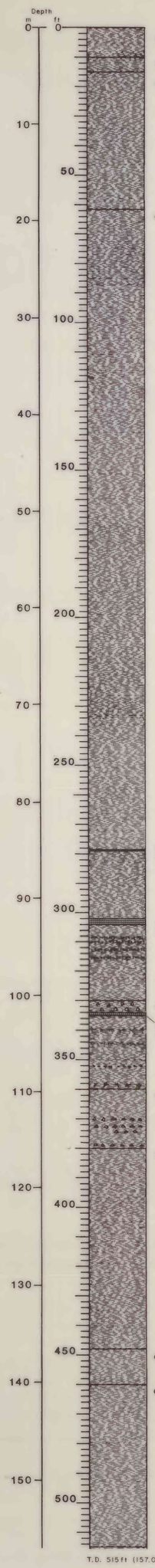
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

LITHOLOGIC LOGS FROM KOEHN DRY LAKE TEST WELL NO. 1

OPEN FILE REPORT 79-1348
(SHEET 1 OF 5)

Dockter -- Test well data from Koehn Dry Lake,
Kern County, California



Feet			Meters			Description
0	-	10	0	-	3.1	CLAY, moderate-yellowish-brown (5YR 3/4), calcareous, sticky with occasional thin black (N 1) clay layers. Unit contains coatings of halite and gypsum as much as 3.2 mm (0.13 in.) thick on fractures. Clay oxidizes moderate-yellowish-brown (10YR 5/4) to dark-yellowish-brown (10YR 4/2)
10	-	15	3.1	-	4.6	CLAY, olive-gray (5Y 3/4), calcareous clay oxidizes to dark-yellowish-brown (10YR 4/2)
15	-	61.5	4.6	-	18.7	CLAY, moderate-yellowish-brown (10YR 5/4), calcareous, with less than 1 percent fine sand and scattered biotite plates as much as 0.5 mm (0.02 in.) across. Unit is moderately indurated and tastes salty. Clay oxidizes to moderate-yellowish brown (10YR 5/4), dark-yellowish-brown (10YR 4/2), or grayish-olive (10Y 4/2)
61.5	-	63	18.7	-	19.2	CLAY, yellowish-gray (5Y 7/2), calcareous. Clay oxidizes grayish-olive (10Y 4/2) to moderate-yellowish-brown (10YR 5/4)
63	-	68	19.2	-	20.7	CLAY, black (N 1), calcareous. Clay oxidizes dusky-yellow (5Y 6/4) to pale-olive (10Y 6/2)
68	-	71	20.7	-	21.6	CLAY, greenish-gray (5GY 6/1), calcareous, with a few thin layers of grayish-orange clay (10YR 7/4). Clay oxidizes dusky-yellow (5Y 6/4) to pale-olive (10Y 6/2)
71	-	72	21.6	-	21.9	CLAY, grayish-orange (10YR 7/4), calcareous. Clay oxidizes dusky-yellow (5Y 6/4) to pale-olive (10Y 6/2)
72	-	74	21.9	-	22.6	CLAY, moderate-yellowish-brown (10YR 5/4), calcareous. Clay oxidizes dusky-yellow (5Y 6/4) to pale-olive (10Y 6/2)
74	-	76.5	22.6	-	23.3	CLAY, greenish-gray (5GY 6/1), calcareous. Clay oxidizes dusky-yellow (5Y 6/4) to pale-olive (10Y 6/2)
76.5	-	100	23.3	-	30.5	CLAY, interlaminated, black (N 1) and greenish-gray (5GY 6/1), calcareous, with less than 1 percent chlorite and biotite plates as much as 0.5 mm (0.02 in.) across. Greenish-gray laminae are generally less than 1 mm (0.04 in.) thick. Unit becomes well indurated below 25.9 m (85 ft). H_2S gas noted at 25.9 m (85 ft) and 30.5 m (100 ft). Clay oxidizes pale-olive (10Y 6/2) or light-olive-brown (5Y 5/6)
100	-	110	30.5	-	33.5	CLAY, interlaminated, black (N 1) and very-pale-orange (10YR 8/2), calcareous. Orange laminae less than 25.4 mm (1 in.) thick. Unit becomes predominantly black near base. Clay oxidizes pale-olive (10Y 6/2) or light-olive-brown (5Y 5/6)
110	-	135	33.5	-	41.1	CLAY, black (N 1), calcareous, with scattered biotite plates as much as 0.5 mm (0.02 in.) across. Clays taste salty. Clay oxidizes pale-olive (10Y 6/2) or light-olive-brown (5Y 5/6)
135	-	278.3	41.1	-	84.8	CLAY, black (N 1), calcareous, with occassional laminae of dark-greenish-gray (5G 4/1) clay. Unit contains biotite and muscovite plates as much as 1 mm across. Biotite is generally scattered, but also concentrated along planes. Clays contain saline minerals in solution from 51.8 m (170 ft) to 84.8 m (278.3 ft). Clay oxidizes moderate-olive-brown (5Y 4/4)
278.3	-	279	84.8	-	85.0	HALITE, transparent, rock salt
279	-	285	85.0	-	86.9	CLAY, black (N 1), calcareous. Unit tastes salty. Clay oxidizes moderate-olive-brown (5Y 4/4) to moderate brown (5YR 4/4)
285	-	290	86.9	-	88.4	CLAY, interlaminated black (N 1), calcareous with pale-greenish-yellow (10Y 8/2) laminae as much as 3.2 mm (0.13 in.) thick. Clay oxidizes moderate-olive-brown (5Y 4/4) to moderate-brown (5YR 4/4)
290	-	302	88.4	-	92.0	CLAY, black (N 1), calcareous. Unit tastes salty. Clay oxidizes moderate-olive-brown (5Y 4/4) to moderate-brown (5YR 4/4)
302	-	304	92.0	-	92.7	HALITE
304	-	330	92.7	-	100.6	CLAY, black (N 1), calcareous. Unit contains halite beds as much as 96.2 mm (3 in.) thick. Salt layers are composed of porous masses of interconnected halite crystals and saturated brine. Salt layers occur at 94.0 m (308.5 ft), 94.6 m (310.5 ft), 95.3 m (312.5 ft), and 96.0 m (315 ft). Clay oxidizes moderate-olive-brown (5Y 4/4)
330	-	334	100.6	-	101.8	CLAY, greenish-gray (5GY 6/1) calcareous, with scattered salt crystals. Clay oxidizes grayish-olive-green (5GY 3/2)
334	-	335	101.8	-	102.1	HALITE
335	-	355	102.1	-	108.2	CLAY, greenish-gray, moderately calcareous, micaceous. Mica plates are as much as 1 mm (0.04 in.) across, composed of biotite or muscovite, and abundant along planes. The unit contains interbeds of olive-gray (5Y 4/1) clay between 105.2-106.7 m (345-350 ft). The unit also contains root or stem fragments at 103.3 m (339 ft), silty partings at 104.9 m (344 ft), and white calcium carbonate spheroids as much as 1 mm (0.04 in.) across at 107.3 m (352 ft). Clays oxidize dark-greenish-gray (5GY 4/1)
355	-	360	108.2	-	109.7	CLAY, interlaminated, greenish-gray (5GY 6/1) and olive-gray (5Y 4/1), calcareous. Unit contains minor amounts of root. Clays oxidize dark-greenish-gray (5GY 4/1)
360	-	375	109.7	-	114.3	CLAY, dark-greenish-gray (5GY 4/1), calcareous, with scattered salt crystals as much as 2 mm (0.08 in.) across below 112.5 m (369 ft). Clays oxidize dark-greenish-gray (5GY 4/1)
375	-	390	114.3	-	118.9	CLAY, dark-greenish-gray (5GY 4/1), very calcareous, with a bed containing 50 percent salt crystals between 115.2 - 115.5 m (378-379 ft). Clays oxidize dark-greenish-gray (5GY 4/1), but change to olive-gray (5Y 4/1) near base
390	-	395	118.9	-	120.4	CLAY, interlaminated, moderate-olive-brown (5Y 4/4) and olive-gray (5Y 4/1), calcareous. Clay oxidizes olive-gray (5Y 4/1)
395	-	400	120.4	-	121.9	CLAY, interlaminated, calcareous, moderate-olive-brown (5Y 4/4), with dusky-yellow (5Y 6/4) interbeds as much as 6.4 mm (0.25 in.) thick. Clay oxidizes olive-gray (5Y 4/1)
400	-	408	121.9	-	124.4	CLAY, moderate-olive-brown (5Y 4/4), calcareous. Clay oxidizes olive-gray (5Y 4/1)
408	-	409	124.4	-	124.7	CLAY, grayish-olive (10Y 4/2), calcareous. Clay oxidizes olive-gray (5Y 4/1)
409	-	448	124.7	-	136.6	CLAY, moderate-olive-brown (5Y 4/4), micaceous. Mica (biotite) as much as 1.0 mm (0.4 in.) across scattered throughout or concentrated along planes. Decrease in saline minerals below 126.5 m (415 ft). Lower part of unit contains white sugary clots of calcite as much as 1.5 mm (0.06 in.) across. Clay oxidizes olive-gray (5Y 4/1) from 124.7 - 129.5 m (409-425 ft) and light-olive-gray from 129.5 - 136.6 m (425-448 ft)
448	-	455	136.6	-	138.7	CLAY, moderate-olive-brown (5Y 4/4), calcareous, sandy, with occasional fine sand layers as much as 1.6 mm (0.06 in.) thick. Unit contains less than 10 percent sand. Clays oxidize light-olive-gray (5Y 5/2) to moderate-brown (5YR 3/4)
455	-	460	138.7	-	140.2	CLAY, moderate-yellowish-brown (10YR 5/4), calcareous, micaceous, with less than 1 percent scattered sand. Sand is less than 1 mm (0.04 in.). Clay oxidizes moderate-brown (5YR 3/4)
460	-	464	140.2	-	141.4	CLAY, grayish-olive (10YR 4/2), calcareous, with scattered mica flakes as much as 0.5 mm (0.02 in.) across. Clay oxidizes dark-yellowish-brown (10YR 4/2) to pale-olive (10Y 6/2)
464	-	465	141.4	-	141.7	CLAY, brownish-black (5YR 2/1), calcareous
465	-	513	141.7	-	156.4	CLAY, black (N 1), calcareous, salty tasting, with occasional mica flakes as much as 0.5 mm (0.02 in.) across. Unit contains 1 to 3 percent mica below 149.4 m (490 ft). Saline minerals not noted below 149.4 m (490 ft). Clay oxidizes grayish-olive (10Y 4/2) to moderate-brown (5YR 4/4) between 141.7 - 143.3 m (465-470 ft), moderate-olive-brown (5Y 4/4) between 143.3 - 147.8 m (470-485 ft), and light-olive-gray (5Y 5/2) between 147.8 - 156.4 m (485-513 ft)
513	-	515	156.4	-	157.0	CLAY, dark-grayish-green (5GY 4/1), highly calcareous, with less than 1 percent scattered mica flakes as much as 0.5 mm (0.02 in.) across. Clay oxidizes dusky-yellow-green (5GY 5/2)

EXPLANATION

INTRODUCTION

This report presents lithologic and water quality data from Koehn Dry Lake, California. These data provided leasable mineral resource input to the Bureau of Land Management's comprehensive long-range plan for the management, use, development, and protection of public lands within the California Desert Conservation Area (index map). This plan was authorized by the Federal Land Policy and Management Act of October 21, 1976 (Public Law 94-579).

TEST WELL NO. 1
DRILLING AND LITHOLOGIC LOGGING TECHNIQUES

The test well was completed in December 1978 using the reverse circulation drilling technique. During drilling, either air or water or both, were pumped between the outer and inner walls of the dual-wall drill pipe to an open-face insert bit. The drilling fluids and cuttings were then forced up the inner opening of the drill pipe to the surface. This technique allows recovery of uncontaminated sediment and water samples. In situ ground water was used as a drilling fluid as much as possible; when this was not possible a fine mist of imported fresh water and air was used.

Lithologic characteristics of the sampled drill cuttings were described in the field. Field descriptions were later supplemented during laboratory examination. The rock color chart (Goddard and others, 1948) was used to describe sample color. All color classifications were made on damp to wet cuttings. Sediment names were described using the classification scheme of Wentworth (1922). The term "clay" is used only in the sense of particle size (less than 4 microns) and does not infer mineralogical content. Percentages of lithologic constituents listed in the description are approximate.

WATER QUALITY

A water sample was collected from a salt layer at 315 feet. The water sample was collected after drilling fluids and foreign matter were pumped from the hole. Water temperature and pH of raw untreated samples and specific gravity of filtered samples were measured in the field.

ACKNOWLEDGEMENTS

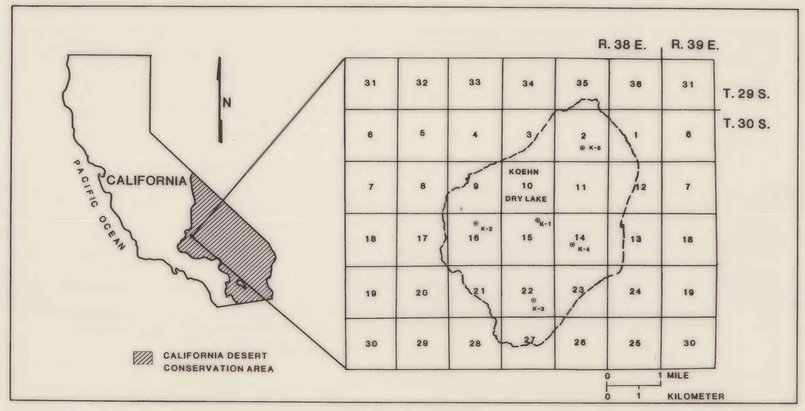
G. Thomas Server provided oxidation color descriptions.

REFERENCES

Goddard, E. N., chm., and others, 1948, Rock-color chart: National Research Council; reprinted by Geological Society of America, 1951, 1963, 1970, 6 p.

Wentworth, C. K., 1922, A scale of grade and class terms for clastic sediments: Journal of Geology, v. 30, p. 377-392.

INDEX MAP



TEST WELL LOCATION

K-1 Latitude: 35° 19' 45" N.
Longitude: 117° 53' 01" W.
NE1/4 NW1/4 NE1/4 sec. 15, T. 30 S., R. 38 E.
Mount Diablo Meridian

WATER QUALITY DATA FROM KOEHN DRY LAKE TEST WELL NO. 1
(Analyses by U.S. Geological Survey, Water Resources Division, Denver, Colorado)

Sample number	Date of collection	Depth of water sample m(ft)	Water temperature (°C)	pH lab	pH field	Specific gravity	Specific conductance (microhms/cm at 25°C)	Percent sodium	SAR* (sodium-adsorption-ratio)
K-1-1	12/8/78	96.0 (315)	21.7	8.3	--	1.218	184,000	99	21,100

	mg/l									
Sample number	Silica (SiO_2)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Phosphorus (P)	Sulphate (SO_4)	Chloride (Cl)	Fluoride (F)	Total Nitrate (NO_2+NO_3)	Iodide
K-1-1	1.2	0.3	1.3	120,000	1,200	84	56,000	150,000	25	0.17	0.07

	µg/l						mg/l			
Sample number	Manganese (Mn)	Iron (Fe)	Boron (B)	Lithium (Li)	Strontium (Sr)	Uranium (U)	Solids, residue on evaporation at 180°C (TDS)	Total Alkalinity Calcium Carbonate ($CaCO_3$)	Bicarbonate# (HCO_3)	Total hardness
K-1-1	330	4,000	570,000	60	840	47	325,000	8,000	9,760	7

Sodium-adsorption-ratio -- predicts degree to which irrigation water tends to enter into cation exchange reactions in soil. High values imply hazard of sodium replacing adsorbed calcium and magnesium, this replacement is damaging to soil structure.

* SAR — Water Classification

SAR	Water Classification
<10	Excellent
10 - 18	Good
18 - 26	Fair
>26	Poor

Calculated

This report has not been edited for conformity with Geological Survey editorial standards

PRELIMINARY
LITHOLOGIC AND WATER QUALITY DATA FROM TEST WELLS ON KOEHN DRY LAKE, KERN COUNTY, CALIFORNIA

By Roger D. Dockter

1979

PRELIMINARY COPY
SUBJECT TO REVISION