GEOLOGIC INVESTIGATIONS IN MOJAVE DESERT AND ADJACENT REGION, CALIFORNIA

CORE LOGS FROM OWENS, CHINA, SEARLES, AND PANAMINT BASINS, CALIFORNIA

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ABSTRACT

Detailed logs of drill cores are presented in this report. The drill cores are of sediments from four basins that were occupied during the Pleistocene by a continuous chain of lakes. Owens Lake basin (one hole, 920 feet) contains fine-grained sediments and includes locally many diatoms and ostracodes. China Lake basin (one hole, 700 feet) contains silt- to sand-sized clastic sediments and some calcite and gaylussite; a few diatoms, ostracodes, and mollusks are present. Searles Lake basin (one hole, 875 feet) contains many layers of gaylussite- or pirssonite-bearing sediments intercalated with beds of halite, trona, and lesser amounts of other minerals peculiar to Searles Lake; the top 120 feet consistsof thicker evaporite bodies with a more complex mineralogy. Panamint basin (three holes, 500, 375, and 995 feet) contains clastic deposits ranging from clay to gravel, a small amount of gypsum, anhydrite, a trace of bassanite, and thick bodies of halite in the basin center; a few diatoms and ostracodes are present.

INTRODUCTION

In 1952 the U. S. Geological Survey began an investigation of saline deposits in the Mojave Desert and adjacent parts of southeastern California. As a part of this investigation, core holes were drilled in several playas to obtain geologic information. Among the playas drilled were Owens Lake, China Lake, Searles Lake, and the two playas in Panamint Valley (fig. 1). The five playas are considered as a group because they occupy basins that probably contained a continuous chain of lakes during the pluvial periods of the Pleistocene.

The relations between the basins are shown diagrammatically in figure 2 and may be summarized as follows:[1] The principal source of water was drainage from the eastern slopes of the Sierra Nevada; this water fed the Owens River and flowed into Owens Lake. When the lake filled to a level about 200 feet above the present playa surface, its waters overflowed through a narrow gorge that led into Indian Wells Valley and formed China Lake. This broad, shallow lake spilled over a low divide into Searles basin and filled it to a maximum depth of about 640 feet; during high-water periods the divide was submerged and China Lake

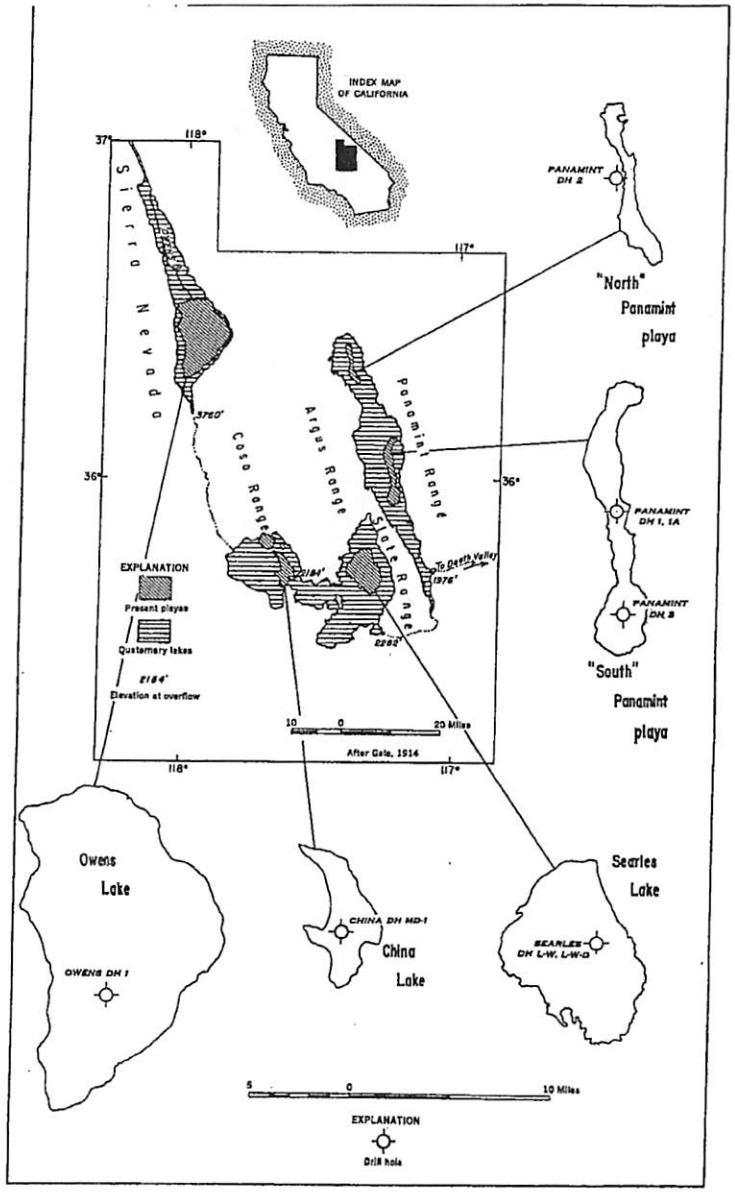

FIGURE 1.—Map showing the location of Owens, China, Searles, and Panamint basins and the location of the holes drilled.

became simply a shallow arm of Searles Lake. From Searles Lake the water flowed around the south end of the Slate Range into Panamint Valley and rose to about 930 feet above the present playa; the water then spilled over Wingate Pass into Death Valley.

At the time of Gale's investigation, very little was known about the fill in these basins; a few holes had been drilled in Searles Lake, but no subsurface data were available for Owens, China, and Panamint Lakes. Since that time a wealth of information has been accumulated about the fill in Searles Lake and, to a lesser extent, the others.

In 1952 the writers began a study of the accumulated data and in 1953 the cores described in this report were obtained. Although the overall study is still far from completion the written and graphic logs (pl. 1) are being presented now so that the data will be available to others.

LOGGING METHODS

All cores were logged in the field, using a hand lens and binocular microscope, a few hours after they were removed from the holes. They were relogged in the laboratory using a petrographic microscope for the more difficult mineral identifications and a binocular microscope and hand lens for the remainder; the relogging allowed a uniformity of detail and technique that will facilitate interpretation.

The cores from Owens and China Lakes were logged in the field by Pratt, and relogged in the laboratory by Pratt and Smith. At Searles Lake, Searles L-W-D was logged in the field and in the laboratory by Pratt and Smith. Searles L-W (the top 150 feet of L-W-D) was drilled by the American Potash & Chemical Corp. in 1950; they have generously allowed the log, made by F. J. Dluzak and M. Flaherty and modified by Smith, to be included in this report. The cores from Panamint Valley were logged in the field by Frederick C. Barstow, Roland E. von Huene, and Smith; the laboratory logs by Smith and Ross C. Ellis utilized much material from the field logs.

The writers are grateful to Robert D. Allen for numerous mineral identifications made with immersion oils; minerals so identified are denoted in the logs by an asterisk (*).

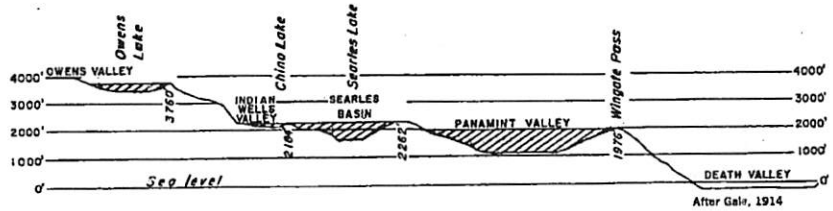

FIGURE 2.—Diagrammatic profile of Pleistocene Lakes in Owens, China, Searles, and Panamint basins showing the elevation of the spillways.

In compiling the final logs the following conventions were established for the sake of uniformity.

Recovery.—Where the core from any given run[2] was less than 100 percent, there was generally no reliable indication of the position of the recovered core within the run. For the Panamint Valley logs, which were made first, the log of a recovered core was "expanded" to fill the entire run; each unit within the run was expanded proportionally. The cores recovered from the drill holes at Owens, China, and Searles Lakes were arbitarily assigned to the upper end of the run and the missing portion to the lower.

Caving.—Between drilling periods there was commonly some caving of material from the walls higher in the hole, and the caved materials were unavoidably recovered in the core barrel along with the core. They were saved and are included in the log but have been designated as slump wherever the combination of poor compaction, position at the top of the run, and anomalous lithology have suggested such an origin. Some other parts of the core were probably also formed in this way, but they have not been designated as such because the evidence was inconclusive.

Sediment names.—Sediment names are in accord with those suggested by Wentworth.[3] Unless otherwise noted, sand is poorly sorted and the fragments are angular to subangular.

Colors.—Colors have been named and numbered according to the Rock-color Chart distributed by the Geological Society of America.[4]

Fossils.—The estimated abundance of diatoms or ostracodes in the Owens and China cores is indicated in a very general way by the following relative terms:

"noted"—1 or 2 fossils seen throughout entire unit.
"sparse"—3 to 10 fossils seen throughout entire unit.
"common"—from "sparse" to about 10 fossils per square inch.
"abundant"—from about 10 fossils per square inch to very abundant."
"very abundant"—fossils appear to form more than 50 percent of the core.

[1]Gale, H. S., 1914, Salines in the Owens, Searles, and Panamint basins, southeastern California: U. S. Geol. Survey Bull. 580-L, p. 251-323.
[2]The term "run" refers to the length of hole drilled between removals of the core barrel from the hole. Usually a run was 10 feet.
[3]Wentworth, C. K., 1922, A scale of grade and class terms for clastic sediments: Jour. Geology, v. 30, p. 377-392.
[4]Goddard, E. N., (chm.) and others, 1948, Rock-color chart: Washington, D. C., Natl. Research Council (republished by Geol. Soc. America, 1951).

LOGS OF CORES FROM OWENS, CHINA, SEARLES, AND PANAMINT BASINS

OWENS DRILL HOLE 1

[Sixty-six percent of core recovered]

Depth (feet)	Unit thickness (feet)	Description
3.0	3.0	No core. This section, exposed in a pit about 10 ft from the hole, consists of irregular crusts of sandy trona grading down into horizontally banded crusts about ½ in. thick separated by vugs up to an inch thick.
5.1	2.1	Gaylussite*, and a little clay. Crystal sizes up to 2 mm, average about ½ mm. Yellowish gray (5Y8/1), massive. Poorly consolidated.
8.0	2.9	No core.
45.0	37.0	No core. Drilling characteristics indicated that this section was poorly compacted clay. The few cuttings recovered show the upper part to consist of clay containing up to about 10 percent concretions(?), averaging about 1 mm across, dark yellowish orange (10YR6/6), composition unknown; this clay grades down into clay which is more compacted and contains fewer concretions. Clay is pale greenish yellow (10Y7/2) with streaks of pale yellowish orange (10YR7/5). Apparently massive.
53.4	8.4	Clay, light greenish-gray (5GY7/1), massive. Ostracodes common; diatoms noted.
55.0	1.6	No core.
64.4	9.4	Clay, yellowish-gray (5Y8/1) to light greenish-gray (5GY8/1), massive. Ostracodes sparse in middle of this unit.
65.0	.6	No core.
71.3	6.3	Clay, yellowish-gray (5Y8/1), massive. Diatoms abundant to very abundant.
75.0	3.7	No core.
85.0	10.0	Clay, yellowish-gray (5Y8/1), massive. Diatoms very abundant; single fish scale noted at 84.6 ft.
90.6	5.6	Clay, similar to unit above. Diatoms very abundant.
93.4	2.8	Clay, yellowish-gray (5Y7-8/1), massive. Diatoms common; ostracodes sparse.
95.0	1.6	No core.
102.5	7.5	Clay, similar to clay at depth of 85.0 ft. Diatoms very abundant.
105.0	2.5	No core.
115.0	10.0	Clay, similar to clay at depth of 85.0 ft. Diatoms very abundant.
121.3	6.3	Clay, yellowish-gray (5Y8/1); generally massive, laminar banding noted at 117.8. Diatoms very abundant in upper part; diatoms sparse, ostracodes abundant in lower part; gradational zone in middle.
125.0	3.7	No core.
126.7	1.7	Clay, yellowish-gray (5Y7/1), massive. Ostracodes abundant.
127.7	1.0	Clay with laminar beds of silt, yellowish-gray (5Y6/2); contains small rounded particles that may be concretions. Ostracodes locally abundant.
130.0	2.3	No core.

OWENS DRILL HOLE 1—Continued

Depth (feet)	Unit thickness (feet)	Description
130.8	0.8	Clay with laminar beds of silt, similar to material at depth of 127.7 ft.
134.5	3.7	Clay, yellowish-gray (5Y8/1) to light greenish-gray (5GY8/1), massive. Ostracodes common in upper part grading to abundant in lower part.
140.0	5.5	No core.
144.9	4.9	Clay, pale greenish-yellow (8Y7/2); generally massive, local thin beds of silt. Top foot poorly consolidated. Ostracodes common to abundant.
148.2	3.3	Clay, yellowish-gray (5Y8/2), massive. Diatoms very abundant. Top 5 in. represents a transition from the unit above and contains both ostracodes and diatoms.
150.0	1.8	No core.
159.7	9.7	Clay, yellowish-gray (5Y8/2), massive. Grades into unit below. Diatoms very abundant.
160.0	.3	Clay, yellowish-gray (5Y8/2), massive. Ostracodes and diatoms common.
165.8	5.8	Clay, pale greenish-yellow (10Y7/2); generally massive, thin-bedded at base. Ostracodes and diatoms abundant.
166.8	1.0	Clay, pale greenish-yellow (10Y8/2), massive. Diatoms very abundant in upper part.
169.0	2.2	Clay, pale greenish-yellow (10Y7/2); generally massive, faint laminar bedding in middle part. Ostracodes abundant except in a 2-in. zone at 167.5 ft.
170.0	1.0	No core.
180.0	10.0	Clay, yellowish-gray (5Y6/2) to pale-olive (10Y6/2), massive. Ostracodes abundant, locally sparse; diatoms common at base.
184.9	4.9	Clay, a 2-in. silty zone at 181.5 ft; yellowish gray (5Y6/2) to pale olive (10Y6/2); massive. Ostracodes abundant; diatoms common in top foot.
190.0	5.1	No core.
193.5	3.5	Clay, yellowish-gray (5Y6/2), massive. Core still damp. Diatoms range from sparse to abundant.
198.8	5.3	Clay, yellowish-gray (5Y7/2) to pale greenish-yellow (10Y8/2), massive. Diatoms common to abundant; ostracodes locally sparse.
200.0	1.2	No core.
202.2	2.2	Clay, yellowish-gray (5Y7/2), massive. Diatoms very abundant.
205.0	2.8	No core.
211.5	6.5	Clay, yellowish-gray (5Y7/2), massive. In top 1½ ft diatoms sparse to abundant, ostracodes common; in remainder of unit diatoms generally abundant, common in middle part.
215.0	3.5	No core.
215.6	.6	Clay, light olive-gray (5Y5/2) and yellowish-gray (5Y8/2); laminar bedding, Ostracodes and diatoms common.
218.4	2.8	Clay, yellowish-gray (5Y7-8/2), massive. Diatoms very abundant.
220.0	1.6	No core.
221.4	1.4	Clay, yellowish-gray (5Y7/2), massive. Diatoms very abundant.

OWENS DRILL HOLE 1—Continued

Depth (feet)	Unit thickness (feet)	Description
225.6	4.2	Clay, yellowish-gray (5Y6-7/2); generally massive, local thin to laminar bedding. In upper third diatoms very abundant, ostracodes sparse; in lower two-thirds diatoms and ostracodes common to abundant.
230.0	4.4	No core.
234.3	4.3	Clay, thin beds of silt in lower part; bedding thin to laminar, locally massive; yellowish gray (5Y7/2-3), local partings of light yellowish gray (5Y8/2). Ostracodes common, locally abundant; diatoms abundant at 232.0 ft.
238.3	4.0	Clay with thin to laminar beds of silt, yellowish-gray (5Y7/2) to dusky yellowish-gray (5Y6/3). Ostracodes locally sparse.
240.0	1.7	No core.
248.4	8.4	Clay, similar to clay at depth of 238.3 ft. Ostracodes locally common.
250.0	1.6	No core.
253.6	3.6	Clay; generally massive, local laminar bedding; yellowish gray (5Y6/2) to pale greenish yellow (10Y7/2). Ostracodes sparse.
255.6	2.0	Clay, yellowish-gray (5Y7/2) with streaks of grayish-orange (10YR6/4), massive. Diatoms very abundant, ostracodes sparse.
260.0	4.4	No core.
264.4	4.4	Clay, yellowish-gray (5Y7/2) with streaks of grayish-orange (10YR6/4), massive. Diatoms common to abundant, locally very abundant.
270.0	5.6	No core.
290.0	20.0	No core. This section drilled as if very soft.
300.0	10.0	No core. Cuttings include a 1-in. angular fragment of dark limestone*. Section drilled similarly to unit above.
302.0	2.0	Clay, grayish-olive (10Y4/2). Core still damp, massive. Diatoms common.
310.0	8.0	Clay, light greenish-gray (5GY7/1), massive. Diatoms sparse to common.
320.0	10.0	No core.
330.0	10.0	Clay, light greenish-gray (5GY7/1), massive. Diatoms common to abundant.
336.2	6.2	Clay, similar to unit above.
339.2	3.0	Clay; mottled coloring includes yellowish gray (5Y7/2-3) and streaks of dark yellowish orange (10YR6/6); massive. Diatoms common, locally abundant.
340.0	.8	No core.
345.6	5.6	Clay, yellowish-gray (5Y7/1), massive. Diatoms sparse to common.
347.8	2.2	Clay, yellowish-gray (5Y7/1-2), massive. Diatoms common.
350.0	2.2	No core.
358.2	8.2	Clay, yellowish-gray (5Y7/2); most of unit damp, somewhat darker; massive. Diatoms sparse, locally common. Poorly consolidated.

OWENS DRILL HOLE 1—Continued

Depth (feet)	Unit thickness (feet)	Description
358.6	0.4	Clay with very fine sand. Sand fragments are about two-thirds quartz and feldspar and one-third hematite* and limonite*. Colors mottled, include light olive gray (5Y5/2) and moderate brown (5YR3/4). Massive. Diatoms sparse. Core still damp.
359.1	.5	Clay; colors similar to those found at depth of 339.2 ft; massive. Diatoms common to abundant.
360.0	.9	No core.
361.0	1.0	Clay, light olive-gray (5Y4/2), massive. Diatoms common to abundant. Core still damp.
363.3	2.3	Clay, slightly silty in lower part; light greenish gray (5GY7/1) to pale greenish yellow (10Y7/2); massive, local faint banding. Ostracodes common to abundant. Grades into unit below.
370.0	6.7	Clay, locally silty, especially in bottom 1.6 ft; colors similar to unit above; generally massive, some thin to laminar beds of silt. Ostracodes sparse to common. Lower part of core still damp.
372.8	2.8	Clay, dark greenish-gray (5GY4/1), massive. Diatoms sparse in upper part. Core still damp.
378.4	5.6	Clay, light olive-gray (5Y4-5/2) to pale-olive (10Y5/2); thin to laminar bedding caused by silt partings, locally massive. Ostracodes sparse to common, locally abundant; diatoms noted at base.
380.0	1.6	No core.
382.1	2.1	Clay, grayish-olive (10Y4/2), massive. Diatoms sparse. Core still damp.
388.0	5.9	Clay with interbedded silt, yellowish-gray (5Y6/2) and pale greenish-yellow (10Y7/2). Ostracodes common to abundant; diatoms sparse at base.
390.0	2.0	Clay, locally slightly silty, pale greenish-yellow (10Y7/2), massive. Ostracodes and diatoms sparse.
391.8	1.8	Clay, grayish-olive (10Y4/2), massive. Core still damp.
399.5	7.9	Clay, pale greenish-yellow (10Y8/2) to yellowish-gray (5Y7-8/3), massive. Diatoms common to abundant.
400.0	.5	No core.
401.7	1.7	Clay, grayish-olive (10Y4/2), massive. Core still damp. Poorly consolidated.
407.8	6.1	Clay, yellowish-gray (5Y7/2) to light greenish-gray (5GY7/1); generally massive, silty partings in top foot. Ostracodes and diatoms locally sparse. At the top of this unit is a 2-in. thick core of greenish-gray (5GY5/1) limestone; it is not known if this represents a bed of limestone or a large rock fragment that was cored by the drill.
410.0	2.2	No core.
415.0	5.0	Clay with local thin beds of silty clay and silt, yellowish-gray (5Y7/2) to pale-olive (10Y6/2); generally thin-bedded, locally massive. Ostracodes sparse to common, locally abundant.

OWENS DRILL HOLE 1—Continued

Depth (feet)	Unit thickness (feet)	Description
420.0	5.0	Clay, yellowish-gray (5Y7/2), massive. At 418.6 ft is a 1-in. bed of material containing about 30 percent glass* with a refractive index slightly above 1.49. The bed also contains other minerals including clay*, amphiboles*, and quartz*. Light greenish gray (5GY7/1). Probably pumice.
421.8	1.8	Clay, similar to clay at depth of 401.7 ft. May be slump, not core.
430.0	8.2	Clay; colors range from yellowish gray (5Y7/2) downward to yellowish gray (5Y7/1) and light greenish gray (5GY7/1) in lower part; massive. Diatoms sparse in middle part, grade to abundant in lower part.
436.6	6.6	Clay, grayish-olive (10Y4/2), massive. Gastropod(?) fragment noted at 431.9 ft. Still damp. May be slump, not core.
440.0	3.4	Clay, yellowish-gray (5Y7/2), massive. Diatoms very abundant; ostracodes sparse. Top foot still damp and slightly darker.
448.4	8.4	Clay, similar to unit above. Diatoms generally very abundant; at 447.3 ft is a 2-in. zone containing sparse diatoms, common ostracodes. This 2-in. zone still damp, somewhat darker.
450.0	1.6	No core.
453.0	3.0	Clay, yellowish-gray (5Y7-8/2), faintly bedded. Ostracodes abundant, apparently concentrated in beds. Grades into unit below.
455.6	2.6	Clay, locally slightly silty, yellowish-gray (5Y7-8/2), massive. Ostracodes common.
460.0	4.4	No core.
467.1	7.1	Clay, similar to clay at depth of 436.6 ft. Still damp; poorly consolidated. May be slump, not core.
467.8	.7	Clay, yellowish-gray (5Y7/2) to pale-olive (10Y6/2). At 467.6 ft is a $\frac{1}{4}$-in. bed of a fine-grained light-gray (N7) to medium dark-gray (N4) glass* with a refractive index slightly below 1.47; probably opal. Diatoms and ostracodes locally abundant.
470.0	2.2	No core.
474.0	4.0	Clay. Similar to clay at depth of 436.6 ft.
479.9	5.9	Clay, yellowish-gray (5Y7/3), massive. Diatoms generally very abundant, ostracodes common.
480.0	.1	No core.
486.4	6.4	Clay, grayish-olive (10Y4/2), still damp; massive. Poorly consolidated. Probably slump, not core.
489.2	2.8	Clay, yellowish-gray (5Y7/2) to pale greenish-yellow (10Y7/2); generally massive, local faint bedding. Ostracodes common.
490.0	.8	No core.
493.9	3.9	Clay. Similar to clay at depth of 486.4 ft.
496.7	2.8	Clay, silty, pale greenish-yellow (10Y7-8/2), massive. Ostracodes abundant.
500.0	3.3	Clay, pale greenish-yellow (10Y7-8/2), massive. Ostracodes common.

OWENS DRILL HOLE 1—Continued

Depth (feet)	Unit thickness (feet)	Description
501.1	1.1	Clay, silty, and silt; yellowish gray (5Y6/2), still damp, fissile bedding. Ostracodes common to abundant.
508.4	7.3	Clay, slightly silty, pale greenish-yellow (10Y7/2); massive, zone of thin bedding at 507.4 ft.
510.0	1.6	No core.
512.8	2.8	Clay, pale-olive (10Y6/2), massive.
513.3	.5	Clay, grayish-olive (10Y4/2), massive. Poorly consolidated; still damp.
514.1	.8	Clay, silty in upper part; pale greenish yellow (7Y7/2). Laminar bedding in upper and lower part, massive in middle.
520.0	5.9	No core.
521.4	1.4	Clay, grayish-olive (10Y4/2), massive. Still damp.
529.8	8.4	Clay, yellowish-gray (5Y7/1) to pale yellowish-gray (7Y7/2), massive. Sparse diatoms in bottom 1½ ft.
530.0	.2	No core.
531.1	1.1	Clay, similar to clay at depth of 521.4 ft.
534.3	3.2	Clay, pale greenish-yellow (10Y7/2) to light greenish-gray (5GY7/1); generally massive, local faint bedding. Diatoms sparse to absent; ostracodes sparse.
538.7	4.4	Clay, yellowish-gray (5Y7/2); fissile, some faint bedding. Diatoms common, locally abundant; ostracodes sparse to common.
540.0	1.3	Clay and a little silt, yellowish-gray (5Y6/2); faint laminar bedding. Diatoms sparse to common; ostracodes abundant.
544.7	4.7	Clay, similar to clay at depth of 521.4 ft. Probably slump, not core.
548.3	3.6	Clay, with local beds of silt; pale olive (10Y6/2) to yellowish gray (5Y7/2); thin to laminar bedding. Ostracodes common to abundant.
550.0	1.7	No core.
551.3	1.3	Clay, similar to clay at depth of 521.4 ft.
554.8	3.5	Clay, with thin beds of silt; yellowish gray (5Y6/2), core still damp, thin bedding, grades into unit below. Ostracodes abundant.
558.3	3.5	Clay and a few local thin beds of silty clay, pale greenish-yellow (10Y7/2), generally massive. Ostracodes sparse.
560.0	1.7	No core.
561.9	1.9	Clay, similar to clay at depth of 521.4 ft. Poorly consolidated. Probably slump, not core.
562.7	.8	Clay, pale greenish-yellow (10Y7/2), massive.
564.6	1.9	Clay, pale yellowish-gray (8Y7/2), massive. Ostracodes generally common, abundant near base.
570.0	5.4	No core.
572.2	2.2	Clay, greenish-gray (5GY6/1), massive. Poorly consolidated. Probably slump, not core.
575.5	3.3	Clay, pale yellowish-gray (7Y7/2), massive. Ostracodes common, grading downward to abundant.
576.8	1.3	Clay, light olive-gray (5Y6/1), massive.
580.0	3.2	No core.
581.4	1.4	Clay, yellowish-gray (5Y6/2); faint bedding. Ostracodes common; diatoms noted at base.

OWENS DRILL HOLE 1—Continued

Depth (feet)	Unit thickness (feet)	Description
582.1	0.7	Clay, similar to clay at depth of 521.4 ft.
582.7	.6	Clay, yellowish-gray (5Y7/2), massive. Diatoms common to abundant. Core still damp in upper half.
589.7	7.0	Clay, yellowish-gray (5Y7/2) to pale greenish-yellow (10Y7/2), massive. Diatoms sparse.
590.0	.3	No core.
600.0	10.0	Clay, pale yellowish-gray (7Y7/2), massive.
607.4	7.4	Clay, grayish-olive (10Y3/2), massive. Core still damp. Poorly consolidated. Probably slump, not core.
609.3	1.9	Clay, light greenish-gray (5GY7/1), massive. Diatoms sparse.
610.0	.7	No core.
618.9	8.9	Clay, light greenish-gray (5GY7/1), massive. Diatoms common in upper part, abundant to very abundant in lower part; ostracodes sparse.
620.0	1.1	No core.
627.4	7.4	Clay, yellowish-gray (5Y8/1), massive. Grades into unit below. Diatoms abundant; ostracodes sparse.
630.0	2.6	Clay, yellowish-gray (5Y6-7/2); generally massive, local fissile bedding in upper part. Diatoms and ostracodes abundant in upper part grading to sparse in lower part.
639.8	9.8	Clay, yellowish-gray (5Y7/2) to pale greenish-yellow (10Y7/2); generally massive, local thin beds of silt. Diatoms noted; ostracodes generally sparse, locally common to abundant.
640.0	.2	No core.
644.4	4.4	Clay, pale yellowish-gray (7Y7/2) to pale greenish-yellow (10Y7/2), massive. Grades into unit below.
649.8	5.4	Ostracodes sparse.
649.8	5.4	Clay, locally silty, yellowish-gray (5Y7/2), generally thin bedded. Ostracodes common to abundant.
650.0	.2	No core.
654.3	4.3	Clay, silty and locally sandy; local faint beds of sand and silt. Pale olive (10Y6/2) to pale greenish yellow (10Y7/2) to yellowish gray (5Y7/1-2). Ostracodes sparse in upper part grading to common in bottom foot.
659.9	5.6	Clay, locally silty in upper part; yellowish gray (5Y6/2) to pale olive (10Y6/2), still damp; generally thin bedded in upper 3 ft, remainder massive. Ostracodes common to abundant; diatoms locally common in bottom 2 ft; several mollusks noted at 659.0 ft.
660.0	.1	No core.
668.4	8.4	Clay, locally silty, yellowish gray (5Y7/2) to pale greenish yellow (10Y7/2); thin bedding in top 3 ft, remainder generally massive. Ostracodes abundant, grading to common in bottom 8 in.
670.0	1.6	No core.
680.0	10.0	Clay, slightly silty, pale yellowish-gray (5Y8/2); generally massive, local faint bedding. Ostracodes sparse; diatom noted in upper part; plant remains(?) at 670.4 ft. Bottom 2 ft. still damp.
690.0	10.0	No core.

OWENS DRILL HOLE 1—Continued

Depth (feet)	Unit thickness (feet)	Description
693.5	3.5	Clay, grayish-olive (10Y4/2), massive. Core still damp. Poorly consolidated. Probably slump, not core.
694.4	.9	Clay; colors mottled (probably because of differences in dampness): grayish olive (10Y4/2) and yellowish gray (5Y7/3). Diatoms common.
699.4	5.0	Clay, yellowish-gray (5Y7/2); generally massive, some faint horizontal banding. Local randomly oriented partings of silt. Diatoms common, locally abundant.
700.0	.6	No core.
709.4	9.4	Clay, yellowish-gray (5Y7/2) to pale greenish-yellow (10Y7/2). Ostracodes abundant to very abundant; diatoms common in upper part grading to sparse in lower part.
710.0	.6	No core.
715.6	5.6	Clay, locally silty, yellowish-gray (5Y7/2) to pale greenish-yellow (10Y7/2); generally massive, local faint banding. Diatoms sparse, locally common; ostracodes common, locally abundant.
720.0	4.4	No core.
725.6	5.6	Clay, yellowish-gray (5Y8/1), massive. Diatoms abundant, locally very abundant; ostracodes sparse; fish scale noted.
730.0	4.4	No core.
738.4	8.4	Clay, locally silty in bottom 3 ft; yellowish gray (5Y8/1); generally massive. Diatoms abundant to very abundant; ostracodes sparse to common at depths from 734.7 to 737.1 ft but not found in rest of unit.
740.0	1.6	No core.
746.8	6.8	Clay, sandy, grayish-olive (10Y4/2), massive. Poorly consolidated; still damp.
747.8	1.0	Sand, medium, clayey, pale-olive (10Y5/2), massive. Still damp.
750.0	2.2	No core.
750.6	.6	Sand, clayey, similar to sand at depth of 747.8 ft.
752.0	1.4	Clay, dusky yellowish-gray (5Y6/3) to pale-olive (10Y5/2), massive. Poorly consolidated.
755.4	3.4	Silt, clayey, pale-olive (10Y7/2-3), massive. Still damp. Poorly consolidated.
756.2	.8	Silt, with thin beds of clay. Silt is massive, greenish yellow (10Y7/2), and consists mainly of silicates* and a little clay and a small amount of glass* whose refractive index is 1.50. Clay is dark greenish gray (5GY4/1). Diatoms sparse.
760.0	3.8	No core.
766.5	6.5	Sand, medium, well-sorted; coarse in bottom 2 ft; grayish olive (10Y4/2); massive. Still damp. Poorly consolidated.
767.3	.8	Sand, fine, consisting almost entirely of thin triangular-shaped wafers of volcanic glass*. Refractive index of glass about 1.503. Pale olive (10Y6/2) grading down to medium dark gray (N4) and medium light gray (N6). Massive. Still damp.

OWENS DRILL HOLE 1—Continued

Depth (feet)	Unit thickness (feet)	Description
768.2	0.9	Clay, grading down to sandy silt; light greenish gray (5GY7/1); mostly massive, local faint thin bedding. Top 4 in. is darker; still damp.
770.0	1.8	No core.
772.8	2.8	Sand, very fine to coarse, average medium; grayish olive (10Y4/2); massive. Poorly consolidated.
775.6	2.8	Sand, medium in upper part grading downward to coarse; light greenish gray (5GY7/1); massive. Poorly consolidated.
780.0	4.4	No core.
781.4	1.4	Sand, coarse; top one-third contains many fragments up to 3 mm in size; pale olive (10Y6/2); massive. Poorly consolidated. Grades into unit below.
783.4	2.0	Silt, clayey in top 4 in. and in bottom 7 in.; yellowish gray (5Y7/2) in upper part grading down to pale greenish yellow (10Y7/2); faint bedding in lower part, remainder is massive.
790.0	6.6	No core.
796.0	6.0	No core. Core was destroyed while being removed from core barrel. Consisted mainly of coarse clayey sand; color when wet was dark greenish gray (5GY4/1).
799.4	3.4	Clay, sandy in upper part, locally sandy in lower part; light greenish gray (5GY7/1); massive.
800.0	.6	No core.
801.4	1.4	Sand, coarse, light greenish-gray (5GY7/1), massive. Poorly consolidated.
806.4	5.0	Sand, silty, clay matrix; pale olive (10Y5-6/2); massive. Still damp. Poorly consolidated.
807.0	.6	Clay, sandy, light greenish-gray (5GY7/1), massive.
810.0	3.0	No core.
818.4	8.4	Sand, fine, clayey in top 1.6 ft; grayish olive (10Y4/2) where damp to yellowish olive gray (7Y6/2) where dry; massive. Poorly consolidated.
820.0	1.6	No core.
825.6	5.6	Sand, medium to very fine, locally clayey, pale-olive (10Y6/2), massive. Poorly consolidated.
830.0	4.4	No core.
835.6	5.6	Sand, medium to very fine, similar to sand at depth of 825.6 ft.
840.0	4.4	No core.
843.7	3.7	Clay and sand. Clay in top third grades into a transitional zone of intermixed pockets of clay and very fine sand; this, in turn, grades to very fine sand at base. Colors mottled: light olive gray (5Y5/3) to grayish olive (10Y4/2). Massive. Still damp; poorly consolidated. Grades into unit below.
846.8	3.1	Silt to very fine sand with local clay pockets; yellowish gray (5Y6/2) to pale olive (10Y6/2), upper part is darker and still damp; massive. Poorly consolidated.
850.0	3.2	No core.
856.3	6.3	Silt to medium sand, some clay; sorting generally poor; locally good; pale olive (10Y6/2) to dusky yellowish gray (5Y6/3) to light greenish gray (5GY7/1); massive. Poorly consolidated.

OWENS DRILL HOLE 1—Continued

Depth (feet)	Unit thickness (feet)	Description
857.2	0.9	Clay, locally silty, yellowish-gray (5Y7/1) to light greenish-gray (5GY7/1), massive.
860.0	2.8	No core.
862.8	2.8	Silt grading down to fine and medium sand, yellowish gray (5Y7/2) to light greenish gray (5GY7/1) to light olive gray (5Y6/1); massive. Sand is poorly consolidated.
865.6	2.8	Sand, coarse, well-sorted, clean; grades down to medium sand, poorly sorted; light olive gray (5Y5/1) to dusky yellowish gray (5Y6/3), massive. Poorly consolidated.
870.0	4.4	No core.
870.8	.8	Sand, very fine, grading down to silt; yellowish gray (5Y7/1); massive.
873.3	2.5	Clay, light greenish-gray (5GY7/1); local faint banding. Diatoms very abundant.
874.1	.8	Sand, medium to coarse, clayey in upper part; moderate olive brown (5Y4/4) to dusky yellow (5Y5/4); massive. Still damp.
880.0	5.9	No core.
886.2	6.2	Sand, fine to medium, fairly well sorted, grayish-olive (10Y4/2). Still damp. Poorly consolidated.
890.0	3.8	Clay, light greenish-gray (5GY7/1), massive. Diatoms common to abundant; ostracode noted.
893.1	3.1	Sand, fine to very fine, clayey in lower part; grayish olive (10Y4/2); massive. Still damp. Poorly consolidated. Probably slump, not core.
895.6	2.5	Clay, light greenish-gray (5GY7/1), massive. Diatoms and diatom casts sparse in upper part grading to abundant in lower part.
900.0	4.4	No core.
904.7	4.7	Clay, a little silt at base; light greenish gray (5GY8/1) to yellowish gray (5Y7/1); massive. Diatoms abundant, locally common; diatom casts abundant in top 1.6 ft.
910.0	5.3	No core.
912.1	2.1	Silt grading down to medium and coarse sand, pale greenish yellow (10Y7/2) to light olive gray (5Y5/1); massive. Poorly consolidated.
913.6	1.5	Clay, yellowish-gray (5Y8/1), massive. Diatoms abundant to very abundant.
920.0	6.4	No core.

CHINA DRILL HOLE MD-1

[Seventy percent of core recovered]

Depth (feet)	Unit thickness (feet)	Description
3.5	3.5	Sand, very fine to coarse, average medium; a little silt and clay; grayish yellowish orange (10YR6/5), massive. Badly shattered during drilling.
5.5	2.0	Sand, very fine to coarse, average medium; dusky yellow (5Y5/4); massive.

CHINA DRILL HOLE MD-1—Continued

Depth (feet)	Unit thickness (feet)	Description
10.0	4.5	No core.
11.6	1.6	Clay, very micaceous, slightly sandy at base; grayish olive (10Y4/2), still damp; massive. Small gastropod noted at 11.4 ft.
12.8	1.2	Sand, fine to medium, locally clayey; fair sorting; grayish olive (10Y4/2), still damp; massive.
20.0	7.2	No core.
23.5	3.5	Clay, slightly silty at base; light yellowish gray (5Y8/2) where dry, still damp in lower half; massive. Ostracodes sparse to common; gastropod cast noted; plant fibers locally sparse.
24.5	1.0	Clay and silt, local fine sand; pale olive (10Y5/2), still damp; indistinct thin bedding. Ostracodes sparse to common.
29.3	4.8	Clay, locally silty, moderate yellowish-brown (10YR5/5) and pale-olive (10Y6/2), still damp; generally massive, local pronounced laminar bedding. Ostracodes noted.
30.0	.7	Sand, fine, clay matrix; grayish olive (10Y4/2); generally massive. Ostracodes noted. In middle of unit is a ½-in. bed of grayish-yellow (5Y7/4) clay.
30.9	.9	Gravel, grading down to clay; colors mottled: grayish olive (10Y4/2) to yellowish gray (5Y6/3). Poorly consolidated. May be slump, not core.
36.2	5.3	Sand, fine to medium, clay matrix; proportion of clay higher at base; pale olive (10Y5-6/2); massive. Grades into unit below.
37.8	1.6	Clay, contains up to about 5 percent fine to coarse sand; grayish olive (10Y4/2), still damp; massive.
40.0	2.2	Clay, contains up to about 5 percent very fine to coarse sand; pale greenish yellow (10Y7/2), damp parts somewhat darker; generally massive, local laminar bedding. Up to about 1 percent calcite* as clusters of euhedral crystals.
42.4	2.4	Clay; local zones contain silt and sand; grayish olive (10Y4/2), still damp; massive. Calcite noted, similar to that in unit above. One small mollusk noted.
48.7	6.3	Sand, very fine to coarse, average medium, clay matrix; pale greenish yellow (10Y7/2); massive.
49.1	.4	Clay, slightly sandy; pale greenish yellow (10Y7/2), streaks of grayish orange (10YR7/5); massive.
50.0	.9	No core.
52.3	2.3	Clay, slightly sandy, similar to clay at depth of 49.1 ft.
56.0	3.7	Clay, locally silty or sandy; grayish olive (10Y4/2) and very pale orange (10YR8/2), still damp; massive. Rhombs of calcite noted.
57.7	1.7	Clay, slightly sandy; pale olive (10Y6/2) where dry, still damp in lower part. Contains clustered rhombs of calcite.
59.0	1.3	Sand, medium, grades down to sandy clay; pale olive (10Y5-6/2); massive.
60.0	1.0	No core.
65.3	5.3	Clay, slightly sandy, grayish-olive (10Y4/2), still damp; massive. Shell fragments noted near top.

CHINA DRILL HOLE MD-1—Continued

Depth (feet)	Unit thickness (feet)	Description
66.5	1.2	Clay, pale greenish-yellow (10Y7/2); local faint bedding. Ostracodes noted.
68.4	1.9	Clay, sandy, grayish-yellow-green (5GY7-8/2); generally massive, local contorted laminar bedding. At 67.3 ft there is a 1-in. zone of clay containing pockets of calcite as medium sand-sized rhombs.
70.0	1.6	No core.
75.6	5.6	Clay with variable amounts of sand; yellowish gray (5Y7/3) to pale olive (10Y5/2), somewhat darker in damp parts; local faint bedding. Calcite crystals noted locally.
80.0	4.4	No core.
83.8	3.8	Clay, locally sandy, grayish-olive (10Y4/2), still damp; massive. Clusters of calcite rhombs noted locally.
87.1	3.3	Clay, grades to silt in bottom foot. Colors range from moderate yellow (5Y6/6) with streaks of pale olive (10Y6/2) in upper part to dusky yellow (5Y6/4) in lower part. Thin to laminar color banding; locally massive. Calcite clusters noted in upper part.
90.0	2.9	No core.
96.9	6.9	Clay, locally sandy, similar to clay at depth of 83.8 ft.
100.0	3.1	No core.
101.3	1.3	Clay, sandy. Sandy material forms about 10 percent of core and consists of rhombs of calcite.
105.1	3.8	Clay, slightly sandy, grayish-olive (10Y4/2) to pale-olive (10Y6/2), still damp; massive. Contains some calcite as rhombs.
110.0	4.9	No core.
114.9	4.9	Clay, slightly sandy, and a little calcite; grayish olive (10Y4/2) to moderate olive brown (5Y4/4), still damp; massive. Grades into unit below.
119.0	4.1	Clay, grades down into crystal gravel. Gaylussite* crystals range from about 10 percent of the material in upper part to about 60 percent at base; they range in size up to about 10 mm, average about 4 mm. Microscopic examination shows that calcite*, in minor amounts, extends at least down to middle of unit and is coexistent with gaylussite*. Dusky yellowish gray (5Y6-7/3) and pale olive (10Y5-6/2); locally still damp. Massive.
120.0	1.0	No core.
124.5	4.5	Clay; contains about 5 percent gaylussite and a little calcite* as sand-sized crystals; probably some silicate sand.
127.6	3.1	Sand, crystal, coarse to very coarse at top grading to fine at bottom; clay matrix. Sand is mostly gaylussite, some calcite. Light greenish gray (5GY7/1), streaks of dark yellowish orange (10YR6/5); pseudobedding defined by color changes.
130.0	2.4	No core.
134.8	4.8	Clay; contains gaylussite and a little calcite which range from a trace at top and bottom to about 30 percent of the material in the middle of the unit; crystals average sand size; grayish olive (10Y4-5/2) and dusky yellowish gray (5Y6/3), still damp; massive.

CHINA DRILL HOLE MD-1—Continued

Depth (feet)	Unit thickness (feet)	Description
137.2	2.4	Sand, crystal; gaylussite and a few calcite crystals in a clay matrix; crystals average very coarse sand size; grayish olive (10Y4/2) to pale olive (10Y6/2), still damp; massive.
140.0	2.8	No core.
146.3	6.3	Clay; sand-sized gaylussite and a few calcite crystals constitute up to 10 percent of the material; grayish olive (10Y4/2), still damp; massive.
147.4	1.1	Clay, trace of calcite crystals; pale olive (10Y6/2), small streaks of grayish orange (10YR6/4); massive.
150.0	2.6	No core.
152.3	2.3	Clay, a little calcite; grayish olive (10Y4/2), still damp; massive.
154.2	1.9	Clay, contains up to 10 percent gaylussite; grayish olive (10Y4/2), moderate olive brown (5Y4/4), and light olive gray (5Y5/2), still damp; massive.
156.8	2.6	Gravel, crystal, grading down to crystal sand; consists of gaylussite crystals up to 5 mm in size in a clay matrix; pale olive (10Y6/2) where dry, upper part still damp; indistinct bedding in lower part.
160.0	3.2	No core.
161.0	1.0	Gravel, crystal; gaylussite crystals and fragments up to about 6 mm in size in matrix of clay which makes up 30 or 40 percent of the core; pale olive (10Y6/2) to greenish gray (5GY6/1); local thin bedding caused by layered concentration of gaylussite crystals.
161.5	.5	Clay, contains about 5 percent sand-sized crystals of gaylussite; colors mottled, dusky yellowish gray (5Y6/3) and grayish olive (10Y4/2), still damp; massive.
162.6	1.1	Gravel, crystal; gaylussite crystals and fragments up to about 15 mm in size in a matrix of clay which makes up about 30 to 40 percent of core; grayish olive (10Y4/2), still damp; massive; crystals randomly oriented.
163.0	.4	Sand and clay interbedded; sand is fine to medium, consists mainly of gaylussite and a little biotite and other silicates in a clay matrix. Locally, gaylussite forms a cement that shows a single large cleavage face. Pale olive (10Y6/2) and dusky yellowish gray (5Y6/3); thin bedding.
164.3	1.3	Crystal gravel, similar to crystal gravel at depth of 162.6 ft.
165.2	.9	Sand, crystal, grading downward from coarse to very fine. Sand is mainly quartz*, with a trace of feldspar*, cemented by gaylussite*. Light greenish gray (5GY7/1-2); indistinct thin bedding.
170.0	4.8	No core.
172.7	2.7	Clay, with about 3 percent sand consisting of silicates and fragments of gaylussite; grayish olive (10Y4/2); massive.
176.9	4.2	Silt and very fine sand, locally clayey, light greenish-gray (5GY7/1) to pale greenish-yellow (10Y7/2); massive. At 172.8 ft there is a 2-in. bed of clay containing about 3 percent gaylussite.

CHINA DRILL HOLE MD-1—Continued

Depth (feet)	Unit thickness (feet)	Description
180.0	3.1	No core.
180.4	.4	Sand, very fine; consists of fragments and crystals of quartz, mica, gaylussite, and probably calcite; yellowish gray (5Y7/2) and pale olive (10Y5/2); a little thin indistinct bedding.
182.8	2.4	Clay, with a small amount of gaylussite and a trace of calcite; grayish olive (10Y4/2); massive.
190.0	7.2	No core.
192.8	2.8	Clay, with a small amount of gaylussite and a trace of calcite; grayish olive (10Y4/2); massive. At base is a 2-in. bed of fine gaylussite sand, well indurated, with a clay matrix.
200.0	7.2	No core.
204.1	4.1	Clay, slightly sandy, grayish-olive (10Y4/2) to moderate olive-brown (5Y4/2), still damp; massive.
210.0	5.9	No core.
210.7	.7	Clay, slightly sandy, similar to clay at depth of 204.1 ft.
213.9	3.2	Sand, very fine; locally clayey. Sand consists of quartz, silicates, and calcite. Pale olive (10Y6/2) to grayish olive (10Y4/2). Thin indistinct bedding.
214.3	.4	Sand, fine, clayey; yellowish-gray (5Y7/2), massive.
220.0	5.7	No core.
225.9	5.9	Clay, with crystals and fragments of gaylussite; sandy in upper part; greenish olive (10Y4/2) to pale olive (10Y6/2), still damp; massive. Grades into unit below. At 221.9 ft there is a pocket of sand containing several small gastropod shells. At 222.7 ft two rounded pebbles of dark-gray limestone were noted.
227.7	1.8	Clay, slightly silty, sandy at base; pale greenish yellow (10Y7/2) and yellowish gray (5Y6/2); thin indistinct bedding. Ostracodes common to abundant.
229.9	2.2	Silt, clayey, yellowish-gray (5Y8/1) to pale greenish-yellow (10Y7/2); thin indistinct bedding.
230.0	.1	No core.
235.9	5.9	Silt grading down to silty clay, dusky yellowish-gray (5Y6/3) to pale olive-gray (7Y6/2); thin indistinct bedding.
240.0	4.1	No core.
242.4	2.4	Clay, slightly sandy, grayish-olive (10Y4/2) to dark greenish-gray (5GY4/1), still damp; massive. Poorly consolidated.
245.2	2.8	Clay, slightly silty, light olive-gray (5Y5/2) to dusky yellowish-gray (5Y6/3); local thin bedding.
250.0	4.8	No core.
260.0	10.0	No core.
265.2	5.2	Clay; grayish olive (10Y4/2) to dark greenish gray (5GY4/1) with streaks of moderate yellowish brown (10YR5/4), still damp; massive. Poorly consolidated in upper part. Grades into unit below.
268.8	3.6	Clay; grayish olive (10Y4/2) to pale olive (10Y6/2) with streaks of moderate yellowish brown (10YR5/4), still damp; thin to laminar bedding.
270.0	1.2	No core.

CHINA DRILL HOLE MD-1—Continued

Depth (feet)	Unit thickness (feet)	Description
271.4	1.4	Clay, grayish-olive (10Y4/2), still damp; massive.
277.8	6.4	Clay, yellowish-gray (5Y6-7/2); thin to laminar bedding defined by color changes.
278.4	.6	Clay, grayish-olive (10Y4/2), still damp; massive.
280.0	1.6	No core.
281.3	1.3	Clay, similar to clay at depth of 278.4 ft.
282.3	1.0	Clay, pale-olive (10Y5/2) to light olive-gray (5Y5-6/2), still damp; bedding thin to laminar; fissile fracture. Ostracodes common to abundant.
285.1	2.8	Clay, grayish-olive (10Y4/2), massive. At 284.3 ft a few basalt(?) pebbles up to 15 mm across were noted.
290.0	4.9	No core.
295.3	5.3	Clay, grayish-olive (10Y4/2), still damp; massive.
299.5	4.2	Clay, light olive-gray (5Y6/1), yellowish-gray (5Y8/1), and yellowish-gray (5Y7/2), locally still damp; bedding thin to laminar, locally massive; bedding defined by color changes.
300.0	.5	Clay, pale-olive (10Y5-6/2), massive.
305.1	5.1	Clay, slightly sandy, grayish-olive (10Y4/2), still damp; massive.
306.1	1.0	Clay, slightly silty, pale-olive (10Y6/2) to yellowish-gray (5Y7/2); laminar bedding.
310.0	3.9	No core.
311.2	1.2	Clay, grayish-olive (10Y4/2), still damp; massive. Poorly consolidated.
312.8	1.6	Clay interbedded with silt and fine sand, grayish-olive (10Y4/2) to light olive-gray (5Y5/2) to yellowish-gray (5Y7/2), still damp; thin to laminar bedding; fissile fracture. Ostracodes sparse.
320.0	7.2	Silt and very fine sand, locally clayey; pale olive (10Y5-6/2) and yellowish gray (5Y7/2), locally damp and darker; faint thin bedding defined by color changes. Ostracodes(?) noted.
324.2	4.2	Clay, slightly sandy, similar to clay at depth of 305.1 ft. May be slump, not core.
324.9	.7	Clay, silty, pale olive-gray (7Y5/2), still damp; thin faint bedding. Ostracodes sparse.
330.0	5.1	No core.
331.2	1.2	Clay, slightly sandy, similar to clay at depth of 305.1 ft.
335.2	4.0	Clay, slightly silty, pale olive-gray (7Y6/2) to dusky yellowish-gray (5Y6/3); thin to laminar bedding.
336.5	1.3	Silt, clayey, grading down to clay; light olive gray (5Y5-7/2) to dark greenish gray (5GY4/1) to pale olive (10Y6/2), still damp; thin bedding. Ostracodes locally abundant.
340.0	3.5	No core.
344.1	4.1	Clay, locally silty, light olive-gray (5Y5/2) to grayish-olive (10Y4/2) to pale greenish-yellow (10Y7/2), still damp; thin bedding defined by color changes. Ostracodes locally common.
345.8	1.7	Clay, slightly sandy, grayish-olive (10Y4/2) to dark greenish-gray (5GY4/1), still damp; massive.
350.0	4.2	No core.

CHINA DRILL HOLE MD-1—Continued

Depth (feet)	Unit thickness (feet)	Description
353.9	3.9	Clay, slightly sandy, grayish-olive (10Y4/2) to dark greenish-gray (5GY4/1), still damp; massive. Ostracodes sparse at top.
358.1	4.2	Clay interbedded with silt, grayish-olive (10Y4-5/2) and light olive-gray (5Y5-6/2); distinct thin to laminar bedding defined by both color and compositional changes. Ostracodes locally sparse between 354.9 and 355.9 ft.
360.0	1.9	No core.
360.4	.4	Clay, slightly sandy, grayish-olive (10Y4/2) to dark greenish-gray (5GY4/1), still damp; massive.
366.5	6.1	Clay and silt alternating, dusky yellowish-gray (5Y5-6/3) to pale olive (10Y6/2); irregular bedding ranges from laminar to 2 in. in thickness. Ostracodes locally sparse in silty parts.
367.3	.8	Sand, very fine, yellowish-gray (5Y7/2), massive.
369.0	1.7	Clay and silt alternating, similar to clay and silt at depth of 366.5 ft.
369.2	.2	Sand, medium, yellowish-gray (5Y7/2), massive.
370.0	.8	Silt and a little clay, pale olive-gray (7Y7/2) to dusky yellowish-gray (5Y6/3), faint thin bedding.
373.1	3.1	Clay, slightly sandy, grayish-olive (10Y4/2) to dark greenish-gray (5GY4/1), still damp; massive.
374.0	.9	Silt, pale olive-gray (7Y6/2) to dusky yellowish-gray (5Y6/3), massive.
374.7	.7	Clay and a little silt, pale-olive (10Y5/2). Silt forms laminar beds. At base is a 1-in. bed of fine-grained opal*; very pale orange (10YR8/4) and very pale purple (5P8/2).
375.3	.6	Silt and a little clay, pale-olive (10Y5-6/2) to pale olive-gray (7Y7/2); local thin bedding.
380.0	4.7	No core.
380.9	.9	Clay, slightly sandy, similar to clay at depth of 373.1 ft. Includes a 1-in. pebble of dark fine-grained metamorphic(?) rock.
382.0	1.1	Clay, silty, pale olive-gray (7Y6/2) to pale-olive (10Y6/2), still damp; massive. At base is a 1-in. bed of medium-gray (N5) and moderate orange-brown (10YR5/5) fine-grained opal.
390.0	8.0	No core.
390.8	.8	Clay, slightly sandy, similar to clay at depth of 373.1 ft.
398.8	8.0	Silt and clay alternating, yellowish-gray (5Y7/2) to pale-olive (10Y6/2); irregular beds range from laminar to 2 in. in thickness.
400.0	1.2	No core.
400.8	.8	Clay, slightly sandy, similar to clay at depth of 373.1 ft.
402.4	1.6	Silt grading down to clay, yellowish-gray (5Y6-7/2) to pale-olive (10Y6/2) to pale greenish-yellow (10Y8/2); bedding thin to laminar. Ostracodes locally common in upper part, locally abundant in lower part.
407.7	5.3	Silt, a little clay; light greenish gray (5GY7/1) to yellowish gray (5Y7/2); generally massive; local thin banding defined by color changes and clay.

CHINA DRILL HOLE MD-1—Continued

Depth (feet)	Unit thickness (feet)	Description
410.0	2.3	No core.
411.2	1.2	Silt, a little clay, similar to silt at depth of 407.7 ft.
411.6	.4	Clay, slightly sandy, similar to clay at depth of 373.1 ft.
417.2	5.6	Silt, a little clay, similar to silt at depth of 407.7 ft.
420.0	2.8	No core.
420.6	.6	Clay, slightly silty, grayish-olive (10Y4/2) and dark greenish-gray (5GY4/1), still damp; massive. Grades into unit below.
426.6	6.0	Clay, slightly silty, yellowish-gray (5Y7/2) to pale-olive (10Y6/2), top foot still damp, slightly darker; massive zones alternate with laminar bedded zones. At 426.3 ft there is a 1-in. bed consisting essentially of an isotropic* material with a refractive index of 1.47; may be glass or opal.
430.0	3.4	No core.
432.6	2.6	Clay, slightly silty in lower part; grayish olive (10Y4/2) to dark greenish gray (5GY4/1), still damp; massive.
440.0	7.4	Silt and clay, yellowish-gray (5Y7/2), pale-olive (10Y4-6/2), and light greenish-gray (5GY7/1). Bedding in top 3 ft is distinctly varvelike; remainder of unit generally massive with faint local laminar bedding.
447.2	7.2	Clay; slightly sandy, especially in bottom 6 in.; grayish olive (10Y4/2) and dark greenish gray (5GY4/1), still damp; massive.
450.0	2.8	Silt grading to very fine sand in bottom foot, yellowish-gray (5Y7/1) to light greenish-gray (5GY7/1); generally massive, local faint bedding. Trace of glass noted in fine sand near the base.
451.8	1.8	Clay, grayish-olive (10Y4/2) and dark greenish-gray (5GY4/1), still damp; massive.
456.7	4.9	Sand, very fine; a little clay and silt; yellowish gray (5Y7-8/1), locally still damp, somewhat darker; generally massive. Clay and silt form local thin beds.
460.0	3.3	No core.
462.8	2.8	Silt, a little clay; yellowish gray (5Y7/1), light greenish gray (5GY7/1), and pale greenish yellow (10Y7/2); generally massive, local laminae of clay in lower half.
463.9	1.1	Clay and silt, a little sand; pale olive (10Y5/2) to yellowish gray (5Y7/2); laminar bedding. Ostracodes common to abundant.
470.0	6.1	No core.
470.4	.4	Clay, silty, grayish-olive (10Y4/2), still damp; massive.
472.7	2.3	Silt and clay, pale-olive (10Y6-7/2) and light greenish-gray (5GY8/1); thin to laminar bedding defined by clay alternating with silt. At 472.1 ft there is a $\frac{1}{2}$-in. bed of very light gray (N8) fine-grained isotropic* material which has a refractive index of 1.47 and may be either opal or glass.
476.0	3.3	Clay, slightly sandy, grayish-olive (10Y4/2) and dark greenish-gray (5GY4/1), still damp; massive.

CHINA DRILL HOLE MD-1—Continued

Depth (feet)	Unit thickness (feet)	Description
480.0	4.0	No core.
481.2	1.2	Silt and a little clay, yellowish-gray (5Y8/1) and pale-olive (10Y5/2); bedding consists of $\frac{1}{4}$-in. beds of silt separated by partings of clay. At base of this unit there is a $\frac{1}{2}$-in. zone of fine-grained opal* with a refractive index of about 1.465; also present are potash feldspar*, quartz*, calcite*, and an opaque material, which form about 10 percent of the total.
486.6	5.4	Silt and clay; silt predominates in the top and bottom thirds, clay predominates in the middle; light greenish gray (5GY7-8/1), pale olive (10Y6-7/2), and yellowish gray (5Y7/2); indistinct thin bedding, locally massive, especially in clay. Ostracodes sparse. At 484.0 ft there is a $\frac{1}{8}$-in. bed of fine-grained light-gray (N8) material, megascopically similar to that at 472.1 ft.
490.0	3.4	No core.
490.7	.7	Clay, slightly sandy, similar to clay at depth of 476.0 ft.
491.5	.8	Clay, silt, and compact fine-grained opal(?) in an irregular mixture; yellowish gray (5Y7/2) to pale greenish yellow (10Y7/2) to grayish olive (10Y4/2); probably massive, badly shattered during drilling. Opal(?) is megascopically similar to that at 481.2 ft.
492.2	.7	Sand, very fine, yellowish-gray (5Y7/2) to pale greenish-yellow (10Y7/2), faint thin bedding.
497.5	5.3	Clay and silt, pale-olive (10Y6-7/2) and dusky yellowish-gray (5Y6/3); bedding thin to laminar, faint in upper part, distinct in lower part; local massive zones. Ostracodes locally common.
500.0	2.5	Silt and fine sand, some medium to coarse sand in lower half; light greenish gray (5GY7/1); generally massive; local faint bedding.
502.2	2.2	Clay, contains a few pebbles or concretions; grayish-olive (10Y4/2) and dark greenish gray (5GY4/1), still damp; massive.
507.8	5.6	Sand, fine, coarser in top foot; yellowish gray (5Y6/2) to pale olive (10Y6/2), still damp; faint thin bedding.
510.0	2.2	No core.
511.3	1.3	Silt and very fine sand, a little clay; yellowish gray (5Y7/2); faint bedding at top.
517.6	6.3	Clay and silt, pale-olive (10Y6-7/2) and yellowish-gray (5Y7/2); laminar bedding defined by alternating clay and silt and color changes; fissile fracture. At 515.7 ft there is a $\frac{1}{2}$-in. bed of fine-grained very light gray (N8) isotropic* material with an average index of 1.475; probably opal.
520.0	2.4	No core.
522.2	2.2	Clay, sandy, grayish-olive (10Y4/2) and dark greenish-gray (5GY4/1), still damp; massive. Poorly consolidated.
523.6	1.4	Sand, fine; contains fine-grained calcite; yellowish gray (5Y7/1-2) and light greenish gray (5GY7/1); faint thin bedding.
530.0	6.4	No core.

CHINA DRILL HOLE MD-1—Continued

Depth (feet)	Unit thickness (feet)	Description
540.0	10.0	Clay, silty, less silty in bottom foot; yellowish gray (5Y7/1) to light greenish gray (5GY7/1); generally thin bedded with fissile fracture, locally massive.
542.0	2.0	Clay, slightly sandy in lower part; dark greenish gray (5GY4/1) and grayish olive (10Y4/2), still damp; massive.
548.1	6.1	Clay, slightly silty, pale olive-gray (7Y6/2) to pale-olive (10Y6-7/2) to light olive-gray (5Y5-6/2); laminar bedding; fissile fracture.
548.2	.1	Glass*, fine-grained, very light gray (N8). In $\frac{1}{4}$-in. beds separated by partings of a darker material. Isotropic; refractive index about 1.478.
549.5	1.3	Clay and a little silt, pale-olive (10Y6-7/2); thin to laminar bedding. Ostracodes sparse.
550.0	.5	No core.
555.3	5.3	Clay, sandy, a few pebbles or concretions; grayish olive (10Y4/2) and dark greenish gray (5GY4/1), still damp; massive.
558.4	3.1	Clay, silty, pale-olive (10Y6-7/2) and yellowish-gray (7Y7/2); laminar bedding; locally massive.
560.0	1.6	No core.
561.6	1.6	Clay, slightly sandy at base; grayish olive (10Y4/2) to dark greenish gray (5GY4/1), still damp; massive.
567.2	5.6	Sand, very fine to fine, grades downward to medium, locally clayey; yellowish gray (5Y6-7/2) to pale olive (10Y6/2), still damp and slightly darker in upper part; faint thin bedding.
570.0	2.8	No core.
578.5	8.5	Clay, local small pockets of very coarse to medium sand; grayish olive (10Y4/2) and dark greenish gray (5GY4/1), still damp; massive.
579.3	.8	Sand, fine, yellowish-gray (5Y6/2); thin to laminar bedding.
580.0	.7	No core.
582.2	2.2	Sandy clay grading down to very fine clayey sand, grayish-olive (10Y4/2) to light olive-gray (5Y5/2) and dark-greenish-gray (5GY4/1), still damp; massive.
590.0	7.8	Clay, a little silt; very fine sand in top 6 in.; yellowish greenish gray (7Y5-6/2) and grayish olive (10Y4/2) to pale greenish yellow (10Y7/2); lighter layers are silt, darker layers are clay; bedding generally varvelike; locally massive. Ostracodes(?) noted.
591.4	1.4	Clay and silt, light olive-gray (5Y4-6/2) to pale-olive (10Y5-7/2); bedding generally varvelike, locally massive.
592.8	1.4	Clay, slightly silty, yellowish-gray (5Y6-7/2); faint thin bedding.
595.8	3.0	Clay, yellowish-gray (5Y6-7/2) and light greenish-gray (5GY7/1); faint thin bedding in upper part grading to varvelike bedding in lower part.
600.0	4.2	No core.
604.9	4.9	Clay with very thin beds of silt, light olive-gray (5Y6/1) to greenish-gray (5GY6/1); thin to varvelike bedding.

CHINA DRILL HOLE MD-1—Continued

Depth (feet)	Unit thickness (feet)	Description
606.6	1.7	Clay with many small pebbles, dark greenish-gray (5GY4/1), still damp; massive.
607.1	.5	Silt and clay interbedded, pale olive-gray (7Y6/2); thin bedding.
610.0	2.9	No core.
612.8	2.8	Silt, with interbedded clay, pale-olive (7-10Y6/2); laminar bedding. Grades into unit below.
617.6	4.8	Clay with interbedded silt, yellowish-gray (5Y6/2) to pale-olive (10Y6/2); laminar bedding.
618.4	.8	Sand, fine, clayey; contains many concretions (or rounded fragments?) of a fine-grained white calcareous substance; yellowish-gray (5Y7/2) to pale greenish-yellow (10Y7/2); thin bedding; concretions are concentrated in beds. Top 2 in. mostly clay.
620.0	1.6	No core.
624.3	4.3	Clay, slightly sandy, pale olive-gray (7Y6/2) and greenish-gray (5GY5/1), top 3 ft still damp and darker; massive.
625.5	1.2	Sand, medium to coarse, yellowish-gray (5Y6/2); faint thin bedding in upper part.
628.8	3.3	Clay, slightly silty, yellowish-gray (5Y7/2) to pale-olive (10Y6/2); laminar bedding with partings of silt.
630.0	1.2	No core.
633.6	3.6	Clay, locally silty, pale-olive (10Y6/2); laminar bedding; generally fissile. Ostracodes locally common.
638.0	4.4	Clay, yellowish-gray (5Y6-7/2) to pale greenish-yellow (10Y7/2); thin to laminar bedding; chunky fracture. Ostracodes locally common.
638.7	.7	Clay with many thin white (N9) beds of calcite*; pale-olive (10Y6/1); thin bedding. Ostracodes locally common.
639.4	.7	Silt, clayey, pale olive-gray (7Y6/2), massive.
640.0	.6	No core.
642.2	2.2	Clay, sandy, pale-olive (10Y6/2) to yellowish-gray (5Y6/2), massive.
648.3	6.1	Clay, slightly silty, pale olive-gray (7Y6/2) to pale-olive (10Y6/2) to light greenish-gray (5GY7/1); thin bedding; fissile except in top foot. Grades into unit below.
649.8	1.5	Silt, clayey, pale olive-gray (7Y6/2); faint thin bedding. Contains small pockets of fine-grained light yellowish-gray (5Y9/1) calcite* generally concentrated along bedding planes.
650.0	.2	No core.
653.0	3.0	Clay, slightly sandy, grayish-olive (10Y3-4/2), still damp; massive.
657.8	4.8	Clay, locally silty, yellowish-gray (5Y6/2-3) to pale-olive (10Y6/2); thin to laminar bedding; locally fissile. Ostracodes common in upper part.
660.0	2.2	No core.
664.3	4.3	Clay, grayish-olive (10Y4/2) to dark greenish-gray (5GY4/1), still damp; massive. Poorly consolidated.
666.3	2.0	Clay, light olive-gray (5Y5-6/2) to pale-olive (10Y5-6/2); thin to laminar bedding with silty partings; varvelike in top 3 in.
670.0	3.7	No core.

CHINA DRILL HOLE MD-1—Continued

Depth (feet)	Unit thickness (feet)	Description
673.3	3.3	Clay, yellowish-gray (5Y6/2) to pale-olive (10Y6/2); laminar bedding with silty partings.
674.9	1.6	Sand, medium, clayey, yellowish-gray (5Y6/2), bottom 1.2 ft still damp and darker; very faint thin bedding.
680.0	5.1	No core.
680.4	.4	Clay, light olive-gray (5Y4/2), still damp; massive.
686.2	5.8	Clay, slightly silty, pale-olive (10Y6/2) to yellowish-gray (5Y6/2); laminar bedding; generally fissile. At 686.1 ft there is a 1-mm bed of very light gray (N8) glass* with a refractive index of about 1.49.
686.8	.6	Clay, silty, pale-olive (10Y6/2) to yellowish-gray (5Y5-6/2); laminar bedding. Ostracodes(?) noted.
690.0	3.2	No core.
691.0	1.0	Clay, silty, light olive-gray (5Y5-6/2) to pale-olive (10Y5-6/2), still damp; laminar bedding. Contains many laminae of yellowish-gray (5Y8/1) calcite*.
692.7	1.7	Clay, silty, yellowish-gray (5Y7/2) to pale-olive (10Y6/2); thin to laminar bedding; fine chunky fracture. Grades into unit below.
694.0	1.3	Sand, medium, clayey, pale-olive (10Y6/2); very faint thin bedding.
700.0	6.0	No core.

SEARLES DRILL HOLE L-W, L-W-D

[Searles L-W, surface to 150 feet, was drilled by the American Potash & Chemical Corp. and is published with their permission; it was logged by F. J. Dluzak and M. Flaherty and has been modified by G. I. Smith. Searles L-W-D extends from the bottom of Searles L-W to 875 feet; 47 percent of the core was recovered.]

Depth (feet)	Unit thickness (feet)	Description
2.0	2.0	Halite, granular and cubic, in light-green mud.
3.0	1.0	No core.
5.0	2.0	Halite, granular and cubic, in light-green mud.
6.8	1.8	Halite, cubic and granular, in greenish mud.
7.6	.8	No core.
8.8	1.2	Halite, cubic and granular, in greenish mud.
11.4	2.6	Mud, light-green, and granular and cubic halite. Equal proportions of halite and mud.
12.7	1.3	Halite, granular and cubic, unconsolidated, in equal proportions.
13.4	.7	Mud, soft, green. Halite crystals throughout.
14.7	1.3	Mud, green, uncompacted. Halite crystals throughout.
15.8	1.1	Mud, green, uncompacted. Large elongated halite crystals of both cubic and octahedral shapes.
16.1	.3	No core.
17.4	1.3	Mud, green, uncompacted. Large elongated halite crystals.
17.8	.4	No core.
18.8	1.0	Halite, loose, in a matrix of green mud.
19.1	.3	Halite, cubic, octahedral, and granular.
19.4	.3	Halite, uncompacted. Some greenish mud.
20.2	.8	Halite?, uncompacted octahedrons and cubes in green mud.
21.7	1.5	Halite, octahedrons and some cubes, in green mud.
22.0	.3	Halite and green mud.

SEARLES DRILL HOLE L-W, L-W-D--Continued

Depth (feet)	Unit thickness (feet)	Description
23.4	1.4	Halite, loose. Green mud and orange hanksite colored by algae in bottom 3 in.
24.2	.8	Hanksite, orange, algae-stained. Large halite crystals in clusters, a little mud, some borax.
25.2	1.0	Hanksite, orange, algae-stained, crystals of different sizes. Large halite crystals; some green mud.
27.4	2.2	Hanksite crystals, algae-stained. Fragments of halite, borax crystals; a little trona; green mud.
27.6	.2	No core.
29.1	1.5	No core.
29.8	.7	Halite, granular, dense crystalline aggregate. Pockets of glaserite and borax; some gray trona and scattered trona needles.
30.0	.2	No core.
30.7	.7	Halite.
31.2	.5	Trona, gray, in alternating seams. A little halite and hanksite.
31.9	.7	Halite fragments and gray trona. Large hanksite crystals at base.
32.3	.4	Hanksite and halite, hard. Sulfohalite scattered throughout; gray trona in cavities.
32.6	.3	Trona, muddy. Large crystals of hanksite and sulfohalite; some green mud.
32.9	.3	Trona, soft. Halite.
33.4	.5	Halite. Hanksite in lower part.
33.6	.2	Hanksite, halite, and greenish mud. A little sulfohalite. Hanksite crystals large.
33.8	.2	Hanksite and halite, hard. A little sulfohalite; greenish mud at top and base.
33.9	.1	Mud, greenish.
34.4	.5	Hanksite. Green mud. Gray trona at top.
35.2	.8	Halite. Pockets of borax and hanksite. Gray trona and sulfohalite at top.
35.5	.3	Halite. A little gray trona.
35.8	.3	Halite and trona, soft.
36.1	.3	Halite and trona. Some large hanksite crystals.
36.3	.2	Halite, vuggy. Borax and halite crystals embedded in the halite. Some gray trona and mud.
37.0	.7	Borax. Some gray trona; a little halite.
38.0	1.0	Borax. Some halite and trona.
38.3	.3	No core.
38.7	.4	Halite and trona.
38.8	.1	Halite and trona, uncompacted.
39.5	.7	Halite, hard, and cream-colored trona, in alternating seams. Pockets of glaserite; streaks of hanksite. Uncompacted halite and trona on top.
40.1	.6	Trona, cream-colored, and halite, in equal proportions. Thin seams of glaserite and hanksite; a little borax.
40.7	.6	Halite, hard. Some gray and cream-colored trona. Pockets of glaserite and brownish mud at the base.
41.0	.3	Halite. Gray trona; some glaserite.
41.8	.8	Halite, vuggy. Gray trona and some glaserite. Hanksite in top 2 in.
42.0	.2	Trona, hard, and hanksite. Some halite and mud.
42.6	.6	Halite, vuggy, pure, and gray trona. A little hanksite and mud.

SEARLES DRILL HOLE L-W, L-W-D--Continued

Depth (feet)	Unit thickness (feet)	Description
42.7	0.1	No core.
43.1	.4	Halite and some trona.
44.0	.9	Halite, vuggy, pure. Trona and glaserite.
44.8	.8	Halite and gray trona and glaserite. Small sulfohalite crystals.
45.0	.2	No core.
45.2	.2	Halite, pure. Trona and glaserite.
45.9	.7	Halite. Glaserite throughout.
46.3	.4	Halite. A thin muddy trona seam contains sulfohalite. Some glaserite.
46.4	.1	No core.
46.8	.4	Halite, vuggy, pure. Large amounts of trona and sulfohalite in top 2 in.; trona needles at base.
47.6	.8	Halite, vuggy. pure. Some glaserite and trona.
48.3	.7	Halite and cream-colored trona. Large amounts of glaserite. Cavities throughout.
49.4	1.1	Halite, glaserite, trona, and sulfohalite.
49.7	.3	Halite, muddy. Some gray trona. Glaserite.
50.3	.6	Halite. A little black mud; a few white hanksite crystals; small sulfohalite crystals.
50.5	.2	Halite and trona and glaserite. Some hanksite; small sulfohalite crystals.
50.8	.3	Halite, pure. Glaserite and trona; some muddy trona on top.
51.3	.5	Halite, hard. A little trona and hanksite.
51.5	.2	Halite, muddy and granular. Thin mud seams contain hanksite crystals.
52.5	1.0	Halite, pure. Cream-colored trona. Glaserite in seams and pockets. A few white hanksite crystals in upper part.
53.5	1.0	Halite, pure. Trona includes a large percentage of glaserite.
56.4	2.9	Halite, pure. Pockets and seams of glaserite; thin seams of cream-colored trona. A little hanksite; octahedral halite.
56.8	.4	Trona and halite.
57.5	.7	Trona, fine-grained. Granular halite.
58.9	1.4	Halite, granular, and seams of halite octahedrons. Thin seams and pockets of glaserite and trona; a little hanksite; some black mud at the base.
60.6	1.7	Halite, pure. Pockets of glaserite, borax, and a little hanksite. Some trona on top. A few large cavities.
60.8	.2	Halite, sugary. Hanksite at base.
61.0	.2	Hanksite with glaserite, halite, and borax surrounding the crystals. A little black mud.
61.6	.6	Glaserite, vuggy. Some soft trona and halite.
62.0	.4	Halite, sugary. Two thin mud seams about 2 in. apart.
62.3	.3	Halite, vuggy, and glaserite. Small irregular mud seam. Some gray trona.
62.5	.2	Halite.
63.3	.8	Halite, fine-grained, granular. A large amount of gray trona.
63.9	.6	Trona, sugary. A little halite.
64.5	.6	Trona and halite in almost equal proportions.
64.6	.1	Trona, gray, and halite.

SEARLES DRILL HOLE L-W, L-W-D—Continued

Depth (feet)	Unit thickness (feet)	Description
65.8	1.2	Halite, pure; slightly porous, with 2-in. trona seams near top; a little trona throughout.
66.4	.6	Halite and trona.
67.4	1.0	Halite, pure. Trona. A little hanksite in top 2 in.
67.9	.5	No core.
69.3	1.4	Trona, cream-colored. A trace of halite.
69.7	.4	No core.
70.3	.6	Trona, light-gray.
70.9	.6	Trona, medium-gray.
71.4	.5	Trona, soft. Borax and black mud.
72.0	.6	No core.
72.8	.8	Mud, black. Pirssonite crystals; a little trona; a few borax crystals.
73.8	1.0	Mud, black, and pirssonite crystals. Thin seams of gray mud and a red organic substance.
75.8	2.0	Mud, black. Gray seams contain tychite(?). Thin seams of red organic material. Scattered pirssonite crystals.
78.7	2.9	Mud, black. Gray clay seams contain tuchite(?). Scattered pirssonite crystals.
82.1	3.4	Mud, black, and many small pirssonite crystals. Clay seams contain tychite(?) in upper half.
82.5	.4	Mud, black. Many pirssonite crystals.
84.5	2.0	Mud, black. Many small pirssonite crystals. A few bluish-gray seams.
85.0	.5	Trona, gray, vuggy. Black pirssonite mud, borax crystals.
85.2	.2	No core.
86.4	1.2	Trona as slightly porous fine needles. Some black mud in cavities.
86.8	.4	No core.
87.6	.8	Trona as loose fine needles.
88.0	.4	Halite, vuggy. Gray trona; black pirssonite mud.
89.7	1.7	Mud, dense, black. Laced with small diamond-shaped pirssonite crystals.
90.5	.8	Trona, flaky and gray.
92.3	1.8	Halite. Locally coherent. Gray trona throughout.
92.5	.2	No core.
93.3	.8	Halite, loosely coherent. Some trona and streaks of red organic substance.
93.5	.2	No core.
94.0	.5	Trona, soft, mushy, gray. A little halite on top; core tinged slightly red by organic substance.
94.3	.3	Mud, dense, black. Pirssonite crystals throughout.
94.5	.2	No core.
96.1	1.6	Pirssonite mud, dense, black. Laced throughout by small diamond-shaped pirssonite crystals. Small patch of nahcolite.
96.5	.4	Trona, fine-grained; gray. Some mud.
96.6	.1	No core.
96.8	.2	Trona, mushy; gray. Crumbly halite.
97.5	.7	Halite, both pure and impure, mixed with gray trona. Small ¼-in. mud seam near bottom.
97.9	.4	Halite, sugary. Gray trona. Crumbly halite and trona at bottom.
98.1	.2	No core.

SEARLES DRILL HOLE L-W, L-W-D—Continued

Depth (feet)	Unit thickness (feet)	Description
98.9	0.8	Halite, loose, crumbly. Some gray trona. Irregular burkeite seam on bottom.
99.1	.2	No core.
99.3	.2	Halite, porous, crumbly. Some gray trona.
99.8	.5	Halite, hard, dirty. Bottom 2½ in. is vuggy burkeite. Gray trona in cavities.
100.0	.2	No core.
100.7	.7	Burkeite, porous. Some halite and trona.
100.8	.1	No core.
101.0	.2	Trona as fine needles. Some halite and burkeite.
101.1	.1	No core.
101.7	.6	Trona as large needles. A large pocket of burkeite. A little halite.
101.8	.1	No core.
102.0	.2	Halite, crumbly and trona. Small pocket of burkeite.
102.1	.1	No core.
102.7	.6	Trona as needles and blades. Halite crystals; burkeite fragments.
102.8	.1	No core.
104.5	1.7	Halite, crumbly. Gray trona; burkeite fragments.
105.1	.6	Trona, solid, gray. Large pockets of burkeite.
105.8	.7	Halite, vuggy, granular, and crumbly. Gray trona and burkeite throughout.
106.4	.6	Halite, crumbly. Gray needles of trona. Large pocket of burkeite. Thin seam of borax 1 in. from base.
107.0	.6	Halite, vuggy. Irregular seam of burkeite contains a large cavity. Gray trona and a seam of hard halite at the base.
107.1	.1	No core.
107.3	.2	Mud seam, stained deep red. Large percentage of trona and borax crystals.
107.4	.1	No core.
107.6	.2	Halite, hard, vuggy. Trona and thin streaks of mud.
108.2	.6	Halite, hard. A large percentage of muddy trona; large burkeite pocket; black mud on bottom.
108.3	.1	No core.
108.6	.3	Mud seam stained red by organic substance. Large amount of trona; some borax. Gray clay seams throughout.
109.0	.4	No core.
109.4	.4	Burkeite and trona. Some trona is changing to burkeite.
110.1	.7	No core.
111.8	1.7	Mud, black, and pirssonite crystals. A few gray clay seams (tychite?) throughout. Small patch of nahcolite and burkeite fragments in top 4 in.
112.2	.4	No core.
113.0	.8	Trona needles. Some appears to be changing to burkeite. A few fairly large cavities (possibly thenardite).
113.2	.2	No core.
114.1	.9	Mud, dense, black. Laced throughout by pirssonite crystals.
114.4	.3	Trona, mushy. Trona needles. Some mud.
114.5	.1	No core.
115.3	.8	Trona, hard, vuggy. Tiny halite crystals.
115.4	.1	No core.

SEARLES DRILL HOLE L-W, L-W-D—Continued

Depth (feet)	Unit thickness (feet)	Description
116.3	0.9	Trona, slightly porous, needles. Large amount of black mud. Hard irregular halite seam near base.
116.5	.2	Mud seam, dense, black, fractured. Scattered tiny pirssonite crystals.
117.0	.5	Mud, dense, black. Gray clay seams (tychite?) throughout. Scattered pirssonite crystals.
117.2	.2	Mud, black, mushy. Some trona embedded in mud.
117.5	.3	Mud, black. Laced by pirssonite crystals.
118.2	.7	Mud, dense, black. Gray clay seams (tychite?). Scattered pirssonite crystals.
118.3	.1	No core.
118.9	.6	Trona, fairly porous, needles. Tiny thin seams of red organic substance. Hard bony trona on bottom (possibly thenardite).
119.0	.1	No core.
119.7	.7	Trona, as flaky blades and needles. A little mud.
119.9	.2	No core.
120.1	.2	Trona, soft, mushy. Black mud on bottom.
120.7	.6	Mud, black. Laced by gaylussite crystals. A few gray clay seams (tychite?).
120.8	.1	No core.
121.5	.7	Mud, dense, black. Laced by gaylussite crystals.
123.6	2.1	Mud, dense, black. Gray clay seams (northupite and tychite) throughout. Scattered gaylussite crystals.
123.8	.2	No core.
127.5	3.7	Mud, dense, black. Laced throughout by gaylussite crystals. The bottom 30 in. has a few gray clay seams (tychite or northupite).
129.1	1.6	Mud, dense, black. Gray clay seams (northupite or tychite). Scattered gaylussite crystals.
129.5	.4	Mirabilite, solid. A little mud engrained.
131.5	2.0	Mud, dense, black. Laced by gaylussite crystals. A few gray clay seams (tychite or northupite).
134.7	3.2	Mud, dense, black. Gaylussite crystals. Patches of mirabilite in bottom 12 in. A few gray seams (tychite or northupite).
135.5	.8	Mud, dense, black. Laced by gaylussite (or northupite).
137.9	2.4	Mud, dense, black. Laced throughout by gaylussite crystals. A few gray clay seams.
138.1	.2	No core.

SEARLES DRILL HOLE L-W, L-W-D—Continued

Depth (feet)	Unit thickness (feet)	Description
138.8	0.7	Mud, black. Gray clay seams, blue clay seams, and thin seams of red organic material. Scattered small gaylussite crystals.
139.7	.9	Mud, black. Gray and blue clay seams. Scattered gaylussite crystals.
139.9	.2	No core.
141.9	2.0	Mud, black. Tiny gaylussite crystals scattered throughout. Gray and blue clay seams; thin seams of red organic material. A twig(?) embedded in top inch.
142.5	.6	Clay. greenish-gray. Tiny white particles embedded in the clay. Clay has large percentage of sand.
144.3	1.8	Clay, green-gray. Middle 6 in. very gritty; probably contains tiny crystals of northupite or tychite. Large percentage of sand.
145.4	1.1	Mud, black. Blue-gray seams of volcanic ash(?). Scattered tiny gaylussite crystals. Patches of greenish-gray clay.
147.7	2.3	Mud, black. Gray clay seams, gaylussite sand. Core has 3 distinct fractures from top down 7 in.
148.9	1.2	Mud, black. Gray clay seams of northupite(?). High percentage of sand. Mud appears to be a gaylussite sand.
149.4	.5	Mud, black. Gray clay seams of northupite(?). Some sand.
150.0	.6	Mud, black. Gray clay seams of northupite(?). Some sand. Gaylussite crystals scattered in top section but dense in bottom. Patches of mirabilite in bottom 3 in.
151.7	1.7	Clay, with about 25 percent gaylussite. Crystal sizes range from 1 to 3 mm. Dusky yellow green (5GY4-5/2). Massive.
152.6	.9	Silt; mottled colors, greenish gray (5GY6/1) and yellowish gray (5Y6/2). Less than 5 percent of material gaylussite crystals; average size about 3 mm. Massive. At base there is a 1-in. bed of fine-grained trona.
153.3	.7	Clay, top 2 in. about 50 percent gaylussite with crystals about 10 mm long. Grades downward into clay containing about 10 percent gaylussite crystals. Dark greenish gray (5GY4/1). Massive.
156.9	3.6	Clay, with about 50 percent gaylussite crystals; average size 2 mm. Color ranges from dark greenish gray (5GY4/1) to grayish olive (10Y4/2) to grayish yellow green (5GY6/2). Mostly massive, local indistinct bedding.

Depth (feet)	Unit thickness (feet)	Description
157.1	0.2	Clay; color ranges from greenish yellow (10Y6/4) to pale olive (10Y6/2) to grayish olive (10Y3-4/2) to light greenish gray (5GY9/1). Laminar bedding defined by color changes.
157.3	.2	Clay, similar to clay at depth of 156.9 ft.
160.0	2.7	No core.
163.6	3.6	Gravel, crystal, about 70 percent gaylussite, a little thenardite, clay, and probably other minerals. Average crystal size about 2 mm. Grayish yellow green (5GY8/2). Poorly consolidated; may be cuttings, not core.
169.2	5.6	Clay, with an average of 30 percent gaylussite crystals; crystal sizes up to 5 mm, average 2 mm; greenish gray (5GY6/1). Thick bedding, very faint.
170.0	.8	No core.
170.8	.8	Clay, similar to clay at depth of 169.2 ft. Crystal sizes up to about 20 mm; average about 5 mm.
176.7	5.9	Clay, with 30 to 50 percent gaylussite crystals. Crystal sizes range from 2 to 10 mm, average 5 mm. Colors range from pale olive (10Y6/2) to grayish yellow (5Y7/4) to yellowish gray (5Y7/2). Massive; crystals appear randomly oriented.
177.4	.7	Gravel, crystal, about 60 percent crystals of gaylussite in a clay matrix. Crystal sizes range from 1 to 5 mm, average about 3 mm. Pale olive (10Y7/2). Poorly consolidated.
177.7	.3	Clay, with about 30 percent gaylussite crystals. Crystal sizes range from 4 to 20 mm, average about 10 mm. Light olive gray (5Y6/2). Massive.
179.7	2.0	Gravel, crystal, about 75 percent gaylussite crystals in a clay matrix. Crystal sizes range from 5 to 20 mm, average about 12 mm. Light olive gray (5Y5/2). Massive; crystals appear randomly oriented.
180.0	.3	No core.
180.7	.7	Clay, with an average of about 25 percent gaylussite crystals. Crystal sizes range from 2 to 12 mm, average about 6 mm. Light olive gray (5Y6/2). Massive, but crystals are locally concentrated.
181.6	.9	Sand, crystal, about 70 percent gaylussite crystals in a clay matrix. Average size is very coarse sand; contains a single crystal about 25 mm long. Light olive gray (5Y5/2). Poorly consolidated.
182.6	1.0	Gravel, crystal, about 75 percent gaylussite crystals in a clay matrix. Crystal sizes range from 4 mm to 20 mm, average about 10 mm. Light olive gray (5Y5/2). Massive.
185.6	3.0	Gravel, crystal, average about 70 percent gaylussite crystals in a clay matrix. Crystals range from sand size to 15 mm, average about 4 mm. Mottled colors; predominantly light olive gray (5Y5/2); laminae of white (N9). Unit has laminar bedding, which is more pronounced at the base. Dolomite* noted in small quantities.
190.0	4.4	No core.

Depth (feet)	Unit thickness (feet)	Description
190.7	0.7	Clay, with about 50 percent gaylussite crystals. Crystal sizes range from 1 to 7 mm, average about 2 mm. Mottled coloring, predominantly pale olive (10Y6/2). Massive. Several nodules of burkeite* noted, approximately 5 mm thick.
190.9	.2	Silt, with thin layers of gaylussite crystals. Gaylussite crystals up to 2 mm in size. Silt may be very fine crystals and fragments of finely crystallized gaylussite. Pale greenish yellow (10Y7/2). Local thin bedding.
191.3	.4	Gravel, crystal, similar to crystal gravel at depth of 182.6 ft.
192.7	1.4	Clay, containing very fine grained gaylussite*. Light olive gray (5Y6/1-2); one bed of olive gray (5Y3/2). Laminar bedding defined by color changes.
200.0	7.3	No core.
203.8	3.8	Gravel, crystal, similar to crystal gravel at depth of 182.6 ft. May be cuttings, not core.
204.2	.4	Clay, with about 50 percent gaylussite crystals. Sizes range from 1 to 10 mm; average about 4 mm. Colors mottled; grayish olive (10Y4/2) and dusky yellow (5Y6/4). Faint thin bedding defined by color changes.
210.0	5.8	No core.
211.9	1.9	Gravel, crystal, similar to crystal gravel at depth of 182.6 ft.
215.0	3.1	No core.
216.0	1.0	Gravel, crystal, about 75 percent gaylussite crystals in a clay matrix. Sizes range from 1 to 8 mm, average about 3 mm. Pale olive (10Y6/2). Poorly consolidated.
217.0	1.0	Silt, with about 30 percent gaylussite crystals. Average crystal size less than 1 mm. Dusky yellow (5Y5/4). Massive in upper part grading to laminar bedding in lower part. At 216.5 ft there is a 6-in. bed of nahcolite*.
220.7	3.7	Gravel, crystal, averages about 70 percent gaylussite crystals in a clay matrix. Crystal sizes range up to about 8 mm; average size about 5 mm at top, diminishing to about 1 mm at bottom. Colors range from olive gray (5Y3/2) to grayish olive (10Y4/2). Generally well bedded but locally massive in lower part. Upper part contains 1 mm aggregates of parallel gaylussite crystals alternating with 2 mm beds of clay. Contains a few randomly oriented gaylussite crystals. One-inch beds of fine-grained nahcolite* occur at 219.3, 220.1, and 220.6 ft.
225.0	4.3	No core.
227.7	2.7	Sand, crystal, similar to crystal sand at depth of 181.6 ft. May be cuttings, not core.
228.2	.5	Nahcolite*, fine-grained. At 227.8 ft there is a 1-in. bed of crystal silt containing about 90 percent silt-sized gaylussite crystals in a clay matrix. Dusky yellow (5Y5/4). Massive.
235.0	6.8	No core.

SEARLES DRILL HOLE L-W, L-W-D—Continued

Depth (feet)	Unit thickness (feet)	Description
236.8	1.8	Clay, with about 10 percent gaylussite crystals. Crystal sizes range from 1 to 3 mm. Mottled colors; from dusky yellow green (5GY5/2) to grayish olive (10Y4/2). Poorly consolidated. May be cuttings, not core.
239.0	2.2	Sand, crystal, similar to crystal sand at depth of 181.6 ft. May be cuttings, not core.
239.9	0.9	Clay, with about 50 percent gaylussite crystals. Crystal sizes range from 0.5 to 3 mm, average about 2 mm. Color ranges from light olive gray (5Y5/2) to light olive brown (5Y5/4). Massive; pseudobedding caused by local concentrations of crystals. Bottom 4 in. is fine-grained nahcolite* with partings of clay.
245.0	5.1	No core.
245.7	.7	Sand, crystal, similar to crystal sand at depth of 181.6 ft. May be cuttings, not core.
247.5	1.8	Trona*, crystalline, in "jackstraw" aggregates of acicular crystals. Lengths of crystals up to 5 mm. Massive. Several small crystals of tychite* noted at 246.5 ft.
248.2	.7	Sand, crystal, average of 50 to 60 percent gaylussite crystals in a clay matrix. Crystal sizes range from 1 to 3 mm. Yellowish gray (5Y7/2). Massive.
248.5	.3	Sand, crystal, principally trona* crystals, about 1 mm in size, in a fine white matrix. Associated with the trona is a faintly anisotropic spherulitic substance with an average refractive index of about 1.53; it gives a moderately strong positive test for boron and may be searlesite*. Laminar bedding.
255.0	6.5	No core.
256.5	1.5	Sand, crystal, generally 80 to 90 percent gaylussite crystals and a little clay. Crystal sizes range from 0.5 to 2.0 mm. Pale olive (10Y5/2). Poorly consolidated. May be cuttings, not core.
257.4	.9	Sand, crystal, similar to crystal sand at depth of 181.6 ft. May be cuttings, not core.
258.0	.6	Gravel, crystal, with about 50 to 60 percent gaylussite crystals in a clay matrix. Crystal sizes range from 1 to 12 mm, average 5 mm. Olive gray (5Y3/2). Local laminar bedding. At the bottom there is a 1-in. bed of fine-grained trona*.
265.0	7.0	No core.
268.2	3.2	Sand, crystal, similar to crystal sand at depth of 256.5 ft. May be cuttings, not core.
269.0	.8	Trona*, crystalline; coarse-grained crystals in a fine-grained matrix. Massive.
275.0	6.0	No core.
281.0	6.0	Trona*, crystalline; clay impurities range up to about 70 percent. Crystal sizes range up to about 20 mm. Orientation of crystals is generally random, locally radiating. Within this unit, from 275.8 to 276.3 ft, is a layer of clay containing about 20 percent gaylussite crystals which average about 3 mm in size. Colors of the clay range from light olive gray (5Y5/2) to grayish olive (10Y4/2). Massive.

SEARLES DRILL HOLE L-W, L-W-D—Continued

Depth (feet)	Unit thickness (feet)	Description
285.0	4.0	No core.
287.5	2.5	Sand, crystal, similar to crystal sand at depth of 256.5 ft; contains small amounts of trona. May be cuttings, not core.
290.6	3.1	Clay, containing an average of about 50 percent crystals of gaylussite, pirssonite, and northupite*. Crystal sizes range from fine sand to about 3 mm; average is fine sand in upper part, coarse sand in lower part. Within this unit from 288.4 to 289.6 ft is a layer of fine to coarsely crystalline trona with clay impurites. Color of the clayey portion is grayish yellow (5Y7/4). Massive.
295.0	4.4	No core.
295.7	.7	Gravel, crystal, containing about 50 percent gaylussite crystals in a clay matrix. Crystal sizes range from 1 to 4 mm, average about 2 mm. Pale olive (10Y6/2). Poorly consolidated. May be cuttings, not core.
298.2	2.5	Gravel, crystal, about 65 percent crystals of gaylussite and pirssonite, in an average ratio of about 5 to 1, in a clay matrix. Crystal sizes range from about 2 to 20 mm, average about 10 mm. Color light olive gray (5Y6/2) to dusky yellow (5Y6/4). Crude bedding in clay at bottom. At 297.5 ft is a 1-in. bed of crystalline trona with a little clay.
305.0	6.8	No core.
306.1	1.1	Gravel, crystal, mostly gaylussite with a little trona, in a clay matrix. Crystal sizes range from 2 to 5 mm, average about 3 mm. Dark greenish gray (5GY4/1). Poorly consolidated.
307.9	1.8	Silt, crystal, about 75 percent crystals, mainly pirssonite, a little northupite* and a trace of gaylussite* in a clay matrix. Majority of crystals are silt size, but sizes range up to 10 mm. Yellowish gray (5Y6/2). Massive.
310.7	2.8	Badly fractured core containing fragments of trona, halite, and clay in the following sequences: 307.9 to 308.3 ft, crystalline trona; 308.3 to 308.8 ft, clay and trona; 308.8 to 309.3 ft, halite and clay; 309.3 to 309.4 ft, clay; 309.4 to 310.1 ft, coarsely crystalline trona; 310.1 to 310.3 ft, clay and halite crystals; 310.3 to 310.7 ft, halite. Average color of the clay is yellowish gray (5Y6/2).
315.0	4.3	No core.
317.8	2.8	Halite*, coarsely crystalline; fine-grained trona* and nahcolite* estimated microscopically at 10 percent of total material. Halite crystal sizes up to 20 mm, average 8 mm. Within this unit are 2-in. clay beds at 316.7 and 317.2 ft. Salts are massive.
318.5	.7	No core.
319.8	1.3	Halite, with a little trona* and gaylussite*. Crystal sizes range from 1 to 8 mm, average about 3 mm. Overall color greenish gray (5GY5/1). Poorly consolidated. May be cuttings, not core.

SEARLES DRILL HOLE L-W, L-W-D--Continued

Depth (feet)	Unit thickness (feet)	Description
324.0	4.2	Halite, in crystalline aggregates; crystal sizes up to about 30 mm, average about 6 mm. Contains many irregular clay inclusions. Core badly shattered; no bedding visible.
325.0	1.0	No core.
327.2	2.2	Halite*, local clay impurities in top foot; remainder is relatively pure. Crystal sizes up to about 45 mm, average 8 mm. Massive.
333.0	5.8	No core.
333.5	.5	Trona, finely crystalline; a little clay, halite, and probably nahcolite. Crystal sizes up to about 2 mm. Massive.
343.0	9.5	No core.
345.3	2.3	Trona, upper part about 40 percent clay, a little clay in lower part. Crystal sizes up to 10 mm, average about 8 mm. Clay is light olive gray (5Y5-6/2). Massive; crystals randomly oriented.
348.0	2.7	No core.
349.9	1.9	Trona* and halite, crystalline, grading downward into trona and a little nahcolite*. Coarse grained at top with crystal sizes up to 25 mm; finer grained at bottom, sizes range from 1 to 5 mm. Massive; crystals randomly oriented.
353.0	3.1	No core.
355.0	2.0	Sand, crystal, about 90 percent crystals of trona, gaylussite, and halite. Sizes range from 0.5 to 2 mm. Pale olive (10Y5/2). Poorly consolidated. May be cuttings, not core.
355.5	.5	Clay, light greenish-gray (5GY8/1) and pale greenish-yellow (10Y8/2). Laminar bedding defined by color changes. Contains several crystals of northupite* about 10 mm in size.
363.0	7.5	No core.
363.6	.6	Sand, crystal, similar to crystal sand at depth of 355.0 ft. Probably cuttings, not core.
363.8	.2	Trona, crystal sizes up to 20 mm. Massive; crystals form radial aggregates.
368.0	4.2	No core.
368.7	.7	Sand, crystal, about 90 percent crystals which are mostly gaylussite, with smaller amounts of trona and halite, and traces of sulfohalite*. Very well sorted, approximates coarse sand. Pale olive (10Y6/2). Poorly consolidated. This could be cuttings but is probably core.
368.9	.2	Trona. Crystal sizes up to 15 mm, average 10 mm. Massive; crystals form radial aggregates.
378.0	9.1	No core.

SEARLES DRILL HOLE L-W, L-W-D--Continued

Depth (feet)	Unit thickness (feet)	Description
382.4	4.4	Trona*. Crystal sizes up to 10 mm, average about 5 mm. Crystals are randomly oriented; locally vuggy; entire section is well consolidated, but porous. Unit contains 5 zones of clay as follows: at 378.0 ft, a 1-in. bed of clay containing about 10 percent pirssonite and a little trona; at 378.9 ft a 1-in. bed of trona containing about 30 percent clay; at 379.7 ft, a ½-in. bed of clay containing about 20 percent trona; at 380.3 ft, a 5-in. bed of clay containing about 10 percent crystals of pirssonite, averaging about 1 mm in size, and a little trona; at 382.0 ft a 2-in. bed of clay containing about 10 percent crystals of pirssonite. The thicker beds of clay are yellowish gray (5Y6/2) and massive.
388.0	5.6	No core.
389.9	1.9	Trona* and halite* intergrown. Either mineral may predominate locally, but the average is 50 percent halite and 50 percent trona. Crystal sizes up to 10 mm, average about 5 mm. Porosity is higher in the layers of trona. Massive.
390.9	1.0	Clay, with about 20 percent gaylussite and pirssonite and a small amount of trona. Crystal sizes up to 3 mm, average about 2 mm. Colors are mottled and range from dark greenish gray (5GY4/1) to grayish yellow (5Y7/4). Massive.
393.0	2.1	No core.
396.8	3.8	Halite*, with local concentrations of trona. At 393.5 and 396.5 ft are 3-in. layers of trona with a little halite; remainder of section is predominantly halite. Crystal sizes up to 10 mm, average about 4 mm. Halite contains local inclusions of clay. Massive.
397.2	.4	Halite and clay, with a little trona and pirssonite. Halite and trona crystals up to 8 mm in size, average about 3 mm; pirssonite crystals are sand sized. Greenish gray (5GY5/1). Massive.
398.0	.8	No core.
399.0	1.0	Halite and a little clay. Crystal sizes up to 10 mm, average 5 mm. Maximum percentage of clay in lower half is about 10 percent. Massive.
400.0	1.0	Clay, with about 5 percent crystals of trona and halite in local concentrations and very small amounts of small unidentifiable crystals. Pale greenish yellow (10Y7/2). Massive.
408.0	8.0	No core.
409.1	1.1	Gravel, crystal. Halite in a clay matrix. Crystal sizes up to 20 mm, average about 8 mm. Yellowish gray (5Y7/2). Poorly consolidated. Probably cuttings, not core.
413.0	3.9	No core.
416.4	3.4	Halite and a little clay. At 413.7 ft there is a 2-in. layer of clay containing pirssonite crystals. Entire unit badly shattered during drilling so that core consists of nothing but chips.

SEARLES DRILL HOLE L-W, L-W-D—Continued

Depth (feet)	Unit thickness (feet)	Description
417.0	0.6	No core.
417.8	.8	Gravel, crystal, predominantly halite and trona. Crystal sizes range from 1 to 7 mm, average about 3 mm. Probably cuttings, not core.
419.2	1.4	Halite. Crystal sizes up to 15 mm, average about 5 mm. Local clay impurities.
419.7	.5	Trona*; very fine grained; contains small masses of halite* and burkeite*. Light yellowish gray (5Y9/1). Very compact and pure; faint bedding 2 to 3 mm thick.
420.0	.3	No core.
422.8	2.8	Halite*, with a little trona and nahcolite*. Crystal sizes up to 20 mm, average about 6 mm. Bottom inch contains halite* and pirssonite* in a very fine grained aggregate. This section badly shattered during drilling.
430.0	7.2	No core.
433.7	3.7	Gravel, crystal, similar to crystal gravel at depth of 417.8 ft. One small fragment of trona noted.
440.0	6.3	No core.
442.8	2.8	Gravel, crystal, similar to crystal gravel at depth of 417.8 ft.
443.6	8	Halite*, crystal sizes up to 15 mm, average about 7 mm. Top 3 in. contains interbedded trona and clay. Trona is very fine grained. Clay is dark greenish gray (5GY4/1). Halite is massive.
450.0	6.4	No core.
452.7	2.7	Assortment of core fragments containing trona, halite, pirssonite, and clay. Top inch consists of interlocking plates of trona up to 20 mm long; the interstices are filled with cryptocrystalline trona*. A few octahedrons of northupite* were also noted.
460.0	7.3	No core.
461.2	1.2	Clay grading down to crystal gravel. Contains halite, trona, and a little pirssonite. Crystal sizes range from 1 to 5 mm, average 3 mm. Yellowish gray (5Y7/2). Poorly consolidated.
464.0	2.8	Halite, with a little trona. Crystal sizes up to 15 mm, average about 4 mm. Massive.
465.3	1.3	Trona* with halite. Halite content grades downward from 50 to 5 percent. Lower part contains small patches of burkeite*; at the base there is a thin bed of clay. Trona is fine grained with saccharoidal texture. Faint bedding.
470.0	4.7	No core.
472.6	2.6	Halite*, with local clay impurities. Crystal sizes up to 20 mm, average about 4 mm. Core badly broken during drilling.
480.0	7.4	No core.
482.3	2.3	Clay, with about 80 percent halite at top grading to about 10 percent halite at bottom. Halite crystal sizes up to about 8 mm, average about 3 mm. Colors mottled; range from yellowish gray (5Y7/2) to dusky yellow (5Y7/4). Massive. Top 4 in. poorly consolidated; may be cuttings, not core.
490.0	7.7	No core.

SEARLES DRILL HOLE L-W, L-W-D—Continued

Depth (feet)	Unit thickness (feet)	Description
492.2	2.2	Halite. Crystal sizes up to 25 mm, average about 6 mm. Core badly shattered and unit contains many cuttings.
493.6	1.4	Sand, crystal, very fine; consists mainly of pirssonite* and northupite*; variable amounts of clay. Pale olive (10Y6/2). Massive. Bottom 4 in. contains medium-grained trona and a little halite.
500.0	6.4	No core.
504.0	4.0	Halite, crystal sizes up to 10 mm, average about 3 mm. At 500.3 and 501.1 ft there are 1-in. beds of clay containing about 20 percent pirssonite crystals averaging about $\frac{1}{2}$ mm in size. Clay is mottled; average color about light olive gray (5Y6/1). Core badly shattered and unit contains many cuttings.
504.6	.6	Trona*, saccharoidal, contains fragments of sulfohalite* and halite* up to about 3 mm in size. White (N9). Very faint bedding, 1 to 3 mm thick.
510.0	5.4	No core.
512.0	2.0	Gravel, crystal, consisting of fragments of halite, trona, a little gaylussite, and about 10 percent clay. Fragments range from 1 to 4 mm, average about 2 mm in size. Probably cuttings, not core.
515.2	3.2	Clay, with about 5 percent pirssonite. Crystals 1 to 2 mm in size. Colors mottled, include pale olive (10Y6-7/2), dusky yellow (5Y7/4), and yellowish gray (5Y7/2). Very faint bedding about 2 to 5 mm thick defined by color changes.
520.0	4.8	No core.
520.4	.4	Clay, with about 20 percent crystals of halite and pirssonite. Crystal sizes up to about 8 mm, average about 5 mm. Yellowish gray (5Y7/2). Massive.
522.1	1.7	Halite, with about 30 percent clay. Crystal sizes up to about 25 mm, average about 6 mm. Clay is yellowish gray (5Y7/2). Massive. Core is badly shattered, and unit contains many cuttings.
524.7	2.6	Clay, with about 15 percent crystals of halite and pirssonite*, 1 to 2 mm in size. A few small veins of halite noted about 1 mm thick and 15 to 20 mm long; both crystals and veins are randomly oriented. Pale olive (10Y7/2). Massive.
530.0	5.3	No core.
531.0	1.0	Clay, with about 15 percent pirssonite crystals up to 4 mm and averaging about $\frac{1}{2}$ mm in size. Pale greenish yellow (10Y8/2). Top 3 in. poorly consolidated; probably cuttings. Massive.
531.6	.6	Siltstone; about 70 percent quartz*, orthoclase*, plagioclase*, and hornblende*, plus about 30 percent pirssonite*, a little halite*, and clay. The rock contains many pirssonite casts up to about $\frac{1}{2}$ mm in size which are coated with a drusy mineral. It also contains veins of halite up to about 4 mm thick and 12 mm long. Dark gray (N3). Massive, compact, and very hard.
535.4	3.8	Clay, with about 10 to 15 percent pirssonite crystals up to 3 mm and averaging about $\frac{1}{2}$ mm in size. Pale olive (10Y6-7/2) with a few mottlings of light brown (5YR6/6). Massive.

Depth (feet)	Unit thickness (feet)	Description
536.0	0.6	Halite crystals, with about 5 percent clay. Crystals up to 10 mm, average about 5 mm in size. Clay is yellowish gray (5Y7/2). Massive.
540.0	4.0	No core.
545.0	5.0	Halite and clay, interbedded. Halite crystal sizes up to 10 mm, average about 4 mm. Clay contains about 25 percent pirssonite* and a trace of gaylussite*, and occurs as 1-in. beds at the following depths: 540.1, 540.6, 540.9, 542.7, 543.5, and 544.4 ft. Clay is yellowish gray (5Y7/2). At 541.6 ft thenardite* was noted. Core was badly shattered during drilling, and unit contains many cuttings.
550.0	5.0	No core.
551.5	1.5	Halite. Crystal sizes up to 20 mm, average about 3 mm. Core badly shattered during drilling.
553.2	1.7	Halite, with a little trona. Crystal sizes up to 8 mm, average about 1 mm. Ratio of halite to trona is about 10 to 1. Core badly crushed during drilling. Bottom 2 in. up to 10 percent clay.
553.8	.6	Halite* and trona* in a ratio of about 10 to 1. Crystal sizes up to 10 mm, average about 5 mm. Massive.
554.4	.6	Gravel, crystal, about 60 percent pirssonite crystals in a clay matrix. Crystal sizes up to 8 mm, average about 3 mm. Pale olive (10Y5/2). Poorly consolidated.
560.0	5.6	No core.
563.4	3.4	Halite and trona*, interbedded. Small amounts of thenardite*. Halite crystals up to 4 mm, average about 2 mm; trona crystals are generally fine grained. Core was badly shattered during drilling.
564.2	.8	Trona and halite, similar to unit above but not shattered during drilling. Massive.
570.0	5.8	No core.
571.2	1.2	Halite; little thenardite* and pirssonite*. Halite crystal sizes up to 8 mm, average about 1 mm. Core badly shattered during drilling.
574.7	3.5	Halite* and trona, interbedded. Crystal sizes up to 5 mm (isolated exceptions up to 20 mm), average about 2 mm. Ratio of halite to trona is about 20 to 1. Vague horizontal banding caused by slight clay impurities.
575.1	.4	Sand, crystal, coarse, about 70 percent pirssonite in a clay matrix. Clay is dusky yellow green (5GY5/2). Massive.
580.0	4.9	No core.
584.3	4.3	Halite; a little trona*, thenardite*, and a single crystal of sulfohalite*; bottom 4 in. is pure trona. Halite crystals up to 8 mm, average about 3 mm in size. Massive.
590.0	5.7	No core.
590.6	.6	Halite. Crystal sizes up to 3 mm, average about 2 mm. Crystals show preferential orientation toward horizontal. Bottom $\frac{1}{2}$ in. of this section is trona; crystals up to 8 mm long, average about 5 mm. Contact with halite is sharp.

SEARLES DRILL HOLE L-W, L-W-D—Continued

Depth (feet)	Unit thickness (feet)	Description
591.3	0.7	Sand, crystal, about 60 percent pirssonite crystals in a clay matrix. Crystal sizes up to 3 mm, average about 1 mm.
597.6	6.3	Trona*, with horizontal bands of clay. Crystals range up to 5 mm long, average about 3 mm, and are randomly oriented. Bands of clay, medium dark gray (N4), form bedding within this unit. Bands range from laminar up to 5 in. thick and are more abundant in the lower half of the unit. At 593.7 ft there is a 4-in. bed of crystal sand consisting of about 60 percent pirssonite* crystals in a clay matrix; crystal sizes up to 2 mm, average about 1 mm.
600.0	2.4	Gravel, crystal, about 60 percent pirssonite crystals in a clay matrix. Crystal sizes up to 4 mm, average about 3 mm. Colors range from moderate greenish yellow (10Y7/4) to dusky yellow (5Y6/4). Poor bedding, thin to laminar, defined by orientation of crystals in some parts and by color changes within the clay in other parts.
605.8	5.8	Gravel, crystal, about 90 percent crystals of halite, pirssonite, and trona in a clay matrix. Crystal sizes up to 4 mm, average about 3 mm. May be cuttings, not core.
607.1	1.3	Trona, with about 15 percent clay. Crystals up to 15 mm long, average about 10 mm. Crystals are generally in radial aggregates. Massive; contains many cuttings.
610.0	2.9	No core.
613.9	3.9	Sand, crystal; fragments of pirssonite, halite, and possibly trona and gaylussite. Fragment sizes up to 2 mm, average less than 1 mm. Pale olive (10Y6/2). Poorly consolidated. Probably cuttings, not core.
615.5	1.6	Clay, with about 10 percent pirssonite and a few pods of halite. Crystal sizes up to 2 mm, average about 1 mm. Dusky yellow (5Y5/4). Core badly shattered during drilling. Contains many cuttings.
620.0	4.5	No core.
621.4	1.4	Gravel, crystal; fragments of halite, pirssonite, and trona in about 10 percent clay. Fragment sizes up to 30 mm, average about 5 mm. Poorly consolidated. Probably cuttings, not core.
623.9	2.5	Clay and pirssonite; top third is about 30 percent pirssonite* with crystals ranging up to 5 mm but averaging 3 mm in size; bottom two-thirds is about 2 percent pirssonite with crystals ranging up to 10 mm but averaging less than 1 mm in size. Light olive (10Y5/4) to pale greenish yellow (10Y8/2). Unit has bedding, defined partly by beds of crystals and partly by fluctuations in color of clay, ranging in thickness from about 3 mm in upper part to laminar in the lower part. Laminar bedding shows graded structures under the microscope.

SEARLES DRILL HOLE L-W, L-W-D—Continued

Depth (feet)	Unit thickness (feet)	Description
629.7	5.8	Clay to silt, generally well-sorted, yellowish-gray (5Y7/2) to pale-olive (10Y6/2), generally massive. Notable variations are as follows: at 625.0 ft, a 2 in. bed that contains about 10 percent halite*; at 627.7 ft, a 5-in. bed of very fine clay that contains subhorizontal veinlets of white clay (N9) and a few crystals of pirssonite; at 628.4 ft, a 1-in. bed of silt consisting of fine sand-sized clay*-coated octahedrons that contain submicroscopic fragments of an evaporite mineral* that may be calcite.
630.0	0.3	No core.
635.8	5.8	Clay*; contains pirssonite* cement which ranges from about 70 percent in the upper part to about 20 percent of the material in the lower part. Small 1 mm veins of pirssonite* cut diagonally through the clay. Light greenish gray (5GY7/1) in the upper part, yellowish gray (5Y7/2) in the middle part, and grayish yellow (5Y7/4) in the lower part. No bedding visible; unit is extremely well indurated.
639.2	3.4	Clay, with about 5 percent pirssonite* in the form of randomly oriented veins 1 mm wide, plus a few crystals. Yellowish gray (5Y7/2) to pale olive (10Y7/2). Contains many small disc-shaped specks of olive gray (5Y3/2) measuring up to about 1 mm; origin and character unidentified. Massive.
640.0	.8	Clay, with about 50 percent crystals, locally ranging from 30 to 70 percent. Sizes up to about 3 mm, average about 1 mm. Crystals in the upper part of the unit are all nahcolite*; in the lower part of the unit pirssonite may also be present. Yellowish gray (5Y7/2). Massive.
640.3	.3	Clay, with about 20 percent pirssonite*, crystal sizes up to 6 mm, average about 3 mm. Yellowish gray (5Y7/2) and dusky yellow (5Y7/4). Massive.
650.0	9.7	Halite*. Crystal sizes up to 30 mm, average about 5 mm. Top foot contains a few clay impurities as inclusions in the halite crystals. At 641.9 ft there is a $\frac{1}{2}$-in. parting of clay containing a few small pirssonite crystals and at 649.4 ft there is a 1-in. bed of fine-grained trona; remainder of unit is relatively pure. Massive; crystals randomly oriented.
653.4	3.4	Trona*, with local concentrations of halite forming up to 50 percent of material. Trona crystal sizes at base up to 10 mm, but through most of section do not exceed 2 mm and average about $\frac{1}{3}$ mm; halite crystal sizes up to 20 mm, average about 10 mm. Clay impurities occur in top 8 in. and bottom 2 in. Trona is massive, locally vuggy.
656.7	3.3	Clay, with about 50 percent crystals, mostly pirssonite* and some northupite*. Pirssonite crystal sizes up to 25 mm, average about 6 mm; northupite crystals average about 3 mm in size. Colors range from pale greenish yellow (10Y8/2) to grayish olive (10Y4/2); local concentrations of greenish gray (5GY6/1). Most of this unit shows a varvelike banding which appears "wrap around" crystals.

SEARLES DRILL HOLE L-W, L-W-D—Continued

Depth (feet)	Unit thickness (feet)	Description
660.0	3.3	No core.
668.1	8.1	Clay, with about 40 percent pirssonite. Crystal sizes up to about 10 mm, average about 4 mm. Yellowish gray (5Y7/2) to pale olive (10Y7/2). The following exceptions within this unit are notable: At 662.8 ft there is a $\frac{1}{2}$-in. bed of exceedingly fine grained material* which has an average refractive index of 1.525 and low to moderate birefringence; it may be a devitrified glass or tuff. From 664.6 to 665.1 ft crystals of pirssonite and northupite, about one-half mm or less in size, are found; about 10 percent clay. From 666.8 to 667.6 ft the material is similar to that between 664.6 and 665.1 ft; several thin layers consist entirely of sand-sized northupite crystals. At 667.6 ft a 2-in. bed of halite has crystals up to 12 mm, and average about 5 mm in size. Generally massive; crystals randomly oriented.
670.0	1.9	No core.
676.6	6.6	Sand, crystal; consists of fine to medium sand-sized fragments, mainly pirssonite*, a little northupite*, and about 10 percent clay. Pale olive (10Y6/2). Bottom 6 in. is predominantly clay containing pirssonite crystals up to 5 mm in size. Very poorly consolidated; probably cuttings, not core.
677.3	.7	Clay, with about 30 percent pirssonite and a little northupite*. Crystal sizes up to 3 mm, average about 1 mm. Greenish gray (5GY4-5/1). Massive. At 676.6 ft there is a 1-in. truncated spherical mass of trona* consisting of a "shell" of silt-sized trona surrounding a "core" of coarse sand-sized trona crystals. The clay surrounding this mass shows a concordant banding, and the truncated end is bounded by the normal lithology of the core. The cause and significance of this structure are not known.
680.0	2.7	No core.
680.3	.3	Sulfohalite*; a little pirssonite*, tychite*, trona*, and clay. Crystal sizes up to 3 mm, average fine-sand size. Massive.
680.9	.6	Clay, with about 75 percent northupite. Crystal sizes up to 3 mm, average very fine sand size. Pale olive (10Y7/2). Massive.
681.1	.2	Clay, with about 40 percent pirssonite. Crystals average medium-sand size. Yellowish gray (8Y7/2). Massive.
681.7	.6	Trona. Crystal sizes up to about 3 mm, average 1 mm. Upper half contains several zones of impure trona 2 to 3 mm thick. Massive; crystals randomly oriented. Locally vuggy.
684.0	2.3	Trona and halite; predominantly trona* in upper part but grades into halite* towards the bottom. Crystal sizes in upper part up to 6 mm, average about 3 mm; crystal sizes in lower part up to 15 mm, average about 8 mm. Massive.

SEARLES DRILL HOLE L-W, L-W-D—Continued

Depth (feet)	Unit thickness (feet)	Description
684.7	0.7	Clay, with about 40 percent pirssonite*. Crystals up to 8 mm long, average about 5 mm, although near the bottom there are two ½-in. zones in which most of the crystals measure less than 1 mm. Grayish olive (10Y5/2) to yellowish gray (5Y7/3), stains of moderate yellowish brown (10YR5/4). Massive; crystals randomly oriented.
687.1	2.4	Halite and a little trona. Crystal sizes up to 12 mm, average about 4 mm. At 685.7 ft there is a 2-in. bed of clay containing about 40 percent pirssonite crystals which average about 4 mm in size; clay is yellowish gray (5Y7/2). Massive.
687.5	.4	Clay, similar to clay at depth of 684.7 ft; crystal sizes up to 8 mm, average about 5 mm.
690.0	2.5	No core.
692.3	2.3	Sand, crystal, coarse; about 80 percent pirssonite*, about 15 percent trona*, and a little quartz* and clay*. Greenish gray (5GY5/1). Poorly consolidated. May be cuttings, not core.
393.0	.7	Halite, crystal sand, and clay in an undifferentiated mixture. Halite crystals up to 10 mm in size, average about 4 mm. Crystal sand is similar to that in unit above. Core badly shattered during drilling.
394.4	1.4	Gravel, crystal; mostly halite, probably some trona and pirssonite. Fragment sizes up to 15 mm, average about 5 mm. Bottom 2 in. consist of solid crystalline trona and a little halite grading down into alternating clay and fine-grained halite and trona. Except for this part, unit is poorly consolidated.
700.0	5.6	No core.
01.7	1.7	Claystone. Microscopic examination shows a mixture of clay* and an isotropic substance with the following properties*: maximum refractive index slightly less than 1.53, cryptocrystalline, groups of radial aggregates show spherulitic extinction; this may be a devitrified glass of volcanic origin. At 700.5 ft there is a 1-in. unit containing thin beds of alternating clay and halite which cleave as if a single crystal. In the bottom 4 in. there are several large clear randomly oriented crystals of halite. Overall color is medium light gray (N6) with small mottlings of a pale yellowish orange (10YR8/6). Massive except as noted. Grades into unit below
.0.0	8.3	Halite* and clay. Crystal sizes up to 28 mm, average about 6 mm. The halite contains up to 5 percent clay, and local concentrations up to about 10 percent occur at the following depths: 3 in. at 703.8 ft; 17 in. at 704.5 ft; 5 in. at 707.5 ft; 6 in. at 708.6 ft; and 2 in. at 709.8 ft. From 702.5 ft to 703.2 ft is a bed of clay that contains about 10 percent halite as silt-sized crystals and fragments and as larger veinlets or stringers. Yellowish gray (5Y7/3). Massive.

SEARLES DRILL HOLE L-W, L-W-D—Continued

Depth (feet)	Unit thickness (feet)	Description
717.5	7.5	Clay, with pirssonite* content ranging from about 20 to 60 percent. Crystal sizes up to 25 mm, average about 8 mm. The larger crystals are concentrated between 713.3 and 714.4 ft, and at 714.6 ft is a single crystal of halite 25 mm across containing several ¼-in. blebs of brilliant blue color. The clay is mottled and includes pale greenish yellow (10Y8/2), pale olive (10Y6/2), yellowish gray (5Y7/2), grayish yellow (5Y6/4), and moderate yellowish brown (10YR5/4). Orientation of crystals is generally random but locally radial. Massive.
719.0	1.5	Siltstone; consists of quartz*, plagioclase*, orthoclase*, clay*, and about 30 percent pirssonite*. Contains randomly oriented 1 mm veinlets of pirssonite up to about 20 mm long. Pale olive (10Y7/2) to greenish gray (5GY6/1), with small mottlings of moderate yellowish brown (10YR5/4). Massive.
720.0	1.0	No core.
720.7	.7	Sandstone; about 80 percent silicates (quartz*, feldspars*, and hornblende)* and 20 percent pirssonite* cement. Fragments average about fine-sand size except for a 1-in. zone of coarse sand. Many cavities about ¼ mm wide. Greenish gray (5GY6/1). Massive.
722.8	2.1	Clay; about 10 percent crystals, apparently all pirssonite; crystal sizes up to 8 mm, average about 4 mm. Mottled; includes the following colors: yellowish gray (5Y7/2), grayish yellow (5Y7/4), greenish gray (5GY6/1), and a little staining of light brown (5YR5/6). One thin streak of sand was noted, and at 721.4 ft there is a 2-in. bed similar to the sandstone above. Massive.
730.0	7.2	Halite*; top part up to 15 percent pirssonite*. Halite crystal sizes up to 40 mm, average about 6 mm. At 723.3 ft a few very small negative crystals were noted within the halite. Average amount of clay is less than 5 percent with the following exceptions: at 723.0 ft a ¼-in. bed 50 percent clay; at 724.6 ft a parting of clay that contains pirssonite; at 726.3 ft a bed about 70 percent clay; at 727.8 ft a 3-in. bed about 10 percent clay; at 728.4 ft a ½-in. bed about 10 percent clay. Massive.
733.5	3.5	Halite. Crystal sizes up to 36 mm, average about 5 mm. Unit is free of other material with the following exceptions: at 731.8 ft there is a 10-in. bed of granular halite up to about 10 percent clay; at 730.8 ft the halite contains several small crystals of northupite*. Massive.
734.0	.5	Sand, crystal, grading down to claystone; sand part about 80 percent pirssonite as crystals, fragments, and cement, the remainder is clay. Crystal sizes up to 4 mm, average 1 mm. Claystone consists of clay cemented by pirssonite and is crosscut by veins of pirssonite* up to 1 mm thick. Lower two-thirds of this unit shows bedding, fine in the upper part grading to laminar in the lower part. Unit is poorly sorted, very well consolidated.

SEARLES DRILL HOLE L-W, L-W-D—Continued

Depth (feet)	Unit thickness (feet)	Description
740.0	6.0	No core.
742.5	2.5	Clay, with up to 15 percent pirssonite as crystals and veins. Crystal sizes up to 10 mm, average about 2 mm. Pale greenish yellow (10Y7/2) to pale olive (10Y5/2). Unit shows very indistinct bedding locally.
743.6	1.1	Siltstone; mainly clay* and feldspars*. Upper part is apparently barren of evaporite minerals; lower part contains veinlets and grains of pirssonite measuring up to about 3 mm. Light greenish gray (5GY7/1) to yellowish gray (5Y7/2). Massive.
744.0	.4	Gravel, crystal; consists of pirssonite, halite, and clay. Crystal fragment sizes up to about 5 mm, average about 2 mm. Poorly consolidated; probably cuttings, not core.
746.7	2.7	Clay containing about 30 percent pirssonite. Crystal sizes up to about 10 mm, average about 5 mm. Top 2 in. is highly indurated, very fine grained, and contains up to about 85 percent pirssonite*; this, with the clay, locally gives the appearance of a chert. Colors include pale greenish yellow (10Y7/2), grayish yellow (5Y7/4), and medium gray (N5). Massive.
750.0	3.3	No core.
750.6	.6	Gravel, crystal; consists of pirssonite, trona, probably other minerals, and a little clay. Poorly consolidated. Probably cuttings, not core.
752.9	2.3	Clay containing an average of about 15 percent pirssonite. Crystal sizes up to 7 mm, average less than 1 mm. Pale greenish yellow (10Y7/2). Within this unit, from 750.6 to 751.3 ft, is a zone of "pirssonite breccia," a rock containing about 70 percent angular to rounded fragments of pirssonite crystals up to 5 mm in size, cemented by pirssonite*; the cement is milky adjacent to the fragments and clearer toward the interstitial centers. In this "breccia" are a few cavities up to 5 mm wide which contain crystals of pirssonite. At 751.4 ft there is a 2 mm bed of fine sand-sized northupite* crystals. Massive.
754.6	1.7	Gravel, crystal; consists of fragments of pirssonite, halite, and probably other minerals and up to 20 percent clay. Crystal sizes up to 15 mm, average about 4 mm. At 754.1 ft there is a 1-in. bed of massive pirssonite containing about 10 percent clay. Pale greenish yellow (10Y7/2). Poorly consolidated except as noted above.
756.0	1.4	Clay containing about 40 percent pirssonite in crystal sizes up to very coarse sand size. Yellowish gray (5Y7/2) to pale greenish yellow (10Y7/2). Massive.
758.2	2.2	Halite* and a little clay. Crystal sizes up to 23 mm, average about 8 mm. Average clay content is about 5 percent; the following are exceptions: at 756.3 ft a $\frac{1}{2}$-in. bed containing about 50 percent clay; at 756.7 ft, a 1-in. bed of clay; at 757.6 ft a 1-in. bed of clay. Massive.
760.0	1.8	No core.

SEARLES DRILL HOLE L-W, L-W-D—Continued

Depth (feet)	Unit thickness (feet)	Description
761.2	1.2	Halite and clay; percentage of clay increases downward from less than 5 to about 90 percent. Crystal sizes up to 15 mm, average about 8 mm. Clay in lower part contains about 5 percent pirssonite in crystal sizes up to about 1 mm. Color ranges from yellowish gray (5Y7/2) to pale greenish yellow (10Y7/2), averages about grayish yellow (5Y7/4). Massive.
764.9	3.7	Clay, with pirssonite. Pirssonite in top 8 in. constitutes about 30 percent of total; crystal sizes are generally less than 1 mm. Pirssonite in remainder of unit constitutes about 20 percent of total; crystal sizes up to 15 mm, average about 8 mm.. Colors mottled, include grayish yellow (5Y7/4), light brown (5YR5/6), light greenish gray (5GY8/1), and grayish yellowish orange (10YR7/5). Massive.
766.3	1.4	Halite, with clay. Percentage of clay ranges from 5 to 60 percent, averages about 30 percent. Halite crystal sizes up to 18 mm, average about 5 mm. The lower percentages of clay are in the middle of this unit. Colors mottled, average yellowish gray (5Y7/4). Massive; crystals randomly oriented.
768.1	1.8	Clay, with about 10 percent pirssonite* and 5 percent halite. Crystal sizes up to 15 mm, average about 7 mm. Colors similar to those at depth of 764.9 ft. Massive.
769.4	1.3	Halite*, with about 20 percent clay. Crystal sizes up to 38 mm, average about 5 mm. Clay is light greenish gray (5GY7/1). Massive.
770.0	.6	Clay, with about 50 percent pirssonite and 20 percent halite; a little northupite. Halite crystal sizes up to 4 mm, average about 2 mm; pirssonite crystal sizes are generally less than $\frac{1}{2}$ mm; northupite crystals measure about 4 mm. Clay is pale olive (10Y5/2). Fine to laminar bedding, generally defined by alternation of the sets of minerals. Halite is concentrated in lower part.
775.4	5.4	Sand, crystal, grading down to crystal gravel. Consists of pirssonite, halite, and probably other minerals. In the top foot there are numerous chips of claystone similar to that at 734.0 ft and of "pirssonite breccia" similar to that at 750.6 ft. At 770.9 ft there is a 3-in. bed of clay containing 5 to 40 percent pirssonite. Poorly consolidated; may be cuttings, not core.
776.0	.6	Sandstone, medium-grained; grades down to clay. Sand consists of pirssonite* and northupite* in equal proportions and constitutes about 95 percent of the total. Clay part contains much fragmentary material and white partings of fine-grained material, both of which are probably pirssonite. Pale yellow (10Y6/2) to grayish olive (10Y4/2). Thin to laminar bedding.
776.8	.8	Sand, crystal, very coarse. About 90 percent fragments of pirssonite, trona, and probably other minerals, in a clay matrix. Pale olive (10Y6/2). Poorly consolidated; probably cuttings, not core.

SEARLES DRILL HOLE L-W, L-W-D—Continued

Depth (feet)	Unit thickness (feet)	Description
778.7	1.9	Clay, with about 10 percent pirssonite. Crystal sizes up to 12 mm, average about 4 mm. Yellowish gray (5Y7/2) to light greenish gray (5GY7/1). Faint bedding defined by color changes; also partings of dusky yellow green (5GY4/2). At base there is a 1-in. bed of coarsely crystalline halite.
781.0	2.3	No core.
781.7	.7	Sand, crystal, medium, and clay. Sand consists of about 95 percent pirssonite, and probably other minerals, in a clay matrix. Bottom 2 in. is clay with about 10 percent pirssonite; crystal sizes up to 10 mm, average about 1 mm. Sand is pale olive (10Y6/2); clay is yellowish gray (5Y7/3). Massive. Grades into unit below.
782.3	.6	Halite*, with 5 to 10 percent clay. Crystal sizes up to 33 mm, average about 8 mm. Clay is dusky yellow (5Y6/4). Massive.
783.5	1.2	Clay, with about 20 percent pirssonite. Crystal sizes up to 7 mm, average about 3 mm. Colors mottled, include yellowish gray (5Y7/3), pale greenish yellow (10Y7/2), and streaks of light brown (5YR5/6). Indistinct thin bedding defined by color changes.
783.8	.3	Halite, with up to 50 percent clay. Maximum crystal size 30 mm, average about 10 mm. Halite generally massive, locally radial. Dark greenish gray (5GY5/1).
784.0	.2	Silt; consists of sulfohalite* crystals and fragments, and about 10 percent clay. Grayish yellow (5Y7/4). Massive.
784.5	.5	Conglomerate, crystal; consists of rounded fragments cemented by clay, pirssonite, and a little northupite*. Fragments constitute about 40 percent of the rock, and range in size from about 3 to 7 mm. They consist of a dark-gray (N3) very fine grained material similar to the claystone at 734.0 ft. A few vugs noted which contain pirssonite and northupite crystals. Clay is light olive gray (5Y5/2). Massive.
786.5	2.0	Pirssonite*, with about 30 percent clay. Pirssonite blades, up to 30 mm long, form large radial aggregates; the clay fills the interstices of these radial aggregates. Yellowish gray (5Y6/2) to pale olive (10Y6/2). Massive, except for a little local fine to laminar bedding.
788.8	2.3	Gravel, crystal, consists of about 60 percent pirssonite* crystals in a clay matrix; percentage of crystals ranges locally from about 40 to about 90 percent. Crystal sizes up to 15 mm, average about 7 mm. Colors include pale olive (10Y5/2), pale greenish yellow (10Y7/2), and grayish yellow (5Y7/4). Massive. Crystals randomly oriented.
791.0	2.2	No core.

SEARLES DRILL HOLE L-W, L-W-D—Continued

Depth (feet)	Unit thickness (feet)	Description
791.7	0.7	Sand, crystal; consists of about 80 percent fragments of pirssonite* in a matrix of clay and a fine-grained white mineral which is probably pirssonite. Fragment sizes up to 3 mm, average about 1 mm. Pale olive (10Y6-7/2) with streaks of white (N9). Local faint thin bedding. Material is well consolidated and looks like a sand-sized breccia.
800.0	8.3	No core.
801.3	1.3	Sand, crystal, coarse, similar to crystal sand at depth of 776.8 ft. At base of unit there are several large fragments of halite and clay similar to those at depth of 782.3 ft, but clay contains a few crystals of gaylussite*. Probably cuttings, not core.
804.9	3.6	Clay. Colors include pale greenish yellow (10Y9/2), light yellowish gray (5Y9/1), and light greenish gray (5GY9/1); small zones are slightly darker. Generally massive; local laminar bedding defined by color changes. Local concentrations of pirssonite in crystals up to 5 mm in size as follows: a 1-in. layer at 803.5 ft, a 2-in. layer at 804.2 ft, and a 1-in. layer at 804.8 ft.
805.4	.5	Clay, with up to 50 percent sand-sized fragments of pirssonite. Colors include dark greenish gray (5GY4/1), light greenish gray (5GY7/1), dusky yellow (5Y6/4), and grayish orange (10YR6/4). Thin to laminar bedding defined by color changes.
810.0	4.6	No core.
816.7	6.7	Sand, crystal, medium, grades down to coarse. Contains pirssonite and probably other minerals. Pale olive (10Y6/2). Poorly consolidated; probably cuttings, not core.
817.3	.6	Clay, with about 25 percent pirssonite. Crystal sizes up to 10 mm, average about 2 mm. Pale olive (10Y5/2) to yellowish gray (5Y6/3). Thin indistinct bedding caused by orientation of crystal blades and color changes.
818.1	.8	Sand, crystal, similar to crystal sand at depth of 776.8 ft.
820.0	1.9	Clay*, with about 30 percent pirssonite, locally about 60 percent. Pirssonite crystals and fragments range from very fine grained to about 10 mm in size and average about 2 mm; fragments appear brecciated and are distributed heterogeneously. Colors include pale olive (10Y6/2), pale greenish yellow (10Y8/2), light grayish yellow (5Y9/4), yellowish gray (5Y6/2), and light gray (N7). Generally massive; local fine bedding. Core badly shattered during logging.
821.6	1.6	Clay containing up to about 60 percent pirssonite*. Crystal sizes up to about 10 mm, average about 2 mm. Pale greenish yellow (10Y8/2) to yellowish gray (5Y7/2). Massive. Grades into unit below.

SEARLES DRILL HOLE L-W, L-W-D—Continued

Depth (feet)	Unit thickness (feet)	Description
828.6	7.0	Clay; local concentrations of pirssonite. Predominant colors are several hues near white; also pale olive (10Y6/2) and light olive gray (5Y5/3). Pirssonite occurs at the following depths: at 826.0 ft, a 7-in. zone containing about 40 percent pirssonite in crystals up to 2 mm; at 826.8 ft, a similar 1-in. zone; at 827.3 ft, a 2-in. zone containing 50 percent pirssonite in crystals up to 2 mm; at 827.6 ft, a 1-ft zone containing locally up to 60 percent pirssonite in crystals up to 3 mm in size. Clay parts of the unit show a laminar banding in contorted "marble-cake" structures.
830.0	1.4	Silt, crystal, with up to 40 percent clay. Crystals are about 70 percent pirssonite* and 30 percent northupite*; the northupite is generally concentrated in small irregular bodies. Crystals up to medium sand size, average silt size. Pale olive (10Y6/2) to yellowish gray (5Y7/2). Massive. At base there is a ½-in. bed of fine-grained trona*.
830.6	.6	Clay, with about 30 percent pirssonite. Crystal sizes up to 4 mm, average 2 mm. Pale olive (10Y6/2). Core badly shattered.
830.7	.1	Claystone, similar to claystone at a depth of 734.0 ft.
833.1	2.4	Trona* and a little halite. Crystal sizes up to 3 mm, average 2 mm. At 831.0 ft there is a 3-in. bed of clay about 50 percent pirssonite in crystal sizes up to 8 mm, average 2 mm. Dusky yellow green (5GY5/2). Trona crystals randomly oriented. Unit shows very faint bedding caused by horizontal zones containing trace amounts of clay.
834.2	1.1	Clay, with up to 40 percent pirssonite. Crystal sizes up to 3 mm. Pale olive (10Y5/2) to light olive gray (5Y5/2), locally pale greenish yellow (10Y8/2). At 833.4 ft there is a 2-in. bed of clay containing no pirssonite and showing indistinct fine to laminar bedding; pale greenish yellow (10Y9/2). Remainder of unit also locally shows indistinct thin bedding.
840.0	5.8	No core.
840.1	.1	Claystone, similar to claystone at a depth of 734.0 ft.
845.0	4.9	No core.
846.0	1.0	Clay, with up to 10 percent pirssonite, a few crystals of northupite*. Pirssonite crystals are coarse sand size; northupite crystal sizes are up to 5 mm. Pale olive (10Y6/2) to several hues near white. Generally massive, locally banded.
850.2	4.2	Sand, crystal, medium; contains pirssonite, trona, and probably other minerals. Pale olive (10Y6/2). At 849.4 ft there is a 1-in. bed of clay similar to unit above. Poorly consolidated.
851.0	.8	Clay, silty in lower part. Grayish yellow (5Y8/4) and several hues near white. Massive.
852.1	1.1	Sand, crystal, coarse to very coarse; contains pirssonite, trona, and probably other minerals. Pale olive (10Y6/2). Poorly consolidated.
855.0	2.9	No core.

SEARLES DRILL HOLE L-W, L-W-D—Continued

Depth (feet)	Unit thickness (feet)	Description
859.4	4.4	Sand, crystal, grading downward from fine to medium. Similar to crystal sand at depth of 850.2 ft.
860.0	.6	Clay; about 5 percent pirssonite*, as crystals and veinlets. Veinlets measure up to 10 mm long, crystals up to 2 mm. Pale greenish yellow (10Y7-8/2) to yellowish gray (5Y7/2). Massive; veinlets and crystals randomly oriented.
862.5	2.5	Pirssonite, with about 20 percent clay. Crystals are tightly intergrown and irregularly shaped; sizes up to 10 mm, average about 3 mm. Yellowish gray (5Y7/2) to greenish gray (5GY5/1) to medium gray (N5). At 861.3 ft there is a 2-in. bed of crystal sand, yellowish gray (5Y7/2), containing about 50 percent pirssonite crystals; at 862.3 ft there is a 4-in. bed of clay, pale greenish yellow (10Y7/2), containing about 10 percent pirssonite crystals. Remainder of unit is massive.
865.0	2.5	Clay, with about 10 percent pirssonite, locally up to 60 percent. Crystal sizes up to 10 mm, average about 2 mm. Light olive gray (5Y6/1) to yellowish gray (5Y7/2). Massive.
869.3	4.3	Siltstone; consists mostly of pirssonite* silt cemented by clay and pirssonite; local beds of intergrown pirssonite crystals similar to those at depth of 862.5 ft. Colors range from light greenish gray (5GY7/1) to dark greenish gray (5GY3/1) to pale olive (10Y6/2). Entire unit very well indurated. Local thin bedding.
873.5	4.2	Clay, similar to clay at depth of 865.0 ft, except that pirssonite does not exceed 10 percent.
875.0	1.5	No core.

PANAMINT DRILL HOLE 1, 1a

[Panamint 1, surface to 450 feet; Panamint 1a, 450 to 500 feet; sixty percent of core recovered]

Depth (feet)	Unit thickness (feet)	Description
6.0	6.0	No core.
40.5	34.5	Silt, dusky-yellow (5Y6/4), very well sorted, calcareous. Apparent bedding defined by color changes.
50.8	10.3	Silt, clayey, to clay, grayish yellow (5Y8/4), well sorted, massive, calcareous.
55.0	4.2	Clay and some silt, yellowish-gray (5Y7/2) to pale-olive (10Y6/2).
59.0	4.0	Silt, clayey, yellowish-gray (5Y7/2) to dusky-yellow (5Y6/4); fine laminar bedding; calcareous; fine beds of gypsum interspersed.
64.0	5.0	Silt, clay, and a little gypsum* interbedded; color ranges from medium light gray (N6) to greenish gray (5GY6/1) to light greenish gray (5GY8/1). Gypsum is in thin beds.
65.0	1.0	Clay, silty; contains nodules of limestone; light greenish gray (5G8/1); massive.

PANAMINT DRILL HOLE 1, 1a—Continued

Depth (feet)	Unit thickness (feet)	Description
71.0	6.0	Clay, silty; pockets of gypsum crystals; light greenish gray (5G8/1); thinly bedded; calcareous.
98.5	27.5	Clay and a little silt, light greenish-gray (5GY8/1), thinly laminated, calcareous. Thin silt and clay beds are very carbonaceous, core had strong odor of H_2S when fresh.
99.5	1.0	Clay and a little silt, greenish-gray (5GY8/1). Similar to unit above. Ostracodes, two species, observed in 98 to 101 ft interval.
105.0	5.5	Clay and a little silt, light greenish-gray (5GY8/1), thinly laminated, calcareous; very carbonaceous beds.
153.0	48.0	Clay and a very small amount of silt, light greenish-gray (5GY8/1) to (5G8/1). Carbonaceous bedding lines, laminar, in top 20 ft; bedding is less pronounced and thicker (maximum about 1 in.) in lower part. Ostracodes observed from about 112 ft to bottom of unit; diatoms in some zones; chara at 150 ft.
155.0	2.0	Silt and a little fine sand; greenish gray (5GY6/1) to light greenish gray (5GY8/1) in lower part; massive; very calcareous. Ostracodes.
165.0	10.0	Clayey silt and silty clay, light greenish-gray (5GY8/1); no distinct bedding planes except near top where the bedding is thin; calcareous.
185.0	20.0	Clay and silty clay, greenish-gray (5GY6/1), thinly bedded, calcareous; slightly carbonaceous. Diatoms and ostracodes visible.
210.0	25.0	Clay and silty clay, light greenish-gray (5GY8/1), massive, calcareous; salty. Contains ostracodes and diatoms.
210.5	.5	Gypsum* crystal aggregate, yellowish-gray (5Y8/1).
228.8	18.3	Silt and clay; color ranges from yellowish gray (5Y8/1) to light greenish gray (5G8/1); massive; calcareous. Gypsum crystals diminish downward from 2 to 0 percent of the material. One inch of very fine sand at 227.3 ft.
230.0	1.2	Sand, very fine, and silt; light olive gray (5Y6/1); massive; calcareous.
246.6	16.6	Silt and clay, yellowish-gray (5Y7/2), massive, calcareous.
255.0	8.4	Clay and silty clay, light greenish-gray (5GY8/1), fine laminations, calcareous; carbonaceous.
259.5	4.5	Silt, yellowish-gray (5Y7/2), massive, calcareous. Visible ostracodes.
269.0	9.5	Silt, with much clay, very light gray (N8), thinly bedded. At 259.9 ft there were laminae of bassanite*, calcite*, and gypsum*.
270.0	1.0	Sand, very fine, to silt, yellowish gray (5Y7/2), laminar bedding.
280.0	10.0	Silt to clay, yellowish-gray (5Y7/2); massive except for bottom 3 in. which are laminar; very calcareous. Ostracodes abundant.
287.6	7.6	Silt, moderate grayish-yellow (5Y7/4), massive, calcareous.

PANAMINT DRILL HOLE 1, 1a—Continued

Depth (feet)	Unit thickness (feet)	Description
310.0	22.4	Silt; greenish gray (5GY6/1) in upper part grading to light olive gray (5Y6/1) in lower part; calcareous; gypsiferous, locally as much as 15 percent but overall average is 2 percent.
315.0	5.0	Silt, greenish-gray (5GY6/1), massive, slightly mottled; calcareous; carbonaceous(?).
339.8	24.8	Silt, dusky-yellow (5Y6/4), massive, calcareous.
350.0	10.2	Sand, medium, to clay; average is fine sand; very light gray (N8) to light greenish gray (5GY8/1); massive; bottom 2 in. finer grained; calcareous in silt and clay zones.
358.0	8.0	Silt, moderate grayish-yellow (5Y7/4), massive, calcareous.
360.0	2.0	Silt to fine sand, light-gray (N7). Bedding laminar to 1 in.; irregular pods (10 percent of total volume) of pure fine-grained calcite.
370.0	10.0	Silt to fine sand, greenish-gray (5GY6/1), massive. Up to 5 percent calcite in upper part diminishing downward. Bottom foot is conglomeratic; pebbles, up to 1 in. in size of metamorphic rocks.
378.4	8.4	Silt, yellowish-gray (5Y7/2), massive, calcareous.
386.0	7.6	Silt to fine sand; light olive gray (5Y6/1) grading to white (N9) in highly calcareous zones, massive. At 380 ft there is a pebble of subangular metamorphic rock 1 in. in diameter; may be from zone above.
408.0	22.0	Silt, a little clay, light olive-gray (5Y6/1), massive, calcareous.
417.0	9.0	Clay, silty, to silt; pale olive (10Y6/2); massive; calcareous.
418.7	1.7	Clay, silty; mottled colors averaging greenish gray (5GY6/1); calcareous.
420.0	1.3	Clay, silty; pods of limestone; light greenish gray (5GY8/1); fine laminar bedding.
430.0	10.0	Silt to fine sand, light greenish-gray (5GY8/1), massive, calcareous.
440.0	10.0	Carbonate, silty, white (N9) to light greenish-gray (5GY8/1), massive.
442.0	2.0	Silt to very fine sand; light greenish gray (5GY8/1) to greenish gray (5GY6/1) in mottled patterns; massive; pods of carbonate.
450.0	8.0	Silt, pale-olive (10Y6/2), calcareous, massive. (End of Panamint drill hole 1.)
470.0	20.0	Silt and a little clay, grayish-yellow (5Y8/4), generally massive, calcareous.
471.0	1.0	Silt and a little clay, yellowish-gray (5Y7/2), with pods of white (N9) limestone; massive.
494.7	23.7	Silt and a little clay, grayish-yellow (5Y8/4), generally massive, calcareous.
495.0	.3	Silt and a little clay, yellowish gray (5Y7/2), and few pods of white (N9) limestone.
500.0	5.0	Silt and a little clay, grayish-yellow (5Y8/4), massive, calcareous.

[Fifty-eight percent of core recovered]

Depth (feet)	Unit thickness (feet)	Description
10.0	10.0	No core; probably all sand, coarse to fine.
17.0	7.0	No core; probably sand to silt.
19.8	2.8	Sand to silt, greenish-yellow (10Y7/2), massive. Sand grains of quartz (about 90 percent of sand), feldspar, biotite (euhedral, bleached to a golden color), iron oxide-coated quartz, possibly some pyroxene and hornblende. Calcareous.
21.5	1.7	Clay, fragments of rounded feldspar crystals, and euhedral biotite; yellowish gray (5Y8/1); massive. Streaks (1 mm average width) of hematite* generally parellel to bedding but some are perpendicular. Spots of black flakes (may be iron or manganese oxides). Irregular patches (up to 1 in. long) of brown stains, darker than hematite stains.
21.9	.4	Sand, coarse to fine, pale greenish-yellow (10Y8/2). Subangular quartz and feldspar, about 5 percent mica; streaks of reddish iron oxide. Calcareous.
22.4	.5	Clay, yellowish-gray (5Y8/1). Scattered flakes of biotite, some zones of iron oxide. A few stringers of coarse sand. Calcareous. Massive.
22.7	.3	Sand, similar to sand at depth of 21.9 ft.
23.2	.5	Clay containing about 5 percent quartz- and feldspar-sand fragments, yellowish-gray (5Y8/1), massive, calcareous.
23.7	.5	Sand, medium, yellowish-gray (5Y7/2), well-sorted, subangular; about 10 percent biotite flakes; calcareous.
26.8	3.1	Clay; contains about 1 percent subangular fragments of fine to coarse sand; pale greenish yellow (10Y8/2); much biotite, generally euhedral; calcareous.
30.0	3.2	No core.
38.0	8.0	Core destroyed while being removed from core barrel; sludge fragments indicate most of core was clay, yellowish gray (5Y8/1), with fragments of coarse sand forming about 5 percent of total. Some layers of coarse to very coarse sand.
40.7	2.7	Sand, fine to very fine, yellowish-gray (5Y7/2), massive, well-sorted. Many biotite flakes up to 1 mm diameter. Very calcareous.
41.2	.5	Pebble gravel, light greenish-gray (5GY8/1). Matrix of clay. Fragments are of large crystals(?) of feldspar and quartz, and fine-grained volcanic(?) rocks. Ratio of pebbles to matrix is 1 to 3. Calcareous.
44.8	3.6	Silt, some beds of fine to very fine sand; yellowish gray (5Y8/1). Sand beds up to 2 in. thick.
50.0	5.2	No core; probably fine sand, pebbly sand, and some clay.
51.6	1.6	Granule and clay mixture, yellowish-gray (5Y8/1). Granules up to 3 mm in diameter, subrounded to subangular, composed of basalt and individual minerals. May be cuttings, not core.
51.8	.2	Sand, very fine, light greenish-gray (5GY8/1). Contains larger fragments of quartzite and limonite(?). Massive. Calcareous.
60.0	8.2	No core; cuttings indicate much clay.

PANAMINT DRILL HOLE 2—Continued

Depth (feet)	Unit thickness (feet)	Description
61.8	1.8	Silt to clay, pale greenish-yellow (10Y8/2). Contains some subangular fragments of dolomite(?) and some small flakes of biotite.
62.0	.2	Clay, pale greenish-yellow (10Y8/2). Contains a 1-in. rounded fragment of vesicular volcanic rock.
65.0	3.0	Sand, fine to medium, some fragments of very coarse grained sand; pale olive (10Y6/2). Fragments about 97 percent feldspar and quartz(?); some biotite, olivine, iron oxide, and rock fragments. Slightly bedded. Calcareous.
70.0	5.0	No core; drilled as if sand.
72.4	2.4	Sand and clay intermixed, pale-olive (10Y6/2). Sand similar to sand at 65.0 ft. Contains rounded fragments of dolomite, intrusive rock, and volcanic rock up to 10 mm in diameter. Average size about 5 mm. Poor core.
80.0	7.6	No core; drilled as if loose sand.
80.7	.7	Clay; contains fragments up to 1 mm long of feldspar and biotite; pale olive (10Y6/2). Bottom 2 in. is coarse sand, mainly feldspar.
90.0	9.3	No core. Drilled as if sand and clay interbedded; interval between 84 and 86 ft mostly clay.
97.6	7.6	Clay, pale greenish-yellow (10Y8/2), massive, homogeneous; core breaks with conchoidal fracture. Contains fragments of biotite up to 0.5 mm in diameter, some feldspar(?).
111.7	14.1	Sand, coarse to very fine, pale-olive (10Y6/2), massive. Fragments angular to subangular, many are crystal shaped. Approximate composition: 90 percent feldspar, 6 percent quartz, 3 percent biotite, 1 percent iron oxide, pyroxene(?), amphibole(?). Entire section is very calcareous.
114.5	2.8	Clay, pale greenish-yellow (10Y8/2). Lower half shows fine bedding (1 to 5 mm thick); upper half shows no bedding. Breaks with a conchoidal fracture. Clay contains 1 mm biotite fragments, some pyroxene(?), hornblende(?), and feldspar. Very calcareous.
114.8	.3	Sand, very coarse, white (N9), well-sorted. Contains fragments of biotite and quartz(?), possibly gypsum. Noncalcareous.
117.8	3.0	Clay, greenish-yellow (10Y7/2); conchoidal fracture. Contains biotite flakes, some iron-oxide stains.
120.0	2.2	No core.
132.4	12.4	Clay, greenish-yellow (10Y7/2); conchoidal fracture. Contains flakes of biotite.
135.0	2.6	No core.
158.2	23.2	Clay and silt breccia; pale greenish-yellow (10Y8/2) clay fragments in matrix of light-brown (5YR6/4) silt. Fragments are angular, range in width up to diameter of core (2 in.). Ratio of fragments to matrix is about 2 to 1.
162.5	4.3	Silt and clay, yellowish-gray (5Y8/1), massive, calcareous. Very few biotite flakes. Contains moderate orange-pink (5YR8/4) stringers of silt, similar to the matrix in the unit above.

PANAMINT DRILL HOLE 2—Continued

Depth (feet)	Unit thickness (feet)	Description
167.5	5.0	Silt and clay, white (N9) to grayish-orange (10YR7/4). Contains fragments of feldspar and biotite.
175.0	7.5	Marl, pinkish-gray (5YR8/1). From 50 to 90 percent calcite, average about 70. Contains fragments of feldspar and biotite.
180.0	5.0	Silt and clay, very pale orange (10YR8/2) grading downward to grayish orange (10YR7/4); massive; calcareous*.
184.0	4.0	Silt and clay, generally very pale orange (10YR8/2); stringers of moderate orange-pink (5YR8/4) silt; massive; calcareous. At 182.3 ft a 1-in. fragment of vein quartz and smaller pebbles of volcanic rocks were found. This unit may be cuttings, not core.
190.0	6.0	Silt and clay, some beds of fine to medium sand; grayish orange (10YR7/4). Well bedded; sand beds up to 2 in. thick, finer sediments laminar. Sand fragments largely quartz and feldspar, with some biotite (bleached), iron oxides, and pyroxene(?). Calcareous.
200.0	10.0	Marl, mottled white (N9) and very pale orange (10YR8/2). Mainly $CaCO_3$ with irregular patches of silt. Ratio of carbonate to silt is generally about 2 to 1; some zones about 98 percent carbonate. Transition to unit above is gradational.
208.2	8.2	Clay and a little silt, pale greenish-yellow (10Y8/2), massive. Irregular patches and vertical "dikes" of iron oxide stains. Visible minerals: biotite, pyroxene(?), feldspar, iron oxides, possible some iddingsite after olivine. Transition to unit above is gradational over about 2 in.
217.7	9.5	Clay and a little silt, pale grayish-orange (10YR7/2). Vertical streaks of light-brown (5YR6/4) finer clay.
219.8	2.1	Gravel, pale grayish-orange (10YR7/2). Matrix of fine to medium sand; fragments of subangular to subrounded pebbles (2 to 15 mm; average size about 5 mm) of volcanic rocks (andesitic and basaltic; pumiceous) and limestones (dusky blue (5 PB3/2) and medium gray (N6)).
225.8	6.0	Clay and a little silt, yellowish-gray (5Y7/2). Vertical streaks of light-brown (5YR6/4) finer clay.
227.4	1.6	Sand, fine to medium, pale grayish-orange (10YR7/2).
230.0	2.6	Clay, silt, and fine sand, pale grayish-orange (10YR7/2).
240.0	10.0	Gravel, pale grayish-orange (10YR7/2). Matrix is fine to medium sand; fragments of volcanic rocks and limestones have a maximum diameter of about 5 mm.
250.0	10.0	No core; sludge cuttings indicate gravel only.
260.0	10.0	No core; gravel(?).
265.0	5.0	No core; solid-bit drill used.
270.0	5.0	Silt and clay, yellowish-gray (5Y7/2), massive. Some subangular fragments of limestone, 2 to 10 mm in diameter.
276.0	6.0	Silt, pale grayish-orange (10YR7/2), massive. A very few pebbles scattered throughout. Calcareous. Some darker streaks (carbon?).

PANAMINT DRILL HOLE 2—Continued

Depth (feet)	Unit thickness (feet)	Description
277.0	1.0	Silt, pebbly, pale grayish-orange (10YR7/2). Pebbles between 2 and 15 mm wide, averaging about 5 mm; composed of volcanic rocks (cinder basaltic rocks and limestone). Ratio of pebbles to silt is about 1 to 10.
279.0	2.0	Sand, very fine, and silt; pale orange (10YR7/2); very well sorted. Fine bedding averaging about 1 mm between bedding planes; bottom 6 in. is crossbedded, as if windblown.
279.4	.4	Gravel, pale-orange (10YR7/2). Pebbles form about 80 percent of the unit; rounded to subrounded, between 2 and 20 mm wide, averaging about 8 mm; consist of basaltic rocks, cinder, and quartzite(?).
282.6	3.2	Clay and silt, pale-orange (10YR7/2), well-sorted. At 281.3 ft and 282.0 ft there are well-cemented 2 in. beds of very coarse sand fragments in a matrix of solid calcite* and silt; sand consists of angular fragments of feldspar*, quartz*, amphibole*, pyroxene*, hematite*, and volcanic rocks*.
290.0	7.4	Sand, fine to very fine, light brownish-gray (5YR6/1), massive. Contains a few pebbles of andesitic rocks, cinder, and dolomite; round to subround; up to 20 mm long.
356.0	66.0	No core; drilled as if gravel.
359.2	3.2	Clay, very pale orange (10YR8/2), massive.
359.5	.3	Clay, grayish-orange (10YR7/4).
365.0	5.5	Sand, fine, grading into coarse sand at base; grayish orange (10YR7/4). Contains pebbles of limestone ranging in size from 2 to 10 mm, averaging about 5 mm; subangular.
375.0	10.0	No core; tricone bit used. Cuttings and drilling characteristics indicate lithology similar to the nearby outcrops of Paleozoic limestone.

PANAMINT DRILL HOLE 3

[Forty-seven percent of core recovered]

Depth (feet)	Unit thickness (feet)	Description
40.0	40.0	Silt, clayey; pale orange (10YR8/4) average color, but varies locally to medium yellowish brown (10YR5/4) forming variegated pattern; massive. Angular fragments of mica, hornblende(?). Calcareous.
50.0	10.0	Clay, silty; moderate brown (5YR3/4) to dark yellowish-brown (10YR4/2), massive. Fragments of iron oxide; about 1 percent gypsum at 50.0 ft. Calcareous. Bottom 2 ft has many angular fragments (up to 10 mm in diameter) of light grayish orange (10YR8/4) clay and fine sand.
59.7	9.7	Calcium carbonate, silty; pale greenish yellow (10Y8/2) to white (N9) forming variegated color pattern; massive.

PANAMINT DRILL HOLE 3—Continued

Depth (feet)	Unit thickness (feet)	Description
60.0	0.3	Silt and halite, calcareous*, grading down to halite; pale olive (10Y6/2) to colorless. Crystals in upper part are euhedral; in lower part form solid mass.
69.0	9.0	Silt, grayish-orange (10YR7/4), massive. Crystals of halite dispersed through silt; also blebs of greenish clay up to 2 mm wide. Poor core.
70.0	1.0	Clay, grayish-yellow green (5GY7/2), massive. Euhedral crystals of halite (up to 10 percent of core) throughout. Calcareous.
80.0	10.0	Halite, with about 40 percent silt to very fine sand; grayish yellow green (5GY7/2). Local laminar bedding. Halite is both euhedral and fragmentary. Thin bed of gypsum* and halite* at 78.0 ft; pure halite between 79.0 and 79.5 ft.
90.0	10.0	Halite and silt, grayish-orange (10YR7/4). Core is about 60 percent halite; a little gypsum; calcareous. Poor core.
159.0	69.0	Halite, generally colorless, but some included silt gives yellowish or grayish coloring; massive. Thin interbeds of silt at 105.0 ft (0.2 ft thick), 124.0 ft (0.3 ft thick), and 133.0 ft (0.2 ft thick). A little gypsum* and calcite*. Core from 135.0 to 159.0 ft is missing; drilling characteristics suggest same material as 90.0 to 135.0 ft interval.
160.0	1.0	Silt, pale-orange (10YR8/4), massive. Halite crystals form about 1 percent of core. Calcareous.
164.5	4.5	Clay, silty, to clay. Average color is yellowish gray (5Y7/2) with patches that are more orange or green thus giving an overall mottled effect. Poor laminar bedding in upper part, excellent laminar bedding in lower part. Halite crystals form about 5 percent of total. Solid beds of halite at 162.0 ft (0.3 ft thick) and 162.9 ft (0.2 ft thick).
173.5	9.0	Halite*, colorless. Bedding, if any, destroyed by drilling. Crystals are encased in yellowish-gray (5Y7/2) clay. Halite probably formed about 90 percent of unit. A little calcite* and gypsum*.
174.0	.5	Clay and silty clay, yellowish-gray (5Y7/2); laminar bedding. Halite crystals make up about 5 percent of core.
205.0	31.0	Halite, colorless. Bedding, if any, destroyed by drilling. Crystals encased in clay.
224.4	19.4	Clay, silty, yellowish-gray (5Y7/2), massive. Beds of solid halite* at 211.5 to 212.5 ft, 214.5 to 215.0 ft, and 220.5 to 221.5 ft; a little calcite* and gypsum*.
265.0	40.6	Halite*; generally colorless or tinted gray or tan by included clay; massive(?). A little gypsum and calcite. This section cored very poorly and the resulting "core" consists of wafers of halite and piles of broken halite crystals.
273.5	8.5	Clay, silty, to clay; pale greenish yellow (10Y8/2) to yellowish gray (5Y7/2); massive. Contains small amounts of halite and gypsum; calcareous.

PANAMINT DRILL HOLE 3—Continued

Depth (feet)	Unit thickness (feet)	Description
275.0	1.5	Clay, a little silt and sand; yellowish gray (5Y7/2) with mottled patches of darker material; massive. Calcareous.
330.0	55.0	Clay, a little silt, a very little fine sand. Color ranges between yellowish gray (5Y7/2) and grayish yellow (5Y7/4); local lenses of pale olive (10Y6/2). From 275.0 to 298.0 ft the color emphasizes the beds (the coarser sediments are greener, the finer are more yellow); from 298.0 to 330.0 ft the unit is massive. Calcareous, increasing downward.
345.0	15.0	Clay, a little silt, a very little fine sand. Colors range between yellowish gray (5Y7/2), pale greenish yellow (10Y8/2), and pale olive (10Y6/2); average is toward pale olive. Color banding but no apparent lithologic bedding. Noncalcareous except for bottom ft.
354.4	9.4	Clay, pale greenish-yellow (10Y8/2), massive; very calcareous; 1-in. beds of gypsum* at 351.0 and 352.0 ft.
365.0	10.6	Silt, calcareous, and gypsum; greenish gray (5GY6/1) to white (N9); massive. Megascopic crystals of gypsum* (from 10 to 50 percent of core) in a matrix of calcareous silt; the calcite content is between 30 and 90 percent.
375.0	10.0	Clay, with pods of calcium carbonate. Dark greenish gray (5G4/1) and moderate brown (5YR4/4) mixed with some streaks and pods of white (N9), still damp. Texture is contorted; may have been bedded.
384.0	9.0	Silt, light greenish-gray (5G8/1) to very light gray (N8), massive; very calcareous; a few crystals of gypsum up to 4 mm long.
385.0	1.0	Gypsum and calcite, very light gray (N8), massive. Crystals of gypsum up to 1 mm long.
395.0	10.0	Gypsum and halite, silty, light greenish-gray (5GY8/1); massive. Gypsum and halite form up to 90 percent of core; average is about 70 percent.
401.0	6.0	Clay with pods of calcite*, dark greenish-gray (5G4/1) and moderate-brown (5YR4/4), still damp. Texture contorted. Poor core.
401.3	.3	Halite and silt, colorless crystals.
408.0	6.7	Clay, silty, light dusky-yellow (5Y7/4), massive. Some isolated halite crystals; calcareous.
412.0	4.0	Silt, grayish-olive (10Y4/2), still damp; massive. May be cuttings, not core.
415.0	3.0	Clay, silty, light dusky-yellow (5Y7/4); laminar bedding. A little halite; calcareous.
418.0	3.0	Silt, grayish-olive (10Y4/2), massive. May be cuttings, not core.
424.3	6.3	Clay and a little silt interbedded. Dusky-yellow (5Y6/4) clay and yellowish-gray (5Y7/2) silt. Bedding of two types: one is laminar; the other is about 20 mm thick. Section about 90 percent clay. Calcareous.

PANAMINT DRILL HOLE 3—Continued

Depth (feet)	Unit thickness (feet)	Description
449.3	25.0	Halite; colorless crystals (usually covered with clay); massive. A little gypsum* and calcite*. Some beds of silt included in the core are probably cuttings, not core.
450.0	.7	Sand, very fine, yellowish-gray (5Y7/2). Bedding faint, about 5 mm average thickness. Well sorted, well indurated. Calcareous.
454.0	4.0	Clay and a little silt interbedded. Dusky-yellow (5Y6/4) clay and yellowish-gray (5Y7/2) silt. Well bedded. Calcareous. Top foot is still damp; presumably cuttings, not core.
456.6	2.6	Silt. Between yellowish gray (5Y7/2), light olive gray (5Y5/2), and pale olive (10Y6/2); average is toward pale olive. Laminar bedding. Carbonaceous partings. Calcareous; salty.
460.0	3.4	Clay and a little silt in upper half grading to silt in lower half. Dusky yellow (5Y6/4) and yellowish gray (5Y7/2) in upper half; pale olive (10Y6/2) in lower half. Entire unit well bedded. Carbonaceous partings. Calcareous.
461.0	1.0	Clay and a little halite. Clay is dusky blue (5PB3/2), still damp. Halite forms about 10 percent of core.
474.0	13.0	Halite*, colorless; tan or gray clay coating on crystals; massive. A 1-in. silt bed at 464.5 ft. Upper two-thirds about 20 percent, clay; lower one-third about 2 percent clay.
479.7	5.7	Silt and clay, pale-olive (10Y6/2). Bedding 1 to 10 mm thick; defined by color banding. Pods of white (gypsum?).
485.0	5.3	Clay and halite. Clay is pale olive (10Y6/2); halite is colorless. Fine bedding. Ratio of halite to clay is 1 to 1. A little calcite.
531.0	46.0	Halite; a little clay. Halite is colorless. Massive(?). A little calcite and gypsum. Top contact is gradational; basal contact is sharp. Core is very poor and bedding is not recognizable; the section drilled as if massive salt.
545.0	14.0	Clay, yellowish-gray (5Y7/2) to pale-olive (10Y6/2). Bedding is distinct, units 1 to 10 mm thick; some partings appear carbonaceous. Calcareous.
555.0	10.0	Silt; yellowish-gray (5Y7/2), darker where core is still damp; massive to mottled texture. Fragments of halite and gypsum, the percentage increasing downward; calcareous.
556.0	1.0	Calcite and gypsum encased in mud, greenish-gray (5GY6/1). Core is about 90 percent crystals.
557.0	1.0	Silt, yellowish-gray (5Y8/1), massive, slightly calcareous.
559.5	2.5	Halite; a little clay. Colorless halite; clay is greenish gray (5GY6/1). Massive.
569.5	10.0	Clay, yellowish-gray (5Y8/1) to light greenish-gray (5GY8/1), mottled coloring; generally massive, local thin bedding; calcareous.
585.3	15.8	Clay grading down to silt, yellowish-gray (5Y8/1). Bedding fine up to 10 mm. Calcareous. Fine sand, 576.0 to 577.0 ft.

PANAMINT DRILL HOLE 3—Continued

Depth (feet)	Unit thickness (feet)	Description
590.0	4.7	Clay, yellowish-gray (5Y8/1) to very pale orange (10YR8/2), massive, calcareous.
596.5	6.5	Silt to fine sand; yellowish gray (5Y7/2) to pale olive (10Y6/2), patches of white (N9); massive. Pods and small lenses of gypsum and halite at 596.0 ft.
601.0	4.5	Clay, yellowish-gray (5Y8/1) to very pale orange (10YR8/2), generally massive, calcareous.
610.0	9.0	Silt grading downward to very coarse sand with silt matrix, yellowish-gray (5Y7/2) to (5Y8/1), massive, calcareous and gypsiferous, from 603.0 to 604.0 ft gypsum forms up to 30 percent of core.
624.0	14.0	Silt and fine sand grading down to fine sand, light olive-gray (5Y6/1), massive, slightly calcareous. Poor core.
624.3	.3	Tuff, mixed with very fine sand; very light gray (N8). Fine bedding defined by black streaks of carbon or biotite. Very well indurated.
656.0	31.7	Sand, very fine, yellowish-gray (5Y7/2), massive. Calcareous.
785.0	129.0	Silt to very fine sand, yellowish-gray (5Y7/2); very faint bedding to massive; very well sorted. Calcareous; a 1-ft bed of calcareous silt at 724.0 ft. Many flakes of mica, up to 0.5 mm wide.
794.0	9.0	Clay, silty, yellowish-gray (5Y7/2), massive(?), slightly calcareous. Poor core.
795.0	1.0	Sand, very fine, yellowish-gray (5Y7/2), massive. A little gypsum; calcareous.
801.0	6.0	Silt; very little fine sand; dark yellowish gray (5Y6/2). Bedding in top ft 1 to 10 mm thick; appears to be at an angle of about 60° to the sides of the core; probably a result of drilling pressures.
805.0	4.0	Silt to very fine sand, dark grayish-yellow (5Y7/4), massive, very slightly calcareous.
814.2	9.2	Silt to very fine sand, dark-yellowish-gray (5Y8/2), massive. A little gypsum.
815.0	.8	Silt to very fine sand, dark grayish-yellow (5Y7/4); faint bedding; slightly calcareous.
829.3	14.3	Silt to very fine sand, yellowish-gray (5Y7/2) to dark-grayish-yellow (5Y7/4). Some faint laminar bedding but generally massive. Slightly (about 0.5 percent) gypsiferous; calcareous; flakes of mica common.
835.0	5.7	Clay, gypsiferous, silty, dark grayish-yellow (5Y7/4), mottled coloring. Gypsum forms 5 to 20 percent of core, average 10 percent; found as bladed crystals up to 10 mm long. Very slightly calcareous.
844.5	9.5	Clay and a little silt. Dusky-yellow (5Y6/4) clay and yellowish-gray (5Y7/2) silt. Massive.
845.0	.5	Silt, gypsiferous(?); very light greenish gray (5GY9/1), lenses of white (N9).
855.0	10.0	Silt, greenish-gray (5Y7/1). Locally shows faint bedding up to 10 mm thick but is generally massive. Lenses of anhydrite* and gypsum*; very slightly calcareous*.

PANAMINT DRILL HOLE 3—Continued

Depth (feet)	Unit thickness (feet)	Description
865.0	10.0	Clay, silty, yellowish-gray (5Y7/2); massive, generally, with local laminar bedding; calcareous, a little gypsum*.
875.0	10.0	Core lost; estimated to be the same as previous 10 ft.
895.0	20.0	No core; solid bit used; the material is presumably similar to that at 865.0 ft.
913.0	18.0	Clay, very little silt and very fine sand; dark grayish yellow (5Y7/4). Very well bedded; laminar to 20 mm thick in upper part, grades down to massive. Black partings of carbon or biotite in upper part. Calcareous, a little anhydrite(?)*.
914.6	1.6	Clay; yellowish gray (5Y7/2), to light olive gray (5Y5/2) in lower part. Lenses (up to 1 mm thick) of biotite(?). Excellent laminar bedding. Calcareous.
915.0	.4	Sand, fine, dusky-yellow (5Y6/4), poorly sorted, massive.
931.4	16.4	Silt to very fine sand, yellowish-gray (5Y7/2). Massive in upper half grading to very faint bedding in lower half. Calcareous; gypsiferous.
935.0	3.6	Silt, yellowish-gray (5Y7/2). Excellent laminar bedding; partings of black biotite(?). Calcareous.
945.0	10.0	Clay, silty,to silt; light greenish gray (5GY8/1); massive. Gypsum at 937.0 ft.
965.0	20.0	Clay to silt, yellowish-gray (5Y8/1) to light olive-gray (5Y6/1). Fine bedding; laminar to 15 mm thick. Some partings of biotite silt. Small lamellae of gypsum(?) and anhydrite*.
985.0	20.0	Silt with thin beds of gypsum(?) and anhydrite(?); yellowish gray (5Y8/1). Silt beds are well sorted and well indurated. Gypsum(?) and anhydrite(?) form about 10 percent of the core. No core recovered from 965 to 973 ft but drilling characteristics indicate a well-indurated material similar to the recovered core.
995.0	10.0	No core; drilled as if very hard material, like unit above.

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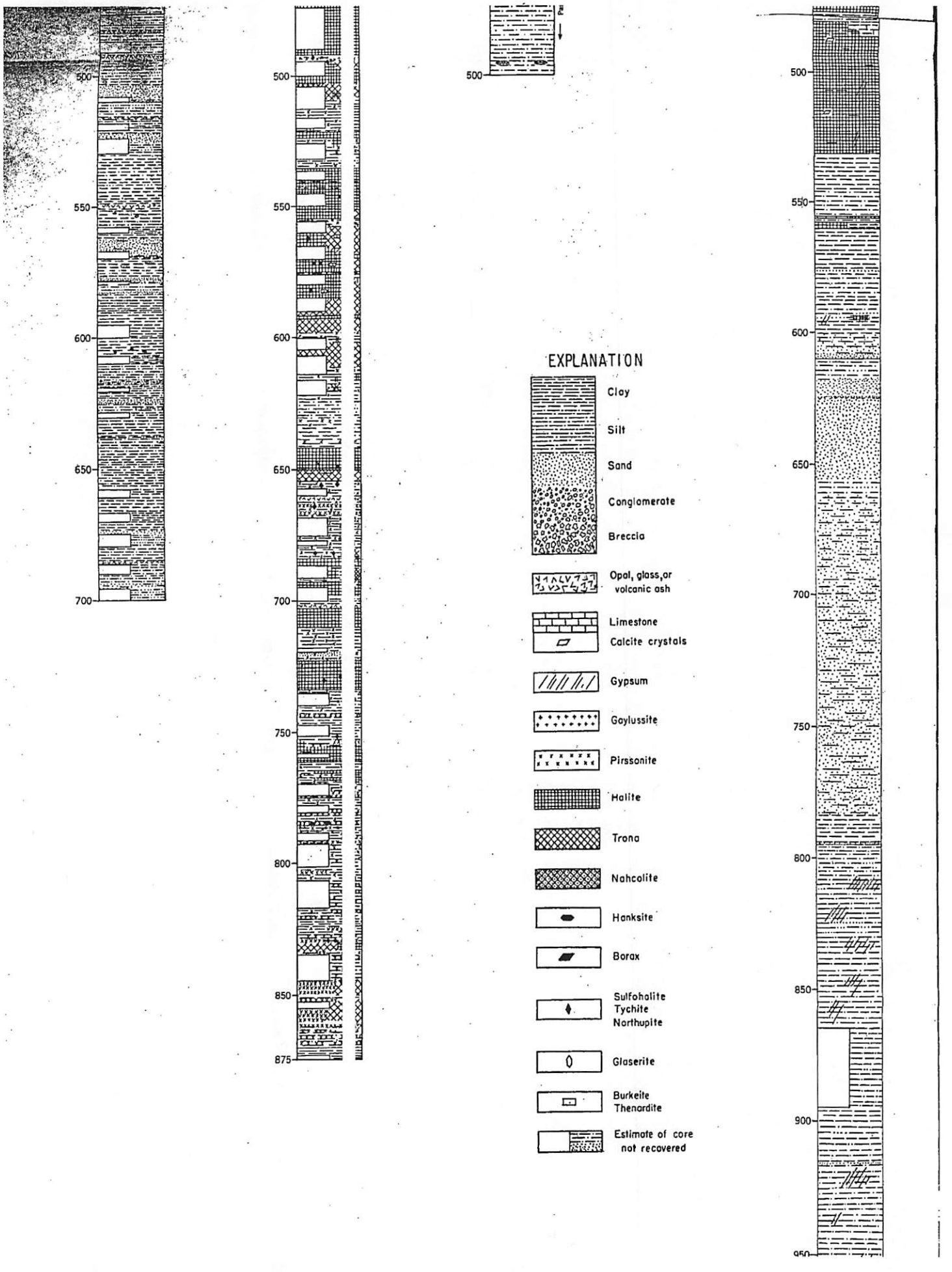
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Silt
Sand
Conglomerate
Breccia
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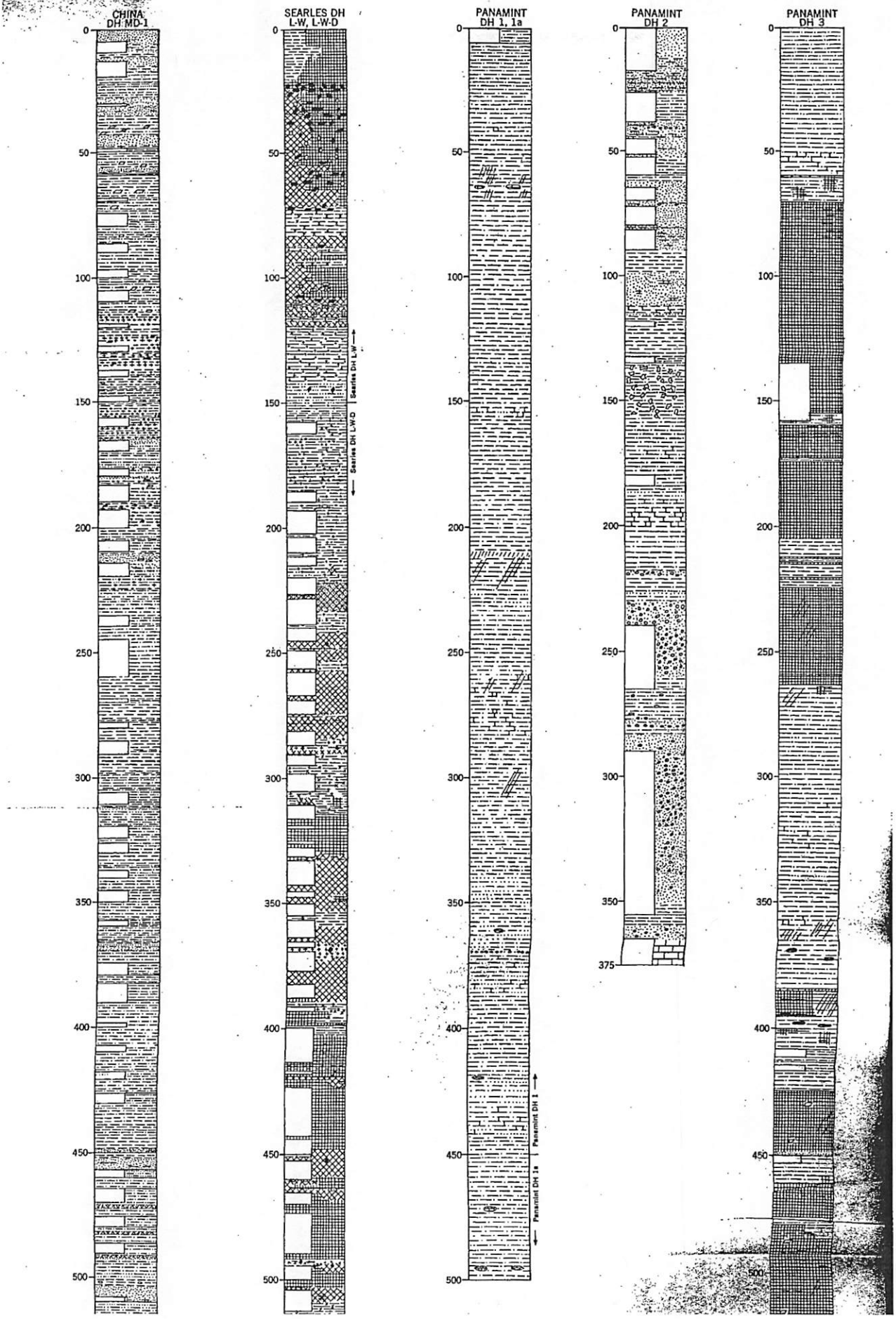
Limestone
Calcite crystals
Gypsum
Gaylussite
Pirssonite
Halite
Trona
Nahcolite
Hanksite
Borax
Sulfohalite
Tychite
Northupite
Glaserite
Burkeite
Thenardite
Estimate of core not recovered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