sylvite mineralization	1,377.6-1,382.0
Halite, clear to moderate-orange-pink, medium to coarse crystalline; abundant grayish-orange-pink polyhalite blebs and stringers throughout unit; minor disseminated sylvite mineralization	1,382.0-1,383.5
Polyhalite and anhydrite mixture, greenish-gray and moderate-orange-pink, massive dense	1,383.5-1,384.3
Halite, clear to moderate-orange-pink, minor greenish-gray, fine to coarse crystalline; trace of greenish-gray interstitial clay; greenish-gray clay parting at 1,386.0 feet; minor disseminated sylvite mineralization	1,384.3-1,389.6
Clay, greenish-gray; minor disseminated clear halite; minor to moderate di seminated sylvite mineralization	1,389.6-1,390.2
Halite, clear to moderate-reddish-orange, fine to coarse crystalline; moderate to heavy disseminated sylvite mineralization, increasing toward base	1,390.2-1,394.3

Table 12C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, fine to medium crystalline, argillaceous; greenish-gray and grayish-red interstitial clay, decreasing in lower 1.5 feet; moderate-reddish-orange polyhalite blebs; minor to moderate disseminated sylvite mineralization throughout unit; grayish-red clay partings at 1,398.3, 1,398.6, 1,398.8, 1,399.3, and 1,400.3 feet-----	1,394.3-1,401.3
Halite, clear to greenish-gray and grayish-red, medium to coarse crystalline; minor, moderate-reddish-orange polyhalite blebs; minor greenish-gray interstitial clay; minor to moderate disseminated sylvite mineralization, increasing toward base----------	1,401.3-1,406.6
Anhydrite, greenish-gray to medium-light-gray; minor disseminated halite crystals throughout unit; lower 1.0 foot of unit consists of anhydrite and pale-red polyhalite; medium gray clay parting at base--	1,406.6-1,416.2
Halite, moderate-reddish-brown, clear, fine to medium crystalline; reddish-brown polyhalite; grayish-green clay at 1,418.2 feet---------	1,416.2-1,425.0
Halite, clear to pale-reddish-brown, medium crystalline; with intercrystalline brown polyhalite blebs; pale-reddish-brown to medium-bluish-gray clay in unit; clay parting at 1,425.2, 1,425.3, 1,425.5, and 1,425.6 feet----------	1,425.0-1,426.1
Halite, clear to moderate-reddish-brown, fine to medium crystalline; moderate-reddish-brown polyhalite blebs; minor, dark-brown intercrystalline clay----------	1,426.1-1,[illegible].1
Halite, as above; without polyhalite and clay----------	1,427.1-1,428.4
Halite, clear to dark-reddish-brown, medium crystalline; moderate-reddish-orange polyhalite blebs; some thin streaks of brown and green clay; thin seam of black clay at 1,429.2 feet----------	1,428.4-1,429.3
Halite, pale-reddish-orange to clear, medium crystalline; disseminated polyhalite in upper part of unit----------	1,429.3-1,430.3
Halite, dark-reddish-brown, medium to coarse crystalline, argillaceous; disseminated dark-orange polyhalite; brown clay partings at 1,430.5, 1,430.8, 1,431.0, and 1,431.2 feet----------	1,430.3-1,431.6
Halite, like above; clay decreases downward----------	1,431.6-1,433.1
Halite, clear to moderate-reddish-brown, coarse crystalline; much intercrystalline reddish-orange polyhalite----------	1,433.1-1,433.8
Clay, dark-reddish-brown, medium to coarse crystalline, halitic; some green clay near top of unit; bluish-gray clay seam at 1,434.0 feet---	1,433.8-1,434.2
Clay, dark-reddish-brown, halitic; seam at 1,434.6 feet----------	1,434.2-1,435.9

Table 12C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to dark-reddish-brown, fine to medium crystalline; core is vertically divided, half is fine crystalline halite, other half is medium crystalline divided by thin, moderate-reddish-orange polyhalite seam	1,435.9-1,437.4
Halite, clear to moderate-reddish-brown, medium crystalline; some reddish-orange polyhalite blebs; moderate-reddish-brown clay in stringers and blebs; polyhalite increases with depth, clay decreases	1,437.4-1,439.3
Halite, pale-reddish-orange to clear, medium to coarse crystalline; disseminated pale-orange polyhalite	1,439.3-1,441.2
Halite, moderate-reddish-orange, medium crystalline; pale-reddish-orange polyhalite increases from above unit	1,441.2-1,442.8
Halite, moderate-reddish-brown to clear, medium crystalline; scattered minor reddish-orange polyhalite blebs; moderate-reddish-brown clay disseminated in blebs and stringers	1,442.8-1,444.4
Halite, grayish-red and pale-reddish-brown, fine to medium crystalline, argillaceous in upper 0.5 foot; minor clay and very minor sylvite in lower 3.4 feet	1,444.4-1,448.3
Halite, pale-red and minor pale-reddish-brown, coarse to very coarse crystalline; very minor, moderate-reddish-orange clay blebs and sylvite	1,448.3-1,450.0
Halite, grayish-red, fine to medium crystalline; minor amount of moderate-reddish-orange polyhalite blebs; very sparse sylvite and brown intercrystalline clay; brown clay parting at 1,450.6 feet	1,450.0-1,450.7
Halite, grayish-red and moderate-reddish-brown, fine to medium crystalline; blebs of moderate-reddish-brown polyhalite; minor to moderate-grayish-green intercrystalline clay	1,450.7-1,453.4
Halite, clear to pale-red to light-grayish-red, medium to coarse crystalline; sparse moderate-sized blebs of moderate-reddish-brown to moderate-red polyhalite; very sparse greenish-gray interstitial clay; some sparse, small, leached cavities throughout unit, increasing in size and number with depth and containing dusky-red residual sylvite; weak disseminated mineralization	1,453.4-1,454.7
Halite, clear to pale-red, medium to coarse crystalline, mostly coarse; sparse, small blebs of moderate-reddish-brown polyhalite; clear to dusky-red sylvite in partially leached cavities throughout unit, increasing slightly in size and number with depth; mineralization weak to moderate; disseminated crystals are small to large, as large as 0.12 foot in longest direction	1,454.7-1,456.3

Table 12C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to moderate-red and light-dusky red; moderate amount of moderate-red to moderate-reddish-brown polyhalite; sparse to moderate amount of greenish-gray interstitial clay, increasing with depth; lesser amount (sparse) brown interstitial clay; moderately abundant leached cavities (sylvite?); weak, disseminated mineralization	1,456.3-1,458.2
Halite, moderate-red to grayish-red, medium to coarse crystalline; moderate to abundant amount of intercrystalline grayish-green clay; minor brown clay; abundant leached cavities with residual sylvite; moderate disseminated mineralization; sparse grayish-orange polyhalite blebs	1,458.2-1,463.3
Halite, clear to pale-red, coarse crystalline; sparse moderate-reddish-brown polyhalite blebs; large leached sylvite cavities, weak disseminated mineralization; sparse grayish-green intercrystalline clay	1,463.3-1,466.5
Halite, clear to light-grayish-red, coarse crystalline; sparse blebs of orange-pink polyhalite; sparse grayish-green intercrystalline clay; sparse leached cavities with residual sylvite, disseminated weak mineralization	1,466.5-1,468.3
Halite, moderate-reddish-orange to pale-reddish-brown, coarse crystalline; abundant reddish-orange polyhalite blebs and stringers; sparse grayish-green intercrystalline clay; small leached cavities (sparse at base) with possible sylvite(?)	1,468.8-1,470.1
Halite, light-red to clear to grayish-red, coarse crystalline; abundant moderate-reddish-brown polyhalite blebs; moderate amount of grayish-green intercrystalline clay; more common brown intercrystalline clay, increasing with depth; several clay-free zones	1,470.1-1,475.7
Halite, moderate-reddish-orange to pale-reddish-brown, medium to coarse crystalline; abundant reddish-brown polyhalite blebs; sparse grayish-green intercrystalline clay	1,475.7-1,477.1
Halite, pale-reddish-brown to clear, with sparse light-grayish-red, fine to coarse crystalline; abundant reddish-brown polyhalite blebs, decreasing with depth; moderate amount of brown to grayish-red intercrystalline clay; sparse grayish-green intercrystalline clay	1,477.1-1,481.1
Halite, moderate-orange-pink to pale-red and clear, medium to coarse crystalline; trace of moderate-reddish-orange polyhalite blebs	1,481.1-1,483.2
Halite, clear to light-olive-gray, coarse crystalline; minor stringers of light-olive-gray anhydrite in lower 0.4 foot of unit; minute, leached vugs throughout unit	1,483.2-1,485.3

Table 12C.--Lithologic log--(Continued)

Description	Depth (feet)
Anhydrite, light-gray to light-olive-gray, dense, massive; moderate-orange-pink halite crystals throughout unit	1,485.3-1,491.5
Halite, clear to greenish-gray and pale-red, medium crystalline; trace of moderate-reddish-orange polyhalite blebs	1,491.5-1,491.7
Anhydrite, light-gray, dense, massive; moderate amount of clear halite crystals	1,491.7-1,492.3
Halite, clear to light-olive-gray, medium crystalline; minor blebs of light-olive-gray anhydrite	1,492.3-1,493.3
Anhydrite, light-gray to light-olive-gray; clear to light-olive-gray, fine to medium crystalline halite	1,493.3-1,494.1
Halite, clear to light-olive-gray and greenish-gray, lower 0.7 foot of unit moderate-reddish-orange, medium to coarse crystalline; light-gray anhydrite blebs and stringers throughout unit; prominent anhydrite banding at 1,497.7-1,498.0 feet	1,494.1-1,498.9
Anhydrite, light-olive-gray to medium-gray, dense, laminated; upper half of unit scattered, clear, fine to medium crystalline halite; lower 0.3 foot of unit consists of olive-gray clay	1,498.9-1,506.3
Polyhalite, moderate-reddish-orange to moderate-reddish-brown, massive, dense; moderate to abundant medium-dark-gray clay scattered throughout unit	1,506.3-1,507.9
Halite, clear to pale-orange, medium crystalline; moderate-orange polyhalite scattered throughout unit; thin, gray clay parting at 1,509.2 feet	1,507.9-1,510.6
Halite, clear to moderate-orange, medium crystalline; very little polyhalite	1,510.6-1,513.5
Clay, clear to dark-reddish-brown, medium crystalline, halitic; medium-gray clay; medium-gray clay seam at top	1,513.5-1,514.3
Halite, clear to pale-orange, medium to very coarse crystalline; some disseminated orange polyhalite in top 0.8 foot of unit	1,514.3-1,518.3
Halite, dark-reddish-brown, coarse crystalline; scattered moderate-reddish-orange polyhalite	1,518.3-1,518.9
Halite, clear to pale-orange, medium crystalline	1,518.9-1,519.7
Halite, clear to moderate-reddish-brown, medium crystalline; scattered moderate-orange polyhalite; disseminated langbeinite; moderate disseminated leonite and kainite	1,519.7-1,520.1
Halite, medium- to dark-reddish-brown, medium crystalline; disseminated dark-orange polyhalite; moderate amount of massive sylvite; minor amount of langbeinite; scattered leonite/kainite	1,520.1-1,521.5

Table 120.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-reddish-orange, medium crystalline; zone is very clayey; bluish-gray clay; large 0.1-inch crystals of langbeinite surrounded by leonite/kainite; mineralization disseminated----------	1,521.5-1,523.4
Halite, clear to moderate-reddish-orange, medium crystalline; dark-reddish-orange polyhalite in upper zone; narrow polyhalite bands (less than 0.1 foot thick) at 1,526.7 and 1,527.0 feet----------	1,523.4-1,527.8
Halite, clear to moderate-reddish-orange, medium crystalline, zone clayey; moderate- to dark-reddish-brown clay; scattered, moderate-orange polyhalite; disseminated kainite----------	1,527.8-1,529.0
Halite, clear to moderate-reddish-orange, medium crystalline, with scattered coarse crystals; upper portion of zone has disseminated dark-reddish-brown clay----------	1,529.0-1,530.6
Halite, clear to moderate-reddish-brown, medium to coarse crystalline; disseminated moderate-orange polyhalite in blebs and stringers; disseminated langbeinite crystals surrounded by leonite/kainite------	1,530.6-1,533.5
Halite, clear to moderate-reddish-orange, fine to medium crystalline; approximately half of core (vertically) is massive, clear to moderate-reddish-orange sylvite; minor amount of kieserite----------	1,533.5-1,534.6
Halite, grayish-red, moderate-reddish-brown, and grayish-pink (kieserite), fine to medium crystalline; moderate amount of sylvite and kieserite----------	1,534.6-1,536.8
Halite, moderate-reddish-brown to grayish-red, medium crystalline; minor amount of grayish-green clay; also minor amount of reddish-brown polyhalite and minor sylvite----------	1,536.8-1,539.3
Halite, pale-red to clear, fine to medium crystalline; very minor amount of reddish-brown polyhalite blebs----------	1,539.3-1,541.3
Halite, pale-red to moderate-yellowish-brown, fine to medium crystalline; very minor amount of reddish-brown polyhalite; minor amount of sylvite----------	1,541.3-1,542.4
Halite, grayish-red and pale-red, fine to medium crystalline; moderate amount of dark-reddish-brown sylvite----------	1,542.4-1,543.3
Halite, pale-red, medium crystalline; minor amount of moderate-reddish-orange polyhalite stringers----------	1,543.3-1,546.3
Halite, clear to pale-orange, medium to coarse crystalline----------	1,546.3-1,548.7
Halite, dusky-yellowish-brown to clear, medium to coarse crystalline; moderate amount of grayish-green intercrystalline clay; some sulfate mineralization----------	1,548.7-1,549.3

Table 12C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, grayish-orange to clear, fine crystalline; possible sulfate mineralization	1,549.3-1,550.6
Halite, clear, fine to medium crystalline; unit contains large amount of sulfates	1,550.6-1,551.5
Halite, dark-yellowish-brown and pale-red, fine crystalline, argillaceous; large amount of intercrystalline, greenish-gray clay	1,551.5-1,552.8
Halite, grayish-red and pale-red, medium crystalline, argillaceous: minor amount of moderate-reddish-orange polyhalite; brown clay seams at 1,552.9, 1,553.2, and 1,554.3 feet	1,552.8-1,554.6
Halite, pale-red, fine to medium crystalline; minor amount of brown clay	1,554.6-1,554.8
Halite, light-brown and pale-red, fine to medium crystalline: minor amount of moderate-reddish-orange polyhalite; moderate amount of brown intercrystalline clay; brown clay parting at 1,555.1 feet	1,554.8-1,555.8
Halite, clear to pale-red, fine crystalline; minor amount of reddish-brown polyhalite blebs	1,555.8-1,556.5
Halite, pale-reddish-brown and clear, medium to coarse crystalline; moderate amount of moderate-reddish-brown and moderate-reddish-orange polyhalite stringers and blebs	1,556.5-1,563.6
Halite, pale-red, medium to very coarse crystalline	1,563.6-1,564.6
Halite, pale-red and moderate-reddish-brown, coarse crystalline; minor amount of moderate-reddish-brown polyhalite stringers	1,564.6-1,565.6
Halite, grayish-red, pale-red and clear, medium to coarse crystalline, very argillaceous; large amount of brown clay stringers; brown clay partings at 1,565.6, 1,565.8, 1,566.5, and 1,567.3 feet	1,565.6-1,571.4
Halite, clear to light-olive-gray, coarse crystalline; trace of grayish-red interstitial clay; grayish-red clay parting at base of unit	1,571.4-1,572.1
Halite, clear to light-olive-gray and pale-red, medium crystalline; minor grayish-red interstitial clay throughout unit	1,572.1-1,574.5
Halite, clear to moderate-orange-pink and pale-red, fine to medium crystalline; minor moderate-reddish-orange polyhalite blebs	1,574.5-1,577.4
Halite, clear to light-medium-gray and greenish-gray, fine to coarse crystalline; minor to moderate amount of medium-gray and grayish-red interstitial clay; trace of moderate-orange-pink polyhalite blebs	1,577.4-1,585.3
Halite, clear to greenish-gray, pale-red, fine crystalline; moderate amount of greenish-gray and grayish-red interstitial clay; minor moderate-orange-pink polyhalite blebs	1,585.3-1,587.6

Table 12C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to greenish-gray and grayish-red, fine crystalline, argillaceous; abundant grayish-red and minor grayish-green interstitial clay; grayish-red clay parting at 1,588.4 and at top of unit----	1,587.6-1,589.2
Halite, clear to greenish-gray and grayish-red, medium to coarse crystalline; moderate amount of grayish-red interstitial clay; minor amount of greenish-gray clay; minor moderate-orange-pink polyhalite blebs----------	1,589.2-1,592.4
Halite, clear to moderate-orange-pink, medium to coarse crystalline; minor moderate-orange-pink polyhalite blebs and stringers----------	1,592.4-1,596.3
Polyhalite and halite mixture: moderate-orange-pink to moderate-reddish-brown polyhalite, clear halite; polyhalite is dense, massive; lower 0.4 foot consists of medium-light-gray clay, containing moderate-reddish-orange polyhalite blebs----------	1,596.3-1,597.3
Halite, pale-red to clear and light-greenish-gray, fine to medium crystalline; moderate amount of greenish-gray and pale-red interstitial clay; pale-red clay parting at 1,597.8 feet----------	1,597.3-1,598.4 Total depth

Table 12D.--Mineralogical and chemical analyses of core samples from potash ore zones and mineralized salt beds in drill hole P-12

[oz, ore zone; mm, middle member, lm, lower member; sb, salt bed; tr, trace; Bl, bloedite, Ha, halite; Ka, kainite; Ki, kieserite; La, langbeinite; Le, leonite; Po, polynalite; Sy, sylvite; n.d., not determined; leaders (---), not present. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mineralogy: X-ray diffraction analysis[1]	Chemical analysis (weight percent): Ca	K	Mg	Na	Cl	SO_4	H_2O+	H_2O-	Water insoluble
P-12/1	1,343.68-1,344.97	1.29		>8 Ha; <1 Sy; tr Po	1.0	2.6	0.27	37.0	n.d.	3.4	n.d.	n.d.	n.d.
P-12/2a	1,344.97-1,345.27	.30	sb	>6 Sy; 3 Ha; tr Po	.53	33.5	.46	14.0	50.5	3.0	0.12	0.04	0.20
[2]P-12/[illegible]	1,345.27-1,345.90	.63		4 Sy, Ki; 1 Ha	.04	12.0	10.5	3.8	20.5	43.0	.41	.03	3.1
[2]P-12/2b					.02	11.4	11.6	3.8	17.5	41.0	.18	.05	3.7
[2]P-12/3	1,345.90-1,346.95	1.05		>6 Ha;>1 Ki, Sy; tr Po	.15	10.0	3.4	23.5	47.5	13.0	.47	.05	7.0
[2]P-12/3					.15	10.0	3.4	23.5	47.5	13.0	.34	.11	1.7
[2]P-12/3					.17	10.6	3.4	24.0	45.0	12.5	.16	.20	1.4
[2]P-12/4	1,346.95-1,348.90	1.95		>6 Ha;>1 Ki, Sy; tr Po	.16	10.0	3.4	23.5	47.0	13.0	.35	.04	2.0
[2]P-12/4			10th oz		.42	6.2	4.0	25.0	43.0	15.0	2.1	.21	.68
P-12/5	1,348.90-1,349.91	1.01		>5 Ha;>2 Sy; 1 Ka; tr Po	.92	11.5	2.7	17.5	40.0	11.0	5.2	.94	10.0
P-12/6	1,349.91-1,350.80	.89		>6 Ha;>3 Sy; tr Ka, Po	.42	10.0	.72	26.5	51.0	2.6	1.7	.51	5.9
P-12/7	1,350.80-1,351.95	1.15		>7 Ha; 2 Sy; tr Po	.16	6.7	.88	26.0	51.0	1.3	1.9	1.6	11.5
P-12/8	1,351.95-1,352.94	.99		>8 Ha;<1 Sy; tr Po	.13	1.5	.46	34.0	54.5	.61	1.0	1.1	6.8
P-12/9	1,364.97-1,365.60	.63	sb	>8 Ha;<1 Sy; tr Po	.42	1.8	.11	37.5	n.d.	1.2	n.d.	n.d	n.d.
P-12/10	1,365.60-1,367.00	1.40		7 Ha;>2 Sy; tr Po	.11	11.0	.17	28.5	56.5	.31	.49	.33	3.1
[2]P-12/11	1,367.00-1,367.73	.73	9th oz	>9 Ha;<1 Sy; tr Po	.07	.28	.21	35.5	58.5	.31	1.0	.23	3.9
[2]P-12/11					.07	.24	.21	36.0	58.5	.16	.95	.24	3.9
P-12/12	1,388.85-1,389.60	.75	sb	9 Ha;<1 Sy; tr Po	.36	1.8	.11	37.0	n.d.	.97	n.d.	n.d.	n.d.
P-12/13	1,389.60-1,390.19	.59		>7 Ha;>1 Sy; tr Po	.04	5.6	.49	30.0	52.5	.13	1.3	1.4	8.3
P-12/14	1,390.19-1,390.97	.78		>7 Ha;>2 Sy; tr Po	.48	8.6	.16	31.5	57.5	1.4	.24	.17	1.2
[2]P-12/15	1,390.97-1,392.66	1.69		>8 Ha;<1 Po; 1 Sy	.98	4.3	.25	34.5	58.0	3.1	.35	.02	.11
[2]P-12/15			8th oz		.98	4.4	.25	34.5	57.5	3.0	.36	.01	.11
P-12/16	1,392.66-1,394.29	1.63		8 Ha;>1 Sy; tr Po	.55	5.9	.16	34.5	58.5	1.7	.15	.04	.09
P-12/17	1,394.29-1,394.90	.61		5 Ha;>4 Sy; tr Ki, Po	1.1	20.0	.53	20.0	49.0	4.3	.68	.55	5.8
P-12/18	1,394.90-1,395.94	1.04		>7 Ha; 1 Sy; tr Po	.16	2.8	.76	25.5	48.0	.36	2.1	2.3	17.0
P-12/19	1,395.94-1,396.89	.95		8 Ha; 1 Sy; tr Po	.50	1.2	.40	33.0	55.0	1.4	.82	.91	5.8
P-12/20	1,518.93-1,520.00	1.07	4th oz, mm	>9 Ha; tr La, Po	.17	1.1	.51	36.0	58.5	2.7	.29	.05	.69
[2]P-12/21	1,520.00-1,521.55	1.55		>3 Ha, La, Sy; tr Ka, Le	.08	20.5	6.8	8.5	24.0	40.0	1.1	.03	1.4
[2]P-12/21					.08	20.0	6.6	8.0	24.0	38.5	1.1	.03	1.2
[2]P-12/22	1,521.55-1,522.39	.84	4th oz, lm	>6 Ha;<1 La; 1 Ka;>1 Po; tr Le	1.2	6.8	3.7	18.0	33.5	21.5	3.7	.56	9.9
[2]P-12/22					1.3	6.0	3.9	19.0	32.5	20.0	3.5	.73	10.0
P-12/23	1,522.39-1,523.20	.81		9 Ha;<1 Po; tr Sy	.34	.44	.23	35.0	58.5	1.3	.49	.10	4.6
P-12/24	1,531.78-1,532.65	.87		>8 Ha;<1 Po, Sy	.40	2.0	.21	36.0	59.5	1.4	.19	.01	.38
P-12/25	1,532.65-1,533.50	.85		>8 Ha;<1 Sy; tr La, Po	.21	2.6	.46	35.0	58.0	2.6	.35	.02	.97
[2]P-12/26	1,533.50-1,535.05	1.55		>5 Ha;>4 La;<1 Sy; tr Po	.04	13.0	5.5	17.0	31.5	33.0	.15	.02	.44
[2]P-12/26			3d oz, mm		.04	13.0	5.5	17.0	32.0	34.0	.24	.01	.50
P-12/27	1,535.05-1,535.59	.54		>8 Ha;<1 La; tr Ka, Po	.48	2.6	1.3	34.0	53.0	7.9	.24	.06	1.5
P-12/28	1,535.59-1,537.01	1.42		6 Ha;>3 La; tr Po	.20	9.6	5.4	18.5	33.5	30.5	.12	.04	1.0
P-12/29	1,537.01-1,537.84	.83		>8 Ha;<1 Po; tr La	.76	1.3	.41	35.0	57.0	3.9	.11	.05	.86
P-12/30	1,540.80-1,541.83	1.03		>8 Ha;<1 La, Po, Sy	.64	3.2	.58	35.0	n.d.	4.2	n.d.	n.d.	n.d.
P-12/31	1,541.83-1,542.86	1.03		>7 Ha;<1 Po;>1 La, Sy	.93	7.4	1.4	29.5	51.5	9.7	.14	.05	.32
[2]P-12/32	1,542.86-1,543.68	.82	3d oz, lm	8 Ha;<1 Po, Sy; tr La	1.0	4.3	.75	33.0	54.5	6.0	.22	.24	2.1
[2]P-12/32					1.1	4.3	.75	33.0	54.5	5.8	.20	.09	1.9
P-12/33	1,543.68-1,544.60	.92		>9 Ha;<1 Po; tr Sy	.62	.60	.20	38.0	n.d.	1.9	n.d.	n.d.	n.d.
P-12/34	1,549.79-1,550.65	.86		9 Ha;<1 La; tr Po	.42	2.0	1.1	35.0	n.d.	6.3	n.d.	n.d.	n.d.
[2]P-12/35a	1,550.65-1,551.29	.64	sb	>7 La;>2 Ha	.04	16.5	9.4	7.0	15.0	55.5	.23	.08	.56
[2]P-12/35a					.04	16.5	9.5	7.2	15.0	55.5	.21	.12	.52
[2]P-12/35a					.05	16.0	[illegible]	7.8	14.5	55.0	.05	.12	.36
P-12/35b	1,551.29-1,551.61	.32	2d oz	2 La, Le, Ka;>2 Bl;>1 Ha	.04	13.0	8.0	8.2	15.0	46.5	8.8	2.2	.50
P-12/36	1,551.61-1,552.87	1.26		9 Ha; tr La, Po	.16	.32	.37	36.0	56.0	1.7	.55	.65	6.2

[1]Estimate of amount reported on a scale of 0-10.
[2]Replicate analyses.

Table 12E.--Calculated mode (mineral content) and potash distribution by mineral in core samples from potash ore zones and mineralized salt beds in drill hole P-12

[oz, ore zone; mm, middle member; lm, lower member; sb, salt bed; Bl, bloedite; Ha, halite; Ka, kainite; Ki, kieserite; La, langbeinite; Le, leonite; Po, polyhalite; Sy, sylvite, Insol., clay and silt; n.d., not determined; leaders (---), not present. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mode (weight percent mineral)									K_2O distribution by minerals					
				Sy	La	Ka	Le	Ki	Bl	Ha	Po	Insol.	Sy	La	Ka	Le	Po	Total
P-12/1	1,343.68-1,344.97	1.29	sb	3.4	---	---	---	---	---	94.1	6.4	n.d.	2.1	---	---	---	1.0	3.1
P-12/2a	1,344.97-1,345.27	.30	sb	62.7	---	---	---	---	---	34.1	4.7	0.2	39.6	---	---	---	.7	40.3
[1]P-12/2b	1,345.27-1,345.90	.63	sb	22.8	---	---	---	61.7	---	9.7	.3	3.1	14.4	---	---	---	<.1	14.4
[1]P-12/2b			sb	21.7	---	---	---	58.9	---	9.7	.1	3.7	13.7	---	---	---	<.1	13.7
[1]P-12/3	1,345.90-1,346.95	1.05	10th oz	18.8	---	---	---	17.7	---	59.7	1.1	7.0	11.9	---	---	---	.2	12.1
[1]P-12/3			10th oz	18.8	---	---	---	17.7	---	59.7	1.1	1.7	11.9	---	---	---	.2	12.1
[1]P-12/3			10th oz	19.9	---	---	---	16.8	---	61.0	1.3	1.4	12.6	---	---	---	.2	12.8
[1]P-12/4	1,346.95-1,348.90	1.95	10th oz	18.8	---	---	---	17.6	---	59.7	1.2	2.0	11.9	---	---	---	.2	12.1
[1]P-12/4			10th oz	11.6	---	---	---	18.7	---	62.2	3.1	.7	7.0	---	---	---	.5	7.5
P-12/5	1,348.90-1,349.91	1.01	10th oz	15.1	---	17.1	---	---	---	50.1	6.9	10.0	9.6	---	3.2	---	1.1	13.9
P-12/6	1,349.91-1,350.80	.89	10th oz	17.8	---	1.5	---	---	---	69.7	3.1	5.9	11.3	---	.3	---	.5	12.1
P-12/7	1,350.80-1,351.95	1.15	10th oz	12.3	---	---	---	---	---	74.4	2.0	11.5	7.8	---	---	---	.3	8.1
P-12/8	1,351.95-1,352.94	.99	10th oz	2.6	---	---	---	---	---	87.8	1.0	6.8	1.7	---	---	---	.1	1.8
P-12/9	1,364.97-1,365.60	.63	sb	3.0	---	---	---	---	---	95.3	1.9	n.d.	1.9	---	---	---	.3	2.2
P-12/10	1,365.60-1,367.00	1.40	9th oz	20.9	---	---	---	---	---	76.9	.5	3.1	13.2	---	---	---	<.1	13.2
[1]P-12/11	1,367.00-1,367.73	.73	9th oz	.3	---	---	---	---	---	96.1	.5	4.0	.2	---	---	---	<.1	.2
[1]P-12/11			9th oz	.4	---	---	---	---	---	96.1	.5	3.9	.3	---	---	---	<.1	.3
P-12/12	1,388.85-1,389.60	.75	sb	2.8	---	---	---	---	---	94.1	2.7	---	1.7	---	---	---	.4	---
P-12/13	1,389.60-1,390.19	.59	8th oz	10.6	---	---	---	---	---	78.2	.2	8.3	6.7	---	---	---	<.1	6.7
P-12/14	1,390.19-1,390.97	.78	8th oz	15.9	---	---	---	---	---	82.3	2.2	1.2	10.0	---	---	---	.3	10.3
[1]P-12/15	1,390.97-1,392.66	1.69	8th oz	7.0	---	---	---	---	---	90.1	4.8	.1	4.4	---	---	---	.7	5.1
[1]P-12/15			8th oz	7.2	---	---	---	---	---	89.1	4.7	.1	4.4	---	---	---	.7	5.1
P-12/16	1,392.66-1,394.29	1.63	8th oz	10.6	---	---	---	---	---	88.1	2.6	<.1	6.7	---	---	---	.4	7.1
P-12/17	1,394.29-1,394.90	.61	8th oz	37.0	---	---	---	4.1	---	50.8	4.6	5.8	23.4	---	---	---	.7	24.1
P-12/18	1,394.90-1,395.94	1.04	8th oz	5.2	---	---	---	---	---	75.0	.5	17.0	3.3	---	---	---	<.1	3.3
P-12/19	1,395.94-1,396.89	.95	8th oz	1.8	---	---	---	---	---	89.3	2.2	5.8	1.1	---	---	---	.3	1.4
P-12/20	1,518.93-1,520.00	1.07	4th oz, mm	---	5.0	---	---	---	---	91.5	1.3	.7	---	1.1	---	---	.2	1.3
[1]P-12/21	1,520.00-1,521.55	1.55	4th oz, lm	18.2	55.9	.3	0.4	---	---	24.9	.6	1.4	11.5	12.7	.3	0.1	<.1	24.7
[1]P-12/21			4th oz, lm	18.0	53.4	1.7	.7	---	---	25.0	.6	1.2	11.4	12.1	.3	.2	<.1	24.1
[1]P-12/22	1,521.55-1,522.39	.84	4th oz, lm	---	8.2	22.6	2.5	---	---	45.8	9.0	9.9	---	1.9	4.3	.6	1.4	8.2
[1]P-12/22			4th oz, lm	---	9.3	15.0	2.9	---	---	50.0	9.8	10.0	---	2.1	2.8	.7	1.5	7.1
P-12/23	1,522.39-1,523.20	.81	4th oz, lm	.3	---	---	---	---	---	96.2	2.1	4.6	.2	---	---	---	.3	.5
P-12/24	1,531.78-1,532.65	.87	3d oz, mm	3.3	---	---	---	---	---	95.5	2.2	.4	2.1	---	---	---	.3	2.4
P-12/25	1,532.65-1,533.50	.85	3d oz, mm	3.7	2.3	---	---	---	---	92.7	1.6	1.0	2.4	.5	---	---	.2	3.1
[1]P-12/26	1,533.50-1,535.05	1.55	3d oz, mm	7.7	47.2	---	---	---	---	43.2	.3	.4	4.9	10.7	---	---	<.1	15.6
[1]P-12/26			3d oz, mm	7.2	48.7	---	---	---	---	47.1	.3	.5	4.6	11.0	---	---	<.1	15.6
P-12/27	1,535.05-1,535.59	.54	3d oz, mm	---	11.3	---	---	---	---	86.4	3.6	1.5	---	2.6	---	---	.6	3.2
P-12/28	1,535.59-1,537.01	1.42	3d oz, mm	---	49.9	---	---	---	---	47.0	1.5	1.0	---	11.3	---	---	.2	11.5
P-12/29	1,537.01-1,537.84	.83	3d oz, mm	---	2.9	---	---	---	---	89.0	5.7	.9	---	.7	---	---	.9	1.6
P-12/30	1,540.80-1,541.83	1.03	3d oz, lm	4.3	1.6	---	---	---	---	89.0	4.8	n.d.	2.7	.4	---	---	.7	3.8
P-12/31	1,541.83-1,542.86	1.03	3d oz, lm	9.7	7.6	---	---	---	---	75.0	7.0	.3	6.1	1.7	---	---	1.1	8.9
[1]P-12/32	1,542.86-1,543.68	.82	3d oz, lm	5.7	1.7	---	---	---	---	85.3	7.5	2.1	3.6	.4	---	---	1.2	5.2
[1]P-12/32			3d oz, lm	5.9	.8	---	---	---	---	85.2	8.3	1.9	3.7	.2	---	---	1.3	5.2
P-12/33	1,543.68-1,544.60	.92	3d oz, lm	.4	---	---	---	---	---	96.6	3.0	n.d.	.2	---	---	---	.5	.7
P-12/34	1,549.79-1,550.65	.86	sb	---	8.5	---	---	---	---	90.0	3.1	n.d.	---	1.9	---	---	.5	2.4
[1]P-12/35a	1,550.65-1,551.29	.64	sb	---	87.4	---	---	---	---	17.8	.3	.6	---	19.8	---	---	<.1	19.8
[1]P-12/35a			sb	---	87.4	---	---	---	---	18.3	.3	.5	---	19.8	---	---	<.1	19.8
[1]P-12/35a			sb	---	84.7	---	---	---	---	19.8	.4	.4	---	19.3	---	---	<.1	19.3
P-12/35b	1,551.29-1,551.61	.32	2d oz	---	38.6	20.4	11.6	---	9.6	19.9	.3	.5	---	8.8	3.9	3.0	<.1	15.7
P-12/36	1,551.61-1,552.87	1.26	2d oz	---	.9	---	---	---	---	92.3	1.2	6.2	---	.2	---	---	.2	.4

[1]Replicate analyses.

TABLES 13A-13G

Basic data from drill hole P-13,
Waste Isolation Pilot Plant area, Eddy County, New Mexico

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Table 13A.--Abridged drill-hole history

LOCATION: Sec. 18, T. 22 S., R. 31 E.
38 m (125 ft) from north line
35 m (116 ft) from west line

ALTITUDE (LAND SURFACE): 1,020 m (3,345.4 ft). Datum for depth measurements in drilling and logging operations.

LITHOLOGIC LOG PREPARED BY: P. C. Aguilar, R. J. Cheeseman, J. D. Kibler, M. N. Mitchell, B. R. Orr, and R. W. Spengler, September 20-23, 1976.

DRILLING CONTRACTOR: Boyles Bros. Drilling Co.

DRILLING RECORD: Commenced drilling on September 17, and completed on September 23, 1976, at 480 m (1,576 ft) below land surface.

Drilled with air foam to casing point at 239 m (785 ft) below land surface. Hit water at 192 m (630 ft).

Recovered all casing, and plugged with cement.

REMARKS: Top of salt in Salado Formation at 221 m (725 ft) below land surface.

Table 13B.--Stratigraphic summary

Rock unit	Depth interval[1] feet	meters
Holocene deposits	0-12	0-4
Pleistocene rocks:		
Gatuna Formation	12-36	4-12
Permian rocks:		
Dewey Lake Red Beds	36-427	12-130
Rustler Formation	427-721	130-220
Magenta Dolomite Member	490-514	149-157
Culebra Dolomite Member	604-627	184-191
Salado Formation	721-1,573	220-479
Upper member	721-1,201	220-366
McNutt potash zone	1,201-1,547	366-472
Vaca Triste Sandstone Member[2]	1,201-1,208	366-368
11th ore zone	1,252-1,255	382-383
Marker bed 117	1,264-1,265	385-386
Marker bed 118	1,287-1,289	392-393
Marker bed 119	1,309-1,311	399-400
10th ore zone	1,317-1,323	401-403
Marker bed 120	1,330-1,331	405-406
9th ore zone	1,336-1,340	407-408
Marker bed 121	1,344-1,346	410-410
Marker bed 122	1,355-1,356	413-413
8th ore zone	1,359-1,368	414-417
Union anhydrite[3]	1,377-1,382	420-421
7th ore zone	1,395-1,400	425-427
6th ore zone	1,407-1,410	429-430
5th ore zone	1,413-1,423	431-434
Marker bed 123	1,447-1,453	441-443
Marker bed 124	1,462-1,471	446-448
4th ore zone	1,474-1,483	449-452
3d ore zone	1,491-1,501	454-458
2d ore zone	1,506-1,510	459-460
1st ore zone	1,525-1,533	465-467
Marker bed 126	1,547-1,548	472-472
Lower member	1,548-1,573	472-479
Marker bed 127	1,572-1,573	479-479
Maximum depth recorded	1,573	479

[1]Depth interval recorded from geophysical logs.
[2]Of Adams, 1944.
[3]Informal unit of Salado Formation.

Table 13C.--Lithologic log

Description	Depth (feet)	
Sandstone, moderate-reddish-brown, very fine grained, subrounded calcareous cement, frosted grains, poorly sorted	0.0-	25.0
Sandstone, moderate-reddish-brown, very fine grained, subrounded, poorly sorted; 10 percent yellowish-gray, slightly calcareous siltstone	25.0-	30.0
Siltstone, dark-reddish-brown and yellowish-gray	30.0-	50.0
Sandstone, dark-reddish-brown, very fine grained, poorly sorted, subrounded	50.0-	55.0
Sandstone, dark-reddish-brown, very fine grained, 50 percent; 50 percent dark-reddish-brown siltstone	55.0-	65.0
Sandstone, dark-reddish-brown, very fine grained, poorly sorted, 50 percent; 50 percent dark-reddish-brown siltstone, with yellowish-gray reduction spots	65.0-	75.0
Siltstone, dark-reddish-brown, with yellowish-gray reduction spots	75.0-	80.0
Siltstone, dark-reddish-brown	80.0-	100.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots	100.0-	150.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots	150.0-	200.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots	200.0-	250.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots	250.0-	300.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots; selenite, micaceous	300.0-	350.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots; selenite, micaceous	350.0-	400.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots; selenite, micaceous	400.0-	425.0
Siltstone, reddish-brown, with greenish-gray reduction spots; selenite, micaceous; 10 percent light-gray, fine crystalline, dense anhydrite	425.0-	430.0
Anhydrite, brownish-gray, dense, fine crystalline	430.0-	450.0
Anhydrite, brownish-gray, fine crystalline; 20 percent dark reddish-brown, siltstone with greenish-gray reduction spots; selenite gypsum	450.0-	455.0
Siltstone, dark-reddish-brown, greenish-gray reduction spots, 50 percent; selenite; 50 percent brownish-gray anhydrite	455.0-	465.0
Anhydrite, brownish-gray to dark-brown, fine crystalline, 70 percent; 30 percent dark-reddish-brown, siltstone with greenish-gray reduction spots	465.0-	470.0
Anhydrite, brownish-gray to dark-brown, fine crystalline	470.0-	485.0
Anhydrite-gypsum, light-brownish-gray to white, 80 percent; 20 percent greenish-gray, fine crystalline dolomite	485.0-	490.0

Table 13C.--Lithologic log--(Continued)

Description	Depth (feet)
Dolomite, greenish-gray, fine crystalline	490.0- 500.0
Dolomite, greenish-gray, fine crystalline	500.0- 510.0
Same as above, 90 percent; 10 percent clear to light-brownish-gray anhydrite and gypsum	510.0- 515.0
Anhydrite and gypsum, clear to light-brownish-gray	515.0- 530.0
Anhydrite, light-brownish-gray, fine crystalline	530.0- 545.0
Same as above; increased hydration with depth	545.0- 600.0
Anhydrite; minor, reddish-brown siltstone	600.0- 605.0
Anhydrite; minor amounts of dolomite	605.0- 610.0
Dolomite, light-greenish-gray, fine crystalline	610.0- 630.0
Same as above	630.0- 635.0
Anhydrite, light-brownish-gray, fine crystalline, dense	635.0- 650.0
Anhydrite; dark-gray mudstone	650.0- 660.0
Same as above, first appearance of reddish-brown siltstone, with greenish-gray reduction spots	660.0- 665.0
Siltstone and mudstone, dark-gray	665.0- 670.0
Siltstone gray and reddish-brown; mudstone	670.0- 680.0
Siltstone, gray	680.0- 715.0
Same as above; some red-brown siltstone	715.0- 735.0
Siltstone, gray, with minor reddish-brown siltstone	735.0- 740.0
Siltstone, gray	740.0- 745.0
Siltstone, gray, with minor reddish-brown siltstone	745.0- 755.0
Siltstone, dark-orange-red	755.0- 765.0
Halite, brown, clayey; minor reddish-brown siltstone	765.0- 775.0
Same as above; some gray clay	775.0- 785.0
Halite, white; very minor polyhalite	785.0- 795.0
Halite; reddish-brown clay	795.0- 800.0
Halite, grayish-orange-pink	800.0- 815.0
Halite, light-brown	815.0- 835.0
Halite, light-orange-brown; minor polyha	835.0- 850.0
Halite, light-brown; increased polyhalite	850.0- 865.0
Halite, light-brown; less polyhalite than above	865.0- 875.0
Halite, white; very minor polyhalite	875.0- 885.0
Halite, grayish-orange-pink	885.0- 890.0
Halite, light-brown	890.0- 895.0
Halite, light-grayish-brown	895.0- 900.0
Halite, white to salmon; contains 2-5 percent dark-red polyhalite	900.0- 905.0

Table 13C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, white to light-salmon-pink; contains less than 2 percent dark-red-brown polyhalite blebs	905.0- 910.0
Halite, grayish-white, clayey; sparse polyhalite blebs and dark-red-brown siltstone, possibly cavings from above	910.0- 920.0
Same as above; lacking siltstone	920.0- 925.0
Halite, white to pink; increasing polyhalite, ±1 percent	925.0- 930.0
Halite, white to pink; numerous pink-salmon polyhalite chips	930.0- 940.0
Halite, clear to white	940.0- 945.0
Halite, clear to white; sparse orange and dark-red polyhalite	945.0- 950.0
Halite, clear to salmon; ±1 percent polyhalite	950.0- 955.0
Same as above; occasional dark-reddish-brown siltstone	955.0- 960.0
Halite, gray to white, clayey; sparse orange polyhalite	960.0- 980.0
Halite, gray to white, some orange; increasing polyhalite (±1 percent) and red siltstone chips, possibly cavings	980.0- 985.0
Halite, white to clear, some salmon; 1-2 percent polyhalite	985.0- 990.0
Halite, clear; less than 2 percent polyhalite	990.0- 995.0
Halite, clear; 1 percent polyhalite	995.0-1,000.0
Halite, clear; less than 2 percent pink polyhalite	1,000.0-1,015.0
Same as above; increasing polyhalite (1-2 percent)	1,015.0-1,020.0
Halite, clear to pink; ±1 percent polyhalite	1,020.0-1,040.0
Same as above; polyhalite increasing	1,04[illegible].0-[illegible]5.0
Halite, white to salmon; ± 2 percent polyhalite	1,045.0-1,050.0
Same as above; less polyhalite	1,050.0-1,060.0
Halite, clear; less than 1 percent polyhalite	1,060.0-1,075.0
Same as above; polyhalite increasing	1,075.0-1,080.0
Halite, clear to white; 2-5 percent orange polyhalite	1,080.0-1,085.0
Same as above; dark-reddish-brown siltstone and sandstone, possibly cavings	1,085.0-1,090.0
Halite, clear to white; very minor polyhalite	1,090.0-1,095.0
Same as above; occasional gray, granular gypsum	1,095.0-1,100.0
Halite, clear; clear selenite; dark-reddish-brown siltstone; sparse (±1 percent) polyhalite	1,100.0-1,105.0
Halite, clear; ±1-2 percent polyhalite	1,105.0-1,110.0
Same as above; ±2-3 percent polyhalite	1,110.0-1,115.0
Halite, clear to salmon; ±2-5 percent polyhalite	1,115.0-1,120.0
Same as above; 2-3 percent polyhalite	1,120.0-1,130.0
Halite, clear to salmon; ±5 percent polyhalite	1,130.0-1,135.0
Same as above; ±2-5 percent polyhalite	1,135.0-1,140.0

Table 13C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to pinkish-white, less than 2 percent polyhalite	1,140.0-1,210.0
No sample	1,210.0-1,220.0
Halite, grayish-red to moderate-reddish-orange, medium to coarse crystalline, clayey; dark-brown polyhalite; clay partings at 1,221.2 and 1,221.5 feet	1,220.0-1,222.3
Halite, moderate-reddish-orange to light-red, medium to coarse crystalline, polyhalitic	1,222.3-1,232.3
Halite, pale-red to grayish-red to moderate-brown, medium to coarse crystalline, clayey, polyhalitic; brown clay partings at 1,232.5, 1,233.1 and 1,233.9 feet	1,232.3-1,234.2
Halite, mottled moderate-reddish-orange and moderate-red, coarse crystalline, polyhalitic; very minor brown clay; brown clay stringers at 1,234.7 and 1,235.5 feet	1,234.2-1,236.7
Halite, moderate-reddish-orange, coarse crystalline, polyhalitic	1,236.7-1,240.0
Halite, pale-red, medium to coarse crystalline, polyhalitic; very minor clay; brown clay partings at 1,240.0 and 1,240.7 feet; greenish-gray clay parting at 1,240.3 feet	1,240.0-1,240.7
Halite, moderate-reddish-orange, medium to coarse crystalline, polyhalitic	1,240.7-1,243.2
Halite, moderate-brown to pale red, medium to coarse crystalline, very clayey	1,243.2-1,244.7
Halite, moderate-reddish-brown, medium crystalline; abundant brown clay; stringer of red polyhalite	1,244.7-1,245.2
Halite, moderate-reddish-brown, coarse crystalline; contains numerous blebs of orange polyhalite; near base are leached indentions approximately 0.03 foot across; contains small amounts of green clay	1,245.2-1,247.4
Halite, light- to moderate-orange, medium crystalline; contains small amount of polyhalite blebs; leached vugs as large as 0.1 foot across; abundant amount of grayish-green clay at 1,251.3 feet; minor disseminated sylvite throughout unit	1,247.4-1,254.7
Halite, white to moderate-reddish-brown, coarse crystalline; contains abundant green to brown clay; blebs of polyhalite	1,254.7-1,257.5
Halite, light- to medium-reddish-orange, medium to coarse crystalline; numerous blebs of red polyhalite; contains small amount of green clay	1,257.5-1,260.5
Halite, moderate-reddish-orange to reddish-brown, medium to coarse crystalline; string of orange polyhalite; abundant green clay at top of interval; occasional cubic-shaped vugs	1,260.5-1,263.8

Table 13C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate reddish-orange, medium to coarse crystalline, polyhalitic	1,263.8-1,265.0
Polyhalite, moderate-reddish-brown, dense; contains occasional grayish-green clay; abundant grayish-green clay at the base	1,265.0-1,266.4
Halite, light- to moderate-orange, medium to coarse crystalline; very little clay, two clay-rich bands at 1,273.2 and 1,274.4 feet; leached vugs as large as 0.02 foot across; contains residual sylvite	1,266.4-1,274.4
Halite, pale-reddish-brown, medium to coarse crystalline; contains abundant gray clay; some green clay at top; sparse polyhalite patches	1,274.4-1,277.7
Halite, light-gray to light-orange, medium to coarse crystalline; occasional aggregates of polyhalite; small amount of grayish-green clay	1,277.7-1,280.6
Halite, clear to light-grayish-orange, coarse crystalline; some grayish-green clay, especially at center	1,280.6-1,281.6
Halite, moderate-reddish-brown, medium to coarse crystalline; numerous orange polyhalite blebs	1,281.6-1,282.4
Halite, moderate-reddish-brown; contains occasional blebs and aggregates of polyhalite and abundant grayish-green clay in slightly recessed leached areas; sparse sylvite as residue in leached cubic-shaped vug near base; minor langbeinite	1,282.4-1,283.8
Halite, pale-red to moderate-reddish-brown, medium to coarse crystalline; moderate amount of sylvite; stringers of red polyhalite	1,283.8-1,286.0
Halite, as above; no sylvite	1,286.0-1,286.9
Halite, pale-red, moderate-reddish-brown, medium to coarse crystalline; minor amount of sylvite; polyhalite band at 1,287.0 feet	1,286.9-1,287.5
Polyhalite and halite: polyhalite is pale red, dense; halite is pale red to moderate-reddish-brown, fine crystalline; banded	1,287.5-1,289.2
Polyhalite, pale-red, dense; minor bands of reddish-brown halite intermixed with polyhalite; minor amount of langbeinite, kainite/leonite; minor amounts of sylvite; pale-olive clay seam at base	1,289.2-1,290.7
Halite, moderate-reddish-brown, pale-red, fine to coarse crystalline; polyhalite band at 1,292.9 feet (0.2 inch thick), lower 0.7 foot has gray anhydrite with reddish-brown halite; sylvite mineralization at 1,290.7 to 1,291.5 feet	1,290.7-1,295.1

Table 13C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to pale-red and moderate-reddish-orange, medium to coarse crystalline; sparse, very light gray interstitial clay; minor sylvite mineralization from 1,295.1 to 1,296.1 feet and lower 1.5 feet; moderate-reddish-orange disseminated polyhalite	1,295.1-1,299.0
Halite, olive-gray and dark-reddish-brown, fine to medium crystalline, clayey; ±5 percent interstitial clay; olive-gray clay parting at 1,299.1 feet; dark-reddish-brown clay parting at 1,299.9 and 1,300.2 feet; dark-reddish-brown clay seam 0.1 foot thick at base of unit	1,299.0-1,300.7
Halite, clear to moderate-reddish-brown, mottled, medium to coarse crystalline; minor moderate-reddish-orange polyhalite blebs; dark-reddish-brown clay parting at 1,301.5 feet	1,300.7-1,303.4
Halite, clear to moderate-reddish-orange and pale-red, medium to coarse crystalline; scattered moderate-reddish-orange polyhalite blebs, stringers, and bands; 0.4 foot pale-red polyhalite band at 1,308.7 feet	1,303.4-1,311.1
Polyhalite, moderate-reddish-orange, massive; lower 0.3 foot consists of medium-dark-gray clay with halite and polyhalite blebs; medium-dark-gray parting at 1,311.7, 1,311.8, 1,312.0, and 1,312.2 feet; 0.3 foot core loss at 1,312.6 feet	1,311.1-1,312.6
Halite, clear to moderate-reddish-brown, medium to coarse crystalline; moderate-reddish-brown polyhalite blebs and stringers scattered throughout unit; minor dark-gray parting at 1,313.6 feet, sparse sylvite and sulfate mineralization	1,312.6-1,317.5
Halite, clear to moderate-reddish-orange, fine to medium crystalline; heavy mineralization of sylvite and langbeinite in upper 2.5 feet; sylvite is clear to moderate reddish brown; minor core of sulfates at 1,320.0 feet; green clay disseminated from 1,318.4 to 1,318.8 feet	1,317.5-1,321.6
Halite, clear to moderate-reddish-brown, fine to medium crystalline; interstitial medium-light-gray and pale-brown clay; contains clear to moderate-reddish-brown sylvite blebs heavily disseminated throughout; medium-light-gray clay parting at 1,321.6 feet, some moderate-reddish-brown polyhalite blebs and stringers	1,321.6-1,325.2
Halite, clear to grayish-red, medium to coarse crystalline; minor moderate-reddish-orange polyhalite blebs; minor clear to moderate-reddish-brown sylvite throughout unit; sparse sulfate mineralization; 0.15 feet thick moderate-orange-pink polyhalite band at 1,330.9 feet	1,325.2-1,331.4

Table 13C.--Lithologic log--(Continued)

Description	Depth (feet)
Polyhalite, moderate-reddish-orange, massive; less than 0.1 foot thick, medium-dark-gray clay seam at base of unit----------	1,331.4-1,331.8
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; less than 3 percent medium-dark-gray interstitial clay in upper 0.3 foot; sparse moderate-red-orange polyhalite blebs; scattered, clear to moderate-reddish-brown sylvite blebs----------	1,331.8-1,336.3
Halite, clear to pale-red, mottled, fine to coarse crystalline; dark-greenish-gray and grayish-red interstitial clay; heavy sylvite in upper 1.0 foot; dark-greenish-gray clay parting at 1,337.3 feet and base; grayish-red clay partings at 1,338.6 and 1,339.6 feet; from 1,337.3 to 1,338.6 feet sylvite concentration decreases to sparse-----	1,336.3-1,342.7
Halite, clear to moderate-reddish-brown, medium to coarse crystalline; minor disseminated sylvite----------	1,342.7-1,346.8
Anhydrite, very light gray; moderate-reddish-brown polyhalite bands; at base is 0.3 foot of dark-greenish-gray clay----------	1,346.8-1,348.5
Halite, clear to grayish-red, medium to coarse crystalline; minor pale-green interstitial clay; minor sylvite throughout unit----------	1,348.5-1,355.5
Polyhalite, pale-red, massive; scattered moderate-orange-pink halite----	1,355.5-1,356.6
Halite, clear to moderate-orange to reddish-orange, fine to medium crystalline; disseminated grayish-orange-pink polyhalite blebs; minor disseminated sylvite----------	1,356.6-1,358.0
Halite, clear to pale-reddish-brown, medium to coarse crystalline; minor orange-pink interstitial clay at 1,359.9 to 1,362.0 feet; moderate sylvite disseminated throughout; grayish-brown clay partings at 1,358.1 and 1,358.3 feet; dark-greenish partings at 1,360.6 and 1,360.9 feet----------	1,358.0-1,365.7
Halite, medium-gray and moderate-reddish-brown, fine crystalline, clayey; pale-red and medium-gray interstitial clay; moderate disseminated sylvite; medium-gray parting at 1,366.4 feet; pale-red at 1,366.9 feet; medium gray at 1,367.1; grayish-orange-pink polyhalite disseminated in lower 2 feet of unit----------	1,365.7-1,368.1
Halite, clear to pale-red and moderate-reddish-brown, fine to medium crystalline, clayey; moderate-orange-pink disseminated polyhalite blebs; 2 percent grayish-red and moderate-reddish-brown interstitial clay; grayish-red clay partings at 1,368.4, 1,368.7, 1,369.4, 1,369.7, 13,69.9, 1,370.1, and 1,371.7 feet----------	1,368.1-1,371.7

Table 13C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to moderate-reddish-orange, fine to medium crystalline; greenish-gray interstitial clay; moderate-reddish-orange disseminated polyhalite blebs; grayish-green clay parting at 1,372.2 feet; grayish-red parting at 1,372.8 feet; heavy concentration of polyhalite in lower 0.8 foot of unit; minor to moderate dissemination of sylvite-	1,371.7-1,377.5
Anhydrite, medium-light-gray, massive; fine, moderate-reddish-orange halite disseminated in upper 0.5 foot of unit and at 1,381.5 to 1,381.7 feet----------	1,377.5-1,382.7
Halite, clear to moderate-reddish-brown and pale-red, medium to coarse crystalline; disseminated moderate-orange-pink polyhalite; sparse greenish-gray interstitial clay; grayish-green clay parting at 1,384.9 and 1,385.5 feet----------	1,382.7-1,392.7
Halite, clear to moderate-reddish-orange; fine to medium crystalline; greenish-gray interstitial clay; minor disseminated grayish-orange-pink polyhalite blebs and stringers concentrated in upper 0.5 foot and lower 0.8 foot----------	1,392.7-1,395.9
Halite, moderate-reddish-brown, medium to coarse crystalline; numerous blebs of orange polyhalite; small amount of grayish-green clay at top; grayish-green partings at base----------	1,395.9-1,397.0
Halite, medium-gray to pale-reddish-brown, coarse crystalline; abundant grayish-green and brown clay; occasional blebs of orange polyhalite; parting at 1,397.2 feet----------	1,397.0-1,398.4
Halite, moderate-reddish-orange, medium to coarse crystalline; very little grayish-green clay; abundant, small, orange polyhalite---------	1,398.4-1,398.9
Halite, light-gray to moderate-reddish-orange, medium to coarse crystalline; moderate amount grayish-green clay; occasional stringers and bands of orange polyhalite; four areas rich in brown clay at 1,399.9, 1,400.8, 1,401.5, and 1,402.7 feet----------	1,398.9-1,403.9
Halite, clear to moderate-orange-pink, coarse crystalline; very little grayish-green clay; sparse orange polyhalite blebs; several small, irregular leached vugs at base----------	1,403.9-1,405.0
Halite, medium-gray to pale-red, medium to coarse crystalline; brown clay stringers; occasional orange polyhalite blebs; small amount of grayish-green clay at base----------	1,405.0-1,405.9
Halite, clear to white; some brown clay at base----------	1,405.9-1,406.3
Halite, light-gray to grayish-red, medium to coarse crystalline; small amount of orange polyhalite and brown clay----------	1,406.3-1,407.2

Table 13C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-orange-pink to moderate-reddish-orange, medium to coarse crystalline; blebs and stringers of polyhalite in places	1,407.2-1,409.0
Halite, very light gray to pale-red, medium to coarse crystalline; contains abundant grayish-green clay	1,409.0-1,409.6
Halite, moderate-pink, coarse crystalline; contains small amount of polyhalite; some leached vugs at base	1,409.6-1,411.0
Halite, grayish-red, coarse crystalline; abundant brown clay; blebs of reddish-orange polyhalite; some large leach areas enclose langbeinite crystal; leached areas may be ghosts of kainite/leonite	1,411.0-1,412.0
Halite, light-red to grayish-red, coarse crystalline; blebs of polyhalite; moderate amount brown clay, decreasing toward base	1,412.0-1,413.8
Halite, light-red to light-gray, coarse crystalline; abundant polyhalite blebs; some grayish-green clay; some small leached areas	1,413.8-1,414.9
Halite, light-gray, medium to coarse crystalline; some grayish-green clay	1,414.9-1,415.3
Halite, pale-reddish-brown to moderate-reddish-brown, coarse crystalline; abundant reddish-orange polyhalite in blebs and stringers; grayish-green clay; clay band at 1,415.8 feet	1,415.3-1,416.5
Halite, moderate-reddish-orange to medium-gray, medium to coarse crystalline; abundant brown and grayish-green clay; very little polyhalite; some leached vugs	1,416.5-1,418.0
Halite, light-gray, coarse crystalline; polyhalite blebs in places; some brown clay	1,418.0-1,418.9
Halite, moderate-orange-pink, medium to coarse crystalline; sparse greenish-gray clay; occasional orange polyhalite blebs and stringers	1,418.9-1,422.2
Halite, moderate-orange-pink, coarse crystalline; small amount grayish-green clay; few polyhalite blebs; leached vugs, residual sylvite	1,422.2-1,423.1
Halite, gray- to grayish-green, medium to coarse crystalline; abundant grayish-green clay; some polyhalite blebs and stringers; white coating of anhydrite	1,423.1-1,424.7
Halite, grayish-orange-pink, medium to coarse crystalline; small amount of polyhalite and brown clay	1,424.7-1,425.1
Halite, grayish-red, medium to coarse crystalline; abundant grayish-green and brown clay; some small leached vugs, some angular	1,425.1-1,429.0
Halite, grayish-green to grayish-orange, medium to coarse crystalline; abundant grayish-green clay; occasional polyhalite stringers; some brown clay	1,429.0-1,430.1

Table 13C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, light-red, coarse crystalline; abundant polyhalite stringers and blebs; small amount grayish-green clay	1,430.1-1,431.4
Halite, light-red to moderate-red, medium to coarse crystalline; rich in polyhalite from small blebs and stringers to aggregates 0.1 foot in diameter; small amount grayish-green clay; richer in polyhalite toward base	1,431.4-1,435.8
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; abundant polyhalite stringers and bands	1,435.8-1,438.5
Halite, moderate-reddish-orange to grayish-green, medium to coarse crystalline; brown partings at 1,438.5 feet, green at 1,438.9 feet; abundant grayish-green and brown clay; orange polyhalite stringers and blebs	1,438.5-1,441.4
Halite, clear to light-gray, medium to coarse crystalline; very little light-reddish-brown polyhalite; small amounts of brown and greenish-gray clay	1,441.4-1,442.5
Halite, moderate-gray to brownish-gray, coarse crystalline; sparse polyhalite blebs and stringers; small amount grayish-green clay; brown parting at 1,442.7 feet	1,442.5-1,443.7
Halite, clear to light-greenish-gray, coarse crystalline; sparse polyhalite blebs; abundant brown and grayish-green clay; some angular leached vugs	1,443.7-1,446.7
Halite, clear to very light gray, coarse crystalline; irregular splotches of white gypsum and polyhalite; very little grayish-green clay	1,446.7-1,449.5
Anhydrite and polyhalite mixture, light- to medium-gray, dense	1,449.5-1,455.4
Halite, clear to very light gray, medium to coarse crystalline; anhydrite and polyhalite bands	1,455.4-1,462.8
Anhydrite and polyhalite mixture, medium-gray, laminated, dense	1,462.8-1,469.8
Mudstone, grayish-green	1,469.8-1,471.6
Halite, moderate-orange-pink, medium to coarse crystalline; small amount of orange polyhalite; small amount grayish-green clay	1,471.6-1,476.0
Halite, clear to medium-gray, orange, medium to coarse crystalline; grayish-green and brown clay abundant at top; leached vugs in clay area at top; occasional vugs and stringers of polyhalite; parting at top	1,476.0-1,480.2

Table 13C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-orange-pink to grayish-green, coarse crystalline; numerous disseminated triangular langbeinite crystals; sparse polyhalite blebs	1,480.2-1,481.7
Halite, medium-gray to moderate-orange-pink, medium to coarse crystalline; abundant grayish-green clay; occasional stringers and masses of orange polyhalite; langbeinite mineralization of moderate disseminated type	1,481.7-1,484.1
Halite, very light yellow to pale-reddish-brown, coarse crystalline; abundant polyhalite blebs and stringers; very little brown clay	1,484.1-1,484.3
Halite, moderate-reddish-orange, medium to coarse crystalline; pale-reddish-brown clay parting at 1,434.8 and 1,484.9 feet; abundant brown clay; several large langbeinite crystals toward base of unit; blebs of polyhalite at top	1,484.3-1,485.4
Halite, light-gray to moderate-reddish-orange, coarse crystalline; some greenish-gray clay; sparsely disseminated langbeinite crystals; moderate amount polyhalite blebs and stringers	1,485.4-1,487.1
Halite, very light yellow to moderate-orange-pink, medium to coarse crystalline; occasional blebs and stringers of polyhalite; one prominent stringer at 1,487.6 feet	1,487.1-1,488.7
Halite, grayish-red, medium to coarse crystalline; contains abundant brown clay; clay parting at base; leached depression, possibly kainite/leonite after langbeinite; sparse polyhalite blebs and stringers	1,488.7-1,489.4
Halite, very light yellow to moderate-orange-pink, coarse crystalline; abundant polyhalite blebs and stringers; greenish-gray clay toward base	1,489.4-1,491.7
Halite, clear to medium-gray, medium to coarse crystalline; grayish-green interstitial clay; moderate amount of disseminated moderate-reddish-brown polyhalite blebs and stringers	1,491.7-1,492.2
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; moderate amount of disseminated moderate-reddish-brown polyhalite blebs and stringers; minor disseminated sulfate (langbeinite?)	1,492.2-1,493.1
Halite, clear to grayish-brown and pale-brown, medium to coarse crystalline; minor amount of disseminated moderate-reddish-brown polyhalite blebs and stringers; less than 1 percent greenish-gray interstitial clay; heavy disseminated sulfates (langbeinite?) from 1,493.7 to 1,494.4 feet; remainder of unit has moderate dissemination of sulfate (langbeinite?) minerals	1,493.1-1,497.4

Table 13C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to moderate-reddish-orange, fine to coarse crystalline; moderate amount of disseminated moderate-reddish-brown polyhalite blebs and stringers; contains 2 percent greenish-gray interstitial clay from 1,501.4 to 1,501.8 feet; weak sulfate (langbeinite?) dissemination from 1,500.3 to 1,501.8 feet	1,497.4-1,501.8
Halite, moderate-reddish-brown grading to pale-red and pale-yellowish-brown, medium to coarse crystalline; weak to moderate amount of disseminated langbeinite	1,501.8-1,507.9
Halite, pale-yellowish-brown, medium crystalline; minor disseminated langbeinite	1,507.9-1,508.6
Halite, clear to moderate-orange-pink and pale red, fine to medium crystalline, clayey; minor moderate-reddish-brown and grayish-pink polyhalite blebs and stringers; moderate, less than 3 percent, medium-bluish-gray interstitial clay; medium-bluish-gray clay partings at 1,509.9 and 1,510.4 feet	1,508.6-1,510.6
Halite, clear to pale-brown, and light-brownish-gray, medium crystalline, clayey; minor moderate-reddish-brown polyhalite blebs and stringers; less than 2 percent moderate-reddish-brown interstitial clay; moderate-reddish-brown clay partings at 1,510.6 and 1,511.1 feet	1,510.6-1,512.0
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; moderate-reddish-brown polyhalite blebs and stringers, increasing downward; minor greenish-gray interstitial clay in upper 1.0 foot of unit; greenish-gray clay parting at 1,512.5 feet; 0.02 foot thick moderate-brown clay seam at 1,518.0 feet	1,512.0-1,520.8
Halite, clear to light-brown and pale-yellowish-brown, fine crystalline, clayey; moderate-brown interstitial clay less than 3 percent; moderate-brown clay partings at 1,521.1, 1,521.2, 1,521.4, and 1,521.6 feet; moderate-reddish-brown polyhalite blebs in upper 0.1 foot	1,520.8-1,521.6
Halite, clear to pale-red and pale-yellowish-brown, medium to coarse crystalline; minor moderate-reddish-brown polyhalite blebs; moderate-brown interstitial clay in upper 0.3 foot and lower 0.5 foot; moderate-yellowish-brown clay parting at 1,522.6 feet	1,521.6-1,523.1
Halite, clear to pale-yellowish-brown and light-gray, medium crystalline; minor moderate-brown interstitial clay less than 1 percent	1,523.1-1,528.6

Table 13C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to pale-red, medium to coarse crystalline; minor moderate-reddish-brown polyhalite blebs and stringers; greenish-gray interstitial clay in lower 0.2 foot of unit	1,523.6-1,531.8
Halite, clear to pale-red, fine to coarse crystalline; minor greenish-gray and moderate-brown interstitial clay less than 1 percent; moderate-reddish-brown polyhalite blebs and stringers; grayish-green clay parting 1,531.8 feet; moderate-brown clay parting at 1,532.3, 1,532.6, and 1,540.0 feet	1,531.8-1,540.0
Halite, clear to pale-red, medium to coarse crystalline; minor reddish-orange polyhalite blebs and stringers; minor grayish-red interstitial clay 2 percent; grayish-red clay parting at 1,541.5 feet	1,540.0-1,544.4
Halite, clear to pale-red, medium crystalline; minor disseminated moderate-reddish-orange polyhalite blebs and stringers	1,544.4-1,548.1
Polyhalite, moderate-reddish-brown, massive, minor clear halite crystals in upper 0.1 foot; lower 0.2 foot consists of light-gray clay	1,548.1-1,549.0
Halite, clear to moderate-orange-pink, fine to coarse crystalline; minor disseminated moderate-reddish-orange polyhalite blebs; minor grayish-red interstitial clay from 1,549.6 to 1,550.4 feet; grayish-red partings at 1,549.6 and 1,550.4 feet	1,549.0-1,554.7
Halite, clear to greenish-gray, fine to coarse crystalline; moderate-reddish-orange disseminated polyhalite blebs throughout, also heavily concentrated in upper 0.7 foot; grayish-red clay partings at 1,554.7, 1,555.3, 1,557.9, 1,565.8, and 1,567.5 feet	1,554.7-1,568.2
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; minor disseminated moderate-raddish-orange polyhalite blebs and stringers	1,568.2-1,572.0
Polyhalite, moderate-orange-pink to moderate-reddish-brown; massive; greenish-gray partings at 1,573.2 feet	1,572.0-1,573.3
Halite, clear to moderate-orange-pink, fine to medium crystalline; minor moderate-reddish-brown polyhalite blebs and stringers, increasing with depth	1,573.3-1,573.9
Halite, clear to pale-red, fine to coarse crystalline; minor moderate-reddish-brown polyhalite blebs and stringers; greenish-gray interstitial clay in upper 0.6 foot of unit; greenish-gray parting at 1,574.0 feet	1,573.9-1,577.3
	Total depth

Table 13D.--Mineralogical and chemical analyses of core samples from potash ore zones and mineralized salt beds in drill hole P-13

[oz, zone; mm, middle member; lm, lower member; sb, salt bed; tr, trace; n.d., not determined; Bl, bloedite; Ha, halite; Ka, kainite; Ki, kieserite; La, langbeinite; Le, leonite; Lo, loeweite; Po, polyhalite; Sy, sylvite. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mineralogy: X-ray diffraction analysis[1]	Chemical analysis (weight percent): Ca	K	Mg	Na	Cl	SO_4	H_2O+	H_2O-	Water insoluble
P-13/1	1,479.58-1,480.20	0.62	4th oz, mm	>9 Ha; tr Po	0.15	0.08	0.64	38.5	n.d.	0.39	n.d.	n.d.	0.14
P-13/2	1,480.20-1,481.73	1.53		>8 Ha; <2 La; tr Po	.24	2.9	1.7	32.5	51.0	10.5	0.24	[illegible]	.30
[2]P-13/3	1,481.73-1,482.78	1.05	4th oz, lm	7Ha; >2 La; tr Po, Ka, Le	.30	6.4	4.0	24.0	38.5	23.5	1.4		1.7
[2]P-13/3					.26	6.4	4.0	24.0	38.0	23.0	1.5	.07	1.7
[2]P-13/4	1,482.78-1,483.73	.95		7Ha; tr Po, La, Bl	.11	2.8	2.0	25.0	40.5	9.7	2.2	1.5	14.5
[2]P-13/4					.10	2.9	1.7	25.0	42.5	9.0	1.4	1.4	13.9
P-13/5	1,483.73-1,484.65	.92	sb	9 Ha; tr Po, La	.63	.44	.40	36.0	57.0	3.0	.38	.05	.30
P-13/6	1,491.70-1,492.65	.95	3d oz	>9 Ha; <1 Po; tr La	.49	.52	.30	36.0	57.0	2.3	.39	.10	1.5
P-13/7	1,492.65-1,493.23	.58		>8 Ha; <1 Po; tr La, Le	1.2	1.2	.53	35.5	53.5	5.1	.53	.01	.23
P-13/8	1,493.23-1,493.88	.65		9 Ha; tr Po, La, Le	.29	1.6	1.0	34.0	52.0	5.4	1.1	.22	2.6
[2]P-13/9	1,493.88-1,494.58	.70		3 Ha; 7 La	.03	15.2	9.4	6.0	11.0	58.0	.01	.07	.47
[2]P-13/9					.01	14.5	10.8	5.8	13.0	56.5	.09	.11	.59
P-13/10	1,494.58-1,495.50	.92		>8 Ha; 1 La; tr Po	.37	2.2	.27	34.0	52.5	7.7	.43	.09	.78
P-13/11	1,495.50-1,496.40	.90		>9 Ha; tr Po, La	.14	.52	.38	38.5	n.d.	2.0	n.d.	n.d.	.48
P-13/12	1,506.60-1,507.90	1.30	sb	>8 Ha; <1 La; tr Po	.52	1.8	1.0	35.0	n.d.	6.5	n.d.	n.d.	.17
P-13/13	1,507.90-1,508.52	.62		<8 Ha; 2 La; tr Po, Lo	.34	4.0	3.1	29.0	42.0	18.5	1.1	.04	.06
[2]P-13/14	1,508.52-1,509.33	.81	2d oz	>2 Ha; 4 La; 3 Bl; tr Po,Ka,Le	.07	8.6	7.8	10.5	10.0	55.0	5.6	2.9	.10
[2]P-13/14					.07	8.6	7.8	11.0	n.d.	55.0	n.d.	n.d.	.20
[2]P-13/14					.10	8.0	9.4	11.0	13.0	53.5	4.8	3.5	.29
[2]P-13/15	1,509.33-1,510.43	1.10		>9 Ha; tr Po	.10	.16	.44	35.0	n.d.	.40	n.d.	n.d.	4.8
[2]P-13/15					.10	.24	.31	36.0	57.0	.66	.43	.87	5.7
P-13/16	1,412.90-1,413.71	.81	5th oz	9 Ha; <1 La; tr Po	.11	1.2	.80	39.0	55.0	4.4	.13	.09	.22
P-13/17	1,413.71-1,415.28	1.57		>7 Ha; >2 La; tr Po	.12	4.2	2.8	30.0	46.0	14.0	.20	.10	.56
P-13/18	1,415.28-1,415.98	.70		4 Ha; >5 La; tr Ka	.06	11.2	6.4	14.5	22.0	42.0	.97	.30	3.0
P-13/19	1,415.98-1,416.75	.77		>9 Ha; tr Po	.15	.16	.18	38.0	n.d.	.64	n.d.	n.d.	1.4
P-13/20	1,358.73-1,359.65	.92	sb	>9 Ha; <1 Sy; tr Po	.30	1.2	.09	37.5	58.0	.44	.14	.05	.25
[2]P-13/21	1,359.65-1,360.63	.98		6 Ha; 4 Sy	.26	16.2	.12	26.5	53.5	.44	.15	.16	.85
[2]P-13/21					.26	16.2	.11	26.5	54.0	.44	.10	.14	.86
[2]P-13/22	1,360.63-1,361.70	1.07	8th oz	>8 Ha; >1 Sy; tr Po	1.0	5.9	.38	31.5	52.5	3.0	.39	.73	2.8
[2]P-13/22					1.1	5.2	.33	33.0	54.0	2.6	.32	.43	3.0
P-13/23	1,361.70-1,362.90	1.20		>9 Ha; tr Po, Sy	.52	.82	.18	37.5	57.0	1.3	.47	.09	.80
P-13/24	1,362.90-1,364.26	1.36		7 Ha; 3 Sy	.11	8.0	.04	33.0	58.0	.10	.12	.01	.09
P-13/25	1,364.26-1,365.71	1.45		8 Ha; >1 Sy; tr Po	.41	4.8	.10	35.5	57.5	.79	.23	.01	.05
P-13/26	1,365.71-1,366.56	.85		>5 Ha; 4 Sy; tr Po	.32	14.8	.21	25.5	53.0	.87	.68	.63	3.2
[2]P-13/27	1,366.56-1,367.10	.54		>5 Ha; >1 Sy; tr Po	.18	5.0	.79	21.5	40.5	.24	3.5	5.2	21.5
[2]P-13/27					.16	5.2	.76	23.0	44.5	.37	1.6	3.7	21.5
P-13/28	1,317.55-1,318.02	.47	sb	>9 Ha; <1 Po; tr Sy, Ki	1.6	1.4	.41	36.0	n.d.	5.1	n.d.	n.d.	.28
P-13/29	1,318.02-1,319.00	.98		>3 Ha; >6 Sy; tr Po, Ki	.09	26.4	.22	18.0	52.0	.35	.23	.01	.12
P-13/30	1,319.00-1,320.22	1.22	10th oz	>6 Ha;>2 Sy;<1 Ki,La; tr Po,Ka	.11	9.6	2.9	24.5	46.0	12.5	1.1	.06	1.7
P-13/31	1,320.22-1,320.88	.66		>9 Ha; <1 Po	.42	.44	.16	39.0	59.0	.94	.31	.04	.35
[2]P-13/32	1,320.88-1,321.87	.99		>3 Ha;3 Ki;2 Sy;<1 La;1 Ka;tr Po	.26	10.6	6.8	12.0	27.5	32.5	3.2	.14	4.5
[2]P-13/32					.25	10.6	6.8	12.0	27.5	32.5	3.2	.14	4.6
[2]P-13/32					.17	10.5	8.4	13.0	28.5	33.0	2.5	.71	1.2
[2]P-13/33	1,321.87-1,323.39	1.52		>7 Ha; 2 Sy; <1 Po; tr Ka	1.1	6.4	1.1	24.5	43.5	4.9	2.7	2.9	11.5
[2]P-13/33					1.2	6.0	1.1	26.0	46.0	4.0	1.5	2.2	11.4
P-13/34	1,323.39-1,324.60	1.21		>7 Ha; 2 Sy; tr Po, Ka	.08	7.8	.60	31.0	54.0	1.3	1.3	1.0	4.5
P-13/35	1,324.60-1,325.30	.70	sb	>8 Ha; <1 Po, Sy	.78	2.4	.35	35.0	57.5	2.3	.53	.36	1.9
P-13/36	1,334.82-1,336.38	1.56	sb	9 Ha; <1 Sy; tr Po	.28	1.2	.08	37.0	n.d.	.58	n.d.	n.d.	.13
P-13/37	1,336.38-1,337.32	.94		5 Ha; >4 Sy; tr Po	.31	18.6	.12	24.5	55.0	.41	.28	.04	1.2
P-13/38	1,337.32-1,338.64	1.32	9th oz	>9 Ha; <1 Sy; tr Po	.06	2.4	.23	35.5	57.5	.10	.50	.89	2.9

[1] Estimate of amount reported on a scale of 0-10.

[2] Replicate analyses.

Table 13E.--Calculated mode (mineral content) and potash distribution by mineral in core samples from potash ore zones and mineralized salt beds in drill hole P-13

[oz, ore zone; mm, middle member; lm, lower member; sb, salt bed; leaders (----), not present; Bl, bloedite; Ha, halite; Ka, kainite; Kl, kieserite; La, langbeinite; Le, leonite; Lo, loeweite; Po, polyhalite; Sy, sylvite; Insol., clay and silt. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mode (weight percent mineral)										K_2O distribution by minerals					
				Sy	La	Ka	Le	Kl	Bl	Lo	Ha	Po	Insol.	Sy	La	Ka	Le	Po	Total
P-13/1	1,479.58-1,480.20	0.62	4th oz, mm	----	----	----	----	----	----		97.9	0.6	0.1	----	----	----	----	<0.1	<0.1
P-13/2	1,480.20-1,481.73	1.53		----	14.1	----	----	----	----	----	82.6	1.8	.3	----	3.2	----	----	.3	3.5
[1]P-13/3	1,481.73-1,482.78	1.05	4th oz, lm	----	30.4	1.7	0.6	----	----	----	63.1	2.2	1.7	----	6.9	0.3	0.1	.3	7.6
[1]P-13/3				----	28.6	2.2	1.9	----	----	----	61.9	1.9	1.7	----	6.5	.4	.5	.3	7.7
[1]P-13/4	1,482.78-1,483.73	.95		----	14.3	----	----	----	4.0	----	62.2	.8	14.5	----	3.2	----	----	.1	3.3
[1]P-13/4				----	14.9	----	----	----	<.1	----	63.6	.7	13.9	----	3.4	----	----	.1	3.5
P-13/5	1,483.73-1,484.65	.92	sb	----	.6	----	----	----	----	----	93.9	2.5	.3	----	.1	----	----	.4	.5
P-13/6	1,491.70-1,492.65	.95	3d oz	----	1.2	----	----	----	----	----	93.9	2.3	1.5	----	.2	----	----	.4	.6
P-13/7	1,492.65-1,493.23	.58		----	2.7	----	.3	----	----	----	90.3	4.8	.2	----	.6	----	<.1	.7	1.3
P-13/8	1,493.23-1,493.88	.65		----	3.3	----	3.3	----	----	----	86.4	2.2	2.6	----	.7	----	.8	.3	1.8
[1]P-13/9	1,493.88-1,494.58	.70		----	80.6	----	----	----	----	----	18.1	.2	.5	----	18.3	----	----	<.1	18.3
[1]P-13/9				----	76.9	----	----	----	----	----	21.4	<.1	.6	----	17.4	----	----	<.1	17.4
P-13/10	1,494.58-1,495.50	.92		----	9.7	----	----	----	----	----	86.4	2.8	.8	----	2.2	----	----	.4	2.6
P-13/11	1,495.50-1,496.40	.90		----	2.1	----	----	----	----	----	97.9	1.0	.5	----	.5	----	----	.1	.6
P-13/12	1,506.60-1,507.90	1.30	sb	----	6.8	----	----	----	----	----	89.0	3.9	.2	----	1.5	----	----	.6	2.1
P-13/13	1,507.90-1,508.52	.62		----	19.5	----	----	----	----	5.2	71.9	2.5	<.1	----	4.4	----	----	.4	4.8
[1]P-13/14	1,508.52-1,509.33	.81	2d oz	----	41.2	2.2	2.0	----	35.9	----	16.0	.5	.1	----	9.3	.4	.5	<.1	10.2
[1]P-13/14				----	41.2	2.2	2.0	----	35.9	----	15.4	.5	.2	----	9.3	.4	.5	<.1	10.2
[1]P-13/14				----	37.8	2.2	2.0	----	43.2	----	12.8	.7	.3	----	8.6	.4	.5	.1	9.6
[1]P-13/15	1,509.33-1,510.43	1.10		----	----	----	----	----	----	----	89.0	1.2	4.8	----	----	----	----	.2	.2
[1]P-13/15				----	----	----	----	----	----	----	91.5	1.9	5.7	----	----	----	----	.3	.3
P-13/16	1,412.90-1,413.71	.81	5th oz	----	5.8	----	----	----	----	----	90.1	.8	.2	----	1.3	----	----	.1	1.4
P-13/17	1,413.71-1,415.28	1.57		----	21.7	----	----	----	----	----	75.8	.9	.6	----	4.9	----	----	.1	5.0
P-13/18	1,415.28-1,415.98	.70		----	55.4	4.5	----	----	----	----	36.9	.4	3.0	----	12.6	.8	----	<.1	13.4
P-13/19	1,415.98-1,416.75	.77		----	----	----	----	----	----	----	96.6	1.2	1.4	----	----	----	----	.2	.2
P-13/20	1,358.73-1,359.65	.92	sb	2.1	----	----	----	----	----	----	95.3	.7	.2	1.3	----	----	----	.1	1.4
[1]P-13/21	1,359.65-1,360.63	.98		30.7	----	----	----	----	----	----	67.4	.7	.9	19.4	----	----	----	.1	19.5
[1]P-13/21				30.7	----	----	----	----	----	----	67.4	.7	.9	19.4	----	----	----	.1	19.5
[1]P-13/22	1,360.63-1,361.70	1.07	8th oz	10.1	----	----	----	----	----	----	80.1	4.7	2.8	6.4	----	----	----	.7	7.1
[1]P-13/22				8.9	----	----	----	----	----	----	83.9	4.0	3.0	5.6	----	----	----	.6	6.2
P-13/23	1,361.70-1,362.90	1.20		1.1	----	----	----	----	----	----	95.3	1.9	.8	.7	----	----	----	.3	1.0
P-13/24	1,362.90-1,364.26	1.36		15.2	----	----	----	----	----	----	83.9	.1	<.1	9.6	----	----	----	<.1	9.6
P-13/25	1,364.26-1,365.71	1.45		8.9	----	----	----	----	----	----	90.3	1.2	<.1	5.6	----	----	----	.2	5.8
P-13/26	1,365.71-1,366.56	.85		27.9	----	----	----	----	----	----	65.5	1.3	3.2	17.6	----	----	----	.2	17.8
[1]P-13/27	1,366.56-1,367.10	.54		9.4	----	----	----	----	----	----	59.4	.4	21.5	6.0	----	----	----	<.1	6.0
[1]P-13/27				9.8	----	----	----	----	----	----	65.7	.5	21.5	6.2	----	----	----	.1	6.3
P-13/28	1,317.55-1,318.02	.47	sb	.9	----	----	----	.6	----	----	91.5	7.3	.3	.6	----	----	----	1.1	1.7
P-13/29	1,318.02-1,319.00	.98		50.2	----	----	----	1.1	----	----	45.8	.7	.1	31.7	----	----	----	.1	31.8
P-13/30	1,319.00-1,320.22	1.22	10th oz	16.4	2.8	2.5	----	13.1	----	----	62.3	.8	1.7	10.3	.6	.5	----	.1	11.5
P-13/31	1,320.22-1,320.88	.66		----	----	----	----	----	----	----	97.2	3.4	.4	----	----	----	----	.5	.5
[1]P-13/32	1,320.88-1,321.87	.99		14.5	2.3	14.7	----	34.5	----	----	30.5	1.9	4.5	9.2	.5	2.8	----	.3	12.8
[1]P-13/32				14.4	2.3	14.7	----	34.5	----	----	30.5	1.9	4.6	9.2	.5	2.8	----	.3	12.8
[1]P-13/32				14.3	5.5	11.5	----	34.5	----	----	33.0	1.1	1.2	9.0	1.2	2.2	----	.2	12.6
[1]P-13/33	1,321.87-1,323.39	1.52		10.2	----	.6	----	----	----	----	63.6	7.3	11.5	6.5	----	.1	----	1.1	7.7
[1]P-13/33				9.9	----	.6	----	----	----	----	67.9	5.3	11.4	6.3	----	.1	----	.8	7.2
P-13/34	1,323.39-1,324.60	1.21		14.0	----	2.4	----	----	----	----	78.8	.6	4.5	8.9	----	.4	----	<.1	9.4
P-13/35	1,324.60-1,325.30	.70	sb	3.7	----	----	----	----	----	----	91.8	3.6	1.9	2.3	----	----	----	.6	2.9
P-13/36	1,334.82-1,336.38	1.56	sb	2.1	----	----	----	----	----	----	94.1	.9	.1	1.3	----	----	----	.1	1.4
P-13/37	1,336.38-1,337.32	.94		35.3	----	----	----	----	----	----	63.0	.6	1.2	22.3	----	----	----	.1	22.4
P-13/38	1,337.32-1,338.64	1.32	9th oz	4.6	----	----	----	----	----	----	91.2	.1	2.9	2.9	----	----	----	<.1	2.9

[1] Replicate analyses.

TABLES 14A-14G

Basic data from drill hole P-14,
Waste Isolation Pilot Plant area, Eddy County, New Mexico

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14G.--Gamma-ray and neutron logs of drill hole	foldout

Table 14A.--Abridged drill-hole history

LOCATION: Sec. 24, T. 22 S., R. 30 E.
95 m (312 ft) from south line
187 m (613 ft) from west line

ALTITUDE (LAND SURFACE): 1,024 m (3,358.1 ft). Datum for depth measurement in drilling and logging operations.

LITHOLOGIC LOG PREPARED BY: J. C. Lorenz, Florian Maldonado, J. W. Mercer, M. N. Mitchell, B. R. Orr, and R. W. Spengler, September 28 to October 4, 1976.

DRILLING CONTRACTOR: Boyles Bros. Drilling Co.

DRILLING RECORD: Commenced drilling on September 24, and completed on October 3, 1976, at 471 m (1,545 ft) below land surface.

Drilled with air foam to 194 m (635 ft) below land surface. Hit water at 180 m (589 ft).

Hole plugged from 471 to 236 m (1,545-775 ft) with cement and converted to hydrologic observation well in Rustler Formation.

REMARKS: Top of salt in Salado Formation at 212 m (695 ft) below land surface.

Table 14B.--Stratigraphic summary

Rock unit	Depth interval[1] feet	meters
Holocene deposits	0-10	0-3
Pleistocene rocks:		
Gatuna Formation	10-42	3-13
Permian rocks:		
Dewey Lake Red Beds	42-387	13-118
Rustler Formation	387-687	118-209
Magenta Dolomite Member	453-475	138-145
Culebra Dolomite Member	573-595	175-180
Salado Formation	687-1,540	209-469
Upper member	687-1,133	209-345
McNutt potash zone	1,133-1,510	345-460
Vaca Triste Sandstone Member[2]	1,133-1,141	345-348
11th ore zone	1,186-1,190	361-363
Marker bed 117	1,199-1,200	365-366
Marker bed 118	1,225-1,228	373-374
Marker bed 119	1,251-1,253	381-382
10th ore zone	1,257-1,263	383-385
Marker bed 120	1,273-1,274	388-388
9th ore zone	1,277-1,282	389-391
Marker bed 121	1,287-1,289	392-393
Marker bed 122	1,297-1,298	395-396
8th ore zone	1,302-1,310	397-399
Union anhydrite[3]	1,319-1,328	402-405
7th ore zone	1,342-1,345	409-410
6th ore zone	1,352-1,355	412-413
5th ore zone	1,361-1,370	415-418
Marker bed 123	1,394-1,400	425-427
Marker bed 124	1,410-1,419	430-433
4th ore zone	1,423-1,435	434-437
3d ore zone	1,443-1,455	440-444
2d ore zone	1,461-1,465	445-447
1st ore zone	1,482-1,492	452-455
Marker bed 126	1,509-1,510	460-460
Lower member	1,510-1,540	460-469
Marker bed 127	1,534-1,536	468-468
Maximum depth recorded	1,540	469

[1]Depth interval recorded from geophysical logs.
[2]Of Adams, 1944.
[3]Informal unit of Salado Formation.

Table 14C.--Lithologic log

Description	Depth (feet)
Siltstone, grayish-red, with grayish-green reduction spots, micaceous---	0.0- 105.0
Same as above; selenitic----------	105.0- 150.0
Same as above; with veined selenite----------	150.0- 200.0
Siltstone, grayish-red, with grayish-green reduction spots, micaceous; white to clear crystalline veined selenite----------	200.0- 300.0
Siltstone, grayish-red, with grayish-green reduction spots, micaceous; selenite; white gypsum----------	300.0- 315.0
No sample----------	315.0- 320.0
Same as 300.0-315.0----------	320.0- 380.0
Siltstone, grayish-red, with grayish-green reduction spots, micaceous, 99 percent; brownish-gray anhydrite 1 percent----------	380.0- 385.0
Siltstone, grayish-red, with grayish-green reduction spots, micaceous, 90 percent; brownish-gray to white gypsiferous anhydrite 10 percent---	385.0- 390.0
Siltstone, grayish-red, with grayish-green reduction spots, micaceous, 90 percent; brownish-gray to white gypsiferous anhydrite 10 percent---	390.0- 395.0
Siltstone, grayish-red, with grayish-green reduction spots, micaceous, 90 percent; brownish-gray to white gypsiferous anhydrite 10 percent---	395. 400.0
Anhydrite, brownish-gray, fine crystalline; some grayish-red siltstone----------	400.0- 405.0
Anhydrite, brownish-gray, fine crystalline----------	405.0- 420.0
Anhydrite, brownish-gray to white gypsiferous, fine crystalline, 50 percent; grayish-red, with grayish-green reduction spots siltstone 50 percent----------	420.0- 425.0
Anhydrite, brownish-gray to white gypsiferous, fine crystalline, 75 percent; grayish-red, with grayish-green reduction spots siltstone 25 percent----------	425.0- 430.0
Anhydrite, brownish-gray, fine crystalline; minor grayish-red siltstone----------	430.0- 460.0
Dolomite, dark-grayish-brown, 40 percent; brownish-gray anhydrite 60 percent----------	460.0- 465.0
Dolomite, dark-grayish-brown----------	465.0- 480.0
Anhydrite, brownish-gray, fine crystalline; some dolomite----------	480.0- 490.0
Anhydrite, brownish-gray, fine crystalline----------	490.0- 500.0
Anhydrite, light-olive-gray, fine crystalline----------	500.0- 515.0
Anhydrite, light-olive-gray to brownish-gray, fine crystalline; dark-reddish-brown siltstone, with greenish-gray reduction spots, 5 percent----------	515.0- 520.0

Table 14C.--Lithologic log--(Continued)

Description	Depth (feet)
Gypsum, white to light-gray, 50 percent; dark-reddish-brown siltstone, with greenish-gray reduction spots, 50 percent	520.0- 525.0
Gypsum, white to light-gray; brownish-gray, fine crystalline anhydrite; reddish-brown siltstone contaminants, 20 percent	525.0- 535.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots	535.0- 540.0
Gypsum, white to light-gray, fine crystalline	540.0- 545.0
Gypsum, white to light-gray; brownish-gray, fine crystalline anhydrite	545.0- 550.0
Gypsum, clear to white to light-gray 25 percent; brownish-gray, fine crystalline anhydrite, 25 percent; dark-reddish-brown siltstone, with greenish-gray reduction spots, 50 percent	550.0- 555.0
Gypsum, clear to white to light-gray; brownish-gray, fine crystalline anhydrite	555.0- 560.0
Same as above; with 30 percent reddish-brown siltstone	560.0- 575.0
Anhydrite, brownish-gray, fine crystalline; white to light-gray gypsum; reddish-brown siltstone, 30 percent	575.0- 580.0
Dolomite, brownish-gray, fine crystalline, pitted	580.0- 600.0
Same as above	600.0- 605.0
Mudstone, gray; dark-reddish-brown siltstone; dolomite contaminants	605.0- 610.0
Anhydrite, white to brownish-gray, fine crystalline	610.0- 630.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots, 60 percent; anhydrite and gypsum, 40 percent	630.0- 640.0
Same as above; less anhydrite and gypsum	640.0- 650.0
Siltstone, reddish-brown, argillaceous	650.0- 655.0
Siltstone, dark-reddish-brown, 50 percent; brownish-gray, fine crystalline anhydrite, 50 percent	655.0- 660.0
Mudstone, light- to medium-bluish-gray	660.0- 700.0
Same as above	700.0- 710.0
Same as above; with minor amounts of satin spar gypsum and reddish-brown siltstone	710.0- 720.0
Same as above; with minor gypsum, anhydrite, and reddish-brown siltstone	720.0- 725.0
Halite; gypsum (selenite and satin spar); anhydrite; reddish-brown siltstone	725.0- 730.0
Halite	730.0- 735.0
Halite, white to clear; reddish-brown siltstone	735.0- 740.0
Halite, white to clear, argillaceous	740.0- 750.0
Halite, white to clear	750.0- 760.0

Table 140.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, white to clear, trace of gypsum and anhydrite	760.0- 765.0
Halite, white to clear, little pale-reddish-brown clay; trace of gypsum and anhydrite	765.0- 770.0
Halite, white to clear; some moderate-red polyhalite; trace of gypsum	770.0- 775.0
Halite, clear to white; trace of moderate-reddish-brown polyhalite	775.0- 790.0
Halite, clear to white; trace of moderate-reddish-brown polyhalite; minor fragments of bluish-gray silty mudstone	790.0- 800.0
Halite, clear; trace of moderate-reddish-brown clay; trace of moderate-red polyhalite	800.0- 805.0
Halite, clear; minor bluish-gray mudstone; minor white anhydrite	805.0- 810.0
Halite, clear; trace of moderate-reddish-brown polyhalite; trace of reddish-brown clay	810.0- 855.0
Halite, clear; trace of reddish-brown polyhalite	855.0- 880.0
Halite, clear; some reddish-brown polyhalite	880.0- 885.0
Halite, clear; trace of reddish-brown polyhalite	885.0- 900.0
Halite, white to clear; sparse reddish-brown polyhalite	900.0- 910.0
Same as above; sparse reddish-brown clay	910.0- 915.0
Halite, clear; sparse reddish-brown polyhalite	915.0- 955.0
Halite, clear to white; reddish-brown polyhalite, 10-15 percent	955.0- 960.0
Same as above; less than 5 percent polyhalite	960.0- 965.0
No sample	965.0- 970.0
Halite, clear, 55 percent; reddish-brown polyhalite, 45 percent	970.0- 975.0
Halite, clear, 90 percent; reddish-brown polyhalite, 10 percent	975.0- 980.0
Halite, clear to white; sparse reddish-brown polyhalite	980.0- 995.0
Halite, clear to white, 85 percent; reddish-brown polyhalite, 15 percent	995.0-1,000.0
Halite, clear to white; sparse reddish-brown polyhalite	1,000.0-1,005.0
Same as above; reddish-brown clay	1,005.0-1,010.0
Halite, clear to white; sparse reddish-brown polyhalite	,010.0-1,025.0
Same as above; polyhalite increased 5 percent	1,025.0-1,030.0
Same as above; sparse polyhalite	1,030.0-1,055.0
Halite, clear to white; sparse reddish-brown polyhalite; minor reddish-brown clay	1,055.0-1,060.0
Halite, clear to white, 85 percent; reddish-brown polyhalite, 15 percent	1,060.0-1,070.0
Halite, clear to white; sparse reddish-brown polyhalite	1,070.0-1,080.0
Same as above; sparse reddish-brown clay	1,080.0-1,085.0

Table 14C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to white; sparse reddish-brown polyhalite----------	1,085.0-1,100.0
Same as above; sparse reddish-brown clay----------	1,100.0-1,110.0
Halite, clear to white; sparse reddish-brown polyhalite----------	1,110.0-1,130.0
Same as above; minor reddish-brown clay----------	1,130.0-1,145.0
Halite, clear to white; sparse reddish-brown polyhalite----------	1,145.0-1,155.0
Same as above; minor reddish-brown clay----------	1,155.0-1,160.0
Halite, clear to white; sparse moderate-reddish-orange polyhalite-------	1,160.0-1,184.0
Halite, clear to moderate-orange-pink, fine to medium crystalline; sparse disseminated moderate-reddish-orange polyhalite; minor to moderate sylvite and sulfates----------	1,184.0-1,188.0
Halite, clear, moderate-orange-pink and pale-red, fine to medium crystalline; disseminated moderate-reddish-orange, pale-red, and greenish-gray, interstitial clay; minor disseminated sylvite and sulfates; greenish-gray clay parting at 1,178.8 feet; pale-red clay parting at 1,188.3 feet----------	1,188.0-1,192.2
Halite, clear to moderate-reddish-orange and pale-red, fine to medium crystalline; minor disseminated moderate-reddish-orange polyhalite blebs and bands concentrated in lower part of unit; sparse pale-red and greenish-gray interstitial clay----------	1,192.2-1,199.7
Polyhalite, pale-reddish-brown, massive; 0.2 foot of medium- to light-gray clay at base of unit----------	1,199.7-1,200.9
Halite, clear to moderate-orange-pink and pale-red, medium to coarse crystalline; sparse moderate-reddish-orange disseminated polyhalite blebs; medium- to dark-gray disseminated clay at intervals: 1,207.8, 1,208.8 feet and lower 0.8 foot of unit; medium-dark-gray parting at 1,208.9 and 1,210.9 feet; sparse disseminated sylvite mineralization--	1,200.9-1,211.2
Halite, clear to pale-red, fine to medium crystalline, clayey; minor moderate-reddish-orange polyhalite blebs; pale-red to grayish-red interstitial clay; grayish-red partings at 1,213.1, 1,213.4, 1,214.1, 1,214.4, and 1,215.0 feet----------	1,211.2-1,215.2
Halite, moderate-orange-pink, pale-red, clear, medium to coarse crystalline; minor moderate-reddish-orange-pink polyhalite blebs; sparse grayish-red disseminated clay concentration in 1.7 feet of upper part of unit; minor to moderate disseminated sylvite, 1,221.1-1,223.7 feet; lower 1.8 feet of unit contains bands of polyhalite, increasing toward base----------	1,215.2-1,226.0
Polyhalite, grayish-orange-pink to moderate-orange-pink; fine disseminated halite; greenish-gray parting at bottom of unit----------	1,226.0-1,228.8

Table 14C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to moderate-orange-pink, fine to medium crystalline; gray-orange-pink polyhalite bands from 1,230.4 to 1,230.5, and 1,232.3 to 1,232.7 feet; sparse greenish-gray disseminated clay-------	1,228.8-1,236.0
Halite, clear to pale-red and greenish-gray, clayey; moderate disseminated greenish-gray and grayish-red interstitial clay; greenish-gray partings at 1,237.0 and 1,237.5 feet; grayish-red partings at 1,237.0, 1,237.1, 1,237.9, 1,238.1, 1,238.2, 1,238.5, 1,239.0, and 1,241.8 feet----------	1,236.0-1,243.2
Halite, clear to moderate-reddish-orange, fine to medium crystalline; blebs, stringers, and bands of moderate-orange-pink polyhalite; upper 0.6 foot contains pale-red interstitial clay; minor to moderate disseminated sylvite and sulfate from 1,244.0 to 1,245.5 feet---------	1,243.2-1,251.3
Polyhalite, moderate-reddish-orange, with greenish-gray clay partin; at 1,252.0 feet and at base, massive ---------- ---	1,251.3-1,252.7
Halite, clayey; moderate-reddish-orange, fine to medium crystalline polyhalite; disseminated greenish-gray clay partings at 1,252.9 and 1,253.1 feet; 0.1 foot clay seam at 1,253.3 feet----------	1,252.7-1,253.4
Halite, moderate-reddish-orange to pale-red, medium to coarse crystalline; sparse disseminated clay; 0.1 foot polyhalite band at 1,255.5 feet; moderate to heavy sylvite mineralization; strong langbeinite mineralization----------	1,253.4-1,260.1
Halite, mottled pale-red to pinkish-gray, medium to coarse crystalline, argillaceous; disseminated blebs of polyhalite; greenish-gray halitic clay at 1,260.6-1,261.1 feet; heavy sylvite mineralization in upper 1.0 foot grading to weak to moderate in lower zones; reddish-brown clay partings at 1,260.6, 1,261.1, 1,261.9, and 1,262.6 feet----------	1,260.1-1,264.7
Halite, pale-red to clear, coarse crystalline; sparse disseminated reddish-orange polyhalite blebs; weak sylvite(?) mineralization-------	1,264.7-1,267.2
Halite, pale-red to grayish-orange, coarse crystalline; sparse reddish-orange intercrystalline polyhalite; weak to moderate sylvite mineralization----------	1,267.2-1,269.2
Halite, grayish-orange, coarse crystalline; clear halite bands; pinkish-orange polyhalite stringers and blebs, increasing toward base; 0.1 foot thick polyhalite band at 1,272.7 feet----------	1,269.2-1,273.0
Polyhalite, moderate-reddish-orange, fine crystalline, dense; fine crystalline halite bands; thin greenish-gray clay parting at base-----	1,273.0-1,274.1

Table 140.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, grayish-orange to moderate-orange-pink, medium to coarse crystalline; disseminated polyhalite blebs, increasing toward base; minor intercrystalline clay	1,274.1-1,278.4
Halite, mottled pale-reddish-brown to grayish-red, medium to coarse crystalline, argillaceous; disseminated polyhalite and abundant brown clay; brown clay partings at 1,278.6, 1,278.9, 1,279.2, 1,279.8, 1,280.2, 1,280.6, 1,281.2, and 1,281.5 feet	1,278.4-1,282.5
Halite, clear to moderate-reddish-orange, mottled, very coarse crystalline; disseminated pink-orange polyhalite, increasing toward base (grades into polyhalite bed below); upper 4.0 feet has disseminated greenish-gray clay	1,282.5-1,289.4
Polyhalite, moderate-reddish-brown, dense; grades to light-gray anhydrite-polyhalite mixture at base; greenish-gray halitic clay at base, 0.3 foot thick	1,289.4-1,290.9
Halite, pale-yellowish-brown to grayish-orange to moderate-reddish-orange, medium to coarse crystalline; disseminated pinkish-orange polyhalite in upper zone, increasing to approximately 50 percent in lower 1.0 foot	1,290.9-1,297.6
Polyhalite, moderate-reddish-orange, fine crystalline, dense; greenish-gray clay partings at 1,297.8, 1,298.0, and 1,298.6 feet	1,297.6-1,298.6
Halite, clear to moderate-orange-pink, coarse crystalline; disseminated sparse polyhalite; greenish-gray clay disseminated in upper zone; partings at 1,300.2, 1,300.5, and 1,300.8 feet	1,298.6-1,303.0
Halite, clear to mottled pale-yellowish-brown, coarse crystalline, argillaceous; minor disseminated polyhalite; clay partings at 1,303.1, 1,303.4, 1,303.8, and 1,304.5 feet	1,303.0-1,304.8
Halite, grayish-orange to moderate-orange-pink, medium to coarse crystalline; disseminated moderate-reddish-orange polyhalite, increasing at base	1,304.8-1,308.6
Halite, mottled greenish-gray to pale-red, fine to medium crystalline, argillaceous; disseminated reddish-orange polyhalite; greenish-gray clay parting at 1,308.8 feet	1,308.6-1,310.1
Halite, mottled, clear to pale-red, very coarse crystalline, argillaceous; disseminated reddish-orange polyhalite blebs; 0.3 foot thick halite band at 1,312.1 feet; heavy disseminated polyhalite zones 1,311.1-1,311.6, 1,313.0-1,313.5, and 1,314.1-1,314.4 feet; brown clay partings at 1,310.5, 1,310.7, 1,311.7, 1,313.4, 1,313.7, and 1,314.6 feet	1,310.1-1,317.5

Table 14C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-reddish-orange to moderate-reddish-brown, medium to very coarse crystalline, polyhalitic	1,317.5-1,319.3
Anhydrite, pale-yellowish-brown to medium-light-gray, light-brownish-gray and pale-brown, massive; contains disseminated blebs and bands of moderate-reddish-brown to moderate-reddish-orange, medium crystalline halite	1,319.3-1,328.4
Halite, clear to moderate-reddish-orange, pale-reddish-brown and pale-red, medium to coarse crystalline; contains sparse disseminated moderate-reddish-brown polyhalite blebs; minor interstitial greenish-gray clay increases with depth; dark-greenish-gray partings at 1,330.2, 1,337.8, and 1,339.8 feet	1,328.4-1,342.0
Halite, clear to pale-red and medium-gray, medium crystalline, argillaceous; contains blackish-red interstitial clay; blackish-red parting at 1,342.6 feet; contains sparse moderate-reddish-brown polyhalite blebs	1,342.0-1,343.2
Halite, clear to moderate-reddish-orange; contains stringers of moderate-reddish-brown polyhalite	1,343.2-,1344.2
Halite, clear to pale-red, medium crystalline, argillaceous; contains greenish-gray interstitial clay and greenish-gray clay partings at 1,344.2 and 1,344.9 feet; sparse disseminated moderate-reddish-brown polyhalite at base	1,344.2-1,345.4
Halite, clear to pale-red and moderate-reddish-brown, medium to coarse crystalline; contains minor moderate-reddish-brown polyhalite blebs; greenish-gray clay parting at 1,347.4 feet; moderate-reddish-brown interstitial clay and partings at 1,346.0, 1,348.2, 1,348.3, and 1,349.2 feet	1,345.4-,350.6
Halite, clear to pale-red and pale-reddish-brown, medium crystalline; contains minor disseminated blebs of moderate-reddish-brown polyhalite; minor grayish-red and greenish-gray and grayish-red interstitial clay	1,350.6-1,357.6
Halite, clear to pale-red, medium to coarse crystalline; contains sparse pale-red interstitial clay; sparse moderate-reddish-orange polyhalite blebs	1,357.6-1,361.2
Halite, clear to pale-red and moderate-reddish-orange, fine to medium crystalline; contains greenish-gray and pale-reddish-brown interstitial clay; sparse moderate-reddish-orange disseminated polyhalite blebs	1,361.2-1,364.0

Table 14C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to moderate-orange-pink, fine to medium crystalline; sparse moderate-reddish-orange polyhalite blebs near base; minor to moderate disseminated sylvite and sulfate mineralization----------	1,364.0-1,368.1
Halite, clear to pale-red, fine to medium crystalline, argillaceous; grayish-red and greenish-gray interstitial clay; grayish-red clay parting at base; minor pale-reddish-brown polyhalite blebs----------	1,368.1-1,371.7
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; contains sparse to minor moderate-orange-pink polyhalite stringers and blebs; minor disseminated sylvite mineralization, except in lower 2.0 feet of unit----------	1,371.7-1,376.9
Halite, clear to pale-red and moderate-orange-pink, fine to medium crystalline; sparse greenish-gray and pale-red interstitial clay, less than 1 percent; sparse moderate-orange-pink polyhalite blebs-----	1,376.9-1,380.9
Halite, clear to pale-red and moderate-orange-pink, fine to coarse crystalline; contains minor moderate-orange-pink and moderate-reddish-orange polyhalite blebs; minor greenish-gray and pale-red interstitial clay----------	1,380.9-1,388.3
Halite, clear to pale-red and moderate-orange-pink, fine to medium crystalline; minor grayish-orange-pink to moderate-orange-pink polyhalite blebs, increasing toward base; very light-gray anhydrite bands and stringers in lower 1.0 foot of unit; sparse greenish-gray interstitial clay----------	1,388.3-1,395.5
Anhydrite, light-gray, massive; clear halite stringers and bands in upper 1.2 feet and lower 1.6 feet of unit----------	1,395.5-1,401.6
Halite, clear to light-greenish-gray and moderate-orange-pink, fine to medium crystalline; white polyhalite stringers and bands throughout interval becomes orange-pink only in last 0.9 foot----------	1,401.6-1,411.8
Anhydrite, gray, laminated; altered to red dense polyhalite in upper 0.5 foot; sparse blebs of gray polyhalite in rest of interval---------	1,411.8-1,420.0
Clay, gray, 100 percent in upper 0.3 foot, alternating with blebs of dense, red polyhalite in next 0.7 foot; grading to 100 percent dense red polyhalite in lower 0.8 foot; 0.1 foot gray clay at base----	1,420.0-1,421.9
Halite, moderate-reddish-orange, medium crystalline; abundant intercrystalline reddish-orange polyhalite----------	1,421.9-1,422.8
Halite, pale-reddish-orange to moderate-reddish-orange, medium crystalline; several bands of clear coarse crystalline halite; blebs and stringers of reddish-orange polyhalite, increasing toward base----	1,422.8-1,427.4

Table 14C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, light-gray to clear to moderate-reddish-orange, medium to very coarse crystalline (very coarse, clear halite bands); intercrystalline greenish-gray clay; mottled patches with disseminated reddish-orange polyhalite	1,427.4-1,430.3
Halite, clear to light-gray to light-yellowish-brown, coarse crystalline; weak leached disseminated red sylvite mineralization; sparse greenish-gray disseminated clay	1,430.3-1,436.8
Halite, clear to medium-dark-gray, medium to coarse crystalline, argillaceous; moderate-reddish-brown polyhalite blebs, abundant intercrystalline bluish-gray clay	1,436.8-1,438.1
Halite, pale-red to pale-reddish-brown, mottled, medium to coarse crystalline, argillaceous; abundant intercrystalline reddish-brown clay; moderate leonite/kainite mineralization	1,438.1-1,439.6
Halite, clear to moderate-reddish-orange, very coarse crystalline; moderate-orange polyhalite disseminated in upper 0.6 foot, light leached sylvite, leonite/kainite(?) and sparse langbeinite mineralization	1,439.6-1,444.4
Halite, pale-red to moderate-reddish-brown, medium to coarse crystalline, argillaceous; scattered stringers and blebs of moderate-orange polyhalite; moderate leonite/kainite mineralization	1,444.4-1,446.1
Halite, clear to moderate-orange-pink, coarse crystalline; disseminated pink-orange polyhalite blebs	1,446.1-1,447.4
Halite, pale-red to moderate-reddish-brown, medium to coarse crystalline; disseminated polyhalite blebs; argillaceous in upper 0.8 foot	1,447.4-1,449.4
Halite, pale-red to moderate-reddish-brown to greenish-gray, mottled, medium to coarse crystalline; disseminated reddish-orange polyhalite; thin clay-rich zones at top, center, and bottom; moderate to heavy sylvite and langbeinite mineralization in upper 1.5 feet	1,449.4-1,454.4
Halite, grayish-orange to moderate-reddish-orange to clear, medium to coarse crystalline; disseminated reddish-orange polyhalite; clear, coarse crystalline halite zone in middle	1,454.4-1,457.9
Halite, grayish-orange to brown, medium to coarse crystalline, argillaceous; disseminated greenish-gray and brown stringers and intercrystalline clay; minor disseminated reddish-orange polyhalite in patches; clay seam at 1,458.5 feet and at base	1,457.9-1,460.5

Table 14C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to light-yellowish-brown to grayish-orange, coarse crystalline; disseminated reddish-orange polyhalite; greenish-gray clay parting at 1,461.0 feet; clay-rich zones at 1,464.6 and 1,465.1 feet; reddish-orange polyhalite-rich zone at 1,462.8 feet-----	1,460.5-1,466.4
Halite, medium-bluish-gray to white to moderate-reddish-brown fine to medium crystalline, argillaceous; disseminated bluish-gray to reddish-brown clay; moderate mineralized (leonite/kainite(?)) zone at 1,467.4-1,469.7 feet; clay partings at 1,468.3, 1,469.4, 1,469.7, 1,470.3, 1,470.4, and 1,472.0 feet----------	1,466.4-1,472.4
Halite, pale-yellowish-brown to light-bluish-gray, very coarse crystalline; numerous moderate-reddish-orange polyhalite blebs and stringers; moderate-brown clay parting at 1,477.6 feet----------	1,472.4-1,480.7
Halite, light-bluish-gray to pale-red, fine to coarse crystalline, argillaceous; disseminated reddish-brown and grayish-green clay; moderate amount of moderate-reddish-brown polyhalite; greenish-gray clay partings at 1,487.1 and 1,488.0 feet----------	1,480.7-1,490.2
Halite, clear to pale-yellowish-brown, moderate-pink-orange in lower 1.5 feet, coarse crystalline; moderate-reddish-orange polyhalite blebs, more common in lower 1.5 feet----------	1,490.2-1,494.1
Halite, pale-red to light-bluish-gray to greenish-gray, fine to coarse crystalline, argillaceous; sparse moderate-reddish-orange polyhalite blebs; grayish-green clay disseminated in blebs and partings at 1,494.1, 1,494.3, 1,495.0, 1,495.4, and 1,501.5 feet; moderate-brown halitic clay zone from 1,502.5 to 1,503.7 feet----------	1,494.1-1,506.1
Halite, clear, very coarse crystalline; disseminated moderate-pinkish-orange polyhalite blebs and stringers, gradational into polyhalite bed----------	1,506.1-1,512.0
Polyhalite, moderate-reddish-brown, fine crystalline, dense; 0.4 foot thick light-bluish-gray clay at base----------	1,512.0-1,513.2
Halite, pale-red, coarse crystalline; disseminated moderate-reddish-orange polyhalite blebs----------	1,513.2-1,513.8
Halite, clear to light-bluish-gray, argillaceous; brown clay partings at 1,513.8 and 1,514.3 feet----------	1,513.8-1,514.5
Halite, clear to light-bluish-gray, coarse crystalline; sparse disseminated moderate-pinkish-orange polyhalite blebs; sparse disseminated moderate-brown clay blebs; brown clay parting at 1,518.9 feet----------	1,514.5-1,518.9

Table 14C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, light-bluish-gray, fine crystalline, argillaceous; brown clay partings throughout	1,518.9-1,519.4
Halite, clear to moderate-reddish-orange and pale-red, medium crystalline; minor to moderate amount of moderate-reddish-orange to moderate-reddish-brown, disseminated polyhalite blebs; pale-red and grayish-red interstitial clay; pale-red and grayish-red partings at 1,519.9, 1,521.6, 1,522.0, 1,528.3, 1,530.7, and 1,531.8 feet	1,519.4-1,533.4
Halite, clear to pale-red, medium to very coarse crystalline; minor moderate-reddish-orange disseminated polyhalite increases in lower 0.5 foot of unit	1,533.4-1,537.8
Polyhalite, moderate-reddish-orange to moderate-reddish-brown, massive; light-gray anhydrite banding near middle of unit; light-gray clay parting at base of unit	1,537.8-1,539.2
Halite, clear to pale-red, moderate-reddish-orange and moderate-reddish-brown, medium to coarse crystalline; sparse moderate-reddish-orange polyhalite blebs; greenish-gray interstitial clay in upper 1.0 foot of unit	1,539.2-1,545.0
	Total depth

Table 14D.--Mineralogical and chemical analyses of core samples from potash ore zones and mineralized salt beds in drill hole P-14

[oz, ore zone; lm, lower member; sb, salt bed; tr, trace; Bl, bloedite, Ha, halite; Ka, kainite; Ki, kieserite; La, langbeinite; Le, leonite; Po, polyhalite; Sy, sylvite. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mineralogy: X-ray diffraction analysis[1]	Chemical analysis (weight percent): Ca	K	Mg	Na	Cl	SO_4	H_2O+	H_2O-	Water insoluble
P-14/1	1,254.19-1,255.24	1.05	sb	>8 Ha;<1 Sy;>1 Po; tr Le	1.3	4.7	0.31	34.0	55.0	4.2	0.13	<0.01	0.15
P-14/2	1,255.24-1,255.64	.40		>4 Ha;>5 Sy; tr Po	.06	30.0	.04	16.0	53.5	.23	.07	<.01	.16
P-14/3	1,255.64-1,257.56	1.92		>5 Ha;>5 Sy; tr Po	.03	30.0	.36	16.0	50.5	1.7	.68	<.01	.11
P-14/4	1,257.56-1,259.07	1.51	10th oz	7 Ha;<1 Po, La;>1 Sy; tr Ka	.38	10.8	2.6	25.0	45.0	14.5	.53	.10	1.0
P-14/5	1,259.07-1,260.15	1.08		>7 Ha;<1 Po, La;>1 Sy	.54	8.2	1.7	29.0	48.0	10.0	.27	.01	.13
[2]P-14/6	1,260.15-1,261.05	.90		>6 Ha;>1 Sy, Ka; tr Po	.18	8.4	2.1	21.5	41.5	8.4	3.9	1.9	10.0
[2]P-14/6					.26	8.5	2.0	22.0	43.5	7.5	3.4	1.7	10.7
P-14/7	1,261.05-1,262.61	1.56		>8 Ha;<1 Po, Sy; tr Ka	.24	3.5	.55	33.0	52.0	1.9	.99	.74	5.2
P-14/8	1,262.61-1,263.36	.75		8 Ha;<1 Po, Le; tr Sy	.78	3.0	.98	29.0	46.0	7.4	2.2	1.4	7.5
P-14/9	1,363.86-1,364.44	.58	sb (below 5th oz)	9 Ha;<1 Po; tr Sy	.37	.68	.16	38.0	57.5	1.3	.21	.02	.18
P-14/10	1,364.44-1,366.11	1.67		>8 Ha;<1 Po, La; tr Sy, Ka	.72	6.0	2.7	29.0	47.0	16.0	.59	.00	.23
P-14/11	1,366.11-1,367.86	1.75		>8 Ha;<1 Po, Sy, La, Ki	.44	4.0	2.3	32.5	48.0	12.0	.21	<.01	.44
P-14/12	1,367.86-1,369.26	1.40		>8 Ha; 1 Ka; tr Po, Bl	.19	2.7	1.9	31.5	48.0	8.7	3.3	.37	3.0
P-14/13	1,369.26-1,370.96	1.70		>8 Ha;<1 Ka; tr Po, Sy	.15	.96	.76	33.0	53.5	2.4	1.4	.95	6.4
P-14/14	1,436.29-1,437.20	.91	4th oz, lm	9 Ha;<1 Po, Sy; tr La	.18	1.5	.40	37.0	57.5	1.9	.12	.06	.13
P-14/15	1,437.20-1,438.20	1.00		9 Ha;<1 La; tr Po, Sy, Ka, Le	.12	3.5	1.7	30.5	50.0	6.6	1.9	.44	5.2
P-14/16	1,438.20-1,439.79	1.59		>8 Ha; 1 Po; tr La, Le	.94	2.0	.77	34.0	51.0	6.8	.93	.15	1.9
P-14/17	1,439.79-1,440.79	1.00	sb	9 Ha;<1 Po; tr Sy, Ka	.61	.92	.44	37.0	57.0	3.1	.45	.06	.72
P-14/18	1,440.79-1,441.98	1.19		6 Ha;>3 La;<1 Po, Sy	.48	10.6	5.7	18.0	30.0	35.0	.14	.01	.08
P-14/19	1,441.98-1,442.84	.86		>9 Ha;<1 Po, Sy	.60	1.5	.34	37.5	56.0	2.6	.11	.11	.16
[2]P-14/20	1,442.84-1,443.98	1.14		>5 Ha;>2 La;>1 Po; tr Ka, Sy	1.9	8.0	.48	22.0	36.0	29.5	.36	<.01	.17
[2]P-14/20					2.1	8.0	5.0	22.0	35.5	30.0	.07	.13	.15
P-14/21	1,443.98-1,444.61	.63		9 Ha;<1 Po, Sy, La	.44	2.9	1.3	34.5	53.0	7.1	.25	.05	.83
P-14/22	1,444.61-1,445.86	1.25		7 Ha;>2 Po; tr Sy	4.7	4.0	1.4	28.0	43.0	18.0	.71	.21	1.7
P-14/23	1,448.34-1,449.43	1.09	3d oz	>9 Ha;<1 La; tr Po, Sy	.33	2.6	1.7	35.5	54.0	6.3	.17	.06	.32
P-14/24	1,449.43-1,449.90	.47		>9 Ha;<1 La; tr Po, Sy, Le	.07	3.4	1.7	33.0	49.0	9.2	1.0	.22	3.2
P-14/25	1,449.90-1,450.79	.89		5 Ha;>3 Sy; 1 La	.04	17.0	5.0	15.0	33.5	30.0	.39	<.01	.30
P-14/26	1,450.79-1,452.05	1.26		9 Ha;<1 Po, La	.48	2.0	1.1	35.5	54.0	7.2	.31	.01	.70
P-14/27	1,465.00-1,465.88	.88	sb	9 Ha;<1 Po; tr La, Le	1.2	.96	.41	36.5	55.5	3.9	.20	.04	.13
[2]P-14/28	1,465.88-1,467.41	1.53	2d oz	>6 Ha; 2 Bl;<1 Ka;>1 La;tr Po,Le	.92	6.7	5.1	22.0	30.0	30.5	4.9	1.0	.75
[2]P-14/28					.09	6.4	5.5	22.0	31.0	31.0	5.0	1.1	.98
P-14/29	1,467.41-1,468.40	.99		>8 Ha;<1 Ka; tr Po, La	.11	.40	.57	32.5	51.5	1.1	1.3	2.3	7.8

[1]Estimate of amount reported on a scale of 0-10.
[2]Replicate analyses.

Table 14E.--Calculated mode (mineral content) and potash distribution by mineral in core samples from potash ore zones and mineralized salt beds in drill hole P-14

[oz, ore zone; lm, lower member; sb, salt bed; Bl, bloedite; Ha, halite; Ka, kainite; Ki, kieserite; La, langbeinite; Le, leonite; Po, polyhalite; Sy, sylvite; Insol., clay and silt; leaders (---), not present. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mode (weight percent mineral)									K_2O distribution by minerals					
				Sy	La	Ka	Le	Ki	Bl	Ha	Po	Insol.	Sy	La	Ka	Le	Po	Total
P-14/1	1,254.19-1,255.24	1.05	sb	7.3	---	---	0.3	---	---	84.9	6.3	0.1	4.6	---	---	<0.1	1.0	5.6
P-14/2	1,255.24-1,255.64	.40	sb	57.2	---	---	---	---	---	43.4	0.4	.2	36.1	---	---	---	<0.1	36.1
P-14/3	1,255.64-1,257.56	1.92	sb	56.6	---	---	---	---	---	40.7	2.6	.1	35.7	---	---	---	.4	36.1
P-14/4	1,257.56-1,259.07	1.51	10th oz	13.2	17.3	1.8	---	---	---	63.6	2.8	1.0	8.3	3.9	0.3	---	.4	12.9
P-14/5	1,259.07-1,260.15	1.08	10th oz	10.8	10.7	---	---	---	---	70.6	4.0	.1	6.8	2.4	---	---	.6	9.8
[1]P-14/6	1,260.15-1,261.05	.90	10th oz	9.8	---	19.5	---	---	---	54.7	1.3	10.0	6.2	---	3.7	---	.2	10.1
[1]P-14/6			10th oz	12.5	---	16.2	---	---	---	55.9	1.9	10.7	7.9	---	2.0	---	.3	10.2
P-14/7	1,261.05-1,262.61	1.56	10th oz	5.6	---	1.9	---	---	---	83.9	1.8	5.2	3.6	---	.4	---	.3	4.3
P-14/8	1,262.61-1,263.36	.75	10th oz	0.8	---	---	8.8	---	---	74.4	5.6	7.5	.5	---	---	2.3	.9	3.7
P-14/9	1,363.86-1,364.44	.58	sb (below 5th oz)	.8	---	---	---	---	---	96.6	1.9	.2	.5	---	---	---	.3	0.8
P-14/10	1,364.44-1,366.11	1.67	sb (below 5th oz)	3.3	16.6	2.7	---	---	---	73.7	5.4	.2	2.1	3.8	.5	---	.8	7.2
P-14/11	1,366.11-1,367.86	1.75	sb (below 5th oz)	1.8	14.0	---	---	3.0	---	77.7	3.3	.4	1.1	3.2	---	---	.5	4.8
P-14/12	1,367.86-1,369.26	1.40	sb (below 5th oz)	---	---	16.0	---	---	2.8	75.4	1.4	3.0	---	---	3.0	---	.2	3.2
P-14/13	1,369.26-1,370.96	1.70	sb (below 5th oz)	.3	---	4.4	---	---	---	87.0	1.1	6.4	.2	---	.8	---	.2	1.2
P-14/14	1,436.29-1,437.20	.91	4th oz, lm	2.0	1.5	---	---	---	---	94.1	1.3	.1	1.3	0.3	---	---	.2	1.8
P-14/15	1,437.20-1,438.20	1.00	4th oz, lm	2.2	4.7	3.5	3.8	---	---	79.9	.9	5.2	1.4	1.1	.7	1.0	.1	4.3
P-14/16	1,438.20-1,439.79	1.59	4th oz, lm	---	2.5	---	2.9	---	---	84.1	7.1	1.9	---	.6	---	.7	1.1	2.4
P-14/17	1,439.79-1,440.79	1.00	sb	.5	---	0.5	---	---	---	94.1	4.6	.7	.3	---	<.1	---	.7	1.1
P-14/18	1,440.79-1,441.98	1.19	sb	2.4	47.1	---	---	---	---	47.6	3.6	<.1	1.5	10.[illegible]	---	---	.6	12.8
P-14/19	1,441.98-1,442.84	.86	sb	1.9	---	---	---	---	---	95.3	4.1	.2	1.2	---	---	---	.6	1.8
[1]P-14/20	1,442.84-1,443.98	1.14	sb	1.0	28.5	1.6	---	---	---	55.9	14.3	.2	.6	6.5	.4	---	2.2	9.7
[1]P-14/20			sb	1.0	28.6	.3	---	---	---	57.7	15.8	.2	.6	6.5	<.1	---	2.5	9.6
P-14/21	1,443.98-1,444.61	.63	sb	2.1	7.2	---	---	---	---	85.7	3.3	.8	1.3	1.6	---	---	.5	3.4
P-14/22	1,444.61-1,445.86	1.25	sb	.7	---	---	---	---	---	71.2	28.2	1.7	.4	---	---	---	4.4	4.8
P-14/23	1,448.34-1,449.43	1.09	3d oz	1.9	6.8	---	---	---	---	90.3	2.5	.3	1.2	1.5	---	---	.4	3.1
P-14/24	1,449.43-1,449.90	.47	3d oz	1.5	11.2	---	2.0	---	---	83.9	.5	3.2	.9	2.5	---	.5	<.1	3.9
P-14/25	1,449.90-1,450.79	.89	3d oz	16.9	42.9	---	---	---	---	41.9	.3	.3	10.7	9.7	---	---	<.1	20.4
P-14/26	1,450.79-1,452.05	1.26	3d oz	---	8.1	---	---	---	---	89.0	3.6	.7	---	1.8	---	---	.6	2.4
P-14/27	1,465.00-1,465.88	.88	sb	---	1.9	---	.7	---	---	92.8	3.4	.1	---	.4	---	.2	.5	1.1
[1]P-14/28	1,465.88-1,467.41	1.53	2d oz	---	23.2	8.3	.7	---	11.2	47.5	6.9	.7	---	5.3	1.6	.2	1.1	8.2
[1]P-14/28			2d oz	---	27.1	6.8	.7	---	15.3	50.6	.7	1.0	---	[illegible]	1.3	.2	.1	7.8
P-14/29	1,467.41-1,468.40	.99	2d oz	---	<0.1	1.8	---	---	---	84.5	.8	7.8	---	<.1	.3	---	.1	.4

[1]Replicate analyses.

TABLES 15A-15G

Basic data for drill hole P-15,
Waste Isolation Pilot Plant area, Eddy County, New Mexico

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Table 15A.--Abridged drill-hole history

LOCATION: Sec. 21, T. 22 S., R. 31 E.
121 m (398 ft) from south line
56 m (184 ft) from west line

ALTITUDE (LAND SURFACE): 1,009 m (3,309.7 ft). Datum for depth measurements in drilling and logging operations.

LITHOLOGIC LOG PREPARED BY: R. J. Cheeseman, J. C. Lorenz, Florian Maldonado, M. N. Mitchell, B. R. Orr, L. A. Rives, R. P. Snyder, and R. W. Spengler, October 5-15, 1976.

DRILLING CONTRACTOR: Boyles Bros. Drilling Co.

DRILLING RECORD: Commenced drilling on October 4, and completed on October 14, 1976, at 447 m (1,465 ft) below land surface.

Drilled with air to 123 m (405 ft) below land surface. Hit water at 69 m (225 ft).

Hole plugged from 447 to 189 m (1,465-620 ft) with cement, and converted to hydrologic observation well in Rustler Formation.

REMARKS: Top of salt in Rustler Formation at 140 m (460 ft) below land surface.

Table 15B.--Stratigraphic summary

Rock unit	Depth interval[1] feet	meters
Holocene deposits	0-11	0-3
Pleistocene rocks:		
Gatuna Formation	11-32	3-10
Permian rocks:		
Dewey Lake Red Beds	32-231	10-40
Rustler Formation	231-542	40-70
Magenta Dolomite Member	294-321	90-98
Culebra Dolomite Member	413-435	126-133
Salado Formation	542-1,465	165-447
Upper member	542-1,057	165-322
McNutt potash zone	1,057-1,453	322-443
Vaca Triste Sandstone Member[2]	1,057-1,065	322-325
11th ore zone	1,116-1,119	340-341
Marker bed 117	1,128-1,130	344-344
Marker bed 118	1,149-1,152	350-351
Marker bed 119	1,176-1,178	358-359
10th ore zone	1,187-1,195	362-364
Marker bed 120	1,203-1,204	367-367
9th ore zone	1,208-1,212	368-369
Marker bed 121	1,216-1,218	371-371
Marker bed 122	1,225-1,226	374-374
8th ore zone	1,234-1,244	376-379
Union anhydrite[3]	1,251-1,263	381-385
7th ore zone	1,271-1,275	387-389
6th ore zone	1,284-1,288	391-393
5th ore zone	1,292-1,301	394-397
Marker bed 123	1,326-1,333	404-406
Marker bed 124	1,343-1,[illegible]3	409-412
4th ore zone	1,361-1,376	415-419
3d ore zone	1,384-1,397	422-426
2d ore zone	1,404-1,408	428-429
1st ore zone	1,426-1,436	435-438
Marker bed 126	1,452-1,453	443-443
Maximum depth recorded	1,465	447

[1]Depth interval from geophysical logs.
[2]Of Adams, 1944.
[3]Informal unit of Salado Formation.

Table 15C.--Lithologic log

Description	Depth (feet)
Sandstone and caliche, dark-reddish-brown, fine- to medium-grained, poorly sorted	0.0- 10.0
Same as above; less caliche	10.0- 45.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots, calcareous	45.0- 55.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots	55.0-235.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots, 50 percent; white, fine crystalline gypsum, 50 percent	235.0-250.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots, 60 percent; white to light-gray, fine crystalline anhydrite and gypsum, 40 percent	250.0-265.0
Anhydrite, brownish-gray to yellowish-gray, fine crystalline, 80 percent; dark-reddish-brown siltstone, with greenish-gray reduction spots, 10 percent; greenish-black siltstone, 10 percent	265.0-275.0
Anhydrite, brownish-gray to yellowish-gray, fine crystalline, 70 percent; dark-reddish-brown siltstone, with greenish-gray reduction spots, 30 percent	275.0-290.0
Anhydrite, brownish-gray to yellowish-gray, fine crystalline, 90 percent; dark-reddish-brown siltstone, with greenish-gray reduction spots, 10 percent	290.0-300.0
Anhydrite, brownish-gray, fine crystalline, 90 percent; white, fine crystalline gypsum, 10 percent	300.0-305.0
Anhydrite, brownish-gray, fine crystalline, 80 percent; white, fine crystalline gypsum, 10 percent; brownish-gray dolomite, 10 percent	305.0-310.0
Dolomite, brownish-gray and olive-gray, silty	310.0-325.0
Dolomite, olive-gray to brownish-gray, silty, 50 percent; white, fine crystalline gypsum, 50 percent	325.0-335.0
Gypsum, white to light-gray, fine crystalline, with anhydrite, 60 percent; olive-gray to brownish-gray dolomite, 40 percent	335.0-340.0
Anhydrite, brownish-gray, fine crystalline	340.0-395.0
Anhydrite, brownish-gray, fine crystalline; minor amounts of white gypsum and dark-reddish-brown siltstone	395.0-400.0
Anhydrite, brownish-gray, fine crystalline, dense	400.0-415.0
Dolomite, brownish-gray, fine crystalline	415.0-440.0
Dolomite, 40 percent; anhydrite, 40 percent; reddish-brown siltstone, 10 percent; dark-gray siltstone, 10 percent	440.0-445.0
Gypsum, white to light gray, fine crystalline	445.0-450.0
Anhydrite and gypsum, white to light-gray, fine crystalline	450.0-485.0
Siltstone, red-brown	485.0-490.0

Table 15C.--Lithologic log--(Continued)

Description	Depth (feet)
Clay, medium-bluish-gray; some clear halite	490.0-495.0
Clay, medium-bluish-gray; some white, massive gypsum	495.0-500.0
Clay, medium-bluish-gray and dark-yellowish-brown; some white, massive gypsum	500.0-505.0
Clay, medium-bluish-gray; some white, massive gypsum	505.0-515.0
Mudstone, olive-gray, silty; halite veins at 527.5-528.1 feet and at 533.5 feet, gradational into unit below	515.0-538.2
Siltstone, brownish-gray; sparse anhydrite blebs	538.2-540.8
Mudstone, grayish-brown	540.8-541.7
Anhydrite, medium-gray to grayish-red; minor stringers of medium-gray claystone	541.7-542.6
Halite, clear to pale-brown, fine to medium crystalline, argillaceous; minor polyhalite stringers at top; large amounts of brown clay stringers	542.6-546.0
Halite, moderate-red-brown, fine to medium crystalline	546.0-546.4
Halite, clayey; like unit at 542.6-546.0 feet	546.4-547.6
Halite; like unit at 546.0-546.4 feet	547.6-548.0
Halite, argillaceous; like unit at 542.6-546.0 feet	548.0-551.2
Halite, clear to moderate-red-orange, coarse crystalline; minor amount of intercrystalline red-brown clay	551.2-552.2
Halite, pale-red to clear, very coarse crystalline; stringers of red-brown polyhalite, more common near top of unit	552.2-553.1
Halite, pale-red to clear, coarse crystalline; moderate amount of red-brown intercrystalline clay	553.1-554.3
Halite, moderate-red-brown, grading down to light-brown and clear, medium to coarse crystalline	554.3-557.5
Polyhalite, moderate-red-brown, clayey; minor amount of pale-red halite	557.5-558.0
Clay, moderate-red-brown	558.0-558.3
Polyhalite, moderate-red-brown, dense	558.3-558.4
Halite, pale-red to clear, coarse crystalline, clayey; moderate amount red-brown intercrystalline clay; bleb of langbeinite(?) at base; red-orange polyhalite blebs common	558.4-559.6
Halite, pale-red to clear, coarse crystalline; minor amount red-brown polyhalite blebs and stringers	559.6-561.0
Halite, clear to pale-red and grayish-red, medium to coarse crystalline; minor amount moderate-reddish-orange polyhalite blebs and stringers	561.0-568.7
Halite, clear to grayish-red, medium to coarse crystalline; moderate amount grayish-red interstitial clay; grayish-red clay partings at 568.8 and 569.5 feet; sparse moderate-orange-pink polyhalite blebs in lower 0.4 foot of unit	568.7-570.0

Table 150.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to moderate-red-orange, medium to coarse crystalline; minor reddish-brown polyhalite blebs	570.0-571.1
Halite, clear to grayish-red, medium to coarse crystalline, moderate-grayish-red interstitial clay	571.1-571.9
Siltstone, grayish-red, some grayish-red clay; minor crystalline halite	571.9-573.3
Halite, clear to grayish-red, fine to medium crystalline, moderate-pale-red to grayish-red siltstone stringers and bands; minor grayish-red interstitial clay; sparse pale-reddish-brown polyhalite blebs	573.3-574.4
Halite, clear to grayish-red, fine crystalline, argillaceous; abundant grayish-red interstitial clay, decreasing with depth; sparse anhydrite	574.4-582.2
Halite, clear to pale-red and dark-brown, fine to coarse crystalline; minor anhydrite blebs and stringers	582.2-583.5
Halite, clear to grayish-red, medium crystalline, argillaceous; abundant grayish-red interstitial clay; sparse anhydrite blebs	583.5-586.9
Siltstone, pale-red, mixed with clear halite, halite decreasing with depth	586.9-596.0
Halite, clear; minor white gypsum and light-gray anhydrite	596.0-625.0
Halite, clear; minor moderate-reddish-orange polyhalite; sparse white gypsum and light-gray anhydrite	625.0-630.0
Halite, clear; minor moderate-reddish-brown clay; sparse moderate-reddish-orange polyhalite; white gypsum and light-gray anhydrite	630.0-635.0
Halite, clear; minor moderate-orange-pink polyhalite	635.0-640.0
Halite, clear; moderate amount moderate-reddish-orange polyhalite	640.0-655.0
Halite, clear; argillaceous; moderate amount moderate-reddish-orange polyhalite; heavy amounts of moderate-brown clay	655.0-685.0
Halite, moderate-reddish-orange and clear; very minor reddish-brown polyhalite	685.0-690.0
Halite, pale-reddish-brown; minor amounts of red-brown polyhalite and brown clay	690.0-740.0
Halite, clear	740.0-745.0
Halite, pale-reddish-brown and clear; minor to moderate amount brown clay	745.0-770.0
Halite, pale-red and clear	770.0-785.0
Same as above	785.0-860.0
Halite, moderate-reddish-orange and clear; minor amount moderate-reddish-brown polyhalite	860.0-925.0
Same as above; less moderate-reddish-brown polyhalite	925.0-930.0
Same as above; trace amounts of reddish-brown polyhalite	930.0-950.0
Halite, clear to salmon; approx. 2-3 percent moderate-reddish-orange polyhalite	950.0-955.0

Table 15C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to white, very little polyhalite	955.0- 970.0
Halite, clear to salmon; less than 2 percent moderate-reddish-orange polyhalite	970.0- 980.0
Halite, clear; abundant (about 5 percent) moderate reddish-orange polyhalite	980.0- 985.0
Halite, clear; salmon to moderate-reddish-orange polyhalite decreasing	985.0- 990.0
Halite, clear; moderate-reddish-orange polyhalite decreasing	990.0- 995.0
Halite, clear; less than 2 percent moderate-reddish-orange polyhalite; some greenish-gray clay	995.0-1,000.0
Halite, clear; moderate-reddish-orange polyhalite	1,000.0-1,005.0
Halite, clear; moderate-reddish-orange polyhalite; some greenish-gray clay	1,005.0-1,010.0
Halite, clear; very little polyhalite	1,010.0-1,025.0
No sample	1,025.0-1,030.0
Halite, clear; less than 2 percent reddish-orange polyhalite	1,030.0-1,037.7
Halite, clear to pale-red and moderate-orange-pink, medium to coarse crystalline; minor amount moderate-orange-pink polyhalite blebs; polyhalite band at 1,043.8 feet	1,037.7-1,044.1
Polyhalite, moderate-reddish-brown to gray, dense; interbedded anhydrite	1,044.1-1,045.4
Halite, gray to light-brown, coarse crystalline; gray clay content, decreasing with depth	1,045.4-1,047.1
Halite, moderate-reddish-orange, mottled, medium to coarse crystalline; minor interstitial polyhalite disseminated throughout	1,047.1-1,052.3
Halite, brown, mottled, clayey to brown halitic clay, with recrystallized halite band at 1,057.4 feet	1,052.3-1,061.1
Halite, grayish-red, medium to coarse crystalline, clayey; brown clay partings at 1,061.3, 1,062.3, 1,062.9, and 1,063.5 feet; minor polyhalite blebs	1,061.1-1,064.1
Halite, moderate-reddish-orange, medium to coarse crystalline, polyhalitic; polyhalite as blebs and as thin bands at 1,065.6 and 1,067.8 feet	1,064.1-1,068.1
Halite, light-gray-brown, mottled, coarse crystalline, clayey; minor polyhalite blebs	1,068.1-1,069.0
Halite, moderate-reddish-orange, medium to coarse crystalline; polyhalite blebs and stringers	1,069.0-1,070.9
Halite, pale-reddish-brown, coarse crystalline; polyhalite disseminated intergranularly; brown interstitial clay; brown clay partings at 1,071.0 and 1,073.3 feet, clay decreasing with depth	1,070.9-1,073.3

Table 15C.—Lithologic log--(Continued)

Description	Depth (feet)
Halite, light-grayish-brown, mottled, coarse crystalline; clear halite band at 1,074.0 feet; gray clay parting at 1,074.1 feet; brown clay parting at 1,074.8 feet	1,073.3-1,075.2
Halite, moderate-reddish-orange to tan, medium to coarse crystalline, polyhalitic	1,075.2-1,084.7
Halite, gray mottled to brown mottled, medium to very coarse crystalline; interstitial reddish-brown polyhalite; brown clay partings at 1,085.5, 1,085.7, 1,086.0, 1,086.2, 1,086.3, and 1,090.0 feet	1,084.7-1,091.3
Halite, moderate-reddish-orange, medium to coarse crystalline, polyhalitic	1,091.3-1,093.4
Polyhalite, moderate-reddish-brown, dense	1,093.4-1,093.6
Halite, tan to light-reddish-orange, medium to very coarse crystalline; interstitial polyhalite increasing with depth; polyhalite band at 1,093.8 feet	1,093.6-1,095.9
Clay, greenish-gray, polyhalitic, grading into brown clay at 1,097.4 feet	1,095.9-1,099.5
Halite, grayish-red, mottled, medium crystalline; minor interstitial brown clay	1,099.5-1,100.7
Halite, light-tan to light-grayish-red, coarse crystalline; minor reddish-brown polyhalite blebs	1,100.7-1,102.1
Halite, light-reddish-orange, medium to coarse crystalline, polyhalitic; polyhalite blebs and stringers	1,102.1-1,102.8
Halite, grayish-red, mottled, coarse crystalline; polyhalite blebs and stringers	1,102.8-1,106.3
Halite, clear to light-reddish-orange, very coarse crystalline; interstitial polyhalite, increasing with depth	1,106.3-1,108.4
Halite, light-gray, coarse crystalline; minor polyhalite blebs	1,108.4-1,109.0
Halite, light-reddish-orange, medium to coarse crystalline, polyhalitic; polyhalite disseminated and in blebs	1,109.0-1,112.4
Halite, clear to light-gray, coarse crystalline; minor brown clay blebs	1,112.4-1,113.0
Halite, gray, very coarse crystalline; grayish-green clay parting at base	1,113.0-1,113.2
Halite, light-grayish-red, medium to coarse crystalline; polyhalite blebs; brown clay partings at 1,113.5, 1,113.7, and 1,114.7 feet	1,113.2-1,114.7
Halite, brown clay, coarse crystalline; brown clay partings at 1,114.9, 1,115.0, 1,115.3, and 1,115.6 feet; minor reddish-brown polyhalite blebs	1,114.7-1,115.8
Halite, reddish-brown, mottled, to grayish-orange-pink, medium to coarse crystalline, polyhalitic	1,115.8-1,116.6
Halite, light-tan to light-gray, mottled, very coarse crystalline; minor polyhalite blebs and gray clay parting at 1,117.3 feet	1,116.6-1,118.7

Table 15C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-reddish-orange, coarse to very coarse crystalline, polyhalitic; numerous reddish-brown polyhalite blebs and stringers	1,118.7-1,124.4
Polyhalite, moderate-reddish-brown, dense; minor interbedded, tan, coarse crystalline halite	1,124.4-1,126.4
Clay, grayish-green, polyhalitic	1,126.4-1,126.6
Halite, clear to light-gray, mottled, coarse crystalline; minor reddish-orange polyhalite blebs and stringers	1,126.6-1,129.4
Halite, moderate-orange-pink to moderate-reddish-orange, coarse crystalline, polyhalitic; some reddish-orange polyhalite blebs and stringers	1,129.4-1,131.9
Halite, light-gray, coarse to very coarse crystalline; minor reddish-brown polyhalite blebs; gray clay partings at 1,132.6 and 1,133.1 feet	1,131.9-1,133.2
Halite, light-tan to moderate-reddish-orange, coarse crystalline, mildly polyhalitic; minor reddish-brown polyhalite blebs	1,133.2-1,134.5
Halite, light-grayish-brown to pale-red, mottled, coarse crystalline, clayey; very minor reddish-orange polyhalite blebs; brown clay partings at 1,137.4, 1,137.9, and 1,138.4 feet	1,134.5-1,139.5
Halite, grayish-red, mottled, very coarse crystalline; minor reddish-brown polyhalite blebs and indistinct reddish-orange polyhalitic banding at 1,140.9 and 1,141.6 feet; gray clay partings at 1,139.9 and 1,141.1 feet	1,139.5-1,143.2
Halite, light-reddish-orange to tan, coarse crystalline, polyhalitic; reddish-orange polyhalite bands, blebs, and stringers	1,143.2-1,146.0
Polyhalite, pale-red to moderate-reddish-orange, dense, massive; contains sparse clear halite crystals in upper 0.8 foot of unit; contains greenish-gray clay in lower 0.4 foot of unit; base is a greenish-gray clay parting	1,146.0-1,149.3
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; sparse moderate-orange-pink polyhalite blebs	1,149.3-1,152.0
Halite, clear to medium-reddish-orange, fine to medium crystalline; abundant moderate-orange-pink polyhalite blebs and stringers; 0.1 foot polyhalite band at base of unit	1,152.0-1,152.5
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; minor amount of moderate-orange-pink to medium-reddish-orange polyhalite blebs	1,152.5-1,153.7
Polyhalite, moderate-orange-pink, dense, massive	1,153.7-1,154.4

Table 15C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to moderate-reddish-orange and greenish-gray, fine to medium crystalline; minor disseminated moderate-reddish-orange polyhalite blebs, increasing toward base; sparse greenish-gray interstitial clay----------	1,154.4-1,157.5
Halite, clear to greenish-gray, fine to medium crystalline, argillaceous; abundant greenish-gray interstitial clay; greenish-gray clay parting at 1,157.5 feet----------	1,157.5-1,158.3
Halite, clear to pale-red, fine to medium crystalline, argillaceous; abundant grayish-red interstitial clay; grayish-red clay partings at 1,158.5, 1,159.0, 1,159.5, 1,159.3, 1,160.0, and 1,161.2 feet----------	1,158.3-1,162.3
Halite, clear to pale-red, fine to medium crystalline; sparse moderate-orange-pink polyhalite blebs; minor grayish-red interstitial clay---------	1,162.3-1,163.3
Halite, clear to moderate-orange-pink and pale-red, medium to coarse crystalline; minor amount of grayish-orange-pink to medium-orange-pink polyhalite blebs and stringers, increasing toward base; sparse grayish-red interstitial clay in upper 0.5 foot of unit----------	1,163.3-1,167.7
Halite, clear to moderate-reddish-orange, fine to medium crystalline; moderate to abundant amount of grayish-orange-pink to medium-orange-pink polyhalite blebs, stringers and bands; top of 0.7-foot-thick, polyhalite band at 1,172.7 feet----------	1,167.7-1,173.7
Polyhalite, medium-reddish-orange, dense, massive; abundant greenish-gray clay in lower 0.6 foot of unit----------	1,173.7-1,175.1
Halite, clear to pale-red and greenish-gray, argillaceous, abundant greenish-gray and grayish-red interstitial clay; grayish-red clay parting at 1,175.9 feet; sparse moderate-orange-pink polyhalite blebs-----	1,175.1-1,176.1
Halite, clear to moderate-orange-pink, medium to coarse crystalline; minor moderate-orange-pink polyhalite blebs and stringers; upper 0.2 foot of unit contains grayish-red interstitial clay----------	1,176.1-1,181.9
Halite, clear to moderate-orange-pink and greenish-gray, fine to medium crystalline; sparse greenish-gray interstitial clay; minor moderate-reddish-orange to moderate-reddish-brown polyhalite blebs and stringers; medium-dark-gray clay parting at 1,183.3 feet----------	1,181.9-1,184.0
Halite, clear to moderate-reddish-orange, fine to medium crystalline; sparse moderate-reddish-orange polyhalite blebs and stringers----------	1,184.0-1,186.0
Halite, clear to pale-red and grayish-orange-pink, fine to medium crystalline, argillaceous; abundant greenish-gray and grayish-red interstitial clay; greenish-gray clay parting at 1,186.0 feet; grayish-red clay partings at 1,186.6 feet----------	1,186.0-1,188.7

Table 15C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to medium-gray, medium to coarse crystalline; minor amount moderate-reddish-brown polyhalite blebs; moderate amount of grayish-red interstitial clay	1,188.7-1,192.3
Halite, clear to moderate-orange-pink, fine to medium crystalline; sparse moderate-reddish-brown polyhalite blebs; sparse greenish-gray interstitial clay; grayish-red clay parting at 1,192.3 feet	1,192.3-1,193.1
Halite, clear to grayish-orange-pink, fine to medium crystalline	1,193.1-1,194.5
Halite, clear to moderate-orange-pink, fine to coarse crystalline; minor to abundant grayish-orange-pink to moderate-orange-pink polyhalite blebs, stringers, and bands, increasing toward base; abundant in lower 1.2 feet of unit	1,194.5-1,199.7
Polyhalite, moderate-reddish-brown, dense, massive; disseminated clear halite crystals in upper 0.2 foot of unit; medium-dark-gray clay parting at base	1,199.7-1,200.3
Halite, clear to moderate-orange-pink, fine to coarse crystalline; sparse medium-reddish-orange polyhalite blebs	1,200.3-1,204.1
Halite, clear to greenish-gray and pale-red, argillaceous; abundant greenish-gray and grayish-red interstitial clay; sparse moderate-reddish-orange polyhalite blebs; greenish-gray clay partings at 1,205.8 and 1,206.3 feet; grayish-red clay parting at 1,207.4 feet	1,204.1-1,208.5
Halite, clear to grayish-red, fine to medium crystalline; minor to moderate-grayish-red interstitial clay; sparse reddish-orange polyhalite blebs	1,208.5-1,209.4
Halite, clear to moderate-reddish-orange, fine to coarse crystalline; minor moderate-reddish-orange polyhalite blebs	1,209.4-1,213.7
Polyhalite, moderate-reddish-brown, dense, massive; mixed with light-gray anhydrite near middle of unit; 0.2 foot of medium-light-gray clay at base	1,213.7-1,215.1
Halite, clear to moderate-red-orange, coarse crystalline; minor amount moderate-reddish-orange polyhalite blebs	1,215.1-1,215.7
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; minor amount moderate-reddish-orange polyhalite blebs; sparse greenish-gray interstitial clay	1,215.7-1,216.9
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; sparse moderate-orange-pink polyhalite blebs	1,216.9-1,219.3
Halite, clear to moderate-reddish-orange, fine to medium crystalline; abundant moderate-reddish-orange polyhalite blebs, stringers and bands	1,219.3-1,221.3
Polyhalite, pale-red, massive, dense	1,221.3-1,222.3

Table 15C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to greenish-gray and moderate-orange-pink, fine to coarse crystalline; sparse greenish-gray clay and moderate-orange-pink polyhalite	1,222.3-1,223.7
Halite clear to grayish-orange-pink and pale-red, fine to medium crystalline, argillaceous; abundant grayish-red and greenish-gray interstitial clay; grayish-red clay partings at 1,223.9 and 1,224.3 feet	1,223.7-1,224.[illegible]
Halite, clear to moderate-reddish-orange, fine to coarse crystalline; sparse moderate-reddish-orange polyhalite blebs; sparse grayish-red interstitial clay	1,224.7-1,226.[illegible]
Halite, clear, medium to coarse crystalline	1,226.8-1,227.[illegible]
Halite, clear to medium-gray, fine to coarse crystalline; minor grayish-red interstitial clay	1,227.9-1,228.1
Halite, clear to moderate-reddish-orange and greenish-gray, fine to coarse crystalline; minor greenish-gray interstitial clay	1,228.1-1,229.1
Halite, clear to greenish-gray, medium crystalline; minor greenish-gray interstitial clay; sparse moderate-orange-pink polyhalite blebs	1,229.1-1,231.9
Halite, moderate-reddish-orange and light-brown, medium to coarse crystalline, polyhalitic	1,231.9-1,235.9
Halite, medium-light-gray to clear, fine to medium crystalline, argillaceous; large amount of intercrystalline grayish-green clay	1,235.9-1,237.2
Halite, medium-light-gray, fine crystalline, argillaceous; minor amount grayish-green clay; clear, medium to coarse crystalline halite at 1,239.7-1,240.1 feet	1,237.2-1,241.2
Halite, light-gray to clear to pale-red, fine to coarse crystalline; moderate amount greenish-gray intercrystalline clay; moderate amount of small vugs throughout	1,241.2-1,247.1
Anhydrite, light-medium-gray, laminated; large amount secondary halite throughout unit	1,247.1-1,259.3
Halite, clear to pale-reddish-orange, grades to pale-red, coarse crystalline, moderately polyhalitic	1,259.3-1,262.0
Halite, medium-gray to pale-red, coarse crystalline, argillaceous; grayish-green clay seam at top and base	1,262.0-1,263.0
Halite, moderate-orange-pink, clear, pale-yellowish-brown, mottled, fine crystalline; moderate amount of moderate-reddish-orange polyhalite blebs and stringers; saccharoidal halite at top	1,263.0-1,266.5
Halite, medium-gray to pale-red, argillaceous; like unit at 1,262.0-1,263.0 feet	1,266.5-1,266.7

Table 15C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, medium-gray to pale-red, argillaceous; like unit at 1,262.0-1,263.0 feet	1,266.5-1,266.7
Halite, moderate-reddish-brown to pale-reddish-orange, medium to coarse crystalline; moderate amount of moderate-reddish-orange polyhalite stringers and blebs	1,266.7-1,267.8
Halite, clear, grading to light-gray, fine to medium crystalline; moderate amount grayish-green clay in lower half; grayish-green clay parting at 1,267.8 feet	1,267.8-1,268.7
Halite, medium-gray to pale-red, fine crystalline, argillaceous; bands of moderate-reddish-brown halite throughout	1,268.7-1,269.6
Clay, greenish-gray; white halite	1,269.6-1,270.1
Halite, moderate-reddish-orange to moderate-reddish-brown, very fine crystalline, argillaceous; clay band at 1,272.0-1,272.5 feet	1,270.1-1,272.5
Halite, moderate-reddish-orange, pale-red, white; coarse crystalline; minor amounts grayish-green and brown intercrystalline clay; blebs of moderate-reddish-brown polyhalite	1,272.5-1,275.0
Halite, moderate-brown to pale-red, fine crystalline, argillaceous; moderate-brown clay seam at top; clay parting at 1,275.2 feet	1,275.0-1,275.9
Halite, pale-brown, pale-red, clear, fine to medium crystalline; moderate amount brown intercrystalline clay	1,275.9-1,277.2
Halite, pale-red, clear, moderate-reddish-orange	1,277.2-1,281.1
Halite, clear, pale-red, medium to coarse crystalline; minor amounts of moderate-reddish-brown polyhalite blebs; minor interstitial grayish-red clay	1,281.1-1,283.3
Halite, clear, pale-red, minor amount moderate-reddish-brown, fine to medium crystalline; minor to moderate amounts of moderate-reddish-brown polyhalite; minor to moderate amounts of interstitial grayish-red clay	1,283.3-1,285.1
Halite, clear, pale-red, medium to coarse crystalline; moderate amounts disseminated moderate-reddish-brown polyhalite blebs; minor amounts of grayish-green interstitial clay, increases toward base	1,285.1-1,289.5
Halite, clear, pale-red, fine to medium crystalline; minor amounts of moderate-orange-pink and medium-reddish-brown polyhalite blebs; moderate amount of interstitial grayish-red clay; grayish-red clay partings at 1,289.9 feet; grayish-green clay seam at top of unit	1,289.5-1,292.6
Halite, clear, medium crystalline; moderate amounts of moderate-reddish-orange blebs and stringers	1,292.6-1,294.7

Table 15C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear, pale-red, medium crystalline, argillaceous; moderate amounts of medium-orange-pink, moderate-reddish-brown polyhalite blebs; moderate to heavy amounts of grayish-red interstitial clay; moderate amounts of grayish-green interstitial clay	1,294.7-1,297.4
Halite, clear, pale-red, fine to medium crystalline; argillaceous; moderate amounts of moderate-orange-pink and moderate-reddish-brown polyhalite blebs; moderate amounts of grayish-red interstitial clay; grayish-red clay parting at 1,298.4 feet; minor amounts of grayish-green interstitial clay	1,297.4-1,299.7
Halite, clear, pale-red, medium to coarse crystalline; moderate amounts of moderate-reddish-brown polyhalite blebs and stringers; increase in polyhalite toward base; minor amounts of grayish-green interstitial clay	1,299.7-1,303.0
Halite, clear, pale-red, fine to coarse crystalline, argillaceous; moderate amounts of moderate-reddish-brown polyhalite blebs; moderate amounts of grayish-red interstitial clay; minor amounts of grayish-green interstitial clay; grayish-red clay parting at 1,307.0 feet	1,303.0-1,309.5
Halite, clear, pale-red, medium to coarse crystalline; minor amounts moderate-reddish-brown polyhalite blebs	1,309.5-1,310.8
Halite, clear to pale-red, fine to coarse crystalline; moderate amounts of moderate-reddish-brown polyhalite blebs; minor interstitial grayish-green and grayish-red clay	1,310.8-1,313.8
Halite, clear, pale-red, medium to coarse crystalline; minor amounts of moderate-reddish-brown, grayish-orange polyhalite blebs	1,313.8-1,321.3
Anhydrite, very light gray to pale-yellowish-brown, massive	1,321.3-1,328.7
Halite, clear, pale-red, moderate-reddish-orange, medium to coarse crystalline; minor to moderate amounts of moderate-reddish-brown and grayish-orange-pink polyhalite blebs and stringers	1,328.7-1,337.9
Anhydrite, gray, dense, banded, grading to gray clay at base	1,337.9-1,347.4
Halite, moderate-reddish-brown, medium to coarse crystalline, polyhalitic; predominant reddish-brown polyhalite stringers	1,347.4-1,348.6
Halite, grayish-green, coarse crystalline, clayey, gray clay at upper contact; minor intergranular reddish-brown polyhalite; gray clay parting at 1,349.2 feet	1,348.6-1,349.4
Halite, light-brown to grayish-brown, coarse crystalline; minor gray clay; minor reddish-brown polyhalite	1,349.4-1,350.7
Halite, light-reddish-orange to light-brown, very coarse crystalline; minor disseminated polyhalite	1,350.7-1,357.2
Halite, moderate-reddish-brown, mottled, coarse crystalline, polyhalitic; gray clayey halite at bottom of unit	1,357.2-1,358.6

Table 15C.—Lithologic log—(Continued)

Description	Depth (feet)
Halite, moderate-reddish-brown, mottled, coarse to very coarse crystalline, polyhalitic; some greenish-gray interstitial clay; concentration of langbeinite	1,358.6-1,359.6
Halite, moderate- to light-reddish-brown, coarse to very coarse crystalline, polyhalitic; polyhalite decreasing to base of unit; some langbeinite	1,359.6-1,364.5
Halite, yellowish-gray to grayish-orange-pink, medium to coarse crystalline	1,364.5-1,369.1
Halite, medium-light-gray to brownish-gray to moderate-reddish-brown, medium to coarse crystalline, clayey; indistinct reddish-brown polyhalite blebs and grayish-green interstitial clay	1,369.1-1,370.7
Halite, pale-red, mottled, coarse to very coarse crystalline, argillaceous; some reddish-brown polyhalite	1,370.7-1,372.1
Halite, moderate-reddish-brown, medium to very coarse crystalline, polyhalitic; indistinct sulfate mineralization	1,372.1-1,372.9
Halite, grayish-orange-pink to moderate-orange-pink, very coarse crystalline, mildly polyhalitic; minor reddish-brown polyhalite blebs	1,372.9-1,375.1
Halite, moderate-reddish-brown, medium to coarse crystalline, polyhalitic; potassium mineralization	1,375.1-1,375.9
Polyhalite, reddish-brown, dense, halitic; some sylvite leaching	1,375.9-1,376.3
Halite, grayish-green, medium crystalline, clayey; reddish-brown polyhalite increasing at base as blebs and bands	1,376.3-1,377.4
Halite, grayish-orange-pink to light-brown, very coarse crystalline; minor reddish-brown polyhalite blebs	1,377.4-1,378.2
Halite, reddish-brown, coarse crystalline, polyhalitic; numerous reddish-brown polyhalite blebs	1,378.2-1,378.5
Halite, clear, coarse crystalline; very minor grayish-green clay and reddish-brown polyhalite	1,378.5-1,379.0
Halite, light-brownish-gray to light brown, coarse to very coarse crystalline; interstitial gray clay; minor reddish-brown polyhalite blebs; very minor potassium mineralization	1,379.0-1,383.0
Halite, light-brown, very coarse crystalline; very minor reddish-brown polyhalite blebs, grading to clayey halite above and below	1,383.0-1,383.9
Halite, light-brownish-gray, very coarse crystalline, argillaceous	1,383.9-1,384.6
Halite, reddish-brown, mottled, very coarse crystalline, clayey; minor sulfate blebs	1,384.6-1,389.3
Halite, moderate-reddish-orange to light-brown, coarse crystalline, polyhalitic; minor reddish-brown polyhalite blebs	1,389.3-1,391.6
Halite, medium-gray, mottled, medium crystalline, clayey; minor reddish-brown polyhalite blebs	1,391.6-1,392.3

Table 15C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-reddish-orange, medium to coarse crystalline, polyhalitic; reddish-orange polyhalite blebs; polyhalite decreasing with depth; minor langbeinite at 1,395.2 feet	1,392.3-1,395.9
Halite, pinkish-gray to yellowish-gray, medium crystalline; pinkish-orange polyhalite blebs and bands	1,395.9-1,397.5
Halite, light-gray to light-brownish-gray, medium to coarse crystalline; gray interstitial clay	1,397.5-1,398.5
Halite, pinkish-gray, medium crystalline; pinkish-orange polyhalite blebs	1,398.5-1,400.5
Halite, gray, medium crystalline, clayey; sylvite and sulfite minerals concentrated at top	1,400.5-1,401.5
Halite, reddish-brown, mottled, medium to coarse crystalline, mildly polyhalitic; minor reddish-brown polyhalite blebs and stringers; some gray clay	1,401.5-1,402.6
Clay, brown, halitic	1,402.6-1,402.8
Halite, medium-light-gray, mottled, medium to coarse crystalline; interstitial brown clay	1,402.8-1,403.6
Halite, moderate-reddish-brown, mottled, medium to very coarse crystalline, clayey; with interstitial reddish-brown polyhalite	1,403.6-1,404.7
Halite, light-brownish-gray, coarse crystalline; interstitial brown clay	1,404.7-1,406.5
Halite, pale-reddish-brown to light-brown, coarse crystalline; reddish-brown polyhalite blebs and stringers	1,406.5-1,407.1
Halite, light-grayish to orange-pink, medium crystalline, slightly polyhalitic	1,407.1-1,407.4
Halite, moderate-red, coarse crystalline; prominent thin moderate-red polyhalite bands	1,407.4-1,408.1
Halite, grayish-orange-pink to moderate-reddish-orange, medium to coarse crystalline; reddish-orange polyhalite in indistinct bands; interstitial grayish-green clay	1,408.1-1,414.4
Halite, brown, medium crystalline, clayey; brown clay partings at 1,414.7, 1,414.9, 1,415.5, 1,416.0, 1,416.5, 1,416.8, and 1,417.1 feet; reddish-orange polyhalite concentration at top	1,414.4-1,417.1
Halite, pale-yellowish-brown, medium to coarse crystalline; brown interstitial clay	1,417.1-1,420.0
Halite, pale-red, medium to very coarse crystalline; reddish-brown polyhalite blebs; minor brown clay	1,420.0-1,421.5
Halite, medium-light-gray, medium to coarse crystalline, clayey; brown interstitial clay stringers	1,421.5-1,423.5

Table 15C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-reddish-orange, crystalline; minor reddish-orange polyhalite blebs	1,423.5-1,424.9
Halite, light-brownish-gray, medium to coarse crystalline; decreased polyhalite; some gray clay	1,424.9-1,425.3
Halite, light-reddish-orange, medium to coarse crystalline, polyhalitic; reddish-orange polyhalite stringers and blebs	1,425.3-1,426.5
Halite, light-brownish-gray to clear, coarse crystalline; minor gray clay	1,426.5-1,427.1
Halite, moderate-reddish-orange, coarse crystalline, polyhalitic; reddish-orange polyhalite blebs	1,427.1-1,429.1
Halite, brownish-gray, coarse crystalline, clayey; brown interstitial clay	1,429.1-1,430.4
Halite, brownish-gray, mottled, fine to medium crystalline, clayey; brown interstitial clay; minor reddish-brown polyhalite blebs	1,430.4-1,432.8
Halite, brownish-gray, mottled to clear, coarse crystalline; brown clay	1,432.8-1,435.5
Halite, light-brown, mottled, medium to coarse crystalline, clayey; reddish-brown polyhalite blebs	1,435.5-1,437.0
Halite, brown, coarse crystalline, clayey; brown clay partings at 1,437.7 and 1,437.9 feet	1,437.0-1,438.4
Halite, light-brown, mottled, medium to coarse crystalline, clayey; seams of brown clay and blebs of grayish-green clay; brown clay partings at 1,439.3 and 1,440.0 feet	1,438.4-1,440.6
Halite, grayish-green, coarse crystalline, clayey; grayish-green clay blebs and reddish-orange polyhalite blebs	1,440.6-1,441.9
Halite, moderate-reddish-orange, coarse crystalline, polyhalitic; numerous reddish-brown polyhalite blebs	1,441.9-1,442.6
Halite, moderate-reddish-brown, coarse crystalline, polyhalitic; numerous polyhalite blebs and stringers	1,442.6-1,447.8
Polyhalite, reddish-brown, dense	1,447.8-1,448.5
Clay, grayish-green, halitic	1,448.5-1,448.9
Halite, light-reddish-brown, mottled, medium to coarse crystalline, argillaceous, polyhalitic	1,448.9-1,449.5
Halite, light-brownish-gray, clayey; brown clay partings at 1,449.5 and 1,449.8 feet	1,449.5-1,449.9
Halite, reddish-brown, very coarse crystalline, polyhalitic	1,449.9-1,450.6
Halite, light-brownish-gray, medium to coarse crystalline; minor brown clay; minor reddish-brown polyhalite blebs	1,450.6-1,452.1
Halite, light-brown to clear, coarse to very coarse crystalline; minor brown clay	1,452.1-1,454.1

Table 15C.—Lithologic log—(Continued)

Description	Depth (feet)
Halite, light-reddish-orange to light-brown, fine to medium crystalline, saccharoidal; polyhalitic in upper part; brown clay parting at top of unit	1,454.1-1,455.3
Halite, light-brownish-gray, coarse crystalline, clayey; minor polyhalite at base	1,455.3-1,458.4
Halite, light-brown, fine crystalline, clayey	1,458.4-1,459.3
Halite, grayish-red, coarse crystalline, clayey; brown clay parting at 1,460.8 feet	1,459.3-1,462.6
Halite, light-brownish-gray, fine to medium crystalline, polyhalitic, clayey	1,462.6-1,465.0
	Total depth

Table 15D.--Mineralogical and chemical analyses of core samples from potash ore zones and mineralized salt beds in drill hole P-15

[oz, ore zone; um, upper member, mm, middle member; lm, lower member; sb, salt bed; tr, trace; Bl, bloedite; Ha, halite; Ka, kainite; La, langbeinite; Le, leonite; Po, polyhalite; Sy, sylvite. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mineralogy: X-ray diffraction analysis[1]	Chemical analysis (weight percent): Ca	K	Mg	Na	Cl	SO_4	H_2O+	H_2O-	Water insoluble
P-15/1	1,357.77-1,358.60	0.83	sb	>9 Ha; <1 Po; tr Sy	0.94	0.60	0.58	38.0	56.5	2.0	0.05	0.09	0.58
[2]P-15/2	1,358.60-1,359.69	1.09	4th oz, um	6 Ha; >2 La; <1 Ka; tr Le, Po	.39	10.0	.23	20.0	31.5	33.5	1.6	.15	1.3
[2]P-15/2					.35	9.4	6.8	20.0	29.5	33.5	1.5	.22	1.4
P-15/3	1,359.69-1,361.62	1.93	4th oz, mm	>9 Ha; <1 Po; tr Sy	.44	.52	.25	39.0	58.0	1.6	.05	.04	.08
P-15/4	1,367.60-1,369.10	1.50	4th oz, mm	>9 Ha; <1 Po; tr La	.33	1.3	.19	38.0	56.0	3.8	.14	.04	.11
[2]P-15/5	1,369.10-1,370.74	1.64	4th oz, lm	>8 Ha; <1 Ka, Po; tr La, Le	.63	3.9	.38	29.5	46.0	11.0	2.3	.40	4.8
[2]P-15/5					.61	4.2	2.4	29.5	44.5	11.0	2.2	.43	5.1
[2]P-15/6	1,370.74-1,371.94	1.20	sb (below 4th oz)	>9 Ha; tr La, Po	.35	4.0	.21	37.5	55.0	2.3	.16	.07	.60
[2]P-15/6					.33	.80	.41	38.0	58.0	1.97	.10	.13	.69
[2]P-15/7	1,371.94-1,372.81	.87		8 Ha; <1 Po; 1 La	.77	5.1	.43	30.0	46.0	15.5	.11	.07	.30
[2]P-15/7					.78	5.4	2.8	31.0	46.0	15.3	.06	.13	.30
P-15/8	1,372.81-1,374.77	1.96		>8 Ha; <1 La, Po	1.0	1.8	.57	35.0	54.5	5.8	.04	.04	.20
[2]P-15/9	1,374.77-1,375.80	1.03		7 Ha; >2 La; <1 Po	1.2	7.2	.67	25.0	38.5	24.5	.13	.01	.09
[2]P-15/9					1.2	6.4	4.4	25.5	39.0	25.0	.07	.09	.12
[2]P-15/10	1,375.80-1,376.30	.50		>4 Ha, Po; tr Ka, La, Le, Sy	8.6	8.6	5.3	15.5	24.0	38.0	1.1	.09	.48
[2]P-15/10					8.5	7.8	3.5	16.5	25.0	38.0	1.3	.13	.65
[2]P-15/11	1,376.30-1,377.33	1.03		>7 Ha; >2 Po; tr Ka, La, Le, Sy	3.2	3.0	1.7	30.5	45.5	10.5	.50	.30	3.7
[2]P-15/11					2.8	2.8	.98	30.0	47.0	10.5	.51	.32	4.2
P-15/12	1,398.38-1,399.66	1.28	sb	>9 Ha; <1 Po, tr La, Le	.71	.52	.39	38.0	58.0	1.8	.05	.06	.12
[2]P-15/13	1,399.66-1,400.38	.72		8 Ha; >1 La; tr Ka, Le, Po	.45	7.2	8.2	25.0	37.0	24.5	.04	.08	.09
[2]P-15/13					.45	6.4	4.6	25.5	37.0	25.0	.12	.14	.23
[2]P-15/14	1,400.38-1,401.51	1.13	2d oz	>8 Ha; <1 Bl, Ka, La; tr Le, Po	.05	3.3	.02	30.0	47.5	12.5	2.8	.91	1.1
[2]P-15/14					.05	3.6	2.8	30.5	45.0	12.0	2.3	1.1	1.3
[2]P-15/15	1,401.51-1,402.36	.85		>8 Ha; >1 Po; tr La, Le	2.2	1.9	1.1	34.0	[illegible]	6.7	.11	.13	.55
[2]P-15/15					2.1	1.9	.56	35.5	52.0	6.5	.11	.27	.79

[1]Estimate of amount reported on a scale of 0-10.
[2]Replicate analyses.

Table 15E.--Calculated [illegible] (mineral content) and potash distribution by mineral in core samples from potash ore zones and mineralized salt beds in drill hole P-15

[oz, ore zone; um, upper member; mm, middle member; lm, lower member; sb, salt bed; Bl, bloedite; Ha, halite; Ka, kainite; La, langbeinite; Le, leonite; Po, polyhalite; Sy, sylvite; Insol., clay and silt; leaders (---), not present. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mode (weight percent mineral)								K_2O distribution by minerals					
				Sy	La	Ka	Le	Bl	Ha	[illegible]	Insol.	Sy	La	Ka	Le	Po	Total
P-15/1	1,357.77-1,358.60	0.83	sb	0.4	---	---	---	---	96.6	3.1	0.6	0.2	---	---	---	0.5	0.7
[1]P-15/2	1,358.60-1,359.69	1.09	4th oz, um	---	34.5	4.6	11.3	---	50.8	2.9	1.3	---	7.8	0.9	2.9	.4	12.0
[1]P-15/2				---	41.3	4.4	2.8	---	50.8	2.6	1.4	---	9.4	.8	.7	.4	11.3
P-15/3	1,359.69-1,361.62	1.93	4th oz, mm	.4	---	---	---	---	95.3	2.5	<.1	.2	---	---	---	.4	.6
P-15/4	1,367.60-1,369.10	1.50	4th oz, mm	---	5.2	---	---	---	92.3	2.5	.1	---	1.2	---	---	.4	1.6
[1]P-15/5	1,369.10-1,370.74	1.64	4th oz, lm	---	3.6	10.6	4.4	---	73.3	4.7	4.8	---	.8	2.0	1.1	.7	4.6
[1]P-15/5				---	4.7	10.1	5.3	---	71.0	4.6	5.1	---	1.1	1.9	1.4	.7	5.1
[1]P-15/6	1,370.74-1,371.94	1.20	sb (below 4th oz)	---	.9	---	---	---	95.3	[illegible]	.6	---	.2	---	---	.4	.4
[1]P-15/6				---	2.5	---	---	---	95.6	2.5	.7	---	.6	---	---	.4	1.0
[1]P-15/7	1,371.94-1,372.81	.87		---	23.1	---	---	---	75.8	5.8	.3	---	5.2	---	---	.9	6.1
[1]P-15/7				---	24.6	---	---	---	75.8	5.8	.3	---	5.6	---	---	.9	6.5
P-15/8	1,372.81-1,374.77	1.96		---	6.6	---	---	---	89.0	4.2	.2	---	1.5	---	---	.7	2.2
[1]P-15/9	1,374.77-1,375.80	1.03		---	32.0	---	---	---	63.4	9.0	<.1	---	7.3	---	---	1.4	8.7
[1]P-15/9				---	27.8	---	---	---	64.8	9.0	.1	---	6.3	---	---	1.4	7.7
[1]P-15/10	1,375.80-1,376.30	.50		.1	.2	.2	.3	---	39.4	64.7	.5	<.1	<.1	<.1	<.1	10.1	10.3
[1]P-15/10				.1	.2	.2	.3	---	41.0	58.6	.6	<.1	<.1	<.1	<.1	9.1	9.3
[1]P-15/11	1,376.30-1,377.33	1.03		.1	.1	.2	.3	---	74.8	21.8	3.9	<.1	<.1	<.1	<.1	3.4	3.6
[1]P-15/11				<.1	<.1	<.1	<.1	---	76.3	21.0	4.2	<.1	<.1	<.1	<.1	3.2	3.4
P-15/12	1,398.38-1,399.66	1.28	sb	---	.9	---	.5	---	95.6	1.8	.1	---	.2	---	.1	.3	.6
[1]P-15/13	1,399.66-1,400.38	.72		---	24.7	1.2	8.9	---	60.7	3.4	<.1	---	5.6	.2	2.3	.5	8.6
[1]P-15/13				---	26.5	3.7	1.8	---	64.8	3.4	.2	---	6.0	.7	.5	.5	7.7
[1]P-15/14	1,400.38-1,401.51	1.13	2d oz	---	7.0	5.8	4.4	4.6	74.7	.4	1.1	---	1.6	1.1	1.2	<.1	3.9
[1]P-15/14				---	8.2	8.1	3.5	1.0	72.3	.4	1.3	---	1.9	1.5	.9	<.1	4.3
[1]P-15/15	1,401.51-1,402.36	.85		---	.4	---	.4	---	84.9	13.5	.6	---	<.1	<.1	---	2.1	2.2
[1]P-15/15				---	.4	---	.4	---	85.7	13.5	.8	---	<.1	<.1	---	2.1	2.2

[1]Replicate analyses.

TABLES 16A-16G

Basic data from drill hole P-16,
Waste Isolation Pilot Plant area, Eddy County, New Mexico

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16G.--Gamma-ray and neutron logs of drill hole	foldout

Table 16A.--Abridged drill-hole history

LOCATION: Sec. 5, T. 23 S., R. 31 E.
198 m (951 ft) from south line
497 m (1,629 ft) from east line

ALTITUDE (LAND SURFACE): 1,013 m (3,322.8 ft). Datum for depth measurements in drilling and logging operations.

LITHOLOGIC LOG PREPARED BY: J. C. Lorenz, Florian Maldonado, J. W. Mercer, M. N. Mitchell, R. P. Snyder, and R. W. Spengler, September 23 to October 5, 1976.

DRILLING CONTRACTOR: Boyles Bros. Drilling Co.

DRILLING RECORD: Commenced drilling on September 27, and completed on October 5, 1976, at 483 m (1,585 ft) below land surface.

Recovered all casing, and plugged with cement.

REMARKS: Top of salt in Rustler Formation at 168 m (552 ft) below land surface.

Table 16B.--Stratigraphic summary

Rock unit	Depth interval[1] feet	meters
Holocene deposits	0-14	0-4
Pleistocene rocks:		
Gatuna Formation	14-32	4-10
Permian rocks:		
Dewey Lake Red Beds	32-316	10-96
Rustler Formation	316-646	96-197
Magenta Dolomite Member	376-401	115-122
Culebra Dolomite Member	500-523	152-159
Salado Formation	646-1,587	197-484
Upper member	646-1,174	197-358
McNutt potash zone	1,174-1,585	358-433
Vaca Triste Sandstone Member[2]	1,174-1,182	358-360
11th ore zone	1,235-1,237	376-377
Marker bed 117	1,245-1,247	379-380
Marker bed 118	1,269-1,273	387-388
Marker bed 119	1,293-1,295	394-395
10th ore zone	1,307-1,313	398-400
Marker bed 120	1,323-1,324	403-404
9th ore zone	1,328-1,331	405-406
Marker bed 121	1,336-1,338	407-408
Marker bed 122	1,345-1,346	410-410
8th ore zone	1,352-1,365	412-416
Union anhydrite[3]	1,373-1,390	418-424
7th ore zone	1,396-1,400	426-427
6th ore zone	1,411-1,412	430-430
5th ore zone	1,417-1,425	432-434
Marker bed 123	1,450-1,456	442-444
Marker bed 124	1,460-1,470	445-448
4th ore zone	1,480-1,501	451-458
3d ore zone	1,510-1,526	467-465
2d ore zone	1,533-1,536	467-468
1st ore zone	1,556-1,568	474-478
Marker bed 126	1,583-1,585	482-483
Maximum depth recorded	1,588	484

[1]Depth interval recorded from geophysical logs.
[2]Of Adams, 1944.
[3]Informal unit of Salado Formation.

Table 16C.--Lithologic log

Description	Depth (feet)	
Caliche, grayish-orange-pink	0.0-	5.0
Same as above	5.0-	15.0
Sandstone, moderate-reddish-orange, fine-grained; contains minor fragments of caliche	15.0-	25.0
Sandstone, moderate-reddish-brown, fine- to medium-grained, fairly well sorted, subrounded; calcite cement; weakly indurated	25.0-	30.0
Same as above	30.0-	35.0
Sandstone, moderate-reddish-brown, fine- to medium-grained, well-sorted, subangular to subrounded; well indurated; moderate-reddish-brown siltstone, with grayish-green reduction spots	35.0-	40.0
Siltstone, moderate-reddish-brown, with grayish-green reduction spots	40.0-	45.0
Same as above	45.0-	50.0
Same as above	50.0-	100.0
Siltstone, moderate-reddish-brown, with grayish-green reduction spots; moderate-reddish-brown, fine-grained, well sorted sandstone; minor gypsum	100.0-	125.0
Siltstone, moderate-reddish-brown, with grayish-green reduction spots; minor moderate-reddish-brown claystone	125.0-	135.0
Siltstone, moderate-reddish-brown, with grayish-green reduction spots; small amounts moderate-reddish-brown claystone and moderate-reddish-brown, fine-grained sandstone	135.0-	200.0
Siltstone, reddish-brown, with grayish-green reduction spots; sparse grayish-white, clear, very fine grained sandstone	200.0-	205.0
Same as above; with some caliche	205.0-	215.0
Same as above; no caliche; with selenite	215.0-	220.0
Same as above; no sandstone; selenite increasing	220.0-	225.0
Same as above; no sandstone; with selenite	225.0-	230.0
Siltstone, reddish-brown, with grayish-green reduction spots; some shale; some selenite	230.0-	240.0
No sample	240.0-	245.0
Siltstone, reddish-brown, with grayish-green reduction spots; some shale; sparse selenite	245.0-	260.0
Same as above; some white anhydrite	260.0-	265.0
Same as above; no white anhydrite	265.0-	300.0
Siltstone, reddish-brown, with grayish-green reduction spots; selenite common; trace of white gypsum	300.0-	320.0
Siltstone, reddish-brown, with grayish-green reduction spots, ~ 90 percent; anhydrite, ~ 10 percent; trace of selenite	320.0-	325.0
Same as above; slight increase in anhydrite	325.0-	350.0

Table 16C.--Lithologic log--(Continued)

Description	Depth (feet)
Anhydrite, 90 percent; siltstone, 10 percent	330.0- 335.0
Same as above; less siltstone	335.0- 340.0
No sample	340.0- 345.0
Anhydrite; some siltstone	345.0- 375.0
Dolomite, gray; anhydrite with gypsum rinds; some reddish-brown siltstone	375.0- 390.0
Dolomite, 75 percent; dark-gray anhydrite; gypsum and selenite; some reddish-brown siltstone	390.0- 400.0
Dolomite, gray, fine crystalline, 80 percent; medium- to dark-gray anhydrite; gypsum and selenite; some reddish-brown siltstone	400.0- 405.0
Dolomite, decreasing; gray anhydrite; gypsum and selenite; some reddish-brown siltstone	405.0- 430.0
Dolomite, sparse; anhydrite; some reddish-brown siltstone	430.0- 435.0
Anhydrite, gray, with gypsum rinds; some reddish-brown siltstone; gypsum and selenite	435.0- 500.0
Anhydrite, medium-gray, fine crystalline; gypsum and selenite; some reddish-brown siltstone	500.0- 510.0
Same as above; with possible dolomite	510.0- 520.0
Dolomite, medium-gray, vuggy; anhydrite; some reddish-brown siltstone	520.0- 540.0
Same as above; less dolomite	540.0- 550.0
Anhydrite, medium- to light-gray; some gypsum, dolomite, and reddish-brown siltstone	550.0- 560.0
Same as above; reddish-brown and bluish-black siltstone	560.0- 565.0
Same as above; reddish-brown siltstone	565.0- 575.0
Siltstone, reddish-brown; grayish-white gypsum and anhydrite	575.0- 590.0
Siltstone and claystone, dary-grayish-blue; some reddish-brown siltstone; some gray anhydrite and gypsum	590.0- 600.0
Siltstone and claystone, dary-grayish-blue; some gray to white gypsum and anhydrite; reddish-brown siltstone	600.0- 610.0
Same as above; with decreasing siltstone and claystone; increasing gypsum and anhydrite	610.0- 615.0
Siltstone and claystone, dary-grayish-blue; some gray to white gypsum and anhydrite; reddish-brown siltstone	615.0- 625.0
Claystone; no siltstone	625.0- 635.0
Anhydrite, gray; white gypsum; some bluish-gray-black siltstone	635.0- 645.0
Same as above; with increasing siltstone	645.0- 655.0
Same as above; no siltstone	655.0- 660.0
Siltstone; mudstone; gray selenite; reddish-brown siltstone; gray anhydrite	660.0- 670.0

Table 16C.--Lithologic Log--(Continued)

Description	Depth (feet)
Siltstone; mudstone; gray selenite; reddish-brown siltstone; gray anhydrite; sparse dolomite	670.0- 680.0
Same as above; no dolomite	680.0- 685.0
Same as above; sparse dolomite; increasing reddish-brown siltstone between 690.0 and 695.0 feet	685.0- 700.0
Siltstone, reddish-brown; some gray siltstone and clay; gray anhydrite and gypsum	700.0- 710.0
Halite, clear to pink; moderate amount of cavings	710.0- 715.0
Halite, clear; sparse polyhalite and red mud	715.0- 735.0
Same as above; increasing mud	735.0- 740.0
Same as above; no increase in mud	740.0- 750.0
Same as above; increasing mud	750.0- 765.0
Same as above; increasing orange polyhalite	765.0- 780.0
Halite, clear; sparse, moderate-reddish-orange polyhalite	780.0- 800.0
Halite, clear; minor moderate-reddish-orange polyhalite	800.0- 825.0
Halite, clear to light-gray; moderate reddish-orange, argillaceous, polyhalite	825.0- 835.0
Halite, clear; minor moderate-reddish-orange polyhalite	835.0- 885.0
Halite, clear; larger percentage of moderate-reddish-orange polyhalite	885.0- 890.0
Halite, clear; minor moderate-reddish-orange polyhalite	890.0- 925.0
Halite, clear; larger percentage of moderate-reddish-orange polyhalite	925.0- 930.0
Halite, clear; minor moderate-reddish-orange polyhalite	930.0- 970.0
Halite, clear to very light gray; larger percentage of polyhalite; slightly argillaceous	970.0- 975.0
Halite, clear; minor moderate-reddish-orange polyhalite	975.0- 985.0
Same as above; slightly argillaceous	985.0- 990.0
Halite, clear; minor moderate-reddish-orange polyhalite	990.0-1,010.0
Same as above	1,010.0-1,075.0
Same as above; increasing polyhalite	1,075.0-1,085.0
Same as above; decreasing polyhalite	1,085.0-1,100.0
Halite, clear	1,100.0-1,105.0
Halite, clear; trace of polyhalite	1,105.0-1,155.0
Halite, clear	1,155.0-1,165.0
Halite, clear; trace of polyhalite	1,165.0-1,190.5

Table 16C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to moderate-orange pink and pale-red, fine to medium crystalline; sparse moderate-reddish-orange disseminated polyhalite blebs; minor grayish-red interstitial clay; minor clay partings at 1,191.4 and 1,194.5 feet	1,190.5-1,202.6
Halite, moderate-yellowish-brown to pale-brown to pale-reddish-brown, mottled, fine to medium crystalline, argillaceous; disseminated moderate-reddish-orange polyhalite; minor grayish-red interstitial clay	1,202.6-1,203.6
Clay, pale-red to pale-reddish-brown, halitic to silty; minor moderate-reddish-orange polyhalite	1,203.6-1,204.7
Halite, pale-yellowish-brown to pale-red, fine to medium crystalline, argillaceous; common interstitial clay; minor reddish-orange polyhalite; pale-reddish-brown to greenish-gray clay partings at 1,205.0, 1,205.5, 1,206.6, 1,206.8, and 1,207.0 feet; lower 1.0 foot of unit contains very little clay	1,204.7-1,207.9
Halite, clear, very coarse crystalline; sparse moderate-reddish-orange polyhalite	1,207.9-1,208.4
Halite, pale-red to pale-reddish-brown, medium to coarse crystalline; common moderate-reddish-orange disseminated polyhalite with prominent bands of dense polyhalite at 1,209.5-1,209.6 and 1,209.8 feet; minor grayish-green clay parting at 1,209.9 feet	1,208.4-1,211.7
Clay, light-bluish-gray to pale-red, halitic to clayey halite; medium crystalline halite; common moderate-reddish-orange polyhalite	1,211.7-1,213.4
Halite, pale-red to pale-reddish-brown, medium to coarse crystalline, argillaceous; common pale-reddish-brown interstitial clay; minor moderate-reddish-orange polyhalite	1,213.4-1,216.1
Halite, clear, grayish-red to pale-red, medium to coarse crystalline; grayish-green to pale-reddish-brown clay in upper 1.5 feet; pale-reddish-brown parting at 1,217.3 feet; common blebs and disseminated moderate-reddish-orange polyhalite	1,216.1-1,224.2
Halite, pale-yellowish-brown to pale-red, medium to coarse crystalline; common grayish-green clay in lower 1.0 foot; minor moderate-reddish-orange polyhalite	1,224.2-1,229.7
Halite, pale-red to pale-reddish-brown, mottled, medium to very coarse crystalline, argillaceous; prominent medium-bluish-gray clay band at 1,229.8 feet; pale-reddish-brown clay partings at 1,230.1, 1,231.1, and 1,231.6 feet; common disseminated moderate-reddish-orange polyhalite	1,229.7-1,232.6

Table 16C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red to moderate-orange-pink, medium to coarse crystalline; common moderate-reddish-orange dissolved particles and blebs of polyhalite, increasing at base; pale-reddish-brown clay parting at 1,235.3 feet, grayish-green interstitial clay at 1,237.1, 1,237.5, and 1,237.8 feet----------	1,232.6-1,239.9
Polyhalite, moderate-reddish-brown, dense; prominent 0.1 foot thick moderate-bluish-gray clay at base----------	1,239.9-1,242.2
Halite, pale-red to moderate-orange-pink, medium to very coarse crystalline; common to abundant moderate-reddish-orange disseminated particles and blebs of polyhalite; greenish-gray disseminated clay in zone from 1,249.4 to 1,250.1 feet----------	1,242.2-1,251.8
Halite, clear to pale-red, medium to coarse crystalline, argillaceous; sparse to moderate moderate-reddish-brown blebs and stringers; greenish-gray clay partings at 1,251.8 and 1,252.8 feet; moderate-brown clay parting at 1,253.0 feet----------	1,251.8-1,258.4
Halite, clear to pale-red, medium to coarse crystalline; moderate amount of moderate-reddish-brown stringers and blebs of polyhalite----------	1,258.4-1,261.0
Halite, clear to moderate-reddish-brown, medium to coarse crystalline; moderate amount of moderate-reddish-orange stringers and blebs of polyhalite; disseminated grayish-green clay; grayish-green clay partings at 1,261.8, 1,262.2, 1,263.0, and 1,263.1 feet; 0.1 foot polyhalite stringer at base----------	1,261.0-1,264.0
Polyhalite, pale-reddish-brown, fine crystalline, massive; trace of halite in blebs and stringers----------	1,264.0-1,268.0
Halite, clear to moderate-reddish-orange, medium to very coarse crystalline; moderate amount of moderate-reddish-orange polyhalite in stringers and blebs; polyhalite stringers at 1,270.2 and 1,271.5 feet; grayish-green disseminated clay at 1,272.8 feet; grayish-green clay parting at 1,272.0 feet----------	1,268.0-1,275.6
Halite, clear to pale-red, fine to medium crystalline, argillaceous; sparse moderate-reddish-orange polyhalite blebs; grayish-green clay partings at 1,275.6 and 1,276.0 feet; moderate-grayish-red clay partings at 1,276.4, 1,277.1, 1,277.9, 1,278.4, 1,278.8, and 1,279.3 feet----------	1,275.6-1,279.3
Halite, clear to pale-reddish-brown, medium to coarse crystalline; moderate amounts of moderate-reddish-orange polyhalite blebs; moderate-orange-pink stringers of polyhalite, increasing at base------	1,279.3-1,288.2

Table 16C.--Lithologic log--(Continued)

Description	Depth (feet)
Polyhalite, moderate-reddish-brown, fine crystalline, massive, dense; grayish-green clay partings from 1,289.1 to 1,289.7 feet------	1,288.2-1,289.7
Halite, clear to pale-red, medium to coarse crystalline, argillaceous; moderate amounts of moderate-reddish-orange to moderate-reddish-brown polyhalite blebs; grayish-red interstitial clay----------	1,289.7-1,293.2
Halite, clear to pale-red, medium to coarse crystalline; sparse to moderate amounts of moderate-reddish-orange polyhalite blebs------	1,293.2-1,300.8
Halite, clear, medium crystalline; moderate amounts of moderate-reddish-brown blebs of polyhalite; moderate amounts of sylvite mineralization----------	1,300.8-1,301.2
Halite, clear to pale-red, medium to coarse crystalline, argillaceous; moderate amount of moderate-reddish-brown blebs and stringers of polyhalite; grayish-green interstitial clay in upper part; grayish-green clay seams at 1,301.8 feet; moderate sylvite mineralization with sulfates at base----------	1,301.2-1,302.3
Halite, clear to pale-red to moderate-reddish-orange, fine to medium crystalline; moderate amounts of moderate-reddish-orange and moderate-reddish-brown polyhalite blebs and stringers----------	1,302.3-1,303.9
Halite, clear to pale-red, fine to medium crystalline, argillaceous; trace of moderate-orange-pink polyhalite blebs; interstitial grayish-green clay; grayish-green clay parting at 1,304.4 feet; grayish-red interstitial clay and clay parting at base; moderate amounts of sulfates (kainite after langbeinite), decreasing at base----------	1,303.9-1,306.5
Halite, clear to pale-red, fine to medium crystalline, argillaceous; moderate amounts of moderate-reddish-orange polyhalite blebs; interstitial grayish-red clay----------	1,306.5-1,307.5
Halite, clear to pale-red, medium to coarse crystalline; moderate amounts of moderate-orange-pink stringers and blebs of polyhalite; sparse amounts of grayish-red interstitial clay----------	1,307.5-1,312.4
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; sparse moderate-reddish-orange polyhalite blebs; polyhalite bands and stringers at 1,316.0, 1,317.3, and 1,317.5 feet----------	1,312.4-1,317.8
Polyhalite, moderate-reddish-brown, fine crystalline; clear, 0.2-foot thick halite band at 1,318.2 feet; 0.1-foot thick grayish-green clay seam at base----------	1,317.8-1,318.9

Table 16C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to pale-red to moderate-reddish-orange, medium to coarse crystalline; moderate amounts of moderate-reddish-orange polyhalite blebs and stringers	1,318.9-1,322.7
Halite, clear to pale-red, medium to very coarse crystalline, argillaceous; moderate amounts of moderate-reddish-brown blebs and stringers of polyhalite; grayish-green intergranular clay becomes moderate brown at 1,324.2 feet; polyhalite stringers abundant in lower 0.7 foot; grayish-green clay parting at 1,322.7 and 1,324.2 feet; moderate-brown clay parting at 1,325.3 feet	1,322.7-1,326.9
Halite, clear to moderate-reddish-orange, coarse crystalline; moderate amounts of moderate-orange-pink polyhalite in blebs and stringers	1,326.9-1,330.6
Polyhalite, pale-reddish-brown, fine crystalline, dense; scattered blebs and stringers of clear to pale-red halite in center; grayish-green clay parting at base	1,330.6-1,332.7
Halite, clear, very coarse crystalline; sparse to moderate amounts of moderate-orange-pink polyhalite in blebs and stringers	1,332.7-1,333.4
Halite, clear to moderate-orange-pink, medium to coarse crystalline; sparse to moderate amounts of moderate-orange-pink polyhalite in blebs and stringers; polyhalite increases at base	1,333.4-1,339.1
Polyhalite, pale-reddish-brown, fine crystalline, dense	1,339.1-1,339.9
Halite, pale-red to pale-reddish-brown, mottled, medium to very coarse crystalline; common disseminated moderate-reddish-orange polyhalite; grayish-green clay partings at 1,340.1, 1,340.5, and 1,340.7 feet	1,339.9-1,341.6
Halite, pale-red to light-brownish-gray, mottled, very coarse crystalline; pale-reddish-brown clay partings at 1,341.8 feet; intercrystalline clay common	1,341.6-1,344.1
Halite, pale-red to pale-reddish-brown, very coarse crystalline; minor disseminated moderate-reddish-orange polyhalite	1,344.1-1,346.0
Halite, mottled, pale-red to light-olive-gray, argillaceous; common disseminated moderate-reddish-orange polyhalite; pale-reddish-brown clay partings at 1,348.8, 1,349.1, 1,349.6, and 1,349.9 feet; common intercrystalline clay	1,346.0-1,350.9
Halite, pale-red to pale-reddish-brown, very coarse crystalline; minor disseminated moderate-reddish-orange polyhalite; grayish-green clay parting at 1,351.1 feet	1,350.9-1,355.3

Table 16C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-yellowish-brown to pale-red, mottled, medium to coarse crystalline, argillaceous; minor moderate-reddish-orange polyhalite; upper 1.0 foot moderate to heavy gray-green clay with partings at 1,355.9 feet; clay in brown seams at 1,356.6, 1,357.5, 1,358.2, 1,359.9, 1,361.4, and 1,361.9 feet----------	1,355.3-1,362.8
Halite, pale-yellowish-brown to pale-red to clear, mottled, medium to very coarse crystalline; common intercrystalline clay with prominent grayish-green clay zone from 1,366.2 to 1,367.4 feet-------	1,362.8-1,368.8
Polyhalite, moderate-red to gray, dense; grades into anhydrite below---	1,368.8-1,369.8
Anhydrite, olive-gray, laminated; grades into polyhalite below---------	1,369.8-1,371.2
Polyhalite, pale-yellowish-brown, dense; grades into anhydrite below---	1,371.2-1,372.3
Anhydrite, medium-gray, dense, laminated; minor halite blebs; common grayish-green disseminated clay in bottom 0.7 foot----------	1,372.3-1,385.4
Halite, light-olive-gray to pale-yellowish-brown, mottled; common intercrystalline grayish-green clay----------	1,385.4-1,386.2
Halite, pale-red to very light brown, coarse to very coarse crystalline; common moderate-reddish-orange disseminated polyhalite; prominent grayish-green clay zone from 1,389.0 to 1,389.5 feet-------	1,386.2-1,391.0
Halite, light-olive-gray to pale yellowish-brown, mottled; common intercrystalline brown clay; parting at 1,391.7 feet----------	1,391.0-1,392.5
Halite, moderate-reddish-brown to pale-red, coarse crystalline; abundant moderate-reddish-orange polyhalite----------	1,392.5-1,393.0
Halite, medium-light gray to bluish-gray, argillaceous----------	1,393.0-1,393.4
Halite, clear to grayish-red and moderate-reddish-orange, fine to medium crystalline, argillaceous; abundant grayish-red interstitial clay in upper 1.5 feet and lower 1.2 feet; sparse moderate-reddish-orange disseminated polyhalite blebs; medium-light-gray clay parting at top of unit; grayish-red parting at 1,394.1, 1,395.9, 1,397.5, 1,398.2 feet and at base----------	1,393.4-1,398.3
Halite, clear to pale-red, medium to coarse crystalline; sparse moderate-reddish-orange polyhalite blebs; minor interstitial grayish-red clay----------	1,398.3-1,403.5
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; sparse moderate-reddish-brown polyhalite blebs----------	1,403.5-1,412.7
Halite, clear to moderate-reddish-orange and pale-red, fine to coarse crystalline; sparse pale-yellowish-orange polyhalite blebs; minor grayish-red and greenish-gray interstitial clay; grayish-brown clay parting at 1,413.5 feet; greenish-gray clay parting at 1,412.7 feet--	1,412.7-1,414.9

Table 16C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to moderate-reddish-orange, fine to coarse crystalline; minor to moderate amount of moderate-reddish-orange polyhalite blebs	1,414.9-1,418.2
Halite, clear to pale-red, fine to coarse crystalline, argillaceous; sparse moderate-reddish-brown polyhalite blebs; pale-reddish-brown and grayish-red interstitial clay; light-gray clay parting at 1,420.0 feet	1,418.2-1,421.8
Halite, clear to moderate-reddish-orange-pink, pale-red, medium to very coarse crystalline; minor moderate-reddish-orange polyhalite blebs; contains pale-red interstitial clay in lower 1.0 foot; polyhalite band 2.1 feet from top	1,421.8-1,428.1
Halite, clear, pale-red, moderate-reddish-orange-pink, fine to medium crystalline; minor moderate-reddish-orange polyhalite blebs; minor light-gray interstitial clay; grayish-red clay in upper 1.6 feet	1,428.1-1,431.6
Halite, clear, pale-red, moderate-orange-pink, medium to very coarse crystalline; moderate-reddish-orange polyhalite blebs and stringers, increasing with depth; lower 1.4 feet contains abundant polyhalite bands and stringers; sparse greenish-gray interstitial clay	1,431.6-1,443.7
Anhydrite, light-olive-gray, massive; disseminated nodules and stringers of clear halite throughout unit	1,443.7-1,449.9
Halite, clear to moderate-reddish-orange, fine to medium crystalline; light-olive-gray anhydrite bands at 1,450.6, 1,451.1, and 1,454.1 feet	1,449.9-1,454.3
Anhydrite, medium-light-gray, massive; mixed with moderate-reddish-orange polyhalite in upper 1.5 feet of unit; massive polyhalite in lower one-fourth of unit; moderate-reddish-orange polyhalite and medium-light-gray clay at 1,462.2-1,462.8 feet	1,454.3-1,464.3
Halite, clear, moderate-reddish-brown and pale-red, medium to coarse crystalline; zone of moderate-reddish-orange polyhalite blebs and stringers at 1,465.0 feet, increasing toward 1,466.4 feet; lower 0.1 foot of interval is massive; greenish-gray clay at base	1,464.3-1,466.5
Halite, pale-red and light-gray, coarse to very coarse crystalline; moderate amount grayish-green intercrystalline clay	1,466.5-1,467.9

Table 16C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to moderate-orange-pink, fine to coarse crystalline; moderate-orange-pink disseminated polyhalite in lower 1.5 feet and upper 1.0 foot of unit----------	1,467.9-1,475.7
Halite, clear to moderate-reddish-orange, fine to medium crystalline; sparse interstitial greenish-gray clay; moderate to heavy disseminated sylvite and langbeinite----------	1,475.7-1,478.4
Halite, clear to moderate-orange-pink, fine to medium crystalline; sparse to minor sylvite and sulfate mineralization disseminated throughout unit----------	1,478.4-1,491.0
Halite, grayish-green to moderate-reddish-brown, fine to medium crystalline, argillaceous; much intercrystalline clay; several clear, crystalline halite zones; moderate langbeinite and sylvite at 1,492.7-1,493.2 feet; minor mineralization below 1,493.2 feet; moderate-reddish-orange polyhalite stringers----------	1,491.0-1,496.6
Halite, moderate-pinkish-orange to light-yellowish-brown, coarse to very coarse crystalline; sparse moderate-orange polyhalite stringers and blebs, increasing at base; minor sylvite; large sylvite crystal at 1,498.4 feet----------	1,496.6-1,501.6
Polyhalite, red, dense----------	1,501.6-1,501.9
Halite, gray to light-gray, medium to coarse crystalline, argillaceous; large kieserite bleb at top; grayish-green clay stringers; clay partings at 1,502.4 feet and base----------	1,501.9-1,503.0
Halite, moderate-reddish-orange to yellowish-brown, coarse crystalline; moderate-reddish-orange stringers and blebs of polyhalite; sparse leached sylvite mineralization----------	1,503.0-1,504.8
Halite, medium-gray to pale-yellowish-brown, fine to very coarse crystalline, argillaceous; disseminated reddish-orange polyhalite blebs and stringers; coarse crystalline, clear halite zones; mottled, yellowish-brown, fine crystalline zones; sparse leached sylvite and sulfate pseudomorphs after langbeinite; reddish-brown and green clay; clay partings at 1,505.3, 1,505.8, and 1,507.1 feet----------	1,504.8-1,511.6
Halite, moderate-pinkish-orange, coarse crystalline, disseminated reddish-orange polyhalite blebs; sparse leached sylvite----------	1,511.6-1,512.6
Halite, pale-red to clear to gray, coarse crystalline; common reddish-brown polyhalite blebs and stringers; grayish-green intercrystalline clay in upper 0.2 foot; sparse leached sylvite; grayish-green clay parting at bottom----------	1,512.6-1,514.5

Table 16C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, yellowish-brown to moderate-orange-pink, coarse crystalline; moderate amount pink-orange polyhalite blebs; moderate amount leached sylvite	1,514.5-1,518.3
Halite, pale-red to moderate-reddish-brown to light-gray, medium to very coarse crystalline; minor amounts reddish-brown polyhalite stringers; zones of grayish-green intercrystalline clay; moderate amount leached sylvite in upper 1.0 foot	1,518.3-1,521.4
Halite, pale-red to pale-yellowish-brown, coarse crystalline; minor amount reddish-brown polyhalite stringers; sparse leached sylvite	1,521.4-1,524.4
Halite, light-gray to clear, fine to medium crystalline, argillaceous; moderate amount grayish-green intercrystalline clay; sparse leached sylvite	1,524.4-1,524.9
Halite, pale-red, clear, pale-yellowish-brown, very coarse crystalline; moderate amount leached sylvite	1,524.9-1,527.0
Halite, clear to light-gray, coarse crystalline; more than 50 percent langbeinite; grayish-green clay seam at base	1,527.0-1,528.0
Halite, pale-red to light-gray to clear, coarse crystalline; moderate amount reddish-brown polyhalite stringers; moderate amount langbeinite and kainite/leonite; brown clay parting at base	1,528.0-1,529.7
Halite, moderate-reddish-brown to reddish-orange, coarse to very coarse crystalline; large amount polyhalite stringers and blebs in lower 0.2 foot	1,529.7-1,530.4
Halite, pale-red to clear, fine to medium crystalline, argillaceous; large amount brown intercrystalline clay; brown clay partings at 1,530.8, 1,531.0, 1,531.8, and 1,532.1 feet	1,530.4-1,533.3
Halite, pale-red, grading down to moderate-reddish-brown to reddish-orange, coarse to very coarse crystalline; minor amount reddish-brown polyhalite stringers; minor amount langbeinite in lower 2.0 feet	1,533.3-1,538.8
Polyhalite, moderate-reddish-brown, dense	1,538.8-1,538.9
Halite, yellowish-brown to moderate-reddish-orange, medium to coarse crystalline; large amount reddish-brown polyhalite stringers and blebs in bottom 0.1 foot	1,538.9-1,540.1
Halite, pale-red to light-gray to moderate-reddish-brown; polyhalite blebs and stringers in lower half; grayish-green intercrystalline clay in upper 0.2 foot; very minor amount leached sylvite	1,540.1-1,544.2

Table 16C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, light-gray to pale-red, fine to medium crystalline, argillaceous; minor amount reddish-brown polyhalite bl s and stringers; moderate amount of brown intercrystalline clay; brown clay partings at 1,544.3, 1,544.7, 1,545.3, and 1,546.8 feet---	1,544.2-1,548.3
Halite, pale-red to moderate-reddish-orange, medium to coarse crystalline; moderate amounts of moderate-reddish-brown polyhalite stringers and blebs----------	1,548.3-1,550.3
Halite, pale-red, light-gray, fine to medium crystalline, argillaceous; moderate amount of reddish-brown polyhalite blebs; fine to medium crystalline, clear halite at base----------	1,550.3-1,551.6
Halite, pale-red to pale-yellowish-brown, fine to coarse crystalline; moderate amounts of reddish-brown polyhalite stringers and blebs-----	1,551.6-1,558.4
Halite, clear to light-gray, medium to coarse crystalline, argillaceous; moderate amount of intercrystalline dark-gray clay; parting at 1,559.7 feet----------	1,558.4-1,560.0
Halite, pale-red to moderate-reddish-orange, mottled, very fine crystalline, with zones of medium crystalline; very sparse leached sulfate; grayish-green intercrystalline clay in lower 0.3 foot----------	1,560.0-1,564.7
Halite, pale-red to light-gray, fine to medium crystalline; moderate amount of moderate-reddish-brown polyhalite stringers and blebs; moderate amount of grayish-green intercrystalline clay----------	1,564.7-1,567.9
Halite, clear to white to pale-red, medium to coarse crystalline, argillaceous; moderate-reddish-brown polyhalite blebs; eminated brown clay blebs, stringers, and intercrystalline clay----------	1,567.9-1,568.9
Clay, brown to grayish-green, halitic----------	1,568.9-1,570.0
Halite, clear to white to light-gray, very coarse crystalline, argillaceous; disseminated and intercrystalline brown and grayish-green clay; disseminated reddish-brown polyhalite stringers--	1,570.0-1,571.3
Halite, pale-red to light-yellowish-brown, coarse crystalline; three bands of very coarse crystalline, clear halite; common intercrystalline and disseminated reddish-brow polyhalite blebs and stringers; sparse grayish-green clay blebs----------	1,571.3-1,577.5
Polyhalite, brownish-red, fine crystalline, dense; fine crystalline halite stringers; 0.4 foot polyhalitic grayish-green clay at base----	1,577.5-1,579.0

Table 16C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-reddish-brown to light-gray, fine to medium crystalline, argillaceous; brown clay parting at 1,579.4 feet; common brown clay stringers at 1,579.4-1,580.0 feet----------	1,579.0-1,580.9
Halite, pale-red to clear to light-gray, very coarse crystalline; sparse reddish-brown polyhalite blebs----------	1,580.9-1,58[illegible].0
	Total depth

Table 16D.--Mineralogical and chemical analyses of core samples from potash ore zones and mineralized salt beds in drill hole P-16

[oz, ore zone; um, upper member; mm, middle member; lm, lower member; sb, salt bed, tr, trace; n.d., not determined; An, anhydrite; Bl, bloedite; Ha, halite; Ka, kainite; Kl, kieserite; La, langbeinite; Le, leonite; Po, polyhalite; Sy, sylvite. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mineralogy: X-ray diffraction analysis[1]	Chemical analysis (weight percent): Ca	K	Mg	Na	Cl	SO_4	H_2O+	H_2O-	Water insoluble
P-16/1	1,300.00-1,300.74	0.74	sb	9 Ha; tr Po, Sy	0.09	0.12	0.04	38.0	n.d.	0.30	n.d.	n.d.	n.d.
P-16/2	1,300.74-1,301.22	.48		9 Ha; <1 Sy; tr Po	.13	2.0	.05	37.5	n.d.	.36	n.d.	n.d.	n.d.
P-16/3	1,301.22-1,301.94	.72	10th oz	>8 Ha; <1 Po, Sy; tr An	.19	3.4	.29	35.5	57.0	1.4	0.47	0.10	1.5
P-16/4	1,301.94-1,302.57	.63		>9 Ha; <1 Po; tr Ka, Le	.37	1.1	.45	36.5	56.0	3.1	.76	.07	.19
P-16/5	1,302.57-1,303.91	1.34		>8 Ha; <1 Po, La	.45	4.4	2.4	31.0	46.0	15.0	.60	.07	.23
P-16/6	1,303.91-1,304.39	.48		7 Ha; <1 La, Ka, Le; tr Bl, Kl	.05	6.5	3.9	24.0	35.0	23.0	5.6	.12	1.2
P-16/7	1,304.39-1,305.46	1.07		9 Ha; <1 Po; tr Le	.49	1.1	.83	26.5	45.5	3.0	1.6	4.2	15.0
P-16/8	1,305.46-1,306.50	1.04		>9 Ha; <1 Po, Sy	.26	.68	.42	33.0	54.0	1.5	.78	1.7	6.5
P-16/9	1,476.25-1,476.76	.51	sb	>9 Ha; <1 Po; tr Kl, Sy	.20	.20	.10	38.0	n.d.	.72	n.d.	n.d.	n.d.
P-16/10	1,476.76-1,478.40	1.64	4th oz, um	5 Ha; >4 La; tr Po	.02	11.0	6.8	14.0	22.5	43.5	.39	.13	.83
P-16/11	1,478.40-1,478.95	.55	4th oz, mm	>9 Ha; <1 Po, La	.26	1.9	1.2	34.0	n.d.	7.2	n.d.	n.d.	n.d.
P-16/12	1,490.12-1,491.00	.88	4th oz, mm	>8 Ha; <1 Po, Sy, La	.07	4.6	1.7	32.5	50.5	9.8	.10	.08	.22
[2]P-16/13	1,491.00-1,491.56	.56	4th oz, lm	7 Ha; <1 La, Ka; >1 Le	.03	7.8	3.7	15.5	27.0	22.0	4.1	1.4	16.0
[2]P-16/13					.04	6.4	3.8	15.5	28.5	21.5	3.9	1.2	16.0
[2]P-16/14	1,491.56-1,492.64	1.08		>8 Ha; <1 La; >1 Po; tr Sy, Le	.97	2.3	1.1	31.0	48.5	7.9	.77	.24	5.5
[2]P-16/14					.94	3.2	1.1	32.0	48.0	8.2	.32	.52	5.9
P-16/15	1,492.64-1,493.89	1.25		7 Ha; 2 La; <1 Po, Le; tr Sy	.21	7.8	4.1	22.0	35.5	24.5	1.7	.21	3.3
P-16/16	1,493.89-1,495.04	1.15		9 Ha; <1 Po, La; tr Le	.46	1.9	1.1	31.0	49.5	6.3	1.2	.53	6.6
P-16/17	1,495.04-1,496.37	1.33		8 Ha; <1 Po; 1 Le; tr La, Ka	.65	3.2	1.4	27.0	44.0	10.5	2.1	.85	9.0
P-16/18	1,[illegible].05-1,526.90	.85	sb	9 Ha; <1 Po; tr Sy	.45	.36	.15	37.0	59.0	1.7	.11		.04
P-16/19	1,[illegible]-1,5[illegible]	1.10	2d oz	7 Ha; >2 La; tr Po, Ka	.10	8.8	5.6	20.0	31.5	34.0	.44	[illegible]	.35
P-16/20	1,[illegible]-1,529.64	1.64		8 Ha; <1 Po, La, Ka; tr Sy	.41	1.5	.89	33.0	53.0	5.4	1.6	.23	2.9
P-16/21	1,529.64-1,530.30	.66		>8 Ha; 1 Po; tr Sy, Ka	1.1	.92	.37	35.5	55.0	4.7	.12	.10	.26

[1] Estimate of amount reported on a scale of 0-10.

[2] Replicate analyses.

Table 16E.--Calculated mode (mineral content) and potash distribution by mineral in core samples from potash ore zones and mineralized salt beds in drill hole P-16

[oz, ore zone; um, upper member; mm, middle member; lm, lower member; sb, salt bed; n.d.; not determined; leaders (----), not present; Bl, bloedite; Ha, halite; Ka, kainite; Ki, kieserite; La, langbeinite; Le, leonite; Po, polyhalite, Sy, sylvite; Insol., clay and silt. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mode (weight percent mineral)									K_2O distribution by minerals					
				Sy	La	Ka	Le	Bl	Ki	Ha	Po	Insol.	Sy	La	Ka	Le	Po	Total
P-16/1	1,300.00-1,300.74	0.74	sb	0.1	----	----	----	----	----	96.6	0.4	n.d.	<0.1	----	----	----	<0.1	0.1
P-16/2	1,300.74-1,301.22	.48		3.7	----	----	----	----	----	95.3	.5	n.d.	2.3	----	----	----	.1	2.4
P-16/3	1,301.22-1,301.94	.72	10th oz	5.9	----	----	----	----	----	90.3	2.2	1.5	3.8	----	----	----	.3	4.1
P-16/4	1,301.94-1,302.57	.63		----	----	2.2	1.9	----	----	91.8	2.8	.2	----	----	0.4	0.5	.4	1.3
P-16/5	1,302.57-1,303.91	1.34		----	21.0	----	----	----	----	75.8	3.4	.2	----	4.8	----	----	.5	5.3
P-16/6	1,303.91-1,304.39	.48		----	14.0	8.3	11.8	3.8	2.2	55.8	.4	1.2	----	3.2	1.6	<3.0	.1	7.8
P-16/7	1,304.39-1,305.46	1.0[illegible]		----	----	----	2.9	----	----	75.0	3.7	15.0	----	----	----	.7	.6	1.3
P-16/8	1,305.46-1,306.50	1.04		.7	----	----	----	----	----	88.4	2.3	6.5	.4	----	----	----	.4	.8
P-16/9	1,476.25-1,476.76	.51	sb	----	.6	----	----	----	----	96.6	.7	n.d.	----	.1	----	----	.1	.2
P-16/10	1,476.76-1,478.40	1.64	4th oz, um	----	58.3	----	----	----	----	37.1	.1	.8	----	13.2	----	----	<.1	13.2
P-16/11	1,478.40-1,478.95	.55	4th oz, mm	----	8.8	----	----	----	----	86.5	1.9	n.d.	----	2.0	----	----	.3	2.3
P-16/12	1,490.12-1,491.00	.88	4th oz, mm	3.7	13.6	----	----	----	----	82.6	.5	.2	2.4	3.1	----	----	<.1	5.5
[1]P-16/13	1,491.00-1,491.56	.56	4th oz, lm	----	11.9	11.8	17.3	----	----	39.4	.6	16.0	----	2.7	2.2	4.4	<.1	9.3
[1]P-16/13				----	24.5	7.8	2.6	----	----	45.2	.3	16.0	----	5.6	1.4	.7	<.1	7.7
[1]P-16/14	1,491.56-1,492.64	1.08		----	4.0	----	.9	----	----	79.3	7.3	5.5	----	.9	----	.2	1.1	2.7
[1]P-16/14				----	4.1	----	1.6	----	----	77.4	7.0	5.9	----	.9	----	.4	1.1	3.8
P-16/15	1,492.64-1,493.89	1.25		----	28.6	----	10.4	----	----	55.9	1.6	3.3	----	6.5	----	2.7	.2	9.4
P-16/16	1,493.89-1,495.04	1.15		----	2.2	----	4.8	----	----	81.6	3.4	6.6	----	.5	----	1.2	.5	2.2
P-16/17	1,495.04-1,[illegible].37	1.33		----	4.3	3.2	5.9	----	----	71.8	4.9	9.0	----	1.0	.6	1.[illegible]	.8	3.9
P-16/18	1,526.05-1,526.90	.85	sb	<.1	----	----	----	----	----	97.2	2.6	<.1	<.1	----	----	----	.4	.4
P-16/19	1,526.90-1,528.00	1.10	2d oz	----	44.6	2.0	----	----	----	51.5	.7	.4	----	10.1	.4	----	.1	10.6
P-16/20	1,528.00-1,529.64	1.64		.3	1.8	3.9	----	----	----	86.2	3.7	2.9	.2	.4	.7	----	.5	1.8
P-16/21	1,529.64-1,530.30	.66		.1	----	----	.1	----	----	97.5	6.3	.3	.1	----	<.1	----	1.0	1.1

[1] Replicate analyses.

TABLES 17A-17G

Basic data from drill hole P-17,
Waste Isolation Pilot Plant area, Eddy County, New Mexico

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Table 17A.--Abridged drill-hole history

LOCATION: Sec. 4, T. 23 S., R. 31 E.
412 m (1,351 ft) from south line
120 m (395 ft) from west line

ALTITUDE (LAND SURFACE):-- 1,018 m (3,339.5 ft). Datum for depth measurements in drilling and logging operations.

LITHOLOGIC LOG PREPARED BY: R. J. Cheeseman, J. C. Lorenz, Florian Maldonado, J. W. Mercer, B. R. Orr, L. A. Rives, R. P. Snyder, and R. W. Spengler, October 18-26, 1976.

DRILLING CONTRACTOR: Boyles Bros. Drilling Co.

DRILLING RECORD: Commenced drilling on October 18, and completed on October 26, 1976, at 506 m (1,660 ft) below land surface.

Drilled with air to 81 m (265 ft), and with air foam to 212 m (695 ft). Hit water at 81 m (265 ft) and at 183 m (600 ft) below land surface.

Hole plugged from 506 to 223 m (1,660-731 ft) with cement and converted to hydrologic observation well in Rustler Formation.

REMARKS: Top of salt in Rustler Formation at 183 m (602 ft) below land surface.

Table 17B.--Stratigraphic summary

Rock unit	Depth interval[1] feet	meters
Holocene deposits	0-14	0-4
Pleistocene rocks:		
Gatuna Formation	14-46	4-14
Permian rocks:		
Dewey Lake Red Beds	46-382	14-116
Rustler Formation	382-715	116-218
Magenta Dolomite Member	438-463	134-141
Culebra Dolomite Member	558-583	170-178
Salado Formation	715-1,662	218-507
Upper member	715-1,234	218-376
McNutt potash zone	1,234-1,648	376-502
Vaca Triste Sandstone Member[2]	1,234-1,242	376-379
11th ore zone	1,294-1,299	394-396
Marker bed 117	1,306-1,308	398-399
Marker bed 118	1,330-1,334	405-407
Marker bed 119	1,358-1,359	414-414
10th ore zone	1,368-1,376	417-419
Marker bed 120	1,387-1,388	422-423
9th ore zone	1,391-1,396	424-426
Marker bed 121	1,402-1,404	427-428
Marker bed 122	1,410-1,411	430-430
8th ore zone	1,418-1,428	432-435
Union anhydrite[3]	1,438-1,453	438-443
7th ore zone	1,456-1,461	444-445
6th ore zone	1,471-1,474	448-449
5th ore zone	1,478-1,487	450-453
Marker bed 123	1,513-1,521	461-464
Marker bed 124	1,527-1,535	465-468
4th ore zone	1,544-1,563	471-476
3d ore zone	1,573-1,587	479-484
2d ore zone	1,594-1,599	486-487
1st ore zone	1,619-1,630	493-497
Marker bed 126	1,647-1,648	502-502
Maximum depth recorded	1,662	507

[1]Depth interval recorded from geophysical logs.
[2]Of Adams, 1944.
[3]Informal unit of Salado Formation.

Table 17C.--Lithologic log

Description	Depth (feet)
Caliche (crushed fill) and unconsolidated windblown sand	0.0- 25.0
Sandstone, moderate-reddish-brown, coarse-grained; cemented with calcite	25.0- 30.0
Unconsolidated sand (cavings)	30.0- 35.0
Sandstone, moderate-reddish-brown, coarse-grained; cemented with calcite	35.0- 50.0
Same as above; pale-reddish-brown siltstone common	50.0- 60.0
Same as above; increase in pale-reddish-brown siltstone; trace of grayish-green reduction spots	60.0- 70.0
Siltstone, pale-reddish-brown; trace of grayish-green reduction spots	70.0-100.0
Sandstone, reddish-brown, very fine grained	100.0-120.0
Same as above; with grayish-green reduction spots	120.0-140.0
Sandstone, moderate-reddish-brown, very fine grained	140.0-155.0
Same as above; with grayish-green reduction spots; sample muddy	155.0-170.0
Same as above; no reduction spots; sample muddy	170.0-175.0
Same as above; no reduction spots; sample not muddy	175.0-185.0
Sandstone, pale-reddish-brown, very fine to fine-grained, subangular to subrounded, fairly well sorted; minor pale-reddish-brown siltstone, with greenish-gray reduction spots	185.0-210.0
Siltstone, pale-reddish-brown, with greenish-gray reduction spots; minor pale-reddish-brown claystone	210.0-215.0
Sandstone, pale-reddish-brown, very fine to fine-grained, subangular to subrounded, fairly well sorted; minor pale-reddish-brown siltstone, with greenish-gray reduction spots	215.0-220.0
Siltstone, pale-reddish-brown, with greenish-gray reduction spots	220.0-225.0
Sandstone, pale-reddish-brown, very fine to fine-grained, subangular to subrounded, fairly well sorted; minor pale-reddish-brown siltstone, with greenish-gray reduction spots	225.0-230.0
Siltstone, pale-reddish-brown, with greenish-gray reduction spots	230.0-265.0
Sandstone, pale-reddish-brown, very fine to fine-grained, subangular to subrounded, fairly well sorted; minor pale-red siltstone, with greenish-gray reduction spots	265.0-275.0
Siltstone, pale-reddish-brown, with greenish-gray reduction spots; minor very fine-grained sandstone	275.0-280.0
Same as above; with trace of white gypsum	280.0-295.0
Sandstone, pale-reddish-brown, very fine grained; pale-reddish-brown siltstone, with greenish-gray reduction spots	295.0-300.0
Siltstone, pale-reddish-brown to moderate reddish-brown, sandy, fine-grained; sparse vein selenite	300.0-305.0

Table 17C.--Lithologic log--(Continued)

Description	Depth (feet)
Same as above; minor grayish-red sandstone, very fine grained; sparse pale-green reduction spots	305.0-320.0
Same as above; sparse to common pale-green reduction spots	320.0-325.0
Siltstone, pale-reddish-brown to grayish-red, sandy, fine-grained; sparse selenite; sparse to common pale-green reduction spots	325.0-330.0
Same as above; common grayish-red mudstone	330.0-340.0
Same as above; sparse to common vein selenite	340.0-345.0
Same as above; mudstone increasing to 30-40 percent	345.0-350.0
Siltstone, pale-reddish-brown to grayish-red, sandy, fine-grained; sparse mudstone; sparse pale-green reduction spots	350.0-355.0
Same as above; mudstone increasing to 30 percent	355.0-365.0
Same as above; sparse to common pale-green reduction spots	365.0-370.0
Same as above; decrease in mudstone to less than 10 percent	370.0-375.0
Same as above; sparse mudstone	375.0-380.0
Anhydrite, pale-yellowish-brown to pale-orange; pale-reddish-brown siltstone, 30 percent	380.0-385.0
Anhydrite, pale-yellowish-brown to grayish-red, dense	385.0-400.0
Anhydrite, pale-yellowish-brown, grayish-red, dense	400.0-410.0
Anhydrite, pale-yellowish-brown, grayish-red; sparse to common gray mudstone (claystone(?))	410.0-420.0
Anhydrite; minor to common pale-reddish-brown to dark-reddish-brown siltstone and mudstone	420.0-425.0
Anhydrite, light- to dark-gray	425.0-440.0
Dolomite, light-gray to yellowish-gray; sparse siltstone; sparse selenite(?) cavings	440.0-455.0
Same as above; increasing pale-reddish-brown to dark-reddish-brown siltstone and mudstone, 30 percent	455.0-460.0
Same as above; sparse siltstone/mudstone	460.0-465.0
Same as above; cavings(?)	465.0-470.0
Anhydrite, light- to dark-gray	470.0-475.0
Same as above; increasing siltstone/mudstone, 20 percent	475.0-480.0
Same as above; siltstone/mudstone, 40 percent	480.0-485.0
Same as above; less than 5 percent siltstone/mudstone	485.0-500.0
Anhydrite, very light gray to medium-dark-gray	500.0-520.0
Same as above; trace of selenite and dolomite	520.0-545.0
Same as above; no selenite or dolomite	545.0-560.0
Same as above; dolomite common	560.0-565.0

Table 17C.--Lithologic log--(Continued)

Description	Depth (feet)
Anhydrite, very light gray to medium-dark-gray, 70 percent; light-olive-gray, pitted dolomite, 30 percent; trace of selenite	565.0-570.0
Dolomite, light-olive-gray; trace of selenite and anhydrite	570.0-575.0
Same as above; no selenite or anhydrite	575.0-580.0
Same as above; some pitted dolomite	580.0-585.0
Dolomite, light-olive-gray, some pitted, 95 percent; light- to medium-dark-gray anhydrite, 5 percent; trace of selenite	585.0-590.0
Same as above; dolomite, 90 percent; anhydrite, 10 percent	590.0-595.0
Same as above; dolomite, 50 percent; anhydrite, 50 percent	595.0-600.0
Dolomite, light-olive-gray to greenish-gray, 90 percent; anhydrite, 10 percent; white gypsum, common	600.0-605.0
Anhydrite, light- to medium-dark-gray; dolomite, common	605.0-615.0
Anhydrite, light- to medium-dark-gray; dolomite, common	615.0-625.0
Anhydrite, light-gray to medium-gray, 90 percent; dark-reddish-brown siltstone, 10 percent	625.0-635.0
Dolomite, anhydrite and dark-reddish-brown siltstone common	635.0-640.0
Dolomite, 80 percent; anhydrite, 15 percent; dark-reddish-brown siltstone, 5 percent	640.0-645.0
Anhydrite, 60 percent; dolomite, 20 percent; dark-reddish-brown siltstone, 20 percent	645.0-650.0
Siltstone, dark-reddish-brown, 70 percent; anhydrite, 20 percent; dolomite, 10 percent	650.0-655.0
Siltstone, dark-reddish-brown, 90 percent; anhydrite, 10 percent; dolomite, common	655.0-660.0
Siltstone, dark-reddish-brown and medium-bluish-gray, 90 percent; anhydrite, 10 percent; dolomite, common	660.0-665.0
Siltstone, dark-reddish-brown and medium-bluish-gray, 80 percent; anhydrite, 20 percent; dolomite, common	665.0-670.0
Siltstone, medium-bluish-gray and dark-reddish-brown; anhydrite, common	670.0-680.0
Siltstone, medium-bluish-gray and dark-reddish-brown, with grayish-green reduction spots (cavings)	680.0-685.0
Same as above; anhydrite, common	685.0-700.0
Siltstone, bluish-gray; anhydrite and white gypsum, common	700.0-705.0
Anhydrite, 60 percent; siltstone, bluish-gray, 40 percent; trace of reddish-brown siltstone	705.0-710.0
Same as above; anhydrite, 70 percent; bluish-gray siltstone, 30 percent	710.0-715.0
Same as above; anhydrite, 60 percent; bluish-gray siltstone, 40 percent	715.0-720.0
Same as above; anhydrite, 50 percent; bluish-gray siltstone, 50 percent	720.0-730.0

Table 17C.--Lithologic log--(Continued)

Description	Depth (feet)
Anhydrite and bluish-gray and reddish-brown siltstone mixture; po. halite, selenite, and white gypsum common (contaminated sample)	730.0- 755.0
Halite, clear; trace of bluish-gray clay and moderate-orange-pink polyhalite	755.0- 760.0
Halite, clear; trace of moderate-orange-pink polyhalite; minor moderate-reddish-orange and bluish-gray clay	760.0- 765.0
Halite, clear: trace of moderate-orange-pink polyhalite; moderate-reddish-brown clay	765.0- 770.0
Halite, clear	770.0- 775.0
Halite, clear; trace of moderate-orange-pink polyhalite	775.0- 785.0
Halite, clear; minor medium-gray clay; trace of moderate-orange-pink polyhalite	785.0- 795.0
Halite, clear; trace of moderate-reddish-orange polyhalite	795.0- 800.0
Halite, clear; trace of medium-gray clay; trace of moderate-orange-pink polyhalite	800.0- 805.
Halite, clear; trace of moderate-reddish-orange polyhalite	805.0- 830.0
Halite, clear: minor moderate-reddish-brown clay; trace of moderate-orange-pink yhalite	830.0- 835.0
Halite, clear; trace of moderate-reddish-orange polyhalite	835.0- 935.0
Halite, clear: minor moderate-reddish-orange polyhalite	935.0- 965.0
Halite, clear; trace of moderate-reddish-orange polyhalite	965.0- 980.0
Halite, clear; minor moderate-reddish-orange polyhalite	980.0- 985.0
Halite, clear; trace of moderate-reddish-orange polyhalite	985.0-1,050.0
Halite, clear; extremely sparse polyhalite	1,050.0-1,085.0
Halite, clear; trace of moderate-reddish-orange polyhalite	1,085.0-1,090.0
Halite, clear	1,090.0-1,155.0
Halite, clear; trace of reddish-orange polyhalite	1,155.0-1,160.0
Halite, clear	1,160.0-1,220.0
Anhydrite and banded light-gray to pinkish-gray polyhalite; bands of clear, medium crystalline halite near base; medium-gray clay parting at base	1,220.0-1,222.1
Halite, clear to light-gray, medium to very coarse crystalline; thin stringers and blebs of moderate-pinkish-orange polyhalite, sparse at top, increasing in number with depth	1,222.1-1,228.1
Halite, medium-dark-gray to reddish-orange, fine to medium crystalline, argillaceous, polyhalitic; disseminated intercrystalline reddish-orange polyhalite and gray clay;0.15-foot-thick brown clay parting at base	1,228.1-1,229.6

Table 170.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, white to light-gray to clear, argillaceous; large amount of brown clay disseminated and as blebs: brown clay parting at 1,230.2 feet, increasing clay with depth----------	1,229.6-1,230.6
Halite, clay, siltstone, sand mixture, dark-reddish-brown; anhydrite bands at 1,231.3-1,232.4, 1,232.9-1,23[illegible], and 1,234.9-1,235.4 feet----------	1,230.6-1,237.0
Halite, medium-gray to grayish-green to clear, medium crystalline, argillaceous; large amount of disseminated brown clay and brown clay stringers; brown clay partings at 1,237.9 and 1,239.1 feet; gray clay parting at 1,239.6 feet----------	1,237.0-1,240.0
Halite, pale-red to moderate-gray, coarse crystalline; grayish-green clay blebs; sparse disseminated polyhalite blebs; brown clay partings at top, 1,240.6 and 1,243.2 feet; grayish-green clay parting at 1,240.6 feet----------	1,240.0-1,244.4
Halite, clear to moderate-orange-pink, very coarse crystalline; orange-pink polyhalite blebs, increasing with depth----------	1,244.4-1,246.9
Polyhalite, moderate-reddish-brown, fine crystalline, dense, massive; blebs of fine crystalline, clear halite----------	1,246.9-1,247.2
Halite, moderate-reddish-orange to clear, very coarse crystalline; numerous reddish-brown polyhalite stringers; 0.3-foot-thick clear halite band at 1,248.2 feet----------	1,247.2-1,249.1
Halite, light-gray to clear, coarse crystalline, argillaceous; disseminated olive-gray clay; moderate-reddish-brown polyhalite blebs; olive-gray clay parting at 1,249.4 feet----------	1,249.1-1,249.6
Halite, clear to moderate-orange-pink, medium to very coarse crystalline; numerous small moderate-reddish-orange polyhalite blebs; clear, coarse crystalline halite bands at 1,250.3 and 1,251.2 feet----------	1,249.6-1,251.4
Halite, pale-red to clear to light-gray, very coarse crystalline; disseminated intercrystalline grayish-green clay; common moderate-reddish-brown polyhalite blebs and stringers; grayish-green clay partings at 1,252.3 and 1,253.2 feet; reddish-brown clay parting at base----------	1,251.4-1,254.1
Halite, moderate-reddish-orange to clear, coarse crystalline; large amount (0.2-foot-thick) of disseminated moderate-reddish-brown polyhalite; coarse crystalline halite zone at base----------	1,254.1-1,255.3
Halite, moderate-reddish-orange, coarse crystalline; large amount of disseminated reddish-orange polyhalite; grayish-green clay-rich zones at 1,256.5-1,256.9 and 1,258.1-1,258.8 feet; clear, coarse crystalline halite zones at 1,262.8-1,263.5 feet----------	1,255.3-1,265.1

Table 17C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, medium-gray to pale-red, coarse crystalline, argillaceous; common disseminated grayish-green clay in upper 0.3 foot; grayish-green clay parting at 1,265.4 feet; common reddish-brown stringers and blebs in lower 1.8 feet, increasing towards base; brown clay parting at 1,266.8 and 1,267.0-1,267.1 feet	1,265.1-1,267.3
Polyhalite, moderate-reddish-brown, dense, massive; common blebs of reddish-brown clay and light-gray fine crystalline halite	1,267.3-1,267.5
Halite, pale-yellowish-brown to moderate-pink-orange, fine to medium crystalline; minor moderate-reddish-brown polyhalite stringers; disseminated intercrystalline reddish-brown clay; reddish-brown clay partings at 1,268.0 and 1,268.8 feet	1,267.5-1,270.4
Halite, clear to pale-yellowish-brown, medium crystalline; abundant intercrystalline reddish-brown clay; blebs of reddish-brown clay and moderate-reddish-brown polyhalite grade into bed below	1,270.4-1,271.8
Clay, grayish-green, halitic; 0.3-foot-thick, massive reddish-brown polyhalite; 0.3 foot clear to white, coarse crystalline halite; grayish-green clay parting at base	1,271.8-1,272.7
Halite, white to medium-gray, medium crystalline, argillaceous; abundant intercrystalline grayish-green clay; grayish-green clay parting at 1,273.0 feet; moderate amounts of reddish-brown polyhalite stringers grade into bed below	1,272.7-1,273.4
Halite, pinkish-orange, coarse crystalline; disseminated intercrystalline reddish-brown polyhalite; some polyhalite stringers near base; grayish-green clay parting at base	1,273.4-1,274.5
Clay, halitic and polyhalitic; clear, fine crystalline halite; moderate-reddish-brown, fine crystalline polyhalite blebs grade into next unit	1,274.5-1,276.3
Clay, reddish-brown, halitic; minor moderate-reddish-brown polyhalite blebs	1,276.3-1,277.6
Halite, pale-red to clear, fine crystalline, argillaceous; abundant reddish-brown clay blebs; reddish-brown clay partings at 1,277.9 and 1,278.5 feet; pale-yellowish-brown, coarse crystalline halite zone at 1,278.5-1,278.8 feet; brown clay parting at 1,278.8 feet	1,277.6-1,279.2
Halite, pale-red to light-gray, coarse crystalline; minor amounts of moderate-reddish-brown polyhalite; disseminated grayish-green and reddish-brown clay	1,279.2-1,280.6
Halite, light-gray to clear to moderate-orange-pink, very coarse crystalline; common moderate-reddish-brown polyhalite stringers; several clear, coarse halite bands	1,280.6-1,282.9

Table 17C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, medium-gray to clear, very coarse crystalline; abundant grayish-green blebs of clay; moderate-reddish-brown polyhalite blebs; reddish-brown partings at 1,283.8 and 1,284.1 feet	1,282.9-1,284.2
Halite, pale-yellowish-brown to light-gray; abundant moderate-reddish-brown polyhalite stringers and blebs; mottled zones of coarse crystalline, clear halite; sparse grayish-green clay blebs; grayish-green clay partings at 1,286.4 and 1,287.4 feet	1,284.2-1,287.7
Halite, clear to pale-yellowish-brown to moderate-pinkish-orange, coarse crystalline; bands of moderate-reddish-orange disseminated polyhalite; bands of very coarse crystalline halite	1,287.7-1,290.9
Halite, dark-gray to white to clear, very coarse crystalline, abundant intercrystalline blebs of grayish-green clay; minor blebs of moderate-reddish-brown polyhalite	1,290.9-1,291.8
Halite, clear to pale-red to moderate-reddish-orange, medium crystalline; moderate-reddish-orange to reddish-brown polyhalite blebs; moderate amounts of grayish-red interstitial clay at top; grayish-red clay partings at 1,291.8, 1,292.0, 1,294.7, and 1,295.0 feet; minor grayish-green interstitial clay toward base	1,291.8-1,295.0
Halite, coarse crystalline, argillaceous, polyhalitic; abundant reddish-brown clay in top 0.6 foot; abundant moderate-reddish-brown polyhalite in lower 0.7 foot; reddish-brown clay partings at 1,295.3, 1,295.5, and 1,295.7 feet	1,295.0-1,296.0
Halite, pale-yellowish-brown to pale-red, medium to coarse crystalline; abundant moderate-reddish-brown polyhalite blebs; very disseminated intercrystalline reddish-brown clay; polyhalite stringers abundant	1,296.0-1,297.6
Halite, pale-yellowish-brown, with bands of medium-gray, coarse crystalline; gray zones contain common grayish-green clay blebs; moderate-reddish-brown polyhalite blebs throughout	1,297.6-1,300.0
Halite, moderate-pink-orange to moderate-reddish-brown, coarse crystalline; abundant reddish-brown polyhalite blebs and stringers	1,300.0-1,303.3
Polyhalite, moderate-reddish-brown, dense, massive; halitic blebs common in upper 0.4 foot; 0.1 foot grayish-green clay band at base	1,303.3-1,305.2
Halite, pale-yellowish-brown to pale-yellowish-gray, medium crystalline; minor moderate-reddish-brown polyhalite blebs; minor grayish-green clay blebs	1,305.2-1,306.3
Halite, clear to moderate-orange-pink, very coarse crystalline; minor amount of moderate-reddish-orange polyhalite blebs; sparse grayish-green clay blebs	1,306.3-1,308.5

Table 170.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-yellowish-brown to moderate-reddish-orange, mottled, coarse crystalline; very fine grained zones with disseminated reddish-brown polyhalite blebs; clear, very coarse crystalline halite zone from 1,310.0 to 1,310.5 feet; coarse crystalline, clear halite zone from 1,310.6 to 1,311.2 feet	1,308.5-1,311.2
Halite, pale-yellowish-brown, with thin bands of medium-gray, very coarse crystalline; common moderate-reddish-brown polyhalite blebs; grayish-green intercrystalline clay common in medium-gray bands; sparse grayish-green clay blebs in remainder of unit	1,311.2-1,313.4
Halite, pale-yellowish-brown to moderate-orange-pink, coarse crystalline; common moderate-reddish-brown polyhalite blebs	1,313.4-1,315.1
Halite, grayish-yellowish-brown to dark-gray, medium to coarse crystalline; common disseminated reddish-brown polyhalite; grayish-green clay zone at 1,315.7-1,316.1 feet; clay partings at 1,315.8 and 1,318.3 feet; minor amount of disseminated grayish-green intercrystalline clay; leached kainite/leonite often pseudomorphs after langbeinite; minor disseminated mineralization	1,315.1-1,319.4
Halite, medium- to dark-gray, very coarse crystalline; abundant intercrystalline grayish-brown clay blebs; minor amount of moderate-reddish-brown polyhalite bleb near base; sparse kainite/leonite mineralization	1,319.4-1,321.9
Halite, moderate-pink-orange, coarse crystalline; abundant moderate-reddish-brown polyhalite blebs; sparse leached kainite/leonite pseudomorphs after langbeinite near base; pale- to moderate-reddish-brown polyhalite stringer at 1,323.3 feet	1,321.9-1,324.0
Halite, coarse crystalline, argillaceous; abundant intercrystalline grayish-green clay blebs; large kainite/leonite leached pseudomorphs after langbeinite; abundant moderate-reddish-brown polyhalite blebs	1,324.0-1,325.0
Halite, clear to pale-red, coarse crystalline; moderate reddish-brown polyhalite blebs; minor interstitial grayish-green clay; minor leached langbeinite at 1,327.3 feet	1,325.0-1,328.0
Polyhalite, moderate-reddish-brown, crystalline, dense; minor clear halite; grayish-orange-pink clay zone at 1,328.0-1,328.6 feet; grayish-green clay with minor disseminated reddish-brown polyhalite at base; minor disseminated langbeinite	1,328.0-1,331.9
Halite, clear to light-brown, medium to coarse crystalline; minor grayish-orange-pink to moderate-reddish-orange polyhalite blebs and stringers	1,331.9-1,334.1

Table 17C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to light-reddish-brown, medium crystalline; moderate-orange-pink to reddish-brown polyhalite stringers, pale-reddish-brown polyhalite bands at 1,334.8-1,335.1 and 1,336.1-1,336.6 feet; grayish-green clay parting at base----------	1,334.1-1,336.6
Halite, clear to pale-red, medium to coarse crystalline; minor to moderate amounts of reddish-brown polyhalite blebs and stringers, increasing toward base; minor grayish-green interstitial clay----------	1,336.6-1,340.2
Halite, clear to pale-red, medium crystalline, argillaceous; minor disseminated reddish-brown polyhalite blebs; moderate-grayish-red interstitial clay; grayish-red clay partings at 1,341.2, 1,341.4, 1,341.5, 1,341.6, 1,341.7, 1,343.1, and 1,343.6 feet; minor amounts of grayish-green clay in upper 0.8 foot of unit----------	1,340.2-1,344.9
Halite, clear to pale-red, medium to coarse crystalline; moderate amounts of moderate-reddish-orange to reddish-brown polyhalite blebs and stringers; reddish-brown polyhalite bands at 1,351.1, 1,352.0, and 1,353.4 feet, with increased polyhalite bands and blebs toward base------	1,344.9-1,354.6
Polyhalite, moderate-reddish-brown, dense; dark-grayish-green polyhalitic clay at 1,355.4-1,355.3 feet----------	1,354.6-1,355.8
Halite, clear to pale-red, medium to coarse crystalline; minor moderate-reddish-orange polyhalite blebs----------	1,355.8-1,359.0
Halite, clear to pale-red, coarse crystalline, argillaceous; minor amounts of pale-orange-pink polyhalite blebs; minor grayish-red interstitial clay; clay partings at 1,359.0 and 1,359.2 feet----------	1,359.0-1,360.5
Halite, clear to pale-red, medium to coarse crystalline; minor moderate-reddish-brown polyhalite blebs; minor grayish-green interstitial clay; minor disseminated sulfates (langbeinite)----------	1,360.5-1,365.6
Halite, clear to light-brown, medium crystalline; minor moderate-reddish-brown polyhalite blebs and stringers; moderate to heavy concentrations of disseminated to massive sulfates (langbeinite)----------	1,365.6-1,368.4
Halite, clear to pale-red, medium crystalline, argillaceous; moderate amounts of pale-reddish-orange polyhalite blebs; moderate-grayish-red interstitial clay; grayish-red clay parting at 1,371.0 feet; moderate-grayish-green interstitial clay in upper 2.0 feet; moderate to heavy amounts of disseminated to massive langbeinite----------	1,368.4-1,373.3
Halite, clear, pale-red, medium to coarse crystalline; minor grayish-red interstitial clay; minor moderate-reddish-orange polyhalite blebs--------	1,373.3-1,375.1
Halite, clear, light-brown, coarse crystalline; minor interstitial reddish-brown polyhalite; minor interstitial grayish-green clay----------	1,375.1-1,376.6

Table 17C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, light-brown, clear, grayish-reddish-orange, medium to coarse crystalline; moderate amounts of moderate-reddish-orange polyhalite blebs in upper part of unit, decreasing in center; major grayish-orange-pink polyhalite bands at 1,380.6 feet	1,376.6-1,383.3
Polyhalite, moderate-reddish-brown, dense; bands of light-brown, medium crystalline halite in upper half of unit	1,383.3-1,384.3
Halite, clear, pale-reddish-orange, fine to medium crystalline: minor reddish-orange polyhalite blebs; medium-dark-gray clay parting at top	1,384.3-1,389.9
Halite, grayish-brown to grayish-red, medium to coarse crystalline, argillaceous; minor to moderate amounts grayish-red interstitial clay; trace amount of grayish-green interstitial clay; minor amount of polyhalite blebs toward base	1,389.9-1,394.9
Halite, light-brown, coarse crystalline; minor pale-reddish-orange polyhalite blebs and stringers	1,394.9-1,398.6
Polyhalite, moderate-reddish-brown, dense; light-gray, dense anhydrite band; minor clear halite; polyhalitic grayish-green clay at 1,400.5-1,400.9 feet	1,398.6-1,400.9
Halite, light-brown, medium to coarse crystalline; minor pale-reddish-orange polyhalite blebs and stringers	1,400.9-1,403.9
Halite, moderate-reddish-orange, clear, to light-brown, medium to coarse crystalline, polyhalitic; disseminated moderate-reddish-orange polyhalite blebs; polyhalite band at 1,405.5 feet	1,403.9-1,407.3
Polyhalite, moderate-reddish-brown, dense	1,407.3-1,408.2
Halite, clear to pale-red, medium to coarse crystalline; minor amount of disseminated moderate-reddish-orange polyhalite blebs; minor intercrystalline grayish-green clay	1,308.2-1,409.4
Halite, clear and pale-red, medium to coarse crystalline; minor amount of disseminated polyhalite blebs; moderate amount of grayish-red intercrystalline clay; numerous grayish-green clay seams at 1,410.0 feet	1,409.4-1,411.9
Halite, clear to pale-red, medium to coarse crystalline: minor amount of moderate-reddish-orange polyhalite blebs; trace amount of grayish-red intercrystalline clay	1,411.9-1,414.3
Halite, clear to pale-red, medium to coarse crystalline, argillaceous; minor to moderate amount of grayish-red intercrystalline clay; grayish-red clay parting at top and base of unit	1,414.3-1,417.8
Halite, clear to moderate-reddish-orange and light-brown, fine to medium crystalline; moderate amount of disseminated moderate-reddish-orange polyhalite blebs	1,417.8-1,422.5

Table 17C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to pale-red, medium crystalline, argillaceous; minor amount of disseminated reddish-orange polyhalite; moderate amount of grayish-red intercrystalline clay; partings at 1,424.0, 1,424.6, 1,427.2, and 1,428.0 feet; minor to moderate amount of grayish-green intercrystalline in top 1.0 foot; grayish-green clay partings at 1,422.8 and 1,423.2 feet--	1,422.5-1,428.0
Halite, clear, pale-red, medium to coarse crystalline, argillaceous; minor to moderate amount of moderate-orange-pink to moderate-reddish-orange polyhalite blebs; minor to moderate amount of grayish-green interstitial clay; very light gray at base----------	1,428.0-1,435.2
Anhydrite, very light gray, pale-yellowish-brown to pale-brown, dense, laminated; lower 2.[illegible] feet of unit is polyhalitic anhydrite; polyhalite bands common; grayish-green clay partings at 1,[illegible], 1,446.3, 1,448.9, 1,450.3, 1,450.4, and 1,450.5 feet----------	1,435.2-1,450.5
Halite, clear, pale-red to moderate-reddish-orange, medium to coarse crystalline; moderate amount of moderate-orange-pink to moderate-orange-brown polyhalite blebs and stringers; minor to moderate amount of dark-greenish-gray interstitial clay; dark-greenish-gray clay parting at 1,453.0 feet----------	1,450.5-1,454.0
Halite, clear, pale-red, medium to coarse crystalline, argillaceous; minor to moderate amount of moderate-reddish-orange polyhalite blebs and stringers; moderate amounts of dark-grayish-red interstitial clay; dark-grayish-red clay partings at 1,454.3, 1,454.6, 1,457.5, and 1,458.6 feet; minor to moderate amounts of grayish-green interstitial clay; grayish-green clay partings at 1,454.0 and 1,457.1 feet; grayish-green clay seam at 1,456.5 feet----------	1,454.0-1,459.6
Halite, clear, pale-red, medium to coarse crystalline, argillaceous; minor moderate-reddish-orange polyhalite blebs and stringers; moderate amount of grayish-red interstitial clay; grayish-red clay partings at 1,460.4, 1,460.6, and 1,460.7 feet; trace amount of grayish-green interstitial clay----------	1,459.6-1,463.5
Halite, clear, pale-red, moderate-reddish-orange, medium to coarse crystalline; moderate amounts of moderate-reddish-orange polyhalite blebs and stringers; trace amount of grayish-green interstitial clay------	1,463.5-1,468.8
Halite, clear, pale-red, fine to coarse crystalline; minor amounts of grayish-red interstitial clay----------	1,468.8-1,471.2
Halite, clear, pale-red, moderate-reddish-orange, medium to coarse crystalline; moderate amounts of moderate-reddish-orange polyhalite bl[illegible] and stringers----------	1,471.2-1,476.7

Table 170.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear, pale-red, medium to coarse crystalline; minor moderate-orange-pink polyhalite blebs; minor grayish-red interstitial clay; grayish-red clay parting at 1,477.3 feet; trace amount of grayish-green interstitial clay	1,476.7-1,478.9
Halite, clear, moderate-reddish-orange, pale-red, medium to coarse crystalline; moderate amount of moderate-reddish-orange polyhalite blebs	1,478.9-1,482.1
Halite, clear, pale-red, fine to medium crystalline; trace amount of polyhalite blebs; moderate amount of grayish-red interstitial clay; grayish-red clay partings at 1,482.8 and 1,483.9 feet; grayish-green clay parting at base	1,482.2-1,484.5
Halite, pale-red to light-gray, medium crystalline, argillaceous; abundant intercrystalline brown and grayish-green clay, also in blebs; brown clay partings at 1,485.0, 1,485.4, and 1,486.2 feet	1,484.5-1,486.5
Halite, clear to pale-red, coarse crystalline; moderate amount of moderate-reddish-brown polyhalite blebs	1,486.5-1,487.9
Halite, clear to pale-yellowish-brown, coarse crystalline; sparse intercrystalline light-gray clay; minor moderate-reddish-brown polyhalite blebs	1,487.9-1,488.8
Halite, clear to pale-red and pale-yellowish-brown and moderate-orange-pink, coarse crystalline; moderate amount of moderate-orange-pink polyhalite blebs and stringers	1,488.8-1,491.8
Halite, dark- to medium-gray, medium to coarse crystalline, argillaceous; abundant intercrystalline greenish-gray clay; greenish-gray clay parting at top; sparse grayish-red clay blebs; sparse moderate-reddish-brown polyhalite blebs	1,491.8-1,493.2
Halite, moderate-reddish-orange to pale-yellowish-brown, mottled, medium to coarse crystalline, zones of fine crystalline; abundant intercrystalline moderate-orange-pink polyhalite blebs; minor intercrystalline pale-reddish-brown and pale-red clay; greenish-gray and grayish-red clay parting at 1,494.4 feet; clay-rich zone at 1,494.1-1,494.4 feet	1,493.2-1,497.3
Halite, clear to moderate-orange-pink and grayish-orange, very coarse crystalline; minor moderate-reddish-orange polyhalite blebs; very sparse greenish-gray clay blebs	1,497.3-1,498.8
Halite, clear to mottled pale-yellowish-brown, pale-red and dark-gray, very coarse crystalline; moderate amount of intercrystalline moderate-reddish-brown polyhalite blebs; zone of very fine crystalline, moderate-yellowish-brown halite; moderate amount of grayish-red clay blebs near base	1,498.8-1,500.7

Table 17C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to pale-yellowish-brown, light-gray and moderate-orange-pink, medium to coarse crystalline; moderate amount of moderate-reddish-brown polyhalite blebs concentrated in middle 0.8 foot of unit; minor light-gray clay blebs; minor intercrystalline greenish-gray clay---------	1,500.7-1,503.5
Halite, clear to pale-yellowish-brown and pale-red, very coarse crystalline; minor white to grayish-orange-pink polyhalite blebs; sparse greenish-gray clay blebs in upper 0.8 foot, thin polyhalite band at 1,510.0 feet----------	1,503.5-1,510.2
Anhydrite, light-olive-gray, laminated, dense; zones of disseminated polyhalite and halite; 0.1-foot band of halite at 1,517.0-1,517.5 feet---	1,510.2-1,517.9
Halite, clear to light-olive-gray to moderate-reddish-orange, fine to medium crystalline; minor moderate-orange-pink polyhalite blebs and stringers; minor bands of light-gray anhydrite in lower 1.5 feet of unit----------	1,517.9-1,522.9
Anhydrite, light-gray to medium light-gray, dense, laminated; upper 0.7 foot contains mixture of anhydrite and moderate-orange-pink polyhalite; upper 3.4 feet contains clear crystalline halite; medium-gray clay from 1,529.8-1,530.6 feet; lower 1.2 feet contains mixture of moderate-reddish-orange polyhalite and medium-gray clay----------	1,522.9-1,531.3
Halite, clear to moderate-reddish-orange, fine to coarse crystalline; moderate amount of moderate-orange-pink polyhalite blebs----------	1,531.3-1,534.2
Polyhalite, moderate-orange-pink, dense, massive; grayish-green clay parting at base----------	1,534.2-1,534.8
Halite, clear to grayish-green and moderate orange-pink, mottled, medium to coarse crystalline; moderate amount of grayish-green intercrystalline clay; sparse moderate-orange-pink polyhalite blebs----------	1,534.8-1,536.3
Halite, clear to moderate-orange-pink to grayish-green, medium to coarse crystalline; minor moderate-orange-pink polyhalite blebs; sparse grayish-green intercrystalline clay----------	1,536.3-1,541.9
Halite, clear to moderate-orange-pink to grayish-green to pale-red, medium to coarse crystalline; moderate amount of grayish-green and grayish-red intercrystalline clay; lower 2.0 feet contains moderately disseminated langbeinite----------	1,541.9-1,544.9
Halite, clear to moderate-reddish-orange, fine to coarse crystalline; minor amount of moderate-reddish-orange polyhalite blebs and stringers---	1,544.9-1,545.3
Halite, clear to yellowish-gray to pale-olive, coarse crystalline; sparse disseminated sylvite and sparse langbeinite----------	1,545.3-1,553.8

Table 17C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to pale-yellowish-brown to moderate-orange-pink, coarse crystalline; moderate disseminated langbeinite with leached sulfate rims----------	1,553.8-1,555.4
Halite, clear, pale-red, medium crystalline, argillaceous; minor amount of moderate-orange-pink polyhalite blebs and stringers; moderate amounts of grayish-red interstitial clay, and in seams; minor amounts of grayish-green interstitial clay; minor to moderate amounts of disseminated sulfate (langbeinite)----------	1,555.4-1,560.1
Halite, clear, pale-red to moderate-reddish-orange, medium to coarse crystalline; minor to moderate amounts of moderate-reddish-orange polyhalite blebs and stringers, increasing toward base; trace of disseminated grayish-green interstitial clay; minor to moderate amounts of disseminated sulfates (langbeinite)----------	1,560.1-1,564.4
Halite and polyhalite mixture, with polyhalite predominant; halite is clear to pale red, fine to medium crystalline; moderate-reddish-orange polyhalite blebs, stringers, and band; minor disseminated sulfates (langbeinite)----------	1,564.4-1,565.3
Halite, clear to pale-red, fine to coarse crystalline, argillaceous; minor amounts of moderate-reddish-orange polyhalite blebs and stringers; moderate amount of grayish-green interstitial clay; green clay partings at 1,565.6 feet; grayish-green seams common; trace of grayish-red clay; minor to moderate amount of disseminated sulfates (langbeinite)----------	1,565.3-1,567.3
Halite, clear, pale-red, medium to coarse crystalline; minor amounts of moderate-reddish-orange polyhalite blebs; minor disseminated sulfates (langbeinite)----------	1,567.3-1,568.6
Halite, clear, pale-red, medium to coarse crystalline, argillaceous; minor amounts of moderate-reddish-orange polyhalite blebs; minor to moderate amounts of disseminated grayish-red interstitial clay; minor amounts of grayish-green interstitial clay; minor to moderate amount of disseminated sulfates (langbeinite)----------	1,568.6-1,575.2
Halite, clear, light-brown, medium crystalline; minor to moderate amount of moderate-reddish-orange polyhalite blebs and stringers----------	1,575.2-1,576.7
Halite, clear, pale-red, medium to coarse crystalline, argillaceous; minor to moderate amount of moderate-reddish-orange polyhalite blebs and stringers; minor amount of interstitial grayish-olive-green clay; minor to moderate amounts of disseminated sulfates (langbeinite)----------	1,576.7-1,580.3

Table 170.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear, pale-red, moderate-reddish-orange, medium crystalline; moderate amount of moderate-reddish-orange polyhalite blebs and stringers; minor disseminated sulfate (langbeinite)	1,580.0-1,582.5
Halite, pale-red, clear, medium crystalline, argillaceous; minor amount of moderate-reddish-orange polyhalite blebs; moderate amounts of disseminated grayish-green and grayish-red clay; minor disseminated sulfates (langbeinite)	1,582.5-1,583.0
Halite, clear, light-brown, medium to coarse crystalline; minor amount of moderate-reddish-orange polyhalite blebs and stringers; minor disseminated sulfates (langbeinite)	1,583.0-1,588.5
Halite, clear, light-brown, medium to coarse crystalline; minor moderate-reddish-orange polyhalite blebs and stringers; minor to moderate disseminated langbeinite; heavy, massive langbeinite in lower 1.0 foot of unit	1,588.5-1,593.0
Halite, clear, pale-red, medium crystalline, argillaceous; minor moderate-reddish-orange polyhalite blebs and stringers; moderate amount of grayish-red interstitial clay; grayish-red clay parting at base; moderate to heavy disseminated langbeinite; heavy amounts of massive langbeinite in upper 1.7 feet of unit	1,593.0-1,596.7
Halite, clear, pale-red, medium to coarse crystalline; minor moderate-reddish-orange polyhalite blebs; minor amount of grayish-red interstitial clay; trace amount of grayish-green interstitial clay	1,596.7-1,598.9
Halite, clear, light-brown, medium to coarse crystalline; moderate amount of moderate-reddish-orange polyhalite blebs and stringers; minor to moderate disseminated sulfates (langbeinite)	1,598.9-1,603.8
Polyhalite, moderate-reddish-brown, dense; clear to pale-red halite blebs common	1,603.8-1,604.0
Halite, clear, light-pale-red, medium to coarse crystalline; moderate amount of moderate-reddish-orange to moderate-reddish-brown polyhalite blebs and stringers; grayish-green clay parting at 1,603.8 feet	1,604.0-1,608.0
Halite, clear, pale-red, medium to coarse crystalline, argillaceous; minor amount of moderate-reddish-orange polyhalite blebs; moderate amount of grayish-red interstitial clay; grayish-red clay parting at 1,608.0 and 1,609.1 feet; trace of grayish-green interstitial clay	1,608.0-1,613.3
Halite, clear, pale-red, medium crystalline; minor moderate-reddish-orange polyhalite blebs	1,613.3-1,615.5

Table 17C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear, pale-red, medium to coarse crystalline, argillaceous; trace amount of moderate-reddish-orange polyhalite blebs; minor to moderate-grayish-red interstitial clay; minor to moderate amount of grayish-green interstitial clay	1,615.5-1,617.1
Halite, clear, coarse crystalline	1,617.1-1,617.6
Halite, clear to pale-red, medium to coarse crystalline; minor to moderate amount of moderate-reddish-orange polyhalite blebs and stringers	1,617.6-1,622.5
Halite, light-gray to pale-red, coarse crystalline, argillaceous; abundant intercrystalline reddish-brown and greenish-gray clay; minor moderate-reddish-brown polyhalite blebs; medium-dark-gray and grayish-red clay parting at 1,623.8, 1,624.1, and 1,624.2 feet	1,622.5-1,624.3
Halite, clear to moderate-yellowish-brown, mottled, and greenish-gray, fine to coarse crystalline; abundant reddish-brown intercrystalline clay; also reddish-brown clay blebs and stringers; minor blebs of moderate-reddish-brown polyhalite	1,[illegible]-1,627.9
Halite, pale-red to medium-bluish-gray, coarse crystalline; abundant blebs of dark-reddish-brown clay; zones of moderate amounts of moderate-reddish-brown polyhalite blebs; zones of abundant intercrystalline dark-gray clay	1,627.9-1,631.6
Halite, clear to pale-olive, medium to coarse crystalline; abundant blebs of grayish-red clay; minor blebs and stringers of moderate-reddish-brown polyhalite; reddish-brown clay parting at 1,631.8 feet	1,631.[illegible]-1,633.0
Halite, clear to pale-red to light-bluish-gray, fine to medium crystalline, argillaceous; abundant reddish-brown clay blebs and stringers, with partings at 1,633.8, 1,634.0, 1,634.5, and 1,635.0 feet; minor blebs of moderate-reddish-brown polyhalite	1,633.0-1,635.7
Halite, clear to moderate-yellowish-brown, very coarse crystalline; moderate amount of moderate-reddish-brown and greenish-gray clay blebs; minor moderate-reddish-brown polyhalite blebs; light-bluish-gray clay parting at base	1,635.7-1,636.7
Halite, clear to pale-red to medium-bluish-gray, coarse crystalline; abundant light-bluish-gray clay blebs; abundant moderate-reddish-brown polyhalite blebs and stringers; clay-rich zone from 1,639.3 to 1,639.9 feet	1,636.7-1,640.3
Halite, clear to grayish-orange to moderate-orange-pink, coarse crystalline; minor to moderate light-gray clay blebs and stringers; minor to abundant moderate-reddish-brown polyhalite blebs and stringers, increasing toward base	1,640.3-1,642.7

Table 17C.--Lithologic log--(Continued)

Description	Depth (feet)
Polyhalite, moderate-reddish-brown, dense, massive; bands of coarse crystalline halite in upper 0.4 foot; medium-bluish-gray clay band in lower 0.3 foot of unit	1,642.7-1,643.7
Halite, clear to pale-yellowish-brown, medium crystalline; moderate amounts of moderate-reddish-orange polyhalite blebs	1,643.7-1,644.4
Halite, grayish-orange to moderate-reddish-orange, mottled, fine crystalline; several bands of clear, coarse crystalline halite, moderate to abundant disseminated light-bluish-gray clay and moderate-reddish-brown polyhalite; 0.2 foot of reddish-brown clay band at top; reddish-brown clay parting at 1,645.0 and 1,645.7 feet	1,644.4-1,646.1
Halite, clear to very pale orange to light-bluish-gray, very coarse crystalline; minor to moderate amounts of moderate-reddish-brown polyhalite blebs; minor moderate-reddish-brown and greenish-gray clay blebs	1,646.1-1,650.1
Halite, moderate-reddish-orange to pale-red to moderate-bluish-gray, mottled, fine to medium crystalline; abundant blebs and stringers of grayish-red clay; disseminated moderate-reddish-brown polyhalite in fine crystalline zones; grayish-red clay partings at 1,650.2, 1,650.4, and 1,651.0 feet	1,650.1-1,651.4
Halite, pale-red to pale-yellowish-brown, coarse to very coarse crystalline; minor grayish-red clay blebs; sparse moderate-reddish-orange polyhalite blebs	1,651.4-1,653.4
Halite, pale-red to moderate-reddish-orange to light-bluish-gray, mottled; abundant grayish-red clay blebs and stringers, with parting at 1,653.8 feet; minor moderate-reddish-orange polyhalite blebs disseminated in fine crystalline zones	1,653.4-1,654.4
Halite, greenish-gray to pale-yellowish-brown, medium to coarse crystalline; moderate amounts of grayish-red intercrystalline clay; moderate amounts of moderate-reddish-brown polyhalite blebs	1,654.4-1,655.6
Halite, clear to light-bluish-gray to pale-yellowish-brown to grayish-orange, coarse crystalline; minor to moderate amounts of moderate-reddish-brown polyhalite blebs and stringers; minor grayish-red clay blebs	1,655.6-1,659.2
Halite, grayish-orange to light-bluish-gray to pale-red, mottled, fine to medium crystalline; moderate amounts of moderate-reddish-brown polyhalite blebs and stringers; minor to moderate disseminated grayish-green and grayish-red intercrystalline clay; sparse grayish-red clay stringers	1,659.2-1,660.7 Total depth

Table 17D.--Mineralogical and chemical analyses of core samples from potash ore zones and mineralized salt beds in drill hole P-17

[oz, ore zone; um, upper member; mm, middle member; lm, lower member; sb, salt bed; tr, trace; Bl, bloedite; Ha, halite; Ka, kainite; La, langbeinite; Le, leonite; Po, polyhalite; Sy, sylvite; n.d., not determined. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mineralogy: X-ray diffraction analysis[1]	Chemical analysis (weight percent): Ca	K	Mg	Na	Cl	SO_4	H_2O+	H_2O-	Water insoluble
P-17/1	1,364.85-1,365.60	0.75	sb	9 Ha; tr Po, Sy, La	0.33	1.3	0.57	35.0	n.d.	3.9	n.d.	n.d.	n.d.
[2]P-17/2	1,365.60-1,367.20	1.60	10th oz	[illegible] Ha; >5 La; tr Po	.14	14.0	7.8	10.5	20.0	47.0	0.35	0.04	1.6
[2]P-17/2					.14	14.0	7.8	10.5	20.5	48.5	.38	.04	1.0
P-17/3	1,367.20-1,368.45	1.25		8 Ha; >1 La; tr Po	.46	3.5	1.8	30.0	50.0	10.5	.26	.98	.40
P-17/4	1,368.45-1,369.70	1.25		>5 Ha; <1 Ka; >3 Le; tr Po, La, [illegible]	.39	9.5	3.8	17.0	27.5	25.0	9.4	1.1	4.9
P-17/5	1,369.70-1,370.57	.87		>8 Ha; <1 Po; tr La, Ka	.92	2.1	1.0	26.5	43.0	5.0	1.8	1.7	15.0
[2]P-17/6	1,370.57-1,371.52	.95		>8 Ha; [illegible] Po, Ka; tr La	.55	1.3	.68	31.0	50.0	3.0	1.4	.99	7.7
[2]P-17/6					.55	1.3	.68	31.0	50.0	3.0	1.4	.96	7.9
P-17/7	1,542.20-1,542.90	.70	4th oz, um	>9 Ha; tr Po, La	.14	.08	.07	38.0	59.5	.05	.15	.11	.90
P-17/8	1,542.90-1,543.68	.78		6 Ha; >3 La; tr Ka, Le	.04	8.6	4.7	19.0	31.0	28.0	2.2	.33	2.9
[2]P-17/9	1,543.68-1,544.46	.78		5 Ha; >4 La; tr Po	.03	11.0	5.9	17.0	27.0	[illegible]	.48	.11	1.1
[2]P-17/9					.02	11.0	5.9	17.0	27.5	36.0	.51	.14	.94
P-17/10	1,544.46-1,545.69	1.23	4th oz, mm	9 Ha; tr Po, La, Le	.75	.84	.34	37.0	57.0	2.7	.44	.02	1.4
P-17/11	1,553.35-1,554.05	.70	4th oz, mm	9 Ha; tr Po, Sy, La	.18	.92	.43	36.0	n.d.	2.6	n.d.	n.d.	n.d.
P-17/12	1,554.05-1,554.82	.77		>8 Ha; >1 La; tr Po	.57	3.6	1.9	29.0	48.5	11.5	.43	.05	.13
P-17/13	1,554.82-1,555	.58		8 Ha; <1 La, Ka; [illegible] Po, Bl	.21	3.1	1.7	30.5	49.5	9.5	2.0	.27	.47
[2]P-17/14	1,555.40-1,556.00	1.28	4th oz, lm	>8 Ha; tr Po, Sy, Ka	.54	.60	.33	32.0	52.5	1.8	.63	.50	6.6
[2]P-17/14					.54	.60	.33	32.0	53.0	1.7	.57	.53	6.6
P-17/15	1,556.68-1,558.07	1.39		>8 Ha; <1 Po; tr Sy, Ka, Le	.63	2.4	.98	30.0	50.0	5.8	2.0	.28	5.2
P-17/16	1,558.07-1,559.42	1.35		9 Ha; tr Po, Sy, Ka	.29	.84	.52	34.0	54.0	2.6	1.1	.46	6.1
P-17/17	1,590.60-1,591.39	.79	sb	>9 Ha; tr Po, Sy	.48	.40	.14	38.0	59.0	1.3	.13	.02	.07
[2]P-17/18	1,591.39-1,592.71	1.32	2d oz	5 Ha; 5 La	.09	10.0	5.7	17.5	29.5	35.5	.36	.01	.70
[2]P-17/18					.09	10.0	5.7	17.5	29.5	34.5	.36	.02	1.0
P-17/19	1,592.71-1,594.21	1.50		8 Ha; <1 La; 1 Bl; tr Po, Ka	.49	1.3	1.3	32.5	49.5	9.1	3.2	.12	2.2
P-17/20	1,594.21-1,594.92	.71		9 Ha; <1 Po; tr Sy	.57	.44	.21	37.0	57.5	1.2	.38	.13	2.6

1 Estimate of amount reported on a scale of 0-10.
2 Replicate analyses.

Table 17E.--Calculated mode (mineral content) and potash distribution by mineral in core samples from potash ore zones and mineralized salt beds in drill hole P-17

[oz, ore zone; um, upper member; mm, middle member; lm, lower member; sb, salt bed; Bl, bloedite; Ha, halite; Ka, kainite; La, langbeinite; Le, leonite; Po, polyhalite; Sy, sylvite; Insol., clay and silt; n.d., not determined; leaders (---), not present. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mode (weight percent mineral)								K_2O distribution by minerals					
				Sy	La	Ka	Le	Bl	Ha	Po	Insol.	Sy	La	Ka	Le	Po	Total
P-17/1	1,364.85-1,365.60	0.75	sb	0.7	3.3	---	---	---	90.0	2.5	n.d.	0.4	0.7	---	---	0.4	1.5
[1]P-17/2	1,365.60-1,367.20	1.60		---	73.6	---	---	---	26.7	1.0	1.6	---	16.7	---	---	.2	16.9
[1]P-17/2				---	73.6	---	---	---	26.7	1.0	1.0	---	16.7	---	---	.2	16.9
P-17/3	1,367.20-1,368.45	1.25		---	16.3	---	1.3	---	76.3	3.1	.4	---	3.7	---	---	.5	4.2
P-17/4	1,368.45-1,369.70	1.25	10th oz	---	.5	15.2	31.1	1.0	41.8	2.9	4.9	---	.1	2.9	8.0	.5	11.4
P-17/5	1,369.70-1,370.57	.87		---	.4	6.2	---	---	67.4	6.9	15.0	---	.1	1.3	---	1.1	2.5
[1]P-17/6	1,370.57-1,371.52	.95		---	.5	2.1	---	---	94.2	4.1	7.7	---	.1	.8	---	.6	1.5
[1]P-17/6				---	.5	2.1	---	---	94.2	4.1	7.9	---	.1	.8	---	.6	1.5
P-17/7	1,542.20-1,542.90	.70		---	.2	---	---	---	98.1	.2	.9	---	<.1	---	---	<.1	<.1
P-17/8	1,542.90-1,543.68	.78	4th oz, um	---	29.3	6.4	9.6	---	48.3	.3	2.9	---	6.6	1.2	2.5	<.1	10.3
[1]P-17/9	1,543.68-1,544.46	.78		---	58.2	---	---	---	43.2	.5	1.1	---	13.2	---	---	<.1	13.2
[1]P-17/9				---	58.3	---	---	---	43.2	.3	.9	---	13.2	---	---	<.1	13.2
P-17/10	1,544.46-1,545.69	1.23	4th oz, mm	---	1.7	---	1.8	---	94.1	1.0	1.4	---	.4	---	.4	.2	1.0
P-17/11	1,553.35-1,554.05	.70		.5	2.5	---	---	---	91.5	1.4	n.d.	.3	.6	---	---	.2	1.1
P-17/12	1,554.05-1,554.82	.77	4th oz, mm	---	16.1	---	---	---	73.7	4.3	.1	---	3.7	---	---	.7	4.4
P-17/13	1,554.82-1,555.40	.58		---	[illegible]	19.1	---	.5	77.4	1.6	.5	---	1.0	2.4	---	.2	3.6
[1]P-17/14	1,555.40-1,556.68	1.28		.3	---	1.3	---	---	87.1	1.9	6.6	.2	---	.2	---	.3	.7
[1]P-17/14			4th oz, lm	.2	---	1.6	---	---	86.0	1.9	6.6	.1	---	.3	---	.3	.7
P-17/15	1,556.68-1,558.07	1.39		1.2	---	3.1	3.0	---	80.7	4.7	5.2	.8	---	.6	.8	.7	2.9
P-17/16	1,558.07-1,559.42	1.35		.1	---	3.2	---	---	88.2	2.2	6.1	<.1	---	.6	---	.3	.9
P-17/17	1,590.60-1,591.39	.79	sb	.2	---	---	---	---	97.0	2.0	<.1	.1	---	---	---	.3	.4
[1]P-17/18	1,591.39-1,592.71	1.32		---	52.6	---	---	---	44.5	.7	.7	---	11.9	---	---	.1	12.0
[1]P-17/18			2d oz	---	52.6	---	---	---	44.5	.7	1.0	---	11.9	---	---	.1	12.0
P-17/19	1,592.71-1,594.21	1.50		---	3.5	1.0	---	10.9	78.8	3.7	2.2	---	.8	.2	---	.6	1.6
P-17/20	1,594.21-1,594.92	.71		.4	---	---	---	---	94.5	1.9	2.6	.2	---	---	---	.3	.5

[1]Replicate analyses.

TABLES 18A-18G

Basic data from drill hole P-18,
Waste Isolation Pilot Plant area, Eddy County, New Mexico

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18G.--Gamma-ray and neutron logs of drill hole	foldout

Table 16A.--Abridged drill-hole history

LOCATION: Sec. 26, T. 22 S., R. 31 E.
41 m (134 ft) from south line
243 m (797 ft) from east line

ALTITUDE (LAND SURFACE): 1,060 m (3,478.7 ft). Datum for depth measurements in drilling and logging operations.

LITHOLOGIC LOG PREPARED BY: J. C. Lorenz, Florian Maldonado, J. W. Mercer, L. A. Rives, R. P. Snyder, and R. W. Spengler, October 19 to November 5, 1976.

DRILLING CONTRACTOR: Pennsylvania Drilling Co.

DRILLING REC[illegible] Commenced drilling on October 19, and completed on November 5, 1976, at 609 m (1,998 ft) below land surface.

Hole plugged from 609 to 343 m (1,998-1,115 ft) with cement, and converted to hydrologic observation well in Rustler Formation.

REMARKS: Top of salt in Rustler Formation at 190 m (63[illegible] ft) below land surface.

Table 18B.--Stratigraphic summary

Rock unit	Depth interval[1] feet	meters
Holocene deposits	0-9	0-3
Triassic rocks:		
Santa Rosa Sandstone	9-87	3-27
Permian rocks:		
Dewey Lake Red Beds	87-626	27-191
Rustler Formation	626-1,088	191-332
Magenta Dolomite Member	704-730	215-222
Culebra Dolomite Member	909-938	277-286
Salado Formation	1,088-2,000	332-610
Upper member	1,088-1,604	332-489
McNutt potash zone	1,604-1,987	489-606
Vaca Triste Sandstone Member[2]	1,604-1,614	489-492
11th ore zone	1,658-1,662	505-507
Marker bed 117	1,670-1,672	509-510
Marker bed 118	1,692-1,694	516-516
Marker bed 119	1,716-1,718	523-524
10th ore zone	1,726-1,734	526-529
Marker bed 120	1,741-1,742	531-531
9th ore zone	1,749-1,752	533-534
Marker bed 121	1,756-1,758	535-536
Marker bed 122	1,765-1,766	538-538
8th ore zone	1,772-1,783	540-543
Union anhydrite[3]	1,793-1,808	547-551
7th ore zone	1,812-1,817	552-554
6th ore zone	1,828-1,830	557-558
5th ore zone	1,835-1,844	559-562
Marker bed 123	1,868-1,875	569-572
Marker bed 124	1,880-1,889	573-576
4th ore zone	1,897-1,910	578-582
3d ore zone	1,919-1,933	585-589
2d ore zone	1,938-1,942	591-592
1st ore zone	1,961-1,972	598-602
Marker bed 126	1,986-1,987	605-606
Maximum depth recorded	2,000	610

[1]Depth interval recorded from geophysical logs
[2]Of Adams, 1944.
[3]Informal unit of Salado Formation.

Table 150.--Lithologic log

Description	Depth (feet)
Caliche (crushed fill) and unconsolidated windblown sand	0.0- 10.0
Caliche, white	10.0- 20.0
Caliche, moderate-red-brown	20.0- 30.0
Siltstone, dark-red-brown, with gray-green reduction spots	30.0- 50.0
Siltstone, grayish-red, with greenish-gray reduction spots	50.0- 100.0
Siltstone, dark-red-brown, with gray-green reduction spots, very fine grained	100.0- 210.0
Same as above, with scattered gray-green reduction spots	210.0- 215.0
Same as above; contaminated with caliche	215.0- [illegible]
Same as above, no caliche	[illegible]
Siltstone, dark-red-brown, with greenish-gray reduction spots; minor dark-red-brown sandstone, very fine to fine-grained, fairly well to well-sorted, subrounded to rounded	230.0- 290.0
Same as above; trace of selenite	290.0- 300.0
Siltstone, dark-red-brown, with greenish-gray reduction spots; minor dark-red-brown sandstone, very fine to fine-grained, subrounded to rounded, fairly well to well sorted; trace of gypsum	300.0- 375.0
Siltstone, red-brown, with small and scattered gray-green reduction spots; sparse satin spar	375.0- 390.0
Same as above; contaminated with caliche	390.0- 420.0
Same as above, without satin spar	420.0- 445.0
Same as above; with minor satin spar	445.0- 450.0
Same as above; no satin spar	450.0- 500.0
Siltstone, moderate-red-brown, scattered green reduction spots, very fine grained, trace of white gypsum	500.0- 515.0
Siltstone, dark-red-brown, sparse green reduction spots, very fine grained	515.0- 590.0
Same as above; sparse gypsum	590.0- 611.0
Siltstone, dark-red-brown, very fine grained; white, fine-grained anhydrite, 10 percent	615.0- 630.0
Anhydrite, white, fine-grained; less than 5 percent red-brown siltstone; minor gypsum	630.0- 650.0
Anhydrite, white to clear, fine-grained; minor red-brown siltstone, minor white gypsum	650.0- 655.0

Table 18C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear, 70 percent; white anhydrite, 30 percent; minor gypsum--------	665.0- 670.0
Halite, clear, 40 percent; dark-red-brown, very fine grained siltstone, 40 percent; white, fine-grained anhydrite, 20 percent----------	670.0- 680.0
Siltstone, 70 percent; halite, 20 percent; anhydrite, 1 percent----------	680.0- 685.0
Halite, 50 percent; siltstone, 40 percent; anhydrite, 10 percent----------	685.0- 690.0
Anhydrite, white, fine-grained, 50 percent; red-brown siltstone 30 percent; clear halite, 15 percent----------	690.0- 700.0
Gypsum, white; gray anhydrite with gypsum rims----------	700.0- 705.0
Dolomite, gray, crystalline, porous, 50 percent; gray anhydrite; some gypsum----------	705.0- 710.0
Dolomite, gray, crystalline, porous; some anhydrite----------	710.0- 715.0
Same as above; some red siltstone----------	715.0- 730.0
Same as above; increasing anhydrite----------	730.0- 735.0
Anhydrite, gray, with white gypsum rims; some dolomite----------	735.0- 785.0
Halite, clear, 75 percent; white, very fine grained, anhydrite 20 percent; white, soft gypsum, 5 percent----------	785.0- 790.0
Halite, clear; trace white anhydrite----------	790.0- 795.0
Halite, clear; white, anhydrite 5 percent; white gypsum, 5 percent--------	795.0- 800.0
Halite, clear; trace anhydrite----------	800.0- 815.0
Halite, clear; white, very fine grained, anhydrite, 15 percent; red-brown siltstone, 5 percent----------	815.0- 820.0
Halite, clear; trace anhydrite----------	820.0- 830.0
Anhydrite, white, fine-grained; clear halite, 10 percent----------	830.0- 835.0
Same as above; white gypsum, 5 percent----------	835.0- 845.0
Halite, clear; white, fine-grained anhydrite, 15 percent----------	845.0- 850.0
Same as above; trace red-orange polyhalite----------	850.0- 865.0
Halite, clear; red-orange polyhalite, about 30 percent----------	865.0- 870.0
Halite, clear; red-orange polyhalite, 10 percent; white anhydrite, 10 percent----------	870.0- 875.0
Same as above; no polyhalite----------	875.0- 880.0
Halite, clear; trace of gypsum----------	880.0- 900.0
Anhydrite, light-gray, with white gypsum rims and chips; minor red-brown siltstone; some halite----------	900.0- 910.0
Dolomite, brownish-gray, crystalline, porous; some anhydrite and gypsum---	910.0- 940.0
Halite, clear; trace of moderate-orange-pink polyhalite; minor brown-gray dolomite----------	940.0- 945.0
Halite, clear; trace of moderate-grayish-pink polyhalite----------	945.0- 985.0
Halite, clear; trace of polyhalite; minor clay----------	985.0- 990.0

Table 18C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear; trace of polyhalite----------	990.0-1,005.0
Halite, clear; minor polyhalite; minor brown clay----------	1,005.0-1,020.0
Halite, clear; large amount brown clay----------	1,020.0-1,060.0
Mudstone, red-brown----------	1,060.[illegible]-1,065.0
Mudstone, red-brown and gray-green----------	1,065.0-1,085.0
Mudstone, gray-green; minor clear halite----------	1,085.0-1,090.0
Halite, clear; moderate amount brown clay----------	1,090.0-1,100.0
Halite, clear; minor red-brown polyhalite----------	1,[illegible].0-1,105.0
Halite, clear; moderate clay----------	1,105.0-1,125.0
Halite, clear; minor polyhalite----------	1,125.0-1,140.0
No sample----------	1,140.0-1,150.0
Halite; siltstone; minor halite (contaminated sample)----------	1,150.0-1,155.0
Halite, clear; minor red-orange polyhalite----------	1,155.0-1,170.0
Anhydrite, light-gray; minor clear halite and polyhalite----------	1,170.0-1,180.0
Same as above; increasing halite----------	1,180.0-1,185.0
Halite, clear; minor, light-gray anhydrite, red-orange polyhalite------	1,185.0-1,300.0
Halite, clear; minor red-orange polyhalite----------	1,300.0-1,345.0
Halite, clear; trace red-orange polyhalite----------	1,345.0-1,405.0
Same as above; minor brown clay----------	1,405.0-1,425.0
Halite, clear; trace red-orange polyhalite----------	1,425.0-1,445.0
Halite, clear----------	1,445.0-1,465.0
Halite, clear; trace of polyhalite----------	1,465.0-1,490.0
Halite, clear; minor polyhalite----------	1,490.0-1,500.0
Halite, clear; trace polyhalite----------	1,500.0-1,515.0
Halite clear; moderate polyhalite----------	1,515.0-1,595.0
Halite, clear; minor polyhalite----------	1,595.0-1,630.0
Halite, moderate-red-brown to pale-red, contains bands of clear, fine to medium crystalline; moderate amount pale-red-brown polyhalite stringers; lower 0.5 foot, slightly argillaceous----------	1,630.0-1,632.5
Halite, grayish-red and clear, fine to medium crystalline, argillaceous; large amount brown intercrystalline clay; brown clay partings at 1,632.9, 1,633.6 and 1,633.9 feet----------	1,632.5-1,633.9
Halite, yellow-brown to moderate-orange-pink, mottled, fine to medium crystalline; moderate amount intercrystalline orange-pink polyhalite; clay-rich zones and partings at 1,635.0 and 1,635.2 feet----------	1,633.9-1,635.6

Table 18C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-red-orange, pale-red, mottled, fine to medium crystalline; moderate to abundant red-orange polyhalite blebs; moderate amounts of red-brown and gray clay blebs and stringers; gray clay parting at 1,637.5 feet; thin polyhalite band at top-------	1,635.6-1,638.0
Halite, clear to moderate-red-orange, coarse to very coarse crystalline; abundant intercrystalline orange-pink and red-orange polyhalite blebs----------	1,638.0-1,639.9
Halite, pale-red and light-gray, medium crystalline, argillaceous; moderate to abundant orange-pink polyhalite blebs; moderate intercrystalline gray-green and brown clay blebs; brown parting at 1,640.2 feet----------	1,639.9-1,641.0
Halite, clear, moderate-orange-pink and moderate-red-orange, mottled, fine to coarse crystalline; moderate amounts intercrystalline orange-pink polyhalite; possible leached sulfates near base----------	1,641.0-1,642.9
Clay, reddish-gray, halitic; fine crystalline halite; moderate amounts of red-brown polyhalite blebs; minor gray-green clay blebs---	1,642.9-1,644.5
Halite, pale-red, medium to coarse crystalline; minor to moderate amounts red-brown polyhalite blebs----------	1,644.5-1,645.3
Halite, clear to orange-pink, very coarse crystalline; minor red-orange polyhalite blebs; thin polyhalite band at top----------	1,645.3-1,646.2
Halite, light-gray to pale-red, coarse crystalline; minor to moderate amounts of moderate-red-brown polyhalite blebs; minor amounts gray-green clay blebs and stringers----------	1,646.2-1,646.9
Halite, pale-red to moderate-red-brown, medium to coarse crystalline; moderate amounts intercrystalline red-brown polyhalite----------	1,646.9-1,647.6
Halite, clear, moderate-red-brown, mottled, coarse to very coarse crystalline; moderate amounts disseminated red-brown polyhalite------	1,647.6-1,648.3
Halite, pale-red to gray-red, medium crystalline; moderate amounts red-orange polyhalite blebs; disseminated gray clay----------	1,648.3-1,648.8
Halite, moderate-red-orange to pale-yellow-brown, coarse crystalline; moderate to abundant intercrystalline orange-pink polyhalite---------	1,648.8-1,651.8
Halite, pale-red and moderate-orange-pink, medium to very coarse crystalline; moderate amounts intercrystalline orange-pink polyhalite; sparse brown clay blebs----------	1,651.8-1,653.1
Halite, moderate-orange-pink to moderate-orange-brown, medium to coarse crystalline; moderate amounts disseminated orange-pink polyhalite; sparse brown clay blebs; clay-rich crystalline band at 1,654.1 feet--	1,653.1-1,656.2

Table 18C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red, white, and light-gray, medium to coarse crystalline, argillaceous; abundant gray clay blebs and stringers; leached kainite crystal near top----------	1,656.2-1,657.2
Halite, gray-red to dark-red-brown, medium to coarse crystalline, argillaceous; moderate amount orange-pink polyhalite blebs; abundant red-brown clay in lower half----------	1,657.2-1,658.0
Halite, light-blue-gray, pale-red, and green-gray, fine crystalline, argillaceous; abundant intercrystalline red-brown and gray-green clay; minor moderate-red-orange polyhalite blebs----------	1,658.0-1,660.6
Halite, moderate-orange-pink to moderate-red-orange, medium to coarse crystalline; moderate amounts disseminated moderate-orange-pink intercrystalline polyhalite----------	1,660.6-1,661.5
Halite, clear to gray-orange and pale-red, mottled, very coarse crystalline; minor moderate-orange polyhalite blebs; sparse to minor gray-green clay blebs; clay parting at 1,662.7 feet----------	1,661.5-1,662.3
Halite, moderate-orange-pink to moderate-red-orange and gray-orange, mottled, medium to coarse crystalline; medium to abundant disseminated intercrystalline polyhalite blebs and stringers; polyhalite bands in lower 1.5 feet; minor leached sulfate minerals---	1,662.8-1,669.6
Polyhalite, moderate-red-brown, dense; halite blebs; 0.1 foot thick medium-gray clay at base----------	1,669.6-1,671.1
Halite, gray-orange and light-blue-gray, fine to coarse crystalline, argillaceous; sparse orange-pink polyhalite blebs; abundant bluish-gray clay in blebs and stringers----------	1,671.1-1,672.4
Halite, moderate-orange-pink, moderate-orange-red and gray-orange, medium to coarse crystalline; moderate amounts moderate-red-orange intercrystalline polyhalite----------	1,672.4-1,674.5
Halite, clear to pale-red, medium to coarse crystalline; minor intercrystalline orange-pink polyhalite; moderate amounts disseminated gray clay; sparse clay blebs----------	1,674.5-1,675.5
Halite, gray-orange, clear, and moderate-orange-pink, coarse crystalline; moderate amounts disseminated intercrystalline moderate-orange-pink polyhalite----------	1,675.5-1,676.2
Halite, clear, gray-orange, and moderate-orange-pink, medium to coarse crystalline; moderate amounts disseminated moderate-red-orange polyhalite; medium-blue-gray clay zone at 1,676.2-1,676.4 feet-------	1,676.2-1,677.2

Table 18C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, medium-blue-gray, fine to medium crystalline; sparce orange-pink intercrystalline polyhalite; common gray and red-brown clay stringers and blebs	1,677.2-1,677.5
Halite, medium-red-orange, medium-red-brown, fine crystalline; moderate-red-brown polyhalite	1,677.5-1,678.6
Halite, pale-red, gray-red, pale-red-brown, fine to medium crystalline, argillaceous; minor moderate-red-orange polyhalite blebs; gray-green clay in upper 0.2 foot; moderate-red-brown clay partings at 1,678.8, 1,680.1, and 1,682.0 feet; minor leached sulfates	1,678.6-1,682.9
Halite, clear, pale-red, coarse crystalline; minor to moderate amount red-brown polyhalite; minor thin bands argillaceous halite; minor amount leached sulfates	1,682.9-1,686.2
Halite, pale-red-brown and moderate-red-brown, fine to medium crystalline, polyhalitic	1,686.2-1,686.9
Halite, pale-red, gray-green, and moderate-red-orange, fine to medium crystalline, argillaceous; moderate amount moderate-red-orange and moderate-red-brown polyhalite in blebs and stringers; minor leached sulfates; langbeinite common in upper 0.3 foot	1,686.9-1,688.8
Halite, pale-red and moderate-red-brown, fine to coarse crystalline; minor polyhalite stringers	1,688.8-1,691.5
Polyhalite, moderate-red-brown, dense; stringers of recrystallized halite	1,691.5-1,693.8
Halite, pale-yellow-brown to light-gray, fine to medium crystalline; minor gray-green clay stringers; moderate amount langbeinite	1,693.8-1,694.7
Halite, pale-red to clear, fine to medium crystalline; minor red-brown polyhalite blebs; minor pale-red polyhalite blebs and stringers; minor leached sulfates	1,694.7-1,696.7
Halite, gray-red to light-gray, fine to medium crystalline, polyhalitic	1,696.7-1,697.5
Polyhalite, gray-red, dense; minor stringers recrystallized halite; zones of leached sulfates	1,697.5-1,698.5
Halite, moderate-red-orange and moderate-red-brown, fine crystalline; minor red-brown polyhalite	1,698.5-1,699.3
Halite, light-gray to gray-green, coarse to very coarse crystalline; moderate amount gray-green clay	1,699.3-1,700.6
Halite, moderate-red-brown, moderate-red-orange, pale-red and clear, fine to medium crystalline, banded; moderate red-brown zones are polyhalitic	1,700.6-1,702.6

Table 18C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, gray-red, pale-red, and pale-brown, fine to medium crystalline, argillaceous; upper 1.0 foot contains gray-green and brown clay and moderate-red-brown polyhalite stringers; gray parting at 1,703.3 feet; brown partings at 1,704.4, 1,704.9 and 1,706.2 feet	1,702.6-1,707.1
Halite, pale-red to clear, fine to medium crystalline; polyhalite-rich zones common	1,707.1-1,710.6
Halite, green-gray and pale-red, fine to medium crystalline, argillaceous; minor moderate-red-orange polyhalite stringers near base; minor leaching near base	1,710.6-1,711.4
Halite, clear to pale-yellow-brown, fine to medium crystalline	1,711.4-1,711.7
Halite, moderate-red-brown, pale-red-brown, fine crystalline; contains numerous stringers and blebs of polyhalite; stringers thicken in lower 1.0 foot	1,711.7-1,715.3
Polyhalite, pale-red, dense; minor recrystallized halite; gray-green clay at base; leached sulfates	1,715.3-1,717.4
Halite, pale-red, clear, gray-red, coarse crystalline; minor moderate-red-orange polyhalite stringers and blebs; minor intercrystalline gray-green clay	1,717.4-1,721.2
Halite, gray-red, pale-red, fine crystalline; disseminated brown clay in upper and lower parts of unit	1,721.2-1,722.4
Halite, clear, pale-yellow-brown, pale-red, medium to coarse crystalline; moderate amount polyhalite stringers and blebs; minor disseminated sylvite	1,722.4-1,727.8
Halite, medium-gray, dark-red-brown, fine crystalline, argillaceous; moderate amounts of moderate-red-brown polyhalite stringers and blebs	1,727.8-1,728.4
Halite, pale-yellow-brown, moderate-red, fine crystalline; moderate amount disseminated polyhalite; minor to moderate disseminated sylvite	1,728.4-1,730.4
Halite, gray-red, gray-brown, fine crystalline, argillaceous; minor moderate-red-orange polyhalite blebs; brown clay partings at 1,731.4 and 1,732.9 feet; clay-rich zone at 1,731.4 and 1,731.8 feet	1,730.4-1,735.6
Halite, moderate-red-orange, pale-red, pale-red-brown, fine crystalline; moderate amount of red-orange and red-brown polyhalite stringers and blebs; polyhalite band at 1,739.8 feet	1,735.6-1,740.5
Polyhalite, pale-red-brown, dense	1,740.5-1,740.9

Table 18C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red-brown, pale-red, coarse crystalline; minor blebs, moderate-red-orange polyhalite	1,740.9-1,741.2
Halite, gray-red, gray-green, fine to medium crystalline, argillaceous; minor scattered stringers red-orange polyhalite; gray-green clay at 1,741.3 feet	1,741.2-1,742.1
Halite, moderate-red-orange, pale-red, pale-red-brown, fine crystalline; moderate amount of red-orange and red-brown polyhalite stringers and blebs	1,742.1-1,746.1
Halite, gray-green, moderate-red-brown, clear, fine to medium crystalline, argillaceous; moderate amount of moderate-red-brown polyhalite stringers and blebs; gray-green clay parting at 1,747.2 feet	1,746.1-1,748.2
Halite, pale-red, clear, pale-red-brown, fine to medium crystalline, argillaceous; moderate amount brown clay blebs	1,748.2-1,751.2
Halite, gray-red grading to moderate-red-orange, pale-yellow-brown, fine to medium crystalline; contains brown and gray-green intercrystalline clay; moderate red-brown disseminated polyhalite	1,751.2-1,755.4
Polyhalite, moderate-red-brown, dense; contains minor recrystallized halite; 0.1 foot thick gray-green clay band at base	1,755.4-1,757.6
Halite, gray-red, pale-red, fine to medium crystalline; moderate amount of moderate-red-orange polyhalite stringers, increasing downward to heavy; moderate amount gray-green clay blebs	1,757.6-1,759.1
Halite, clear, pale-red, moderate-red-orange, fine to medium crystalline; moderate amount pale-red polyhalite stringers	1,759.1-1,763.3
Polyhalite, dusky-yellow-brown, pale-red, dense; recrystallized halite near base	1,763.3-1,763.9
Halite, pale-red-brown, moderate-red-orange, very fine to medium crystalline; minor stringers gray-green clay and moderate-red-orange polyhalite	1,763.9-1,764.9
Halite, dark-yellow-brown, pale-red-brown, fine to medium crystalline, argillaceous; brown clay partings at 1,765.5 and 1,765.8 feet; moderate polyhalite stringers in lower 1.[illegible] foot	1,764.9-1,768.3
Halite, moderate-red-orange to clear, fine to medium crystalline; minor amount moderate-red-brown disseminated polyhalite in upper 0.5 foot	1,768.3-1,770.2

Table 18C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, gray-red, pale-red, clear, fine to medium crystalline; moderate amount brown clay stringers and moderate red-orange polyhalite in upper 0.5 foot; minor intercrystalline brown clay in lower 1.7 feet	1,770.2-1,772.5
Halite, dark-yellow-brown, gray-red, fine to medium crystalline, argillaceous; moderate amount moderate-red-orange polyhalite stringers in lower one-half unit; brown clay parting at 1,773.1 feet	1,772.5-1,773.8
Halite, pale-red, pale-red-brown, fine to medium crystalline; moderate amount disseminated moderate-red-brown polyhalite; thin moderate-orange-pink polyhalite stringer at 1,777.3 feet	1,773.8-1,778.3
Halite, gray-green and pale-yellow-brown grading to gray-red, pale-red, fine to medium crystalline, argillaceous; moderate amount moderate-red-orange polyhalite blebs; upper 0.5 foot contains gray-green clay, rest of unit has brown clay; gray-green parting at 1,778.8 feet, brown partings at 1,779.8, 1,781.8, 1,783.5, and 1,784.3 feet	1,778.3-1,785.7
Halite, gray-green, pale-red, fine crystalline, argillaceous; gray-green clay partings at 1,786.5 and 1,786.9 feet	1,785.7-1,787.9
Halite, gray-red, green-gray, fine crystalline, argillaceous; moderate amount gray-orange-pink polyhalite stringers and blebs; moderate amount gray-green clay blebs; gray-green partings at 1,789.7 [illegible] 1,790.2 feet	1,[illegible]-1,790.3
Halite, pale-red, clear, fine to coarse crystalline; minor amount gray-orange-pink polyhalite stringers and blebs	1,790.3-1,791.3
Anhydrite, medium gray, mottled, laminated; contains polyhalite blebs and halite blebs	1,791.8-1,806.6
Halite, clear, pale-red-orange, fine crystalline	1,806.6-1,307.2
Halite, gray-green, pale-red, fine crystalline, argillaceous; minor amount moderate-red-orange polyhalite blebs; gray-green clay parting at 1,807.3 feet	1,807.2-1,808.3
Halite, clear, pale-red and moderate-red-orange, fine to medium crystalline; moderate amount moderate-orange-pink polyhalite blebs and stringers	[illegible]8.3-1,309.6
Halite, clear, medium-gray, fine to medium crystalline; minor amount gray-green intercrystalline clay	1,809.6-1,810.6
Halite, moderate-red-brown, pale-red, fine crystalline	1,810.6-1,811.6

Table 18C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, gray-green, clear, pale-red, moderate-red-brown, fine crystalline, argillaceous; green-black clay parting at 1,812.0 feet; intercrystalline gray-green clay in bands----------	1,811.6-1,813.6
Halite, moderate-red-brown, moderate-brown, fine crystalline grading to medium crystalline near base, argillaceous; moderate amount moderate-red-brown polyhalite disseminated in upper 0.3 foot; gray-green parting at 1,814.3 feet----------	1,813.[illegible]-1,814.7
Halite, moderate-brown, mottled with pale red and gray red, fine to coarse crystalline, argillaceous; moderate amount moderate-red-brown polyhalite stringers and blebs; numerous blebs and stringers brown clay; brown clay parting at 1,814.8 and 1,817.6 feet----------	1,814.7-1[illegible]18.7
Halite, moderate-brown and pale-red, fine to medium crystalline, argillaceous; minor amount moderate-red-brown polyhalite stringers; brown clay partings at 1,8[illegible]9.0 and 1,819.4 feet----------	1,818.7-1,819.4
Halite, gray-red, pale-red, light-green-gray, fine crystalline; moderate amount red-brown and gray-green stringers and blebs of clay----------	1,819.4-1,821.2
Halite, moderate-red-brown, pale-red, clear, fine to medium crystalline; moderate amount red-orange and red-brown polyhalite stringers and blebs----------	1,821.2-1,823.0
Halite, clear, pale-red and gray-green, fine to medium crystalline; minor stringers and blebs moderate-red-brown polyhalite; moderate amount intercrystalline gray-green and red-brown clay----------	1,823.0-1,824.2
Halite, moderate-red-brown, moderate-red-orange, pale-red, medium to coarse crystalline; moderate amount disseminated red-brown polyhalite----------	1,824.2-1,825.7
Halite, pale-red, clear, fine to coarse crystalline; contains bands of argillaceous halite; brown clay stringers and blebs----------	1,825.7-1,827.7
Halite, pale-red, mottled with white, moderate-red-brown, fine crystalline; moderate amount red-brown polyhalite blebs; minor brown clay partings----------	1,827.7-1,828.6
Halite, pale-red, gray-red, medium to coarse crystalline; minor blebs brown clay; brown parting at 1,828.8 feet----------	1,828.6-1,829.4
Halite, moderate-red-orange, moderate-red-brown, pale-yellow-brown, very fine to medium crystalline; upper 2.6 feet contains moderate amount disseminated red-brown polyhalite----------	1,829.4-1,834.0

Table 18C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red, clear, gray-red, fine to medium crystalline, argillaceous; gray-green clay seam at top; brown clay parting at 1,834.5 feet; lower 1.0 foot contains minor amount red-brown polyhalite blebs	1,834.0-1,836.4
Halite, pale-red, clear and moderate-red-orange, medium to coarse crystalline; moderate amount moderate-red-orange polyhalite blebs and stringers	1,836.4-1,837.4
Halite, clear, pale-red, becoming moderate red-brown in lower 0.6 foot, fine to medium crystalline; lower 0.6 foot contains numerous red-brown polyhalite stringers and blebs	1,837.4-1,840.2
Halite, gray-red and pale-red, fine to medium crystalline, argillaceous; lower 0.2 foot contains moderate amount moderate-red-brown polyhalite stringers	1,840.2-1,841.4
Halite, pale-red, gray-green, fine crystalline; minor amount red-brown polyhalite stringers and blebs; moderate amount gray-green and brown intercrystalline clay; brown clay parting at 1,843.4 feet	1,841.4-1,843.6
Halite, clear to pale-red, fine to medium crystalline; minor amount moderate-red-orange polyhalite stringers and blebs	1,843.6-1,849.4
Halite, green-gray, pale-red, fine crystalline, argillaceous; minor blebs red-brown polyhalite; moderate amount green-gray and brown clay blebs	1,849.4-1,850.5
Halite, gray-red and clear, fine crystalline; minor amounts moderate-red-orange polyhalite stringers and blebs, mostly in upper one-half	1,850.5-1,852.0
Halite, pale-red to green-gray, fine to medium crystalline, argillaceous; brown clay parting at 1,852.5 feet	1,852.0-1,853.0
Halite, moderate-red-orange and clear, grading down to gray-red and clear, fine to medium crystalline; concentrated polyhalite blebs at 1,853.5 feet; lower 1.5 feet contains minor brown clay stringers	1,853.0-1,855.5
Halite, clear, pale-red-brown, moderate-red-brown, very fine to fine crystalline; moderate amounts red-brown polyhalite stringers and blebs; minor amount gray-green intercrystalline clay	1,855.5-1,857.7
Halite, pale-yellow-brown, gray-orange, clear, coarse crystalline; moderate amounts red-brown polyhalite blebs; minor amounts green-red clay blebs and intercrystalline clay	1,857.7-1,859.1

Table 18C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, grayish-orange, moderate-orange-pink, pale-red, coarse to very coarse crystalline; moderate amounts pink-orange polyhalite blebs; sparse intercrystalline green-gray clay	1,859.1-1,863.1
Halite, grayish-orange, very pale orange, clear, coarse to very coarse crystalline; minor amounts gray-orange polyhalite blebs and stringers	1,863.1-1,869.0
Anhydrite, greenish-gray to medium-gray, dense, laminated; minor amounts polyhalite and halite in blebs and stringers	1,869.0-1,876.3
Halite, clear, pink-gray, fine to medium crystalline; anhydrite in sparse bands and stringers; lower 0.3 foot is moderate orange pink	1,876.3-1,879.5
Anhydrite, greenish-gray to gray, dense, laminated; very common halite blebs; sparse pink-orange polyhalite blebs	1,879.5-1,884.7
Anhydrite, olive-gray to greenish-gray, dense, laminated; sparse zones of halite blebs	1,884.7-1,887.2
Anhydrite, medium-bluish-gray, laminated, argillaceous; gray clay partings at 1,888.1 and 1,888.2 feet; polyhalite-rich zone at 1,888.1-1,888.2 feet	1,887.2-1,888.3
Halite, moderate-red to dark-red-brown, coarse crystalline; very abundant polyhalite blebs and stringers; gray intercrystalline clay blebs, minor in upper 2.0 feet, increasing to abundant in lower 0.5 foot; clay parting at 1,891.2 feet	1,888.3-1,891.4
Halite, clear, gray-orange-pink, very coarse crystalline; sparse intercrystalline orange-pink polyhalite blebs; sparse gray-green clay blebs and stringers	1,891.4-1,893.6
Halite, gray-orange-pink, moderate-red, mottled, coarse to very coarse crystalline; moderate to abundant moderate-orange-pink polyhalite blebs and stringers; disseminated sparse clay	1,893.6-1,896.6
Halite, clear, pale-red, gray, fine to medium crystalline, argillaceous; common to abundant brown-gray intercrystalline clay; clay partings at 1,897.3 and 1,898.5 feet; very sparse moderate-red-orange polyhalite	1,896.6-1,898.5
Halite, clear to gray-orange-pink, medium to coarse crystalline; minor moderate-red-orange disseminated polyhalite	1,898.5-1,899.1
Halite, clear, pale-red, moderate-orange-pink, coarse crystalline; minor moderate-red-orange disseminated polyhalite	1,899.1-1,899.9
Halite, clear, pale-yellow-brown, moderate-red-orange, medium to coarse crystalline; minor moderate-red-orange polyhalite stringers and blebs	1,899.9-1,905.8

Table 18C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, gray-green, pale-red, clear, fine to medium crystalline, argillaceous; large amount gray-green clay blebs	1,905.8-1,906.6
Halite, pale-red, dark-brown, fine crystalline, argillaceous; brown clay partings at 1,907.4 and 1,907.8 feet	1,906.6-1,907.9
Halite, clear, moderate-red-orange, fine to coarse crystalline; minor scattered stringers and blebs moderate-red-orange polyhalite; lower 0.4 foot slightly argillaceous	1,907.9-1,909.7
Halite, moderate-red-brown, pale-red, fine crystalline; moderate amount blebs and stringers of moderate-red-orange polyhalite	1,909.7-1,913.3
Halite, gray-red, brown, fine to medium crystalline, argillaceous; brown clay parting at 1,913.8 feet	1,913.3-1,914.1
Halite, clear, pale-red, moderate-red-brown, fine to medium crystalline; moderate amount blebs and stringers red-orange and red-brown polyhalite	1,914.1-1,915.7
Halite, gray-red, mottled with light gray, light brown, fine to medium crystalline, argillaceous; minor red-orange polyhalite stringers and gray-green clay layers	1,915.7-1,917.4
Halite, pale-red grading to moderate-red-orange, medium crystalline; minor red-orange polyhalite stringers	1,917.4-1,918.2
Halite, gray-red, pale-red, fine to medium crystalline, argillaceous; brown clay seam at 1,918.7 feet	1,918.2-1,919.2
Halite, medium-gray, gray-green, fine crystalline, moderately argillaceous; minor stringers moderate-red-orange polyhalite	1,919.2-1,922.6
Halite, pale-red, moderate-red-orange, fine crystalline; moderate amount moderate-red-orange and moderate-red-brown polyhalite stringers increasing at base	1,922.6-1,923.4
Halite, medium-gray, gray-green, fine crystalline, moderately argillaceous; minor stringers moderate-red-orange polyhalite	1,923.4-1,924.4
Halite, pale-red, moderate-red-orange, fine crystalline; moderate amount of moderate-red-orange and moderate-red-brown polyhalite stringers	1,924.4-1,925.2
Halite, pale-red, clear, and moderate-red-orange, fine to medium crystalline, moderately argillaceous; common moderate-red-orange polyhalite blebs	1,925.2-1,926.5
Halite, moderate-red-orange, pale-red, clear, medium to coarse crystalline; abundant moderate-red-orange polyhalite stringers	1,926.5-1,930.2
Halite, gray-green and dark-gray, fine crystalline, argillaceous; minor moderate-red-orange polyhalite blebs; dark-gray-green clay at base	1,930.2-1,930.9

Table 18C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red, banded with clear and moderate-red- range, fine crystalline; moderate amount moderate-red-orange polyhalite blebs----	1,930.9-1,932.5
Halite, clear, pale-yellow-brown, fine crystalline; scattered blebs and stringers moderate-red-orange polyhalite; argillaceous halite bands at 1,935.3 and 1,935.8 feet----------	1,932.5-1,937.6
Halite, light-gray to clear, fine to very coarse crystalline, moderately argillaceous; gray-green clay seam at base----------	1,937.6-1,938.3
Halite, medium-gray to dark-green-gray, fine to medium crystalline, argillaceous; minor stringers and blebs moderate-red-orange polyhalite in lower 1.0 foot; gray-green clay partings at 1,939.2 and 1,941.5 feet----------	1,938.3-1,941.9
Halite, gray-red and brown, fine crystalline, argillaceous; brown clay parting at top and at base----------	1,941.9-1,942.8
Halite, moderate-red-brown, clear, pale-red, moderate-red-orange, very fine to fine crystalline; moderate amount red-orange and red-brown polyhalite stringers and blebs; contains leached sulfate(?) at 1,944.4 feet----------	1,942.8-1,949.1
Polyhalite, moderate-red-brown, dense----------	1,949.1-1,949.3
Halite, moderate-red-orange, pale-yellow-brown, light-olive-gray, fine crystalline; minor stringers moderate-red-orange polyhalite; scattered moderate amounts of polyhalite; gray-green clay partings at 1,949.8 and 1,950.8 feet----------	1,949.3-1,953.2
Halite, pale-red, gray-red, clear, fine crystalline grading to medium crystalline, argillaceous; minor amount moderate-red-orange polyhalite blebs; brown clay partings at 1,953.3, 1,953.6, 1,954.8, and 1,955.2 feet----------	1,953.2-1,955.3
Halite, gray-red, pale-red, moderate-red-orange, very fine to medium crystalline, argillaceous; brown clay parting at 1,956.0 feet--------	1,955.3-1,957.8
Halite, pale-red, clear, fine crystalline; minor scattered stringers of moderate-red-orange polyhalite----------	1,957.8-1,959.0
Halite, pale-red, medium-gray, very fine to fine crystalline, moderately argillaceous; common moderate-red-orange polyhalite stringers in lower 1.8 feet----------	1,959.0-1,962.7
Halite, pale-red, gray-red, fine to medium crystalline, argillaceous; brown clay partings at top and base----------	1,962.7-1,963.4
Halite, gray-red, pale-red; fine to medium crystalline; contains bands of clear, coarse crystalline halite; scattered minor stringers of moderate-red-orange polyhalite----------	1,963.4-1,968.2

Table 18C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red, gray-red, fine to medium crystalline, moderately argillaceous; minor scattered stringers moderate-red-orange polyhalite; brown clay partings at 1,969.4, 1,970.6, and 1,971.2 feet	1,968.2-1,974.4
Halite, dark-green-gray, gray-red, fine crystalline, argillaceous; minor scattered stringers medium-red-orange polyhalite	1,974.4-1,976.0
Halite, gray-red, clear, fine to medium crystalline, moderately argillaceous; polyhalitic zones from 1,977.8 to 1,978.5 feet; below 1,978.5 feet minor stringers red-orange and red-brown polyhalite; brown clay partings at 1,977.3 and 1,978.7 feet; lower 1.0 foot minor gray-green clay	1,976.0-1,981.1
Halite, clear and pale-red, medium to coarse crystalline; moderate amount moderate-red-orange and moderate-red-brown polyhalite stringers	1,981.1-1,984.0
Halite, clear, pale-red, and grayish-red, fine crystalline; moderate to heavy amounts red-orange and red-brown polyhalite stringers; gray-green clay parting at base	1,984.0-1,986.3
Halite, clear and pale-red, fine to medium crystalline; minor stringers and blebs of moderate-red-brown polyhalite	1,986.3-1,988.0
Halite and banded polyhalite; halite is clear, fine crystalline; polyhalite is moderate-red-brown, dense	1,988.0-1,989.8
Halite, gray-red and clear, very coarse crystalline; moderate to heavy amount red-brown polyhalite stringers and blebs; minor red-brown clay stringers	1,989.8-1,991.7
Halite, clear and pale-red, medium to coarse crystalline; minor blebs of moderate-red-brown polyhalite; minor brown clay blebs in lower 0.5 foot	1,991.7-1,994.2
Halite, pale-yellow-gray, pale-red, and clear, fine to medium crystalline; minor amount moderate-red-brown polyhalite blebs and stringers; moderate amount gray-green clay in lower 1.0 foot	1,994.2-1,998.0
Halite, clear and pale-red, fine to coarse crystalline; contains a 0.3 foot band of pale-yellow-brown, very fine crystalline halite at 1,998.6-1,998.9 feet; very minor red-orange polyhalite; very minor green-gray intercrystalline clay	1,998.0-2,000.5
	Total depth

Table 18D.--Mineralogical and chemical analyses of core samples from potash ore zones and m[illegible]ized salt beds in drill hole P-18

[oz, ore zone; sb, salt bed; tr, trace; Ha, halite; Ka, kainite; La, langbeinite; Le, leonite; Po, polyhalite; Sy, sylvite; n.d., not determined. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mineralogy: X-ray diffraction analysis[1]	Chemical analysis (weight percent): Ca	K	Mg	Na	Cl	SO_4	H_2O^+	H_2O-	Water insoluble
P-18/1	1,726.68-1,727.78	1.10	sb	>8 Ha; <1 Sy; tr Po	0.[illegible]	1.3	0.08	3.80	n.d.	0.49	n.d.	n.d.	n.d.
P-18/2	1,727.78-1,728.40	.62	10th oz	>9 Ha; <1 Po, Sy	.13	.44	.12	37.0	57.5	.34	0.28	0.15	2.6
P-18/3	1,728.40-1,728.78	.38		>4 Ha; >4 Sy; >1 La; tr Po, Ka	.09	24.5	2.4	16.0	40.5	15.0	.95	.03	.28
P-18/4	1,728.78-1,730.45	1.67		>8 Ha; <1 Po; >1 Sy	.46	5.3	.26	34.0	55.5	1.9	.19	.04	.23
[2] P-18/5	1,730.45-1,731.49	1.04		>8 Ha; <1 Sy; >1 Po; tr Le	.85	1.5	.44	31.5	49.0	2.7	.81	.77	10.2
[2] P-18/5					.85	1.5	.44	31.5	49.0	2.6	.80	.76	10.1
P-18/6	1,731.49-1,732.29	.80		>7 Ha; <1 Po; Sy, tr Le	.59	1.5	.49	29.0	45.0	1.5	1.0	1.24	16.7

[1] Estimate of amount reported on a scale of 0-10.
[2] Replicate analyses.

Table 18E.--Calculated mode (mineral content) and potash distribution by mineral in core samples from potash ore zones and mineralized salt beds in drill hole P-18

[oz, ore zone; sb, salt bed; Ha, halite; Ka, kainite; La, langbeinite; Le, leonite; Po, polyhalite; Sy, sylvite; Insol., clay and silt; n.d., not determined; leaders (---), not present. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mode (weight percent mineral)							K_2O distribution by minerals					
				Sy	La	Ka	Le	Ha	Po	Insol.	Sy	La	Ka	Le	Po	Total
P-18/1	1,726.68-1,727.78	1.10	sb	2.3	---	---	---	96.6	0.7	n.d.	1.4	---	---	---	<.1	1.5
P-18/2	1,727.78-1,728.40	.62	10th oz	.7	---	---	---	94.2	.5	2.6	.4	---	---	---	<.1	.5
P-18/3	1,728.40-1,728.78	.38		38.8	19.5	2.6	---	35.7	.7	.3	24.5	4.4	0.5	---	.1	29.5
P-18/4	1,728.78-1,730.45	1.67		9.4	---	---	---	84.1	2.9	.2	5.9	---	---	---	.5	6.4
[1]P-18/5	1,730.45-1,731.49	1.04		1.5	---	---	1.2	80.7	3.3	10.2	.9	---	---	0.3	.5	1.7
[1]P-18/5				1.6	---	---	1.1	80.1	3.2	10.1	1.0	---	---	.3	.5	1.8
P-18/6	1,731.49-1,732.29	.80		2.0	---	---	1.2	73.7	1.4	16.7	1.3	---	---	.3	.2	1.8

[1]Replicate analyses.

TABLES 19A-19G

Basic data from drill hole P-19, Waste Isolation Pilot Plant area, Eddy County, New Mexico

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19G.--Gamma-ray and neutron logs of drill hole	foldout

Table 19A.--Abridged drill-hole history

LOCATION: Sec. 23, T. 22 S., R. 31 E.
504 m (1,652 ft) from south line
710 m (2,330 ft) from west line

ALTITUDE (LAND SURFACE): 1,081 m (3,546.3 ft). Datum for depth measurement in drilling and logging operations.

LITHOLOGIC LOG PREPARED BY: R. J. Cheeseman, J. C. Lorenz, Florian Maldonado, J. W. Mercer, B. R. Orr, L. A. Rivas, and R. P. Snyder, October 20 to November 4, 1976.

DRILLING CONTRACTOR: Pennsylvania Drilling Co.

DRILLING RECORD: Commenced drilling on October 19, and completed on November 4, 1976, at 610 m (2,000 ft) below land surface.

All casing recovered and plugged with cement.

REMARKS: Top of salt in Rustler Formation at 271 m (890 ft) below land surface.

Table 19B.--Stratigraphic summary

Rock unit	Depth interval[1] feet	meters
Holocene deposits	0-8	0-2
Triassic rocks:		
Santa Rosa Sandstone	8-232	2-71
Permian rocks:		
Dewey Lake Red Beds	232-758	71-231
Rustler Formation	758-1,117	231-340
Magenta Dolomite Member	814-839	248-256
Culebra Dolomite Member	967-997	295-304
Salado Formation	1,117-2,002	340-610
Upper member	1,117-1,621	340-494
McNutt potash zone	1,621-2,011[2]	494-613
Vaca Triste Sandstone Member[3]	1,621-1,628	494-496
11th ore zone	1,677-1,681	511-512
Marker bed 117	1,688-1,690	515-515
Marker bed 118	1,711-1,713	522-522
Marker bed 119	1,735-1,737	529-529
10th ore zone	1,745-1,753	532-534
Marker bed 120	1,760-1,761	536-537
9th ore zone	1,767-1,771	539-540
Marker bed 121	1,776-1,778	541-542
Marker bed 122	1,785-1,786	544-544
8th ore zone	1,792-1,801	546-549
U[illegible]ion anhydrite[4]	1,812-1,822	552-555
7th ore zone	1,835-1,840	559-560
6th ore zone	1,850-1,854	564-565
5th ore zone	1,858-1,872	566-601
Marker bed 123	1,892-1,901	577-579
Marker bed 124	1,909-1,917	582-584
4th ore zone	1,923-1,933	586-589
3d ore zone	1,944-1,955	592-596
2d ore zone	1,962-1,967	598-600
1st ore zone	1,983-1,994	604-608
Maximum depth recor[illegible]	2,002	610

[1]Depth interval recorded from geophysical logs.
[2]Estimate. Coring st[illegible]ped between 1st ore zone and marker bed 126.
[3]Of Adams, [illegible]944.
[4]Informal unit of Salado Formation.

Table 19C.--Lithologic log

Description	Depth (feet)	
Siltstone, reddish-brown; caliche	0.0-	5.0
Sandstone, grayish-red-brown, well-sorted, salt and pepper texture; caliche	5.0-	25.0
Same as above; less caliche	25.0-	40.0
Same as above; some chert	40.0-	75.0
Sandstone, light-grayish-green, well-sorted, salt and pepper texture; reddish-brown sandstone	75.0-	80.0
Same as above; some reddish-brown shale	80.0-	85.0
Same as above; less grayish-green and more reddish-brown sandstone	85.0-	95.0
Shale and siltstone, reddish-brown, with grayish-green reduction spots; reddish-brown sandstone	95.0-	100.0
Siltstone, reddish-brown, with grayish-green reduction spots; reddish-brown and grayish-green, salt and pepper texture sandstone	100.0-	105.0
Same as above; less siltstone and more sandstone	105.0-	110.0
Sandstone, brown to grayish-green, salt and pepper texture; reddish-brown siltstone, with grayish-green reduction spots	110.0-	140.0
Same as above; increasing siltstone	140.0-	145.0
Same as above; less sandstone, more siltstone	145.0-	155.0
Same as above; 30-40 percent grayish-green color	155.0-	165.0
Siltstone and shale, reddish-brown, with grayish-green reduction spots; some brown sandstone	165.0-	170.0
Same as above; sparse reduction spots	170.0-	180.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots; some grayish-red, white, granular gypsum; selenite	180.0-	185.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots	185.0-	210.0
Siltstone, dark-reddish-brown; minor fine-grained, reddish-brown sandstone, with minor grayish-green reduction spots	210.0-	215.0
Same as above; increasing sandstone	215.0-	220.0
Siltstone, dark-reddish-brown; minor light-orange, fine-grained sandstone and reddish-brown sandstone, with grayish-green reduction spots	220.0-	225.0
Same as above; increasing light-orange sandstone	225.0-	230.0
Same as above; light-orange sandstone decreasing	230.0-	235.0
Siltstone, dark-reddish-brown, with grayish-green reduction spots	235.0-	265.0
Same as above; minor selenite	265.0-	270.0
Same as above; no selenite	270.0-	295.0
Siltstone, dark-reddish-brown; minor amount of light-green and clear, fine-grained sandstone	295.0-	300.0

Table 19C.--Lithologic log--(Continued)

Description	Depth (feet)
Sandstone, reddish-brown, very fine grained; minor light-green to clear, very fine grained sandstone; minor reddish-brown siltstone	300.0- 310.0
Siltstone, dark-reddish-brown; minor amount of very fine grained reddish-brown sandstone, with grayish-green reduction spots	310.0- 330.0
Siltstone, reddish-brown; gray to clear sandstone; sparse selenite and gypsum; sparse grayish-green reduction spots	330.0- 335.0
Same as above; less sandstone and selenite	335.0- 350.0
Same as above; common reddish-brown sandstone	350.0- 365.0
Siltstone, reddish-brown; very fine grained sandstone, with grayish-green reduction spots; sparse white crystalline gypsum	365.0- 375.0
Same as above; sparse selenite	375.0- 390.0
Same as above; very sparse selenite and gypsum	390.0- 400.0
Siltstone, moderate-reddish-brown to dark-reddish-brown, with greenish-gray reduction spots; white granular gypsum; clear crystalline selenite; some red mudstone present	400.0- 410.0
Siltstone, moderate-reddish-brown to dark-reddish-brown; white granular gypsum; red mudstone; sparse greenish-gray reduction spots	410.0- 415.0
Same as above; minor clear, crystalline selenite	415.0- 430.0
Siltstone, moderate-reddish-brown to dark-reddish-brown with some greenish-gray reduction spots; sparse fine-grained, light- to medium-gray to light-gray sandstone; sparse white granular gypsum	430.0- 435.0
Same as above; clear, crystalline selenite	435.0- 440.0
Sandstone, moderate- to dark-reddish-brown, very fine grained; and light-medium-gray to light-gray, fine-grained, silty sandstone; sparse clear, crystalline selenite	440.0- 445.0
Same as above; dark-reddish-brown siltstone, with greenish-gray reduction spots	445.0- 450.0
Siltstone, moderate- to dark-reddish-brown, with greenish-gray reduction spots; dark-reddish-brown, very fine grained sandstone; white, granular gypsum; clear, crystalline vein selenite	450.0- 500.0
Siltstone, dark-reddish-brown, with grayish-green reduction spots; common moderate-reddish-brown, fine- to medium-grained sandstone; trace of white gypsum	500.0- 515.0
Siltstone, moderate- to dark-reddish-brown, with greenish-gray reduction spots; sparse, dark-reddish-brown, very fine grained sandstone; trace of clear, crystalline selenite	515.0- 520.0
Same as above; sparse white granular gypsum	520.0- 525.0
Same as above; sparse black mudstone	525.0- 530.0

Table 190.--Lithologic log--(Continued)

Description	Depth (feet)
Siltstone, moderate- to dark-reddish-brown, with grayish-green reduction spots; sparse dark-reddish-brown, very fine grained sandstone; trace of clear, crystalline selenite; sparse, white, granular gypsum	530.0- 535.0
Same as above; with sparse black mudstone	535.0- 540.0
Siltstone, dark-reddish-brown; white to light-medium-gray sandstone; white, granular gypsum	540.0- 545.0
Siltstone, dark-reddish-brown; dark-reddish-brown sandstone; white, granular gypsum; sparse, clear crystalline selenite	545.0- 550.0
Same as above; with increasing selenite	550.0- 555.0
Same as above; clear, crystalline selenite, 1-5 percent	555.0- 565.0
Siltstone, dark-reddish-brown; dark-reddish-brown, very fine grained sandstone; white, granular gypsum; white to light-medium-gray, fine-grained sandstone; trace of clear, crystalline selenite	565.0- 580.0
Same as above; with very sparse light-grayish-green siltstone	580.0- 595.0
Same as above; sparse, white to light-medium-gray, very fine grained sandstone	595.0- 600.0
Siltstone, dark-reddish-brown, with grayish-green to greenish-gray reduction spots; dark-reddish-brown, very fine grained sandstone; sparse, clear, crystalline selenite	600.0- 605.0
Same as above; with sparse, white, very fine grained to fine-grained sandstone	605.0- 640.0
Siltstone, dark-reddish-brown, with greenish-gray reduction spots; dark-reddish-brown, very fine grained sandstone; sparse white to light-medium-gray, very fine grained sandstone; sparse, white, granular gypsum; trace clear, crystalline selenite	640.0- 660.0
Siltstone, moderate-reddish-brown, with grayish-green reduction spots, micaceous; minor white selenite	660.0- 700.0
Siltstone, moderate-reddish-brown, with grayish-green reduction spots, micaceous; clear crystalline veined selenite	700.0- 735.0
Same as above; not micaceous	735.0- 760.0
Anhydrite, white, fine-grained; moderate-reddish-brown, very fine grained siltstone, about 15 percent	760.0- 765.0
Same as above; less than 5 percent sandstone	765.0- 775.0
Same as above; less than 1 percent sandstone	775.0- 785.0
Same as above; less than 10 percent sandstone	785.0- 790.0
Same as above; less than 20 percent sandstone	790.0- 795.0
Same as above; 50 percent sandstone	795.0- 800.0

Table 19C.--Lithologic log--(Continued)

Description	Depth (feet)
Anhydrite, white, fine-grained; less than 5 percent reddish-brown, fine-grained siltstone	800.0- 810.0
Dolomite, light-olive-gray, fine-grained; less than 5 percent reddish-brown siltstone	810.0- 815.0
Dolomite, olive-gray to grayish-orange, fine-grained; some gypsum	815.0- 840.0
Dolomite, greenish-gray, fine-grained; anhydrite; gypsum; some reddish-brown siltstone	840.0- 845.0
Same as above; increase of siltstone to 40 percent	845.0- 850.0
Anhydrite, white, clear, fine-grained; some reddish-brown, very fine grained siltstone	850.0- 880.0
Same as above; some halite	880.0- 890.0
Same as above; no halite	890.0- 895.0
Same as above; some halite	895.0- 900.0
Anhydrite, white, fine-grained; white, soft gypsum, less than 10 percent	900.0- 910.0
Same as above; 40 percent clear halite	910.0- 930.0
Halite, clear; white, fine-grained anhydrite, 30 percent; trace of gypsum	930.0- 935.0
Halite, 80 percent; anhydrite, 20 percent	935.0- 940.0
Halite, clear; less than 1 percent white anhydrite	940.0- 960.0
Halite, white, 75 percent; white, very fine grained anhydrite, 20 percent; white gypsum, 5 percent	960.0- 965.0
Halite, clear, 80 percent; light-gray gypsum, 20 percent	965.0- 970.0
Dolomite, greenish-gray; clear halite, 10 percent	970.0- 975.0
Dolomite, greenish-gray, very fine grained	975.0- 985.0
Same as above; trace of halite	985.0-1,000.0
Dolomite, greenish-gray, very fine grained; 10-15 percent clear halite	1,000.0-1,005.0
Same as above, trace of white gypsum	1,005.0-1,010.0
Anhydrite, white, very fine grained; clear halite, 10 percent, trace of white gypsum	1,010.0-1,025.0
Halite, clear; white anhydrite, 20 percent, trace of orange-red polyhalite	1,025.0-1,040.0
Halite, clear; reddish-orange polyhalite, 10 percent	1,040.0-1,050.0
Same as above; 5 percent reddish-brown siltstone	1,050.0-1,055.0
Siltstone, dark-reddish-brown, very fine grained; less than 5 percent halite; trace of polyhalite	1,055.0-1,065.0

Table 19C.--Lithologic log--(Continued)

Description	Depth (feet)
Siltstone, dark-reddish-brown, very fine grained, 50 percent; clear halite, 40 percent; white, fine-grained anhydrite, 10 percent	1,065.0-1,070.0
Siltstone as above, 70 percent, halite, 20 percent; anhydrite and gypsum, 10 percent	1,070.0-1,100.0
Siltstone, dark-re[illegible]n-brown, very fine grained; clear halite 10 percent	1,100.0-1,115.0
Halite, clear; trace of white anhydrite; trace of siltstone	1,115.0-1,200.0
Halite, clear; trace of reddish-orange and white polyhalite	1,200.0-1,225.0
Halite, clear; 10 percent reddish-brown siltstone; white anhydrite, 5 percent; trace white gypsum; trace of polyhalite	1,225.0-1,230.0
Halite, clear; trace of reddish-orange polyhalite	1,230.0-1,305.0
Same as above; minor clay	1,305.0-1,310.0
Halite, clear; reddish-brown siltstone	1,310.0-1,320.0
Halite, clear; minor reddish-brown siltstone; minor polyhalite	1,320.0-1,325.0
Siltstone, reddish-brown; clear halite; minor, very fine grained sandstone	1,325.0-1,330.0
Halite, clear; minor reddish-brown siltstone	1,330.0-1,335.0
Halite, clear; minor reddish-brown polyhalite and siltstone	1,335.0-1,340.0
Halite, clear; minor orange-red polyhalite	1,340.0-1,385.0
Halite, clear; minor orange-red polyhalite; less than 5 percent white anhydrite	1,385.0-1,400.0
Halite, clear; minor reddish-orange polyhalite; less than 1 percent white anhydrite	1,400.0-1,430.0
Halite, clear; some reddish-orange polyhalite; white anhydrite, 15-20 percent	1,430.0-1,435.0
Anhydrite, white, fine-grained; less than 5 percent clear halite; trace of reddish-orange polyhalite	1,435.0-1,445.0
Same as above; 10-15 percent reddish-brown siltstone	1,445.0-1,450.0
Halite, clear; trace of reddish-orange polyhalite	1,450.0-1,465.0
Halite, clear; 10 percent white anhydrite	1,465.0-1,470.0
Halite, clear; trace of anhydrite	1,470.0-1,500.0
Halite, clear; less than 5 percent white, fine-grained anhydrite; trace of reddish-orange polyhalite	1,500.0-1,515.0
Halite, clear; trace of reddish-orange polyhalite	1,515.0-1,535.0
Halite, clear; minor reddish-brown polyhalite	1,535.0-1,545.0
Halite, clear; moderate amount of reddish-orange and reddish-brown polyhalite	1,545.0-1,550.0

Table 19C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear; minor reddish-brown polyhalite	1,550.0-1,555.0
Halite, clear; moderate amount of reddish-orange polyhalite	1,555.0-1,570.0
Same as above; increasing pol halite	1,570.0-1,585.0
Halite, clear; moderate amount of reddish-orange polyhalite	1,585.0-1,590.0
Halite, clear; minor reddish-orange polyhalite	1,590.0-1,635.0
Halite, grayish-red and clear, medium to coarse crystalline; minor reddish-orange polyhalite stringers and brown clay stringers	1,635.0-1,637.2
Halite, moderate-reddish-orange and clear, coarse crystalline; minor reddish-orange polyhalite blebs, grading downward to moderate amount	1,637.2-1,638.4
Halite, grayish-red and pale-olive-gray, medium to coarse crystalline, argillaceous; grayish-green clay parting at 1,638.9 feet	1,638.4-1,639.0
Halite, grayish-red and pale-red, coarse crystalline; minor disseminated polyhalite blebs	1,639.0-1,639.7
Halite, grayish-red and clear, medium to coarse crystalline, argillaceous; minor reddish-brown polyhalite stringers; brown clay stringers; brown clay parting at 1,640.1 feet	1,639.7-1,641.0
Halite, pale-red, grayish-red, and moderate-reddish-brown, mottled, fine to medium crystalline; moderate amount of reddish-brown polyhalite stringers; minor to moderate amount of brown clay stringers and blebs	1,641.0-1,645.1
Halite, moderate-reddish-orange and pale-red, fine crystalline; moderate amount of reddish-orange disseminated polyhalite; unit faintly bedded	1,645.1-1,650.6
Halite, grayish-red and dark-reddish-brown, fine crystalline, argillaceous; minor amount of moderate-reddish-orange polyhalite blebs; brown clay parting at top, 1,652.1, and 1,652.8 feet; grayish-green clay parting at 1,653.2 and 1,653.5 feet	1,650.6-1,653.8
Halite, pale-reddish-brown and moderate-reddish-brown, fine to medium crystalline; slightly clayey in upper 0.3 foot; polyhalite seam at 1,654.1-1,654.2 feet	1,653.8-1,654.6
Halite, moderate-reddish-brown and pale-reddish-brown, fine to medium crystalline; minor amount of moderate-reddish-orange clay and polyhalite stringers; becomes more argillaceous toward base, with clay becoming brown; brown clay seam at 1,656.5 feet	1,654.6-1,656.7
Halite, moderate-reddish-brown and pale-red, fine to medium crystalline, polyhalitic; polyhalite seam at 1,657.4-1,657.5 feet	1,656.7-1,658.6

Table 19C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, grayish-red, fine crystalline, argillaceous; mottled with stringers and blebs of moderate-reddish-orange polyhalite	1,658.6-1,659.4
Halite, moderate-reddish-orange to moderate-reddish-brown, very fine to fine crystalline	1,659.4-1,662.1
Clay, pale-red and brown, halitic	1,662.1-1,663.0
Halite, moderate-orange-pink to pale-red, coarse to very coarse crystalline; minor to moderate amount of moderate-reddish-orange, intercrystalline polyhalite; minor clay stringers; clay seam at 1,663.4-1,663.5 feet; clay bleb at 1,663.5 feet	1,663.0-1,667.7
Halite, gray-orange-pink to moderate-reddish-brown, coarse crystalline; abundant intercrystalline pink-orange polyhalite	1,667.7-1,669.6
Halite, grayish-red, coarse crystalline; abundant disseminated gray clay	1,669.6-1,670.1
Halite, moderate-reddish-orange, mottled, coarse crystalline; abundant blebs and stringers of orange-pink polyhalite	1,670.1-1,673.3
Halite, pale-red to olive-gray to dark-reddish-brown, mottled, medium to coarse crystalline, argillaceous; abundant blebs of reddish-brown polyhalite; heavy concentration of light-gray and reddish-brown clay; moderate to heavily disseminated leached sulfates	1,673.3-1,677.3
Halite, moderate-orange-pink, very coarse crystalline; moderate amounts of disseminated reddish-orange polyhalite blebs; grades into unit below	1,677.3-1,678.6
Halite, grayish-red to grayish-orange-pink, coarse to very coarse crystalline; minor disseminated blebs of reddish-orange polyhalite; moderate disseminated gray clay	1,678.6-1,679.8
Halite, moderate-reddish-orange to pale-yellowish-brown, coarse to very coarse crystalline; moderate amount of intercrystalline reddish-orange polyhalite blebs; minor amounts of leached sylvite(?); stringer of langbeinite at base	1,679.8-1,683.0
Halite, moderate-orange-pink to pale-reddish-brown, coarse crystalline; blebs and stringers of pale-red to reddish-brown polyhalite; sparse leached sylvite(?) near base	1,683.0-1,685.6
Polyhalite, pale-reddish-brown, dense, massive; minor crystalline halite; 0.1 foot thick dark-gray clay at base	1,685.6-1,687.3
Halite, pale-red and moderate-reddish-brown, fine to medium crystalline; argillaceous between 1,687.7 and 1,688.9 feet; minor amount of moderate-orange-pink polyhalite blebs and stringers in lower 2.2 feet	1,687.3-1,691.0

Table 19C.—Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-reddish-brown to pale-red, fine to medium crystalline; argillaceous in upper 0.2 foot	1,691.0-1,691.8
Halite, pale-red, mottled with moderate-reddish-brown, medium to coarse crystalline; few thin zones of argillaceous halite; minor leached sylvite and langbeinite disseminated in lower 1.2 feet	1,691.8-1,695.0
Halite, pale-red and grayish-red and clear, mottled, fine to medium crystalline, argillaceous; minor amounts of moderate-reddish-orange and moderate-reddish-brown polyhalite blebs; minor to moderate amounts of disseminated sylvite and langbeinite	1,695.0-1,699.7
Halite, pale-reddish-brown to moderate-reddish-orange, mottled, fine to medium crystalline; moderate amount of grayish-orange and reddish-brown polyhalite blebs and stringers; minor amount of intercrystalline grayish-green clay	1,699.7-1,700.8
Halite, pale-red to clear, coarse crystalline; very minor amounts of polyhalite blebs; very minor amount of disseminated sylvite	1,700.8-1,702.2
Halite, grayish-red to moderate-reddish-orange, fine to medium crystalline; moderate amount of intercrystalline grayish-green clay; minor disseminated sylvite	1,702.2-1,702.6
Halite, moderate-reddish-brown to pale-reddish-brown, fine to coarse crystalline; moderate amount of moderate-reddish-orange and moderate-reddish-brown polyhalite blebs and stringers; very minor disseminated sylvite in lower 0.2 foot	1,702.6-1,704.1
Halite, grayish-red and pale-red, fine to medium crystalline; moderate amount of moderate-reddish-orange polyhalite stringers; minor amount of disseminated sylvite and langbeinite	1,704.1-1,706.2
Halite, moderate-reddish-orange and grayish-red, fine to coarse crystalline; moderate amount of reddish-orange polyhalite blebs; very minor sylvite	1,706.2-1,707.3
Halite, pale-reddish-brown to moderate-reddish-brown, fine to medium crystalline; moderate to heavy reddish-orange polyhalite stringers and blebs; minor disseminated sulfates	1,707.3-1,709.5
Polyhalite, moderate-reddish-brown and medium-dark-gray, dense, massive; disseminated beds of recrystallized halite	1,709.5-1,710.9
Halite, moderate-reddish-orange to clear, medium to coarse crystalline; very minor moderate-reddish-brown polyhalite blebs; very minor disseminated sylvite in lower 0.3 foot	1,710.9-1,713.3

Table 19C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, grayish-red to clear, fine to medium crystalline; moderate amount of pale-reddish-orange disseminated polyhalite; polyhalite seam at 1,714.2-1,714.3 feet; minor disseminated sylvite in lower 0.1 foot	1,713.3-1,715.3
Polyhalite, pale-red, dense; thin halite stringer at 1,715.6 feet	1,715.3-1,715.8
Halite, banded moderate-reddish-orange, pale-red and light-gray, fine to medium crystalline; argillaceous in the pale-red and light-gray layers; very minor disseminated sylvite	1,715.8-1,720.1
Halite, light-brown to grayish-red, fine crystalline, argillaceous; brown clay seams at 1,722.4, 1,723.6, and 1,724.5 feet	1,720.1-1,724.5
Halite, pale-brown to pale-reddish-brown to moderate-reddish-brown, mottled, fine to medium crystalline; minor amount of moderate-reddish-orange polyhalite stringers; numerous scattered brown clay stringers	1,724.5-1,728.0
Halite, moderate-reddish-brown to pale-red, medium to coarse crystalline; numerous stringers of pale-red polyhalite in lower two-thirds of unit; polyhalite seam at 1,731.4-1,731.7 feet	1,728.0-1,733.6
Polyhalite, moderate-reddish-brown, dense; stringers of recrystallized halite in upper 0.2 foot; lower one-half unit contains abundant grayish-green clay and polyhalite fragments	1,733.6-1,735.0
Halite, pale-reddish-brown to pale-yellowish-brown, fine to medium crystalline; moderate amount of polyhalite, disseminated and in stringers	1,735.0-1,737.4
Halite, grayish-red and pale-red, fine crystalline; minor intercrystalline cl[illegible] in upper two-thirds, increasing to moderate amount in lower one-third; moderate amount of moderate-reddish-orange polyhalite stringers	1,737.4-1,739.0
Halite, polyhalitic, moderate-reddish-brown to moderate-reddish-orange, fine to medium crystalline; clayey zones; thin moderate-reddish-orange polyhalite band at 1,740.2 feet	1,739.0-1,740.6
Halite, pale-yel[illegible]owish-brown to moderate-reddish-brown, fine crystalline; minor amount of [illegible]ish-brown polyhalite blebs	1,740.6-1,741.8
Halite, grayish-red to moderate-reddish-brown to light-brown, fine to medium crystalline; argillaceous in upper 0.8 foot; moderate to heavily disseminated and massive sylvite and langbeinite	1,741.8-1,745.1
Halite, grayish-red to moderate-reddish-brown to olive-gray, mottled, fine to medium crystalline, argillaceous; moderate to heavily disseminated sylvite and langbeinite in upper 2.0 feet; minor to moderate sylvite in rest of unit	1,745.1-1,750.5

Table 19C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, grayish-red to pale-red, medium to coarse crystalline; minor amounts of moderate-reddish-orange polyhalite stringers; minor amount of disseminated sylvite and moderate disseminated grayish-green clay	1,750.5-1,751.3
Halite, moderate-reddish-orange to pale-reddish-brown, fine to medium crystalline; polyhalite band at 1,755.8 feet; moderate amount of disseminated sylvite	1,751.3-1,756.6
Polyhalite, moderate-reddish-brown, dense, banded; minor halite crystallization throughout	1,756.6-1,757.1
Halite, pale-red to light-gray, medium crystalline; minor grayish-green intercrystalline clay; minor disseminated sylvite	1,757.1-1,757.6
Halite, pale-red to pale-reddish-brown to grayish-green, fine to medium crystalline, argillaceous; minor disseminated sylvite	1,757.6-1,759.6
Halite, moderate-reddish-brown to pale-red, fine to medium crystalline; minor to moderate disseminated sylvite	1,759.6-1,762.0
Halite, moderate-reddish-brown to pale-reddish-brown to grayish-red, mottled, fine to medium crystalline; moderate amount of moderate-red polyhalite; minor amount of grayish-green intercrystalline clay	1,762.0-1,762.6
Halite, grayish-red and moderate-reddish-brown, fine to medium crystalline, argillaceous and polyhalitic; grayish-green clay seam at 1,764.2 feet	1,762.6-1,764.2
Halite, light-olive-gray to pale-red to grayish-red, fine crystalline, argillaceous; upper 0.3 foot contains grayish-green clay, rest of unit contains brown clay stringers and blebs	1,764.2-1,768.1
Halite, pale-red to pale-reddish-brown, fine to coarse crystalline; minor amount of moderate-reddish-brown disseminated polyhalite blebs	1,768.1-1,770.7
Halite, pale-reddish-brown to clear to pale-red, medium to coarse crystalline; numerous stringers and blebs of moderate-reddish-brown polyhalite	1,770.7-1,773.4
Polyhalite, moderate-reddish-orange; secondary light-gray polyhalite fills solution voids; grayish-green clay seam at base	1,773.4-1,775.6
Halite, pale-red to grayish-red, medium to coarse crystalline; minor disseminated moderate-orange-pink polyhalite; and sparse, disseminated, light-gray clay blebs	1,775.6-1,776.2
Halite, moderate-orange-pink to moderate-reddish-brown, fine to coarse crystalline; disseminated moderate-orange-pink polyhalite, becomes fine crystalline toward base	1,776.2-1,781.6

Table 19C.--Lithologic log--(Continued)

Description	Depth (feet)
Polyhalite, pale-red, massive	1,781.6-1,782.3
Halite, moderate-orange-pink to moderate-reddish-orange, fine crystalline; disseminated moderate-reddish-orange polyhalite blebs; 0.1 foot thick polyhalite band at 1,782.6 feet	1,782.3-1,783.7
Halite, pale-red to moderate-reddish-orange, medium crystalline, argillaceous; minor medium-gray intercrystalline clay; sparse moderate-reddish-orange polyhalite blebs	1,783.7-1,784.6
Halite, pale-red to grayish-red, medium crystalline, increasing to coarse crystalline at base, argillaceous; clay seam at 1,784.7 feet	1,784.6-1,786.1
Halite, pale-red to moderate-reddish-orange, medium to coarse crystalline; common reddish-orange, disseminated polyhalite; very coarse crystalline, clear halite in bottom 0.3 foot	1,786.1-1,788.4
Halite, clear to grayish-red, coarse crystalline, argillaceous; common intercrystalline grayish-red clay; grayish-red clay seam at top and 1,790.4 feet	1,788.4-1,790.7
Halite, pale-red to moderate-reddish-orange, fine to medium crystalline; common medium-gray intercrystalline clay in upper 1.0 foot; common reddish-orange, disseminated polyhalite	1,790.7-1,795.5
Halite, clear to grayish-red, fine to medium crystalline, argillaceous; common, medium-gray intercrystalline clay, gray clay partings at 1,795.6, 1,795.9, and 1,796.1 feet	1,795.5-1,796.2
Halite, pale-red to grayish-red, mottled, fine crystalline, argillaceous; abundant moderate-reddish-brown intercrystalline clay, with partings at 1,797.1, 1,797.8, 1,798.7, 1,799.2, 1,800.1, and 1,801.0 feet; common disseminated polyhalite	1,796.2-1,801.5
Halite, clear to pale-red, very coarse crystalline; minor, light-gray clay with parting at 1,802.6 feet; sparse disseminated reddish-orange polyhalite	1,801.5-1,802.7
Halite, clear to grayish-red, mottled, medium to coarse crystalline, argillaceous; common pale-reddish-brown to moderate-reddish-brown intercrystalline clay; common disseminated moderate-reddish-orange polyhalite	1,802.7-1,807.5
Halite, clear to pale-red, very coarse crystalline; sparse intercrystalline clay; sparse pink polyhalite blebs	1,807.5-1,808.4
Anhydrite, light- to medium-gray, banded to massive; large pale-red polyhalite bleb at 1,815.8 feet; medium-gray clay partings throughout	1,808.4-1,818.0

Table 19C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to brownish-gray, very coarse crystalline; sparse medium-gray intercrystalline clay; minor amount of moderate-reddish-orange polyhalite blebs	1,818.0-1,819.5
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; common to abundant moderate-reddish-orange polyhalite blebs, decreasing toward base; sparse gray intercrystalline clay	1,819.5-1,825.6
Halite, clear to moderate-reddish-orange, mottled, coarse crystalline; abundant moderate-reddish-orange blebs and disseminated polyhalite; sparse medium-gray intercrystalline clay	1,825.6-1,827.8
Halite, clear to medium-dark-gray, coarse crystalline; sparse to common, medium-gray intercrystalline clay	1,827.8-1,828.9
Halite, clear to pale-red, medium to coarse crystalline; common moderate-reddish-orange disseminated polyhalite; polyhalite-rich band at 1,829.6-1,829.8 feet; sparse medium-gray clay, increasing toward base	1,828.9-1,830.4
Halite, clear to pale-red, medium crystalline, argillaceous; common to abundant grayish-red intercrystalline clay; sparse to common moderate-reddish-orange polyhalite; clay parting at 1,830.5 feet	1,830.4-1,832.2
Halite, white to medium-bluish-gray, fine crystalline, argillaceous; abundant medium-bluish-gray intercrystalline clay; clay partings at 1,832.4 feet and at base	1,832.2-1,832.9
Halite, pale-red, white and grayish-red, fine medium crystalline, argillaceous; abundant dark-reddish-brown intercrystalline clay; zones of clear, medium to coarse crystalline halite; sparse reddish-orange polyhalite blebs; brown clay partings at 1,833.3, 1,834.0, 1,834.5, 1,836.1, 1,836.5, 1,837.4, 1,838.0, 1,838.5, 1,839.0, 1,839.6, and 1,839.8 feet	1,832.9-1,840.6
Halite, pale-red, grayish-red, and light-bluish-gray, coarse crystalline with grayish-orange saccharoidal zones; zones of grayish-green intercrystalline clay; moderate amounts of intercrystalline pinkish-orange polyhalite blebs	1,840.6-1,842.1
Halite, banded grayish-orange, light-bluish-gray and moderate-orange-pink, fine to coarse crystalline; minor to moderate amounts of intercrystalline reddish-orange polyhalite blebs	1,842.1-1,845.0
Halite, yellowish-brown, clear, and moderate-pinkish-orange, mottled, very fine to medium crystalline; minor disseminated intercrystalline reddish-orange polyhalite	1,845.0-1,847.3

Table 19C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear, pale-red and light-gray, mottled and banded, fine to coarse crystalline; moderate to abundant reddish-brown intercrystalline clay blebs and stringers; minor to moderate-reddish-brown polyhalite blebs and stringers; gray clay parting at 1,848.6 feet	1,847.3-1,849.8
Halite, moderate-reddish-orange and grayish-orange-pink, medium to coarse crystalline; minor to moderate disseminated reddish-orange polyhalite	1,849.8-1,851.6
Halite, moderate-reddish-orange, moderate-reddish-brown, medium to very coarse crystalline; moderate to abundant disseminated intercrystalline polyhalite blebs and stringers	1,851.6-1,854.6
Halite, pale-red, medium-bluish-gray and clear, mottled, fine to coarse crystalline; minor to moderate amounts of disseminated reddish-brown polyhalite blebs; moderate to abundant grayish-green and reddish-brown clay blebs and stringers; brown clay parting at top	1,854.6-1,858.7
Halite, clear to pale-red to moderate-orange-pink, very coarse crystalline; minor amount of moderate-reddish-orange polyhalite, increasing in lower 1.5 feet	1,858.7-1,862.9
Halite, clear to pale-red to moderate-orange-pink, medium to very coarse crystalline, argillaceous; moderate sulfates, primarily kainite and langbeinite; minor amount of greenish-gray intercrystalline clay, also as stringers	1,862.9-1,869.9
Halite, clear to grayish-red, coarse crystalline, argillaceous; minor amounts of moderate-reddish-orange stringers and blebs of polyhalite; minor to common intercrystalline greenish-gray clay	1,869.9-1,871.3
Halite, clear to pale-red, medium to coarse crystalline; minor amount of moderate-reddish-orange polyhalite stringers	1,871.3-1,875.3
Halite, clear to pale-red, very coarse crystalline, argillaceous; minor amount of moderate-reddish-orange disseminated polyhalite; common greenish-gray and pale-reddish-brown, intercrystalline clay	1,875.3-1,876.7
Halite, clear to pale-red to grayish-red, medium to coarse crystalline; common moderate-reddish-orange polyhalite stringers and blebs	1,876.7-1,877.9
Halite, clear to pale-red to grayish-red, mottled, medium to very coarse crystalline; common moderate-reddish-orange polyhalite stringers and blebs; minor greenish-gray to moderate-reddish-brown clay; prominent greenish-gray clay band at 1,886.0 feet	1,877.9-1,886.7

Table 19C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to pale-red and gray-orange-pink, medium to coarse crystalline; sparse moderate-reddish-orange, disseminated polyhalite; polyhalite seam at 1,888.7 feet	1,886.7-1,889.4
Polyhalite, pale-yellowish-brown, dense, laminated; laminated halite	1,889.4-1,893.9
Polyhalite, light-olive-gray, dense; minor recrystallized halite	1,893.9-1,898.1
Halite, clear to grayish-red, medium to coarse crystalline, polyhalitic; numerous seams and stringers of white and pale-red polyhalite	1,898.1-1,899.0
Halite, clear, grading downward to moderate-reddish-brown and pale-red, fine crystalline; light-gray and moderate-reddish-brown polyhalite stringers in lower 2.0 feet	1,899.0-1,901.9
Halite, moderate-red and pale-reddish-brown, fine crystalline; polyhalitic; half of unit is massive polyhalite	1,901.9-1,903.2
Polyhalite, medium-gray, dense; moderate amount of recrystallized halite	1,903.2-1,907.9
Anhydrite, medium-gray, laminated	1,907.9-1,910.2
Mudstone, medium-gray	1,910.2-1,910.8
Polyhalite, moderate-orange-pink, dense; minor bands of grayish-green clay	1,910.8-1,911.5
Halite, moderate-reddish-brown and pale-reddish-brown, fine to medium crystalline; moderate amount of pale-red and moderate-reddish-brown polyhalite stringers and blebs	1,911.5-1,918.3
Halite, grayish-red and pale-red, fine crystalline, argillaceous; minor blebs of reddish-brown polyhalite	1,918.3-1,921.0
Halite, pale-red and moderate-reddish-brown, fine crystalline; moderate amount of disseminated polyhalite	1,921.0-1,925.3
Halite, grayish-orange-pink, moderate-orange-brown, and grayish-red, fine to coarse crystalline, argillaceous; abundant disseminated gray clay; heavy occurrence of blebs of langbeinite; sparse gray clay blebs	1,925.3-1,926.7
Halite, pale-red, moderate-reddish-orange and light-gray, fine to medium crystalline, argillaceous; abundant intercrystalline brownish-red clay; moderate to abundant intercrystalline moderate-reddish-brown polyhalite; several large langbeinite and kainite crystals; clay parting at 1,926.8, 1,927.3, and 1,927.9 feet	1,926.7-1,928.8
Halite, clear, pale-red, and grayish-orange, medium crystalline; minor to moderate disseminated intercrystalline moderate-reddish-brown polyhalite; brown clay parting at top	1,928.8-1,930.4

Table 19C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-orange-pink, gray-orange-pink, and moderate-reddish-orange, medium to coarse crystalline; moderate to abundant intercrystalline polyhalite blebs and stringers	1,930.4-1,934.0
Halite, dark-bluish-gray, grayish-green, and pale-red, mottled, medium crystalline, argillaceous; abundant reddish-brown and grayish-green clay blebs and stringers; moderate amount of moderate-reddish-brown, disseminated polyhalite	1,934.0-1,935.3
Halite, grayish-red to moderate-reddish-orange, coarse crystalline; moderate amounts of moderate-reddish-brown polyhalite blebs and stringers	1,935.3-1,936.9
Halite, clear, grayish-red and light-gray, coarse crystalline, argillaceous; moderate amounts of reddish-brown intercrystalline clay, abundant in upper 0.6 foot; minor intercrystalline moderate-reddish-brown polyhalite blebs	1,936.9-1,942.1
Halite, reddish-orange, moderate-reddish-brown, and grayish-orange, mottled, medium to coarse crystalline; zones of abundant intercrystalline moderate-reddish-brown polyhalite; minor reddish-brown clay blebs; moderate disseminated 0.3 foot langbeinite zone at 1,943.4-1,943.7 feet	1,942.1-1,949.7
Halite, grayish-red and medium-bluish-gray, medium crystalline, argillaceous; minor moderate-reddish-brown polyhalite blebs	1,949.7-1,951.4
Halite, gray-orange-pink, pale-yellowish-brown, and moderate-orange-pink, medium to coarse crystalline; sparse disseminated moderate-reddish-orange polyhalite; very sparse disseminated langbeinite blebs	1,951.4-1,956.4
Halite, moderate-reddish-orange, clear and gray-orange-pink, very coarse crystalline; grayish-green clay zone in upper 0.1 foot; moderate to heavy langbeinite; lower 1.0 foot is massive langbeinite	1,956.4-1,958.8
Halite, pale-red, mottled with light-bluish-gray and white, fine to coarse crystalline, argillaceous; abundant reddish-brown intercrystalline clay blebs; zones of langbeinite and kieserite	1,958.8-1,961.2
Halite, grayish-red, pale-red, and grayish-orange, medium to coarse crystalline, argillaceous; moderate amount of moderate-reddish-brown polyhalite blebs; abundant dark-reddish-brown clay in blebs, seams, stringers, and intercrystalline; clay-rich zone at 1,961.9 feet	1,961.2-1,963.7
Halite, moderate-pale-red, clear, grayish-orange, mottled, coarse crystalline; abundant moderate-reddish-brown polyhalite blebs and stringers	1,963.7-1,968.3

Table 19C.--Lithologic log--(Continued)

Description	Depth (feet)
Polyhalite, grayish-red, dense	1,968.3-1,968.4
Halite, grayish-orange and moderate-orange-pink, mottled, medium to coarse crystalline; abundant moderate-reddish-orange polyhalite blebs and stringers	1,968.4-1,969.5
Halite, grayish-orange, light-bluish-gray and clear, coarse crystalline; minor to moderate amounts of moderate-reddish-brown polyhalite blebs and stringers; gray clay stringers and disseminated in zones	1,969.5-1,973.7
Halite, pale-red, light-bluish-gray, grayish-green, dark-reddish-brown, argillaceous; abundant reddish-brown clay blebs; minor gray clay blebs; minor intercrystalline reddish-brown polyhalite; reddish-brown clay partings at 1,974.0, 1,974.3, 1,975.3, and 1,976.3 feet	1,973.7-1,976.4
Halite, pale-red, medium-bluish-gray, coarse crystalline; contains moderate-reddish-orange zones; minor reddish-brown intercrystalline clay; sparse disseminated reddish-orange polyhalite	1,976.4-1,987.0
Halite, pale-red, medium-bluish-gray, very coarse crystalline; moderate amounts of large reddish-brown polyhalite blebs; moderate amounts of reddish-brown clay blebs in lower 0.7 foot; reddish-brown clay parting at 1,988.7 feet	1,987.0-1,989.0
Halite, pale-red and clear, medium crystalline; moderate amounts of reddish-brown intercrystalline polyhalite blebs	1,989.0-1,989.4
Halite, grayish-orange, clear, and pale-red, coarse crystalline in upper part to very coarse crystalline in lower part; minor disseminated intercrystalline reddish-brown polyhalite blebs	1,989.4-1,990.0
Halite, clear, light-gray, pale-red, coarse to very coarse crystalline; disseminated brown clay, intercrystalline and as blebs; minor reddish-brown polyhalite blebs	1,990.0-1,991.2
Halite, moderate-reddish-orange, grayish-orange, coarse crystalline; minor disseminated, reddish-brown polyhalite blebs and disseminated brown intercrystalline clay blebs	1,991.2-1,991.5
Halite, medium-bluish-gray, pale-red, and clear, mottled, medium to coarse crystalline, argillaceous; abundant intercrystalline brown clay blebs; minor reddish-brown polyhalite blebs; brown clay parting at 1,992.4 feet	1,991.5-1,993.6
Halite, grayish-orange, pale-red, medium-bluish-gray, mottled, fine crystalline; abundant reddish-brown disseminated polyhalite blebs and intercrystalline grayish-green and brown clay	1,993.6-1,994.7

Table 19C.--Lithologic log--(Continued)

	Depth (feet)
Halite, grayish-orange, medium-bluish-gray, moderate-orange-pink, fine to medium crystalline; abundant blebs of brown clay; minor amounts of reddish-brown polyhalite as small blebs----------	1,994.7-1,996.7
Halite, grayish-green, medium-bluish-gray, pale-red, medium crystalline; abundant blebs and stringers of reddish-brown polyhalite; abundant disseminated intercrystalline gray clay----------	1,996.7-1,998.9
Halite, clear, medium-bluish-gray and grayish-green, coarse crystalline; abundant blebs of grayish-green and brown clay----------	1,998.9-1,999.5
Halite, clear, pale-red, coarse crystalline; abundant brown clay blebs and stringers in upper 0.3 foot----------	1,999.5-2,000.0
	Total depth

Table 19D.--Mineralogical and chemical analyses of core samples from potash ore zones and mineralized salt beds in drill hole P-19

[oz, ore zone; lm, lower member; sb, salt bed; tr, trace; Po, polyhalite; Bl, bloedite; Ha, halite; Ka, kainite; Ki kieserite; La, langbeinite; Le, leonite; n.d., not determined. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mineralogy: X-ray diffraction analysis[1]	Chemical analysis (weight percent): Ca	K	Mg	Na	Cl	SO_4	H_2O+	H_2O-	Water insoluble
P-19/1	1,672.60-1,673.30	0.70	sb	>9 Ha; <1 Po; tr Sy	n.d.	0.84	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
P-19/2	1,673.30-1,674.34	1.04	11th oz	8 Ha; >1 Po; <1 Ka,Le; tr Sy, La	0.35	2.9	1.2	32.0	49.0	7.3	1.5	0.12	3.6
[2]P-19/3	1,674.34-1,675.67	1.33		>7 Ha;>1 Po;<1Ka,Le;tr Sy, La	1.2	4.9	2.2	28.5	43.0	12.2	3.0	.29	4.1
[2]P-19/3					1.4	4.0	2.4	28.0	43.0	12.5	3.0	.34	4.0
[2]P-19/4	1,675.67-1,676.92	1.25		>5 Ha;>1 Sy, Le; 1 La,Ka;tr Po	.12	9.2	4.4	18.0	30.0	22.0	5.3	.73	9.3
[2]P-19/4					.12	9.2	4.4	18.0	30.0	20.5	5.3	.65	8.9
P-19/5	1,676.92-1,677.75	.83	sb	9 Ha;<1 Po, Sy; tr La	.88	.88	0.37	38.0	54.5	2.3	0.31	.10	1.2
P-19/6	1,740.95-1,741.80	.85	sb	9 Ha; tr Po, Sy, La, Le	n.d.	.40	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
P-19/7	1,741.80-1,742.35	.55	10th oz	>6 Ha;>2 La;<1 Sy;tr Po, Ki	.15	10.5	4.3	21.5	33.5	25.0	.61	.05	1.7
P-19/8	1,742.35-1,743.72	1.37		5 Ha;>4 La; tr Po, Sy	.16	15.0	7.9	11.0	18.0	49.0	.38	.04	.61
[2]P-19/9	1,743.72-1,745.09	1.37		9 Ha;<1 Po, Sy, La	.53	5.3	1.8	32.0	48.0	10.0	.13	.01	.11
[2]P-19/9					.54	5.3	1.8	32.0	48.0	10.5	.13	.02	.15
P-19/10	1,745.09-1,746.00	.91		6 Ha;>1 La;<1 Po, Sy; 1 Le;tr Ka	.26	10.0	3.1	21.0	34.5	17.0	5.4	.45	7.1
[2]P-19/11	1,746.00-1,746.86	.86		>7 Ha;>1 Po;<1 Sy, Ka, Le	1.7	5.7	1.9	24.5	40.0	12.0	3.0	.83	8.3
[2]P-19/11					1.6	5.0	2.1	25.5	40.0	12.5	2.2	1.3	8.1
P-19/12	1,746.86-1,747.82	.96		>8 Ha;<1 Sy; tr Po	.05	2.3	.40	34.0	53.0	.94	.65	.32	5.3
[2]P-19/13	1,747.82-1,749.37	1.55		>9 Ha;<1 Po, Sy	.23	2.5	.22	34.0	53.0	.66	.32	.49	5.7
[2]P-19/13					.23	2.5	.22	34.0	53.0	.52	.29	.48	5.6
P-19/14	1,749.37-1,750.50	1.13		>7 Ha;>2 Sy;<1 Po; tr Le	.85	13.0	.27	29.0	52.5	2.1	.31	.05	2.4
P-19/15	1,750.50-1,751.60	1.10		>9 Ha;<1 Po, Sy	.87	2.6	.25	37.5	54.0	2.2	.28	.09	2.1
P-19/16	1,864.69-1,865.32	.63	sb	>9 Ha; tr Po,Sy,Ka,Ki,Bl	.11	.60	.61	35.5	58.0	2.2	1.0	.21	.70
P-19/17	1,865.32-1,866.01	.69		>9 Ha;<1 Po; tr Sy, Le	.90	.72	.36	35.5	57.0	3.2	.40	.20	.97
P-19/18	1,866.01-1,866.89	.88		>8 Ha;<1 Ki; tr Po, La, Bl	.25	1.4	1.2	34.0	54.0	6.2	1.6	.27	.75
[2]P-19/19	1,866.89-1,868.33	1.44		>8 Ha;<1 La; tr Po, Ka, Bl	.07	4.7	3.0	29.0	44.0	15.5	1.8	.11	1.3
[2]P-19/19					.07	4.7	3.0	29.0	44.0	16.0	1.7	.10	1.3
P-19/20	1,868.33-1,869.33	1.00		>9 Ha;<1 Ki; tr Po, La	.17	[illegible]	.61	35.0	57.0	1.6	.79	.66	3.1
P-19/21	1,925.20-1,925.90	.70	4th oz, lm	>8 Ha;>1 Ki;<1 La; tr Po	.13	2.8	2.6	29.0	47.0	12.0	.55	.07	2.7
P-19/22	1,925.90-1,926.70	.80		>4 Ha;>4 La;>1 Ki; tr Po, Ka	.09	13.0	7.8	10.5	20.5	44.5	.77	.01	4.4
[2]P-19/23	1,926.70-1,927.94	1.24		>7 Ha; tr Po, Ka, Le	.27	2.2	1.7	24.5	44.0	6.4	2.5	1.3	16.0
[2]P-19/23					.25	2.2	1.7	24.5	44.5	6.7	2.5	1.3	16.0
P-19/24	1,927.94-1,929.28	1.34		9 Ha;<1 Po; tr La, Ka, Le	.59	.88	.56	33.0	55.0	2.7	.94	.42	6.0
P-19/25	1,955.66-1,956.40	.74	sb	9 Ha;<1 Ki; tr Po, La	n.d.	.04	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
[2]P-19/26	1,956.40-1,957.36	.96		7 Ha;<1 Po;>1 La, Ki	.71	5.4	4.1	24.0	41.0	22.5	.10	3.7	3.7
[2]P-19/26					.82	4.4	4.8	25.0	39.0	23.0	.03	.12	2.1
[2]P-19/27	1,957.36-1,958.71	1.35		5 Ha;>3 La; 1 Ki; tr Po	.12	13.0	7.5	11.5	23.0	45.0	.20	.05	2.9
[2]P-19/27					.12	13.0	7.5	11.5	23.5	43.5	.22	.04	2.0
P-19/28	1,958.71-1,959.21	.50		>7 Ha;>1 La, Ki; tr Po, Ka	.05	4.8	3.9	24.0	43.0	19.5	.58	.13	2.0
P-19/29	1,959.21-1,959.78	.57		7 Ha;>2 Ki;<1 Ka; tr Po, La	.05	2.9	4.2	20.5	38.0	17.5	3.5	.44	10.9
P-19/30	1,950.78-1,960.80	1.02		>9 Ha; tr Po, La, Ka, Ki	.04	.16	.38	35.5	54.5	1.3	.55	.22	3.1

Estimate of amount reported on a scale of 0-10.
Replicate analyses.

Table 19E.--Calculated mode (mineral content) and potash distribution by mi[illegible] in core samples from potash ore zones and mineralized salt beds in drill hole P-19

[oz, ore zone; lm, lower member; sb, salt bed; Bl, bloedite; Ha, halite; Ka, kainite; Ki, Kieserite; La, langbeinite; Le, leonite; Po, polyhalite; Sy, sylvite; Insol., clay and silt; n.d., not determined; leaders (---), not present. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mode (weight percent mineral)									K_2O distribution by minerals					
				Sy	La	Ka	Le	Ki	Bl	Ha	Po	Insol.	Sy	La	Ka	Le	Po	Total
P-19/1	1,672.60-1,673.30	0.70	sb	1.0	---	---	---	---	---	---	2.2	n.d.	0.3	---	---	---	0.7	1.0
P-19/2	1,673.30-1,674.34	1.04	11th oz	.6	0.5	7.6	4.5	---	---	78.5	2.6	3.6	.4	0.1	1.4	1.2	.4	3.5
[1] P-19/3	1,674.34-1,675.67	1.33		.7	1.0	4.3	11.7	---	---	70.9	9.0	4.1	.5	.2	0.8	3.0	1.4	5.9
[1] P-19/3				.7	1.0	4.3	6.5	---	---	71.2	10.5	4.0	.5	.2	.8	1.7	1.6	4.8
[1] P-19/4	1,675.67-1,676.92	1.25		4.0	18.4	17.4	3.7	---	---	45.8	.9	9.3	2.5	4.2	3.3	0.9	.1	11.0
[1] P-19/4				4.6	14.9	20.0	3.4	---	---	45.8	.9	8.9	2.9	3.4	3.8	.9	.1	11.1
P-19/5	1,676.92-1,677.75	.83	sb	.7	.5	---	---	---	---	89.8	3.1	1.2	.5	.1	---	---	.5	1.1
P-19/6	1,740.95-1,741.80	.85	sb	---	---	---	1.1	---	---	n.d.	1.1	n.d.	---	---	---	.3	.2	.5
P-19/7	1,741.80-1,742.35	.55	10th oz	8.2	32.2	---	---	2.7	---	54.7	1.1	1.7	5.2	7.3	---	---	.2	12.7
P-19/8	1,742.35-1,743.72	1.37		3.3	69.5	---	---	---	---	2.7	1.2	.6	2.1	15.8	---	---	.2	18.1
[1] P-19/9	1,743.72-1,745.09	1.37		5.0	11.5	---	---	---	---	74.8	4.0	.2	[illegible]	2.6	---	---	.6	6.4
[1] P-19/9				5.3	10.7	---	---	---	---	75.0	4.0	.1	3.3	2.4	---	---	.6	6.3
P-19/10	1,745.09-1,746.00	.91		9.0	14.7	2.8	8.5	---	---	53.4	1.9	7.1	5.7	3.3	.5	2.2	.3	12.0
[1] P-19/11	1,746.00-1,746.86	.86		4.7	---	4.2	4.2	---	---	62.3	12.8	8.3	[illegible]	---	.8	1.1	2.0	6.9
[1] P-19/11				2.8	---	5.3	5.3	---	---	62.5	12.0	8.1	[illegible]	---	1.0	1.4	1.9	6.1
P-19/12	1,746.86-1,747.82	.96		4.0	---	---	---	---	---	86.5	1.4	5.3	2.5	---	---	---	.2	2.7
[1] P-19/13	1,747.82-1,749.37	1.55		4.5	---	---	---	---	---	86.5	1.0	5.7	[illegible]	---	---	---	.2	3.0
[1] P-19/13				4.6	---	---	---	---	---	86.4	.8	5.6	[illegible]	---	---	---	.1	3.0
P-19/14	1,749.37-1,750.50	1.13		23.7	---	---	1.2	---	---	73.7	1.2	2.4	15.0	---	---	.3	.3	15.6
P-19/15	1,750.50-1,751.60	1.10		4.1	---	---	---	---	---	85.8	3.4	2.1	[illegible]	---	---	---	.5	3.1
P-19/16	1,864.69-1,865.32	.63	sb	.8	---	.5	---	[illegible].5	2.0	94.8	.8	.7	[illegible]	---	<.1	---	.1	.6
P-19/17	1,865.32-1,866.01	.69		.1	---	---	.2	---	---	93.8	4.7	1.0	<.1	---	---	<.1	.7	.7
P-19/18	1,866.01-1,866.89	.88		2.2	---	---	---	5.6	1.9	87.3	1.9	.7	1.4	---	---	---	.3	1.7
[1] P-19/19	1,866.89-1,868.33	1.44		---	12.9	13.9	---	---	1.4	69.2	.5	1.3	---	2.9	2.6	---	<.1	5.5
[1] P-19/19				---	15.2	11.3	---	---	1.3	69.9	.5	1.3	---	3.4	2.1	---	<.1	5.5
P-19/20	1,868.33-1,869.33	1.00		---	.6	---	---	.5	---	93.9	1.3	3.1	---	.1	---	---	.2	.3
P-19/21	1,925.20-1,925.90	.70	4th oz, lm	---	14.2	---	---	2.2	---	77.5	1.0	2.7	---	3.2	---	---	.1	3.3
P-19/22	1,925.90-1,926.70	.80		---	43.4	30.2	---	3.3	---	26.7	.7	4.4	---	9.8	5.7	---	.1	15.6
[1] P-19/23	1,926.70-1,927.94	1.24		---	---	5.2	5.2	---	---	71.3	2.0	16.0	---	---	1.0	1.4	.3	2.7
[1] P-19/23				---	---	5.3	5.3	---	---	72.1	1.9	16.0	---	---	1.0	1.4	.3	2.7
P-19/24	1,927.94-1,929.28	1.34		---	.9	1.2	1.8	---	---	90.4	1.1	6.0	---	.2	.2	.4	.2	1.0
P-19/25	1,955.66-1,956.40	.74	sb	---	.1	---	---	---	---	n.d.	.1	n.d.	---	<.1	---	---	<.1	<.1
[1] P-19/26	1,956.40-1,957.36	.96		---	25.0	---	---	2.5	---	67.6	5.3	3.7	---	4.3	---	---	1.0	5.3
[1] P-19/26				---	19.1	---	---	8.3	---	63.6	6.1	2.1	---	4.3	---	---	1.0	5.3
[1] P-19/27	1,957.36-1,958.71	1.35		---	68.4	---	---	---	---	29.2	.9	2.9	---	15.5	---	---	.1	15.6
[1] P-19/27				---	68.4	---	---	---	---	29.2	.9	2.0	---	15.5	---	---	.1	15.6
P-19/28	1,958.71-1,959.21	.50	2d oz	---	16.9	10.0	---	5.3	---	61.0	.4	4.7	---	3.8	1.9	---	<.1	5.7
P-19/29	1,959.21-1,959.78	.57		---	3.1	14.4	---	13.7	---	52.1	.4	10.9	---	.7	2.7	---	<.1	3.4
P-19/30	1,959.78-1,960.80	1.02		---	.2	.5	---	1.1	---	90.3	.3	3.1	---	<.1	<.1	---	<.1	<.1

[1]Replicate analyses.

TABLES 20A-20G

Basic data from drill hole P-2?,
Waste Isolation Pilot Plant area, Eddy Co.ty, New Mexico

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20G.--Gamma-ray and neutron logs of drill hole	foldout

Table 20A.--Abridged drill-hole history

LOCATION: Sec. 14, T. 22 S., R. 31 E.
242 m (794 ft) from south line
31 m (103 ft) from east line

ALTITUDE (LAND SURFACE): 1,083 m (3,552.9 ft). Datum for depth measurements in drilling and logging operations.

LITHOLOGIC LOG PREPARED BY: R. J. Cheeseman, J. C. Lorenz, Florian Maldonado, L. A. Rives, R. P. Snyder, and R. W. Spengler, October 7-14, 1976.

DRILLING CONTRACTOR: Boyles Bros. Drilling Co.

DRILL RECORD: Commenced drilling on October 6, and completed on October 14, 1976, at 608 m (1,995 ft) below land surface.

Drilled with air to 320 m (1,050 ft) below land surface. No report of water.

Recovered all casing, and plugged with cement.

REMARKS: Top of salt in Rustler Formation at 305 m (1,002 ft) below land surface.

Very weak air flow noted during logging operation on October 14, 1976. Air pocket escaped detection throughout coring operation.

Table 20B.--Stratigraphic summary

Rock unit	Depth interval[1] feet	meters
Holocene deposits	0-6	0-2
Triassic rocks:		
Santa Rosa Sandstone	6-261	2-80
Permian rocks:		
Dewey Lake Red Beds	261-780	80-238
Rustler Formation	780-1,103	238-336
Magenta Dolomite Member	839-866	256-264
Culebra Dolomite Member	953-979	290-298
Salado Formation	1,103-1,996	336-608
Upper member	1,103-1,604	336-489
McNutt potash zone	1,604-1,977	489-603
Vaca Triste Sandstone Member[2]	1,604-1,612	489-491
11th ore zone	1,658-1,662	505-507
Marker bed 117	1,671-1,673	509-510
Marker bed 118	1,69[illegible]-1,697	517-517
Marker bed 119	1,72[illegible]-1,721	524-525
10th ore zone	1,728-1,735	527-529
Marker bed 120	1,742-1,743	531-531
9th ore zone	1,747-1,750	532-533
Marker bed 121	1,756-1,758	535-536
Marker bed 122	1,764-1,765	538-538
8th ore zone	1,771-1,779	540-542
Union anhydrite[3]	1,789-1,795	545-547
7th ore zone	1,807-1,811	551-552
6th ore zone	1,821-1,823	555-556
5th ore zone	1,828-1,839	557-561
Marker bed 123	1,866-1,873	569-571
Marker bed 124	1,880-1,891	573-576
4th ore zone	1,893-1,904	577-580
3d ore zone	1,911-1,924	582-586
2d ore zone	1,928-1,932	588-589
1st ore zone	1,947-1,961	593-598
Marker bed 126	1,975-1,977	602-603
Lower member	1,977-1,996	603-608
Maximum depth recorded	1,996	608

[1]Depth interval recorded from geophysical logs
[2]Of Adams, 1944.
[3]Informal unit of Salado Formation.

Table 20C.--Lithologic log

Description	Depth (feet)	
Sand, fine to very fine grained	0.0-	15.0
Caliche, with chert, dolomite, and reddish-brown siltstone; sandstone fragments cemented with calcite	15.0-	25.0
Sandstone, grayish-red, very fine grained to fine-grained	25.0-	30.0
Same as above; reddish-brown siltstone, with grayish-green reduction spots	30.0-	35.0
Sandstone and siltstone, reddish-brown, with grayish-green reduction spots, increasing with depth	35.0-	95.0
Siltstone, reddish-brown, with grayish-green reduction spots, micaceous	95.0-	100.0
Sandstone and siltstone, reddish-brown, with grayish-green reduction spots, very fine grained	100.0-	120.0
Siltstone, reddish-brown, with grayish-green reduction spots	120.0-	125.0
Same as above; some very fine grained, reddish-brown sandstone	125.0-	140.0
Same as above; trace of dark-yellowish-brown, fine-grained sandstone	140.0-	200.0
Siltstone, pale-reddish-brown, with greenish-gray reduction spots; minor pale-reddish-brown, very fine grained sandstone	200.0-	255.0
Siltstone, pale-reddish-brown, with greenish-gray reduction spots	255.0-	315.0
Siltstone, pale-reddish-brown, with greenish-gray reduction spots; sparse pale-reddish-brown, fine-grained sandstone, fairly well sorted, subrounded to rounded	315.0-	330.0
Siltstone, pale-reddish-brown, with greenish-gray reduction spots	330.0-	365.0
Siltstone, pale-reddish-brown, with greenish-gray reduction spots; some pale-reddish-brown, fine-grained sandstone, subrounded to rounded, fairly well sorted	365.0-	380.0
Siltstone, pale-reddish-brown, with greenish-gray reduction spots; sparse pale-reddish-brown, fine-grained sandstone	380.0-	385.0
Sandstone, pale-reddish-brown to grayish-red, very fine grained to medium-grained, fairly well to well sorted, subrounded to well-rounded; mostly feldspar and quartz	385.0-	400.0
Sandstone, reddish-brown, well rounded, well sorted, arkosic	400.0-	405.0
Siltstone, reddish-brown, with grayish-green reduction spots, satin spar veins	405.0-	420.0
Same as above; some white, well-sorted, very fine grained sandstone	420.0-	425.0
Sandstone, reddish-brown, very fine grained, arkosic; white satin spar	425.0-	430.0
Siltstone, reddish-brown: satin spar; some very fine grained, white sandstone	430.0-	435.0

Table 20C.—Lithologic log--(Continued)

Description	Depth (feet)
Siltstone, reddish-brown, satin spar; no white sandstone	435.0- 445.0
Siltstone, reddish-brown; satin spar; with grayish-green siltstone chips and reduction spots	445.0- 470.0
Same as above; no satin spar	470.0- 475.0
Same as above; satin spar	475.0- 480.0
Same as above; sparse satin spar	480.0- 500.0
Siltstone, reddish-brown, with green reduction spots, very fine grained, well sorted	500.0- 510.0
Same as above; some gray siltstone	510.0- 515.0
Same as above; no gray siltstone	515.0- 555.0
Same as above; some gray siltstone	555.0- 600.0
Siltstone, reddish-brown, with green reduction spots, very fine grained; some white crystalline selenite	600.0- 605.0
Same as above; spotty gray sandstone	605.0- 610.0
Same as above; no selenite	610.0- 615.0
Same as above; spotty gray sandstone	615.0- 625.0
Same as above; some selenite	625.0- 635.0
Same as above; no selenite	635.0- 660.0
Same as above; very spotty, clear gypsum	660.0- 665.0
Same as above; no gypsum	665.0- 680.0
Same as above; very spotty, clear gypsum	680.0- 690.0
Same as above; no gypsum	690.0- 695.0
Same as above; scattered selenite	695.0- 700.0
Siltstone, reddish-brown, with grayish-green reduction spots, very fine grained, well rounded	700.0- 725.0
Same as above; some selenite	725.0- 745.0
Same as above; no selenite	745.0- 765.0
Same as above; spotty anhydrite	765.0- 775.0
Same as above; increasing anhydrite	775.0- 780.0
Siltstone, reddish-brown, very fine grained; 15 percent white, crystalline anhydrite	780.0- 800.0
Siltstone, dark-reddish-brown, very fine grained; 5-10 percent white anhydrite; scattered gypsum	800.0- 805.0
Same as above, less than 1 percent anhydrite; no gypsum	805.0- 810.0
Same as above; 5 percent anhydrite; 5 percent gypsum	810.0- 815.0
Same as above; less than 1 percent light-gray dolomite	815.0- 820.0
Same as above; no dolomite	820.0- 825.0

Table 20C.--Lithologic log--(Continued)

Description	Depth (feet)
Siltstone, reddish-brown, very fine grained; about 20 percent light-gray crystal dolomite; scattered anhydrite	825.0- 830.0
Same as above; 40 percent siltstone; 60 percent dolomite; no anhydrite	830.0- 840.0
Same as above; 30 percent siltstone; 70 percent dolomite; no anydrite	840.0- 845.0
Same as above; 60 percent siltstone; 35 percent dolomite; 5 percent anhydrite; trace of gypsum	845.0- 850.0
Same as above; 90 percent siltstone; less than 5 percent dolomite; 5 percent anhydrite	850.0- 870.0
Siltstone, moderate-reddish-brown; minor light-gray anhydrite; trace of clear gypsum	870.0- 885.0
Siltstone, moderate-reddish-brown; minor reddish-brown, fine-grained sandstone; minor light-gray anhydrite	885.0- 890.0
Anhydrite, light-gray; minor moderate-reddish-brown siltstone	890.0- 895.0
Anhydrite, white to light-gray; moderate-reddish-brown siltstone; sparse white gypsum	895.0- 900.0
Anhydrite, white to medium-gray; minor moderate-reddish-brown siltstone	900.0- 945.0
Anhydrite, white to medium-gray; minor moderate-reddish-brown clay; moderate-reddish-brown siltstone	945.0- 950.0
Anhydrite, white to medium-gray with gypsum rinds; minor moderate-reddish-brown siltstone	950.0- 960.0
Anhydrite, white to dark-gray	960.0- 965.0
Anhydrite, white to dark-gray; minor greenish-gray dolomite	965.0- 970.0
Dolomite, greenish-gray; minor white to dark-gray anhydrite	970.0- 990.0
Dolomite, greenish-gray, vuggy; minor dark-gray anhydrite; white gypsum rinds	990.0-1,000.0
Dolomite, greenish-gray; trace of selenite; some anhydrite	1,000.0-1,005.0
Anhydrite, 60 percent; dolomite, ~ 40 percent	1,005.0-1,010.0
Dolomite, ~ 70 percent; anhydrite, ~ 30 percent	1,010.0-1,015.0
Anhydrite; some dolomite; trace of bluish-gray mudstone	1,015.0-1,020.0
Anhydrite; some dolomite; trace of reddish-brown siltstone	1,020.0-1,025.0
Same as above; trace of selenite	1,025.0-1,030.0
Same as above; no selenite	1,030.0-1,035.0
Same as above; dolomite increasing	1,035.0-1,045.0
Dolomite, ~ 70 percent; anhydrite, ~ 30 percent; trace of selenite	1,045.0-1,050.0
Same as above; bluish-gray mudstone	1,050.0-1,100.0

Table 20C.--Lithologic log--(Continued)

Description	Depth (feet)
Mudstone, bluish-gray; contaminated with reddish-brown mudstone	1,100.0-1,160.0
Halite, clear; polyhalite common; some bluish-gray mudstone	1,160.0-1,165.0
Same as above; no bluish-gray mudstone	1,165.0-1,200.0
Halite, clear; moderate-reddish-orange polyhalite common	1,200.0-1,225.0
Same as above; with black flakes (oxidized?)	1,225.0-1,250.0
Halite, clear; with black flakes (oxidized?)	1,250.0-1,260.0
Same as above; moderate-reddish-orange polyhalite common	1,260.0-1,295.0
Same as above; trace of anhydrite	1,295.0-1,300.0
Halite, clear, some moderate-reddish-orange	1,300.0-1,360.0
Halite, clear; minor orange polyhalite	1,360.0-1,365.0
Halite, clear; no polyhalite	1,365.0-1,390.0
Halite, clear; some orange polyhalite	1,390.0-1,400.0
Halite, clear; some dark-orange polyhalite	1,400.0-1,405.0
Same as above; minor light-orange polyhalite	1,405.0-1,415.0
Same as above; spotty white gypsum	1,415.0-1,420.0
Same as above; scattered red clay	1,420.0-1,425.0
Halite, clear; minor light-orange polyhalite	1,425.0-1,430.0
Same as above; scattered red clay	1,430.0-1,435.0
Same as above; no clay	1,435.0-1,440.0
Same as above; scattered red clay	1,440.0-1,450.0
Halite, clear	1,450.0-1,470.0
Halite, clear; scattered reddish-orange polyhalite	1,470.0-1,475.0
Halite, clear	1,475.0-1,550.0
Same as above; minor reddish-orange polyhalite	1,550.0-1,570.0
Halite, clear	1,570.0-1,580.0
No sample	1,580.0-1,585.0
Halite, clear	1,585.0-1,620.0
Halite, clear to pale-red, medium to coarse crystalline; moderate amount dark-reddish-brown interstitial clay; moderate-dark-brown clay parting at 1,620.3 feet and at base	1,620.0-1,622.0
Halite, clear to moderate-reddish-orange and pale-red, coarse crystalline; leached indentations filled with greenish-gray clay; sparse moderate-reddish-orange to moderate-reddish-brown polyhalite blebs and stringers	1,622.0-1,623.7
Halite, clear to moderate-orange-pink and moderate-reddish-orange, coarse crystalline; moderate amounts pale-reddish-orange polyhalite blebs; trace of greenish-gray interstitial clay in upper 0.3 foot of unit	1,623.7-1,626.4

Table 20C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to moderate-orange-pink, medium to coarse crystalline; moderate amounts of disseminated moderate-reddish-orange polyhalite blebs; minor greenish-gray interstitial clay----------	1,626.4-1,631.9
Halite, clear to pale-reddish-brown, medium to coarse crystalline; abundant dark-reddish-brown interstitial clay; minor pale-reddish-orange to moderate-reddish-brown polyhalite blebs and stringers------	1,631.9-1,632.8
Halite, clear to dark-reddish-brown and pale-red, medium to coarse crystalline, argillaceous; contains abundant dark-reddish-brown interstitial clay; moderate large aggregates of moderate-reddish-orange polyhalite; dark-reddish-brown clay partings at 1,633.2 and 1,633.3 feet----------	1,632.8-1,634.1
Halite, clear to pale-red, moderate-reddish-orange, coarse crystalline; contains sparse greenish-gray interstitial clay; moderate amount of moderate-reddish-orange to pale-reddish-brown polyhalite blebs and stringers; dark-reddish-brown clay parting at 1,634.3 feet----------	1,634.1-1,637.4
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; moderate to abundant moderate-reddish-brown polyhalite blebs and stringers; 0.1-foot thick polyhalite band at 1,638.2 feet--	1,637.4-1,639.0
Halite, clear to grayish-red, pale-reddish-brown, medium to coarse crystalline; sparse moderate-reddish-orange polyhalite blebs and stringers; moderate amount of dark-reddish-brown interstitial clay; clay parting at 1,639.9 feet----------	1,639.0-1,639.9
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; moderate amounts of moderate-reddish-orange polyhalite blebs and stringers; polyhalite concentration at base----------	1,639.9-1,641.0
Clay, greenish-gray to moderate-reddish-brown, halitic; contains halite intergrowths; moderate amounts of moderate-reddish-orange polyhalite at base; vertical fracture healed with halite in upper three-fourths of unit----------	1,641.0-1,643.4
Halite, clear to pale-red to moderate-reddish-brown, medium to coarse crystalline, argillaceous; dark-reddish-brown clay parting at top; moderate amount dark-reddish-brown interstitial clay; moderate-reddish-orange polyhalite blebs----------	1,643.4-1,644.9
Halite, clear to moderate-reddish-orange and pale-red, medium to coarse crystalline; abundant moderate-reddish-orange polyhalite blebs and stringers; moderate amount of greenish-gray interstitial clay; minor leached indentations; greenish-gray clay parting at 1,648.4 feet-----	1,644.9-1,649.7

Table 20C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to pale-red and moderate-reddish-orange, medium to coarse crystalline; moderate amount of moderate-reddish-orange to moderate-reddish-brown polyhalite blebs; minor greenish-gray interstitial clay 1,651.2-1,651.4 feet; weak to moderate disseminated sylvite and sulfates (langbeinite) throughout unit------	1,649.7-1,654.3
Halite, clear to pale-red to grayish-red, medium to coarse crystalline, argillaceous; moderate amount of moderate-reddish-orange polyhalite blebs; abundant greenish-gray and dark-reddish-brown interstitial clay; greenish-gray clay parting at 1,653.2 feet; a reddish-brown clay parting at 1,656.8 and 1,658.1 feet; moderate to strong disseminated sylvite decreasing toward base; minor disseminated sulfates (langbeinite)----------	1,654.3-1,659.0
Halite, clear to moderate-reddish-orange and pale-reddish-brown, coarse crystalline; abundant moderate-reddish-orange polyhalite blebs and stringers, increasing to bands in lower 0.5 foot of unit: minor greenish-gray interstitial clay in upper half of unit; minor disseminated sylvite and sulfates (langbeinite?) scattered throughout unit; a concentration of langbeinite in lower 0.7 foot of unit----------	1,659.0-1,667.2
Polyhalite, moderate-reddish-brown, dense, massive, mixed with anhydrite near middle of unit; 0.1 foot of greenish-gray clay at base----------	1,667.2-1,668.8
Halite, clear to moderate-reddish-orange and pale-reddish-brown and greenish-gray, medium to coarse crystalline; abundant greenish-gray clay in upper 1.4 feet of unit; moderate amounts of moderate-reddish-orange polyhalite blebs and stringers; disseminated small crystals of sylvite in lower 1.6 feet of unit----------	1,668.8-1,672.3
Halite, clear to moderate-orange-pink and moderate-reddish-orange, and greenish-gray, fine to coarse crystalline; moderate amount of moderate-reddish-orange polyhalite blebs; minor greenish-gray interstitial clay in upper two-thirds of unit----------	1,672.3-1,676.2
Halite, clear to pale-red and moderate-orange-pink, fine to coarse crystalline, argillaceous; moderate amount of grayish-red interstitial clay, continues decreasing with depth; moderate disseminated sylvite and sulfates throughout, decreasing with depth----------	1,676.2-1,683.7
Halite, clear to moderate-orange-pink, medium to coarse crystalline; sparse moderate-orange-pink polyhalite blebs; minor disseminated sylvite----------	1,683.7-1,685.3

Table 20C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to pale-red and grayish-red, fine to coarse crystalline; minor amount moderate-reddish-orange blebs and stringers of polyhalite in upper one-half of unit; moderate disseminated sylvite and sulfates, langbeinite(?); sparse greenish-gray interstitial clay	1,685.3-1,688.4
Halite, clear to moderate-reddish-orange, coarse crystalline; moderate concentration of moderate-reddish-green polyhalite blebs in upper 1.0 foot of unit, decreasing with depth; minor to moderate concentration of sylvite and sulfates in lower 2.0 feet of unit	1,688.4-1,691.8
Polyhalite, grayish-red and medium-dark-gray, dense, massive; minor disseminated clear halite stringers and greenish-gray clay parting at base; moderate disseminated sylvite and sulfates in basal clay unit	1,691.8-1,692.9
Halite, moderate-reddish-orange and clear, coarse crystalline; scattered polyhalite stringers; minor vugs of leached sylvite; moderate-red polyhalite bed at 1,696.3-1,696.9 feet	1,692.9-1,697.8
Polyhalite, moderate-reddish-brown, dense	1,697.8-1,698.4
Halite, light-brown and pale-red, coarse crystalline	1,698.4-1,698.9
Halite, light-olive-gray and olive-gray, medium to coarse crystalline; grayish-green intercrystalline clay	1,698.9-1,699.9
Halite, moderate-reddish-orange, pale-red and clear, medium crystalline; reddish-brown polyhalite stringers and blebs	1,699.9-1,701.3
Halite, olive-gray, light-gray, fine to medium crystalline, clayey; minor reddish-brown polyhalite stringers	1,701.3-1,701.7
Halite, moderate-reddish-brown and pale-red, medium to coarse crystalline; moderate amount of reddish-brown polyhalite blebs and stringers	1,701.7-1,702.2
Halite, light-brown and pale-red, medium crystalline, clayey; much intercrystalline brown clay	1,702.2-1,705.4
Halite, moderate-reddish-orange and moderate-reddish-brown, medium to coarse crystalline; numerous reddish-brown polyhalite stringers; thin polyhalite bands in lower 1.5 feet	1,705.4-1,712.2
Polyhalite, reddish-brown, dense; pale-red, medium to coarse crystalline halite	1,712.2-1,712.9
Halite, clear and pale-red, very coarse crystalline	1,712.9-1,713.1
Halite, pale-red and moderate-reddish-brown, very coarse crystalline; minor reddish-brown polyhalite stringers and leached sylvite vugs; polyhalite stringers at base	1,713.1-1,714.5

Table 20C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-reddish-brown and clear, medium to coarse crystalline; moderate amount of reddish-brown polyhalite stringers and blebs	1,714.5-1,715.3
Polyhalite, moderate-reddish-brown, dense; minor halite intergrowths	1,715.3-1,715.8
Clay, moderate-reddish-orange and medium-gray, polyhalitic	1,715.8-1,716.5
Halite, greenish-gray grading to moderate-reddish-orange and moderate-reddish-brown, fine to medium crystalline; clayey, grading to slightly clayey halite; minor polyhalite stringers	1,716.5-1,720.0
Halite, moderate-reddish-orange to moderate-reddish-brown, fine to medium crystalline; moderate amount of reddish-brown polyhalite stringers; grayish-green intercrystalline clay from 1,721.2 to 1,722.2 feet; minor sylvite, leached vugs	1,720.0-1,725.0
Halite, light-brown and pale-red, fine crystalline; moderately to heavily disseminated sylvite	1,725.0-1,725.6
Halite, light-gray and pale-red, medium crystalline, clayey; leached sylvite vugs at base; some langbeinite	1,725.6-1,726.1
Halite, moderate-reddish-brown and grayish-orange-pink, fine to medium crystalline; moderate-reddish-brown polyhalite stringers; moderate amount of sylvite and leached sylvite vugs and langbeinite	1,726.1-1,728.0
Halite, greenish-gray and moderate-reddish-brown grading downward to pale-red, fine to medium crystalline, slightly clayey; moderate amount of polyhalite stringers and sylvite; grayish-green clay seam at base	1,728.0-1,732.5
Halite, pale-red and light-brown, fine to medium crystalline; moderate amount of reddish-brown polyhalite stringers and leached sylvite vugs	1,732.5-1,733.3
Halite, moderate-reddish-brown and pale-red to pale-yellowish-brown, fine to medium crystalline, polyhalitic; polyhalite band at 1,736.8 feet; minor leached sylvite	1,733.3-1,737.8
Polyhalite, moderate-reddish-brown, dense; crystalline halite near base	1,737.8-1,738.4
Halite, moderate-reddish-brown, fine to medium crystalline, polyhalitic	1,738.4-1,738.6
Halite, light-gray and pale-red, fine crystalline, clayey; grayish-green clay seam at 1,738.9 feet; minor reddish-brown polyhalite stringers	1,738.6-1,739.3
Halite, moderate-reddish-orange and pale-red, fine to coarse crystalline; minor reddish-brown polyhalite stringers	1,739.3-1,742.7

Table 200.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, medium-gray, mottled with moderate-reddish-brown and pale-red, fine to medium crystalline, clayey; reddish-brown polyhalite stringers in upper 1.0 foot; brown intercrystalline clay and partings at 1,744.4 and 1,745.2 feet; grayish-green clay parting at 1,744.3 feet; minor gas vugs in upper 1.0 foot; lower 1.0 foot is coarse to very coarse crystalline	1,742.7-1,748.0
Halite, clear and moderate-reddish-brown, fine to medium crystalline; minor reddish-brown polyhalite stringers in upper three-fourths; polyhalitic halite in lower one-third of unit	1,748.0-1,751.5
Polyhalite, moderate-reddish-brown, dense; minor light-gray anhydrite stringers	1,751.5-1,753.3
Halite, pale-red and clear, medium to coarse crystalline; grayish-green clay parting at top; grayish-green clay filling in vugs	1,753.3-1,753.8
Halite, moderate-reddish-brown, pale-red and clear, medium to coarse crystalline; moderate amount of reddish-brown polyhalite stringers and blebs	1,753.8-1,759.3
Anhydrite, medium gray, laminated; reddish-brown polyhalite, dense near base	1,759.3-1,759.9
Halite, moderate-reddish-brown, pale-red and clear, coarse to very coarse crystalline; polyhalite bands at 1,760.1-1,760.3 feet; reddish-brown polyhalite stringers increase downward	1,759.9-1,761.7
Halite, medium-brown and grayish-green, fine crystalline, clayey; grayish-green clay parting at top; brown clay parting at base	1,761.7-1,762.3
Halite, light-gray and pale-red, fine to medium crystalline; minor brown intercrystalline clay; minor small vugs	1,762.3-1,763.8
Halite, pale-red and moderate-reddish-orange and clear, fine to medium crystalline; moderate amount of moderate reddish-brown polyhalite stringers	1,763.8-1,767.1
Halite, pale-red, very coarse crystalline; minor amount of intercrystalline brown clay; brown clay parting at 1,768.3 feet	1,767.1-1,768.6
Halite, moderate-reddish-brown and pale-red, fine to medium crystalline; brown clay parting at 1,768.7 feet	1,768.6-1,769.4
Halite, pale-red and brown polyhalite bands; brown clay parting at 1,769.8 feet	1,769.4-1,770.3

Table 20C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-reddish-orange and light-brown, fine crystalline; minor scattered reddish-brown polyhalite stringers	1,770.3-1,772.9
Halite, light olive-gray, clayey	1,772.9-1,773.5
Halite, medium-gray and brown, fine to coarse crystalline, clayey; brown clay partings at 1,774.0, 1,775.9, and 1,776.5 feet	1,773.5-1,777.2
Halite, pale-red and brown, very fine crystalline to very coarse crystalline, clayey; brown clay partings at 1,777.6, 1,777.9, and 1,778.5 feet; grayish-green parting at 1,780.8 and 1,782.4 feet	1,777.2-1,782.4
Halite, clear to pale-red, coarse crystalline; minor intercrystalline brown clay; minor small vugs	1,782.4-1,784.3
Anhydrite, light- to medium-gray, laminated; minor polyhalite; grayish-green clay seam with polyhalite at 1,789.8-1,790.0 feet	1,784.3-1,790.1
Halite, moderate-reddish-brown, medium crystalline; scattered polyhalite stringers and blebs	1,790.1-1,791.2
Halite, clear to dark-gray, argillaceous; dark-greenish-gray clay; thin polyhalite bands	1,791.2-1,791.9
Halite, clear to pale-red, medium crystalline; moderate amounts of pale-reddish-brown polyhalite blebs	1,791.9-1,793.3
Same as above, with scattered polyhalite	1,793.3-1,796.5
Halite, same as 1,791.9-1,793.3 feet and 1,798.8 feet	1,796.5-1,798.9
Halite, clear, medium to coarse crystalline; intercrystalline pale-red to brown clay; clay partings at	1,798.9-1,799.4
Halite, moderate-reddish-brown, fine to medium crystalline; scattered thin stringers of moderate-reddish-orange polyhalite	1,799.4-1,801.7
Halite, clear to pale-red, coarse crystalline; grayish-green clay parting at 1,803.3 feet	1,801.7-1,803.3
Clay, dark-brown to dark-gray; clear halite; clay parting at 1,804.2 feet	1,803.3-1,804.2
Halite, clear to pale-red, medium crystalline, argillaceous; scattered polyhalite stringers	1,804.2-1,804.9
Clay, grayish-green to brown; clear to reddish-brown, fine to medium crystalline halite	1,804.9-1,805.9
Halite, clear to medium-reddish-orange, argillaceous; brown clay partings at 1,807.9, 1,808.1, 1,808.7, 1,808.9, and 1,809.7 feet	1,805.9-1,809.7
Halite, clear to pale-reddish-orange, medium crystalline; scattered polyhalite blebs; some intercrystalline light-gray clay	1,809.7-1,812.7
Clay, bluish-gray; clear halite; scattered polyhalite	1,812.7-1,813.0

Table 20C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to pale-reddish-orange, medium crystalline, grades to coarse crystalline; intercrystalline pale-red clay; bluish-gray clay parting at 1,814.3 feet	1,813.0-1,821.5
Halite, moderate-reddish-orange to clear, medium crystalline	1,821.5-1,824.9
Halite, clear to dark-reddish-brown, medium to coarse crystalline; brown clay partings at 1,825.1 and 1,825.9 feet; minor scattered polyhalite blebs	1,824.9-1,827.7
Halite, clear to moderate-reddish-orange, medium to coarse crystalline	1,827.7-1,830.6
Halite, clear, medium to coarse crystalline; moderate-reddish-brown polyhalite stringers at 1,830.9 feet	1,830.6-1,831.1
Halite, dark-reddish-brown, medium crystalline; grayish-green clay partings at 1,831.9, 1,832.5, 1,833.0, 1,835.9, and 1,836.9 feet, argillaceous; numerous clay washouts in lower part	1,831.1-1,837.4
Halite, clear to pale-reddish-orange, coarse crystalline; minor intercrystalline clay; polyhalite increases with depth	1,837.4-1,843.4
Halite, clear to moderate-reddish-brown, medium to coarse crystalline, argillaceous; moderate-reddish-brown clay partings at 1,843.8 and 1,845.0 feet	1,843.4-1,845.4
Halite, moderate-reddish-brown to pale-reddish-orange, fine to medium crystalline; polyhalite in blebs and stringers in moderate amount	1,845.4-1,846.9
Halite, clear to moderate-brown, medium to coarse crystalline, argillaceous; brown clay parting at 1,847.3 feet; blue clay parting at 1,848.1 feet; scattered stringers of reddish-orange polyhalite throughout	1,846.9-1,848.9
Halite, clear to moderate-reddish-orange and pale-red, medium to coarse crystalline; moderate to sparse greenish-gray interstitial clay; abundant moderate-reddish-orange to moderate-reddish-brown polyhalite blebs and stringers	1,848.9-1,854.6
Halite, clear to pale-red and moderate-orange-pink, medium to coarse crystalline; moderate amount of greenish-gray interstitial clay; minor amount of moderate-reddish-brown clay; moderate amount of moderate-reddish-orange polyhalite blebs	1,854.6-1,856.7
Halite, clear to moderate-reddish-orange and pale-greenish-yellow, medium to coarse crystalline; moderate amount of moderate-reddish-orange polyhalite blebs and stringers; sparse greenish-gray interstitial clay	1,856.7-1,858.6

Table 20C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to moderate-reddish-orange and moderate-orange-pink, coarse crystalline; abundant moderate-orange-pink to moderate-pink polyhalite blebs and large aggregate masses throughout unit; sparse greenish-gray interstitial clay at top of unit	1,858.6-1,862.3
Halite, clear to grayish-red and pale-red, coarse crystalline; contains bands of light- to medium-gray anhydrite; 0.2-foot thick anhydrite band at 1,864.0 feet; abundant, large blebs of moderate-pink to moderate-reddish-orange polyhalite; sparse grayish-red interstitial clay	1,862.3-1,864.3
Anhydrite and polyhalite mixture, medium-light-gray and light-moderate-reddish-brown, laminated, dense, massive; disseminated clear halite near base	1,864.3-1,871.3
Halite, clear to moderate-orange-pink and grayish-red; abundant moderate-reddish-orange polyhalite blebs and stringers; sparse greenish-gray interstitial clay; bands of anhydrite at 1,871.6, 1,872.0, 1,873.5, and 1,875.0 feet	1,871.3-1,875.8
Anhydrite and polyhalite mixture, light-medium-gray and moderate-pink to light-red, laminated; anhydrite, predominant in lower half, dense, massive; light-medium-gray clay and polyhalite in lower 2.2 feet of unit	1,875.8-1,887.1
Halite, clear to moderate-reddish-orange, medium to coarse crystalline; abundant moderate-reddish-orange polyhalite blebs and stringers throughout unit, stringers predominant near base; sparse greenish-gray interstitial clay; minute leached vugs near base, possibly containing sylvite	1,887.1-1,890.3
Halite, clear to moderate-reddish-brown, fine to coarse crystalline; minor to moderate amount of moderate-reddish-brown polyhalite blebs	1,890.3-1,897.3
Halite, clear to pale-red and grayish-red, medium to coarse crystalline, argillaceous; sparse moderate-reddish-orange polyhalite blebs; moderate amount of greenish-gray and grayish-red interstitial clay; minor sulfate mineralization	1,897.3-1,899.1
Halite, clear to moderate-reddish-brown, fine to medium crystalline; moderate to abundant moderate-reddish-brown polyhalite blebs; sparse greenish-gray interstitial clay; minor to moderate disseminated sulfate mineralization	1,899.1-1,903.5
Halite, clear to pale-red, fine to medium crystalline, argillaceous; abundant pale-red interstitial clay; pale-red clay seam from 1,903.5 to 1,903.6 feet	1,903.5-1,904.4

Table 20C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to moderate-reddish-brown, fine to coarse crystalline; minor to moderate amount of moderate-reddish-orange polyhalite blebs	1,904.4-1,905.3
Halite, clear to greenish-gray and moderate-reddish-orange, medium to coarse crystalline, argillaceous; minor moderate-orange-pink polyhalite blebs; minor to moderate amount greenish-gray and grayish-red interstitial clay; minor disseminated sulfate mineralization	1,905.3-1,909.1
Halite, clear to greenish-gray and moderate-reddish-orange, fine to coarse crystalline; sparse greenish-gray and grayish-red interstitial clay; sparse moderate-reddish-orange polyhalite blebs throughout unit	1,909.1-1,912.2
Halite, clear to moderate-reddish-orange and greenish-gray, fine to coarse crystalline; minor moderate-reddish-orange polyhalite blebs; minor greenish-gray and grayish-red interstitial clay; moderate disseminated sulfate mineralization	1,912.2-1,914.5
Halite, clear to moderate-reddish-orange, fine to medium crystalline; moderate amounts of pale-reddish-brown polyhalite blebs and stringers; minor sulfate mineralization in upper 0.4 foot and lower 0.9 foot	1,914.5-1,918.2
Halite, clear to moderate-orange-pink, pale-red, and greenish-gray, medium to coarse crystalline; sparse moderate-reddish-orange polyhalite blebs and stringers; minor greenish-gray and grayish-red interstitial clay; minor sulfate mineralization	1,918.2-1,922.0
Halite, clear to moderate-reddish-orange, fine to medium crystalline; minor to moderate amount of moderate-reddish-orange polyhalite blebs and stringers	1,922.0-1,926.3
Halite, clear to greenish-gray, fine to medium crystalline, argillaceous; abundant greenish-gray interstitial clay; upper 1.8 feet contains disseminated to massive sulfates (langbeinite?)	1,926.3-1,929.0
Halite, clear to greenish-gray, fine to medium crystalline; sparse moderate-reddish-orange polyhalite blebs; minor greenish-gray and grayish-red interstitial clay	1,929.0-1,931.0
Halite, clear to light-olive-gray, medium to coarse crystalline; minor moderate-reddish-brown polyhalite blebs and stringers	1,931.0-1,932.2
Halite, clear to moderate-reddish-orange, fine to medium crystalline; moderate amount of moderate-reddish-orange to moderate-reddish-brown polyhalite blebs and stringers; grayish-red clay parting at 1,937.5 feet	1,932.2-1,940.3

Table 20C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to grayish-red, argillaceous; 50 percent grayish-red interstitial clay	1,940.3-1,941.1
Halite, clear to grayish-red, fine to medium crystalline; moderate amount of grayish-red interstitial clay	1,941.1-1,943.7
Halite, clear to pale-red, fine to coarse crystalline; sparse grayish-red and greenish-gray interstitial clay; trace of moderate-reddish-brown polyhalite	1,943.7-1,948.3
Halite, clear to greenish-gray and moderate-orange-pink, fine to medium crystalline; sparse greenish-gray and grayish-red interstitial clay; sparse moderate-reddish-brown polyhalite blebs and stringers	1,948.3-1,950.0
Halite, clear to moderate-orange-pink, fine to medium crystalline; minor to moderate amount of moderate-reddish-orange polyhalite blebs and stringers, decreasing to base; sparse grayish-red clay in lower 0.2 foot of unit	1,950.0-1,953.3
Halite, clear to grayish-red and medium-gray, medium to coarse crystalline; sparse greenish-gray and grayish-red interstitial clay, concentrated in upper 0.8 foot of unit; minor moderate-reddish-orange polyhalite blebs in upper 0.8 foot of unit	1,953.3-1,956.0
Halite, clear to medium-gray and greenish-gray, fine to medium crystalline; moderate amount of grayish-red, greenish-gray, and medium-dark-gray interstitial clay throughout unit; very dusky red clay parting at 1,956.1 feet	1,956.0-1,959.8
Halite, clear to light-olive-gray and pale-red, fine to medium crystalline; minor greenish-gray and grayish-red interstitial clay; moderate amount of moderate-reddish-orange disseminated polyhalite blebs and stringers; greenish-gray clay parting at 1,961.0 feet	1,959.8-1,961.0
Halite, clear to light-olive-gray, fine to medium crystalline; sparse greenish-gray and grayish-red interstitial clay; trace of moderate-reddish-orange polyhalite blebs	1,961.0-1,961.8
Halite, clear to pale-red and medium-gray, medium to coarse crystalline; moderate amount of grayish-red interstitial clay and minor greenish-gray interstitial clay; sparse moderate-reddish-orange polyhalite blebs in upper 0.1 foot	1,961.8-1,966.2
Halite, clear to pale-red to grayish-red, medium to coarse crystalline; minor grayish-red and greenish-gray interstitial clay; abundant moderate-reddish-orange polyhalite blebs and stringers throughout unit	1,966.2-1,968.5

Table 20C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to moderate-reddish-brown, medium to coarse crystalline; sparse moderate-reddish-orange polyhalite blebs and stringers increasing to abundant polyhalite in lower 0.8 foot of unit----------	1,968.5-1,970.7
Polyhalite, moderate-reddish-brown, dense, massive; predominantly clear halite in middle of bed; greenish-gray clay mixed with polyhalite in lower 0.5 foot of bed----------	1,970.7-1,972.2
Halite, clear to grayish-red and moderate-orange-pink, medium to coarse crystalline; abundant grayish-red interstitial clay in lower 1.3 feet of unit; trace of moderate reddish-orange polyhalite blebs; grayish-red clay parting at 1,973.7 feet----------	1,972.2-1,974.3
Halite, clear to pale-red, coarse crystalline; minor moderate-reddish-orange polyhalite blebs; trace of grayish-red interstitial clay----------	1,974.3-1,978.0
Halite, clear to greenish-gray and pale-red, very fine crystalline (sugary texture); moderate amount of pale-red and greenish-gray interstitial clay; grayish-red clay parting at 1,978.1 and 1,978.7 feet----------	1,978.0-1,979.5
Halite, clear to greenish-gray to medium-dark-gray, fine to coarse crystalline; minor to moderate amount grayish-red interstitial clay; grayish-red clay parting at 1,981.3 feet; minor to moderate amount of moderate-reddish-orange polyhalite blebs----------	1,979.5-1,991.0
Halite, clear to pale-red and greenish-gray, medium to coarse crystalline; minor moderate-orange-pink polyhalite blebs----------	1,991.0-1,994.5
	Total depth

Table 20D.--Mineralogical and chemical analyses of core samples from potash ore zones and mineralized salt beds in drill hole P-20

[oz, ore zone; mm, middle member; lm, lower member; sb, salt bed; tr, trace; Bl, bloedite; Ha, hallite; Ka, kainite; Ki, kieserite; La, langbeinite; Le, leonite; Po, polyhallte; Sy, sylvite; n.d., not determined. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mineralogy: X-ray diffraction analysis[1]	Chemical analysis (weight percent): Ca	K	Mg	Na	Cl	SO_4	H_2O+	H_2O-	Water insoluble
P-20/1	1,723.80-1,725.00	1.20	sb	9 Ha;<1 Po; tr Sy	1.3	1.0	0.25	36.5	n.d.	3.3	n.d.	n.d.	n.d.
P-20/2	1,725.00-1,726.15	1.15	10th oz	>6 Ha;>2 Sy;<1 La, tr Po	.27	11.0	.84	28.5	52.5	5.3	0.22	0.10	1.0
P-20/3	1,726.15-1,728.10	1.95		>6 Ha; 2 La; 1 Sy; tr Po, Ka,Le	.56	11.0	2.8	25.0	42.0	18.0	.96	.27	.18
[2]P-20/4	1,728.10-1,729.62	1.52		6 Ha;>3 Sy; tr Po	.34	13.5	.20	23.5	49.5	.92	.43	1.5	10.2
[2]P-20/4					.37	12.5	.20	23.5	50.0	.89	.49	1.6	10.3
P-20/5	1,729.62-1,731.48	1.86		6 Ha;>3 Sy; tr Po	.40	14.0	.23	23.5	52.5	.95	.18	.45	4.1
P-20/6	1,731.48-1,732.74	1.26	sb	>8 Ha;<1 Po; 1 Sy	.61	3.2	.35	35.0	55.0	1.5	.20	.15	1.3
[2]P-20/7	1,732.74-1,733.80	1.06		>8 Ha; 1 Sy; tr Po	.44	3.5	.25	36.0	n.d.	.87	n.d.	n.d.	n.d.
[2]P-20/7					.44	3.5	.25	34.5	n.d.	.74	n.d.	n.d.	n.d.
P-20/8	1,896.40-1,897.30	.90	4th oz, mm	>9 Ha; tr Po, Sy, Ki	.13	.32	.26	37.5	n.d.	.95	n.d.	n.d.	n.d.
P-20/9	1,897.30-1,898.80	1.50	4th oz, lm	>8 Ha;<1 Sy; tr Po, Ki	.25	.84	.48	34.0	55.0	2.5	.46	.32	3.6
[2]P-20/10	1,898.80-1,900.45	1.65	sb	6 Ha;>3 La; tr Po, Ka	.74	8.8	.50	21.0	32.0	30.5	.54	.19	1.5
[2]P-20/10					.60	8.2	5.3	21.0	33.0	30.5	.48	.43	1.5
[2]P-20/11	1,900.45-1,901.77	1.32		>8 Ha; 1 Po; tr La	2.1	2.3	.76	33.5	50.5	8.5	.21	.05	.37
[2]P-20/11					2.2	2.3	.76	33.5	50.5	8.5	.27	.05	.39
[2]P-20/12	1,901.77-1,903.35	1.58		>7 Ha;>1 La; tr Po	1.3	6.0	2.9	29.0	41.5	18.9	.18	.06	.16
[2]P-20/12					1.2	4.6	3.2	29.0	5	19.0	.06	.17	.21
P-20/13	1,903.35-1,904.55	1.20		9 Ha;>1 Po; tr Sy	.73	.56	.43	34.0	51.5	2.1	.55	.54	8.0
P-20/14	1,925.08-1,926.30	1.22	sb	9 Ha; tr Po, La	.35	.48	.20	37.5	n.d.	1.5	n.d.	n.d.	n.d.
[2]P-20/15	1,926.30-1,927.75	1.45	2d oz	>6 Ha;>2 La; 1 Ka;>1 Bl	.15	6.5	4.1	24.0	35.5	24.5	2.8	.57	1.7
[2]P-20/15					.15	6.5	4.1	24.0	35.5	25.0	2.7	.54	1.8
P-20/16	1,927.75-1,928.83	1.08		>8 Ha; tr Po, La	.17	.24	.32	34.0	54.0	.80	1.1	.90	5.9

[1]Estimate of amount reported on a scale of 0-10.
[2]Replicate analyses.

Table 20E.--Calculated mode (mineral content) and potash distribution by mineral in core samples from potash ore zones and mineralized salt beds in drill hole P-20

[oz, ore zone; mm, middle member; lm, lower member; sb, salt bed; Bl, bloedite; Ha, halite; Ka, kainite; Ki, kieserite; La, langbeinite; Le, Leonite; Po, polyhalite; Sy, sylvite; Insol., clay and silt; n.d., not determined; leaders (---), not present. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mode (weight percent mineral)									K_2O distribution by minerals					
				Sy	La	Ka	Le	Ki	Bl	Ha	Po	Insol.	Sy	La	Ka	Le	Po	Total
P-20/1	1,723.80-1,725.00	1.20	sb	0.6	---	---	---	---	---	92.8	5.2	n.d.	0.4	---	---	---	0.8	1.2
P-20/2	1,725.00-1,726.15	1.15	10th oz	18.4	5.8	---	---	---	---	72.5	2.0	1.0	11.6	1.3	---	---	.3	13.2
P-20/3	1,726.15-1,728.10	1.95		11.6	19.5	1.8	2.0	---	---	59.5	4.2	0.2	7.3	4.4	0.3	0.5	.7	13.2
[1]P-20/4	1,728.10-1,729.62	1.52		25.4	---	---	---	---	---	61.7	1.5	10.2	16.0	---	---	---	.2	16.2
[1]P-20/4				23.5	---	---	---	---	---	63.9	1.4	10.3	14.8	---	---	---	.2	15.0
P-20/5	1,729.62-1,731.48	1.86		26.3	---	---	---	---	---	65.9	1.5	4.1	16.6	---	---	---	.2	16.8
P-20/6	1,731.48-1,732.74	1.26	sb	5.5	---	---	---	---	---	89.0	2.4	1.3	3.5	---	---	---	.4	3.9
[1]P-20/7	1,732.74-1,733.80	1.06		6.3	---	---	---	---	---	91.5	1.4	n.d.	4.0	---	---	---	.2	4.2
[1]P-20/7				6.4	---	---	---	---	---	87.7	1.1	n.d.	4.0	---	---	---	.2	4.2
P-20/8	1,896.40-1,897.30	0.90	4th oz mm	.4	---	---	---	0.5	---	95.3	1.0	n.d.	.2	---	---	---	.2	0.4
P-20/9	1,897.30-1,898.80	1.50	4th oz lm	1.1	---	---	---	1.9	---	89.8	1.9	3.6	.7	---	---	---	.3	1.0
[1]P-20/10	1,898.80-1,900.45	1.65	sb	---	40.8	2.5	---	---	---	52.2	5.6	1.5	---	9.3	.5	---	.9	10.7
[1]P-20/10				---	36.8	4.3	---	---	---	53.4	4.5	1.5	---	8.4	.8	---	.7	9.9
[1]P-20/11	1,900.45-1,901.77	1.32		---	1.3	---	---	---	---	83.2	15.8	.4	---	0.3	---	---	2.5	2.8
[1]P-20/11				---	0.8	---	---	---	---	83.2	16.6	.4	---	.2	---	---	2.6	2.8
[1]P-20/12	1,901.77-1,903.35	1.58		---	25.1	---	---	---	---	68.4	9.8	.2	---	5.7	---	---	1.5	7.2
[1]P-20/12				---	18.2	---	---	---	---	71.7	9.0	.2	---	4.1	---	---	1.4	5.5
P-20/13	1,903.35-1,904.55	1.20		.3	---	---	---	---	---	88.5	3.3	8.0	.2	---	---	---	.5	0.7
P-20/14	1,925.08-1,926.30	1.22	sb	---	.7	---	---	---	---	95.3	2.6	n.d.	---	.2	---	---	.4	0.6
[1]P-20/15	1,926.30-1,927.75	1.45	2d oz	---	26.1	9.1	---	---	4.6	56.4	1.1	1.8	---	5.9	1.7	---	.2	7.8
[1]P-20/15				---	26.1	9.1	---	---	4.6	56.4	1.1	1.8	---	5.9	1.7	---	.2	7.8
P-20/16	1,927.75-1,928.83	1.08		---	.4	---	---	---	---	89.0	1.3	5.9	---	.1	---	---	.2	0.3

[1]Replicate analyses.

TABLES 21A-21G

Basic data from drill hole P-21,
Waste Isolation Pilot Plant area, Eddy County, New Mexico

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21G.--Gamma-ray and neutron logs of drill hole	foldout

Table 21A.--Abridged drill-hole history

LOCATION: Sec. 15, T. 22 S., R. 31 E.
260 m (852 ft) from north line
46 m (150 ft) from east line

ALTITUDE (LAND SURFACE): 1,070 m (3,510.2 ft). Datum for depth measurements in drilling and logging operations.

LITHOLOGIC LOG PREPARED BY: J. C. Lorenz, Florian Maldonado, J. W. Mercer, B. R. Orr, L. A. Rives, R. P. Snyder, and R. W. Spengler, October 16-26, 1976.

DRILLING CONTRACTOR: Boyles Bros. Drilling Co.

DRILLING RECORD: Commenced drilling on October 15, and completed on October 26, 1976, at 584 m (1,915 ft) below land surface.

Drilled with air foam to 160 m (525 ft). Driller reported water between 160 and 181 m (525-595 ft).

Recovered all casing, and plugged with cement.

REMARKS: Top of salt in Rustler Formation at 288 m (944 ft) below land surface.

Table 213.--Stratigraphic summary

Rock unit	Depth interval[1] feet	meters
Holocene deposits	0-8	0-2
Triassic rocks:		
Santa Rosa Sandstone	8-225	2-69
Permian rocks:		
Dewey Lake Red Beds	225-734	69-234
Rustler Formation	734-1,043	234-318
Magenta Dolomite Member	738-812	240-247
Culebra Dolomite Member	899-924	274-282
Salado Formation	1,043-1,918	318-585
[illegible] member	1,043-1,526	318-465
[illegible] potash zone	1,526-1,887	465-575
Vaca Triste Sandstone Member[2]	1,526-1,533	465-467
11th ore zone	1,579-1,583	481-482
Marker bed 117	1,591-1,593	485-486
Marker bed 118	1,615-1,616	492-493
Marker bed 119	1,637-1,638	499-499
10th ore zone	1,647-1,653	502-504
Marker bed 120	1,659-1,660	506-506
9th ore zone	1,665-1,669	507-509
Marker bed 121	1,676-1,678	511-511
Marker bed 122	1,685-1,686	514-514
8th ore zone	1,690-1,699	515-518
Union anhydrite[3]	1,707-1,714	520-522
7th ore zone	1,727-1,732	526-528
6th ore zone	1,740-1,744	530-532
5th ore zone	1,748-1,757	533-536
Marker bed 123	1,781-1,789	543-546
Marker bed 124	1,796-1,805	547-550
4th ore zone	1,811-1,817	552-554
3d ore zone	1,824-1,837	556-560
2d ore zone	1,841-1,845	561-562
1st ore zone	1,859-1,873	567-571
Marker bed 126	1,886-1,887	575-575
Lower member	1,887-1,918	575-585
Marker bed 127	1,912-1,913	582-583
Maximum depth recorded	1,918	585

[1]Depth interval recorded from geophysical logs.
[2]Of Adams, 1944.
[3]Informal unit of Salado Formation.

Table 110.--Lithologic log

Description	Depth (feet)	
Sand, unconsolidated, windblown, and fill	0.0-	10.0
Caliche, white and sandy	10.0-	15.0
Sandstone, grayish-red; caliche common	15.0-	20.0
Sandstone, grayish-red; no caliche	20.0-	25.0
Sandstone, grayish-red, very fine grained to medium-grained	25.0-	35.0
Sandstone, grayish-red, medium-grained	35.0-	40.0
Sandstone, grayish-red, with trace of grayish-green reduction spots, very fine grained; medium-grained sandstone common	40.0-	45.0
Same as above; increase in grayish-green reduction spots	45.0-	50.0
Siltstone, grayish-red; grayish-green reduction spots common	50.0-	60.0
Same as above; grayish-pink, medium-grained sandstone, 40 percent	60.0-	65.0
Siltstone, grayish-red; trace of grayish-pink, medium-grained sandstone	65.0-	70.0
Siltstone, grayish-red, grayish-green reduction spots common; trace of grayish-pink, medium-grained sandstone	70.0-	75.0
Siltstone, grayish-green, with common grayish-green reduction spots; fine-grained sandstone	75.0-	80.0
Siltstone, grayish-green, with grayish-green reduction spots; medium-grained, grayish-red and grayish-pink sandstone	80.0-	90.0
Mudstone, reddish-brown	90.0-	95.0
Siltstone, gray, with grayish-green reduction spots; medium-grained, grayish-red and grayish-pink sandstone abundant	95.0-	100.0
Siltstone, grayish-red, with grayish-green reduction spots; pale-red, medium-grained sandstone	100.0-	140.0
Siltstone, grayish-red, with abundant grayish-green reduction spots	140.0-	170.0
Same as above; fewer grayish-green reduction spots; pale-red, medium-grained sandstone common	170.0-	180.0
Same as above; no pale-red, medium-grained sandstone	180.0-	200.0
Siltstone, grayish-red, with very common grayish-green reduction spots	200.0-	220.0
No sample	220.0-	225.0
Siltstone, grayish-red, with very common grayish-green reduction spots	225.0-	230.0
Same as above; fewer grayish-green reduction spots	230.0-	280.0
Same as above; trace of selenite	280.0-	310.0
Siltstone, grayish-red; pale-red and grayish-orange-pink dolomite; trace of selenite	310.0-	315.0
Same as above; increase in grayish-orange-pink dolomite	315.0-	320.0
Siltstone, grayish-red, with grayish-green reduction spots; trace of white gypsum	320.0-	345.0

Table 21C.--Lithologic log--(Continued)

Description	Depth (feet)
Siltstone, grayish-red and pale-reddish-brown, with greenish-gray reduction spots; trace of white gypsum; trace of pale-reddish-brown claystone	345.0- 370.0
Siltstone, pale-reddish-brown and sandstone, grayish-red, very fine to fine-grained, subangular to subrounded, fairly well sorted; minor white gypsum	370.0- 375.0
Siltstone, pale-reddish-brown, with greenish-gray reduction spots; minor pale-reddish-brown claystone; minor white gypsum	375.0- 425.0
Siltstone, pale-reddish-brown, with greenish-gray reduction spots; minor pale-reddish-brown claystone; trace of grayish-red, very fine to fine-grained sandstone; trace of gypsum	425.0- 500.0
Siltstone, pale-reddish-brown, with grayish-green reduction spots; trace of medium-grained sandstone, gypsum, and dark-reddish-brown mudstone	500.0- 525.0
Same as above; increase in gypsum	525.0- 535.0
Same as above; trace of selenite	535.0- 565.0
Same as above; trace of white gypsum and selenite	565.0- 590.0
Siltstone, pale-reddish-brown, with grayish-green reduction spots; selenite and white gypsum common; trace of very fine grained sandstone and dark-brown mudstone	590.0- 600.0
Siltstone, pale-reddish-brown, with greenish-gray reduction spots; trace of gypsum	600.0- 640.0
Siltstone, pale-reddish-brown, with greenish-gray reduction spots; very fine to fine-grained, subangular to subrounded, fairly well sorted sandstone	640.0- 650.0
Siltstone, moderate-reddish-orange, with greenish-gray reduction spots	650.0- 720.0
Gypsum, clear to white; minor moderate-reddish-orange siltstone	720.0- 735.0
Gypsum, clear to grayish-orange-pink	735.0- 770.0
Gypsum, clear to greenish-gray and white	770.0- 780.0
Anhydrite, white to dark-greenish-gray; white gypsum common	780.0- 790.0
Dolomite, light-olive-gray to greenish-gray, 80 percent; white to dark-greenish-gray, gypsiferous anhydrite, 20 percent; white gypsum common	790.0- 800.0
Dolomite, light-olive-gray to greenish-gray, 90 percent; gypsiferous anhydrite, 10 percent; white gypsum common	800.0- 810.0
Dolomite, light-olive-gray to greenish-gray; trace of white gypsum	810.0- 815.0
Dolomite, 50 percent; white gypsiferous anhydrite, 50 percent	815.0- 820.0

Table 21C.--Lithologic log--(Continued)

Description	Depth (feet)
Dolomite, light-olive-gray to greenish-gray, 80 percent; very light gray gypsiferous anhydrite, 20 percent; sparse pale-reddish-brown siltstone	820.0- 825.0
Anhydrite-gypsum, white to very light gray	825.0- 830.0
Same as above; sparse pale-reddish-brown siltstone	830.0- 845.0
Same as above; 10 percent siltstone	845.0- 850.0
Same as above; less than 5 percent siltstone	850.0- 855.0
Anhydrite-gypsum, white to very light gray, 50 percent; pale-reddish-brown to moderate-reddish-brown siltstone, 50 percent	855.0- 865.0
Same as above; anhydrite-gypsum, 90 percent; siltstone, 10 percent	865.0- 880.0
Same as above; anhydrite-gypsum, 70 percent; siltstone, 30 percent	880.0- 885.0
Siltstone, pale-red to moderate-reddish-brown, 70 percent; light-gray anhydrite, 30 percent; minor mudstone	885.0- 890.0
Anhydrite-gypsum, white to light-gray, 70 percent; pale-red to moderate-reddish-brown siltstone, 30 percent	890.0- 900.0
Same as above; minor dolomite	900.0- 905.0
Dolomite(?), grayish-pink to light-gray, 60 percent; light-gray anhydrite-gypsum, 30 percent; siltstone, 10 percent; sparse selenite-gypsum	905.0- 910.0
Same as above; minor siltstone	910.0- 915.0
Dolomite, 90 percent; anhydrite-gypsum, 10 percent; minor siltstone	915.0- 920.0
Dolomite, 80 percent; anhydrite, 10 percent; siltstone, 10 percent; minor selenite-gypsum	920.0- 925.0
Siltstone, 50 percent; anhydrite, 20 percent; dolomite, 20 percent; selenite-gypsum, 10 percent	925.0- 930.0
Anhydrite-gypsum, 80 percent; siltstone, 20 percent; sparse dolomite	930.0- 935.0
Siltstone, pale-red to moderate-reddish-brown, 60 percent; anhydrite-gypsum, 40 percent; minor pale-green mudstone	935.0- 940.0
Anhydrite-gypsum, 60 percent; siltstone, 40 percent; minor mudstone	940.0- 950.0
Anhydrite-gypsum, 50 percent; siltstone, 50 percent; minor mudstone	950.0- 960.0
Anhydrite-gypsum, 70 percent; reddish-brown siltstone, 30 percent; minor mudstone	960.0- 975.0
Siltstone, reddish-brown, very fine grained, 70 percent; white, very fine grained anhydrite, 30 percent	975.0- 980.0
Same as above; siltstone, 50 percent; anhydrite, 40 percent; gypsum, 10 percent	980.0-1,000.0

Table 21C.--Lithologic log--(Continued)

Description	Depth (feet)
Siltstone, reddish-brown, very fine grained, about 60 percent; white, very fine grained anhydrite, 30 percent; gypsum, 10 percent	1,000.0-1,005.0
Same as above; selenitic gypsum	1,005.0-1,015.0
Same as above; minor halite	1,015.0-1,020.0
Same as above; no halite	1,020.0-1,035.0
Siltstone, moderate-reddish-brown, very fine grained, 60 percent; white anhydrite, 30 percent; gypsum (selenite), 5 percent; bluish-gray, very fine grained siltstone, 5 percent	1,035.0-1,040.
Siltstone, moderate-reddish-brown, very fine grained, 80 percent; bluish-gray, very fine grained siltstone, 15 percent; gypsum, 5 percent	1,040.0-1,045.0
Siltstone, moderate-reddish-brown, very fine grained; anhydrite; gypsum	1,045.0-1,050.0
Halite, clear, 60 percent; moderate-reddish-brown, very fine grained siltstone, 30 percent; anhydrite and gypsum, 10 percent	1,050.0-1,055.0
Halite, clear; less than 5 percent reddish-brown siltstone	1,055.0-1,065.0
Halite, clear, 50 percent; moderate-reddish-brown, very fine grained siltstone, 30 percent; white, very fine grained anhydrite, 20 percent	1,065.0-1,080.0
Halite, clear; less than 5 percent siltstone	1,080.0-1,085.0
Halite, clear, 70 percent; moderate-reddish-brown, very fine grained, siltstone, 20 percent; white, very fine grained anhydrite, 10 percent	1,085.0-1,100.0
Halite, clear; trace of polyhalite	1,100.0-1,145.0
Halite, clear	1,145.0-1,155.0
Halite, clear; trace of polyhalite	1,155.0-1,200.0
Halite, clear; some reddish-orange polyhalite	1,200.0-1,210.0
Halite, clear; trace of reddish-orange polyhalite	1,210.0-1,235.0
Halite, clear; very sparse polyhalite	1,235.0-1,265.0
Halite, clear	1,265.0-1,280.0
Halite, clear; trace of polyhalite	1,280.0-1,300.0
Halite, clear; trace of reddish-orange polyhalite	1,300.0-1,375.0
Halite, clear; very sparse traces of polyhalite	1,375.0-1,400.0
Halite, clear; trace of reddish-orange polyhalite	1,400.0-1,480.0
Halite, clear, very fine crystalline	1,480.0-1,495.0
Halite, clear; trace of moderate-reddish-orange polyhalite	1,495.0-1,500.0
Halite, clear, very fine crystalline; trace of moderate-reddish-orange polyhalite	1,500.0-1,510.0

Table 21C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to moderate-orange-pink and pale-red, medium to coarse crystalline; minor amount of moderate-orange-pink polyhalite blebs; polyhalite band at 1,511.8 feet	1,510.0-1,512.1
Anhydrite and polyhalite mixture, moderate-orange-pink and greenish-gray, dense, massive; minor disseminated clear crystalline halite; clear medium crystalline halite zone from 1,513.7 to 1,514.1 feet; greenish-gray clay parting at base of unit	1,512.1-1,514.7
Halite, clear to moderate-orange-pink and greenish-gray, medium to coarse crystalline; greenish-gray interstitial clay in upper 1.0 foot of unit; minor disseminated grayish-orange-pink polyhalite	1,514.7-1,518.8
Halite, clear to moderate-reddish-orange, fine to medium crystalline	1,518.8-1,519.8
Halite, clear to grayish-red, fine crystalline, argillaceous; abundant grayish-red interstitial clay throughout unit; grayish-red clay parting at 1,520.7 feet	1,519.8-1,521.4
Siltstone, grayish-red, clayey; minor disseminated clear, fine to medium crystalline halite	1,521.4-1,526.1
Halite, clear to grayish-red fine to coarse crystalline; moderate amount of grayish-red interstitial clay; minor amount of moderate-reddish-orange polyhalite blebs; 0.1 foot thick grayish-red clay seam at base of unit	1,526.1-1,527.7
Halite, clear to moderate-orange-pink, moderate-reddish-orange and grayish-red, fine to coarse crystalline; minor to moderate-grayish-red interstitial clay; minor greenish-gray interstitial clay; sparse moderate-orange-pink polyhalite blebs; grayish-red clay parting at 1,529.4 feet; greenish-gray clay parting at 1,530.2 feet	1,527.7-1,531.6
Halite, clear to pale-reddish-brown, coarse crystalline; minor to moderate amount of moderate-reddish-orange to pale-reddish-brown polyhalite blebs and stringers, decreasing toward base; 0.2 foot thick pale-reddish-brown polyhalite band at 1,535.4 feet; trace of greenish-gray clay	1,531.6-1,537.3
Halite, clear to grayish-red, medium to coarse crystalline; minor grayish-red and greenish-gray interstitial clay; sparse moderate-reddish-orange polyhalite blebs	1,537.3-1,538.5
Halite, clear to moderate-orange-pink to moderate-reddish-orange, medium crystalline; minor amount of moderate-reddish-orange to pale-reddish-brown polyhalite blebs	1,538.5-1,539.4

Table 21C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to pale-red to grayish-red, medium to coarse crystalline; moderate amount of grayish-red interstitial clay in lower 0.5 foot of unit; grayish-red clay seam at base of unit; trace of moderate-orange-pink to moderate-reddish-orange polyhalite blebs	1,539.4-1,540.7
Halite, clear to grayish-red, fine to medium crystalline; minor grayish-red and greenish-gray interstitial clay; minor amount of moderate-reddish-orange polyhalite blebs	1,540.7-1,543.1
Halite, clear to moderate-orange-pink to moderate-reddish-orange, medium to coarse crystalline; minor amount of moderate-orange-pink to moderate-reddish-orange polyhalite blebs and stringers	1,543.1-1,551.3
Halite, clear to grayish-red, fine crystalline, argillaceous; abundant grayish-red interstitial clay	1,551.3-1,552.8
Halite, clear to pale-reddish-brown, pale-red and grayish-red; moderate amount of grayish-red and greenish-gray interstitial clay; minor amount of moderate-reddish-brown and moderate-reddish-orange polyhalite blebs; 0.1 foot thick polyhalite band at 1,554.4 feet; grayish-red clay parting at 1,554.3 feet	1,552.8-1,556.2
Halite, clear to pale-reddish-brown, fine to medium crystalline; minor amount of moderate-reddish-orange to pale-reddish-brown polyhalite blebs; 0.2 foot thick pale-reddish-brown polyhalite band at 1,557.9 feet	1,556.2-1,558.5
Halite, clear to moderate-orange-pink and grayish-red, fine to medium crystalline; minor grayish-red and greenish-gray interstitial clay; sparse moderate-reddish-orange polyhalite blebs	1,558.5-1,559.4
Halite, clear to moderate-reddish-orange, fine crystalline; minor finely disseminated moderate-reddish-orange polyhalite blebs	1,559.4-1,560.3
Halite, clear to greenish-gray and grayish-red, fine to medium crystalline, argillaceous; abundant greenish-gray and grayish-red interstitial clay, decreasing toward base; grayish-red clay parting at 1,562.3 feet and at base	1,560.3-1,563.1
Halite, clear to grayish-red and greenish-gray, fine to coarse crystalline; minor to moderate-greenish-gray and grayish-red interstitial clay; minor to moderate disseminated moderate-reddish-orange to pale-reddish-brown polyhalite blebs and stringers; greenish-gray clay parting at 1,566.0 feet	1,563.1-1,568.9
Halite, clear to moderate-orange-pink to pale-red, medium to coarse crystalline; minor amount of moderate-reddish-orange polyhalite blebs-	1,568.9-1,570.2

Table 21C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear to moderate-reddish-orange and greenish-gray, fine to medium crystalline; minor greenish-gray interstitial clay; sparse moderate-orange-pink polyhalite blebs; minor to heavy disseminated sylvite and potassium sulfate mineralization, increasing toward base--	1,570.2-1,574.3
Halite, clear to greenish-gray to dark-reddish-brown, fine to medium crystalline; moderate amount of greenish-gray and grayish-red interstitial clay; minor disseminated sylvite(?) mineralization---	1,574.3-1,578.3
Halite, moderate-reddish-brown and mottled pale-yellowish-brown, fine to medium crystalline; moderate amount of reddish-brown polyhalite blebs and grayish-green intercrystalline clay----------	1,578.3-1,579.1
Halite, pale-red and pale-reddish-brown, medium crystalline; moderate amount of reddish-brown polyhalite stringers and minor sylvite scattered throughout core----------	1,579.1-1,583.4
Halite, pale-red and moderate-reddish-orange, fine to medium crystalline; minor amount of reddish-brown polyhalite stringers and sylvite----------	1,583.4-1,585.6
Halite, pale-reddish-brown and moderate-reddish-brown, medium crystalline, bands and stringers of polyhalite; moderate amount of sylvite in center of unit----------	1,585.6-1,586.4
Polyhalite, moderate-reddish-brown, dense; minor halite bands; possible very minor sylvite----------	1,586.4-1,588.2
Clay, grayish-green----------	1,588.2-1,588.3
Halite, pale-reddish-brown and pale-red, medium crystalline; minor polyhalite stringers----------	1,588.3-1,589.7
Halite, grayish-green, medium crystalline, argillaceous----------	1,589.7-1,590.4
Halite, pale-red and pale-reddish-brown, medium crystalline; very minor polyhalite stringers----------	1,590.4-1,591.1
Halite, grayish-red and pale-reddish-brown, medium to coarse crystalline; minor polyhalite stringers and very minor sylvite--------	1,591.1-1,591.9
Halite, grayish-green and grayish-red, fine to very coarse crystalline, argillaceous; minor sylvite----------	1,591.9-1,592.5
Halite, grayish-red and dark-reddish-brown, very coarse crystalline; minor grayish-green clay and sylvite----------	1,592.5-1,594.0
Halite, pale-red and pale-reddish-brown, fine to medium crystalline; very minor sylvite----------	1,594.0-1,594.6
Halite, grayish-green and medium-gray, fine to medium crystalline, argillaceous; moderate amount of sylvite in upper part, argillaceous in lower part----------	1,594.6-1,595.0

Table 21C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-reddish-brown and moderate-reddish-orange, medium crystalline; minor amount of sylvite	1,595.0-1,596.1
Halite, pale-red and grayish-red, fine crystalline, grading downward to coarse crystalline, argillaceous; minor reddish-brown polyhalite blebs; grayish-green clay in upper 0.5 foot, brown clay below	1,596.1-1,599.9
Halite, grayish-red and pale-red, medium to coarse crystalline; moderate amount of brown intercrystalline clay; very minor sylvite	1,599.9-1,601.2
Halite, pale-red and grayish-red, fine to medium crystalline; minor sylvite	1,601.2-1,601.7
Halite, grayish-red and clear, medium crystalline; minor polyhalite stringers; brown clay partings at 1,602.3 and 1,602.4 feet	1,601.7-1,603.4
Halite, polyhalitic, grayish-red and moderate-reddish-brown, fine to medium crystalline; polyhalite content increases downward	1,603.4-1,604.1
Halite, grayish-red, pale-red and grayish-green, fine to medium crystalline, argillaceous; brown intercrystalline clay; minor sylvite	1,604.1-1,606.3
Halite, pale-red, pale-reddish-brown, fine to medium crystalline; minor reddish-brown intercrystalline clay; very minor sylvite; minor amount of moderate-reddish-orange polyhalite bands	1,606.3-1,610.0
Polyhalite, moderate-reddish-brown; halite crystals in polyhalite; grayish-green clay seam at base	1,610.0-1,611.0
Halite, pale-red and light-brown, medium to coarse crystalline; minor amount of sylvite	1,611.0-1,613.8
Halite, grayish-red, pale-red, fine to medium crystalline, slightly argillaceous; brown intercrystalline clay; very minor sylvite	1,613.8-1,614.9
Halite, grayish-red, pale-red, fine to coarse crystalline; polyhalite band at top of unit and also at bottom of unit; minor sylvite	1,614.9-1,616.7
Polyhalite, moderate-reddish-brown, dense	1,616.7-1,617.1
Halite, moderate-reddish-orange, fine crystalline	1,617.1-1,617.6
Halite, grayish-green, pale-red, clear, fine crystalline, argillaceous; very minor sylvite	1,617.6-1,618.5
Halite, grayish-red, pale-red, medium to coarse crystalline; moderate amount of polyhalite stringers; minor sylvite	1,618.5-1,620.1
Halite, moderate-reddish-orange, moderate-reddish-brown, coarse crystalline; polyhalitic	1,620.1-1,620.7
Halite, pale-red, brown, fine to medium crystalline, argillaceous; grayish-green clay streak in upper 0.2 foot; brown clay seams at 1,620.2, 1,620.8, and 1,622.0 feet	1,620.7-1,623.6

Table 210.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, polyhalitic, moderate-reddish-brown, grayish-red, fine to medium crystalline	1,623.6-1,624.9
Halite, moderate-reddish-brown, pale-reddish-brown, coarse crystalline; moderate amount of moderate-reddish-brown polyhalite stringers and blebs; few minor grayish-green clay partings	1,624.9-1,629.7
Polyhalite, moderate-reddish-brown; numerous halite stringers	1,629.7-1,630.1
Halite, pale-red, pale-reddish-brown, fine to coarse crystalline; numerous polyhalite bands and blebs	1,630.1-1,632.2
Halite, moderate-reddish-brown, pale-red, medium crystalline; polyhalitic near base	1,632.2-1,632.9
Polyhalite, moderate-reddish-brown, dense	1,632.9-1,633.7
Polyhalite, moderate-reddish-brown, argillaceous; grayish-green clay	1,633.7-1,634.1
Halite, moderate-reddish-orange, pale-red, fine crystalline	1,634.1-1,634.5
Halite, pale-red, grayish-red, fine to medium crystalline; minor reddish-brown polyhalite blebs; brown clay	1,634.5-1,635.9
Halite, moderate-reddish-brown, pale-red, very fine crystalline, polyhalitic	1,635.9-1,636.2
Halite, pale-red, moderate-reddish-brown, clear, fine to medium crystalline; minor amount of sylvite	1,636.2-1,638.2
Halite, grayish-red, moderate-red, fine to medium crystalline, argillaceous; minor reddish-brown polyhalite stringers; brown clay stringer	1,638.2-1,638.9
Halite, moderate-reddish-orange, pale-red, fine to medium crystalline; minor reddish-brown polyhalite stringers	1,638.9-1,639.4
Halite, grayish-red, grayish-green, fine to medium crystalline, argillaceous	1,639.4-1,639.9
Halite, moderate-reddish-brown grading downward to clear and pale-red, fine to medium crystalline; moderate amount of reddish-brown polyhalite in upper 1.0 foot	1,639.9-1,643.4
Halite, grayish-red, clear, fine to medium crystalline; moderate amount of reddish-brown polyhalite stringers	1,643.4-1,644.0
Halite, greenish-black, grayish-red, fine to medium crystalline, argillaceous; minor amount of sylvite	1,644.0-1,644.5
Halite, grayish-red, pale-red, fine crystalline; moderate amount of sylvite	1,644.5-1,645.0
Halite, moderate-reddish-brown, coarse crystalline; moderate amount of sylvite	1,645.0-1,646.2

Table 21C.—Lithologic log—(Continued)

Description	Depth (feet)
Halite, moderate-reddish-brown, pale-red, very fine crystalline, argillaceous; moderate to heavy intercrystalline grayish-green clay; moderate to heavy sylvite	1,646.2-1,649.2
Halite, pale-red, dark-reddish-brown, medium to coarse crystalline; minor grayish-green intercrystalline clay; moderate sylvite	1,649.2-1,650.3
Halite, pale-red, clear, grayish-red, fine to medium crystalline; minor to moderate amount of sylvite	1,650.3-1,655.1
Polyhalite, moderate-reddish-brown, moderate-reddish-orange, dense; stringers and blebs of halite; stringers of sylvite and bladed crystals of anhydrite throughout	1,655.1-1,656.0
Halite, grayish-red, dark-reddish-brown, minor amount of pale-red, fine crystalline; grayish-green clay seams at 1,656.2 and 1,656.7 feet; lower three-fourths of zone contains large amount of carnallite	1,656.0-1,657.8
Halite, pale-red and moderate-reddish-orange, fine to medium crystalline; moderate amount of sylvite and carnallite	1,657.8-1,660.6
Halite, pale-red and grayish-red, fine to medium crystalline, argillaceous; moderate amount of carnallite	1,660.6-1,661.9
Halite, pale-red to light-brown, medium to coarse crystalline, argillaceous; moderate amount of grayish-green intercrystalline clay; minor pale-reddish-orange polyhalite blebs; very minor sylvite	1,661.9-1,667.5
Halite, pale-brown to pale-reddish-brown, coarse crystalline; minor intercrystalline grayish-green clay; moderate amount of reddish-brown sylvite blebs	1,667.5-1,668.7
Halite, pale-reddish-orange to light-brown, coarse crystalline; moderate amount of sylvite	1,668.7-1,673.2
Polyhalite, moderate-reddish-brown, dense; light-gray anhydrite bands; minor halite; gray clay partings at 1,674.8 and 1,674.9 feet	1,673.2-1,674.9
Halite, moderate-reddish-orange, medium to coarse crystalline; pale-reddish-orange polyhalite stringers and minor disseminated sylvite	1,674.9-1,681.1
Polyhalite, light-grayish-brown, dense	1,681.1-1,681.6
Halite, pale-reddish-orange, medium crystalline; moderate amount of brownish-gray polyhalite bands and blebs; very minor sylvite in lower 0.6 foot	1,681.6-1,683.3
Halite, light-brownish-gray, medium crystalline, argillaceous; gray clay parting at 1,683.5 feet	1,683.3-1,683.6

Table 21C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-reddish-orange to light-brown, medium crystalline; brown clay parting at 1,684.1 feet; minor sylvite, increasing to moderate with depth	1,683.6-1,686.4
Halite, greenish-gray, medium crystalline, argillaceous; minor sylvite; gray clay partings at 1,686.7 and 1,686.8 feet	1,686.4-1,687.0
Halite, moderate-orange-pink to moderate-reddish-orange, medium crystalline; moderate amount of sylvite; indistinct grayish-green clay zones	1,687.0-1,688.5
Halite, light-brown, medium crystalline; moderate amount of disseminated sylvite	1,688.5-1,691.6
Halite, pale-red, coarse to very coarse crystalline; abundant sylvite; excellent euhedral halite	1,691.6-1,692.5
Halite, clear, grayish-red, medium to coarse crystalline, argillaceous; minor amounts of sylvite; disseminated grayish-green clay partings at 1,692.7 and 1,693.0 feet; brown clay partings at 1,694.0, 1,694.6, 1,694.9, and 1,695.3 feet; minor disseminated moderate-reddish-orange polyhalite	1,692.5-1,695.3
Halite, pale-red, moderate-reddish-orange, moderate-orange-pink, fine to medium crystalline, argillaceous, top half; polyhalite in lower half; disseminated brown interstitial clay	1,695.3-1,696.8
Halite, grayish-red, pale-red, coarse to very coarse crystalline; minor amounts of brown interstitial clay; minor amounts of moderate-reddish-orange polyhalite stringers	1,696.8-1,697.4
Halite, pale-red, clear, pale-reddish-brown, fine to medium crystalline; moderate amount of brown interstitial clay	1,697.4-1,698.0
Halite, pale-red, greenish-gray, pale-yellowish-brown, fine to medium crystalline, argillaceous; grayish-green clay parting at 1,699.3 and 1,699.7; minor amounts of disseminated sylvite	1,698.0-1,701.0
Halite, pale-yellowish-brown, moderate-reddish-brown, medium to coarse crystalline, slightly argillaceous; minor amount of disseminated sylvite	1,701.0-1,702.1
Halite, dark-reddish-brown, pale-yellowish-brown, medium crystalline; moderate-reddish-brown polyhalite band at top of unit; moderate amount of disseminated polyhalite; minor disseminated sylvite; trace of sulfates	1,702.1-1,703.5
Anhydrite, light-gray, dense, laminated; polyhalite in upper and lower 2.0 feet	1,703.5-1,710.3

Table 21C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, dark-reddish-brown, pale-red, coarse crystalline; minor disseminated polyhalite; moderate amount of disseminated sylvite------	1,710.3-1,712.1
Halite, pale-red, fine to medium crystalline, argillaceous; grayish-green clay seams 1,712.2 and 1,712.5 feet----------	1,712.1-1,712.7
Halite, moderate-reddish-orange, pale-red, and moderate-reddish-brown, fine to coarse crystalline; bands of clear, very coarse crystalline halite; grayish-green clay parting at 1,713.2 feet; very minor disseminated sylvite----------	1,712.7-1,719.3
Halite, grayish-red and white, fine to medium crystalline, argillaceous; grayish-green clay parting at top; brown clay parting at base---------	1,719.8-1,720.2
Halite, pale-red and grayish-red, fine to coarse crystalline; moderate amount of grayish-green and brown intercrystalline clay; minor reddish-brown polyhalite stringers----------	1,720.2-1,722.6
Halite, pale-red and moderate-red, medium crystalline; moderate amount of reddish-brown polyhalite stringers; very minor disseminated sylvite	1,722.6-1,723.5
Halite, grayish-green and moderate-reddish-brown, fine to medium crystalline, argillaceous; greenish-black clay parting at 1,723.9 feet; minor reddish-brown polyhalite stringers----------	1,723.5-1,723.9
Halite, grayish-green and moderate-reddish-brown and pale-red, fine to medium crystalline; moderate amount grayish-green intercrystalline clay; minor reddish-brown polyhalite blebs----------	1,723.9-1,724.9
Halite, pale-red and grayish-green, fine to medium crystalline; moderate amount of grayish-green intercrystalline clay; moderate amount of reddish-brown polyhalite stringers----------	1,724.9-1,725.7
Halite, moderate-reddish-brown, medium crystalline; minor intergranular clay; minor intergranular polyhalite; brown clay partings at 1,725.8, 1,726.4, 1,726.6, and 1,726.8 feet----------	1,725.7-1,728.0
Halite, light-brown to moderate-reddish-orange, fine to medium crystalline, clayey; minor reddish-brown polyhalite blebs in center of unit----------	1,728.0-1,730.6
Halite, moderate-reddish-orange to moderate-reddish-brown to pale-red, medium to coarse crystalline; moderate amounts of reddish-brown polyhalite blebs and stringers; very minor gray intergranular clay----	1,730.6-1,735.3
Halite, moderate-reddish-orange, fine to coarse crystalline; moderate amounts of reddish-brown polyhalite----------	1,73[illegible].3-1,737.4
Halite, pale-red, coarse crystalline; moderate amounts of brown intergranular clay; gray clay parting at base----------	1,737.4-1,738.0

Table 21C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, moderate-reddish-orange to pale-red, fine to very coarse crystalline; minor amounts of grayish-green intergranular clay; gray clay parting at 1,739.0 feet; minor sylvite throughout	1,738.0-1,739.0
Halite, moderate-orange-pink, coarse crystalline; very minor disseminated reddish-orange polyhalite throughout	1,739.0-1,744.2
Halite, pale-red, mottled, medium to coarse crystalline, clayey; moderate intergranular brown clay; minor amount of moderate-reddish-orange polyhalite blebs, increasing toward base	1,744.2-1,746.5
Halite, moderate-reddish-orange, coarse crystalline; minor reddish-orange polyhalite, disseminated and as blebs	1,746.5-1,749.2
Halite, grayish-orange-pink, coarse crystalline; very minor reddish-orange polyhalite blebs	1,749.2-1,750.0
Halite, pale-red, mottled, medium to coarse crystalline; moderate amounts of brown clay; minor scattered reddish-orange polyhalite blebs; very minor sylvite, kainite, and langbeinite	1,750.0-1,757.9
Halite, moderate-orange-pink, coarse crystalline; very minor reddish-orange polyhalite blebs	1,757.9-1,759.3
Halite, moderate-reddish-brown, medium to coarse crystalline; polyhalitic; common reddish-brown polyhalite bands, blebs, and stringers	1,759.3-1,761.0
Halite, moderate-reddish-orange, medium to coarse crystalline; moderate-reddish-orange polyhalite stringers and blebs, increasing at base	1,761.0-1,763.5
Halite, pale-red to light-gray to pale-reddish-orange, medium to coarse crystalline, clayey; moderate amounts of grayish-green intergranular clay; minor reddish-orange polyhalite blebs; grayish-green clay parting at base	1,763.5-1,769.4
Halite, pale-red and light-brown, coarse to very coarse crystalline; minor to moderate scattered reddish-brown to reddish-orange polyhalite blebs and stringers; minor grayish-green intergranular clay	1,769.4-1,774.3
Halite, light-brown to moderate-orange-pink, fine to medium crystalline; minor reddish-orange polyhalite blebs and stringers; grayish-green clay parting at 1,775.6 feet	1,774.3-1,776.0
Halite, moderate-pink-orange to pale-yellowish-brown, coarse crystalline; moderate to heavy reddish-brown polyhalite blebs and stringers; minor grayish-green clay; zones of clear, very coarse crystalline halite	1,776.0-1,780.4

Table 21C.--Lithologic log--(Continued)

Description	Depth (feet)
Anhydrite, light-gray, dense, laminated; banded, light-gray polyhalite, grading into halite at top and bottom of unit	1,780.4-1,788.5
Halite, light-grayish-orange-pink to yellowish-gray, medium to coarse crystalline; light-gray polyhalite bands and stringers; grading into underlying unit	1,788.5-1,790.8
Halite, moderate-reddish-orange, medium crystalline; light-gray polyhalite bands and stringers; disseminated reddish-orange polyhalite	1,790.8-1,793.0
Polyhalite and anhydrite, light- to medium-gray; polyhalite, dense; laminated anhydrite; moderate-reddish-brown polyhalite in lower 0.6 foot; secondary crystalline halite	1,793.0-1,799.7
Polyhalite, moderate-reddish-brown, clayey; grayish-green clay; clay seam at top and at 1,800.6-1,800.8 feet	1,799.7-1,801.6
Halite, moderate-reddish-brown and pale-red, fine to coarse crystalline; trace of sylvite	1,801.6-1,803.8
Halite, pale-yellowish-brown with bands and streaks of reddish-brown polyhalite, medium crystalline; polyhalite band at base	1,803.8-1,809.3
Halite, greenish-gray and pale-red, fine crystalline, argillaceous; greenish-gray clay parting at 1,809.4 feet	1,809.3-1,809.6
Halite, moderate-reddish-orange, fine crystalline	1,809.6-1,809.9
Halite, pale-yellowish-brown and pale-red, fine crystalline, argillaceous; moderate amount of disseminated langbeinite	1,809.9-1,812.5
Halite, pale-red and clear, fine to medium crystalline	1,812.5-1,813.1
Halite, moderate-reddish-brown, pale-red and moderate-reddish-orange, fine to coarse crystalline; moderate amount of reddish-brown polyhalite stringers	1,813.1-1,814.1
Halite, pale-red and pale-yellowish-brown, fine to medium crystalline; moderate amount of reddish-brown and reddish-orange polyhalite stringers; very minor amount light-brown clay	1,814.1-1,814.7
Halite, moderate-reddish-orange and pale-red, fine to medium crystalline; disseminated langbeinite, increases downward from sparse to heavy; moderate amount of moderate-reddish-orange polyhalite stringers; minor grayish-green clay in bands	1,814.7-1,817.2
Halite, pale-brown and pale-red, fine crystalline, argillaceous; moderately heavy langbeinite	1,817.2-1,818.1
Halite, pale-red, pale-yellowish-brown, fine crystalline; moderate amount of reddish-brown polyhalite stringers; minor disseminated langbeinite	1,818.1-1,819.9

Table 21C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red and dark-reddish-brown, fine to medium crystalline, argillaceous; reddish-brown intercrystalline clay; moderate amount of disseminated langbeinite	1,819.9-1,820.5
Halite, pale-red, grading downward to moderate-reddish-brown and pale-red, fine to medium crystalline, slightly clayey in upper half; polyhalite stringers throughout unit	1,820.5-1,821.7
Halite, pale-red and pale-yellowish-brown, fine to medium crystalline, moderately argillaceous; brown clay parting at 1,822.1 feet	1,821.7-1,825.6
Halite, moderate-reddish-orange and pale-red, fine to medium crystalline; minor polyhalite stringers; trace of clay	1,825.6-1,827.1
Halite, pale-red and moderate-reddish-brown, fine to medium crystalline; minor reddish-brown polyhalite stringers; scattered sulfates; clear halite at 1,830.8-1,831.2 feet	1,827.1-1,832.0
Halite, grayish-red and medium-gray, fine crystalline, argillaceous; disseminated minor sulfates	1,832.0-1,833.8
Halite, pale-red to moderate-reddish-brown and clear, fine to medium crystalline; moderate amount of moderate-reddish-brown polyhalite stringers and blebs; minor grayish-green clay zones in lower 4.0 feet of unit; minor disseminated sulfates from 1,836.3 to 1,837.2 feet	1,833.8-1,839.1
Sulfates, massive (langbeinite and kainite)	1,839.1-1,839.3
Halite, grayish-green, pale-red, grayish-orange-pink, coarse crystalline, argillaceous; grayish-green clay at 1,840.0 feet; brown clay seam at base	1,839.3-1,841.8
Halite, pale-red, moderate-reddish-orange, clear; moderate amount of reddish-brown polyhalite stringers; minor amount of reddish-brown clay; reddish-brown clay seam at base	1,841.8-1,844.2
Halite, moderate-reddish-brown, pale-red, clear, medium to coarse crystalline; moderate amount of moderate-reddish-brown polyhalite stringers	1,844.2-1,851.9
Clay, moderate-reddish-brown, halitic	1,851.9-1,852.8
Halite, grayish-red, pale-red, clear, fine to coarse crystalline, argillaceous; minor reddish-brown polyhalite blebs; trace of sylvite; brown clay parting at top of zone	1,852.8-1,861.3
Halite, pale-red, clear, fine to coarse crystalline; minor amount of moderate-reddish-brown polyhalite stringers	1,861.3-1,863.3

Table 21C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, pale-red, clear, grayish-red, greenish-gray, mottled, fine to medium crystalline; minor reddish-brown polyhalite stringers; brown clay partings at 1,866.7, 1,876.5, 1,876.0, and 1,873.9 feet; grayish-green clay partings at 1,866.4, 1,867.3, and 1,878.3 feet	1,863.8-1,878.6
Halite, clear, pale-red, medium to coarse crystalline; reddish-brown polyhalite blebs at base of unit; minor grayish-green intercrystalline clay	1,878.6-1,880.3
Halite, grayish-red, pale-red, medium to coarse crystalline, polyhalitic; reddish-brown polyhalite stringers increase from moderate to heavy at base	1,880.3-1,882.6
Polyhalite, moderate-reddish-brown, massive; contains moderate amount of reddish-brown clay	1,882.6-1,882.8
Halite, pale-red, grayish-red, fine to medium crystalline	1,882.8-1,883.1
Halite, pale-red, clear, fine crystalline, polyhalitic; moderate amount of reddish-brown clay; brown clay parting at 1,884.1 feet; much moderate-reddish-orange polyhalite in stringers and bands	1,883.1-1,885.2
Halite, pale-red, coarse crystalline; minor amount of reddish-brown clay streaks and blebs; minor amount of moderate-reddish-orange polyhalite blebs at base of unit	1,885.2-1,887.0
Halite, clear, medium to coarse crystalline; minor amount of moderate-reddish-orange polyhalite blebs; brown clay parting at base of unit	1,887.0-1,888.2
Halite, light-brown, pale-yellowish-brown, fine crystalline; moderate amount of brown intercrystalline clay	1,888.2-1,888.9
Halite, clear, pale-red, fine crystalline; minor reddish-brown polyhalite blebs	1,888.9-1,889.1
Halite, grayish-red, pale-red, clear, fine to medium crystalline; minor reddish-brown polyhalite blebs; moderate amount of reddish-brown intercrystalline clay	1,889.1-1,893.6
Halite, pale-red, moderate-reddish-orange, clear, fine crystalline; minor amount of reddish-brown polyhalite blebs and stringers; minor amount of grayish-green clay	1,893.6-1,895.6
Halite, grayish-red, clear, pale-yellowish-brown, very fine to fine crystalline; very minor amount of moderate-reddish-orange polyhalite blebs; moderate amount of brown intercrystalline clay; brown clay partings at top and at 1,896.0 feet	1,895.6-1,897.1
Halite, grayish-red, argillaceous; minor amount of moderate-reddish-brown polyhalite blebs; brown clay partings at 1,898.0 and 1,899.2 feet	1,897.1-1,901.6

Table 21C.--Lithologic log--(Continued)

Description	Depth (feet)
Halite, clear, moderate-reddish-orange, fine to medium crystalline; moderate amount of reddish-orange and reddish-brown polyhalite stringers and blebs	1,901.6-1,906.5
Polyhalite, medium-gray, dense; pale-yellowish-brown halite band at 1,906.6-1,906.8 feet	1,906.5-1,907.2
Halite, clear, pale-yellowish-brown, coarse crystalline; one minor stringer of moderate-reddish-orange polyhalite	1,907.2-1,908.2
Halite, pale-red, clear, coarse crystalline; 0.1 foot thick polyhalite band at top; grayish-green clay seam at 1,908.5-1,908.6 feet; moderate amount of polyhalite stringers and blebs	1,908.2-1,910.0
Halite, clear, medium to coarse crystalline	1,910.0-1,910.8
Halite, pale-red, clear, moderate-reddish-brown, fine crystalline; moderate amount of reddish-orange and reddish-brown polyhalite blebs and stringers	1,910.8-1,912.6
Halite, clear, moderate-reddish-orange, coarse crystalline; minor disseminated moderate-reddish-orange polyhalite blebs and stringers; clear halite zone at 1,913.9-1,914.4 feet	1,912.6-1,915.8
Polyhalite, moderate-reddish-orange to moderate-reddish-brown, dense; some stringers of crystalline halite	1,915.8-1,916.5
	Total depth

Table 21D.--Mineralogical and chemical analyses of [illegible] samples from potash ore zones and mineralized salt beds in drill hole P[illegible]

[oz, ore zone; um, upper member; mm, middle member; lm, lower member; sb, salt bed; tr, trace; Bl, bloedite; Ca, carnallite; Ha, halite; Ka, kainite; Kl, kieserite; La, langbeinite; Le, leonite; Lo, loeweite; Po, polyhalite; Sy, sylvite; n.d., not determined. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mineralogy: X-ray diffraction analysis[1]	Chemical analysis (weight percent): Ca	K	Mg	Na	Cl	SO_4	H_2O+	H_2O-	Water insoluble
P-21/1	1,643.20-1,644.03	0.83	sb	8 Ha; 1 Sy; tr Kl, Po	1.3	4.0	0.43	35.0	n.d.	3.1	n.d.	n.d.	n.d.
[2]P-21/2	1,644.03-1,644.84	.81	10th oz	>7 Ha; 2 Sy; tr Po	.49	9.8	.36	32.0	53.5	1.3	0.52	0.62	2.0
[2]P-21/2					.49	9.8	.36	31.5	54.0	1.3	.53	.62	2.0
P-21/3	1,644.84-1,646.00	1.16		>7 Ha; 2 Sy; <1 Kl; tr Po	.54	7.2	1.2	32.0	53.5	5.5	.33	.08	.32
P-21/4	1,646.00-1,646.33	.33		3 Ha; >3 Sy, Kl; <1 Ka	.15	11.5	8.2	11.0	27.5	31.0	2.5	.21	5.4
P-21/5	1,646.33-1,647.20	.87		5 Ha; >3 Sy; <1 Ka, Kl	.10	14.5	3.7	16.0	35.0	12.5	4.8	2.20	9.4
[2]P-21/6	1,647.20-1,648.22	1.02		>5 Ha; 4 Sy; tr Po	.19	16.5	.57	24.5	51.0	.49	.78	1.5	5.9
[2]P-21/6					.22	16.5	.57	24.5	52.0	.51	.75	1.5	6.0
P-21/7	1,648.22-1,649.23	1.01		>5 Ha; >4 Sy; tr Po	.39	17.5	.54	25.0	52.0	.77	[illegible]	1.3	3.5
P-21/8	1,649.23-1,650.08	.85	sb	>8 Ha; <1 Sy; tr Po, Kl	.77	2.8	.66	36.0	56.5	1.7	.65	1.2	.64
P-21/9	1,657.97-1,659.07	1.10	sb	>8 Ha; <1 Sy; tr Kl	.66	3.6	.69	35.0	57.0	1.4	2.0	1.4	.16
[2]P-21/10	1,659.07-1,660.55	1.48		>8 Ha; 1 Ca; tr Po, Sy	.64	4.0	1.9	31.0	53.0	1.6	4.1	4.0	.15
[2]P-21/10					.63	4.4	1.9	31.0	52.5	1.5	3.9	4.2	.10
P-21/11	1,660.55-1,660.97	.42		6 Ha; 2 Ca; >1 Sy; tr Po	.18	10.0	3.2	23.0	51.5	.26	8.6	5.4	.08
P-21/12	1,660.97-1,662.01	1.04	9th oz	6 Ha; 2 Ca; >1 Sy; tr Po	.27	10.0	2.7	22.0	48.5	.49	6.6	5.7	2.4
P-21/13	1,662.01-1,662.97	.96		>8 Ha; <1 Ca; [illegible], Sy	.04	2.0	1.0	33.0	53.0	.06	1.8	3.1	3.9
P-21/14	1,684.27-1,685.17	.90	sb	>9 Ha; tr Po, Sy	.31	.20	.09	39.0	60.0	.67	.21	.10	.44
P-21/15	1,685.17-1,686.48	1.31		5 Ha; >4 Sy; tr Po	.05	25.0	.3	22.0	53.5	.13	.13	.05	.75
[2]P-21/16	1,686.48-1,687.20	.72	8th oz	>7 Ha; >1 Sy; <1 Po	.52	4.0	.41	32.5	53.0	1.5	.82	1.1	6.2
[2]P-21/16					.57	4.5	.43	33.0	53.5	1.3	.76	1.1	6.2
P-21/17	1,687.20-1,688.24	1.04		9 Ha; <1 Po, Sy	.67	2.2	.16	36.0	57.5	.25	.33	.06	.20
P-21/18	1,688.24-1,688.77	.53		9 Ha; <1 Po, Sy	.57	1.0	.18	37.5	56.5	1.4	.43	.21	1.0
[2]P-21/19	1,688.77-1,690.19	1.42		>8 Ha; >1 Sy; <1 Po	.77	5.8	.15	34.0	56.0	.29	.20	.07	.10
[2]P-21/19					.77	5.2	.18	35.0	54.0	1.7	.19	.17	.08
P-21/20	1,690.19-1,691.26	1.07		9 Ha; <1 Po, Sy	1.0	1.6	.18	37.5	56.5	2.3	.24	.10	.10
[2]P-21/21	1,691.26-1,692.40	1.14		6 Ha; >3 Sy; <1 Po	.42	18.0	.14	25.5	53.5	1.1	.08	.26	1.6
[2]P-21/21					.42	18.0	.14	25.5	53.5	1.0	.09	.24	1.6
P-21/22	1,692.40-1,693.34	.94		>6 Ha; >2 Sy; 1 Po	.63	8.0	.56	25.5	47.0	1.6	.91	2.4	12.8
P-21/23	1,809.07-1,809.90	.83	4th oz, um	>8 Ha; 1 Po; tr Sy, Le	1.0	.8[illegible]	.44	32.0	51.0	4.4	.70	.28	8.4
[2]P-21/24	1,809.90-1,811.50	1.60	4th oz, mm	>4 Ha; >5 La; tr Le, Ka	.03	14.0	8.3	11.5	19.5	47.0	1.1	.29	1.1
[2]P-21/24					.03	13.8	7.6	12.0	20.0	47.5	.60	.70	.88
P-21/25	1,811.50-1,811.82	.32	4th oz, lm	4 Ha, La; 1 Le, Ka	.01	15.0	7.6	7.0	13.0	44.5	5.9	1.3	5.9
P-21/26	1,811.82-1,812.50	.68		>8 Ha; tr Po, La, Ka	.02	.40	.53	29.0	48.0	1.3	1.2	1.6	15.7
P-21/27	1,812.50-1,813.10	.60	sb	>9 Ha; tr Po, La	.04	.12	.07	38.5	n.d.	.13	n.d.	n.d.	n.d.
P-21/28	1,813.10-1,814.25	1.15		>8 Ha; <1 Po; tr La, Le	1.2	1.0	.41	35.5	n.d.	5.3	n.d.	n.d.	n.d.
P-21/29	1,814.25-1,815.51	1.26		>9 Ha; <1 Po; tr La	1.04	.60	.42	36.0	n.d.	3.8	n.d.	n.d.	n.d.
[2]P-21/30	1,815.51-1,816.10	.59		>5 Ha; >1 Po; >2 La; 1 Ka; tr Le	1.4	8.8	5.1	20.0	32.5	30.5	2.5	.67	1.9
[2]P-21/30					1.4	8.8	5.1	20.0	33.0	30.0	2.6	.67	1.9
P-21/31	1,816.10-1,817.25	1.15	3d oz	5 Ha; >4 La; tr Po	.43	11.5	6.7	16.5	28.0	39.0	.35	.07	.32
P-21/32	1,817.25-1,818.21	.96		7 Ha; 2 Le; <1 Ka	.17	5.4	2.1	24.0	37.0	14.5	4.6	1.4	10.0
P-21/33	1,818.21-1,818.96	.75		9 Ha; <1 Po; tr La	.89	.40	.26	37.0	n.d.	2.6	n.d.	n.d.	n.d.
P-21/34	1,830.54-1,831.21	.67		9 Ha; <1 La; tr Po	.25	1.4	.95	36.0	n.d.	5.5	n.d.	n.d.	n.d.
[2]P-21/35	1,831.21-1,831.94	.73		>8 Ha; <1 Po; 1 La; tr Sy	.45	3.4	2.1	32.5	49.5	13.0	.17	.08	.29
[2]P-21/35					.45	3.4	2.1	31.0	48.5	12.5	.16	.08	.29
P-21/36	1,831.94-1,832.67	.73		8 Ha; <2 La; tr Po, Le, Ka	.13	3.8	2.1	30.0	46.5	13.5	1.0	.15	1.8
P-21/37	1,832.67-1,833.33	.66		9 Ha; <1 Po; tr La	.23	.20	.25	38.5	56.5	1.3	.30	.13	1.3
P-21/38	1,837.80-1,838.96	1.16	sb	>8 Ha; 1 La; tr Po	.31	.34	2.1	32.5	n.d.	12.5	n.d.	n.d.	n.d.
P-21/39	1,838.96-1,839.80	.84	2d oz	>3 Ha; >1 La; >4 Bl; tr Po, Lo	.05	3.4	6.5	17.0	15.0	46.0	8.1	5.6	.90
P-21/40	1,839.80-1,840.80	1.00		9 Ha; tr Po, La, Bl	.28	.64	.45	35.5	53.0	2.4	.89	.56	[illegible]

[1] Estimate of amount reported on a scale of 0-10.
[2] Replicate analyses.

Table 21E.--Calculated mode (mineral [illegible]) and potash distribution by mineral in core samples from potash ore zones and mineralized salt beds in drill hole P-21, Eddy County, New Mexico

[oz, ore zone; um, upper member; mm, middle member; lm, lower member; sb, salt bed, Bl, bloedite; Ca, carnallite; Ha, halite; Ka, kainite; Ki, kieserite; La, langbeinite; Le, leonite; Lo, loeweite; Po, polyhalite; Sy, sylvite; Insol., clay and silt; n.d., not determined; leaders (---), not present. To convert from English to metric units, multiply feet by 0.3048]

Sample No.	Depth interval (feet)	Thickness (feet)	Rock unit	Mode (weight percent mineral)											K_2O distribution by minerals						
				Sy	La	Ka	Le	Ca	Ki	Bl	Lo	Ha	Po	Insol.	Sy	La	Ka	Le	Ca	Po	Total
P-21/1	1,643.20-1,644.03	0.83	sb	6.9	---	---	---	---	1.8	---	---	89.0	2.9	n.d.	4.4	---	---	---	---	0.5	4.9
[1]P-21/2	1,644.03-1,644.84	.81	10th oz	18.2	---	---	---	---	---	---	---	73.9	2.0	2.0	11.5	---	---	---	---	.3	11.8
[1]P-21/2				18.2	---	---	---	---	---	---	---	74.8	2.0	2.0	11.5	---	---	---	---	.3	11.8
P-21/3	1,644.84-1,646.00	1.16		13.3	---	---	---	---	6.5	---	---	77.7	1.6	.3	8.4	---	---	---	---	.2	8.6
P-21/4	1,646.00-1,646.33	.33		19.1	---	8.6	---	---	38.8	---	---	28.0	1.1	5.4	12.1	---	1.6	---	---	.2	13.9
P-21/5	1,646.33-1,647.20	.87		24.2	---	11.6	---	---	11.2	---	---	40.7	.7	9.4	15.3	---	2.1	---	---	.1	17.5
[1]P-21/6	1,647.20-1,648.22	1.02		31.1	---	---	---	---	---	---	---	62.3	1.4	5.9	19.7	---	---	---	---	.2	19.9
[1]P-21/6				31.3	---	---	---	---	---	---	---	62.3	.8	6.0	19.7	---	---	---	---	.1	19.8
P-21/7	1,648.22-1,649.23	1.01		31.1	---	---	---	---	---	---	---	63.6	1.2	3.5	20.9	---	---	---	---	.2	21.1
P-21/8	1,649.23-1,650.08	.85	sb	4.9	---	---	---	---	.7	---	---	91.5	1.9	.6	3.1	---	---	---	---	.3	3.4
P-21/9	1,657.97-1,659.07	1.10	sb	6.5	---	---	---	---	.7	---	---	89.0	1.4	.2	4.1	---	---	---	---	.2	4.3
[1]P-21/10	1,659.07-1,660.55	1.48		4.2	---	---	---	10.5	---	---	---	78.8	2.5	.1	2.6	---	---	---	1.8	.4	4.8
[1]P-21/10				5.1	---	---	---	10.0	---	---	---	78.8	2.3	.1	3.2	---	---	---	1.7	.4	5.3
P-21/11	1,660.55-1,660.97	.42		13.1	---	---	---	22.1	---	---	---	60.7	.4	<.1	8.2	---	---	---	3.7	<.1	11.9
P-21/12	1,660.97-1,662.01	1.04	9th oz	14.3	---	---	---	16.9	---	---	---	58.0	.7	2.4	9.1	---	---	---	2.9	.1	12.1
P-21/13	1,662.01-1,662.97	.96		2.6	---	---	---	4.6	---	---	---	83.9	.1	3.9	1.6	---	---	---	.8	<.1	2.4
P-21/14	1,684.27-1,685.17	.90	sb	.1	---	---	---	---	---	---	---	99.1	1.0	.4	<.1	---	---	---	---	.2	.2
P-21/15	1,685.17-1,686.48	1.31		47.6	---	---	---	---	---	---	---	50.8	.2	.7	30.1	---	---	---	---	<.1	30.1
[1]P-21/16	1,686.48-1,687.20	.72	8th oz	7.0	---	---	---	---	---	---	---	82.6	2.3	6.2	4.4	---	---	---	---	.4	4.8
[1]P-21/16				8.1	---	---	---	---	---	---	---	83.9	2.1	6.2	5.1	---	---	---	---	.2	5.3
P-21/17	1,687.20-1,688.24	1.04		3.2	---	---	---	---	---	---	---	91.5	3.9	.2	2.0	---	---	---	---	.6	2.6
P-21/18	1,688.24-1,688.77	.53		1.4	---	---	---	---	---	---	---	95.3	2.2	1.0	.9	---	---	---	---	.3	1.2
[1]P-21/19	1,688.77-1,690.19	1.42		9.6	---	---	---	---	---	---	---	84.7	5.8	.1	6.1	---	---	---	---	.9	7.0
[1]P-21/19				8.5	---	---	---	---	---	---	---	82.4	5.8	<.1	5.4	---	---	---	---	.9	6.3
P-21/20	1,690.19-1,691.26	1.07		2.2	---	---	---	---	---	---	---	95.3	3.6	.1	1.4	---	---	---	---	.6	2.0
[1]P-21/21	1,691.26-1,692.40	1.14		33.9	---	---	---	---	---	---	---	61.6	1.7	1.6	21.4	---	---	---	---	.3	21.7
[1]P-21/21				33.9	---	---	---	---	---	---	---	61.6	1.6	1.6	21.4	---	---	---	---	.2	21.6
P-21/22	1,692.40-1,693.34	.94		14.6	---	---	---	---	---	---	---	66.0	2.6	12.8	9.2	---	---	---	---	.4	9.6
P-21/23	1,809.07-1,809.90	.83	4th oz, um	.4	---	---	0.4	---	---	---	---	83.7	3.7	8.4	.3	---	---	<0.1	---	.6	.9
[1]P-21/24	1,809.90-1,811.50	1.60	4th oz, mm	---	54.0	7.4	12.4	---	---	---	---	29.2	.2	1.1	---	12.2	1.4	3.2	---	<.1	16.8
[1]P-21/24				---	58.4	7.4	7.6	---	---	---	---	30.5	.2	.9	---	13.2	1.4	1.9	---	<.1	16.5
P-21/25	1,811.50-1,811.82	.32	4th oz, lm	---	32.9	20.8	26.0	---	---	---	---	16.6	<.1	5.9	---	7.5	3.9	6.7	---	<.1	18.1
P-21/26	1,811.82-1,812.50	.68		---	1.2	1.0	---	---	---	---	---	78.9	.1	15.7	---	.3	.2	---	---	<.1	.5
P-21/27	1,812.50-1,813.10	.60	sb	---	.4	---	---	---	---	---	---	97.9	.3	n.d.	---	<.1	---	---	---	<.1	<.1
P-21/28	1,813.10-1,814.25	1.15		---	.2	---	.4	---	---	---	---	90.3	6.6	n.d.	---	<.1	---	.1	---	1.0	1.1
P-21/29	1,814.25-1,815.51	1.26		---	.5	---	---	---	---	---	---	91.5	3.9	n.d.	---	.1	---	---	---	.6	.7
[1]P-21/30	1,815.51-1,816.10	.59		---	23.8	11.6	4.6	---	---	---	---	50.8	10.5	1.9	---	5.4	2.2	1.4	---	1.6	10.6
[1]P-21/30				---	21.6	15.1	4.7	---	---	---	---	50.8	10.5	1.9	---	4.9	2.8	1.2	---	1.6	10.5
P-21/31	1,816.10-1,817.25	1.15		---	58.8	---	---	---	---	---	---	41.9	3.2	.3	---	13.4	---	---	---	.5	13.9
P-21/32	1,817.25-1,818.21	.96		---	---	6.5	19.8	---	---	---	---	59.5	1.3	10.0	---	---	1.2	5.1	---	.2	6.5
P-21/33	1,818.21-1,818.96	.75		---	.2	---	---	---	---	---	---	94.1	2.8	n.d.	---	<.1	---	---	---	.4	.4
P-21/34	1,830.54-1,831.21	.67	3rd oz	---	0.1	---	---	---	---	---	---	91.5	1.9	n.d.	---	1.4	---	---	---	.3	1.7
[1]P-21/35	1,831.21-1,831.94	.73		<.1	15.6	---	---	---	---	---	---	82.6	1.4	.3	<.1	3.5	---	---	---	.5	4.0
[1]P-21/35				.3	14.9	---	---	---	---	---	---	79.7	3.4	.1	<.1	3.4	---	---	---	.5	3.9
P-21/36	1,831.94-1,832.67	.73		---	16.6	2.9	.4	---	---	---	---	76.3	1.0	1.8	---	3.8	.6	<.1	---	.1	4.6
P-21/37	1,832.67-1,833.33	.66		---	.2	---	---	---	---	---	---	97.9	1.2	1.3	---	<.1	---	---	---	.2	.2
P-21/38	1,837.80-1,838.96	1.16	sb	---	.2	---	---	---	---	---	---	82.6	2.9	n.d.	---	<.1	---	---	---	.3	.3
P-21/39	1,838.96-1,839.80	.84	2d oz	---	17.8	---	---	---	---	38.9	17.4	23.4	.4	.9	---	4.0	---	---	---	<.1	4.0
P-21/40	1,839.80-1,840.80	1.00		---	1.9	---	---	---	---	1.9	---	87.4	2.1	4.1	---	.4	---	---	---	.3	.7

[1] Replicate analyses.