

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

Feasibility of obtaining domestic ground-water supplies in the YU Bench
and Emblem Bench areas, Big Horn and Park Counties, Wyoming

By

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This memorandum was prepared at the request of the Bureau of Reclamation, for use in preparation of the Bureau's definite plan report on the YU Bench and Emblem Bench areas.

The YU Bench and Emblem Bench are flat-topped terrace remnants representing former flood plains of the Greybull River. They are underlain by poorly sorted, unconsolidated sand, gravel, and silt. The terrace deposits are underlain by sandstone, claystone, and siltstone of the Willwood formation. The Emblem Bench is 110 to 225 feet above the present river level and the YU Bench, 400 to 550 feet above. The eastern part of the Emblem Bench is irrigated; the western part of the Emblem Bench and the YU Bench are not irrigated.

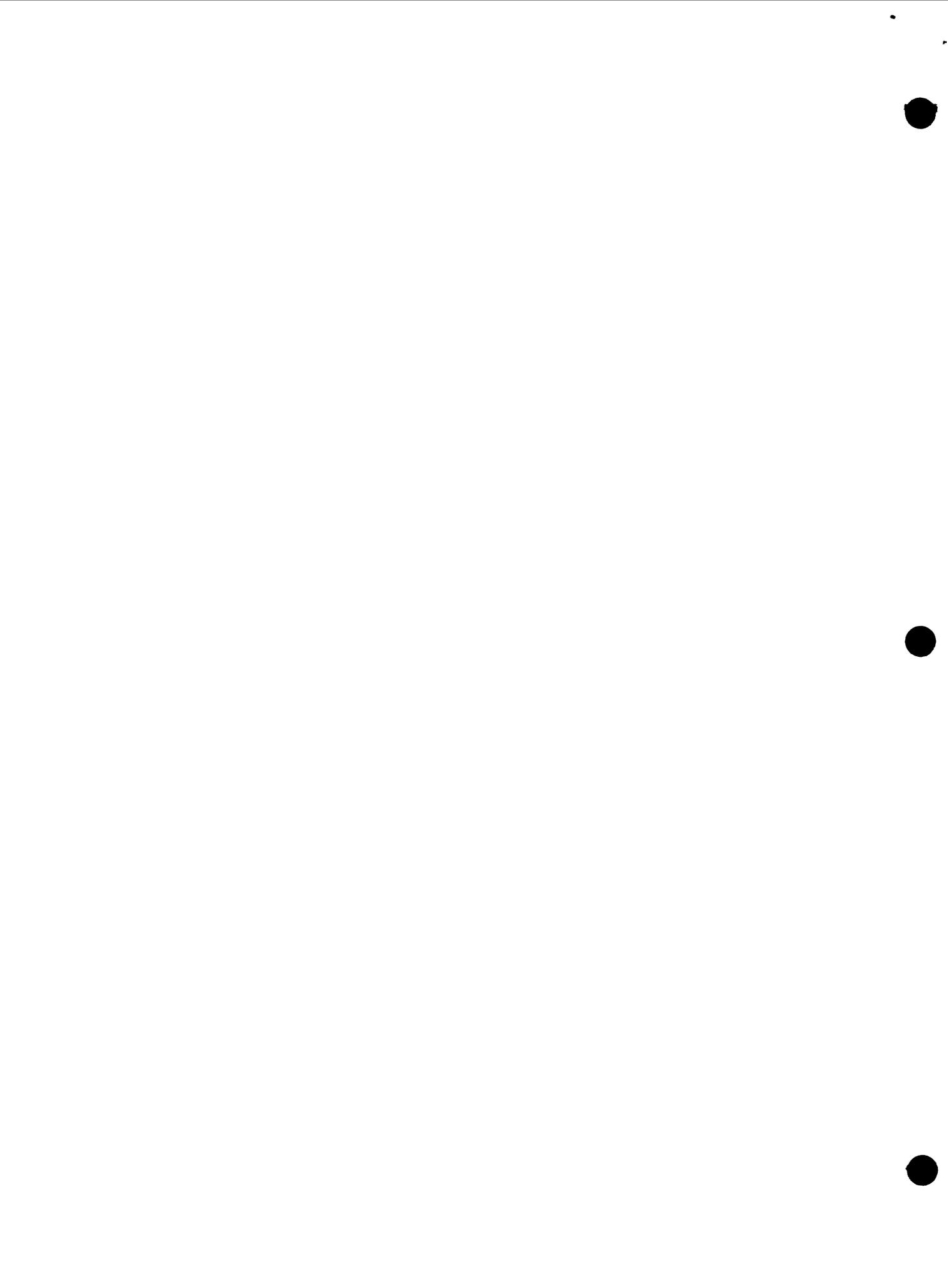
Data concerning ground-water conditions in the nonirrigated areas on the benches are meager. No wells are known to have been drilled on the benches; however, 14 test holes have been drilled by the U.S. Bureau of Reclamation on the YU Bench to determine the thickness of the terrace deposits. Logs of the test holes and measurements made of the thickness of the terrace deposits at the edges of the YU Bench indicate that the bedrock surface underlying the terrace deposits is irregular; one principal buried channel in the bedrock surface lies under the approximate center



of the bench and parallels the long axis of the bench. More exact delineation of the channel is not possible without drilling additional test holes. The terrace deposits range in thickness from 8 feet to 62 feet or more.

The amount of water now in the terrace deposits underlying the YU Bench and the nonirrigated part of the Emblem Bench probably is insufficient for even domestic requirements. The terrace deposits underlying the irrigated part of the Emblem Bench probably contained little if any ground water before they were irrigated. After irrigation was begun on the bench, influent seepage of applied irrigation water recharged the terrace deposits, and they now will yield sufficient water to wells for domestic and stock use and some supplemental irrigation. If water is applied to the nonirrigated parts of the terraces, some of it will seep into the terrace deposits in the same way and create a ground-water body above the bedrock. The amount of water thus stored in the terrace deposits will vary with the amount and rate of the application of irrigation water and the amount and rate of the discharge of water from the terrace deposits. When enough influent seepage occurs, the water table will rise to a level where water will be discharged along the edges of the bench and at the eastern, or low, end of the buried channel. Thus, the saturated thickness of the terrace deposits will be the greatest in areas where the buried channel is deepest, and least along the edges of the bench.

Depending upon the amount and rate of application of water on the terraces, water for domestic use probably will become available in all parts of the benches except along their edges. The chemical quality of the ground



water will depend upon the quality of the applied irrigation water, the relative amount of soluble salts in the soil and in the applied water, and the rate of water recharge to and discharge from the terrace deposits.

The possibility of obtaining water from wells penetrating the Willwood formation depends upon the presence of saturated sandstone beds. Wells probably will need to be drilled to depths below the level of the Greybull River valley to locate saturated beds in the Willwood formation; wells in the YU Bench probably will need to be at least 400 and possibly more than 550 feet deep; wells in the Emblem Bench probably will need to be 100 to more than 225 feet deep. The chemical quality of the water in the bedrocks underlying the YU Bench has not been determined by analyses, but owners of deep wells penetrating these rocks in the Greybull River valley report the water to be soft.