Key Contract Awarded for Colorado River Storage Project

by C. H. CARTER,
Assistant Regional Director, Region 4,
Bureau of Reclamation,
Salt Lake City, Utah

With the opening of bids on the prime contract for Glen Canyon Dam, the Bureau of Reclamation launched the $938 million Upper Colorado River development program. Bids were opened on April 11, 1957—exactly 1 year to the day after President Dwight D. Eisenhower signed Public Law 485 authorizing construction of the initial four storage units of the Colorado River storage project and the initial 11 participating projects.

Kanab, a small picturesque town in southern Utah, where the Hollywood film producers make cowboy movies on location, was the site of the bid opening. The Bureau of Reclamation office in the old school building was obviously too small to accommodate the bid opening crowds so bids were opened in the gymnasium of the new Kanab High School, where the decorations for a high school dance set the scene for what must have been the Bureau's most festive bid opening.

While the locale was outwardly festive, 750 people had assembled to witness the opening of bids for the largest single contract in the history of the Bureau of Reclamation.

A tenseness filled the air! How high would the bids run? What would happen if bids were way above the engineer's estimate? Would the Upper Colorado River program be delayed? These, and scores of other questions were heard on every hand.

Finally, the 10 a.m. bid opening time arrived, and the time-honored, machinelike procedures began. By chance, the first bid read by L. F. (Lem) Wylie, project construction engineer for Glen Canyon Dam, was the low bid submitted by Merritt-Chapman and Scott of New York, $107,955,122.

With this short announcement, the Upper Colorado River basinwide development was launched. Glen Canyon Dam—the key to the entire development—was assured. The third highest dam in the world with the third largest reservoir in the world and the seventh largest hydroelectric powerplant in the United States would be built.

Two additional joint-venture bids of about $118 million and $120 million were received; but Merritt-Chapman and Scott's bid of $108 million—more than $27 million below the engineer's estimate of $135,608,170—was the best. The contract was awarded and notice to proceed issued on April 29.

AUGUST 1957
Glen Canyon Dam is located on the Colorado River in Arizona at the lower margin of the Upper Colorado River Basin. At this point, Glen Canyon Dam can store the erratic flows of the Colorado River to assure steady releases to the Lower Colorado River Basin in accordance with the Colorado River Compact. Only with this control of the Colorado River can upstream diversions for beneficial, consumptive uses on a large scale be made every year, year-in and year-out.

Power revenues from the Glen Canyon Dam powerplant of 900,000 kilowatts will repay about 75 percent of the $938 million cost of initially authorized works plus interest on the power investment. Revenues from the sale of Glen Canyon power will be placed in the basin fund along with revenues from other sources to repay in full all reimbursable costs.

Merritt-Chapman and Scott's bid of $108 million on the prime contract for Glen Canyon Dam clearly assumes great significance. Glen Canyon Dam, which is the essential feature of the Upper Colorado Basin plan of development, is now under construction. Flaming Gorge Dam in Utah, Navajo Dam in New Mexico, and the Curecanti unit of several dams in Colorado will be undertaken in timely progression. Flaming Gorge Dam and Reservoir will provide about 4 million acre-feet of storage and 100,000 kilowatts of installed generating capacity; Navajo Dam and Reservoir, more than 1 1/2 million acre-feet of storage; and the Curecanti unit, 1 1/4 million acre-feet of storage and 152,000 kilowatts of installed generating capacity.

Construction work at the Glen Canyon damsite began with the first blast of rock from the right canyon wall on October 15, 1956, as President Eisenhower gave the signal from his desk in Washington, D. C., in a historic telephone network ceremony. The Mountain States Construction Co. of Denver, Colo., thus began work on a $2.5 million contract awarded on October 1, for excavating the right diversion tunnel. As this is written in May 1957, more than 1,000 feet of the approximately 45-foot diameter tunnel had been driven. Completion of the 2,768-foot-long tunnel is scheduled for December 1957.

Access road construction to the Glen Canyon damsite was started immediately. An alternate route for U. S. Highway 89 received prompt approval. This alternate highway will leave the present U. S. 89 at Bitter Springs, Ariz., reach northward 25 miles to the Glen Canyon damsite; cross Glen Canyon on the highest steel arch bridge in the United States; and extend generally westward 72 miles to join with U. S. 89 at Kanab, Utah.

The 25 miles of primary highway from Bitter Springs to the damsite will be completed and surfaced by late fall of 1957 at a total cost of about $3,700,000.

The 1,271-foot long, 700-foot high, 38-foot wide steel arch bridge across Glen Canyon, about 900 feet downstream from the damsite, is under contract for $4,139,277 to the Kiewit-Judson Pacific Murphy combine. Work on the bridge abutments is now well under way. Completion of the bridge is scheduled for early in 1959. The “hanging” of

The Reclamation Era
3,500 tons of structural steel across this chasm will be a spectacular undertaking.

A 7-mile graveled road has been built by the Bureau of Reclamation from the damsite to the Utah-Arizona State line. It is expected that the State of Arizona will bring this road up to primary highway standards at an early date.

The State of Utah will soon have all of the remainder of the new Alternate U. S. 89 from the State line to Kanab under construction contracts.

A new town, which has been named Page, Ariz., (after former Commissioner of the Bureau of Reclamation John C. Page), is now under construction on Manson Mesa about 2 miles from the damsite on the southeast side of the Glen Canyon. Estimates of peak population for Page, in which Government and contractor personnel will live, range from 8,000 to 12,000. The nearest existing towns are Flagstaff, Ariz., (also the closest railhead), which is 135 miles from Glen Canyon damsite and Kanab, Utah, 72 miles.

Merritt-Chapman and Scott's $108 million prime contract calls for the following major work items: (1) Drilling of left diversion tunnel, (2) lining both left and right diversion tunnels, (3) building two cofferdams to divert the river during construction, (4) constructing the concrete dam from bedrock to crest, (5) constructing the powerhouse and related features, and (6) drilling and lining the spillway tunnels. A total of 5,200,000 cubic yards of concrete will be placed in the Glen Canyon Dam and appurtenant works, with 4,770,000 of that total in the dam proper.

The steel in reinforcing concrete, in penstocks and outlets, and in many other installations will total 35,340 tons—a quantity of steel sufficient to produce more than 20,000 low-priced automobiles.

The time allowed for completion of the prime contract is 2,500 days, or nearly 7 years. A completion contract will be entered into to finish construction of the powerhouse, including installation of the generating equipment.

Glen Canyon Dam is a truly great engineering undertaking. It will rank with Hoover and Grand Coulee Dams which have been acclaimed by the American Society of Civil Engineers as two of the seven modern engineering wonders of the United States.

But great as Glen Canyon Dam will be as an engineering wonder, its greatest worth is found in the benefits which it creates by making the entire Upper Colorado River Basin development possible.

Completion of the initially authorized 4 storage units and 11 participating projects will create benefits estimated to total about $57 million annually! These benefits will result by making abundant water and power resources available to the upper basin States of Colorado, New Mexico, Wyoming, and Utah. Irrigation and industrial developments utilizing water and power will produce the primary benefits.

Population estimates reveal clearly the significance of the benefits to be achieved in the upper basin States. The present population of the upper basin States is nearly 3½ million people. By 1975, the population of this intermountain empire is expected to reach about 5,200,000 without the Upper Colorado development. But, it is estimated that development of the upper Colorado River Basin will swell the population by another 1 million persons, bringing the anticipated 1975 population to 6,300,000 people or nearly double the present population!

The real benefits of any resource development are revealed in terms of economic opportunities for people; the creation of economic support for people; the creation of economic support for people; the creation of economic support for people.
1 million persons by 1975 through construction of the initially authorized features of the Colorado River storage project and the participating projects indicates the very great magnitude of the benefits which will result in the short span of less than 20 years.

Expansion of irrigation water supplies will result in the long-range permanent chain of direct and indirect benefits which always attend irrigation developments in the arid West. The storage dams at tributary, upstream locations and the distribution canal and lateral systems on the participating projects will supply irrigation water to about 130,000 acres of new land and will provide supplemental water to about 230,000 acres of lands short of water late in each irrigation season. The total dollar benefits from these currently authorized irrigation projects will exceed $10 million annually.

About 25 additional potential participating projects are scheduled for priority investigation in the authorizing legislation. These would provide irrigation water for nearly 1 million acres of land, of which almost one-half would be new land and the balance presently irrigated farm land needing a supplemental water supply.

Control and use of water for municipal supply is also an important aspect of the upper Colorado River development program. Water for the anticipated rapid urban growth in the upper basin States is a critical need which will be met.

Water and power are ingredients essential to those industries which will be established to develop the tremendous, but now largely dormant, mineral resources in the upper basin States.

The largely undeveloped mineral reserves of the upper basin States await development and use to meet the increasing national needs for domestic and defense materials. These reserves include large quantities of coal and petroleum; the principal United States sources of uranium, vanadium, and molybdenum; three-fourths of the Nation's phosphate ores; the world's greatest source of rare hydrocarbons; and much of the United States supply of gold, silver, lead, zinc, manganese, copper, bismuth, antimony, and magnesium. The mineral reserves of the central and eastern United States are being rapidly depleted, and the Nation will look to the mineral storehouse of the Upper Colorado River Basin to meet many future requirements.

Shale oil offers great reserves as yet untouched. It is estimated that a reserve 1,000 billion barrels of petroleum are available in the oil shales in the 16,500 square-mile area in the upper basin where Colorado, Utah, and Wyoming meet.

Phosphate materials—1.6 billion tons or three-fourths of the United States reserves—occur in the upper basin States, and await power as the foundation stone for a new industrial development.

Recreation is one additional important benefit of the upper basin development which needs to be mentioned. Hoover Dam and Lake Mead, visited by more than 2 million persons each year, offer evidence of the recreational values which result.

The 186-mile long Glen Canyon Reservoir will
open up the beauties of a canyon seen at present only by a mere handful of people each year.

The Colorado River storage project and the participating projects, with Glen Canyon Dam as the key structure, is a long-range undertaking. Widespread national, as well as regional and local, benefits will result. New employment opportunities will be created. Enlarged purchasing power will develop for manufactured goods produced throughout the Nation. The broadened tax base will increase the direct taxes paid to the Federal Treasury which in a short time will exceed the construction investment. With award of the prime contract on Glen Canyon Dam on April 29, 1957, the basinwide development program has begun.

Commissioner of Reclamation W. A. Drexheimer has summarized the importance of the basinwide development of the Upper Colorado River as follows:

"These things can be done at reasonable cost and are good investments whether done by local people, the States, or the Federal Government. The returns in stable, prosperous farms and communities; the returns in business and industrial activity; and the returns in local, State, and Federal taxes will more than pay the cost of Upper Colorado River development in a very short period of years. In addition, we will have opportunities for recreation so vitally needed for our enjoyment of better living and particularly needed to accommodate a growing population with more leisure time, paid vacations, and early retirement.

"Whether you view the water conservation and development features of this program as farmers, industrialists, retailers, or just plain vacationers, I think you will find they are very worthwhile."

### WOMEN VOLUNTEERS WANTED FOR ERA

The Secretary or some other officer of each and every organization of women on our projects is requested to take her pen or typewriter in hand and write to J. J. McCarthy, Editor of RECLAMATION ERA, and outline her views as to how the ERA may best serve the interests of our project women. The same invitation is extended to every woman not connected with a women's organization.