KOOTENAY RIVER INVESTIGATION(1968)

Descriptions of Permanent Monuments

In Octo / and November of 1968 twenty five permanent cross sections of the Kootenay River, designated PXS #1 through PXS #25, were established between Porthill Idaho and Kootenay Lake. Monuments were placed on each bank of the river at the cross sections to serve as permanent elevation and position reference marks.

All of the monuments with the exception of B.B. #366, which is a brass bolt, are standard pipe posts. The posts are 2½ feet long and are sunk full depth in a formed concrete pyramid 9" x 9" on top, and 18" x 18" on the bottom. The posts are surmounted with a brass disk inscribed "British Columbia Water Resources" with an assigned reference number stamped in the centre of each disk. Where there were dykes paralleling the river, the monuments were, with three exceptions, placed on the centre line of the dyke with the top of the monument flush with the surface of the ground. The three exceptions are: P.P.350, which is on the land side berm of the dyke on the left bank at PXS #8. P.P.358, which is on the land side berm of the dyke on the left bank at PXS #12. P.P.357, which is on the river side berm of the dyke on the right bank at PXS #12.

Where monuments are not placed on dykes the top few inches of concrete are above ground level.

Elevation Determination

Two G.S.C. Bench Marks, one Department of Public Works Bench Mark, and three Gauges were used for fundamental vertical control.

The Bench Marks selected were:

G.S.C. 198-D on International Boundary Monument No. 207 at Porthill. We found +.114' discrepancy between the actual and published elevations of G.S.C. 198-D and W.S.C. and G.S. No. V-10 nearby, and accepted the value of G.S.C. No.198-D.

D.W.P. and H.D. at West Creston Ferry which was established by the Department of Public Works.

G.S.C. No. 203-D-2 at Kuskanook.

Gauges used were staffs at Porthill and West Creston, and a staff and recorder at Kuskanook. Gauge datums were established by ties to Bench Marks G.S.C. 198-D, D.W.P, G.S.C. and H.B. and G.S.C. 203-D-2, and the following values were accepted:

Porthill	-	Zero of gauge	=	1699.960
West Creston	-	" " "	=	1739.921
Kuskanook	-	" " "	=	~~1774.527~~ 1735.207 1735.207

Permanent Cross Section Monument Elevations

The difference in water surface elevations between Porthill and Kootenay Lake is very small - about .515 feet in 28½ miles, or .0036 per 1000 feet of river length. On the basis of several independant measurements, we established the gradient between Porthill and West Creston Ferry to be .0037 ± .0003 per 1000 feet, and the gradient between West Creston Ferry and Kootenay Lake to be .0033 ± .0003 per 1000 feet.

Since acceptable first order levels (G.S.C.) allow a discrepancy of $.017' \sqrt{M}$ (M=miles) between two runs, it can readily be seen that surface runs of a very high order would be required for acceptable monument elevation determination.

The potential saving in time and money of using water gradients for establishing monument elevations was obvious, and trial values obtained by this method were checked by precise three wire surface runs.

Correlation betweeen the two methods was very good, and the water gradient method was accepted. Gradients were established for each period of use, and monument elevations obtained by this method should be very near the true values.