

LITHOLOGIC LOGS FROM KOEHN DRY LAKE TEST WELL NO. 5

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

Depth (Feet)	Depth (Meters)	Description	260 - 275	79.2 - 83.8	Description
0 - 27	0 - 8.2	CLAY, micaceous (10YR 5/4) and light-olive-brown (10YR 5/4), calcareous, with occasional scattered chlorite and biotite flakes as much as 0.5 mm (0.02 in.) across. Unit contains less than 1 percent mica. Clay oxidizes moderate-yellowish-brown (10YR 5/4) to dark-yellowish-brown (10YR 4/2).	260 - 275	79.2 - 83.8	CLAY, interbedded, moderate-yellowish-brown (10YR 5/4) and light-olive-brown (10YR 5/6), calcareous, with scattered biotite flakes as much as 1.0 mm (0.04 in.) across. Individual clay beds are as much as 3 feet thick. Unit contains moderate-yellowish-brown (10YR 5/4) claystone interbeds as much as 12.7 mm (0.5 in.) thick between 83.2-83.5 m (273 to 274 ft). Clays oxidize dark-yellowish-brown (10YR 4/2) from 79.2 to 82.3 m (260 to 270 ft) and light-olive-gray (5Y 5/2) from 82.3 to 83.8 m (270 to 275 ft).
27 - 30	8.2 - 9.1	CLAY, moderate-yellowish-brown (10YR 5/4), calcareous			
30 - 31	9.1 - 9.4	CLAY, dusky-yellow (5Y 6/4), calcareous, with scattered mica flakes as much as 0.5 mm (0.02 in.) across. Clay oxidizes light-olive-gray (5Y 5/2)	275 - 281	83.8 - 85.6	CLAY, interbedded. Lithology similar to 79.2-83.8 m (260-275 ft), but unit also contains beds of light-olive-gray (5Y 5/2) clay. Unit oxidizes dark-yellowish-brown (10YR 4/2)
31 - 32.5	9.4 - 9.9	CLAY, light-olive-gray (5Y 5/2), calcareous, with scattered mica flakes as much as 0.5 mm (0.02 in.) across			
32.5 - 34	9.9 - 10.4	CLAY, grayish-olive (10Y 4/2), calcareous, with scattered mica flakes as much as 0.5 mm (0.02 in.) across. Clay oxidizes light-olive-gray (5Y 5/2)	281 - 287	85.6 - 87.5	CLAY, moderate-yellowish-brown (10YR 5/4), calcareous, with less than 1 percent scattered mica flakes as much as 0.5 mm (0.02 in.) across. Clay oxidizes dark-yellowish-brown (10YR 4/2)
34 - 34.5	10.4 - 10.5	CLAY, pale-olive (10Y 6/2) and olive-gray (5Y 3/2), calcareous, with scattered mica flakes as much as 0.5 mm (0.02 in.) across	287 - 289	87.5 - 88.1	CLAY, dark-yellowish-brown (10YR 4/2)
34.5 - 38	10.5 - 11.6	CLAY, moderate-olive-brown (5Y 4/4), clay, calcareous, with scattered mica flakes as much as 0.5 mm (0.02 in.) across. Clay oxidizes light-olive-gray (5Y 5/2)	289 - 290	88.1 - 88.4	CLAY, olive-gray (5Y 4/1), calcareous, small calcite crystals as much as 1.6 mm (0.06 in.) across. Clay oxidizes dark-yellowish-brown (10YR 4/2)
38 - 39	11.6 - 11.9	CLAY, grayish-olive (10Y 4/2), calcareous, with scattered mica flakes as much as 0.5 mm (0.02 in.) across. Clay oxidizes light-olive-gray (5Y 5/2)	290 - 321.5	88.4 - 98.0	CLAY, black (N 1), slightly calcareous, with less than 1 percent scattered biotite flakes as much as 0.5 mm (0.02 in.) across. Clay oxidizes dark-yellowish-brown from 89.4-89.9 m (290-295 ft) and moderate-olive-brown (5Y 4/4) from 89.9 to 97.5 m (295 to 320 ft)
39 - 41	11.9 - 12.5	CLAY, moderate-olive-brown (5Y 4/4), with scattered mica flakes as much as 0.5 mm (0.02 in.) across. Clay oxidizes light-olive-gray (5Y 5/2)	321.5 - 324.5	98.0 - 98.9	CLAY, interlayered, dark-greenish-gray (5GY 4/1) and black (N 1), with less than 1 percent scattered biotite flakes as much as 1 mm (0.04 in.) and clots of biotite and muscovite(?) flakes as much as 3 mm (0.12 in.) across. Clay beds are less than 12.7 mm (0.5 in.) thick and oxidize pale-olive (10Y 6/2) and grayish-olive (10Y 4/2)
41 - 195	12.5 - 59.4	CLAY, black (N 1), calcareous, with scattered mica flakes as much as 0.5 mm (0.02 in.) across. Unit contains less than 1 percent mica. Clays oxidize light-olive-gray (5Y 5/2) between 12.5-13.7 m (41-45 ft), light-olive-gray (5Y 5/2) to moderate-olive-brown (5Y 4/4) between 13.7-27.4 m (45-90 ft), moderate-olive-brown (5Y 4/4) between 27.4-44.2 m (90-145 ft), light-olive-gray (5Y 5/2) between 44.2-48.8 m (145-160 ft), light-olive-gray (5Y 5/2) to moderate-olive-brown (5Y 4/4) between 48.8-57.9 m (160-190 ft), and light-olive-gray (5Y 5/2) between 57.9-59.4 m (190-195 ft)	324.5 - 355	98.9 - 108.2	CLAY, black (N 1), calcareous, with thin dark-greenish-gray (5GY 4/1) laminae. The dark-green laminae are as much as 1 mm (0.04 in.) thick and occur from 100.6 to 102.1 m (330 to 335 ft) and 103.6 to 105.2 m (340 to 345 ft). Clay oxidizes moderate-olive-brown (5Y 4/4) from 99.1 to 100.6 m (325 to 330 ft), moderate-olive-brown (5Y 4/4) with minor moderate-yellowish-brown (10YR 5/4) or pale-yellowish-green (10YR 7/2) from 100.6 to 102.1 m (330 to 335 ft), and moderate-olive-brown (5Y 4/4) from 102.1 to 108.2 m (335-355 ft)
195 - 199	59.4 - 60.7	CLAY, grayish-olive (10Y 4/2), calcareous, micaceous. Clay oxidizes light-olive-gray (5Y 5/2)	355 - 366	108.2 - 111.6	CLAY, variegated, black (N 1) and greenish-gray (5GY 4/1), calcareous. Clay oxidizes moderate-olive-brown (5Y 4/4)
199 - 210	60.7 - 64.0	CLAY, black (N 1), calcareous, with scattered mica flakes as much as 0.5 mm (0.02 in.) across. Unit contains less than 1 percent mica. Clays oxidize light-olive-gray (5Y 5/2) between 60.7-62.5 m (199-205 ft) and moderate-olive-brown (5Y 4/4) with minor moderate-yellowish-brown (10YR 5/4) between 62.5-64.0 m (205-210 ft)	366 - 374	111.6 - 114.0	CLAY, greenish-black (5G 2/1), calcareous, with 5 to 10 percent rounded to subrounded frosted medium quartz sand. Clay oxidizes moderate-olive-brown (5Y 4/4)
210 - 214	64.0 - 65.2	CLAY, dark-greenish-gray (5GY 4/1), with 1 to 3 percent chlorite and biotite flakes as much as 0.5 mm (0.02 in.) across. Clay oxidizes moderate-olive-brown (5Y 4/4)	374 - 392	114.0 - 119.5	SAND, fine to medium and minor coarse, subangular to rounded, predominantly frosted quartz, with less than 1 percent rounded (abraded) biotite and chlorite flakes as much as 2.5 mm (0.1 in.) across and scattered magnetite grains. Unit contains minor amounts of dark-yellowish-brown (10YR 4/2) oxidized organic(?) matrix
214 - 217	65.2 - 66.1	CLAY, interlayered, light-olive-gray (5Y 6/1) and olive-gray (5Y 4/1), moderately well indurated, with silt and fine sand. Clay oxidizes light-olive-gray (5Y 5/2)	392 - 394	119.5 - 120.1	SAND, clayey. Lithology similar to 114.0-119.5 m (374-392 ft), but contains a black (N 1) calcareous clay matrix. Matrix oxidizes moderate-olive-brown (5Y 4/4)
217 - 225	66.1 - 68.6	CLAY, olive-gray (5Y 4/1), calcareous, with less than 1 percent mica plates as much as 0.5 mm (0.02 in.) across. Clay oxidizes light-olive-gray (5Y 5/2) to olive-gray (5Y 3/2)	394 - 394.5	120.1 - 120.2	CLAY, light-olive-gray (5Y 6/1). Clay oxidizes moderate-yellowish-brown (10YR 5/4)
225 - 229	68.6 - 69.8	CLAY, dark-greenish-gray (5GY 4/1), calcareous. Clay oxidizes grayish-olive (10Y 4/2)	394.5 - 403	120.2 - 122.8	SAND, clayey. Lithology same as 119.5-120.1 m (392-394 ft)
229 - 232	69.8 - 70.7	CLAY, greenish-gray (5GY 6/1), calcareous. Clay oxidizes olive-gray (5Y 3/2)	403 - 407	122.8 - 124.1	SAND, grayish-olive (10Y 4/2), rounded, clear to milky white quartz, with occasional granules and less than 1 percent scattered biotite and chlorite as much as 0.5 mm (0.02 in.) across
232 - 239	70.7 - 72.8	CLAY, dark-greenish-gray (5GY 4/1), with thin layers of light-olive-gray (5Y 5/2) as much as 1.6 mm (0.06 in.) thick. Clays are calcareous, contain mica flakes as much as 1.0 mm (0.04 in.) across, and oxidize olive-gray (5Y 3/2)	407 - 415	124.1 - 126.5	CLAY, sandy, black (N 1), greenish-black (5GY 2/1), and dark-greenish-gray (5GY 4/1), with fine to medium, mainly angular to subrounded quartz sand. Beds are as much as 0.9 m (3 ft) thick. Clay oxidizes moderate-olive-brown (5Y 4/4) to light-olive-gray (5Y 5/2)
239 - 241	72.8 - 73.5	CLAY, greenish-gray (5GY 6/1), calcareous, with root fragments and small halite (?) crystals. Clay oxidizes olive-gray (5Y 4/1)	415 - 420	126.5 - 128.0	CLAY, interbedded with sandy clay. Unit is dark-greenish-gray (5GY 4/1) and greenish-black (5GY 2/1). Sand is fine to coarse
241 - 243	73.5 - 74.1	CLAY, light-olive-gray, calcareous, with 1 to 3 percent scattered biotite flakes as much as 0.5 mm (0.02 in.) across and less than 1 percent angular to subangular quartz and feldspar sand as much as 2.0 mm (0.08 in.) across. Clay oxidizes olive-gray (5Y 4/1)	420 - 425	128.0 - 129.5	CLAY, black (N 1), interbedded with thin beds (less than 6.4 mm, 0.25 in. thick) of dark-greenish-gray (5GY 4/1) and greenish-black (5GY 2/1) clay and sandy clay, with clots of white calcite(?) as much as 2 mm (0.08 in.) across. Clay oxidizes grayish-olive (10Y 4/2)
243 - 250	74.1 - 76.2	CLAY, variegated, moderate-yellowish-brown (10YR 5/4) and light-olive-gray (5Y 5/2), with minor subangular to subrounded quartz and feldspar sand as much as 1 mm (0.04 in.) across. Clay oxidizes olive-gray (5Y 4/1)	425 - 430	129.5 - 131.1	CLAY, dark-greenish-gray (5GY 4/1), with interbeds of dark-greenish-gray (5GY 4/1), greenish black (5GY 2/1), and greenish-gray (5G 6/1) clay as much as 25.4 mm (1.0 in.) thick. Greenish-gray clay contains fine sand and silt. Unit contains minor scattered medium sand. Clay oxidizes grayish-olive (10Y 4/2)
250 - 257	76.2 - 78.3	CLAY, interbedded, moderate-yellowish-brown (10YR 5/4) and light-olive-brown (5Y 5/6), calcareous, with scattered mica flakes as much as 1.0 mm (0.04 in.) across and less than 1 percent sand as much as 0.5 mm (0.02 in.) across. Clay oxidizes dark-yellowish-brown (10YR 4/2)	430 - 435	131.1 - 132.6	CLAY, dark-greenish-gray (5GY 4/1), with fine to coarse sand and 1 to 2 percent biotite as much as 0.5 mm (0.02 in.) across. Clay oxidizes grayish-olive (10Y 4/2) to moderate-olive-brown (5Y 4/4)
257 - 260	78.3 - 79.2	CLAY, moderate-yellowish-brown (10YR 5/4), with less than 1 percent scattered mica flakes as much as 0.5 mm (0.02 in.) across and less than 1 percent subangular quartz sand. Clay oxidizes dark-yellowish-brown (10YR 4/2)			

EXPLANATION

INTRODUCTION  
This report presents lithologic and water quality data from Koehn Dry Lake, California. These data provided leaseable 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. 5  
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  
Water samples were collected from sand layers at 375 feet and 415 feet. The water samples were 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.

WATER QUALITY DATA FROM KOEHN DRY LAKE TEST WELL NO. 5

(Analyses by U.S. Geological Survey, Water Resources Division, Denver, Colorado)

Sample number	Date of collection	Depth of water sample (m)	Water temperature (°C)	pH		Specific gravity	Specific conductance (microhm/cm at 25°C)	Percent sodium (Na <sup>+</sup> )	SAR* (sodium-adsorption-ratio)
				Lab	Field				
K-5-1	12/14/78	114.3 (375)	23.9	8.1	7.0	1.084	137,000	100	1,980
K-5-2	12/14/78	126.5 (415)	22.2	8.2	7.5	1.104	146,000	100	2,720

Sample number	mg/l										
	Silica (SiO <sub>2</sub> )	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Phosphorus (P)	Sulphate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Total Nitrate (NO <sub>2</sub> +NO <sub>3</sub> )	Iodide
K-5-1	3.6	10	22	49,000	300	0.06	10,000	64,000	7.6	0.04	0.04
K-5-2	1.8	7.5	21	64,000	440	.06	12,000	92,000	9.0	.05	.05

Sample number	µg/l									
	Manganese (Mn)	Iron (Fe)	Boron (B)	Lithium (Li)	Strontium (Sr)	Uranium (U)	Solids residue on evaporation (TDS)		Total Carbonate (CaCO <sub>3</sub> )	Bicarbonate (HCO <sub>3</sub> )
K-5-1	170	1,100	150,000	100	6,500	16	98,700	750	915	120
K-5-2	220	1,500	190,000	120	7,500	22	110,000	860	1,049	110

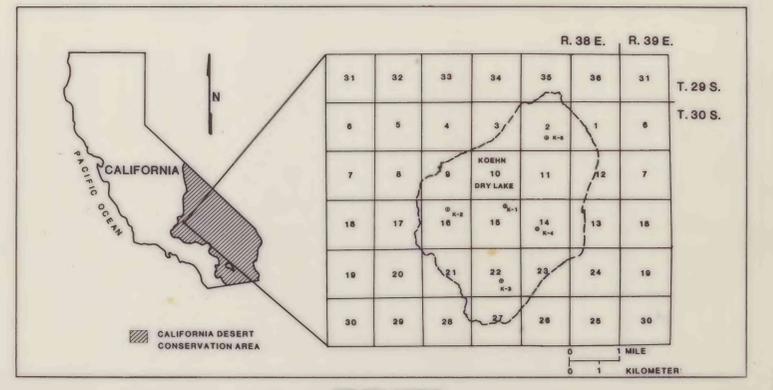
Sodium-adsorption-ratio -- predicts degree to which irrigation water tends to enter into cation exchange reactions in soil. High values imply hazard of sodium replacing adsorbed calcium and magnesium, this replacement is damaging to soil structure.

\* SAR Water Classification

<10	Excellent
10 - 18	Good
18 - 26	Fair
>26	Poor

# Calculated

INDEX MAP



TEST WELL LOCATION  
K-5 Latitude: 35° 20' 59" N  
Longitude: 117° 52' 09" W  
SW1/4 NW1/4 SE1/4 sec. 2, T. 30 S., R. 38 E.  
Mount Diablo Meridian

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

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SUBJECT TO REVISION