

November 18, 1939

UNITED STATES
 DEPARTMENT OF THE INTERIOR
 OFFICE OF INDIAN AFFAIRS
 IRRIGATION SERVICE

Hopi

November 18, 1939

Mr. A. L. Wathen
 Director of Irrigation
 Office of Indian Affairs
 Washington, D. C.

Dear Mr. Wathen:

In company with Mr. John J. Schwartz, I visited the Hopi Reservation and Superintendent Seth Wilson on October 23-25.

On the 24th, with Assistant Engineer J. L. Westerman and Mr. Hall, Extension Agent, I went to Wepe Wash, where it is proposed to construct a diversion dam for the irrigation of about 200 acres of land near the Walapai village. Nothing had been done on this project beyond preliminary investigations by the Soil Conservation Service. It is understood that prior to the time Wepe Wash began to erode, the Indians cultivated small tracts of the sandy land where the flood waters fanned out, and about 20 years ago a diversion dam and canal were constructed. These were destroyed, and it has been impossible for the Indians to utilize any of this land except by dry-farming methods, which were not very successful. It is proposed to construct a permanent diversion dam and canal to irrigate this tract. Being adjacent to the Walapai village, it is ideally located and very much needed.

I suggested to Superintendent Wilson that we would be glad to prepare plans for a dam if he would send us a topographic map of the site. This he has done, and Mr. Keesee is working on the plans, but it is difficult to plan a type of dam which can be constructed within the funds available. The Superintendent also sent us tentative plans for a rail-type dam, designed by the Soil Conservation Service, and consideration is being given to the type of construction. Additional information has been requested regarding unit costs of various materials, and as soon as that has been received we will complete the review of the plans and submit suggestions, perhaps along other lines.

On the same date we went to the Phillips' farm project, located on Lower Polacca Wash, where a check dam and pump-house have been constructed. Pumping equipment has been purchased but was stored in the warehouse. Work is proceeding on the clearing and leveling of a tract of about 12 acres of land adjacent to the pumping plant. Polacca Wash at this point is about 58 ft. deep and several hundred feet wide across the top. It is cut down to a sort of scaly bed-rock and there is a per-

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manent flow of, perhaps, $3/4$ sec. ft. in addition to the erratic and sometimes enormous flood flows. The structure consists of concrete piers and abutments 8 ft. high sunk into bed-rock $2-1/2$ ft., with three 4' x 16' radial gates and a 4' x 35' spillway on the right side, with the pump-house on the left bank. The radial gates are to be lowered to create a pool from which to pump the accumulation of seepage water. The gates are to be raised during floods. A slide-gate, controlled pump-pit is located in the abutment wall above the radial gate. The pumping plant consists of a 6", 900-gpm, Fairbanks--Morse, horizontal, centrifugal pump, direct connected to a 25 hp gasoline engine. The pump-house is of stone 8' x 12' in dimensions; the suction lift is 10 ft., and the total lift is 58 ft., plus friction. Two hundred and twenty feet of 8", 12-gauge, dipped and wrapped pipe, with Dresser couplings, will convey the water to an earth ditch on top of the bank (see attached photographs). It is expected to have this plant ready for operation and the land prepared for irrigation by the beginning of next irrigation season. This is one of the first pumping plants for irrigation to be tried out in this vicinity.

There can be no question as to the need of additional irrigated areas on this reservation, and the possibilities are so few that advantage must be taken of every real opportunity. The fact that there is a small, continuous flow of water here is difficult to ignore, and, of course, the only possibility of utilizing it is by pumping. Whether the Indians will be able to furnish the fuel oil, maintenance and a degree of responsibility necessary to keep the plant in operating condition, remains to be seen. It will require very close attention to keep the engine supplied with oil and cooling water and to prevent its freezing, and to operate the gates so that floods will not wreck the installation.

With the radial gates up, the cross-sectional area has about 500 sq. ft., with an estimated velocity of 10 ft. per second, which gives an average capacity of 5,000 sec. ft. without overtopping. With the gates down, the area is only about 290 sq. ft., and the capacity less than 3,000 sec. ft. However, on the same Polacca Wash, near Polacca, the flood marks of several years ago indicate a cross-section of 1,260 sq. ft. without scour, and with a velocity estimated at 8 ft. per second, gives about 10,000 sec. ft. This would flatten out to some considerable extent, but there might be some inflow between. There is every indication that the pumping-plant structure may be flooded, causing possible erosion around the abutments, possibly undermining the pump-house and dropping the equipment into the river, if not totally destroying the works. I believe early attention should be given to extending the spillway crest a considerable distance into the right bank. This can be done at reasonable cost, providing the foundation rock extends latterly for a sufficient distance.

On the same date (24th) we went to see the rail-check dam built by S.C.S. on Oraibi Wash (see photograph). Approximately 500 ft. in width, Oraibi Wash is considerably larger than Polacca Wash and probably has a larger drainage area and carries more water. I was told that immediately after completion of the dam a big flood occurred which destroyed a portion

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of the center section. Since it was repaired there has been only a small flood, possibly 18", over the crest, which it satisfactorily withstood. However, it is noted that the cable ties between some of the blocks have been worn or broken through, and if these continue to break, the apron will be lost and the dam will be wrecked. I cannot bring myself to feel that this structure is safe against major floods or floods of long duration.

On the 25th Superintendent Wilson, Mr. Schwartz and I went down to Jeddito Project on Jeddito Wash, where we met Mr. Firmin Brown and Mr. Bentley of Navajo and Mr. Schreiner, who is in charge of construction. This is a joint Navajo and Hopi Project, being constructed by the Navajo forces. It consists of a concrete diversion dam of 95' span, 7' drop, with outlet gates on each end, to divert the water of Jeddito Wash. The right-hand diversion is for use of the Hopis and the left-hand for use of the Navajos. Construction of the dam and the right-hand canal is complete, and subjugation of 55 acres of the land for the Hopis was nearly completed and irrigation had just been started that morning. No work has been done toward canal construction or subjugation on the Navajo side. The water supply consists of a steady flow of about 1/2 sec. ft., which comes from springs under a volcanic mountain in the distance (see picture). There also will be large flood flows at irregular intervals. It is said that the Hopis irrigated land in this vicinity before the wash cut down. The soil is apparently of excellent quality, although rather light, and will blow badly if not seeded immediately. It is understood that Superintendent Wilson will furnish funds for immediate seeding.

Very truly yours,

Herbert V. Clotts
Herbert V. Clotts,
Assistant Director

Encs.

CC Supt. Wilson
Mr. Westerman

HVC:AC