MINERAL RESOURCES AT FLATWILLOW RESERVOIR SITE, FLATWILLOW CREEK, LOWER MUSSELSHELL UNIT, MONTANA

By Charles R. Hubbard

Bureau of Mines

May 1966

MINERAL RESOURCES AT FLATWILLOW RESERVOIR SITE, FLATWILLOW CREEK, LOWER MUSSELSHELL UNIT, MONTANA

by

Charles R. Hubbard[1/]

CONTENTS

ILLUSTRATIONS

1/ Mining engineer, Spokane Field Office, Area VII Mineral Resource Office, Bureau of Mines, U.S. Department of the Interior, Spokane, Wash.

At the request of Upper Missouri Projects Office, Bureau of Reclamation, Region 6, the Bureau of Mines studied the mineral resources of the proposed Flatwillow Dam and Reservoir site and its environs, Lower Musselshell unit, Montana.

LOCATION AND DESCRIPTION

The Flatwillow Damsite, as shown by Bureau of Reclamation data, is on Flatwillow Creek about 2 miles upstream from its confluence with the Musselshell River in sec 6, T 13 N, R 30 E, and sec 31, T 14 N, R 30 E, Petroleum County, Mont. The reservoir, at the top of the conservation pool, would inundate about 2,290 acres in Tps 13 and 14 N, Rs 29 and 30 E, and would store about 70,819 acre-feet of water (fig. 1).

The proposed project would irrigate approximately 8,000 acres of land along both sides of the Musselshell River, from near the mouth of Flatwillow Creek downstream to the maximum flow line of Fort Peck Reservoir in Tps 13, 14, 15, and 16 N, R 30 E, Petroleum County, Tps 17 and 18 N, Rs 29 and 30 E, Garfield County. This area lies in the flood plain of the Musselshell River; it averages approximately 1 mile in width and 30 miles in length in a northerly direction from the mouth of Flatwillow Creek.

GEOLOGIC FEATURES

The underlying bedrock in the Flatwillow Dam and Reservoir site is Claggett shale (Cretaceous). According to Reeves,2/ the Claggett shale in this area ranges from 430 to 650 feet in thickness and consists of dark-marine shale containing bentonite beds and yellow calcareous concretions. A few hundred feet downstream from the damsite, Flatwillow Creek crosses a narrow outcrop of Eagle sandstone (Cretaceous) and then flows over Colorado shale (Cretaceous) to its mouth (fig. 2).

The dam and reservoir site is on the southern flank of the Cat Creek anticline; the beds are nearly horizontal, strike northwesterly, and dip 1 to 2 degrees toward the southwest.

In the flood plain area of Flatwillow Creek, alluvium (Recent) covers the bedrock. Immediately north of Flatwillow Creek and west of Musselshell River, a terrace or bench gravel deposit covers an area equal to the size of a township. Reeves3/ reports that the bench gravel deposits are 10 to 50 feet thick.

2/ Reeves, Frank. Geology of the Cat Creek and Devils Basin Oil Fields and Adjacent Areas in Montana. U.S. Geol. Survey Bull. 786-B, 1927, pp. 41-66.

3/ Work cited in footnote 2.

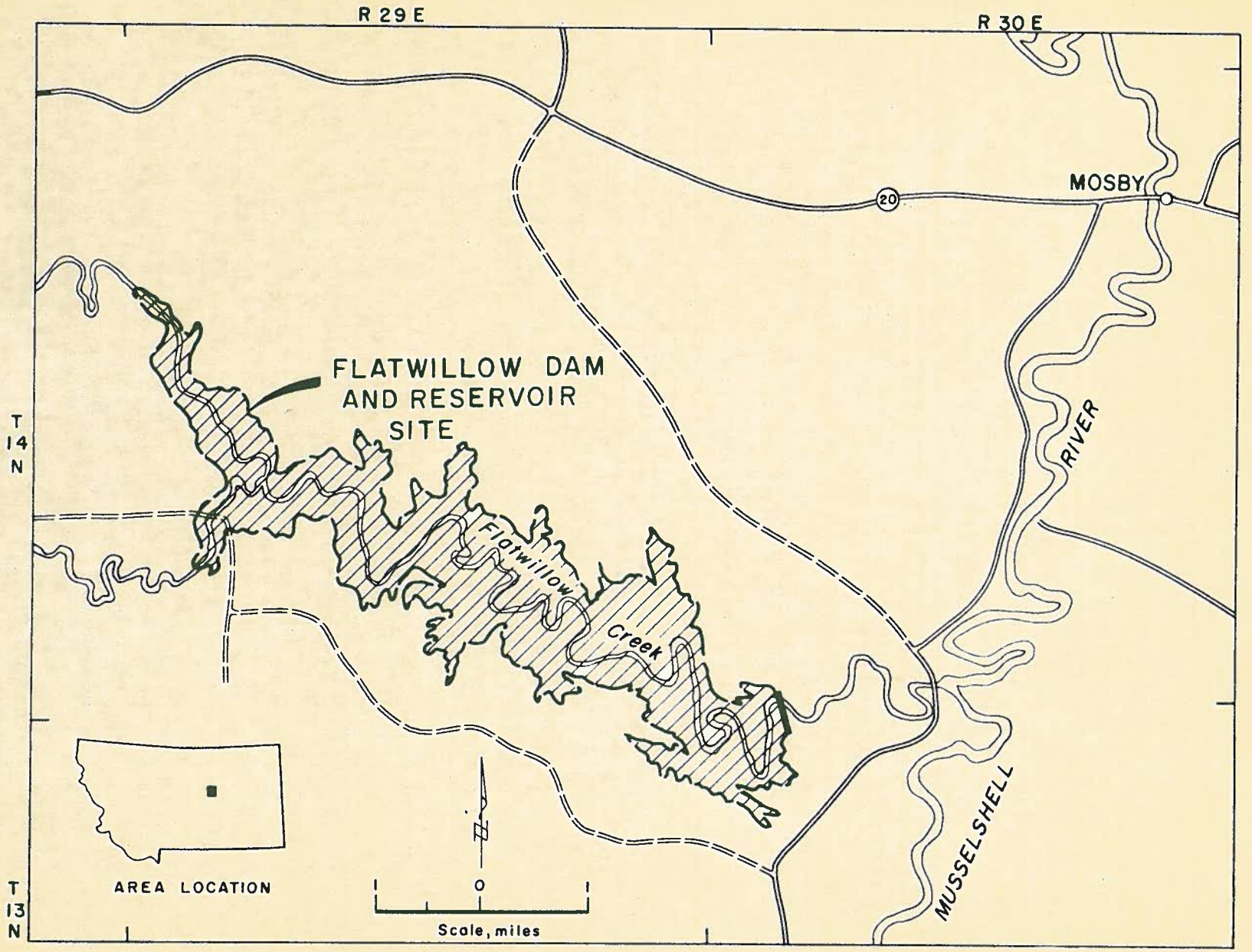

FIGURE 1. – Location map, Flatwillow Dam and Reservoir site, Petroleum County, Mont.

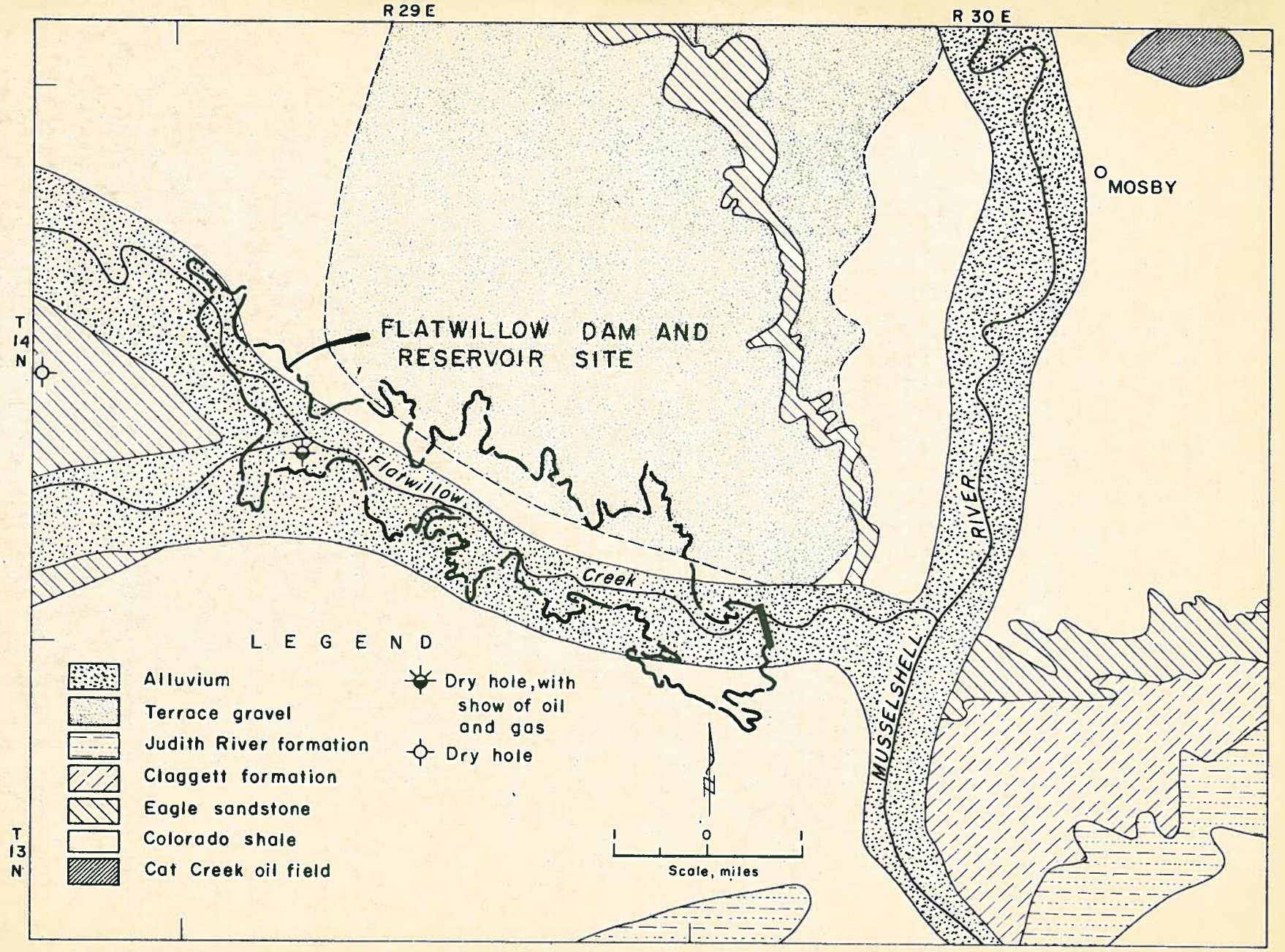

FIGURE 2. – Geology, Flatwillow Dam and Reservoir site, Petroleum County, Mont.

MINERAL RESOURCES

The principal mineral resources of the Flatwillow Dam and Reservoir site, of its environs, and of the potential irrigable lands are oil and gas, coal, clay, and sand and gravel.

The Cat Creek oilfield is approximately 8 to 10 miles north of the Flatwillow Creek Reservoir site. The field, opened in 1920, was one of the early oil discoveries in Montana. It is still producing, having had a relatively long life; total production to 1960 was 19,575,000 barrels.

The potentially irrigable lands, occupying low benches within the meanders of the Musselshell River, pass through the Cat Creek oilfield. The irrigation plan proposes that the landowners construct their own systems. These systems would generally include a small pumping plant and short canals and laterals; pump lifts are generally less than 40 feet. It appears unlikely that this type of irrigation development would adversely affect oil production.

No productive oil or gas wells are in the proposed boundaries of the dam and reservoir site. Perry[4/] (plate 2) shows a "dry hole, with show of oil and gas" within the reservoir site, (T 14 N, R 29 E) and a "dry hole" in the vicinity of the project (in T 14 N, R 28 E) (fig. 2).

The Bull Mountain coalfield is 25 to 60 miles south and the Garfield County coalfield is 18 to 36 miles northeast of the dam and reservoir site. The Bull Mountain field, centering in the vicinity of Roundup, has been one of the most productive in Montana. The coal-bearing formations in this field do not occur near the reservoir site, and no coalbeds are known to exist in this vicinity.

Clay and bentonite beds are present in the Claggett shale formation, which comprises the surface formation in the reservoir site. Very little test work has been done, but it is unlikely that clay of unusual quality occurs in the reservoir site that cannot be found in large quantities in nearby areas. A sample of weathered Claggett shale, taken from 1.7 miles west of Lavina in Golden Valley County, was tested by the Montana Bureau of Mines and found unsuitable for ceramic use; expanding tests indicated that with careful temperature control a satisfactory expanded lightweight aggregate could be produced.

Sand and gravel occur in large quantities in terraces north of the damsite (fig. 2). No market exists for commercial production of sand and gravel in this region; however, the deposits may prove useful in dam construction. Most of the deposits are outside the reservoir site.

4/ Perry, Eugene S. Oil and Gas in Montana. Montana Bureau of Mines and Geology, Bull. 15, 1960, 85 pp.

CONCLUSIONS

The proposed Flatwillow Reservoir would inundate some clay and impure bentonite beds occurring in the Claggett shale formation underlying the reservoir site. They are of no present commercial value; deposits of similar nature adequate for all foreseeable future needs occur in the adjoining region. A small part of a very large terrace deposit of sand and gravel may become inaccessible owing to reservoir construction; very large reserves remain outside reservoir boundaries. No other mineral resources are known within the reservoir site.

Depending on the type of dam proposed for construction, the sand and gravel deposits and possibly the impermeable or water resistant clay or bentonite in the vicinity may be useful in constructing the dam and appurtenances.

The Fort Union formation, which is productive in the Bull Mountain coalfield in Musselshell County and which is coal-bearing in the Garfield County coalfield, does not occur in the dam and reservoir site, and no workable coalbeds are present.

Part of the lands considered potentially irrigable in the project plan traverse the Cat Creek oilfield, an active producer. It seems unlikely that irrigation improvements will adversely affect oil production, and additional water supply may be beneficial for possible future waterflooding projects in the oilfield.

Possible future development of oil and gas in or adjoining the dam and reservoir site need not interfere with irrigation, recreation, or other project purposes because holes drilled on adjoining land can be directed to penetrate any oil-bearing horizons that may occur beneath the proposed reservoir. In accord with Departmental Manual, Chapter 1, 751.1.4E, the oil and gas rights would not be acquired by the Bureau of Reclamation, thus leaving future exploration and development open for private enterprise, subject to regulation by the Government.