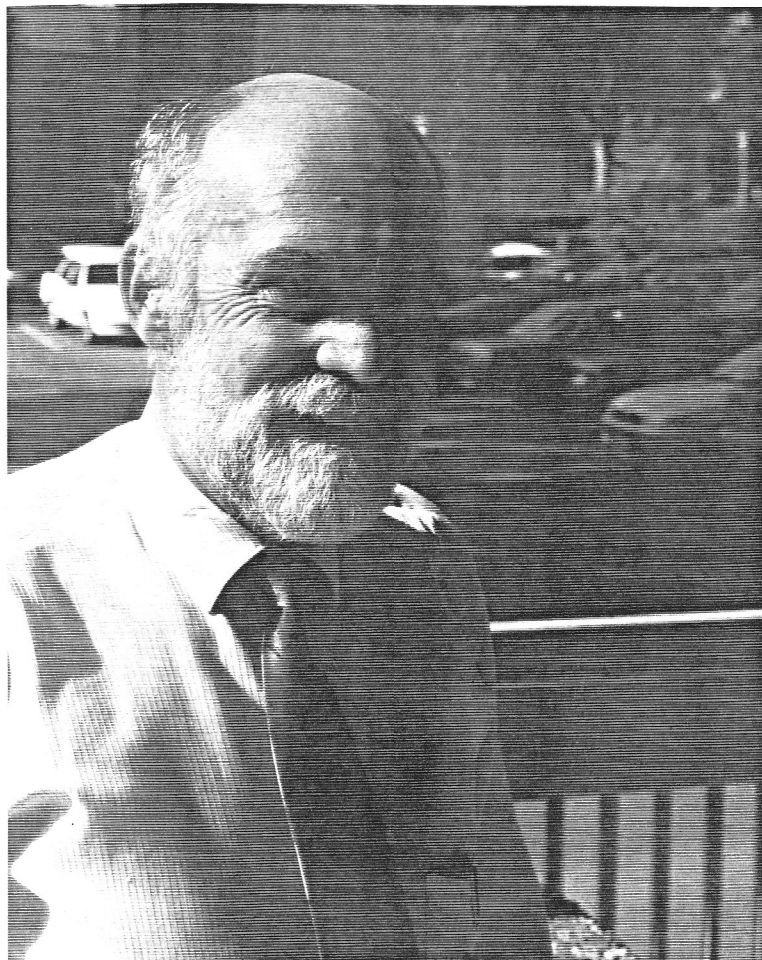


HUGH CRAWLEY

Hugh was born in Canberra in 1943. He studied engineering at the University of Sydney while a cadet of the Department of Works. After completing his studies in 1964 he continued to work with the Department. During rotational placements with different areas within Works, Hugh assisted the design of the Corin Dam spillway, and also designed a bifurcation for the Cotter end of the Bendora Gravity Main; he was already experienced with the route of the main through other work. Subsequently Hugh worked on Googong Dam and other projects (including the environment inquiry for the Ranger uranium mine) before leaving the department in 1987. Presently he is Operations Manager, Contaminated Sites, Environment ACT. Hugh married Lorraine in 1972, and they have two children.



Tape 1 Side A

Hugh was a cadet with Works while studying and had placements in the Major Development Section. After graduating he joined the section on rotation. At this time the design of the Bendora Gravity Main was being revised because tenders had been too expensive and the new design called for less cover over the pipeline. Hugh was trained to lead prospective tenderers along the route of the line.

Hugh also at this time was involved with Corin Dam spillway modelling studies, jointly with Max Ilbery who later continued the work. The spillway model was made by Frank Hessler and Hugh and Max were working on scour patterns; the basic ski jump design had by now been done by others and the slot at the foot of the spillway was in the design.

The model was in the nissen hut at Kingston, and the Works offices were in the nearby Barton 'woolshed' buildings. There was a pump with the model and simulated flood events were pumped through the model. The objective was to determine how the river behaved through the spillway. Low flows caused the most damage and a cut-off wall was needed in the design to stop the spillway being undermined. Another result of the model studies was that the bucket design was changed because of scouring deposits landing near the outlet tunnel exit. Max's main focus was on the spillway crest and solving problems relating to the side-flow nature of the spillway. Hydraulic pressure measuring tubes were put into the sides of the spillway model and conclusions were drawn about the pre-stressing of the crest. Confettie was thrown into the water and photographed with a time lapse camera to determine flow patterns. It was all lots of fun too. All of the work was basically under the leadership of Arn Fokkema [also interviewed]. Today this sort of work, and the extrapolation to actual flows, would be done with computer.

Hugh designed the culverts under the Corin Road. These are at the crossings of Kangaroo Creek and Gibraltar Creek. This was done during another rotation.

Hugh visited Corin several times during construction and the experience helped him when resident engineer later at Googong. At Corin 'one of the things that really was quite impressive was the heavy rollers going across the clay core of the dam and the bow-wave in front of the rollers as compaction was occurring'. Soil has to be at the right moisture content so there's a build up of pore pressure (pressure in the voids between soil particles).

Asked if Corin and the Bendora Gravity Main were exciting and like an ACT Snowy scheme, Hugh says 'yes, very much so. And the Major Development Section was seen as a mini Snowy scheme. The engineers in it had an immense pride in the sort of work that they were doing. It was challenging work, very exciting work, in that you were pioneering — getting out into areas that people weren't generally going to, opening them up...This was your whole reason for being'.

The NCDC came in with a big bang and it was a time of real optimism. Works felt they provided NCDC with the expertise for its objectives. There was some competition between the two organisations, but staff of both had a common purpose.

Asked about the environmental controversies surrounding dams today, and the situation in the 1960s, Hugh responds 'the momentum of the Snowy scheme was there. It was a great engineering feat and people were seeing it that way. The attitude toward building dams was that they could only do good, whether they be an irrigation dam, water supply dam, or power dam. It was only in the early 1970s that the environmental impact assessment came in and people started looking at the values that were being lost as dams were being built. Nowadays a lot more work goes into deciding whether or not to build a dam, rather than just the geotechnical stuff of determining whether or not the site is suitable for a dam'. Googong Dam was the first one to have an EIS, and it was written by Graeme Kelleher [also interviewed].

Another issue at Corin was the rockfill source. It had levels of sulphide (pyrites) which would oxidise on exposure to air and there was concern about acidity in the water and even if the rock would decompose in the wall. Such fears were not realised.

The debate over whether Corin should be concrete or earth and rockfill was intense in the design area and even extended to letters in journals etc. The geology eventually determined the choice of dam type.

Turning to the Bendora Gravity Main again, Hugh walked the route after the survey and design had been done. Because it did not follow the contours but went in a straighter line the pipe went through country steep and rugged. 'Young, fit people

were more appropriate to show people over the site than the old, desk-bound engineers.' He walked half the route with Ned Spiering; Ned found it hard going. As it turned out Hugh was rotated again shortly after and didn't get to walk tenderers along the route.

Tape 1 Side B

The best part of the walk was at the Cotter where the river was crossed and drinks were available. Along the line surveyors had cleared trees and left pink rags as marks on trees.

Hugh was later involved with the bifurcation where the Bendora main and the rising main join behind the Cotter Pumping Station. The design problem was complex and not well known in Australia. He was given a German paper on the subject and as he didn't know German, Hugh asked fellow office worker, typist Lottie Tiedeman, to translate. The bifurcation came out literally as 'trouser cuts' (ie a trunk and two legs coming out of it) and the reinforcing shapes around the seams were 'horseshoe shapes'. So a few concepts still needed clarification and fellow engineer Rudi Kohlehasse helped out. In time the bifurcation was designed. Another rotation saw Hugh on other work before the project was constructed.

Design and construction in Works were quite separate, a situation which had both pros and cons. A negative aspect was the lack of continuity from design on through construction.

Hugh mentions the valve failure incident on the gravity main [see also Waldron, Fitzgerald and Moore summaries and Sherratt correspondence] and how the steep hillside was washed away, with the cut-off walls failing. [Although Hugh mentions the cut-off walls in this context, the other interviews and the Purcell correspondence indicate that the cut-off wall problem was identified and dealt with before this incident.]

Recalling individuals, Hugh says of Ken Harding 'he was our concrete dams expert' and of Arn Fokkema 'he was our earth and rockfill dams expert'. Ken smoked and Hugh recalls him ashing his cigarette into his hand and then placing the ash into his pocket. Hugh says Ron Moore had a difficult job supervising the Bendora main because of its strung-out nature. Jack Purcell was Hugh's boss on two occasions and knew dams well. Keith Knuckey was a senior Works supervisor at Bendora and Corin; 'rough as guts', Keith was well respected. He died of throat cancer. Don Stockdill was head of Major Development and responsible for many major projects. It was his personal input that made the Major Development area such a good place to work.

Hugh has made visits to Corin spillway to see the structure work after heavy rain, even with his heavily pregnant wife on the eve of their first daughter's birth. He is disappointed that the water has not yet got higher than the slot at the base. 'I'm still waiting for that big flood that we saw when we were modelling it.' The world's meteorological bureaux have recently changed the attitude to maximum probable floods and spillways are being upgraded all over the world. The 1976 flood at Googong changed that size of flood from a 1 in 200 year status to a 1 in 20 year one. It illustrates how little data we really have.