# KANSAS GEOLOGICAL SURVEY
# OPEN-FILE REPORT 48-5

MELVERN DAM SITE

by

J. M. Jewett

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KGS
OF
48-5

August 18, 1948

Dr. Stafford C. Happ
United States Engineers Office
601 Davidson Building
10 East 17th Street
Kansas City 8, Missouri

Dear Staff:

I visited the Melvern dam site Sunday, August 15, and believe I can answer the questions in your letter of August 10.

I too do not remember too well about the correlation of the beds in the drill hole (C-3) near the center of sec. 4, T. 18 S., R. 16 E., but I believe Kereford to Toronto is right. The Kereford is well exposed in the SW¼ sec. 3.

In the NW cor. sec. 6 the section is as follows.

| | |
|---|---|
| Tecumseh shale (?) (a few feet) | |
| Lecompton limestone | |
| Avoca limestone member | |
| Limestone, dark bluish, dense, laminated, fusulines in lower part | 2.5 |
| King Hill shale member (15 feet) | |
| Shale, gray, clayey | 1.5 |
| Limestone, yellowish, soft, impure, irregular thickness | 0.4 |
| Shale, bluish, gray | 2.4 |
| Limestone, light yellow, impure, irregular | 1.2 |
| Shale, yellow brown, clayey, dark bluish gray in lower part | 9.5 |
| Beil limestone member ("B") | |
| Limestone, gray and brown, contains Campophyllum and brachiopods | 2.0+ |

The measurements in the section above are those of several years ago by Dr. Moore. I did not remeasure, but identified the beds.

The exposures along the North line of the NE¼ NW¼ sec. 7 (on the west-facing slope east of the ravine and leading up to the crest of the first hill east of the school house) are perhaps more revealing.

| | |
|---|---|
| Limestone, dove gray, weathers yellow brown, massive (slightly south of fence) | |
| Shale, bluish, weathered, contains large concretions (opposite house) | 6.0± |
| Lecompton limestone | |
| Avoca limestone member | |
| Limestone, bluish with 1'± crust of fossil fragments in upper part, abundant fusulines in lower part | 3.5± |
| King Hill shale member (16± feet) | |
| Shale, yellow and grey, clayey, contains little limestone, better shown in next exposure to east | 16.0± |
| Beil limestone member (4.0-5.0 feet) | |

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Dear Staff:

I visited the Melvern dam site Sunday, August 15, and believe I can answer the questions in your letter of August 10.

I too do not remember too well about the correlation of the beds in the drill hole (C-8) near the center of sec. 4, T. 18 S., R. 16 E., but I believe Kereford to Toronto is right. The Kereford is well exposed in the SW¼ sec. 3.

In the NW cor. sec. 6 the section is as follows.

| | |
|---|---|
| Tecumseh shale (?) (a few feet) | |
| Lecompton limestone | |
| Avoca limestone member | |
| Limestone, dark bluish, dense, laminated, fusulines in lower part | 2.5 |
| King Hill shale member (15 feet) | |
| Shale, gray, clayey | 1.5 |
| Limestone, yellowish, soft, impure, irregular thickness | 0.4 |
| Shale, bluish, gray | 2.4 |
| Limestone, light yellow, impure, irregular | 1.2 |
| Shale, yellow brown, clayey, dark bluish gray in lower part | 9.5 |
| Beil limestone member ("B") | |
| Limestone, gray and brown, contains Campophyllum and brachiopods | 2.0+ |

The measurements in the section above are those of several years ago by Dr. Moore. I did not remeasure, but identified the beds.

The exposures along the North line of the NE¼ NW¼ sec. 7 (on the west-facing slope east of the ravine and leading up to the crest of the first hill east of the school house) are perhaps more revealing.

| | |
|---|---|
| Limestone, dove gray, weathers yellow brown, massive (slightly south of fence) | |
| Shale, bluish, weathered, contains large concretions (opposite house) | 6.0± |
| Lecompton limestone | |
| Avoca limestone member | |
| Limestone, bluish with 1'± crust of fossil fragments in upper part, abundant fusulines in lower part | 3.5± |
| King Hill shale member (16± feet) | |
| Shale, yellow and gray, clayey, contains little limestone, better shown in next exposure to east | 16.0± |
| Beil limestone member (4.0-5.0 feet) | |

| | | |
|---|---|---|
| Limestone, dark to bluish gray, weathers brown, beds somewhat wavy, massive especially in lower part, more or less sparse Campophyllum and brachiopods | | 4.5 ± |
| Queen Hill shale member (2.5 ± feet) | | |
| Shale, not well exposed, black in part | | 2.5 ± |
| Big Springs limestone member | | |
| Limestone, massive, lower part covered | exposed | 1.5 ± |

The thicknesses in the above section are all estimated. I think the upper limestone is in the lower part of the Tecumseh shale. As seen in exposures in sec. 16, T. 18 S., R. 15 E., W. of Olivet. However, the Tecumseh may be unusually thin and the limestone is the Ozawkie.

The following section was observed on the east-facing slope of the same hill down to the "medium to thick-bedded limestone" that crops at the junction of the private road and which is the Beil, identified by its sparse corals and especially the underlying black shale.

Limestone (at top of hill, described in section above)

| | |
|---|---|
| Shale, with large limonitic concretions | 6.0 ± |
| Lecompton limestone | |
| Avoca limestone member (more or less continuous exposure into section described above) | |
| Limestone, bluish, blocky, massive contains fusulines | 3.5 ± |
| King Hill shale member (± 18 feet) | |
| Shale, with granular calcareous material in upper part, mostly greenish | 2.0 ± |
| Limestone, yellow, soft | 1.0 ± |
| Shale, bluish-gray, blocky, clayey, contains coquina in middle part | 15.0 ± |
| Beil limestone member | |
| Limestone ("the 4-foot, medium to heavy-bedded rock at the junction of the private road") | 4.0 ± |
| Queen Hill shale | |
| Shale, partly black, not well seen (exposed on south side of road) | |

The above thicknesses are estimated.

The following starts (at the base) with rock just below your "limestone B," near Con. S. line sec. 6.

| | |
|---|---|
| Lecompton limestone | |
| King Hill shale (17.5 ± feet) | |
| Shale slope up to Avoca limestone | 10.0 ± |
| Coquina (limestone), irregular thickness | 0.5 ± |
| Shale, yellow, blocky, clayey | 7.0 ± |
| Beil limestone member (limestone "B") | |
| Limestone, brown weathering | 4.0 ± |
| Queen Hill shale member | |
| Shale, largely black | 3.0 ± |
| Big Springs limestone | |
| Limestone, only upper part seen (south side of road) | |

The thicknesses are estimated.

Referring to the section in the ravine one-fourth mile east of highway (east of the NW cor. sec. 6): the limestone that is poorly exposed in the road is, I am sure, the Avoca. This opinion is based on the abundance of fusulines and lithology. Its elevation indicates some east dip, but as you noticed, the rock in the road is largely flint and slumping may be responsible in part for its lower position. I did not have time, because of an approaching rain to measure or make notes of my estimation of intervals as I went down the section down the ravine, south of the road. However, the Beil is partly exposed in the ravine with its top at drainage level a short distance south of the road. Seemingly your limestone "C" is the Big Springs. I went as far south down the creek as your limestone "D" which is, I think the Spring Branch. The fusulines in these two rocks (Big Springs and Spring Branch) are similiar, and the rock seems rather thick for the Big Springs.

A little more study there would make the picture quite clear. The main key to the various crops include: (1) Black shale in the Queen Hill member between the Beil (above) and the Big Springs limestone (below); (2) sparse corals in the Beil; and (3) fusulines abundant in the lower part of the Avoca.

I believe that this is correct, with "D" being the Spring Branch (basal Lecompton).

I do not have very reliable data on the thickness from the Spring Branch to the Kereford (thickness of the Kanwaka shale). In exposures along the west side of sec. 31, T. 18 S., R. 16 E., the interval from the base of the Spring Branch limestone to the Clay Creek limestone (in the Kanwaka) is, according to Dr. Moore's measurements, 18 feet. Newell noted that best altimeter measurements indicate that along the N side of sec. 22, T. 18 S., R. 16 E., the interval from the Big Springs to the Kereford is about 60 feet but that accurate measurements are not possible from exposures.

Newell measured 40 feet of "covered shale and sandstone between the Kereford and the Clay Creek along the N side of sec. 21, T. 18 S., R. 16 E.

Hence it seems that approximately 60 feet is the interval we might expect, as the thickness of the Kanwaka at the dam site.

I hope that this will be of some help and will be glad to go out with you or alone if I can help any further.

Sincerely,

J. M. Jewett

JMJ:mmm