

# CORRECTED VERSION

## ENVIRONMENT AND NATURAL RESOURCES COMMITTEE

### Inquiry into Melbourne's future water supply

Melbourne — 2 February 2009

#### Members

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#### Witness

Mr G. Croker, civil engineer.

**Mr CROKER** — I did have a nice presentation, but I think there have been enough articles in the paper.

**The CHAIR** — I might just go through the formal procedure. All evidence taken at the hearing today is protected by parliamentary privilege as provided by the Constitution Act 1975 and further subject to the provisions of the Parliamentary Committees Act. Any comments you make outside the hearing may not be afforded such privilege. We thank you very much for joining us, Geoff. If you can present and take some questions later, we would appreciate it.

**Mr CROKER** — My name is Geoff Croker. I am a civil engineer by trade. I have done some computing work, but the knowledge for this particular scheme has really come from my experiences with Rio Tinto, which I used to work for.

When we look at water, at the moment we do not understand what actually causes our drought. We understand the process, the results and the consequences, but we do not understand what actually causes it. A lot of money needs to be spent on finding out what causes it, because without knowing what causes it we do not know how long it is going to go on for. It may well be permanent.

We know that the rainfall in south-east Australia has changed. We know that a drought in Perth went on for a long time. Originally I came from Adelaide, so I know all about Adelaide. We know about Melbourne. We probably know that one of the major causes of our weather change is tropical oceans warming. Whether that is caused by CO<sub>2</sub>, river outflow temperatures or sunspots, no-one knows. However, we do know that the rainfall patterns have moved 200 kilometres to 300 kilometres south from where they were, so now rain is occurring at different times of the year at a higher latitude. You can see that easily, just by examining a sequence of weather maps. It is easy to prove. We know also, not according to just me but the CSIRO, that the rainfall in north-west Tasmania is actually increasing; it is now receiving a lot of the rain we used to get. The data over the past 10 years collates quite well with this.

We know also that Victoria is not receiving the rainfall it once was. Whether we take the attitude that this particular scheme we are thinking about is for just Melbourne or one that can service the whole state is a debate that we need to have. We know that the average rainfall in the Goulburn-Murray basin has gone down 20 per cent. The result of that is that the run-off has gone down 30 per cent to 40 per cent. We know also that the major dams we have — the Dartmouth, Hume and Eildon dams — are all in the wrong places to receive the rainfall that we get currently, so the catchments are in the wrong place.

If we believe in global warming, we have a few problems coming. We know that the sea levels may change and that that will probably mean we will have dramatic issues with power. So if we want to actually manufacture water, we may not have the power to do it, as we have seen over the past week and people in Perth saw last year. One of their power stations was non-functional because of gas problems, and therefore the desalination plant was not working. Desalination plants in general have business continuity risks that we should be aware of. It is no good having just one desalination plant or one power station connected to that desalination plant.

Victoria needs a new, low-cost, reliable water source that is not dependent on polluting processes or sea level changes. What does Melbourne use currently? Without water restrictions, we use 500 gegalitres; with water supply demand, as we have been using, we use about 380 gegalitres per year. So we have saved 100 or 120 gegalitres, which is pretty good going. There is no doubt about that; it is a good idea. We have three on-stream catchments, but really we have only two. We have the Thomson River and the Yarra River, and they account for 95 per cent of our water.

Let's look at the whole country. Australia uses 24 000 gegalitres of water per year. Let's look at Tasmania. Tasmania uses under 1000 gegalitres per year. The measured run-off in Tasmania — that is, the measured run-off, because there are many streams that are not measured at all — is 45 000 gegalitres per year, so about double what the whole country uses. The wettest part of Australia is north-west Tasmania. Lots of it has 3 metres of rainfall per annum. Hydro Tasmania has been around I guess for a long time; it must be getting on for close to 100 years now. It has existing dams. What I am proposing is that no new dams need be built because there are plenty of existing dams. All that has to happen is that the dams be connected. The connection I am looking at specifically is to the Forth River, but there are two streams that can be connected into this system. They have 5300 gegalitres running off to the sea per annum. That has been the case for the past 80 years and it is slowly increasing. Some of that spare water could be sold to Melbourne.

'How do we get it here?' is a good question. We build a pipe that is 350 kilometres long from around Melbourne to around Burnie and put it under the sea. People say to me, 'Well, who else has done this?'. The facts are that the oil and gas industry has been doing this for an awfully long time. There are lots of pipes — hundreds of them — under the sea, in far more onerous locations. They go down to literally 1000 metres deep these days and they go across mountain ranges. They

even have tunnels underneath the sea. That is done at a far lower cost than a desalination plant, over longer distances et cetera.

The good news about Tasmania, of course, is that the water can be got from a height that allows it to come across via gravity from Tasmania to the shores of Melbourne. Depending on which dam you want to put it into, you may have to get more head by bringing the pipe from a higher location in Tasmania. Initially all you would have to do is build a pipe from Burnie in Tasmania to Melbourne and then put a pump at Burnie and pump across some water. That would be stage 1, while you are building the pipe further upstream to a dam upstream. The water coming from Tasmania would be potable water. It is not A grade water; it is high-quality water. That is the good news.

To install this stage 1, so to speak, I have some initial costing coming from a consulting engineer. I am not doing this by myself. I have put a consortium together; unfortunately I am under a non-disclosure agreement so I cannot reveal who they are, other than the fact that they include an oil and gas company and one of the partners is ConocoPhillips — I can say that — so they are not small. The cost, including the pumping station, would be about \$1.4 billion, to get 170 gegalitres per year. The time line for the build is two and a half years and the time line for the design is about half a year — so it would be done in three years, bringing 170 gegalitres. If you extend the pipe up the hill you get 200 metres of head, all of a sudden you can take away the pumps and the flow rate from that pipe will go up to 250 gegalitres per year. To do that would cost an extra \$500 million. Why would it cost so much? The answer is because anything you do across land costs a lot more than anything you do across the ocean. Fish do not talk. You can always put it down on the bottom of the ocean.

To put it into perspective, the actual cost of a 12 per cent loan paid off completely over 20 years would cost \$185 million per year. The water would be sold to a Melbourne wholesaler at \$1700 per megalitre, compared to water from desalination, which will be \$3300 per megalitre. Hydro Tasmania or the Tasmanian government would receive \$300 per megalitre. These are real numbers. Fortunately the price of steel has gone down about 60 per cent over the last three or four months so they are the latest numbers.

That is done. The pipe is coming across. What do you do next? Part of this plan was to look at the whole state of Victoria so the board of works design of 1961 would be followed but would be extended to make it a bit deeper. That design was for a pipe from Big River across to the Upper Yarra. I think I have a diagram in there somewhere that shows the water flow direction, but that would be extended from 9 kilometres to 30 kilometres and would cost about \$300 million. The work could be done by McConnell Dowell, which has a drilling machine available today. It would probably take about 18 months to bore out the hole. So a tunnel would come across and water would go from the Upper Yarra Reservoir across to Big River and down into the Eildon Reservoir.

Why would you do that? If you are bringing across 250 gegalitres of water with one pipe, obviously you can bring across another pipe which would bring across 500 gegalitres. You do not need any water in Melbourne at all then. All you need to do is to fill up the lower dams to make sure they are full as insurance in case there is a problem with the pipe or the pipe needs maintenance. The lower dams would be full and Melbourne could not possibly run out of water.

A lot of the water that comes from Gippsland and the Yarra River that we currently use for drinking would go across to Eildon. Why would we send it to Eildon? We need to because at the moment the Goulburn Valley is going broke. If you accept the fact that there is climate change, there will not be a Goulburn Valley in 10 years from now. There will not be any water to produce fruit, and that is the problem. That is why we need to find out what is causing the drought. It is no good just knowing the result of it.

We now have two pipes, and I agree the cost goes up but it is still worth doing as it is cheaper than desalination. Five hundred gegalitres comes across to Melbourne, and what does Melbourne Water do? Melbourne Water is busy paying someone \$1700 per megalitre, \$300 of which goes to the Tasmanian government and \$1400 goes into financing the pipes constructed by a private company. There is no reason for the government to be involved at all. We do not want your money. We would prefer that you were out of it completely, from what I have seen so far. I am talking to people who have the money.

The Upper Yarra and Thomson reservoirs are connected, and then slowly over a period of 20 years all those dams in the country that are currently empty are filled up. This system is expandable. The pipe that comes across to Melbourne can have a branch line to Geelong, to the Wurdee Buloc Reservoir, and could supply both sides of town, so to speak. The build and manufacturing would be done locally. Pipe would be made in Western Port and then fed into the Western Port bay and sunk until there was enough pipe ready to roll across Bass Strait. It can be made in very long lengths. Typically Norwegian

pipe is made in 500-metre lengths, but I think this particular pipe could be made in significantly long lengths, probably up to 5 kilometres.

People say to me that 2.5 metres is a very large diameter. It is. Gas pipes tend to be up to 1.4 metres in diameter, but at very great depths they can be up to 1000 metres. This is a pipe that would be one-half an inch thick only. It would have a plastic lining internally and externally and would be made of carbon steel. The connectors at both ends would be plastic — when I am talking about plastic, I am talking about glass-reinforced plastic — and that pipe would be made in Adelaide.

I am open to questions if anyone has any.

**Ms DUNCAN** — Geoff, thanks for that. You said the pipes float.

**Mr CROKER** — Yes, a big pipe floats if you close the ends — like a ship, so to speak.

**Ms DUNCAN** — These pipes float?

**Mr CROKER** — Yes, until you open the ends up and then they sink.

**Ms DUNCAN** — So they do not float. When they are operating they are not floating?

**Mr CROKER** — No, no. They do not float.

**Ms DUNCAN** — Why do you think this has not been done before?

**Mr CROKER** — It has in several countries. There is a water pipe — —

**Ms DUNCAN** — Why has it not been done here, do you think?

**Mr CROKER** — A lot of the water industry in Australia uses old technology. Say, for example, in England, 70 per cent of all the pipes are made of plastic.

**Ms DUNCAN** — Sorry, I am not talking about the technology. I assume if we can put people on the moon we can move water from Tasmania to mainland Australia.

**Mr CROKER** — Sure.

**Ms DUNCAN** — My question is: why do you think it has not been done before?

**Mr CROKER** — In Australia?

**Ms DUNCAN** — Yes. I have read a number of articles in recent times about this particular proposal. There has been all sorts of proposals — water barges, pipes — no doubt you have read some of these.

**Mr CROKER** — Sure.

**Ms DUNCAN** — I just ask you: why do you think these things have not happened before? Or why it is not being explored now?

**Mr CROKER** — Until I brought this up, I did not know anyone else had brought this up. I cannot answer that. It is new for Australia, there is no doubt about that. Is it new for the rest of the world? No. We have, of course, a gas pipe that goes across Bass Strait that is a small diameter gas pipe, but really in Australia we do not have large diameter pipes, other than the original one that was built in the Western Australian goldfields or the original Adelaide pipes. We have kind of forgotten engineering. I am an engineer so I know about this. In 1980, when I graduated, there was almost nothing going on. I went to a mining company. I came to Melbourne. I went off to Bougainville. I went to Hamersley Iron. I went to some coalfields in New South Wales. I went to Mary Kathleen Uranium. I was actually involved with piping early on because I wrote the program that Rio Tinto used to design their slurry lines, so I know a bit about that.

There was almost no engineering going on. We had stopped doing engineering. We had stopped building things. It is only recently that we have started again, and it has caused a huge problem.

**Mrs PETROVICH** — Thank you for your presentation. I think it is an innovative and interesting concept. Obviously it is something that you are working on in partnership with the major private company and other investors. What would be the major obstacles to developing this program to completion?

**Mr CROKER** — The major obstacles? There are a few. The first one, of course, is Dave Llewellyn, who is the water minister in Tasmania. He is an obstacle because he has an agreement sitting on his desk which he has had for several months. He wants us to basically give him a detailed design, and we are saying unless you sign an MOU, we are not going to give you a detailed design. There is not enough pain yet. The pain is increasing, by the way. We are a private organisation so we look to government and say when there is enough pain, people will do this because they will soon find out that desalination has warts on it.

**Mrs PETROVICH** — If this was to go ahead, could we say there would be no need for a north–south pipeline? Perhaps we would be building a south–north pipeline.

**Mr CROKER** — They have already built it so it is very difficult to say that there is no need for it when it exists. My attitude would be that if a pipe exists and you are the person who has this capex sitting there, you would not want it to become an orphan. What are you going to do with it? Make it a go-kart track? I do not understand what the question is.

**Mrs PETROVICH** — The pipe is not completed as yet and you have spoken about the Goulburn Valley being in jeopardy. We have a north–south pipeline, which is set against the principles of taking water out of the north and piping it to the south.

**Mr CROKER** — Sure.

**Mrs PETROVICH** — Is there an opportunity, then, to have a south–north pipeline which would take water back into that system which might reinvigorate — —

**Mr CROKER** — I certainly would not be doing it the way it is being done at the moment; it involves a lot of pumping. What you would do is bore a tunnel between the Upper Yarra and Big River at the right level so that water could flow both ways, if you wanted it to. You cannot lose that way. You never know what the weather patterns are going to be over 1000 years. It is always a good idea to hedge your bets, so the pipeline that is currently being built for the Sugarloaf, the flow only goes one way. It was designed that way.

**Mrs PETROVICH** — What are the energy costs, in comparison to a major desalination plant, to drive your project from Tassie?

**Mr CROKER** — If you were going to pump off the beach, it would cost \$27 million per year to get 250 gigalitres, but that is a cost we would wear, of course. If you do not pump and bring the pipes up the river to Lake Cethana, then the water just flows via gravity. The thing about pumping is that pumping can get about 1.1 metres per second flow rates, whereas gravity flows can go up to 1.7. so essentially there is more flow coming down the pipe if you use gravity. That is a \$500 million additional expense in order to be environmentally correct, so to speak. Generally speaking, Melbourne Water and civil engineering organisations have been loath to get rid of the pumps and use gravity.

Melbourne has been fortunate because nearly all the system we currently have is fed by gravity. This pumping is brand new, and unfortunately we are going to see a huge drain on resources of electricity. Whether that is greenhouse gas — I am not going to get into that argument — we do not have enough power now to pump things. It is going to fail. There will be this huge weight of water going uphill on pump and the power will go off. One needs to be aware that one would not want to stand at the bottom end of the pipe when power fails.

**Mr WALSH** — You would not be standing for long.

**Mrs PETROVICH** — You might be surfing.

**Mrs FYFFE** — When the north-south pipeline was announced, quite a few people in my electorate in the Yarra Valley — ex board of works employees — came to see me and talked about the Big River and Upper Yarra and why that should have been used. As an engineer, could you try to explain to me why the north–south pipeline would have been chosen over a tunnel from the Big River going up?

**Mr CROKER** — That is an interesting issue. I think you will find there is a heritage order on Big River. Because of the fact that the tunnel was 2 or 3 kilometres away from its entrance to Eildon, which is at the bottom end of Big River, the

government was pedantic about this heritage order. If it was within 100 metres or even 5 inches, they could not use this particular existing design because the design was done in 1961.

**Mrs FYFFE** — I have seen the design.

**Mr CROKER** — I am proposing to use some of the information, of course. If we had to go out and get the geology all over again, it would take us longer to do that, but fortunately somebody has already done the work so we are just going to make that particular tunnel deeper and longer so that water goes both ways. In the 1961 design the water was only going from Big River to the Upper Yarra.

The interesting problem, of course, is that the Big River water is pristine, whereas water coming out of Eildon is not pristine. To take water below Eildon and put that into the Sugarloaf, then the water going into the Sugarloaf is not pristine, it has to be processed at the Winneke treatment plant.

**Mrs FYFFE** — That is right, which is more power gone.

**Mr CROKER** — Yes, more power gone. So it would have been better to take it out at Big River and put it into the Upper Yarra; that would have been smarter. But there is this heritage order that I guess was signed by John Thwaites. Big River is a nice trout fishing river; I have gone there fishing for trout and it is a nice spot. There is no doubt about that. You could probably lose 2 or 3 kilometres of it without too much drama to the trout fishermen.

**Mrs FYFFE** — It would be a lot less damage than is being done with the construction of a pipeline.

**Mr CROKER** — Of course. Some people would probably get upset about it; you would have to go through an environmental process. But it is really quite simple.

**Mr WALSH** — You spoke about the fact that the north-south pipeline is being built at the moment, and once it is built there are investors who want a return on their investment. One would assume that with an action Premier, the desal contract would be signed fairly shortly. There would want to be a return on investment there. What gives you any hope that your proposal would get up once those two things are effectively signed off?

**Mr CROKER** — We do not care.

**Mr WALSH** — How do you mean you 'do not care'?

**Mr CROKER** — We will become a competitor.

**Mr WALSH** — So if the government has signed its PPP for a desal with a take or pay clause in it, you are — —

**Mr CROKER** — We will supply their top 40 customers.

**Mr WALSH** — You are saying you will be able to supply water cheaper even though the PPP is going to be paid for?

**Mr CROKER** — I guess from a commercial prospect it is a beautiful setup. Ours is cheaper. We know who the customers are.

**Mr INGRAM** — I suppose my question is: what is in this to convince the population of Tasmania that they should help their friends back in the mainland?

**Mr CROKER** — Good question. I thought exactly the way you think, and that is why I went down to Burnie. I thought I would be lynched but I was not. I gave a talk down there almost a year ago. I put my bullet-proof vest on — they all knew I was coming. There would have been 1000 people in the room waiting for me. I explained it all. I said at the end that Tasmania has this 45 000 gegalitres, and I understand that Tasmania does have drought.

I did explain, though, that the drought was caused by the rain bands moving down 300 kilometres. The rainfall was happening on the north-west mountains. There was a rain shadow in the central part of Tasmania and a rain shadow in north-east Tasmania. The farmers started putting up their hands and saying, 'We knew that. No-one would listen to us'.

I said, 'Okay, if you can get the Tasmanian government to spend some of this money on supplying you with water, it is not our responsibility to do that. All we can do is leave a valve in the pipe so that water can move via sea over to the north-east

coast of Tasmania'. Personally, looking at the financial aspects of this — and I have explained it to the farmers — every farm could be bought and shut down at a lower price.

**Mr INGRAM** — We deal with politics, and I think it would be a fairly easy thing to mount a political campaign against in Tasmania. A proposal like this, why should government endorse it? We have seen political opposition historically to the Snowy, the north–south pipeline, the desal plant. There is still a fair bit of hoo-ha about the diversion of the Thomson to Melbourne.

**Mr CROKER** — Would you like some more reasons? Hydro Tasmania are broke. They owe \$1.1 billion. The supply they use, the Pedder and the Gordon rivers, are slowly drying up in the drought. Perhaps people think about some parts of Tasmania not having enough water, that is not really true. There is plenty of water, but unfortunately a lot of it is used to generate power, which means the water flows through the system and out to sea. To give you an idea, Hydro Tasmania currently get paid \$30 a megalitre at peak for their water converted to power.

**Ms DUNCAN** — So where would their power come from?

**Mr CROKER** — They have an agreement with a Chinese company on a 50-50 basis to put in alternate power supplies in Tasmania. That has been running now for about four or five years, and they are putting in wind farms and things like that. Essentially, though, they have no money. They are broke.

**Ms DUNCAN** — So you are confident this will get up? This sounds like a pretty easy win-win, and you could be in competition with a whole range of other water suppliers?

**Mr CROKER** — I think it will become a bit of a commercial — — I am sure Veolia and Degrémont will have their oar in the water.

I am not against the desalination plant. That is what people get confused about. I am not against it; I just think that it is too expensive and does not solve Victoria's problem. Victoria's problem is getting bigger daily. Essentially in 20 years we may not have enough water to support our lifestyle. We need another source of water that is big, and they have plenty of water. Should we pay Tasmania \$300 a megalitre? I think that once we explain it to all Tasmanians they will get the idea that over a period of time — because this would be incremental against CPI and that sort of stuff — every Tasmanian would get around \$1000.

There are only 500 000 of them. This is a pretty good deal for them, but to be honest I think it is a much better deal for Melbourne Water; it is the winner. The desalination plant will make it powerless for almost 20 years, because it will have spent all its dough if water is sold at \$2200 a megalitre, which is what is proposed for 2012 under the Essential Services Act. It will be on its bones for 20-odd years. It will not be able to do anything at all. It will have no money.

**The CHAIR** — We might wind it up there, Geoff. Thank you very much for your contribution — your submission and your presentation. We appreciate it. You will get a transcript in the next couple of weeks with instructions. Thank you very much.

**Witness withdrew.**