

THE SELECT COMMITTEE ON THE MANAGEMENT OF THE TAMAR AND ESK RIVERS MET IN COMMITTEE ROOM 2, PARLIAMENT HOUSE, HOBART, ON TUESDAY, 17 MARCH 2009.

Mr SCOTT GADD, SECRETARY, DEPARTMENT OF ENVIRONMENT, PARKS, HERITAGE AND THE ARTS AND CHAIR, TAMAR ESTUARY AND ESK RIVERS PROGRAM; **Mr JAMES MCKEE**, CEO, NRM NORTH; **Mr BRIAN RISBY**, ASSISTANT STATE PLANNING ADVISER; **Mr ALAN HARRADINE**, GENERAL MANAGER, WATER RESOURCES, DPIW; AND **Mr CHRIS LOCK**, DIRECTOR, ECONOMIC POLICY, DEPARTMENT OF TREASURY AND FINANCE, WERE CALLED, MADE THE STATUTORY DECLARATION AND WERE EXAMINED; AND DISCUSSION WITH **Ms MICHELLE O'BYRNE**, MINISTER FOR ENVIRONMENT, PARKS HERITAGE AND THE ARTS.

CHAIR (Mr Hall) - Thank you very much, Minister and others, for making yourself available.

Ms O'BYRNE - I'm happy to make a brief opening statement and I thank the committee very much for the opportunity to appear. I know that this committee also shares some residential issues with me so we are all particularly committed to the Tamar River. I know the Government has shown, over the years, great commitment to the Tamar and Esk rivers, including sustainable use of land and resources in the region.

We understand the importance of the waterways, not only to the community who live around the rivers but also to the broader Tasmanian community. We've been working on a wide range of areas to improve the condition of the catchment and to ensure that recent development of the land in the region is done in a sustainable manner. As you would be aware, significant areas of work include the TEER program - the Tamar Estuary and Esk Rivers program - the development of the Launceston Flood Authority, including appropriate amendments to the planning scheme and a financial contribution in dredging, and the North and North-East Regional Planning Project. I think that through these projects as a State government we can be confident that we can bring together all of the relevant councils and all of the stakeholders to identify and raise issues and hopefully then address those issues around the Tamar and Esk Rivers.

As I understand it, the driving force of this committee is to explore whether all of the roles that are associated with the protection and management of the Tamar and Esk River systems can be managed under one statutory authority. There are clearly challenges, it would be fair to say, associated with that objective, including defining the relationship of the authority to various levels of government and to existing statutory and non-statutory responsibilities for natural resource management in the region. However, as a minister but also as a local member responsible in that region, I am really interested to find the outcomes of this inquiry. I think we'll get a lot of very good data and information about how that might work. Cabinet has not had consideration of the role of a statutory authority so there is no existing cabinet position that I can bring to the table here, which I think is probably good because it means we can look at a range of outcomes, including the outcomes of this inquiry.

We will form our view based on the outcomes of a number of programs that are currently being implemented but we will also form our view dependent upon the outcome of this inquiry as well and the evidence that is presented to this inquiry.

CHAIR - How do you as minister view responsibility for the welfare of the Tamar River and the Tamar Estuary and the Esk River? Who do you think is responsible?

Ms O'BYRNE - You can argue a case that every stakeholder and everyone who has an engagement with it has a level of responsibility. One of the things that we as governments do is absolve people of responsibility. I am not sure that has necessarily been a healthy movement for communities. There is an opportunity for greater responsibility out of collaboration. This is my personal view, not necessarily one of the Government's - I do stress that. Bringing players to the table with a joined view of collaboratively working to resolve issues is often a better way of achieving things.

Historically with the Tamar River we have dealt with the urgent problems, the ones that might be causing us grief on any given day. Whilst that is important to do, and certainly the dredging program is an important program, we have not committed in a really dedicated way to ensuring broader understanding of the nature of the issues. We are driven often by the urgent and not the import, and that is the nature of many levels of government. I think we have all at different times had to respond to that. The responsibility sits with everyone but in a collaborative sense.

I am not sure that is the answer that you were necessarily looking for. I do not think it is only a State government issue or only an issue of the many local governments that have responsibility for this area. I think it is a responsibility for everyone. I note the authority around the Derwent is a very collaborative one; there is no great stick used to get those people to the table and I think that has worked very well. At this stage I have not yet been convinced that a statutory authority is needed, however I am still open to be convinced on that if that case can be made.

CHAIR - Yes, it is our concern about the management and who is responsible for the management that has prompted this inquiry.

Ms O'BYRNE - I understand entirely the steps that you have taken. Our problem, though, has been that over the years we have dealt with this issue in isolation and we have a plethora of reports. What we have lacked is the will to bring all that data together. TEER has shown that we do have the will there and the capacity to bring it together. I would like to see how TEER plays out and whether or not that mechanism does what we want it to do in terms of bringing together all of the players and planning a path forward. Maybe that after that has played out the evidence is that we do need some kind of other body, but my personal view - and it is not the view of Cabinet, not a government decision - is that I would like to see that played through.

Mr WING - You have said that you think it is the responsibility of everyone. Isn't that the problem, that everybody has some responsibility but nobody has accepted the main responsibility?

Ms O'BYRNE - The problem is that we have never asked all the players to be together on it before. I think nationally and on a statewide perspective we absolve people from

responsibility too quickly. I think there is a broad commitment that we need to make about the Tamar River. It is not just about State government agencies and it is certainly not just local governments whose boundaries it crosses. You are right that in the past everyone has gone off and done their own thing and produced their own reports. What we have lacked is the will to bring it together. I think since then we have identified a mechanism to bring it together. I think the work that TEER is doing has unified the wills and desires although I accept that we haven't had everyone to the table yet but I think we can show that being at the table is not a bad thing. I prefer people to be brought to a table willingly rather than by force. I think you get far better engagement and commitment to processes when you do, and I also think if we suddenly say, 'Okay, this is now a State government job, a local government job, or a statutory authority job' that there are a whole host of people in the community who should be engaged, commit and be responsible. People will say, 'It's not my problem'. I guess that is my feeling; I feel I must be honest about where I see this heading.

Mr WING - I agree with your comment about TEER; they are doing really good work. That is mainly research and evaluation work, which is very important in the whole scheme of things. There seems to be a problem that nobody has accepted the main responsibility for dealing with the problems and the information that is collated by TEER and other bodies. Do you not think it would be an advantage for there to be some body that has the ultimate main responsibility and powers to deal with the problem?

Ms O'BYRNE - I'm not sure that that is not what we are heading to, though. In one way the proof of the pudding is in the eating, and I think that TEER is collating the research that exists and giving us a better picture of the state of the river. We will plot a course forward that we would want stakeholders to sign up to collaboratively. That is where I sit on this.

Mr DEAN - At the end of the whole thing what responsibility would TEER have for the management of the Tamar River and its estuaries?

Ms O'BYRNE - The key is that we would have all of those stakeholders still together. We would have at the table the people who make decisions. I think if there is an opportunity to do this collaboratively rather than with a big stick then that would be the path to go. I have said, though, that I would like TEER to be able to run its course, to go through that process to get that point. I think there is a pathway that is being followed and I think it is a model that could take that ownership but do it in a much more collaborative way. I will allow Mr Gadd, who is desperate to speak, to add to that.

Mr WING - And who has a very good knowledge of all this.

Ms O'BYRNE - And he is here not as the secretary of the department but in his role as chair.

Mr GADD - Just to cover off on a couple of those points, I think the Government and NRM North have shown a bit of leadership by initiating this process a couple of years ago. We got this up and running in 2008, so in that sense there is some recognition of the disparate interests around the river and that there is a need to bring some of it together.

My second point is that in some sense we are putting the cart before the horse because the reality with the Tamar River is that we don't fully understand the problem. We know

what the problem is but we don't yet categorically understand how the silt moves from one place to the other, where it all comes from, where it ends up and those sorts of things. The very first thing we recognised at TEER was that we had to build a foundation of information to inform any decision making that we were going to undertake, whether that be through some sort of authority, voluntary body or whatever. It doesn't matter, at the end of the day we have a fair bit of work to do to pull together what we already know and plug the gaps, which we are starting to do now with some extra studies and funding that has come along. The eventuality of that has to be that we are then in a position to address some of these bigger issues about the future management of the estuary and how we might go about that. At the moment we could make a whole range of ad hoc decisions that might prove to have no impact whatsoever down the track. By bringing everything together now and doing these further studies I think we will be far better placed to work out what we think needs to be done and then ascertain who is going to have a role and what that role is. Then we will be in a position to work out how that would be best coordinated. It might be some existing structure, such as TEER, some other government committee, some other partnership-type body or it might be some new structure.

As the minister said, the Government has an open mind at this stage, but we recognise the problems with the Tamar. We think the Derwent Estuary model is a good one and so we have applied that and we probably have another year or two before we are in a really good position to say, 'This is what we have to do. Here's the plan to sort the Tamar out'.

Ms O'BYRNE - I think historically we have used the piecemeal approach. There has been good reason for it. It is not a criticism of the work that is being done but we have not yet reached a point where we have created a clear picture about where the sediment comes from, how long it has been there, at what rate it moves. All of those things are based on a lot of piecemeal studies.

The capacity to bring all of those together to get a true picture of where we are is probably the most fundamental step that we can then make. That is why Cabinet has not made a decision about what the ongoing management might look like. I have a preference for collaborative models, but that is my personal preference. I think if we have that data and we then get those people together there are a number of options that might exist in terms of how we play forward. The key for us has to be in understanding what the condition of the river is and what the implications are in terms of the changed management around that.

I think the main step now is for us to work to get that data and to have a finalised picture that pulls together all the research, get new data from what is being undertaken now and get a picture of where to go from here.

Mr WING - That is mainly concerned with the environment matters, is it not, the silt problem and the state of the river, rather than the flooding problem?

Mr McKEE - The flooding problem sits outside the immediate scope of the TEER program at this point. We are obviously interested in it because Launceston City Council is part of the TEER program and so it is raised as part of one of the issues. As Scott indicated, our primary consideration has been the silt issue but it is not off our radar either.

Mr GADD - The whole agreement around the flood and the authority was in train before we started the TEER.

Mr WING - That is the agreement between the Government and the city council?

Mr GADD - Yes.

Mr WING - The responsibility for implementing that now rests with the Launceston City Council, doesn't it?

Mr GADD - I believe so.

Mr WING - The Launceston City Council has no jurisdiction outside its boundaries. That is agreed, is it?

Mr GADD - Yes.

Mr WING - About 92 per cent of the catchment area for the flood plains are outside the city council boundaries, is that agreed in general terms?

Mr RISBY - You seem to be very well informed. I would suggest that is probably about right, yes. It is a very large catchment area

Mr WING - Nobody has responsibility for that and no research has been done into that?

Mr RISBY - I do not think that is quite accurate. I think that there are two aspects to this. The first is that the agreement with the Launceston City Council over the flooding issue provides the capacity for the new authority to engage in some land-use planning issues within its realm and beyond. It is contemplated that we may want to make submission on some land-use issues in neighbouring municipalities that impact on the catchment.

The second and bigger aspect is the regional approach to the planning process going on at the moment which cooperatively brings all of those councils together, almost on a catchment basis to address the regional land-use strategy which will pick up some of those issues. I think there are other things that are running parallel which do assist with addressing the implications in the catchment.

Mr WING - As a result of the agreement between the State Government and the Launceston City Council, the Launceston Flood Authority has been appointed and is the responsibility of the Launceston City Council, is that right?

Mr RISBY - That is my understanding. Chris Locke is more au fait with the workings of the agreement.

Mr LOCKE - Yes, because the Launceston Flood Authority is a separate body, which was created by the Launceston City Council under the Local Government Act.

Mr WING - Arising from that agreement with the State Government?

Mr LOCKE - That is correct.

Mr WING - So it is not the State Government that has appointed that authority, it is the responsibility of the Launceston City Council to appoint that authority and it has done so?

Mr LOCKE - That is correct - to appoint the authority, draw up all the rules and also to advise the authority on behalf of the State Government that it complies with local -

Ms O'BYRNE - There were agreed measures though, weren't there?

Mr LOCKE - Certainly, yes.

Mr WING - Yes, and that authority has no jurisdiction outside the city council boundaries? Is that correct?

Mr LOCKE - That is correct.

Mr WING - That is a weakness at the moment, isn't it - that we do not have any body or organisation that has any power to deal with the cause of the flooding in the Launceston area because most of the catchment areas are outside the boundaries?

Mr LOCKE - The authority was established to address that particular issue with flooding at Launceston, particularly in the Inveresk-Invermay area. In fact this is responsible for all the levees and the whole flooding system around Launceston but it was never contemplated that it would have any further role.

Mr WING - That is dealing with the flooding when it occurs in the Launceston area and trying to reduce the impact but being appointed by the Launceston City Council, it has no power to do anything about the cause of the flooding outside the boundary.

Ms O'BYRNE - Mr Wing, sorry, I am not trying to argue, I am just trying to understand all of it. Most of the flooding is actually in the purview of the Launceston City Council because it occurs on their flood plains. I am not sure that an authority would -

Mr DEAN - Where does it come from?

Ms O'BYRNE - This is my point, though. Even if they had power, what are they going to do, say, 'Stop letting water come through your local government area and ending up in my local government area.'? I am just not quite sure.

Mr WING - There are a lot of suggestions about what could be done. Some people feel that if there were dams further up the river that would help, that if there were some power to deal with the irrigation and the erosion into the river of soil as a result of irrigation and new farming methods in the northern Midlands that would help. There are a whole lot of suggestions, and I am not adopting any of them, but whatever the causes are of the flooding and the possible measures that could be taken to reduce the impact, this flood authority has no jurisdiction over those because that all occurs outside the city council boundaries. That is the point I am suggesting.

Ms O'BYRNE - I am happy to be corrected by others at the table.

Mr RISBY - If I might just revisit the point I was making about the authority's ability to engage in land use planning matters beyond the Launceston City Council area, the intention is for the legislation to enable the authority to engage in submission to neighbouring planning authorities about matters that might be backed on the flooding and to also have standing before the planning appeals tribunal on matters it has not made representation to if it seeks to get engaged. That is perhaps a relatively small role in terms of the overall strategic land use planning in the area but at least it does provide the opportunity to make a point to the relevant authorities - the RPDC or the tribunal - on matters that could affect the flooding capacity.

Mr WING - But it has no power to deal with any of those matters, only the opportunity to make some suggestions?

Mr RISBY - Yes.

Mr WING - Do you not agree that it would be an improvement if there were an authority that did have power to deal with certain matters rather than just making suggestions?

Mr RISBY - I think it is a very complicated matter when you take into account all the issues that can impact on a catchment area. It is very hard to know where to draw the line between, for example, a subdivision being approved in the Meander Valley which might have some run-off issues into the catchment or, as you mentioned earlier, agricultural activity, dams and so forth. There is an array of activity and issues. If one were to think about a single authority, it is a question of which of those issues would be picked up and which would still be left with other authorities. I think the approach that the Government is trying to take on these matters, as the minister has alluded to, is a cooperative approach across a range of issues to try to capture all of those which are already dealt with by existing jurisdictions or existing legislative regulatory regimes. Certainly the regional planning approach tries to do that. One simple solution would be to impose a regional planning body, but then you take away from the local councils the ability to deal with small areas at a level which is appropriate. So the approach is to take a cooperative, strategic approach to land use which is then devolved down to the local councils to their own planning schemes at the appropriate level.

Mr WING - All those things that you are suggesting are desirable, I agree. There are matters of detail to be taken into account if there were a statutory authority appointed by the State Government to have jurisdiction over all relevant areas, but don't you agree that in principle it would improve the situation if the statutory authority could be appointed with powers to deal with the problems and the matters you have spoken about would be factors to be taken into account in determining what powers the authority would have? In principle, don't you agree that it would be an improvement and desirable to have one body with certain relevant powers?

Mr RISBY - Theoretically that might be the case but I am not convinced, given the layering that we have there now, that that would be workable. I think we have the NRM situation and the capacity for regional issues. I think it is a question of horses for courses. It is not my area of expertise but I am not convinced that there is a huge problem that is not already being picked up through existing mechanisms.

Mr LOCKE - I am not aware of evidence to suggest there has been inappropriate land use that has contributed to the risk of flooding in Launceston, or anywhere else. When GHD did that big study on looking at this issue nothing came up that identified any inappropriate land use upstream as contributing to the flooding.

Mr WING - What about contributing to the silt?

Mr LOCKE - They weren't required to look specifically at that.

Mr WING - But that is a different matter. Don't you think that a specific authority, having certain powers to be agreed on, would be able to play some significant role in looking at the cause of the silt problems rather than dealing only with the result of the flood problems?

Mr LOCKE - I am not aware of the silt issue, but I would imagine that is something which is being currently examined through other bodies.

Mr GADD - I have a completely open mind on the authority but it would be an extremely complex process to put it in place. It would cut across every other statutory authority in the State - Parks, local government, potentially Police, Environment, Heritage. Where it overrides or defers to those various bodies would be an extremely lengthy and difficult process to work through in terms of that whole catchment. I am pretty sure these issues arise in other catchments. We have certainly dealt with them in the Derwent for a good couple of decades now. I am not aware of any other example where an authority has been required to get the end result. It has generally been through cooperation and coercion, if you will, in some instances. There is a range of authorities that already have powers, such as the EPA and others, that could be brought to bear once we understand the issues and therefore what the solution is. We would be able to tap into those various regulatory mechanisms to achieve that. But to appoint an authority and give it the overarching power in certain areas potentially would take as many years to work through, I suspect.

Mr WING - It depends on the detail, doesn't it, and the specific powers that an authority would have?

Mr GADD - Yes.

Mr WING - The matters that you are discussing would all be taken into account in determining what the powers are. I think you wouldn't disagree that, despite the difficulty, it would be possible to work out a system where an authority would have some powers, working in conjunction with the other authorities, that would give somebody responsibility for the causes of the silt problem and the flooding?

Mr GADD - There are other examples - the Sydney Harbour Authority is probably one - which cut across a number of jurisdictions. I guess there would be examples we could look at, it is just a question of whether we could really justify it, given our circumstance, and whether we really needed it. As I said, we really need to do a bit more work before we can answer those questions.

Mr WING - Can you tell us of any other authority similar to the Sydney Harbour one where this has happened?

Mr GADD - I think there might be one in Moreton Bay - is that an actual authority?

Mr HARRADINE - No, that's not an actual authority. There is a separate authority looking after Sydney's water catchment as opposed to the supplier of water. So there is that sort of model.

Mr WING - There was the Thames River one in London. That was very effective.

Mr GADD - I am not familiar with it, Mr Wing, I am sorry.

Mr WING - That was the one that succeeded in cleaning up the Thames River. There would have been similar considerations there.

Mr GADD - Yes, and as I said, if you look at our examples in the Derwent Estuary Program, what we've achieved is phenomenal. We have managed to address a lot of issues; whales are returning to the Derwent, the water quality is pretty good and you can swim at most of the beaches all year around. That's a completely different story to 10 years ago. We didn't need an authority to do that; slowly we have been bringing all the stakeholders on board and what we're finding now is that they're actually motivated to be part of it. They all recognise the benefits of being part of it. That's a win-win and it makes my life much easier to drive those outcomes in that way than having to take the big-stick approach.

Mr DEAN - I wish we could say the same about the Tamar but in the last 10 years it has become worse, if anything.

Mr GADD - True, but we're onto it now so hopefully in 10 years' time we'll be having this discussion and saying that thanks to all of our efforts things are looking better.

Ms O'BYRNE - The end point is that we want the river to be better than it currently is but in order to do that we need to understand why the river is like it is. That's the key thing we need to do. Once that's done it may be that there is a very clear answer as to what any future authority, management group or cooperative might be required to do. Isn't the problem that we still actually haven't reached the stage yet of understanding the nature of the causes for those issues? I know that we are working very closely towards it and once we understand the causes we can then plot a path forward which might end up suggesting we need a governing body that has a very large capacity for power and authority, or that there is a great opportunity for collaboration to continue with this work, or it might be something that we haven't considered yet. Isn't the problem that we still haven't reached that point?

CHAIR - I want to ask a question of Mr Gadd in respect of similarities that you might see in the work that was started 10 years ago with the Derwent and the issues that we have in the Tamar River. Can you make a comparison between the two?

Mr GADD - Obviously they're different and I think the main issues are different. Your main issue is that Launceston has technically been developed on a flood plain, a lot of which historically was a swamp. Hobart is not in that category and the siltation issues therefore

are far more significant than we've ever seen in the Derwent. Pollution was the big issue in the Derwent and you have that in the Tamar as well. At the end of the day, I'd argue the framework for dealing with any of the problems that we've developed in the Derwent Estuary Program is a good one and I think it has the capacity to deal with your issues in the Tamar as well, albeit that they are different to those the Derwent faced 10 years ago. Some are similar but the main ones are different.

CHAIR - Can I ask about the Government's commitment to the TEER program? You've heard already that we respect and acknowledge the good work of TEER in its establishment, but what's the Government's commitment to the maturity of this program for our community?

Mr GADD - The initial funding was to cover our project officer for a two-year period. We topped that up last Budget.

Ms O'BYRNE - Yes, it was \$150 000 in that last Budget.

Mr GADD - Yes. In the current climate it's a bit harder for me to commit to a set level of funding going forward but there's no doubt the Government is committed to the program.

Ms O'BYRNE - Yes, you can be sure that I'm committed to the program continuing.

CHAIR - But you have to argue that through Cabinet and through the budget process.

Ms O'BYRNE - There's always capacity within the department for some degree of flexibility but the Government has remained very committed to save this river. I think there is a substantial shift in understanding that it's not just about dredging and that our financial support shouldn't just be about supplementing the dredging program. That's an important part of maintaining our waterways as they currently are but it is about understanding the future point from here.

CHAIR - I get a cautionary note from both your answers in respect to the future of TEER. Can you give me some more assurance?

Mr GADD - Okay, an example might be that one of the things we did was commit to a work plan for four years. We have that and we are working to this four-year plan. It's just that in the current environment, Mr Finch, as you'd appreciate it's impossible for me to say we're going to commit \$150 000 for four years because that might change next week, but there's no doubt we're committed to it and we'll find the resources to support it. We've been in the Derwent Estuary Program for some 10-plus years. Our commitment is not as significant as it used to be because industry partners and others have come on board and are contributing financially.

At the moment, only our body and NRM North support TEER but over time I would imagine we will bring on board more stakeholders who will want to be part of it and will share the burden with us. There is no doubt that the commitment is there for the long haul. We cannot start this and get a couple of reports, put them on the shelf and walk away because we will all be on a hiding to nothing.

Ms O'BYRNE - It has also been a problem that we have recognised. It is about moving forward and moving this debate and the issue forward.

CHAIR - What is the commitment now of the State Government to the Derwent program? You say you have your corporates, other stakeholders, but what would be the extent of the Government's commitment to the project 10 years down the track? You can take that on notice.

Mr GADD - We will take that on notice. I think it is in the order of \$50 000 to \$100 000. It varies because we provide both services through our laboratory, Analytical Services Tasmania which does a lot of the testing and, subject to what programs and research is happening, we tend to provide those services for free to both the Derwent Estuary Program and the Tamar. I think direct cash is somewhere between \$50 000 and \$100 000 to Derwent and they may receive up to another \$150 000 in in-kind support. As well as the cash we give Tamar, they also receive similar levels of support through the laboratory.

Ms O'BYRNE - They also had different projects going on at different times which or may not have a component of State government funding in them.

Mr GADD - Certainly the cash contribution to the Tamar has been greater than the Derwent in the last couple of years to get it up and running.

CHAIR - My understanding is that you want us to draw some confidence about the future of TEER.

Mr GADD - Absolutely.

CHAIR - That it is going to be a long running program rather than a suck-it-and-see situation.

Mr GADD - It may well need to evolve over time. It may well evolve as a result of the outcomes of this inquiry, who knows, but I think we have to have an open mind about that. In terms of the work program and what needs to be done the commitment is there, but if somebody comes along and says there is a better way then we would consider that at the time and take that on. We all remain committed to the plan that is being set.

Mr WING - Can I ask what arrangements or agreements are in place between the Launceston City Council and the government instruments such as Hydro or Department of Primary Industries and Water relating to the management of the Tamar and Esk systems?

Ms O'BYRNE - We can get some of that information but somebody may need to take it on notice. I know there is a current project about the surface water monitoring with Hydro in partnership.

Mr GADD - The Hydro is a member of the TEER program at this stage as are DPIW. Forestry Tasmania is a member of one of the advisory committees to TEER, as is Parks, so we have linked them all in through that mechanism. Hydro is undertaking a separate study with the Launceston Council in relation to water flows at the moment.

Ms O'BYRNE - Hopefully it will also give us a picture of impacts of flooding.

Mr GADD - I would like to clarify my comments in that local government also contributed \$60 000 to TEER so I sold them a bit short in my answer.

Mr WING - Thank you.

Does the Government have any strategies to deal with the siltation problem in the Tamar and whose responsibility is the problem of siltation in the estuary?

Ms O'BYRNE - In a sense that is what we are doing as TEER's role currently is trying to gain the picture. The Launceston City Council has an independent study, the Upper Tamar River sediment evaluation study, which is investigating the proposed dredging and management options. They are addressing the accumulation of sediment in the river. GHD were engaged to do the first part of that study, the identification of community values and mitigation measures on siltation of the Tamar River. There was community consultation in the September-October period and those results were released as a stakeholder engagement outcome paper before Christmas, I think from memory.

The main findings of that were that the community thinks that siltation is one of the major impacts on the Tamar River. They thought that was a more important issue than pollution and the image of the river. Mitigation measures for siltation included catchment management and dredging. The weir raised its head again as we always expected it would and also changes to the Trevallyn Dam flow regime. There is, as I understand it, further work going into the study to review the silt management strategies for the Upper Tamar. UTRIA committed \$120 000 for that study and the State Government contributed \$100 000. NRM North, through TEER, are developing a sediment model to determine the volume processes, the cause and the fate of sediment entering the Tamar estuary from the upper catchment river system. Essentially, we know that there is sediment there but we are not quite sure how long certain parts have been there and where the source may be so it is hoped that will give us a lot of source data around that. The Australian Government committed \$260 000 for that.

There is the Tamar estuary hydro dynamic model which is being developed by the Launceston City Council, and that is with the assistance from Hydro, to simulate sediment transport and tidal movements. That will link closely with the sediment model that we talked about and the outcomes of both of those, I think, will be what we then use to create a plan to reduce sediment input into the Tamar. So at the moment we are trying to pull together the existing data and this new data to work out what it is we are dealing with because we have only ever dealt with bits of the problem in isolation in the past.

I think this is a significant move forward, that we are trying to pull it together so that we know what we are dealing with. A lot of the questions that this committee is looking at may become self-evident once we know the nature and causes of the problem.

Mr LOCKE - The Government is also committed to provide funding for dredging of \$250 000 a year indexed at 2006 prices. In effect the arrangement is, and you will remember from the discussions that we had, that there is \$150 000 which is, in a sense, allocated to maintenance of the levees and there is \$250 000 allocated notionally, in a

sense, to the dredging. So that comes to \$400 000. But the arrangement was that if in particular years there is a greater call for funding on dredging then it was not necessarily a bucket of \$400 000 that should be divided up \$250 000 and \$150 000, it could be \$300 000 for dredging and \$100 000 for levee maintenance, depending upon the priorities of the authority at the time.

Mr WING - There certainly is a critical situation as far as siltation is concerned. It is getting to almost the unmanageable stage. The channel is narrowing and it is a visual pollution of enormity.

Mr LOCKE - I know. I am just pointing out the Government's financial commitment to the dredging.

Mr WING - Whose responsibility is it mainly to deal with the siltation problem?

Ms O'BYRNE - Within the flood plain area itself?

Mr WING - The problem that is there now.

Ms O'BYRNE - Do you mean where boats are at the moment when you can see the silt?

Mr WING - Yes. Whose main responsibility is it to deal with the problem as it exists?

Ms O'BYRNE - We support council in their management of the sedimentation issue but it is clear that the reason that we are not managing it properly is that we do not know what the source of it is and how to manage that, and that is why we are engaging in trying to get a proper picture of what causes it. Yes, I support dredging because it does manage the immediate problem in front of us and there is no doubt that needs to occur and we will support council in its role with that and I know that they have also called on Federal Government assistance in the past for that as well. But we do not understand where it is coming from and until we deal with that, we are always going to have an issue and just continue to dredge.

Mr DEAN - But shouldn't it be the other way around, the council supporting the State Government? Isn't the siltation in the Tamar River and around the boating area and the yachting club area and so on a State Government responsibility and not local government? That is one of the problems we have.

Ms O'BYRNE - Mr Dean, it would be easy to say it is somebody's responsibility and someone is responsible. We are trying to work collaboratively and say we all have an engagement and a role in this, and I think the problem has always been that it has been so-and-so's problem. We want to work collaboratively.

Mr WING - Exactly, and nobody particularly.

Ms O'BYRNE - One of the main points of TEER is that we want to bring people collaboratively to the table, understand what the problem is and then be able to say, 'Quite clearly, these are the mechanisms that we need to deal with and it is not just dredging', although I think dredging will always be a feature. But it will also be that we

need to manage the issues at the point where siltation is occurring and it is not always occurring only in the flood basin.

Mr DEAN - It is not likely to change, though, is it? That attitude and that view on that position is not likely to change while we have this whole heap of authorities and people involved and councils involved in this situation?

Mr GADD - Not without a good argument.

Mr DEAN - In fact they go into double figures, don't they? I think we were given a number at one stage of the authorities and people who have some say and some responsibility for that area and it is well into double figures. I think there are 20-something.

Ms O'BYRNE - But that is not unusual for any catchment that there would be a raft of people who have a level of engagement and control of certain aspects. What TEER is trying to do, and what I think we are currently supporting, is bringing all of those players together. But what I have said is that we have not made a decision as a government about what we think an entity might look like. We are going to listen to the findings of this inquiry but I think a lot of that will probably also be fed from what we get as the final outcome of an understanding of the nature of the causes. It might be that that clearly defines something; it might mean it defines something that we have not even thought of.

Mr DEAN - We have had here today statements being made by you as to whose responsibility it is. So there is no acceptance of whose responsibility it is to clean the river.

Ms O'BYRNE - I think it is a collaborative response.

Mr GADD - We have already accepted responsibility by initiating the TEER program in recognition of the problem. The bottom line is I am not going to convince anyone without understanding fully and clearly what the problem is and then having a solution to it. I cannot go and argue for budgets. If I go and argue for budgets for what might be a solution or what might be a problem, it is not going to happen. I am never going to be able to convince all the landowners and all the various authorities unless I have a clear picture of what needs to be done. When we have that then we can go and talk. Then we will know if there is going to be a cooperative approach or whether we need the big stick. I suspect we can do it cooperatively. But without having the understanding and the foundation of knowledge, I have no hope of convincing anyone of anything, and that has been the problem until now. It has been an ad hoc spurious approach and we have not had a collective fight. We are actually trying to bring that together now. The question of whether you need the big stick or the authority I think is still out there. But at the end of the day we cannot wait for that. We just need to get on and do that base work - which is happening right now - and we will continue that.

Mr DEAN - I think you agree, don't you, up until now nothing really has happened to fix this problem?

Ms O'BYRNE - Things have happened.

Mr GADD - I would not agree with that. Things have happened, it is just that it has not been strategic and it has not been coordinated. A lot of money has been spent and a lot of silt has already been dredged over many years - recognition by the State Government that they have a responsibility here. The problem is that we have never had the resources to sit down and understand whether we are actually making a difference or not. We can look back now and say we probably have not made much of a difference. Perhaps it is time to do it differently. That is what we are trying to do: get a scientific basis for how we go forward. You have all been very supportive of that approach and remain so. At the end of the day, without that information, we are in the dark really.

CHAIR - One of the examples that stands out to me is, if there is a log in the Tamar River whose responsibility is that log in the river?

Mr GADD - There is a marine authority that obviously looks after navigation channels.

CHAIR - Yes, and they will hand it over to Parks and Wildlife.

Mr GADD - I was going to say, Mr Finch, regardless of who is responsible, I guarantee it will be the Parks and Wildlife Service that goes and retrieves it when it becomes an issue.

Laughter.

Mr WING - I appreciate the studies that are being undertaken but the fact is that at this very moment the upper reaches of the Tamar River are full of silt. Who is mainly responsible for removing and dealing with that problem now?

Mr GADD - We need to know who put it there or where it came from.

Mr WING - It is there, irrespective of who put it there. Who is responsible for removing it?

Mr GADD - If we understand where it is coming from then we might be able to ascertain who might be responsible for stopping it getting there, if it is private land.

Mr WING - That is one thing but who is responsible for what is there at the moment, for dealing with it and removing it?

Mr GADD - If it is not a navigation channel, I suspect it would come back to the local authority, being the local government.

Mr WING - Why? It all comes from outside the local authority's boundaries.

Ms O'BYRNE - Is that not the point - that we do not actually know the source and until we know the source, we cannot then empower or require in whatever you do to manage that?

Mr GADD - The Government is not backing away from any responsibility here. We continue to be proactive in this phase and we will continue to work with all of the councils, even the ones that are not at the table yet, to see if we can get there. So it is not as though we are saying we do not have a responsibility, we are accepting that we do have part of the responsibility, it is just not clear who else does.

Mr WING - You are not accepting that you have the main responsibility as the State Government and I would have thought that of all the information available at this stage without further inquiry, it would be obvious that the bulk of the silt has come from outside the city council boundaries and been dumped within the boundaries so it is not reasonable for the city council to have any significant responsibility.

Mr GADD - I guess those other councils could argue that somebody way back when made a decision to build there and that really adequate infrastructure should probably have been put in and considered around the time of development and subsequent developments. That has been a failing, I guess, of the local Launceston authority, in that sense, historically. So in some sense perhaps the burden should be there as well.

Mr DEAN - Mr Chairman, that is the problem that we will have, that the local government authority that is now set up under the Local Government Act will be the whipping boys when it comes to the siltation in the river, not the State Government where the responsibility should lie. Without a single statutory it is pushed all around.

Mr GADD - That has not been the case in the south and it is not the approach we are taking in the north. We are not out there whipping Launceston City Council; we are going hand in hand with them.

Mr WING - My submission is you shouldn't be just going hand in hand with them. The State Government should be showing the main leadership and providing the bulk of the funding.

Ms O'BYRNE - I think that the establishment of TEER and the work we are doing with TEER is showing that we are taking a leadership role and our responsibilities. A lot of the longer-term solutions are about getting the investigation point right. I accept that there are immediate issues that need to be dealt with on a day-to-day basis. I think the problem is that is all we have ever dealt with are the immediate issues, thinking about who might be responsible for fixing things. Once we know the source not only can we deal with the immediate issues but we can also have a longer-term agenda to manage this input and the impact throughout the entire catchment. When we know that I think it will demonstrate what sort of management structure might be needed in order to do that.

I am not saying that a big stick authority is not it. I have a personal view of collaboration but it might be that the collaborative model is not appropriate. It has worked though extremely successfully for the Derwent Estuary as a Tasmania model.

Mr WING - Isn't it obvious that the extent of the funding provided by the State Government has not been anywhere near sufficient to control reasonably the build-up of silt which is continuing now? It is a token amount compared to what is needed.

Mr GADD - Without understanding how the silt moves, how do we know how much we need to spend to get rid of it? Historically we have been moving silt around that estuary, I would suggest, and the tides have been bringing it back up. How long is a piece of string? If we had applied that in a more strategic fashion and had had some foundation knowledge to support how and where we dredged and what we did with it, then we might have been able to do it for less.

Mr WING - You only have to look back to when the PLA maintained an effective dredging system, rowing events were held there, competitions. You would not think of doing that now. That was effective in maintaining a reasonable channel and avoiding the eyesore, the visual impact that occurs now. It is an enormous problem and token amounts of money have been used. Whatever the source of the problem, the big problem is that it exists.

Ms O'BYRNE - Sorry, Don, you say it is an enormous problem and we are tokenistic in our response. What we have said is that -

Mr WING - Financially.

Ms O'BYRNE - It is not justified. The reality is that we could continue to dredge - we could put lots of money into dredging. The key thing that we are doing now is identifying the source. If we identify the source it might change the entire way that we approach the river. It might change how we dredge or where we dredge. It might change a whole host of things about land management and land usage. That is what we need to understand if we are going to change the final outcome of the state of the river. We will continue to work to improve the state and health of the river but I think that the problem we have had is that we have done things on a piecemeal basis; we need to get together and do it properly. Whether or not that requires a statutory body, let us wait and see but you know my views - that I prefer the collaborative model. It has worked in the Derwent. Let us at least get the data and know where and what we are dealing with so we can do this properly, rather than responding when the issue becomes prevalent.

The reality is it is an ongoing issue. We are probably going to find that there is a host of natural forming sediments that we need to be aware of because there may be anthropogenic impacts that we need to deal with.

Mr WING - When is it likely that these investigations will be completed?

Mr McKEE - The sediment modelling from upstream will be finished at the end of May and the Launceston City Council one I believe is before council so it has been drafted and it has been completed. By the end of June we expect to have the results of the two studies in order to put them together. They have been working in collaboration to some degree and we will be able to make some assessment about where to from here with those.

Mr WING - Can we assume that the State Government will then make some decision on the adequacy of funding and what action should be taken?

Ms O'BYRNE - We will be responding to the data that we get from that, as I am sure that you will be responding as a committee as the information presented to you changes as well.

The key is that I do not think that we should be racing into a decision now when we are very close to getting some really good empirical data that might allow us to manage the ongoing health of the river. As to what the model looks like, I do not know.

CHAIR - Can I just get some clarification, Minister? Will that be through NRM or through the TEER program?

Mr McKEE - The project is through the TEER program.

CHAIR - Yes.

Mr McKEE - NRM North is obviously supporting that -

Ms O'BYRNE - A partner in a sense.

Mr McKEE - A partner in that project.

Mr DEAN - Does the Federal Government have a role in this? What has the State Government done in relation to the Federal Government, what applications have been made to them for further funding and assistance in moving forward with the Tamar River difficulties and problems?

Ms O'BYRNE - They gave \$260 000 for the 'State of The Tamar' report and also for development of a settlement model that it's currently being undertaken. That goes back to whether we all need to contribute to the solution on this one.

Mr GADD - We are actively seeking further grants from various sources, mainly Commonwealth government sources, at the moment.

Mr DEAN - For what?

Mr GADD - A range of initiatives, all within the four-year plan. We always have our eye open for those opportunities. In fact, the Derwent Estuary Program has been very good - they've been able to leverage millions of dollars into the system, something like 10 to one, compared to our contributions.

Mr DEAN - Right. With all of the organisations that have had a role in the Tamar River, whatever they might be, what is the total government expenditure on all of those organisations?

Ms O'BYRNE - I'd like to take that on notice to be sure because I'd have to do a calculation of the Parks' engagement as management conservation. We can pull something together that indicates the broader picture.

CHAIR - Minister, we appreciate very much the answers that you have given. I am curious as to your time constraints -

Ms O'BYRNE - I am happy to continue.

CHAIR - I am curious about catchment management authorities such as in Victoria, New South Wales and South Australia. Has there been any investigation by TEER or by the Government into how they manage their situation and what comparisons we might be able to draw with what we're looking to investigate?

Mr McKEE - Certainly some of those models change regularly and they're all very different models. For example, in Victoria and particularly New South Wales you have bodies which have both statutory and regulatory responsibilities. There are one or two in Victoria that have flood protection roles but they're fairly few and far between.

Mr WING - Which are they?

Mr McKEE - I think West Gippsland CMA. I may have to correct that but it's one of the Gippsland CMAs. When you go somewhere like South Australia, it's a very different model where you have levies from land managers supporting the CMA process. They're statutory but that they have only minimal regulatory responsibilities. Queensland has a completely different system that has no statutory or regulatory responsibility.

The simple answer is we have looked at those different models and in particular the Moreton Bay partnership in south-east Queensland which is effectively addressing the same issues we're facing in the Tamar, by and large, maybe not quite the same siltation issues. It has become one of our primary mentors in developing the TEER program. That's been one of the most successful voluntary, collaborative approaches around Australia where they've not only leveraged millions each year but have brought together significant other authorities in that collaborative approach. As I say, the TEER program is using those and the CMA process in Queensland as one of our mentors for the TEER program.

CHAIR - Is there any evidence, with this understanding you have with other authorities, that there might be some cost savings if we did have a single statutory authority that looked after the Tamar Estuary and the Esk Rivers?

Mr McKEE - I couldn't answer that.

Mr GADD - It's difficult to get cost savings. If you take my department, for example, and say the authority's going to take responsibility for all reserve and land management in the area, that doesn't mean I can immediately lose all those staff because they all have other responsibilities and do other things and I certainly cannot get rid of the internal support structures, such as corporate services and HR, my office, for example. I still have to be there regardless of whether they are or not.

Mr WING - We want you to hang in there.

Laughter.

Mr GADD - The logic would dictate perhaps there are savings but the reality is when you start to unravel all the various authorities and mechanisms, often there is not. I can speak from experience when we established this department. It is an impossible thing to do in a cost-neutral manner.

Mr DEAN - What is your perception or view or belief of the role of the new local government authority that has been set up, the flood authority? What is your position on their role and what they are responsible for?

Mr GADD - My understanding is they are responsible for the levees, the redevelopment of the levees.

Mr LOCKE - That is right, and for educating the local people about the risks of flood and to review and make sure that the emergency management procedures are up to date.

Mr DEAN - With no responsibility for the siltation?

Mr GADD - They are responsible for the dredging only.

Mr LOCKE - They are responsible for the dredging.

Mr GADD - They are currently managing our response to the silt.

Mr DEAN - So they take over the role of UTRIA, as it was?

Mr GADD - Yes, I believe that is the case.

Mr LOCKE - I think it is helpful to remember that in response to the flood issues in Launceston, the Government and the council developed an integrated package of measures, part of which was the funding towards the levees themselves and, of course, the Commonwealth Government is chipping in \$30 million to that as well, as you are aware. Part of it is the amendments to the Land Use Planning Scheme to prevent the build-up of future damage in the event of a flood and part of it was the establishment of this body, in a sense at arm's length from the council, responsible for the tasks of building the levees and also maintaining them. In particular, it was agreed by the council that there would be a funding arrangement put in between the council and the authority that would ensure that there are always sufficient funds for the maintenance of the levees because the history, we have found around the world, is that there are often funds available to build the levees but then they are not maintained properly and then the risk of flooding is increased because of inadequate maintenance. So part of the structure that was established was to ensure that there would be ongoing funding guaranteed to maintain the levees and to minimise the risk of flooding into the future. So it was part of the whole package of measures, including also updating the emergency plans we currently receive from the council, 500 pages of new emergency management plans in place, again to minimise the risk of damage and possible death in the event of a flood.

Mr WING - There is no visible evidence of the new flood authority doing any work that I have seen to strengthen some of the weaker parts of the levees in the Launceston area. What is the perception of the Government and the departments of the effectiveness in the way that the flood authority is performing?

Ms O'BYRNE - I understand the council are responsible for managing the authority.

Mr LOCKE - That is right. To explain, the conditions for the funding to be drawn down for the building of the levees have not yet been satisfied.

Mr WING - What are the main ones there?

Mr LOCKE - One of the conditions was to submit to the RPDC amendments to the planning scheme that reflected the agreed measures. The other one is to have emergency management plans and KPIs established which the SES, the State Emergency Service, is comfortable with. Once they have been ticked off then the funding can be drawn down. So at this stage we are still waiting. The amendments are fine; that has all been done. In fact last week we were with the RPDC going through them. But it is KPIs and the emergency management plans, just to have those ticked off. Once that has happened then the funding can be released.

So at this stage effectively all the preparatory work that is being done is being done by the council, it has not been transferred over, but the State did also commit to provide \$750 000 over two years to assist with this preparatory work. A lot of that funding has been used for some of the design work, which is in train, but that is being handled by the council under Geoff Brayford because they haven't yet got the bulk of the funding.

Mr WING - There are certain parts of the levees that are obviously weak. The mud wall is one. If work was done to strengthen them that would give protection to the City of Launceston for a moderate flood, where the protection is not available now due to the weakness in some sections. Do you feel the flood authority is taking appropriate action in this or other respects?

Mr LOCKE - At this stage the responsibility for these things is remaining with the council.

Mr WING - Is the Government monitoring this in any way? Would it like to see some activity in bolstering to give some protection for a moderate flood?

Mr LOCKE - You should remember that the position of the Government has been that ultimately the management of the flood risk is the council's responsibility. The Government has been very keen to contribute and work closely with the council to develop these packages and has sought Commonwealth funding but at the end of the day insofar as it affects the Launceston area it does become an issue for the local council.

Mr WING - I know that the Treasury attitude is that the prevention of flooding is the council's responsibility and I want to suggest that it ought not to be, that it ought to be the State Government's responsibility mainly because the flood waters all come from outside the city. How do you justify that attitude, that it's the council's main responsibility, other than by forcing the council in the agreement to accept that responsibility?

Mr LOCKE - I am happy to provide evidence, but that is an opinion. I am not prepared to offer an opinion, except that the Government has worked closely with the council to address the issues that are there.

Mr WING - I'm sorry, but you did offer the opinion that it was the council's main responsibility. That's what I am challenging.

Ms O'BYRNE - No, he didn't say that. He said that at this stage the Government interacts with council as being responsible for that.

Mr WING - We can check the *Hansard*, but I am pretty sure you said it was the council's main responsibility for the flood protection.

Ms O'BYRNE - I don't think he was saying it as an opinion, though, he was saying in terms of our relationship with them now that is how it's done.

Mr WING - Oh yes, I understand that and I am challenging that.

Mr LOCKE - What I am really doing is reflecting the position that I am sure you heard at our steering committee meetings. The position maybe of the department is that we see this as primarily the responsibility of the local council, but we have been working with them.

Mr WING - Why do you see that as the main responsibility of the local council?

Mr GADD - I guess because councils are responsible for approving developments within their own municipality and are technically responsible for the supply, infrastructure and services. It comes back to what I said before: it is a bit hard to argue from outside the municipality that they might be responsible for decisions that they were not part of. It is not clear-cut, I think. It could be one or the other or a mixture but it is very difficult to just say that because the waters come from outside they are someone else's responsibility. Ultimately those other players, including the State Government, weren't privy to decisions about where development was allowed to occur as Launceston evolved.

Mr WING - In 1960 the then State Government clearly believed that the State Government had the major responsibility because it provided 60 per cent of the funding for the Launceston flood levees and the council was required to provide only 30 per cent.

Ms O'BYRNE - Mr Wing, are you saying that the level of responsibility is tagged to the level of financial support? Is that the argument you are making, that because they gave 60 per cent of the funding in the time of the 1960s flood that meant that they were assuming bulk responsibility?

Mr WING - I think they did at that time and the State Government was the level of government that showed the leadership and provided the majority of the funding. The point I am making is that that is not happening now and I think it should be happening now to the same extent as it did in 1960.

Mr DEAN - Indeed there was legislation in place which required the State Government and gave them the total, absolute responsibility for maintaining the levee structure in Launceston.

Ms O'BYRNE - I was just trying to get the correlation between funding and responsibility.

Mr GADD - The Government is still providing the bulk of the funding and has been for many years. We can argue whether in fact it is effective or perhaps even ill-placed but we have definitely been the lead player in terms of what money has been spent in history.

Ms O'BYRNE - We are taking a leadership in terms of trying to identify the longer-term issues of how we move forward.

Mr WING - With respect, that is not so, because under the agreement reached between the State Government and the Launceston City Council - forced on the city council last year - the State Government, the city council, the Federal Government each provide one-third. The ratepayers of Launceston are providing just as much as the State Government, whereas in 1960, they provided 30 per cent and the State Government provided 60 per cent - double the amount.

Ms O'BYRNE - But that is not there in the expenditure.

Mr GADD - There is all the money that we have contributed to the TEER program on top of that, plus everything else. My department and other departments that do not can also be added on top of that. So we are still very much the lead player in terms of finances being spent on the health and wellbeing of the estuary.

Mr WING - What is the total amount that has been spent by government?

Mr GADD - We would have to take that on notice because I cannot comment on that.

Ms O'BYRNE - Mr Dean has already asked that question and we have already said that we will provide that on notice. It will take a little while. We do need to go to a number of departments because a whole host of areas provide funding through different mechanisms.

CHAIR - Thanks, Mr Wing. I realise that there are time constraints for you, Minister. Just in closing in respect of your presence here today, you have mentioned the weir with a wry smile before. I am wondering where that factors in as far as your interest in the solutions for the Tamar are concerned.

Ms O'BYRNE - I am very much looking forward to seeing the data that is provided by TEER. I think that is going to take us to a new level of understanding about what might work. I think there are a whole host of measures that have been suggested over the years and they have been suggested in good faith by people who have a great passion and commitment for those areas.

I think we might see a whole raft of different suggestions now once we get the data of where things occur. There are some issues that we see raised regularly, there are some that come out less regularly. As to their worth, I think we will get a far better understanding of that come June when we get the final data or the research data that we have commissioned and be able to make a decision then about what clearly would be the pathway forward. I expect there to be a lot of people who will take a great interest in the data and pursue forward with it.

Mr DEAN - Minister, it is the view of a number of people that a single statutory authority, properly resourced, properly financed or reasonably financed, would have the ability to speed up all of these processes that we are currently looking at and with some control over the river and where we are going, the cleaning up of the siltation and so on, that that would be a much smoother way, a much quicker way of putting everything into place to actually do something. Do you have a comment to make in relation to that?

Ms O'BYRNE - Probably two points. One is that I am yet to be convinced that a stick authority works far better than a collaborative one. I think if you are requiring players to be at a table that they don't want to be at, they can always find ways to slow it down. The other issue is that a statutory authority would then need also the power to bypass other statutory authorities and other requirements of acts. I am not quite sure how that could work.

My point is, though, that whilst I have yet to be convinced of that particular model as being the one, it may be that that becomes clearly the model at the end of the research data that occurs. I like the way the Derwent project has worked. I think that bringing those players to the table has meant that whilst there probably was a bit of, 'Okay, I really should be there and I'll sit at the table because I must', they have evolved through that process to be really intrinsically valuable, creative players about where they may go forward. I think that has been a model that has really worked for the Derwent. It is one that I like. It may be, though, that this committee presents a different model that manages to convince me otherwise. It may be that the research that we get provides an alternative that we have not yet considered and I think a lot of that will be the proof of the pudding come June.

CHAIR - Is that your closing statement, Minister?

Ms O'BYRNE - It can be if you wish it to be. I am very worried about the way I am going to be treated at the waste water treatment plant.

I thank the committee very much for allowing us to make the submission and the nature of the questions. I also thank the officers who have made themselves available today because I know that they all have great concern about and commitment to this area and issue as well.

CHAIR - We appreciate it very much. Minister, thank you very much.

A question I would ask you, Alan, is in respect of the water that comes down from the catchments into the Tamar estuary and the impact of that; just a broad picture of the Meander Dam impact on what comes down through into the Tamar estuary and how the approval of dams process is managed in the catchment areas that might in fact have an effect of not allowing as much water as would normally come down during a flood time into the Tamar estuary. Can you tell me about some of those impacts that might be occurring in catchment areas that might mitigate more water during flood time?

Mr HARRADINE - Yes. It is a very wide-ranging question. I think as an opening statement I should say that hydrologically, historically this is, more water comes down the South Esk in a year than is ever likely to be dented by dams in the catchment. The Meander Dam, for example, is a dam that takes a maximum of 45 000 megalitres out of the catchment that has an annual flow of more than 300 000 megalitres so while it does have a local impact at certain times of the year on low to medium floods, it was never deemed to have any flood mitigation capacity for the major floods that come down through the Meander. I think that was clearly demonstrated last year when the dam filled up for the first time. It filled up very quickly, it sat there full, and every flood that came through after that, notwithstanding it was a fairly dry year, simply went over the top of the dam and moved down.

The South Esk system, the South Esk River itself, has even greater hydrological capacity than the Meander. I think the flows there are something like 800 000 megalitres a year on average. I think we have done investigations of the number of dam proposals in that catchment. I think the biggest physically possible dam is about a 125 000-megalitre dam which floods the road and everything else but, from a purely engineering point of view, that would be feasible but again, from a flood mitigation viewpoint, that would take about an eighth of the water that would flow down the catchment in any one year. I guess I am trying to get across the message that while we have a lot of dam building going on in the catchment by many, the Irrigation Development Board is looking at a number of opportunities in the catchment for dams and storage, unless there is a severe reduction in catchment flows due to climate change over future years then those dams are unlikely to have a significant impact on flows into the estuary.

In terms of the dam permits process, basically there is a statutory authority called the Assessment Committee for Dam Construction that approves dam works. Basically that authority has to take into account environmental issues related to dams but also dam safety issues and Aboriginal heritage and the broader environmental issues.

CHAIR - Do they look at issues of run-off and silt that might come further down from the catchment areas?

Mr HARRADINE - They have done in some instances. There was some concern about the impact of the Meander Dam on silt, both for and against its silt capacity stopping. There is no doubt that those dams do stop silt. I guess the argument is how much silt goes over a dam when a flood goes through. The best information we could get is that certainly when the dam is not full, any flood that comes down and carries silt with it will deposit that silt in the dam. Quite simply, it does not move past there and the dam silts up. When you get a significant flood coming through the dam what happens is that if the dam is full, the flood hits the water at the back of the dam - and this is looking at a large dam like Meander, for example, so the back of the lake is a considerable distance from the dam - and does not just skate across the top of the water that is there and move over the top, it basically hits the back of the water body, that slows it down and a lot of the silt that is in there drops out. Basically the flood wave goes through the water and the water is pushed over the front. So even when the dam is full it does have a significant capacity to stop silt.

CHAIR - Are you saying that the flood does not scar the bottom of the dam?

Mr HARRADINE - That is correct. Over time dams will silt up and there was some concern given the fact that the catchment above the Meander Dam is prone to landslides and the Dunning Rivulet landslip of 10 years ago now was I guess a classic example of what can happen in the catchment. There were calculations done because obviously it was no use building a dam that was going to silt up. My recollection was that even with that capacity of silt coming down, the amount of silt that would deposit in the dam would not provide a risk in the medium term of filling the dam with silt. Notwithstanding that, there is some capacity for scouring silt out of the bottoms of dams by opening the valves fully out but it is certainly not something that you would necessarily use to routinely clean silt out of a dam.

CHAIR - Alan, there has been some suggestion too that a series of dams be built on the North Esk River to try to mitigate that flow of silt down. Can you tell us anything about that?

Mr HARRADINE - I have not seen any proposals along those lines. I have not heard of any significant dam proposals in the North Esk system other than the dam on the St Patricks River that has been mooted for some time for water supply issues. I have not heard of proposals for a series of dams in the North Esk to stop silt.

CHAIR - Would it do that, if you put a series of dams on the North Esk?

Mr HARRADINE - It certainly could, depending on the size of the dams. Certainly there is some capacity to stop floods when they are smaller floods and the dams are not full. But, as I say, there is still a significant capacity to slow down the flow of water and what happens when the flow slows down is that the bigger particles obviously will still drop out of suspension. So even slowing down the water can have a significant impact on the amount of silt moving down the river. What tends to happen through dams is that the water going over the spillway will still look dirty but it would be mostly the smaller particles that are well held in suspension, while the bigger particles have dropped out at the back of the dam when the water starts to slow down. So it may well have some mitigation properties.

I would suspect that environmentally dams on the North Esk River would be -

Mr GADD - Challenging?

Mr HARRADINE - challenging, thank you.

Laughter.

Mr WING - Why is that?

Mr GADD - Think of the environmental issues. It is one thing if what we are worried about is silt, but we need water flows to maintain the habitat and ecosystems within the river systems to maintain their health. If we were going to dam it to effectively stop silt, potentially you might have to stop water and then there is a massive environmental cost which would have to be weighed against the social benefit of what you were trying to achieve.

Mr WING - A similar effect to the proposal to have a weir on the Tamar. It might solve one problem but cause several others?

Mr HARRADINE - Yes, and interestingly enough, one of the issues with the Meander Dam was a threatened plant species that grows along the river bank down below the dam. One of the impacts of larger dams like that is that they stop silt, which in some ways is a potentially good thing, but when floods go river they scour the river bank and they cause a lot of erosion of the river bank. As the flood recedes and slows down and the water goes through it, a lot of that scouring is replaced by silt dropping out and going back into those areas. So it naturally replaces itself.

Mr WING - That would be on the bed of the river, wouldn't it, rather than on the banks?

Mr HARRADINE - As the flood recedes it drops silt as it goes down. You can see the impacts of the flotsam and jetsam that falls out of floods on river banks. The silt is a similar sort of issue.

Mr WING - I see. Even on the river banks?

Mr HARRADINE - Yes. One of the issues with this endangered plant species was that if you got the erosion of the flood but not the replacement silt, you would erode the river bank back and back and take away the habitat of the plant. That is a significant issue with a number of dams. I know that a dam that has been proposed on the St Pauls River has a similar issue and that is, how you can pass flood flows through the dam to provide environmental requirements but also to provide some silt movement downstream to prevent this erosive power and non-replacement of silt. Whilst they may well have some silt-prevention and flood-mitigation capacity, they also can lead to significant downstream environmental issues.

Mr WING - Could I ask you about the Trevallyn Dam in particular? We have been told that most of the silt coming from the South Esk River comes at flood time and that the dam prevents silt coming in drier periods. You have said that there is usually a build-up of silt behind the dam. How is that cleansed in the case of the Trevallyn Dam? Do you know what quantity of silt builds up there and how that is removed?

Mr HARRADINE - No, I don't have any information on that. All I can say is that the Trevallyn Dam is a relatively small dam in terms of the amount of water that comes down the catchments, so it is over the top quite commonly. There would be some deposition of silt. I have seen the Cataract Gorge in full flood and there is a lot of silt that still seems to be in there, so I am not sure what the capacity of the Trevallyn Dam is to stop silt. It certainly would stop some. I know Trevallyn Dam does over-top regularly because irrigators upstream can benefit from the flood flows that go over the top of Trevallyn. We have done a fair bit of work to look at the over-topping of Trevallyn and how often it occurs.

Mr DEAN - Scott, what is the position of TEER in relation to the many studies and consultants' reports on the Tamar River and siltation studies that we have available to us? I suspect you would have looked at those very closely in what you have done already. What is your view on those reports as to the information contained in them? Do you believe that they are a clear indication of where we are with the river, what is happening and the problems with it and so on?

Mr GADD - Personally, no, I am not familiar with all of those reports. From a general perspective, the first thing TEER did was look at what is already out there, what has been done. Let us not reinvent the wheel and make sure that we factor that into our considerations. James might be in a position to elaborate on that.

Mr McKEE - It is one of the reasons we have been able to do the current studies with a fairly minimal amount of money. Normally to do properly the sorts of studies we are looking at you are talking millions of dollars. Having those studies, which you are familiar with, meant that we have been able to pull them together and do this study and get some sort

of consensus about what is there, what is happening and what some of the directions may be.

Mr GADD - They are all certainly being looked at. I cannot comment as to whether some are of more value than others, no doubt they are, but everything we are aware of is being considered.

CHAIR - What is the department's assessment of the environmental health of the Tamar estuary and the Esk rivers?

Mr GADD - I would have to take that on notice because there would be a technical response to that, which I would probably need to refer to the EPA.

CHAIR - Yes, that's quite okay - just an assessment of how it is viewed in light of the Derwent authority and the way things have been mitigated in that respect, and just where we stand in respect of how much work needs to be done, how many issues there are and how much concern there is. We hear about the E.coli and the run-off from septic tanks and those sorts of things through the length and breadth of the Tamar River.

Mr DEAN - And the run-out from Ti Tree Bend.

CHAIR - Yes, so if we could have some sort of assessment.

Mr GADD - I will get you an informed answer on that because I could not give you one off the top of my head.

I can give you a view, that I think that the Derwent and Tamar environmental health issues would be similar. The sorts of issues that emerge are the same, apart from the silt. So environmentally I suspect they are probably on a par.

CHAIR - Are those environmental problems the responsibility of the new EPA or is it their area of concern that they would be overseeing or have an overview of what is occurring in the area?

Mr GADD - As a regulator they would respond to an event. That tends to be the role of the regulator. If something happens, they step in and conduct the investigation and then formulate a response or a reaction to that. It might be a prosecution or something along those lines. We would rely on the environment division staff to do the scientific work that would inform the answer to that.

CHAIR - Would there be ongoing monitoring of something like the E.coli problems? Does that come back into the province of the Launceston City Council?

Mr GADD - It does and there is ongoing monitoring. I know that because they do a lot of that through our laboratory but it is the role of the council as the local authority to do the regular sampling and make sure that those areas where people come in contact are assessed for things like E.coli and other issues.

CHAIR - That is the Launceston City Council but then the West Tamar Council would have its area of responsibility?

Mr GADD - All councils have similar responsibilities.

CHAIR - And it is defined in the river as to where their responsibilities are?

Mr GADD - That is correct, and where there are gaps in the south we have used the Derwent Estuary program to plug those gaps and that would certainly be our intention in the north too once we understand exactly what everybody is doing.

The other thing that is happening, and it happens down here, is that industry do a lot of monitoring. For example, on the Derwent we have Norske Skog that do a lot of research that informs everything we do.

I will be up at the Tamar estuary next week meeting with all the industries in Bell Bay and talking about the TEER program and starting to try to bring them into the loop because if you think about the pulp mill development, for example, a lot of research and study is currently taking place as a result of that development. All of it will be useful and relevant to what we are trying to understand so we want to try to capture all that as well, and that goes for every industry on the estuary.

CHAIR - Are you suggesting they are not in the loop now?

Mr GADD - We have only just started the program. We took a deliberate effort to get local government on board first, the next step is then industry and that is where I am headed next week. Now is the time to do that. At this stage they are informed but not on board because we have not invited them yet.

CHAIR - Thank you.

Mr DEAN - I want to go back to the single statutory authority. I think you have said that you really have an open mind at this stage and I think that is a good position to adopt until everything comes out in the wash, as it were. What would you see are any impediments to this whole process if a single statutory authority was set up, was embraced and did take over? Do you see any real difficulties in it? Do any impediments or any problems immediately come to mind? Obviously you would have looked at this closely.

Mr GADD - I think it is going to be a difficult task to define its roles and responsibilities, to be frank, because to have total power over the Tamar estuary will cut across a lot of other departments and a lot of other authorities so defining its roles and responsibilities will be a difficult task. The risk you run there is either they will be too broadly defined and you will be in ongoing conflict with other authorities and planning processes or they will be too narrowly defined, which you might argue is the current case, and therefore do not achieve your outcomes. I think that is the single biggest hurdle and it could take us quite some time to work out how it could work and how it would intermesh with all the various acts that it would have to operate under.

I guess the other impediment in the current climate would be funding. At the end of the day I think there is a general view that people probably want fewer bureaucrats not more.

Mr WING - And politicians too.

Laughter.

Mr GADD - Never, Mr Wing, never.

I think that the current global financial crisis would make things difficult in the short to medium term, but that is just my view, that is not necessarily a government view. Government priorities will always get funding. In terms of other impediments, I think at the moment we have a really good cooperative relationship happening, but not everyone is in the team and I think if you don't get them voluntarily then, as somebody made the point before, there are always ways and means to undermine things if you are of a mind to and I think there is a risk of that. There is a real risk in this case. If you try to, say, force a local government to take responsibility for an issue upstream, for example, that they don't really want to know about, there is a risk of real conflict and for it to be politicised and get bogged down in that whole issue. I think they are probably the main ones, off the top of my head.

Mr DEAN - I will reverse that. Have you also looked at what we could gain from a single statutory authority if it were set up?

Mr GADD - I haven't looked at either question, to be honest.

Mr DEAN - I thought you might have looked at that as well.

Mr GADD - No, we thought we would wait until the outcome of this committee and then we would be in a position to look at all your evidence and we'd have a very informed view then.

Mr WING - What is the role of the Environment Protection Agency in dealing with the problems in the Tamar and Esk system?

Mr GADD - It is a regulatory role so they would be reacting to an incident that may or may not happen. They would also be responsible for regulating any level 2 activity - big industry water/sewerage activity on the estuary, and that includes signing off management plans and mitigation plans as per the approval process and then monitoring those activities on an ongoing basis.

Mr WING - Mainly a responsive role rather than proactive, is it?

Mr GADD - In terms of level 2 activities it is ongoing, and proactive as well as reactive. In relation to an incident, say a sewage spill, it would be reactive. We also do regular monitoring of areas that maybe consistently do not comply or occasionally don't comply and then we work with those authorities and others over time to improve that standard. Certainly if they fall below an acceptable standard we have the authority to force action or take a prosecution.

Mr WING - I don't think the question of the health of the Tamar estuary has been asked.

Mr DEAN - I think it was asked by the chairman.

Mr GADD - I took it on notice and I will go back to the environment division and get you an informed answer.

Mr WING - Thank you.

Mr GADD - Mr Wing, we will be publishing a report card on the state of the Tamar in July.

CHAIR - Are there any closing comments from you, Scott?

Mr GADD - I would like to thank the committee for their time today and for allowing us all to come along. It makes it easier for us and I guess for you if we can all come like this. I reiterate the minister's comments that the Government does have an open mind. We are looking forward to the outcomes of this committee. I don't think it is an easy question and any decisions we take going forward will certainly be informed by your work.

CHAIR - We appreciate very much the time you have given to attend today and for being open and frank with your answers. It has been very helpful to us with our investigations.

THE WITNESSES WITHDREW.

Mr ANDREW SCANLON AND Mr DAVID JEFFREY, HYDRO TASMANIA, WERE CALLED, MADE THE STATUTORY DECLARATION AND WERE EXAMINED.

CHAIR - Thanks to you for coming and to Hydro for making you available today. Initially I would ask about your assessment of the impact Hydro has on the way that the Tamar Estuary reacts to the silt issues, to the flood issues and those things that we are concerned about with the Tamar Estuary.

Mr SCANLON - I will do the flood issue first. Essentially the Trevallyn Dam has little impact on floods. It is a small dam with a relatively small reservoir. One of the interesting features of it is that it does not really accumulate much sediment. Basically the sediment gets past because when there is a flood the whole reservoir is quite agitated and the flood waters go over the top of the dam. So medium and large floods pass the dam. The effect of the Poatina diversion is to add water, particularly during the summer and autumn months. A significant amount of water that comes through the system in the dry period is Poatina water which naturally would not have been there. It would have been flowing to the south of the State through the Ouse River. It is a major diversion on the Great Lakes scheme. It used to produce power at Waddamana. In the late 1950s, Parliament approved the Great Lakes scheme which diverted water to the north through the Poatina power station. So there is additional water in the system due to Poatina, particularly in the summer and autumn months, so to that extent there is more water around during flood periods. We do have a flood wall along Poatina - it affects more than that area. We would turn the power station off in floods.

Trevallyn itself in many ways is a modern-style dam. It has a bottom release system and it passes floodwater very well. It has a major spillway right across the top so floods themselves will not be affected. If you have a major flood in that catchment, you will not be retaining much water anywhere in our assets; it will go straight through.

CHAIR - Bottom release; explain how that works.

Mr SCANLON - We have riparian valves in the bottom of the dam so we can open those up. We have them permanently open for the environmental flow release and we can open them up for larger releases that we do occasionally for the flushing flows that we have agreed with councils to put through occasionally - and for the canoe events that we do now and again.

Mr DEAN - That is from that bottom valve and that is on the whole time?

Mr SCANLON - The environment flow valve, yes. We have set the thing at 1.5 cumecs and we have the valve open.

Mr DEAN - It has been suggested at one stage that the release valve is for the purpose of desilting the dam from time to time; is that right?

Mr SCANLON - I might not be the expert on the original design of this dam but it would have that effect when it was open. But the bigger effect wouldn't really be different. The big effect would be that the silt that accumulates in that dam, if it was accumulating much, would go through the system when there was a flood. It is a very agitated system - it is not a very big lake - so the floodwaters will take the silt with them. We

actually drained that lake in the early 1990s because we had to fix the intake structure. There is mud and silt in there but it is not a big lake. It has been there for a long time and is not filling up with silt so the stuff is being passed either through the bottom valves or by the floods. It does not trap silt in any significant amount.

Mr WING - You do not have to clean it out at all?

Mr SCANLON - No.

Mr WING - Ever.

Mr SCANLON - No; to the best of my knowledge we have never had any active silt removal in the dam itself. It would be done through the processes of water release through the bottom and flood flow over the top.

Mr WING - I understand that most of the silt coming into the Tamar through the South Esk comes at flood time when the dam is overflowing. During drier periods or at any time when the dam traps the silt, how is it released?

Mr SCANLON - The water is continuously released from the bottom.

Mr WING - Continuously released?

Mr SCANLON - Yes, we have the valve open at the bottom for environmental flow release. When the dam was built there was a requirement to put a valve release in the bottom for the statutory purpose of the 0.43 cubic metres a second, so less than half a cubic metre was the requirement when the dam was approved. We had a legislative requirement to release that continuously.

Mr WING - 15 cusecs?

Mr SCANLON - I think that is it, yes. So the valves are there to do that and also to have bigger flows at times.

We increased the environmental flow after the water management review for the Great Lake in the South Esk. We did a whole range of things - community meetings and consultations - and one of the things we voluntarily decided to do was to increase the flow to 1.5 cumecs, so the valve was adjusted to that.

We did try a monitoring arrangement downstream but you cannot really monitor the flow very well because it is all over and into the rocks. So instead of building some sort of artificial structure that you have to pass all the flow through, which wouldn't have been aesthetically useful anyway, we have made sure that we calculate that the valves open to deliver at 1.5 cumecs. The lake itself operates for a very narrow range. We try to maintain it near full during summer and we drop it a little bit during winter. So about 1.5 metres in winter would be the low point of the lake, except of course if we did one of these big maintenance things and dropped it down a fair bit.

CHAIR - Why do you do that?

Mr SCANLON - The intake structures, the trash racks, the screen things and things that protect infrastructure needed major maintenance in the early 1990s so we lowered to lake right the way down.

CHAIR - But why do you, during winter, have it at a lower level?

Mr SCANLON - In winter we tend to do that to capture as much water as we can and minimise spill. It is capturing as much water into the power stations as we can. So it is an incremental thing in terms of the lower flood flows and medium flows. It would have little effect on a big flood. It is not much extra storage that we are talking about - 1.5 metres.

Mr WING - Have any tests been conducted to see what the quantity of silt is in the environmental flow release?

Mr SCANLON - No.

Mr WING - So, there would be some, I suppose?

Mr SCANLON - There would be some, yes.

Mr WING - But you are not aware of the quantity?

Mr SCANLON - No. Generally coarser material would accumulate at the back end of the lake, but the finer stuff would pass through the system. So the environmental flow would have a certain component, the bigger flow out of the valves would have a bigger component probably, but it would be stuff that was in the water, and the floods that pass over the dam would take a lot of the silt. So the big cleaning mechanism would be more the big flood flows.

We have not done any particular trials or studies on this. It has just been understood that the lake is not silting up and causing us problems and that the stuff is passing through the system.

Mr DEAN - In your opinion is that having any bearing on the siltation problems that we currently have in the river, in the estuary area that we were talking about?

Mr SCANLON - Minor. To be frank, I think the reality of silt in the Tamar is historical. The silt coming down the South Esk and the North Esk - most would come down the South Esk and less down the North Esk - is minor compared to what is in there and has been in there for a very long time. This has been a problem for Launceston for many years. Dredging started in 1850s, so it has been going for a long time. It was very active when the Port of Launceston was very active and I think a lot of older people in Launceston remember that time when there was a lot more depth around the port area, particularly. But the natural condition of that system is channelled estuarine swampland, if you like.

In terms of flows down Cataract Gorge, if it were a tight channel then bigger flows would keep the tight channel better open. The late Doug Foster in his studies was essentially correct. Flows down the Cataract Gorge have very little impact, he believed,

on the silt in the Tamar. If you want to manage that silt you have to do something with levees or dredging or something. The proposal from Foster was that the operation of the Trevallyn Power Station in fact helped the silt, contrary to some popular opinion that the more water you put through Trevallyn the more effect you would have on the silt. That has not been properly established. If you have a big flow against the incoming tide then the problem is that it is a never-ending battle. The tide just keeps bringing the silt in. The floods move it up the river and that is the other problem you have at the moment. We have had a terrible dry period. No big floods have been going through there for a few years now - or medium floods even. We have had occasional spills but not many at all. That exacerbates the problem. Floods will move the silt but inexorably, for ever and a day, it will just keep coming back on the incoming tide. So the problem is how do you put a barrier up against that or how do you manage that? It's a big question. What we did was some trialling; after the Foster report we did some trialling in 1991, I think. From recollection, I think we had some 50 days of trialling operating the power station and we found that it does have an effect. It will slow down the siltation rate.

It is quite problematic for Hydro Tasmania and it's potentially very expensive but we have agreed to cooperate again. We have recently been doing some studies with the Launceston City Council people. We tested zero flow, we tested two-turbine flow and we couldn't do the four-turbine flow because we just haven't got enough water lately. It's quite low flows into this system in summer and if Poatina is not operating a lot, you're back to what you had naturally many years ago - very flows during summer.

So at the moment it's still an open question but what's got to happen here, I guess, is a decision about what condition you want for that part of the estuary and how much you're prepared to pay to manage it to get that. There are different methods to do it.

Mr WING - Could you give us an indication of some of those methods and how much we'd have to pay to adopt them?

Mr SCANLON - I'm not an expert in these methods but the cost of the Port of Launceston Authority work associated with dredging when it was very active was a fair percentage of those costs. I understand it wasn't half but it was a big percentage of the cost of running the Port of Launceston Authority activities.

You could also look at levees and I know people have proposed structures and barriers. They are all very expensive. To take the area back to a condition that it might have been in after a very active dredging would require a lot of active dredging but then you've got this big body of silt just up the estuary so if you dig a big hole then the stuff comes back into it.

The environmental flow down the Gorge really won't do anything significant at all.

Mr WING - You can hardly see it at times, can you?

Mr SCANLON - No, but even if you increase the flow, there's not a bottomless pit; it's only a small reservoir so the flows during summer aren't big.

Mr WING - That's a masterpiece of understatement.

Mr SCANLON - Yes, well, we've got 1.5 cumecs there now; that's a reasonable percentage of the low flows during summer and in fact on rare occasions it would be in excess of the natural flows prior to Poatina diversion. So it's not a tiny flow but the objectives of that flow are about what you've got in the Gorge itself, not in the estuary. Regarding the cost of that flow, one cumec diverted away from Trevallyn is about \$750 0000 a year - more than that actually. The voluntary addition, when we took it from 0.43 up to 1.5, is about \$800 000 a year loss at Trevallyn Power Station.

When we did the voluntary flow over five years ago we said we'd do a review and the review is now under way so we have a process under way now where we're looking at the review of the flow. It's going to be dealing with stakeholders and talking to people and we've got some research. One of the main reasons for the flow was a snail that lives in the Gorge.

Mr WING - One snail?

Laughter.

Mr SCANLON - It's so hard to find that we're not so sure it's one.

Laughter.

Mr SCANLON - It's called *Beddomeia launcestonensis* and it's a very rare, hard to find thing. Detailed quantitative biological research is very expensive but we've got a program we think where we can get some comparative data to see if that flow has worked for the snail. We don't have that evidence yet.

CHAIR - It shouldn't be hard to chase it down, though, I would think.

Mr SCANLON - It lives under the rocks. It is a threatened species and that is something we want to be looking at. That is part of the reason we did the flow.

CHAIR - On the subject of the environmental flow, I think there is some discussion about a mini-hydro scheme underneath. Could you apprise us of the possibilities of that occurring, giving us extra power or making sure we are using the water as it comes out of the dam but also increasing that aesthetic appearance of the Gorge as it travels down to the Tamar basin?

Mr SCANLON - We have a study under way of two mini-hydro schemes on this system. The proposals are around a mini-hydro scheme right at the foot of the dam where the environmental flow release is and another one in the original Duck Reach Power Station. Those proposals are looking at the environmental flow level. That is part of what we are looking at.

Let me explain hydro schemes in general. The power you get is directly proportional to the height of the lake and the turbine level, so if it is half the height you get half the power. You get twice the volume of water, you get twice the power. So hydro power is very simple really, it is about volume and water pressure, which is head. As you go up in height you get more and more in a straight line. Any mini-hydro scheme in the system will only get back part of the power compared to what it would have done if we had put

the water through Trevallyn. Mini-hydro schemes are small and hydro is one of the most efficient ways of converting, say, an energy to another energy so big hydro systems generally are 95 per cent efficient. They take the water potential energy and turn it into electricity at a very small loss rate, less than 10 per cent, 5 per cent or something like that. It is between 90 per cent and 95 per cent for big hydro schemes. Mini-hydro schemes are smaller machines, with more friction and energy losses so that tends to be down in the 60s and 70s perhaps, sometimes the 80s depending on the design and the scale. We would have a little bit of a loss of efficiency but the big problem is there is a loss of head. I have said that with \$800 000 for the one cumec we would get some of that back, perhaps a half or something - a maximum of a half. If we increase that flow through there, it is a lost game for us all the time but we would be recovering part of that cost in a mini-hydro system. If you put the Trevallyn power station at the foot of the Gorge you would have the sort of thing. You wouldn't have any flow in the Gorge.

Mr WING - You wouldn't have any flow in the river?

Mr SCANLON - You could have the same flow, you wouldn't have any extra flow.

Mr WING - I thought if you put it at the end of the Gorge you'd have all the flow down there, wouldn't you?

Mr SCANLON - You could put the flow through the power station. Wherever you put the power station you have the flow below it. If you put the power station at the bottom of the Gorge you would have the flow there and the environmental flow probably still up the top, from the dam down.

One of the issues for the Duck Reach mini-hydro scheme is we would be looking at taking a lot of the environmental flow from below the dam and putting it into Duck Reach, so there is about a 3 kilometre stretch of the upper part of the Gorge area where we would be looking at reducing the environmental flow so we could put it through the Duck Reach Power Station.

Mr WING - What quantity of power would that produce? I have heard about 7 or 8 megawatts.

Mr SCANLON - I would have to take that on notice. I don't know. It would be a relatively small amount; probably less than that, I would think, but I don't have those figures with me. It is a two-station proposal. The one at Trevallyn is fairly straightforward, I think; you just put the power station there and use that relatively small head of water. The reason Duck Reach might be viable is that there is a lot of the infrastructure still there. You wouldn't be building Duck Reach now by drilling the tunnels; the tunnels are still there. I am optimistic about it. I think it would be a really good thing if we could get that working. It would be a working power station.

Mr WING - You have been investigating that now for some little time, haven't you?

Mr SCANLON - Yes.

Mr JEFFREY - We have a project, Mr Wing, which we call within our organisation a '1 000 gigawatt hours project', where we are trying to get 1 000 gigawatt hours of additional

energy from existing resources. We are looking at a large suite of projects around the State raising dam levels, diverting some channels and so on and Duck Reach is in that suite.

Mr SCANLON - Those studies have progressed to a certain point. With the Duck Reach one they are waiting on the environmental flow study that is also under way and that will be happening over the next few months. This environmental flows issue is relevant to the question about the viability of Duck Reach.

CHAIR - Does Hydro have a recognition of the tourism potential and opportunities that might be presented or would the tourism opportunities be shut down because then it becomes a working power station?

Mr SCANLON - We would be very mindful of the tourism opportunities. We understand what it is now. It is an interesting heritage site, a very interesting heritage site, and we have a lot of the heritage engineers who we are working with now quite closely on Lake Margaret and they are very interested in Duck Reach as well. It was the first municipal hydro power station in Australia and you have certain things there now but you would certainly enhance Duck Reach if you had a working turbine in there. You could build that quite protected. I do not know about viewing galleries and other things. All those add cost but you could do it in a way that did not compromise access to the site, I think. I am pretty confident we could do that.

Mr DEAN - If it all goes well, what is the program time line for that?

Mr SCANLON - Good question. We are hopeful that we would have that view understood around August-September so that would then feed back into -

Mr DEAN - This year, 2009?

Mr SCANLON - Yes, it is under way now. We would then hope, and again I am not directly involved in the feasibility studies of the mini-hydro schemes, they would proceed beyond that and take a period of time with board approval. They are not big projects, we have done preliminary feasibility on them, so I would think there would be another year to approval and then construction would be probably a year, but I am only guessing now.

Mr DEAN - Two years?

Mr SCANLON - Two years.

CHAIR - I want to ask about the silt and its effect on turbines at Trevallyn power station. What does the water quality need to be like when you drive it through turbines; do you need to not do it when there is a lot of the suspended silt? Could you give me some understanding of that?

Mr SCANLON - This is an interesting problem for hydro systems but it is a big problem in countries like Nepal and northern India where you have very active and hard silt and lots of abrasive material going through the system. We don't at Trevallyn. I am not the expert in this area. I am pretty certain there has not been a requirement to ever shut down because of silt through that system. I do not understand any detail; I have not

checked any detail on cavitation and abrasion rates on the turbines. I do not think it is a big issue but I would have to take it on notice. I am not sure but I am pretty certain it is not a major issue and I am pretty much 100 per cent certain we do not have a program where we are monitoring silt intakes into the system and then having to shut down.

CHAIR - So you would not be shutting down Trevallyn power station because of a flood?

Mr SCANLON - No.

Mr JEFFREY - We would -

Mr WING - But not for that reason?

Mr JEFFREY - Not for a silt problem.

Mr SCANLON - A flood that got into the station but if Lake Trevallyn is in flood, we will be operating that power station.

CHAIR - And capitalising on the strong amount of water?

Mr SCANLON - Yes. If the whole catchment is in flood, we do have a flood rule for Poatina but that is for the landowners up around the Cressy area and those sorts of districts. We would try to back off adding extra water into the system from the basically southern Tasmanian diversion which is what Poatina is. It is a diversion away from the south to the north so we do have a flood rule that if that whole place is in flood, we would have Poatina off, we would not be adding any water from the top, but Trevallyn we would keep going.

CHAIR - Could you tell me about the times that you run Trevallyn power station? Is that dictated too by demand or do you have a roster? Do you have a regular program - midday to 4 p.m. and what have you? Or high tide and low tide to help with the silt problem in the Tamar River?

Mr SCANLON - No, the constraints on us are that we deliver an environmental flow out of the lake. We operate in a national market and we have to put bids in and then we are dispatched by the national market. We are constrained obviously by the water in-flows into the system and the operation at Poatina. The whole system works together. Trevallyn would often operate as a peaking station -

Mr JEFFREY - When the prices are high, as distinct from a base load which runs all the time.

Mr SCANLON - Basically in winter and spring it would be on pretty much all the time when the flows are high. In summer it is lower. We have a number of turbines in there, so the peaking might be merely adjusting up to full turbine operation. I am not an operator and I am not an expert but it is essentially a 'use it or lose it' station. When the water comes in, you use it. We have three types of hydro stations. We have our two giant lakes that sit above Poatina and Lake Gordon - our two biggest power stations. They are the last ones on, generally, in our old system, the way we used to operate. But now we have

connection to the national grid they come on and off more regularly to meet demand there.

We have our big lakes at the head of our cascades. They tend to cycle. Those lakes seem to move up and down on an annual basis and we feed water in the summer and autumn through those cascades to support those cascade stations - the Mersey, the Derwent and the west coast schemes. The others are all what you call 'run of rivers' - the cascades. Trevallyn is a pure run-of-river station. It has very little storage so water coming in of a day would generally go out in a day. As I said we operate the lake very high in summer. Lake Trevallyn does not have much free board in summer. In winter we drop it down a little bit so we capture a bit more of the variable flow through floods and things. It is a very complex water harvesting system for Hydro Tasmania. We try to not spill. We try to operate where the big rain storms are coming. We have to look at the load. We have a lot of load in Tasmania. We have a percentage of load that can come onto the mainland markets. We have to bid that in. Basslink can provide, in the middle of the night, very cheap power from the mainland as well. So it is a complex system. Trevallyn is a very important part of that system.

I actually did want to make a correction because I made a mistake in that submission letter. I said, 'Poatina and Trevallyn are Tasmania's second and sixth largest Hydro stations'. It is a minor correction: Trevallyn is the seventh largest.

CHAIR - Boy oh boy, that changes our proceedings entirely.

Laughter.

Mr SCANLON - It is a big station, a 100-megawatt station. In wet periods it is going to do better than a 50 per cent average on that on a yearly basis. Right now it is a bit under that - about 48 megawatts average. So it is a very important part of the electricity system.

CHAIR - Has joining the NEM meant a dramatic change in operations at Trevallyn or is it pretty much similar to what it was experiencing before we joined the National Grid?

Mr SCANLON - It has probably produced a minor change, but again there is that basic constraint of being a very small reservoir. If there is water coming down from Poatina you have to use it, and for floods and other things coming through in either winter or spring, you have to use them. So those constraints are still the same but there is more opportunity for using the station on a peaking basis. Some of the machines come on and off during the day more.

Mr DEAN - With the flow through the gorge and Trevallyn and so on, how many authorities do you have deal with? Are you able to give me some idea of the number of instrumentalities or authorities that you have to work with in that whole process?

Mr SCANLON - Yes, there are quite a few. We deal with the Launceston City Council. We had the Upper Tamar River Improvement Authority. We have the NRM, of course; we deal closely with them. We have TEER, and we have membership on that. We are trying to work with other more informal groups focused on particular issues. We have had this algal bloom issue at Lake Trevallyn; there is a working group on that which is

now being affiliated with the NRM. We are putting a lot of effort and money into monitoring and helping the management of that algal bloom. They had quite bad algal bloom there in 2007. Subsequently it is dissipating and I think it reflects the drought.

Mr DEAN - I take it you work with DPIW and MAST and all those other authorities?

Mr SCANLON - Yes, we do a lot of work with MAST around the State, more on lakes and boat ramps. Obviously DPIW are the regulators and of course we have the environmental regulator and the water regulator.

Mr DEAN - From Hydro's point of view would you much better off and more comfortable working with one statutory body that has some control over the whole of the water system, siltation, estuary flows and so on? Would that be a better model?

Mr SCANLON - I couldn't say. We essentially have to work with the whole State. We are working with all the councils we have in Tasmania is, and there are a whole lot of councils that are under-resourced to deal with issues. We have ongoing management issues we have to work through with very small councils that do not have environmental health officers. We regulate on a whole-of-State-government basis and we now have Federal environmental legislation. It is part of doing business that you deal with the regulators that are in place. It is probably not our call to make recommendations on that.

Mr JEFFREY - I think if there were a single water authority for the Tamar we would still have a number of other agencies to deal with. For example, DPIW oversees and regulates our water licence. As Andrew just said, the Federal Government has the Environment Protection and Biodiversity Conservation Act, so even if there were bodies such as you suggest we would still have water responsibilities to most of those.

Mr SCANLON - We would be in favour of efficiency and streamlining if it works, but sometimes it doesn't; it is just another layer again.

Mr DEAN - With the TEER program, you have a seat on that body. Are you comfortable where we are going there and what you are doing there? What has been your input into that so far?

Mr SCANLON - It is early days in some sense, but I have participated in a workshop up there. Andrew Catchpole, who is one of our executives, is on TEER and we are participating. We have people at a meeting today on the technical side. We have tried to be as positive and as involved as we can on a range of things. We have certainly been able to offer our own expertise - we have a significant body of expertise in the environmental area, for instance - into health problems, particularly the algal problem at Trevallyn. I think we are taking a good lead on that. We want to work through the community bodies and that is what we will certainly be doing with this environmental flow review - consult with them.

Mr JEFFREY - TEER seems to be a good collection of the various stakeholders as well, in the experiences we have had.

Mr DEAN - In relation to the algae problems and E. coli and so on, where do you see Hydro sitting in that process, the environmental condition of that river? What is your position?

Mr SCANLON - We try to make sure that we are monitoring because we have responsibility for a lot of lakes. Where it is multiple-stakeholder lake, like a lot are, particularly further down the system, like Trevallyn, a lot of people are involved and we want to do it on a multi-stakeholder basis.

As a rule, I do not think it is really the function of a dam operator to flush out problems associated with sewage downstream, but the situation in low flows can be a problem and we have cooperated with the council on occasions to turn the valves on. We only do it for a short period of time because it is not a big lake, and we have cooperated on occasions to turn the valves on for recreational events. The payment is generally in-kind sponsorship - the Hydro Tasmania Canoeing Championships. We want to cooperate, we understand the circumstances and we have a good relationship with councils, and we will continue that. However, when you have a sewage problem, fixing it at the source is often the best way to deal with it in the longer term.

Mr DEAN - Are you satisfied that there is a sewage problem in the river?

Mr SCANLON - There appears to be. The E. coli levels seem to heighten at times as sewage. We have had algal blooms and algal increases in Lake Trevallyn - that is nutrient. You have point-source pollution - and you have it everywhere. It has obviously created issues in this area and the drought that we have had has exacerbated that. This is not unique; we have a significant algal bloom problem in the highlands. We have a really seriously affected lake and we have monitoring programs on a range of lakes that are very low because of the drought. We take very seriously our environmental responsibilities to know what is happening and then see what we can do about it.

Mr WING - If a single statutory authority were established, do you consider Hydro Tasmania would be prepared to have a representative on that body?

Mr SCANLON - If one were established, we would. We operate one of our big power stations in that catchment and we feed the Poatina system. The power station is at the top of that catchment. A big part of our business is those two power stations, so we would be keen to be involved.

Mr WING - Could you give some indication of when and for how long a flow is diverted from Poatina down through the South Esk in summer and autumn? Usually how many days and weeks would that be?

Mr SCANLON - It is very hard to answer. The normal operation of that system is to have Poatina running much more through summer and autumn. In fact in the drier periods of the year most of the water coming through the system is from Poatina. It significantly enhanced the catchment flows and it has created the Cressy irrigation district as well by providing this flow during summer. So it is on for most of that period.

Mr WING - In summer and autumn, for most of the six months?

Mr SCANLON - Yes, but it is impossible to say; we have had periods where we shut the system down for maintenance. We would run it across the year as well, so some of the

flow during winter and spring would be Poatina flow. At the moment we are trying to build Great Lake back up a bit; we are actually importing more power from the mainland than otherwise if we wanted to take a bigger risk. We want to build Great Lake and Lake Gordon back up; they are very low. We are operating Poatina less; Trevallyn, as a consequence, is operating less than it would be. I think I said it was about 48 megawatts average at the moment and we would like to see it at 50.

Mr WING - So it is down to 48 megawatts even with the supplementary water coming through the Poatina system?

Mr SCANLON - Yes. The 100-megawatts design is for the whole system. In winter and spring it is a lot of the stuff coming off of the big catchments. It has to be catching about 12-13 per cent or more of the State, so there is a lot of water coming through the system when it is wet, and then the power station would be generally operating near its full capacity. In summer or autumn, when the flows are much lower, a lot of that water is Poatina water.

Mr WING - What percentage of that water would be coming through the Poatina system?

Mr SCANLON - It would vary from year to year.

Mr WING - In summer and autumn?

Mr SCANLON - In summer and autumn it is about half the water.

Mr WING - And in terms of gegalitres?

Mr SCANLON - I am going to take that on notice, I do not have the numbers. Right now the cumecs flow would be around eight.

Mr WING - How many cumecs would be going down the gorge?

Mr SCANLON - 1.5.

Mr WING - You say that one cumec represents about \$800 000. To maintain a much better visual display of water flowing in the gorge, how many cumecs would be needed?

Mr SCANLON - If it were doubled you wouldn't see a huge difference, to be honest. You would see a bit.

Mr WING - It has trebled now from the original undertaking of 15 cusecs and you hardly see any difference now.

Mr SCANLON - It is more than three times the flow, so from 15 cusecs it has tripled, so that is better. It is designed around the snail and not having really big flows for some of the structures that people use where they swim and things like that. In part of the review we have we want to explore that. I do not think there is a lot of extra value for the aesthetics in just increasing that flow. It could be done on an occasional basis; there could be a night-time light-up of a flushing flow, or something. You could do something like that,

as they do in New Zealand, but I think the tourism potential might be better served by the Duck Reach Power Station and things like that.

Mr WING - How many extra cumecs would be likely to come down if the Duck Reach Power Station were reinstated?

Mr SCANLON - We are looking at about the same level as the base case at the moment. We are looking at the diversion -

Mr JEFFREY - So 1.5. Using that 1.5 cumecs of environmental flow is what we consider.

Mr SCANLON - So there is the base case and there are other options around slight increases. I think if you start decreasing the flow below 1.5, those mini-hydros probably wouldn't be economic, but again I am not 100 per cent sure on that. If we put both in, and Duck Reach would be the second one to be put in - the first one would be Trevallyn - we would probably be looking at a reduced environmental flow on that top section. That is part of the study as well.

Mr WING - So there is a great limit to the amount of water that could be made available to increase the flow down the gorge?

Mr SCANLON - Yes, and it is expensive water and you have to ask the question, 'For what purpose?' Downstream flows really have to be geared to balance the social, environmental and economic objectives. It is pretty clear that if you take water out of Trevallyn Power Station and put it down through environmental flow, it is about \$800 000 per cumec. You can get some of that back with mini hydro. I am not 100 per cent sure how much it is but I would be surprised if it is any more than half. It is just recovering some of the loss.

Mr WING - In terms of the environment and what the gorge used to be like as a tourist attraction, I think it is not appropriate just to look at the loss of income. If the dam had not been built and there was a proposal to build it now, I do not think, on environmental grounds, that would be permitted. On that basis I think it is appropriate to look at the money Hydro gets from the power generated by the Trevallyn Dam as a big bonus, rather than looking to see what the loss would be if water came down the gorge. As a potential tourist attraction it has lost a lot of its value now and I am interested to know how much water would be available to make it an acceptable flow. I have seen a greater flow going through the main street in a water feature in Seoul, South Korea, than we usually now see going through the gorge in summer and autumn. Are you able to say how many cumecs would be required to have a steady flow coming down for most of summer and autumn?

Mr SCANLON - Again it depends on what you are trying to achieve.

Mr WING - Aesthetics; restoring the gorge to its former glory, basically.

Mr SCANLON - The actual flows down the gorge without the Trevallyn Dam would be less on occasions than the 1.5 cumecs. It is not that many days, but still quite a few days over the summer and autumn period, where the natural flows in the South Esk are quite low.

The dam actually does enable a base minimum that wouldn't be there otherwise on some occasions.

Mr WING - About how many days a year would you say?

Mr SCANLON - Again I do not have that but it would be less than 10 per cent of the summer - perhaps 5 per cent but I would have to check it up. Not on many days. The base flow through December-February is a 90 percentile flow - 4.36 in summer; 5.52 in autumn. A 70 percentile is 10 cumecs, so it varies. If you wanted to remove the dam and go back to what it was, you would have more flow down there for sure. The Poatina flows would be there as well and they are more than half the flows. If you took out the Trevallyn Dam there would certainly be bigger flows down the Gorge but it would be variable and sometimes it would be less than what we have now.

Mr WING - What percentage of extra flow would there be if the Trevallyn Dam were not there?

Mr SCANLON - It would be quite a bit. It would be the average flow through Trevallyn down the Gorge.

Mr WING - Can you give us some indication of the range?

Mr SCANLON - The average flows are probably around 50-55 cumecs.

Mr WING - That is considerably more, then, isn't it?

Mr SCANLON - Yes.

Mr DEAN - Are you talking about the daily flow?

Mr SCANLON - I am talking about the average flow over the whole period - summer to autumn. If you take out Poatina it is around the mid-20s on average, and the low flows are much lower. Those average flows are beefed up by the occasional floods that you get through the system.

Mr WING - It is obvious that with the Trevallyn Dam there is limited availability of water in that river system?

Mr SCANLON - In the Gorge, yes.

Mr WING - If the pulp mill were to proceed, requiring 26 gigalitres per annum, I think it is, and Hydro Tasmania has undertaken to make available up to 40 gigalitres, how is that going to be achieved if there is such an inadequate amount available for the Gorge?

Mr SCANLON - The amount for the Gorge is 1.5 cumecs - so that is a continuous flow. There is no guarantee for Gunns but it is relatively high surety water if they take it out of Lake Trevallyn because we do have that Poatina water coming in all the time. So it is a low-risk source of water but it would not impinge on our being able to release water for the gorge flow of 1.5 cumecs.

Mr WING - Which is virtually nothing, isn't it, a trickle?

Mr SCANLON - Not really, one and half tonnes per second; it is quite a bit of water.

Mr JEFFREY - \$1.5 million worth of trickle.

Mr WING - I have been there, taken photographs of it, and you can hardly see it going through the rocks.

Mr SCANLON - That is the condition it would have been in on very dry periods. Without the dam and without Poatina there would be a bigger flow because the dam takes the water to the power station and the power station then generates power.

Mr WING - You feel confident of being able to provide 26 gigalitres?

Mr SCANLON - If it is there then it is there, but it is pretty high surety water and we are pretty confident. Gunns have to make that call. We can't make a 100 per cent rock-solid guarantee - the rains have to come and the water has to be there.

Mr WING - If that is available for that purpose, I assume much more water will be available to flow down the Gorge provided Hydro Tasmania was prepared to accept the loss of income.

Mr SCANLON - Gunns will pay for the water.

Mr WING - But at a much lower rate than other people using irrigation?

Mr SCANLON - No.

Mr JEFFREY - Probably two-and-a-half times what some of the extractors are paying at the moment.

Mr WING - Right. I will not pursue that because I am mainly concerned about the quantity.

Mr JEFFREY - Gunns' extraction will be about 1 per cent of the annual inflows to Lake Trevallyn. The 26 gigalitres sounds like a lot of water, which it is, but it is 1 per cent of what flows into the lake in an average year.

Mr WING - What percentage would go down the Gorge in a year?

Mr SCANLON - It would be more like 3 or 4 per cent.

Mr DEAN - It has often been suggested that after the water flows through the power station it should be diverted back up through the Gorge. As I understand it the tail waste is a supporting mechanism for controlling the silt to some extent, so obviously it would impact on that. What comment can you make in relation to that because it is often referred to in the papers?

Mr SCANLON - There are a couple of things there. The Doug Foster view - and I think what he said is probably right - is that you have more effect on the silt if you put the

water through Trevallyn than if you put it down the Gorge because it reduces the tidal ingress of the silt. Pumping it back up is a loss game. Pump-storage hydro systems only work where you are pumping up a certain distance and dropping a much bigger distance - like at Arthurs Lake. We pump up, we recover a little of the fall energy through Tods Corner, then we recover a heap of extra energy because we drop it down to Poatina. Around the world there are pump storage systems that just go up and down. They are an energy loss on their own. It takes more energy to pump it up hill than you get back from running it through a power station, but economically it wins because it is there in conjunction with thermal stations, like nuclear power and coal-fired stations, that do not want to shut down at night. They are thermally efficient and they need to be running all the time, and therefore in the middle of the night the power is very cheap. It is just throwing power away for nothing to keep the thing at thermal efficiency and to keep it ticking it over, so you use that power to pump water back up the hill.

Hydro is the premium electricity product because you just turn it on or turn it off. Electricity is an unusual product; it is actually used as it is made and it varies through the day. In the morning people turn on stuff - businesses turn things on - and in the evening things turn on. It is moving around all the time and we can turn the hydro system on and off to meet peak demand. It is a highly valuable feature of hydro systems. Pump storage is just making use of that higher value use of water. Pumping it back up the hill will cost more energy than running it down so it would be cheaper to run it through the dam.

CHAIR - We appreciate the information you have given us today and thank you very much for your time.

THE WITNESSES WITHDREW.