

Mr. V. Raudsepp, Chief Engineer
Water Investigations Branch,
Water Resources Service, Bldgs.

E. Livingston,
Geologist, Water Invest. Branch.

January 25th, 63.

Groundwater Supply for Kootenai Fish Hatchery.

0239014

Mr. J. R. Simpson, Senior Structural Engineer, Department of Public Works requested me on January 24 to review a Progress Report on "Test Drilling and Well Development, Kootenai, Fish Hatchery" prepared by R. Gordon Knight & Associates Ltd. dated January 18, 1963.

The report describes work done in development of a 5 cfs groundwater supply from 2 wells for the hatchery. The work started November 1 and was stopped because of cold weather.

The first hole was started with 16" casing drilled to 61'. For some reason, not stated, the hole size was reduced to 12" and the hole continued to 111'. No log is given for the hole although the report mentions that gravel was encountered at 25' and that this extended down to 80'. The report mentions sand and gravel with considerable silt from 80' to the bottom of the hole at 111 where "tight silts" were encountered. The static level remained at 16'.

The rig was then moved and 5, six-inch diam. holes were drilled in "a pattern laid out by our field supervisor". Logs are not given for these holes nor is any information given as to their location, depth, construction, or purpose.

Upon completion of these 5 holes a test screen was installed in the original 12" hole. No information is given on the size, slot size, length, type, or location of this screen, except to mention that the 12" casing was pulled back 20' to expose it. The well was then surged for an unspecified time; the development was "slow because of the fine sand encountered where the test screen was set." A pumping test was then carried out. No information is given on this pumping test except that pumping charges for 72 hours are included in the estimates and a rate of pumping of 400' gpm (U.S.) is mentioned.

Mr. Knight concludes that the pumping test indicates that 1500 gpm (US) can be developed from this formation with 20' of permanent screen.

Mr. Knight gives an itemized estimate of cost to complete well No.1 and describes the construction of the proposed well as follows. The 12" casing is to be pulled back to 80' and 20' of 10" screen is to be placed between 60' and 80'. The screen is to be exposed 2' at a time and surged. The well is to be pumped at rates up to 1500 gpm (US) to eliminate sand and determine final draw down. The drawdowns in the pilot holes are to be analyzed to determine the spacing of well No.2.

On the work already done the following points should be brought up:

1. When 6" diam. test holes were to be drilled why was one of these holes not drilled first in order to determine the geology and in order to estimate size, depth, and screen requirements for the production well? This is common practice under these circumstances.
2. The logs, locations, and all other data on the 5 test holes should be presented.
3. Why was the hole diameter reduced from 16" to 12" at 61'?
4. I presume that the test screen was set at or near the bottom of the hole. With a static level of 16', and with coarse gravel extending to 80', why was the test screen located at the bottom of the hole in "sand and gravel with considerable silt"?
5. Were aquifer samples taken during drilling? If so how were they taken and what were the results?
6. What test screen (size, length, slot size) was used, where was it located, and how was it selected? What were the results of development?
7. The raw data from the pumping test should be presented and specific conclusions stated.
8. Mr. Knight concludes that ground-water movement is from the Bull River, and that a well at this location is capable of producing the required amount of water. He should present evidence for these conclusions.

Regarding the estimates presented for completion of Hole 1 I question the following points:-

1. Why, after drilling a 16" well then reduced to 12", is a 10" screen proposed?
2. Why are 100 hours of pumping required?

In regard to the first point I believe that the largest diameter screen which can be used in the well should be used under these circumstances, namely in coarse gravel. I think the screen should be kept as short as possible to allow for the maximum drawdown in case there should be need to pump this well at more than design capacity. Using a 20' screen allows about 40' of drawdown; 10' of screen allows 50' drawdown.

Regarding the second item, a maximum of 25 hours pumping is required for the pumping test. A maximum of 25 hours pumping would seem to be more than adequate for pumping preliminary to the pumping test.

In the estimate of cost to complete well No.2 I question the following:

1. Why is a 16" well to be drilled to 60' when a 12" screen is to be used? Why not drill a 12" well? Why is 100 feet of 14" casing proposed?
2. Again I question the need for 20' of screen and the need for 100 hours of pumping.

It is quite likely that more complete information on the work already done and the data on the pumping test carried out on well No.1 will clear up some or all of the points listed above. However, I think that completion of the job should be held up until some of these items are clarified.

E. L.

E. Liv/pd.

E. Livingston.

Geol. Engineer

cc. to Mr. J.R. Simpson, Sen. Struct. Eng.
Department of Public Works, Bldgs.