5 Mss 100

A true not received edited copy back from Washington. Document this issue not changed. Released to USIS date unknown

Released to open file 4/14/49

United States

Department of the Interior

Geological Survey

Water-supply investigation at Baca School, near Prewitt, McKinley County, New Mexico

By

L. C. Halpenny and H. A. Whitcomb

~~Preliminary report, subject to revision~~

Albuquerque, New Mexico

~~March 1, 1949~~
April 4, 1949

49-77

CONTENTS

TABLES

ILLUSTRATIONS

INTRODUCTION

The Baca Day School at Prewitt, New Mexico, although not on the Navajo Indian Reservation, is operated by the Navajo Service for the benefit of Indians living on Government-allotted lands in the area. During the summer of 1948 the Geological Survey, in conjunction with studies of the ground-water problems of the Navajo Reservation, conducted an investigation in the Prewitt area in an attempt to develop a new or improved supply of water for the school. The findings of this investigation, with resulting recommendations, are incorporated in this report.

Location

The Baca school is located on a 40-acre tract of Federally-owned land which lies about 1 mile west of Prewitt, in south-central McKinley County, New Mexico. The school allottment is in the SW¼ sec. 11, T. 13 N., R. 12 W. The northern boundary of the school land lies along the right-of-way of U. S. Highway 66, which passes through Prewitt.

Topography and drainage

The area investigated lies along the north flank of the Zuni uplift. Topographically, the region may be described generally as that characteristic of a dissected dome. A series of sandstone-capped cuestas parallel the axis of the dome, with steep escarpment slopes facing southward in the direction of its center. Broad, flat valleys cut in beds of shale lie between the cuestas and facilitate travel from east and west across the uplifted area.

Drainage is predominantly to the east, away from the Continental Divide which attains an altitude of 7,246 feet 14 miles west of Prewitt. The altitude at the Baca school is about 6,800 feet. The land surface slopes so gently to the east that stream gradients are too low to accomplish much downcutting.

Existing water supply

The Baca school was built about 1934, at which time a well was drilled to a depth of 1,987 feet on the school land (see log, table 2). A substantial supply of water was obtained but the quality was poor. The well was plugged

back to 1,200 feet in an effort to seal off the bad water. The quality remained poor after the plug-back operation, and the well was again plugged back, this time to a depth of 475 feet. The well was then perforated at the uppermost aquifer, and about 4 gallons per minute of fairly good water was obtained. The supply was insufficient for the school needs, and therefore the Geological Survey was requested to study the area for the purpose of locating a supply of at least 20 gallons per minute of potable water.

Field work

Field work was begun by L. C. Halpenny and A. D. Pulido, engineers, in June 1948. Four days were spent in the field collecting water samples and obtaining information on nearby wells. On July 29-30, 1948, S. C. Brown, geologist, assisted by Halpenny and Pulido, made a plane-table traverse to determine the thicknesses of the formations exposed north of the well. In August H. A. Whitcomb, geologist, studied the rock outcrops south of the well.

Acknowledgments

C. V. Theis, District Geologist for ground-water investigations in New Mexico, assisted in the interpretation of the field studies and reviewed the report. C. B. Read, Geologist, Fuels Section, Geologic Division, helped to interpret the stratigraphy of the region and reviewed the geologic section of the report. The quality-of-water section of the report was prepared by J. D. Hem and reviewed by C. S. Howard, both District Chemists of the Quality of Water Branch.

GEOLOGY

The broad, flat valley in which the community of Prewitt is situated is underlain by Triassic and Permian strata. The lowest stratigraphic unit which could be considered as a possible aquifer at the Baca school is the Glorieta sandstone member of the Middle Permian San Andres formation. The rocks below this member are known to yield water of poor quality in the region, and therefore will not be discussed in this report.

The geologic section is as follows:

Age	Formation	Member
Triassic	Chinle formation	Upper shale member
		Middle sandstone member
		Lower shale member
	Shinarump (?) conglomerate	
Permian	San Andres formation	San Andres limestone
		Glorieta sandstone
	Yeso formation	
	Abo formation	

Stratigraphy

The Glorieta sandstone member of the Middle Permian San Andres formation is not exposed in the area studied. The log of well 9 (table 2) indicates that the member is about 188 feet thick in the vicinity of Prewitt. Exposures in other parts of the region show that the Glorieta sandstone member is gray, fine-grained, hard, massive, and cross bedded.

The San Andres limestone member of the San Andres formation is the youngest of the Permian strata exposed in the area. About 150 feet of this gray, coarse-grained, massive, sandy limestone, containing abundant Middle Permian fossils, crops out in the north wall of Bluewater Canyon about 4 miles south of Prewitt. The contact with the underlying Glorieta sandstone member was not observed in the area studied.

Immediately overlying the San Andres formation is about 30 feet of red, medium-grained, rather soft, shaly to thin-bedded sandstone which contains scattered small quartzite pebbles. According to Read,/ this sandstone may be

/ Read, C. B., Oral communication, December 10, 1948.

the equivalent of the Shinarump conglomerate, of Upper (?) Triassic age.

Overlying the Shinarump (?) conglomerate is an estimated thickness of 260 feet of soft red, gray, and purplish shale, containing beds of generally

coarse and commonly cross-bedded gray sandstone. These deposits were designated by Darton[1] as the Moenkopi formation. Recent studies by Read[2]

[1] Darton, N. H., "Red Beds" and associated formations in New Mexico: U. S. Geol. Survey Bull. 794, p. 143, 1928.
[2] Theis, C. V., Ground-water conditions near Wingate Ordnance Depot: U. S. Geol. Survey (Report to Army Engineers), pp. 10-11, 1941.

produced paleobotanical evidence that these beds are of a later Triassic age than Moenkopi, and suggest that they are more properly correlated with the Chinle formation than with the much older Moenkopi formation. These beds are designated in this report as the "lower shale member of the Chinle formation".

About 100 feet of gray to buff, coarse-grained, rather hard, massive sandstone containing conglomeratic lenses in its lower part, overlies the lower shale member of the Chinle formation. This sandstone is exposed at the top of the steep southward-facing escarpment slope south of Prewitt. The sandstone was correlated with the Shinarump conglomerate by Darton.[1] In this

[1] Darton, N. H., op. cit., p. 143.

report it is designated as the "middle sandstone member of the Chinle formation".

Conformably overlying the middle sandstone member of the Chinle formation is about 1,100 feet of soft gray, maroon, and purple shales and interbedded thin red to brown sandstones. This sequence is designated in this report as the "upper shale member of the Chinle formation". Erosion of these beds has produced the wide valley lying between the sandstone-capped cuesta to the south and the red sandstone cliffs of Jurassic age which form the high cliffs of Dutton Plateau to the north.

Structure

The Zuni uplift consists of an elongated dome, the axis of which strikes roughly northwest. The strata on the northeastern flank dip uniformly to the north and northeast at angles ranging from 2° to 3°. Dips are much steeper on the southwestern flank. The northeastern limb of the upwarp has been

dissected by erosion to form a series of northwest-trending cuestas. The areas between successive cuestas are occupied by broad valleys cut into soft Triassic, Jurassic, and Cretaceous shales lying between more resistant sandstones and limestones.

Two faults were observed during the investigation, both of which are evident in the prominent Jurassic sandstone cliffs north of Prewitt. One of the faults parallels State Highway 56 for about 3 miles north of well 23 (pl. 1). Darton's map of the Zuni Mountain region shows this fault extending southward about 25 miles to the core of the Zuni uplift. The east side of the fault is upthrown. The second fault is about 7 miles east of the fault mapped by Darton. The strike of the second fault is north and the east side is downthrown. This fault could not be traced southward into the Chinle formation.

/ Darton, N. H., op. cit., pl. 33.

GROUND-WATER RESOURCES

The water yielded by the strata below the San Andres formation is known to be of poor quality in the area, and it is not believed practicable to consider these strata as a source of ground water for the Baca school. The following discussion is confined, therefore, to the occurrence of ground water in the rocks described in the geologic section of this report.

Occurrence of ground water

The Glorieta sandstone member of the San Andres formation yields water to three railroad wells at Chavez (pl. 1). Two of the wells flow, and in the third well the water level is reported to be about 10 feet below the land surface. The log of well 9 (table 2) shows that water was encountered in the Glorieta sandstone member at a depth of 663 feet at the Baca school. The records do not show the height to which water rose in the well but it is reported that the well did not flow. However, the structural relations in the area are such that the water probably is under some artesian pressure at the school.

The San Andres limestone member of the San Andres formation is not known to be water bearing in the area. However, it is possible that some of the water produced from the wells at Chavez is obtained from the San Andres limestone.

It is reported that the Shinarump (?) conglomerate does not yield water to the railroad wells at Chavez, and an examination of the outcrops indicated that the formation may not transmit water readily. The top of the formation is estimated to be about 600 feet below the land surface at the Baca school.

Ground water in the Chinle formation occurs principally in the middle sandstone member. The lower shale member is not water-bearing in the area, and the sandstone beds of the upper shale member yield water only to two wells (10 and 11, table 1). The well at Baca school and most of the domestic and stock wells in the area obtain water from the middle sandstone member. These wells each produce from 4 to 10 gallons per minute. The middle sandstone member is about 100 feet thick and lies about 120 feet beneath the land surface along U. S. Highway 66.

QUALITY OF WATER

The quality of ground water in the vicinity of the Baca school is shown by the 10 analyses in table 3.

Wells 15 and 17 obtain water from the San Andres formation. The analysis for well 17 indicates that water from this aquifer is hard. If no other water of better quality were available, water from the San Andres formation in the vicinity of Chavez probably would be satisfactory for most domestic purposes.

With one exception, samples from wells reported to obtain water from aquifers in the Chinle formation indicate, in general, that the water is satisfactory for domestic use although it may be expected to be hard and to contain moderate amounts of dissolved matter. Well 10 yields highly mineralized water that is unlike other waters from the Chinle formation. The well is

directly south of a fault that was observed in the south wall of Dutton Plateau. If the fault extends southward from the place where it was observed, the highly mineralized water in the well may be derived from beds other than the Chinle formation.

The quality of the existing water supply for Baca school is shown by the analysis for well 9. The water is moderate in hardness and dissolved solids concentration and, except for the relatively high concentration of fluoride (3.5 parts per million), it is satisfactory for domestic use. According to the standards established by the Public Health Service for drinking waters to be used on public carriers, the fluoride content of a satisfactory water supply should not exceed 1.5 parts per million[1]. It is commonly recognized that waters containing

[1] Public Health Service Drinking Water Standards, 1946: Reprint no. 2697, Public Health Reports, Vol. 61, No. 11, pp. 371-384, March 15, 1946.

excessive amounts of fluoride may cause mottling of the tooth enamel of children who drink such waters during the time their permanent teeth are forming. As none of the wells that produce water from aquifers in the Chinle formation contain a high concentration of fluoride, the analysis for well 9 indicates that water is still entering the well from the deep aquifer that has supposedly been plugged off.

POSSIBILITIES FOR OBTAINING ADDITIONAL WATER

The quality of water studies indicate that the existing well at Baca school may be producing a small amount of water from deeper beds, implying that the plug-back operations may not have been successful. None of the wells which are known to produce water solely from the sandstone members of the Chinle formation and from the San Andres formation contain fluoride in excessive amounts. Therefore, it is believed that these formations do not contain water of high fluoride content in the vicinity of the school.

The best course to follow in developing a satisfactory water supply at the school is to drill one or two new wells about 235 feet deep, and to use the existing well as a standby supply. The wells would produce water from the middle sandstone member of the Chinle formation. Casing might be needed only to a depth of about 120 feet, as the aquifer may not need to be cased to prevent caving. The wells should be drilled through the aquifer and about 10 feet into the underlying shale.

CONCLUSIONS AND RECOMMENDATIONS

1. About 20 gallons per minute of potable water is needed at Baca school.

2. The existing well at the school produces about 4 gallons per minute of water that is of good quality in all but one respect. The water contains 3.5 parts per million of fluoride, which is considered injurious to the teeth of growing children. The well was drilled to a depth of 1,987 feet and was plugged back twice in an effort to improve the quality of the water.

3. There are two aquifers in the vicinity of Baca school that probably contain sufficient water to supply the needs of the school. Water from these aquifers is not high in fluoride and is of good quality, as shown by analyses of samples from nearby wells. The uppermost of the two aquifers is the middle sandstone member of the Chinle formation, which lies about 120 feet beneath the land surface at the school. The lower aquifer is in the San Andres formation, at a depth of about 665 feet at the school.

4. It is recommended that one or two wells be drilled to a depth of about 235 feet, to penetrate the middle sandstone member of the Chinle formation. The existing well could be used for an emergency standby supply.

5. If the recommended wells are drilled, samples of the drill cuttings should be collected at 10-foot intervals, and water samples should be collected for analysis.

Table 1. Records of wells in vicinity of Baca school, near Prewitt, New Mexico
(All wells are drilled unless otherwise noted.)

Well No.	Location	Owner	Driller	Date completed	Topographic situation	Depth of well (feet)	Diameter of well (in.)
	T. 13N., R.11W.						
d/ 1	NW¼SE¼ sec. 17	T. B. Greer	-Masters	1938?	Draw	200	6
2	NE¼NW¼ sec. 17	Pet. Products Ref. & Producing Co.	-Bledsoe	1946	Flat	774	6
d/ 3	NW¼NW¼ sec. 17	do.	do.	1946	do.	240	6
d/ 4	do.	do.	do.	1946	do.	200	6
5	do.	do.	do.	-	do.	200	6
d/ 6	do.	do.	do.	-	do.	200	6
7	NE¼NW¼ sec. 18	-Berryhill	-Berryhill	-	Hillside	200	6
d/ 8	do.	do.	do.	-	Flat	200	6
	T.13 N., R.12 W.						
d/ 9	NE¼SW¼ sec. 11	Navajo Service	Burt Cravath	1934?	Rolling	1,987	8
	T.13 N., R.11 W.						
d/ 10	NW¼NE¼ sec. 8	Tom Elkins	Tom Elkins	-	Flat	100	6
11	SE¼SE¼ sec. 6	do.	do.	-	do.	100	6
	T.14 N., R.11 W.						
12	SE¼SW¼ sec. 29	Unknown	-	-	do.	71	4
	T.13 N., R.11 W.						
d/ 13	NE¼NW¼ sec. 18	Justin La Font	-	-	Gentle slope	147	5
	T.13 N., R.12 W.						
14	NE¼NE¼ sec. 5	Tom Elkins	-	-	Flat	200	8
	T.13 N., R.13 W.						
d/ 15	NE¼NE¼ sec. 1	A.T. & S.F. Railroad	A.T. & S.F. Railroad	1902	Sloping	707	10

a/ Measuring point was usually top of casing, top of pump base, or top of water-pipe clamp.

b/ C, cylinder; T, turbine; A, air lift; E, electric; W, windmill; G, gasoline; D, diesel, number indicates horsepower.

c/ D, domestic; Ind., industrial; S, stock; P, public supply; RR, railroad; N, not used.

N. Vaught, Geo. Miller refineries June 10, 1952 stated that this well lined 5¼" casing with 4" liner, equipped with pump with 3" discharge, ran 18-20 hrs. Pumps continuously. another well planned ½ mi southwest tank

Records obtained by L. C. Halpenny
(Locations of wells are shown on plate 1.)

Well No.	Water level: Depth below measuring point (feet) a/	Water level: Date of measurement	Pump and power b/	Use of water c/	Temp. °F.	Remarks
1	147 e/	-	C,E,½	D	54	Supplies Zuni Mountain Trading Post. Reported discharge, 10 gallons per minute.
2	145 e/	-	None	N	-	See log. Reported hole too crooked for use. Reported former discharge, 45 gallons per minute.
3	-	-	T,E,2	Ind.	56	Used at refinery.
4	-	-	T,E,2	Ind.	55	Used at refinery. Reported discharge, 20 gallons per minute.
5	95.62	June 23, 1948	None	N	-	-
6	-	-	T,E,2	Ind.	56	Used at refinery. Reported discharge, 10 gallons per minute.
7	76.67	June 23, 1948	None	N	-	In rock pumphouse.
8	-	-	C,W	D,S	-	About 200 feet east of well 7.
9	80.65	June 25, 1948	C,6 3/4	P	56	See log. At Baca Day School. Plugged back to 475 feet in 1943.
10	37.23	June 24, 1948	C,W	S	55	-
11	45.30	June 23, 1948	C,W	D,S	-	-
12	56.50	June 24, 1948	None	N	-	Reported depth, 372 feet. Abandoned as dry hole.
13	-	-	C,E,1	D,S	-	Supplies LaFont Trading Post. Reported discharge, 12 gallons per minute.
14	54.41	June 24, 1948	C,W	S	-	-
15	Flows	-	A,D 100	RR	62	See log. Measured flow, 3 gallons per minute, June 25, 1948. Reported discharge with air lift, 100 gallons per minute.

d/ See table 3 for water analysis.
e/ Water level reported.

Table 1. Records of wells in vicinity of Baca school, near Prewitt, New Mexico-Cont.

Well No.	Location	Owner	Driller	Date completed	Topographic situation	Depth of well (feet)	Diameter of well (in.)
16	NE¼NE¼ sec. 1	A.T. & S.F. Railroad	A.T. & S.F. Railroad	1911	Sloping	725	10
d/17	do.	do.	do.	1918	do.	930	12
	T.13 N., R. 12 W.						
18	SE¼NW¼ sec. 10	Navajo Service	Burt Cravath	1944	Flat	215	8-5/8

a/ Measuring point was usually top of casing, top of pump base, or top of water-pipe clamp.

b/ C, cylinder; T, turbine; A, air lift; E, electric; W, windmill; G, gasoline; D, diesel; number indicates horsepower.

c/ D, domestic; Ind., industrial; S, stock; P, public supply; RR, railroad; N, not used.

Records obtained by L. C. Halpenny
(Locations of wells are shown on plate 1.)

Well No.	Water level: Depth below measuring point (feet) a/	Water level: Date of measurement	Pump and power b/	Use of water c/	Temp. °F.	Remarks
16	2e/	-	A,D 100	RR	-	See log. Reported discharge with air lift, 100 gallons per minute.
17	Flows	-	A,D 100	RR	65	See log. Measured flow, 20 gallons per minute, June 25, 1948. Reported discharge with air lift, 100 gallons per minute.
18	75.19	Dec. 3, 1948	C,W	S	-	See log.

d/ See table 3 for water analysis.
e/ Water level reported.

Table 2. - Logs of wells in vicinity of Baca school, Prewitt, New Mexico.
Formations identified by H. A. Whitcomb and L. C. Halpenny

	Thickness (feet)	Depth (feet)
Driller's log of well 2. Petroleum Products Refining and Producing Co., owner.		
Surface soil	8	8
Chinle formation		
Red clay	32	40
Gray shale	35	75
Red water sand	5	80
Gray shale	24	104
Water sand	7	111
[illegible]ale	5	116
[illegible]ter sand	26	142
Gray shale	5	147
Water sand	6	153
Sand and gravel	31	184
Sand	4	188
Blue shale	20	208
Red shale	7	215
Shale	19	234
Red shale	24	258
Sticky red-gray shale	2	260
Red shale	60	320
Blue shale	10	330
Red shale	44	374
Lime shell	12	386
Red shale	20	406
Blue shale	54	460
[illegible]me	2	462
Sandy blue shale	8	470
Red shale	42	512
Blue shale	16	528
Lime	3	531
Blue gray shale	5	536
Sand	3	539
Water sand	1	540
Sand	15	555
Blue shale and lime	12	567
Blue shale, caving	5	572
Shale, caving	12	584
San Andres formation		
Sand	8	592
Hard sand	48	640
Lime	2	642
Sand	132	774
TOTAL DEPTH		774

	Thickness (feet)	Depth (feet)
Driller's log of well 9. Navajo Service, owner. Baca Day School.		
Surface sand	5	5
Chinle formation		
Hard sand	4	9
Purple shale	7	16
Dark-gray sand	5	21
Dark-blue shale	6	27
Gray shale	11	38
Red shale	6	44
Purple shale	8	52
Gray lime	36	88
Purple shale	22	110
Gray lime	4	114
Green shale	4	118
Dark-gray water sand (5 gpm)	6	124
Sandy gray shale	23	147
Gray sand	27	174
Sandy gray shale	12	186
Gray sand	28	214
Gray shale	15	229
Red shale	14	243
Gray shale	26	269
Purple shale	30	299
Red shale	16	315
Brown shale	9	324
Gray shale	30	354
Lime shell	4	358
Red shale and hard conglomerate	22	380
Sandy lime	6	386
Gray sand	16	402
Sand, little water	3	405
Red shale	35	440
Red shale with lime shell	32	472
Gray shale	40	512
Hard gray sand	14	526
Gray lime shell	26	552
Gray lime	19	571
Sand, little water	6	577
Sandy brown shale	4	581
Red shale	23	604
Shinarump conglomerate (?)		
Gray sand	13	617

Table 2. - Logs of wells in vicinity of Baca school, Prewitt, New Mexico - cont.

	Thickness (feet)	Depth (feet)
Driller's log of well 9, cont.		
San Andres formation		
San Andres limestone member		
Gray lime	46	663
Glorieta sandstone member		
White water sand	8	671
Hard white sand	5	676
Hard gray sand	8	684
White sand	112	796
Gray shale	3	799
White sand	52	851
Yeso formation (?)		
Gray shale	3	854
Red sand	12	866
Red sand with shale streaks	17	883
Sandy red shale	17	900
Red sand	14	914
Red shale	12	926
Red water sand (37 gpm)	7	933
Red shale	6	939
Sticky red clay	6	945
Red shale	17	962
Sandy red shale	49	1,011
Lime shell	5	1,016
Gray sand	6	1,022
Dark-gray lime	12	1,034
Blue shale	2	1,036
Gray sand	4	1,040
Sandy gray shale	11	1,051
Gray sand	3	1,054
Sandy red shale	4	1,058
Red sandstone	14	1,072
Dark-gray lime	2	1,074
Black lime	5	1,079
Sandy gray lime	5	1,084
Sandy red shale	38	1,122
Dark-gray lime	2	1,124
Sandy red shale	66	1,190
Red shale	6	1,196
Sandy red shale	254	1,450
Red water sand	18	1,468
Red sand	48	1,516
Abo formation (?)		
Sandy red shale	24	1,540
Red shale	22	1,562
Sandy red shale	70	1,632
Red sandstone	38	1,670
Sandy red shale	14	1,684
Red shale	16	1,700
Sandy red shale	10	1,710
Hard sand, iron pyrite	6	1,716
Sandy red shale	12	1,728
Hard shell	5	1,733
Red shale	83	1,816
Hard shell	4	1,820
Red shale	87	1,907
Red water sand (33 gpm)	17	1,924
Red shale	8	1,932
Sandy red shale	5	1,937
Red sand	7	1,944
Red shale	43	1,987
TOTAL DEPTH		1,987
Driller's log of well 15.		
A.T. & S.F. Railroad, owner.		
Chinle formation		
Red clay	45	45
Gray sandstone	150	195
Red clay	335	530
Blue clay	40	570
Shinarump conglomerate (?)		
Gray sandstone	25	595
Black sand	5	600
San Andres formation		
Gray sandstone	107	707
TOTAL DEPTH		707
Driller's log of well 16.		
A.T. & S.F. Railroad, owner.		
Shale, fire clay, and sandstone	615	615
Limestone	45	660
Gray sandstone	22	682
White sandstone	43	725
TOTAL DEPTH		725
Driller's log of well 17.		
A.T. & S.F. Railroad, owner.		
Chinle formation		
Sand, rock, and shale	55	55
White sand rock	45	100
Sand rock and shale	52	152

Table 2. - Logs of wells in vicinity of Baca school, Prewitt, New Mexico - cont.

	Thickness (feet)	Depth (feet).
Driller's log of well 17, cont.		
Chinle formation, cont.		
Hard white sand rock	33	185
Sand rock and shale	198	383
Very hard sandstone	7	390
Red shale	130	520
Gray shale	45	565
Shinarump conglomerate (?)		
Hard gray sandstone	10	575
Sand rock with slate streaks	25	600
San Andres formation		
Gray sandstone	25	625
White sandstone on lime rock	25	650
Brown sandstone	30	680
Gray sandstone	10	690
White sandstone	145	835
White and yellow sandstone	50	885
Reddish-brown sandstone	45	930
TOTAL DEPTH		930
Driller's log of well 18.		
Navajo Service, owner.		
Chinle formation		
Broken sandstone	3	3
Light-colored sandstone	19	22
Purple shale	15	37
Light-colored sandstone	33	70
Light-red sandstone	18	88
Brown sandstone	6	94
Soft red sandstone	12	106
Red sandstone	12	118
Dark-brown sandstone	15	133
Gray sandstone	6	139
Sandy gray shale	13	152
Hard sandstone	4	156
Sandy gray shale	24	180
Purple shale	24	204
Light-colored shale	11	215
TOTAL DEPTH		215

Table 3. - Analyses of water from wells in vicinity of Baca school, Prewitt, New Mexico.
Analyzed in Southwestern Laboratory of Geological Survey, Albuquerque, N. Mex.
(Parts per million except specific conductance.)

Well No.	Date of collection 1948	Depth (feet)	Specific conductance (micromhos @ 25°C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Total hardness as $CaCO_3$
1	June 23	200	925	75	29	97	334	210	16	0.5	0	602	306
3	do.	240	770	-	-	-	338	-	16	-	-	-	-
4	do.	200	642	-	-	-	320	-	13	-	-	-	-
6	do.	200	693	-	-	-	327	-	14	-	-	-	-
8	do.	200	1,000	-	-	-	322	-	51	-	-	-	-
9	do.	475	727	45	17	104	332	102	15	3.5	0.5	462	182
10	do.	100	2,860	160	69	452	322	1,260	60	.4	5.5	2,180	682
13	June 24	147	597	9.0	3.5	128	270	61	17	.6	5.6	369	37
15	do.	707	762	-	-	-	271	-	5	-	-	-	-
17	June 25	930	889	125	37	23	256	285	5	.2	.6	615	464