

## **MIKE SMITH**

*Mike was born in London in 1941 and he migrated to Australia seven years later. He graduated from the University of Sydney as an engineer in 1963. Employed by the Department of Works, Mike's first job was assisting the design proposals for Corin Dam during 1964. Subsequently he was responsible for dam design (particularly Googong Dam) and other engineering projects. Mike was the dam safety officer from the 1970s, and with the incorporation of water and sewerage responsibilities into ACTEW, Mike was ACTEW's Principal Engineer: Dam Safety until he retired in 1996. He still consults. Mike married Annette in 1969 and they have a son and a daughter.*



### **Tape 1 Side A**

After finishing university, Mike had a placement in the Department of Works' Major Development Section for nine months in 1964 and worked at a junior level on preliminary designs for Corin Dam. The proposals for Corin included a concrete multi-arch dam and an earth and rockfill dam; an earth dam had also been proposed by Melbourne head office but was dropped. The multi-arch dam proposal was based on the Grand Val Dam in France, and would have had arches between buttresses. The foundation rock at Corin eventually ruled out such a dam. Mike also comments on problem rock on the western abutment at Corin and how this later affected the spillway design for the dam as built.

The earth and rockfill dam was proposed by Arn Fokkema, the head of the design team. Bendora's designer Ken Harding proposed the multi-arch dam. 'Both worked pretty well independently of each other...Ken was very much a structural dams man. He believed you needed concrete to make a dam.' (Ken was also leading designer of

Scrivener Dam.) Earth and rockfill dams were 'the fashion' at the time, but were also cheaper because less manpower was required than with a concrete dam.

Whereas at Bendora Ken had been senior to Arn, Arn was now senior to Ken after the latter's absence overseas. 'I suspect they did go their own ways, for very good reasons. And they were very different personalities and very different designers.' Mike had to work to them both, doing, say, stability analysis for Ken on the one hand and slip circle analysis ( a method used to calculate stability) for Arn on the other. 'I had one set of drawings on one side of the desk, and another on the other side and just interchanged between the two.'

Mike was involved with spillway model studies for the multi-arch dam, work which was completed by Max Ilbery after Mike's placement finished and he was rotated elsewhere. The studies showed that it was difficult to get the flow through the buttresses because the buttresses were too small. This work was done at the Kingston nissen hut, which also contained the Canberra lake model, and the Corin earth and rockfill dam spillway model; Googong Dam models were later studied here too. Was it fun to do the model work? 'You were well out of sight of all the bosses (laugh). So you did have a bit of fun. It was a bit like kids playing in puddles'. The spillway models were purely flow models, not structural ones.

Probable maximum river flows were hypothetical, based on calculations. Stream gauges told what flows came down the river and were useful in setting the bottom of the flood frequency curve up to a 1 in 100 year flood; beyond that you have to extrapolate. Maximum flood calculations are always changing, and have been changed recently.

Mike went out to the Corin site a number of times during 1964. Access then was via Orroral Valley to the site camp at the Cotter River/Kangaroo Creek junction. The camp consisted of a few iron buildings and some tents, and was 'a bit primitive'. Works supervisor Bill Sauverain was in charge there. Bulldozers were making roads, stripping overburden, excavating costeans and investigating potential borrow areas. Mike investigated a possible borrow area up Kangaroo Creek. The western end of the later road built into the dam (the current road) follows roughly the track built for this work from the dam site up to Kangaroo Creek. There was also a track from the east to Smokers Gap before the current road was put through, but probably nothing from there to Kangaroo Creek.

Transport to the site was not easy. 'We had a VW. It was a bit difficult getting it out there at times. There was one fairly boggy area — we had to go like the clappers to get through or we'd bog it down. There was another couple of hills that were a bit steep, particularly if it got wet. I can remember walking 5 or 6 miles into camp one day when we couldn't get up a hill. The powers that be in Works wouldn't allow us to have chains; they reckoned they ruined the vehicle or something.' The trips allowed Mike to gain familiarity with the site, to select sand filter borrow areas for the wall, to investigate the borrow area up Kangaroo Creek, and to keep an eye on what Sauverain's team was doing. Mike recalls geologist Eric Best at the camp, and John Hill (Mike also went with John to the Cooma Snowy lab to have shear tests done on foundation rock from Corin.)

Mike is unsure whether he later visited Corin during construction. He mentions that prior to Corin, during a university vacation he saw Bendora being built and was impressed by the Land Rover pulling the concrete bucket out for hitching onto the cableway [see Albert Shaw interview, and illustrations]. He also saw grouting going on at Warragamba which was carried out to counteract leaks.

## **Tape 1 Side B**

Mike heard that one of the bridge beams for the intake tower at Corin fell down during construction [see Graeme Kelleher interview] but he wasn't there at the time.

There was little consideration of prevention of pollution of the Cotter River in the early 1960s. 'It was before the advent of pollution control measures. I suspect that there was fairly well lip service to pollution of the river, and hoping that the colour would come out in Bendora.' The sluicing at Corin in the early 60s may have gone straight into the river, though there may have been a holding pond to keep the sediment. Things have changed a lot since then. [See also Fokkema and Kelleher interviews]

Mike is a keen bushwalker and member of the National Parks Association (ACT). He feels the dams in the Cotter have not had an environmental impact and that they are a 'necessary evil'. Today the 'environmental side is much more prominent in engineer's thinking than in the past'. Large areas downstream of Corin were mullock heaps but have now revegetated. You need water and electricity, so you build dams. Environmental factors are not the only ones to be considered.

Geologists play a very big role in determining site geology, and the engineer has to then deal with the site in terms of the dam to be built. Foundation geology is vitally important, and there is a lot of responsibility. Canberra is lucky in that all its dam sites have been excellent in this regard. Large flat river valleys are the most difficult to work on. Mike refers to a dam in Pakistan where remedial measures have been going on for 30 years to try to stop leaks.

Mike was the ACT's dam safety officer from the 1970s, and he talks of the 3 Cotter valley dams. In the 1980s he conducted investigation and stabilisation work at Cotter Dam. Cotter when originally built had an outer layer made with a strong cement mix, while the interior had a weaker mix, so water getting into the dam could not get out (hence the drainage work done in the 1980s). The weaker internal mix has, on the other hand, helped prevent bad cracking in the dam. Plums (large rocks) were placed in the original concrete and this practice has changed today, just as the practice of building the wall all in one piece (rather than in several blocks) has also now changed. The flood calculation criteria used when the dam was built are a cause for scepticism. Also, theories on uplift at the turn of the century reckoned that 20% of the base of a dam was exposed to uplift pressure, whereas today 100% is the figure. The 1980s drilling discovered French drains, foundation drains which were previously not known to have been incorporated into the dam. In many respects Cotter Dam is a dam of its time, and its problems are not bad ones.

Bendora has 'performed very well'. Discussing the right abutment and the rockbolts used for anchoring, Mike says that today you'd use restressible anchors that can be checked and adjusted (these are in Googong and are to go into Corin).

Corin too has performed well. The spillway has not flowed in the way predicted in that the flows have not been large enough for the ski-jump to work; as only the lower slot of the chute has operated, the water is cutting a channel owing to the geology of the area where the water lands. There is a small leak through the dam, and the leaking water is acidic owing to the pyrites in the oxidised rock of the rockfill wall. This oxidation has turned the rock from blue to brown.

There are virtually no problems with the dams in the Cotter valley. Rather than maintenance, it is the changing design flood criteria that are necessitating attention.