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GEOLOGY OF THE CANYON RESERVOIR SITE ON THE GUADALUPE RIVER, COMAL COUNTY, TEXAS

By

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INTRODUCTION

In response to a request by Colonel Harry O. Fisher, District Engineer of the Fort Worth District of the Corps of Engineers, United States Army (letter of Dec. 13, 1954), a reconnaissance investigation was made of the geology of the Canyon (F-1) reservoir site on the Guadalupe River in Comal County, Tex.

The purpose of the investigation was to study the geology in relation to possible leakage - particularly leakage of water that might then be lost from the drainage area of the Guadalupe River - and to add to the general knowledge of the ground-water hydrology of the San Antonio area. The dam (F-1) was originally designed for flood control and conservation only, with provision for the addition of a power unit if feasible. Since the completion of the investigation by the Corps of Engineers, the city of San Antonio has expressed an interest in the reservoir as a possible source of public water supply.

The Corps of Engineers has made a thorough engineering and geologic study of the dam site (Corps of Engineers, 1950), which has Congressional approval. The geology and water resources of Comal County have been studied by George (1952).

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The rocks studied are those within the reservoir area and generally below the 1,000-foot contour as shown on the Smithson Valley quadrangle of the U. S. Geological Survey.

GENERAL GEOLOGY

All the rocks exposed in the reservoir area below an altitude of 1,000 feet belong to the Trinity group of Cretaceous age. The oldest rocks exposed belong to the Cow Creek limestone member of the Travis Peak formation. The Cow Creek is a massive limestone about 75 feet thick. The limestone crops out northwest of Demijohn Bend in a very small portion of the reservoir area. Its position in the section is shown as A on figure 1.

The Hensell sand member of the Travis Peak formation lies conformably on the Cow Creek and is about 50 feet thick. It is composed mostly of fossiliferous marl and dolomite and is relatively impermeable, as is indicated by the fact that a number of contact springs in the area issue at the top of the formation.

Above the Travis Peak formation is the Glen Rose limestone, which is subdivided into lower and upper members, the division being at a thin limestone bed (the so-called Salenia texana zone) containing large numbers of the fossil Corbula texana Whitney.

In most of the area the rocks dip gently east-southeastward except in the immediate vicinity of the faults, where in some places rather steep dips have been observed. Several normal faults cross the area in a northeasterly direction.

Figure 1 includes a small revised portion of the geologic map shown in U. S. Geological Survey Water-Supply Paper 1138, with six measured geologic sections in graphic and simplified form. The sections show four massive limestones, A, B, C, and D, through which some leakage might occur.

GEOLOGIC SECTIONS

Section 1

Location: Demijohn Bend and adjacent creek on Guadalupe River, 3 miles west of Hancock.

Description:

Lower member, Glen Rose limestone

Top of C zone

	Thickness (feet)
Limestone, massive to medium-bedded, cream colored, rudistids abundant in upper 3 feet, Orbitolina texana common in lower part	14.3
Marl, yellow, clam molds and Orbitolina texana abundant in upper 30 feet	40.1
Limestone, medium-bedded to nodular, cream-colored, argillaceous	3.0
Covered	18.0
Limestone, massive, light-brown, hard	2.0
Covered, Orbitolina texana scattered on slope	11.5
Limestone, medium-bedded, hard, gray	1.5
Limestone, shaly, poorly exposed	8.0
Limestone, medium-bedded to nodular, hard, brown, semilithographic, bored	6.4
Limestone composed mostly of large oysters (Exogyra sp.), large Pectens common	1.2

Section 1 -- continued	Thickness (feet)
Limestone, medium bedded to nodular, highly pelletal, highly bored	11.1
Limestone, medium bedded, cream color with calcitic shell fragments	15.0
Limestone, cream color, fragments of large oysters common	5.5
Marl, shaley, Orbitolina texana common	2.7
Limestone, medium bedded to nodular, argillaceous, clam molds and oyster fragments common	5.8
Limestone, medium bedded, cream to buff color, Orbitolina texana common at base	3.7
Limestone, medium bedded, light brown, hard, large oysters common	6.0
Top of B zone	
Limestone, massive, light brown, hard, shell fragments abundant	27.0
Limestone, massive, cream color, hard, shell fragments, clam depressions, oyster shells common, honeycombed	20.0
Base of B zone	
Travis Peak formation - Hensell sand member	
Limestone, medium to irregular bedding, olive-green color, highly arenaceous, glauconitic, becoming dolomitic at base where 'cat heads' are common	15.0
Dolomite, irregular bedding, olive color, glauconitic and arenaceous at top where "cat heads" are common	31.4
Cow Creek limestone member, Travis Peak formation	
Top of A zone	
Limestone, medium bedded, cream color, granular, slightly colitic, few oyster fragments	15.4

Section 1 -- continued	Thickness (feet)
Limestone, massive, yellow-brown, hard, granular, slightly honeycombed ----------	20.5
TOTAL ----------	285.1

Section 2

Location: On Guadalupe River, 1 mile south and 2 miles west of Hancock.

Description:

Lower member, Glen Rose limestone

Limestone, medium bedded, ripple marked, hard, composed mostly of Corbula texana ----------	1.7
Limestone, buff color, fossiliferous grading down into marl, Orbitolina texana, Porocystis and Hemiaster abundant ----------	4.6
Limestone, buff color, flaggy, pocked ----------	1.8
Covered, section probably cut here by normal fault	3.5
Limestone, flaggy, cream color, alternating with marl beds ----------	4.4
Limestone, nodular, buff color, rudistids common in upper half ----------	4.9
Covered ----------	1.7
Limestone, nodular, cream color, soft, Orbitolina texana common ----------	1.8
Marl, dolomitic ----------	6.3
Limestone, nodular, highly bored, soft ----------	1.6
Covered ----------	5.5
Limestone, nodular, soft, rudistids abundant ------	1.5
Covered ----------	2.2

Section 2 -- continued

	Thickness (feet)
Top of C zone	
Limestone, massive, gray, honeycombed, rudistids common	11.0
Limestone, medium bedded, chalky, Orbitolina texana abundant	4.8
Covered, Orbitolina texana abundant on slope	47.6
Limestone, hard, gray-brown, calcitic shell fragments	1.0
Covered	9.8
Limestone, medium bedded, hard, cream color, clam molds common	3.0
Marl, shaley, Orbitolina texana common on slope	10.6
Limestone, nodular, argillaceous, becoming shaley in lower half	7.9
Limestone, massive, hard, oyster fragments and clam impressions abundant, honeycombed	5.8
Limestone, thin bedded, argillaceous	3.8
Limestone, massive, brown, scattered oyster shells	1.7
Marl, shaley with scattered oyster shells	2.5
Limestone, nodular, hard, gray to brown, highly bored	2.8
Marl	3.2
Limestone, massive, brown, clam molds common, slightly honeycombed	1.7
Marl, shaley	1.3
Limestone, massive, gray to brown, scatterd clam molds and oyster shells	3.2
Covered with river alluvium	31.5

Section 2 -- continued	Thickness (feet)
Limestone, medium bedded, gray to brown, large oysters common, slender gastropods common	3.7
Covered with river alluvium	7.6
Top of B zone	
Limestone, massive, hard, small shell fragments common	River bed
TOTAL	206.0

Section 3

Location: On Guadalupe River, 1½ miles south of Hancock

Description:

Upper member, Glen Rose limestone	
Limestone, irregular bedding, yellow, argillaceous	3.0
Covered	4.5
Limestone, hard, with many red pellets which may be Corbula	0.5
Covered, appears to be shale slope	11.6
Lower member, Glen Rose limestone	
Limestone, medium bedded, composed mostly of Corbula	2.0
Marl, yellow, Orbitolina texana and clam molds abundant, Porocystis common	14.9
Limestone, medium bedded, clear color, hard, large oyster shells rare, rudistids common, honeycombed	3.0
Covered, soil markedly brownish red	3.1
Limestone, hard, iron stained	1.5

Section 3 -- continued

	Thickness (feet)
Covered	10.0
Limestone, cream color, semi-lithographic	1.0
Covered	4.0
Limestone, hard, cream color, slightly honeycombed	0.5
Covered	1.5
Limestone, hard, gray, rudistids common at top	2.0
Covered, yellow leached appearance	19.4
Limestone, thin bedded, cream color, pocked	3.0
Covered	1.2
Top of C zone	
Limestone, medium bedding, hard, rudistids common, honeycombed	12.0
Limestone, medium bedded, hard, Orbitolina texana abundant	8.3
Covered, marl slope, Orbitolina texana abundant	37.1
Limestone, apparently massive, poorly exposed, cream color, hard, large oysters and Pecten scattered throughout	32.6
Marl, yellow, scattered clam molds, Orbitolina texana abundant in lower three feet	9.8
Limestone, hard, cream colored, lower half highly bored	11.6
Limestone, hard, cream colored, highly bored, large oysters abundant	4.2
Limestone, massive, hard, honeycombed, cream color	5.3
Limestone, massive, cream color, large oysters and Pecten abundant	2.9

Section 3 -- continued	Thickness (feet)
Limestone, massive, cream color, hard-	13.4
Covered-	10.0
TOTAL-	244.4

Section 4

Location: On Guadalupe River, 3 miles south of Hancock.

Description:

Upper member, Glen Rose limestone	
Limestone, nodular, argillaceous, becoming shaley at base-	4.0
Limestone, nodular, bored, clam molds common-	1.0
Covered-	4.8
Limestone, medium bedded, hard, cream color, pelletal-	2.5
Shale, limey, Orbitolina texana abundant-	4.0
Limestone, medium bedded, hard, bored, honeycombed, Orbitolina texana common-	4.0
Limestone, argillaceous, nodular, Orbitolina texana common-	5.0
Limestone, thin bedded, argillaceous-	2.5
Limestone, nodular, argillaceous, bored, Orbitolina texana common-	5.2
Limestone, medium bedded, hard, pelletal-	3.0
Limestone, nodular, argillaceous, soft-	9.3
Limestone, medium bedded, hard, cream color, very pelletal-	8.8
Limestone, argillaceous, poorly exposed-	14.7

Section 4 -- Continued	Thickness (feet)
Top of D zone	
Limestone, thin bedded, hard, bored, Orbitolina texana common, large rudistids common, lower half is marl	5.9
Limestone, gray, hard rudistids and Orbitolina texana common	2.0
Limestone, shaley and argillaceous, Orbitolina texana abundant	10.0
Limestone, gray, hard, rudistids scattered at top, becoming argillaceous in lower half	5.1
Covered	7.0
Limestone, gray, argillaceous, pelletal	1.0
Covered	4.3
Limestone, flaggy, gray, pelletal	2.0
Covered	2.6
Limestone, hard, gray with rusty brown pellets	1.0
Covered	2.1
Limestone, flaggy, brown, hard, slightly bored	1.5
Covered	8.1
Limestone, hard, gray, nodular, bored	1.7
Covered	5.0
Limestone, brown, hard, bored	0.5
Covered	5.4
Limestone, hard, gray	0.5
Covered, surface appears leached	17.6
Lower member, Glen Rose limestone	
Limestone, composed mostly of Corbula	2.0
Marl, yellow, Orbitolina texana and Porocystis abundant	11.0

Section 4 -- continued	Thickness (feet)
Limestone, medium bedded, alternating with softer argillaceous beds	9.5
Limestone, flaggy, gray, pelletal	1.0
Marl, nodular, bored, clam molds abundant	9.0
Limestone, flaggy, hard, pelletal	1.5
Marl, yellow	2.5
Limestone, medium bedded, hard, rudistids common in middle	7.9
Limestone, massive to nodular, hard, buff to brown, clam molds and borings abundant	3.9
Marl, yellow	10.5
Limestone, hard, shell fragments abundant	1.0
Marl, shaley	1.7
Limestone, thin bedded, argillaceous, yellow	1.5
Marl, shaley, chalky	5.0
Top of C zone	
Limestone, massive, hard, rudistids abundant	3.5
Chalk, Orbitolina texana abundant	14.1
Limestone, chalky, massive, slightly bored at top, Orbitolina texana abundant	6.3
Chalk, blue on fresh surface, Orbitolina texana abundant	13.0
Covered	33.2
Limestone, massive, hard, shell fragments	4.3
Limestone, nodular, argillaceous	4.6
TOTAL	302.8

Section 5

Thickness (feet)

Location: On Guadalupe River, 3½ miles southeast of Hancock

Description:

Upper member, Glen Rose limestone

	Thickness (feet)
Dolomite, medium bedded, olive color, with occasional thin beds of limestone, becoming argillaceous at bottom	80.0
Limestone, thin bedded, cream color, hard	2.0
L Limestone, shaley, highly bored, lower half covered	7.8
Limestone, thin bedded, argillaceous	2.3
Limestone, argillaceous, thin bedded, poorly exposed, clam molds common	28.5
Limestone, medium bedded, brown, hard	1.5
Covered	16.4
Limestone, medium bedded, hard	2.0
Covered	19.5
Limestone, highly argillaceous, irregular bedding, highly bored, rudistids common	17.2
Limestone, cream color, medium bedding, bored, honeycombed	4.0
Covered	2.0
Limestone, medium bedded to flaggy, cream color, hard, slightly honeycombed	4.0
Covered, soil gives impression of having been leached, this zone may be gypsiferous in subsurface	10.6
Limestone, brown, hard, highly honeycombed	2.0
Covered	18.8
Limestone, medium bedded, highly bored and honeycombed	7.5
Covered	9.9

Section 5 -- continued

	Thickness (feet)
Limestone, massive, hard, cream color	2.5
Covered	8.5
Limestone, gray, chalky, medium bedded	2.5
Covered, Orbitolina texana scattered on slope	4.3
Limestone, cream color, hard, medium bedded	2.5
Covered, Orbitolina texana	10.9
Limestone, medium bedded, cream color, hard	2.5
Covered, Orbitolina texana abundant on slope	20.5
Top of D zone	
Limestone, medium bedded to massive, contains many boring full of Orbitolina texana which weather out giving a highly honeycombed texture	29.3
Covered	15.9
Limestone, medium bedded, hard, topographically prominent	3.5
Mostly covered with exposures of limestone, highly argillaceous, nodular	24.5
Limestone, thin bedded, dolomitic	2.5
Shale, dolomitic, non-fossiliferous, leached appearance, may be gypsiferous in subsurface	16.4
Lower member, Glen Rose limestone	
Limestone, composed mostly of Corbula	2.0
Covered, probably a shale section, Orbitolina texana common on upper half	42.5
Limestone, massive, chalky, Orbitolina texana common	6.3
Limestone, thin bedded to laminated, chalky	8.7
Limestone, medium bedded to massive, hard, oyster shells common	10.9
TOTAL	456.6

Section 6

Thickness (feet)

Location: On Triple M Ranch, 3 miles southeast of Hancock

Description:

Upper member, Glen rose limestone	
Marl with occasional limestone beds-	66.0
Limestone, medium bedded, argillaceous, rudistids abundant-	12.4
Covered-	7.2
Limestone, medium bedded, honeycombed-	5.7
Mostly covered, occasional thin limestone beds-	36.0
Limestone, medium bedded, argillaceous in lower half, slightly honeycombed-	39.1
Covered-	4.0
Limestone, medium bedded, hard, alternating with covered, probably marl beds-	47.5
Top of D zone	
Limestone, massive to medium bedded, rudistids common at top, Orbitolina texana abundant in lower half-	32.4
Covered-	5.0
Limestone, massive, argillaceous-	4.5
Covered-	4.6
Limestone, massive to medium bedded, hard-	4.7
Covered-	7.5
Limestone, medium to thin bedded, marly-	19.5
Covered-	16.3

Section 6 -- continued	Thickness (feet)
Lower member, Glen Rose limestone	
Limestone, composed mostly of Corbula-	2.0
Marl, with breaks of thin limestone, Orbitolina texana abundant-	19.9
Limestone, massive-	3.1
Limestone, thin bedded, argillaceous-	6.1
Covered-	14.1
Limestone, medium bedded, hard-	9.6
Limestone, thin bedded to laminated-	9.6
Limestone, massive, hard cream color, rudistids abundant-	15.5
TOTAL-	392.3

CONCLUSIONS AND RECOMMENDATIONS

Because of the alternation of shales and limestones, the Glen Rose limestone is much less permeable than the overlying massive limestones of the Fredericksburg group. It is believed that the shales in the Glen Rose limestone retard the vertical movement of water and have provided cushions to absorb some of the fracturing stresses that occurred during deformation.

The evidence collected to date suggests that the springs that issue from the Glen Rose limestone along the Guadalupe River are supplied by upstream losses from the river. Records of existing wells (Water-Supply Paper 1138) indicate that the cavernous and honeycombed limestone seen along the Guadalupe River are less permeable in the interstream areas.

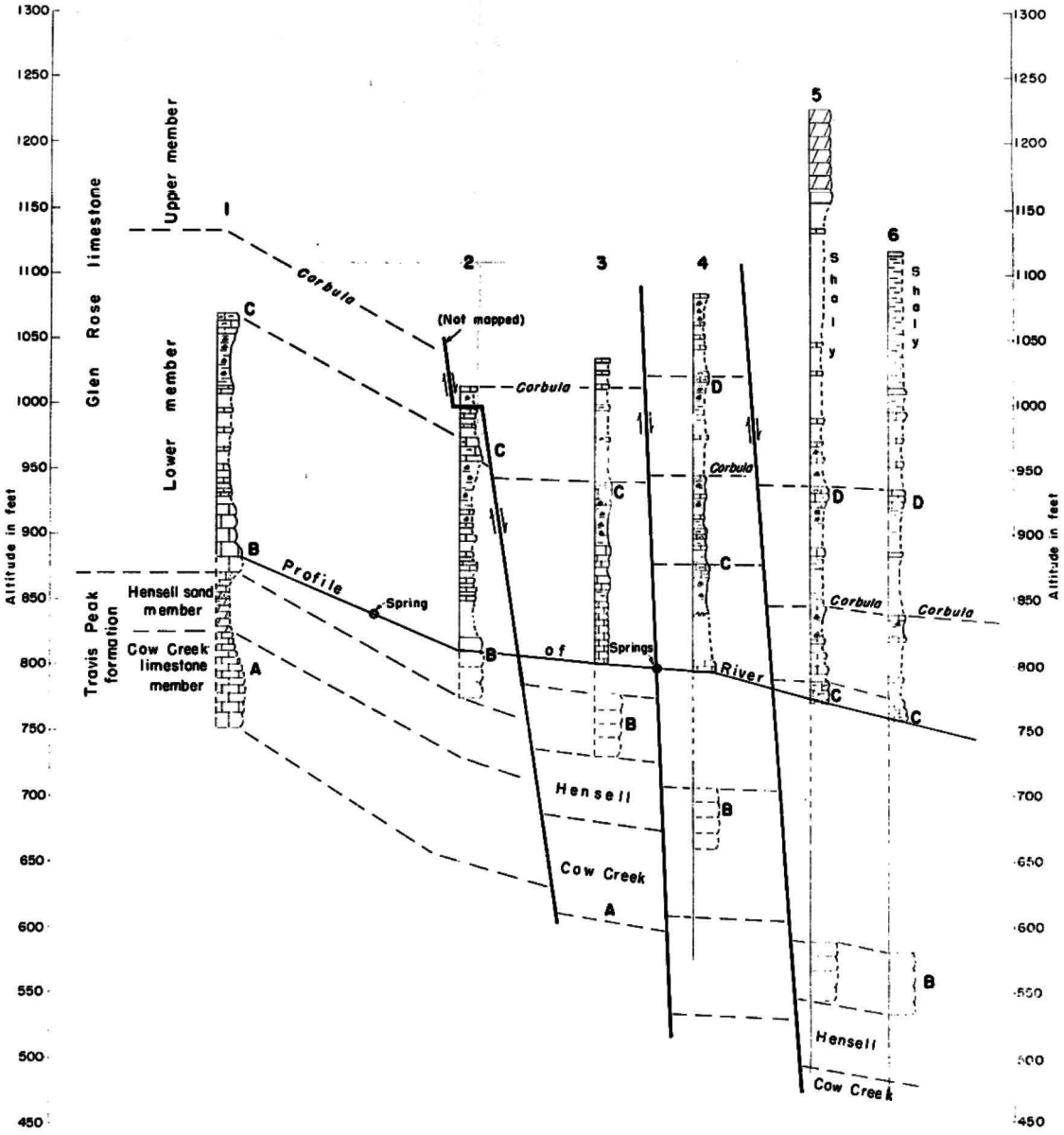
It is suggested that the investigation should be broadened to include correlations with geologic sections in the Blanco River drainage and possible the Cibolo River drainage. An inventory of existing water wells should be made to include those drilled since 1946, including elevations and water-level measurements. Following further geologic study and well inventory, some test holes should be drilled, particularly in the vicinity of faults, for geological information and for pressure tests. Temperature and quality-of-water studies may be desirable.

REFERENCES

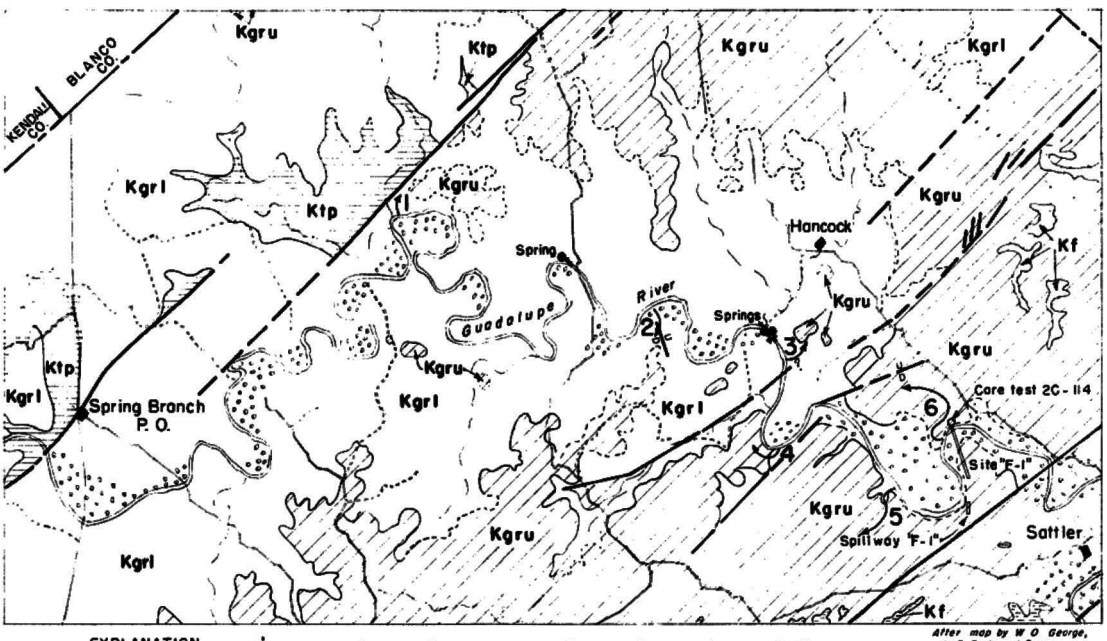
GEORGE, WILLIAM O., 1952: Geology and water resources of Comal County, Tex., U. S. Geol. Survey Water-Supply Paper 1138.

U. S. ARMY, CORPS OF ENGINEERS, 1950: Engineering Report. In files of Corps of Engineers.

Texas Board of Water Engineers and San Antonio Water Board in cooperation with U. S. Geological Survey



GEOLOGIC SECTION THROUGH LOCALITIES 1-6



EXPLANATION

QUATERNARY
- Leona formation

CRETACEOUS
- Kf — Fredericksburg group
- Kgru / Kgrl — Glen Rose limestone, Upper member, Kgru; Lower member, Kgrl
- Ktp — Travis Peak formation

Comanche series
Trinity group

FIGURE 1

GEOLOGY OF CANYON RESERVOIR SITE, GUADALUPE RIVER, COMAL COUNTY, TEXAS

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