COMMONWEALTH OF AUSTRALIA

Official Committee Hansard

HOUSE OF REPRESENTATIVES

STANDING COMMITTEE ON AGRICULTURE, FISHERIES AND FORESTRY

Reference: Future water supplies for Australia's rural industries and communities

WEDNESDAY, 4 JUNE 2003

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HOUSE OF REPRESENTATIVES

STANDING COMMITTEE ON AGRICULTURE, FISHERIES AND FORESTRY

Wednesday, 4 June 2003

Members: Mrs Elson *(Chair)*, Mr Adams *(Deputy Chair)*, Mr Forrest, Mrs Gash, Ms Ley, Mr Schultz, Mr Secker, Mr Sidebottom, Mr Windsor and Mr Zahra

Members in attendance: Mr Adams, Mrs Elson, Mr Forrest, Ms Ley, Mr Secker and Mr Windsor

Terms of reference for the inquiry:

To inquire into and report on:

The provision of future water supplies for Australia's rural industries and communities, particularly:

- The role of the Commonwealth in ensuring adequate and sustainable supply of water in rural and regional Australia.
- Commonwealth policies and programs in rural and regional Australia that could underpin stability of storage and supply of water for domestic consumption and other purposes.
- The effect of Commonwealth policies and programs on current and future water use in rural Australia.
- Commonwealth policies and programs that could address and balance the competing demands on water resources.
- The adequacy of scientific research on the approaches required for adaptation to climate variability and better weather prediction, including the reliability of forecasting systems and capacity to provide specialist forecasts.

WITNESSES

Committee met at 5.11 p.m.

GINGIS, Mr Aron, Environmental Consultant, Australian Management Consolidated Pty Ltd

CHAIR—I declare open this public hearing of the House of Representatives Standing Committee on Agriculture, Fisheries and Forestry in its inquiry into future water supplies for Australia's rural industries and communities. Today's hearing is the 14th one for this inquiry. I thank you very much for your submission and for the time you are giving us today, Mr Gingis.

Mr Gingis—Thank you very much. I really appreciate your inviting me along. I apologise that I could not attend the 7 April presentation because unfortunately I had to be in Casablanca, Morocco. As you are aware, I had to attend as I was the only Australian representative there that was presenting scientific papers. This was the eighth World Meteorological Organisation conference on weather modification.

CHAIR—Although the committee does not require you to give evidence under oath, I should advise you that these hearings are formal proceedings of parliament and consequently warrant the same respect as proceedings in the House itself. It is customary to remind witnesses that the giving of false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. Would you like to make a brief statement or go into detail about your submission? We will then take questions and I will introduce the committee after we hear from you. Thank you.

Mr Gingis—Firstly, I would like to say that since my presentation has been given to the committee, the situation with water resources in Australia has markedly deteriorated. I will show you what is the real situation at the moment. I would like to ask your permission to show you on the Web. It is a real life explanation for you of what is actually happening with our water resources. I think it is very, very important to appreciate not only what happened six or seven months ago but in fact what is actually happening at the moment.

CHAIR—Is it in your submission, what you are showing us?

Mr Gingis—No. I gave you my submission seven months ago. It is what is happening at the moment, unless you know all of that.

Mr ADAMS—I understood that what we were going to get today was what Mr Gingis's company has got to offer in cloud seeding and issues in relation to that. Is that what I understood to be the correct interpretation of the submission?

Mr Gingis—I said that cloud seeding is one of the remedies, but I think you have to appreciate that, considering we are looking at water resources, you have to know what the situation with water resources is. Secondly, I am happy to discuss the issues of scientific evidence to explain the course of our present position. We can then discuss issues of cloud seeding. Then again, I am open to go with anything you would like me to talk about. I am happy to talk about cloud seeding.

CHAIR—The cloud seeding is a remedy that you are going to show us?

Mr Gingis—Cloud seeding is one of the solutions to mitigate the situation.

CHAIR—Do you have any problems with that?

Mr FORREST—No. I would be grateful if you could give the current situation with water storage. The inquiry has been going quite a while and we are well aware of that. If you could quickly show us that and then get to the science of cloud seeding.

Mr Gingis—It will not take more than five minutes to show you the key points on the web site where you could see exactly what is the situation around the country at the moment is. You can see, unfortunately, how grim the situation is. Then we will go to my submission and explain who we are, what we do and how we can make our the scientific findings, who is specifically at risk and, more importantly, what remedies we would like to offer.

CHAIR—Most of us have to be out of here by six o'clock because we have other commitments. We do not want to not have questions asked by the committee.

A Web presentation was then given—

Mr Gingis—Firstly and importantly, I understand that you are from Queensland.

CHAIR—I am from Queensland.

Mr Gingis—And you are not far away from the west of Brisbane?

CHAIR—Yes.

Mr Gingis—We will search down the page for Sun Water. Do you understand what that means?

CHAIR—Yes.

Mr Gingis—It is www.sunwater.com.au. We will wait for this. You can see here south-east Queensland. You can see that the position in the south-east of Queensland is quite typical. The wet season recently just finished, so you can imagine what kind of summer the people around the area will have. It is terrible. That dam, Atkinson Dam, is at three per cent at the moment. Their dry season was just started. The next example is Lake Clarendon Dam, which is nil. The Bill Gunn Dam is at two per cent. Moogerah Dam is at three per cent. Leslie Dam, which is the start of the Murray-Darling Basin, is at seven per cent, which means there will be no irrigation in the area. The Coolmunda Dam is much better; it is at 29 per cent. However, after the wet season, it does not rain much. You can see that Maroon Dam is at just 15 per cent.

I want to bring to your attention the main cause we believe that we have found. I will show you during my submission that all these dams are empty because they are sitting west from major sources of air pollution, being Brisbane, the Gold Coast and the Ipswich power station. If you look at the capacity of dams on land air pollution is not so substantial and it is generally diluted. In the St George area, the regional dam is at 34 per cent. We believe that that air pollution is the main cause of all these problems west of Brisbane.

Mr SECKER—How do you know it is not a coincidence?

Mr Gingis—It is not a coincidence.

Mr SECKER—How do we know that this is not historical and that that is a wetter area? Was it showing the same trend five or 10 years ago?

Mr Gingis—We will show you not modelling but physical measurements of what is happening with the clouds and what is happening with the microphysical structures of those clouds. We will show you what is actually happening in this specific area. So you can appreciate what is happening west of this area, let me just refer you to the present situation in New South Wales, if I may.

Mr ADAMS—You might have to hurry this along a bit, Mr Gingis.

Mr Gingis—I am trying my best. We are looking at the Web address of the Department of Land and Water Conservation in the New South Wales government. It is www.waterinfo.dlwc.nsw.gov.au I just want to show exactly what is happening with the major rivers of New South Wales at the moment.

When we take a picture of most major rivers in New South Wales, you find that most of the summer the Darling River was not running. Therefore, the capacity of Menindi Lakes at the moment is 2.2 per cent. You can see it at the bottom. Regrettably, the Darling River is still not running and the wet season has already finished. What is happening at the moment is that the flow into the Menindee Lakes is very low. It is 80 to 100 megalitres a day, which is nothing. It is deteriorating because the wet season has finished. Most of the time, inflows increase during summer. In fact, last summer it was nil. That is why the Menindee Lakes were drained.

A similar suggestion could be made about the Murray River area. While the Murray River at the moment is running because there is hardly any consumption, the last reservoir that was left with some capacity of water is Dartmouth Dam, which as of today is at 30 per cent. Hume Dam at the moment, as of today, not six or seven months ago, is right on 10 per cent. It means that, from our research and in our opinion, in a relatively warm and dry winter, as the Bureau of Meteorology predicts, and we agree with that prediction, we can see a very good chance of drying rivers that will not be running because the wet season has finished at the top. We can see clearly that the Murray River will not be running. If the Murray will not be running, I regret to say to you that there will be very substantial damage to the horticultural and viticultural industries. It will devastate, in our opinion, Victorian and New South Wales horticulture and in South Australia. It will be wiped out. In the best case, it will lose a lot of crop.

A similar situation could be very clearly seen in the storage area. I will go through most of the dams. If you look at the Menindee Lakes, you can see what the present situation is. It is about two per cent. In other words, most of them are empty or almost empty. Only the little ones may be at 14 or 15 per cent. I will give you an example of the Namoi area. You can see that it is something like 15 per cent. They have obviously kept a certain capacity in the dam that could not be pumped. In other words, they could not pump. That is what the present situation is. That is the issue with the Hume at the moment. Mind you, these measurements are maybe a week or 10 days old.

Mr FORREST—Which one of them is Sydney's main water supply?

Mr Gingis—Sydney's main water is basically not here. They have got their own dams. It is more from that area here. I will give you an example. This is a relatively small reservoir. It is only 368 gigalitres, which is now 160,000 megalitres. It is 50 per cent full. Burrinjuck is a very large dam. You can see that it is at something like five or six per cent at the moment. In other words, that is after all this substantial rain they have had on the coast.

Mr ADAMS—Is there a measurement for the last year or the year before that?

Mr Gingis—Yes. That is what Burrinjuck was last year, the green.

Mr ADAMS—The green one is Burrinjuck last year?

Mr Gingis—That is last year. That is not what is happening today. Mind you, it was deteriorating from year to year, going down, down, down. They are all just above 10 per cent.

Mr FORREST—I think we have the picture on that.

Mr Gingis—The main water storage for the Murray-Darling Basin is in fact covered by Goulburn Murray Water. Goulburn Murray Water is the major authority and the main supplier from the Murray River. Goulburn Murray Water is in a critical position at the moment. While they believe they are comfortable, I cannot share their comfort at all. Goulburn Murray Water is at the moment something around 18 per cent.

I want to show you that at the moment the major reservoir in Goulburn Murray Water is Eildon Lake. Eildon lake is under nine per cent at the moment. That is the total capacity of Goulburn Murray Water, which includes many major catchments, like the Dartmouth and Hume reservoirs. They have very substantial capacities. Altogether they have 18 per cent. If you look at the rainwater they had last year and at present, you see that we have almost three times less than we had last year. There is only 2,160 gigalitres in their reservoirs. Complying with the Murray-Darling Basin agreement for South Australia will be requiring about 1,800 gigalitres. In order to supply South Australia with 1,800 gigalitres, they need to have on top of the mountains in their reservoirs double of that amount. There is no way I can see how they can possibly supply according to the agreement. They will have to cut water to irrigation areas or cut water to the Adelaide metropolis.

We are in a worse situation at the moment with Western Australia. The WA Water Corporation has a picture of what happens in a drought. Basically, for the last two or three years. It is a very similar situation also in South Australia, where they have very small local storage. Unless we get a proper supply from the Murray River, they will not meet their requirements agreement.

Mr FORREST—Can we get to how you fix it. Tell us about how cloud seeding can deliver us an outcome that can fix it.

Mr Gingis—Perhaps I could refer to my submission. I will explain to you the science behind what we have found. Obviously from that it will flow how this could be corrected. I have to tell that you we have informed most of the governments, particularly the Victorian government—I

have also suggested it to this government—that when we have discovered the cause, we can offer remedies. Unfortunately, there is no government that actually took us on and tried to understand or learn how to progress. It is four years now since we advised the Victorian government.

Let me explain to you the issues here as they are presented in my submission. Let me give you a bit of background. Australian Management Consolidated is working together with our consultant and representative in Australia, Professor Daniel Rosenfeld. Professor Rosenfeld is a Professor of Meteorology at the Hebrew University of Jerusalem. Daniel is also a principal scientific team member for the NASA Tropical Rainfall Measuring Mission. The Tropical Rainfall Measuring Mission was initiated as a joint venture between NASA, which is the US space agency, as well as NASDA, which is the Japanese space agency. Rainfall around the world is of great importance to the USA and the Japanese governments because of the single fact of the amount of charities and donations and support around the world for countries that are losing their rainfall or do not get their rainfall. They cannot seem to get it. Therefore, understanding what is happening with global rainfall is critically important.

That mission was launched at the end of 1997. The first assignment of that NASA mission was on behalf of the United Nations to look at the processes that have substantially affected the very substantial fires that have occurred not very far away from where we are at the moment, in Kalimantan, Borneo. Do you remember the 1998 bushfires there? In fact, Professor Rosenfeld had been invited specifically on a private basis by Dr Habibi, who used to be the President of Indonesia. The insight into the processes that happened there were very valuable to the Indonesian government from the point of view of assisting them to understand the process and to educate the Indonesian government. Those fires in 1998 have spread all over South-East Asia. People got sick because of the smoke.

More importantly, the side issue of that was that those fires were the main cause of more fires. Professor Rosenfeld published his findings in a paper in *Geophysical Research Letters*. You can see it as reference No. 2 in attachment 1. The findings were that TRMM, which is the Tropical Rainfall Measure Mission, observed first-hand evidence of smog from forest fires affecting rainfall. In other words, the smoke from the fires that had been started by developers clearing that land shut off precipitation for hundreds, if not thousands, of kilometres downwind in Kalimantan. In other words, when these fires were created, the clouds did not precipitate any more. They went right into the ocean without any precipitation. More importantly, what has to be understood is that because of the climate through the Kalimantan, which is quite warm, and evaporation was quite substantial, the forests were drying off. Can you imagine clouds day by day by day just drifting along without producing any rain? The forests are drying off. The same clouds had inhibited rainfall. The same clouds that produce rains also produced lightning. They were starting more fires in inaccessible areas which could not be controlled. It created a snowball effect. So the situation that was explained to the Indonesian government was that not only do they not have the same technical capacity like we have here to fight fires but they also could not access those fires because the forests were quite sick. He explained to them at the time that in order to eradicate those fires and that terrible smoke that affected them, the only thing they could do was to stop developers burning fires upwind in those developing areas. Slowly the monsoonal rains—that is the only thing that could help—would close the fires downwind. As you appreciate, monsoons drive these clouds from Kalimantan down. They were polluted.

Unfortunately, when we focused our instruments on NASA satellites on south-east Australia, we found a very similar picture. We reported that by publishing in the *Science* journal a paper entitled 'Suppression of rain and snow by urban and industrial air pollution'. It was published in March 2000 by the American Association for the Advancement of Science. It was also in the *Science* journal. It focuses on south-eastern Australia. It shows the following: you can see that this is a pollution tract in south-eastern Australia. That is the Adelaide coast. It is obvious that this is air pollution from Adelaide and Port Pirie and Port Augusta, which have large power stations. I do not know if you know that Port Pirie has the largest lead smelter in the world. Port Augusta has a couple of fairly large power stations. Adelaide is obviously a large metropolis with substantial industry there; there are many cars and trucks there.

This is traditional for all of the clouds. When they are unpolluted, they are marked as a red magenta colour. When they are polluted, they change colours. They are changing their physical structure. The cloud particles become much smaller. One of the major findings of the Tropical Rainfall Measuring Mission is that when smoke particles get into the clouds, they change the physical structure of those clouds. What does it do? They inject into those clouds trillions and trillions of what is called PM2.5. It is particulate matter. The particulate matter are little pieces of smoke. The PM2.5 are smaller than 2.5 microns. Each one of them takes a little bit of cloud water on itself. By doing so, they reduce the particle size in the cloud. It is not a big deal because there is still plenty of water in these clouds.

What we have found, unfortunately, is that as soon as the average size of the particles is smaller than 15 microns, these particles will not coalesce. If they do not coalesce, there is no rainfall. In order for a drop to fall on the ground, you need to have millions of those small particles to collide, to coalesce. If there is no coalescent process in those clouds, the clouds will just drift along with all that water. What we have found is two things happening with those clouds. One is that they evaporate, like in this particular case; they just disappear. The other is that the wind drives those clouds full of water right through the mainland of Australia into the ocean. They are maybe raining over the ocean. We have found a special other natural process where those clouds commence rainfall there. That water has been deprived from falling on the ground.

Mr FORREST—On the scale of that, where is Mount Kosciuszko?

Mr Gingis—Mount Kosciuszko is here, approximately. You can see also Port Phillip Bay. You can see the air pollution in this particular satellite image from Geelong—that is Melbourne pollution—and specifically air pollution from the power stations, which we believe is the main cause of a substantial reduction of rainfall in the major catchment of the Murray-Darling Basin, the Victorian Alps and the Snowy Mountains. We also believe that this reduction is between 30 to 70 per cent on certain days. In other words, that is the amount of rainfall that is lost.

Just to prove that point, the major findings of our work, firstly, are that pollution tracks are clearly visible in the clouds and can be pinpointed to urban and industrial developments and individual pollution sources, such as power stations, smelters and refineries, as I showed you here on this satellite image. By the way, Mr Windsor will be interested to see that that is the Hunter Valley power stations here. You can see those tracks of air pollution.

The second finding is that the precipitation from clouds impacted by the pollution is markedly inhibited to the point of total suppression. In other words, there are certain clouds that completely shut off. The pollution inhibits the production of the snow in the clouds. It is estimated that precipitation in the Snowy Mountains has reduced by at least 30 per cent on average each day and year and week.

Mr ADAMS—How long and for how many years back?

Mr Gingis—We have looked at it in quite some detail, but not in this paper. We have looked through about 70 years of the last century. We looked at statistics. I will show to you that we have looked for approximately eight months with the Victorian EPA. I will explain to you in a minute what we have also found. The finding is that urban and industrial air pollution causes a substantial reduction of rainfall and snowfall. The consequence is a substantial reduction in flow of the Murray-Darling, Goulburn, Murrumbidgee and other rivers in New South Wales and Victoria. Of course it impacts on the economic decline in certain rural communities in the Murray-Darling Basin.

We also have an estimation of how much physical rainfall we believe is lost in the Victorian Alps and the Snowy Mountains. We believe that only in the area of the Victorian Alps and the Snowy Mountains, on average every year, we are losing approximately five million megalitres.

Mr FORREST—That is 5,000 gigalitres?

Mr Gingis—It is 5,000 gigalitres. It is a huge amount. If you could get that—

Mr ADAMS—How did you measure that?

Mr Gingis—Every year, do you know how much rainfall on a percentage basis is lost per annum?

Mr ADAMS—How? I am asking you how. You made an assertion without any scientific fact behind it. You assert that this is the amount of water that will fall. Tell me how you asserted that.

Mr Gingis—I will explain.

Mr ADAMS—Please do.

Mr Gingis—First of all, we have done a statistical analysis of two issues: the cause, which is air pollution; and the statistical analysis of rainfall data. We are the first to do the statistical analysis. To give you an idea of what we have done more than that, we have worked for eight months very closely with the Victorian EPA. The Victorian EPA in fact have done a good thing. They modelled air pollution discharges. That is their table. It is air pollution. They knew how much coal they mined and how much is sold and how much petrol and approximately how much wood they sold through the period from 1920 to 1990. They also have calculated particulate matter, as you can see, and sulphates, or SO_2. They did it separately from Melbourne and separately from the Latrobe Valley power stations in Victoria. The main catchment they are referring to is the catchment of the Snowy Mountains, which is area 71. The Victorian Alps are

areas 82 and 83. We knew how much air pollution in fact had been produced and obviously fuel burned.

After we did that, we did an analysis of this data, eliminating annual variability. They are the results. We have found that there has been between a 20 and 40 per cent reduction. They are the graphs. Because of the ratios, they are not as drastic on the ratios. I am happy to present to you a paper that was published in the *Science* journal that involved Professor Rosenfeld and the Manager of Air Quality Studies of the Victorian EPA, Dr Peter McAllister.

CHAIR—It has been published in *Science*?

Mr Gingis—No, it has not been published in the *Science* journal. We have good reasons for that. We were ready to publish it. The only thing that stopped us publishing it was we had published the previous paper on the suppression of rainfall, which I referred to in here. I will show you some satellite images and how we actually measured that.

CHAIR—What was that published in?

Mr Gingis—In the *Science* journal.

CHAIR—It is just called *Science*?

Mr Gingis—*Science*; it is only *Science*. The *Science* journal is published by the American Association for the Advancement of Science. I referred to that paper in the paragraph at the bottom of page 3. It is the third paper by Professor Rosenfeld entitled 'Suppression of rain and snow by urban and industrial air pollution'. It was published on 10 March 2000 by the American Association for the Advancement of Science in the *Science* journal. It focused on south-east Australia. I will show you some satellite images further on taken in *Science*. That will explain it better.

Before we see what percentage is lost or how much approximately is lost, we were ready to publish this paper. That is a copy of the *Science* satellite image. Mind you, all our measurements are not models. They are physical measurements. There is a big difference between us and the CSIRO. We measure precipitation processes because we have these precipitation radars. Those precipitation radars are very accurate. They actually measure precipitation intensity with an accuracy of 0.7 millimetres per hour, which is a very, very good accuracy.

Ms LEY—I accept that the measurements are very good. You have described the cause and what you say is an effect. But where is the evidence that links the effect with the cause?

Mr Gingis—They were published in *Science*.

Ms LEY—You have described a scientific process of nuclei forming in clouds. You have described the pollution over industrial areas of Australia. You have described a lack of rainfall. The key to the argument is how you link the two together.

Mr Gingis—I will address that. We are comparing the fluctuations of air pollution discharges to the fluctuations of rainfall on the ground.

Ms LEY—I realise that. The measurements are probably very good. But what is the argument that actually shows the cause and effect? How can you demonstrate the close link between the cause and effect?

Mr ADAMS—We accept that what you are telling us is right. There is less rain. How do we prove that that is causing less water to fall?

Mr Gingis—Yes.

Mr FORREST—It might be useful to explain how a raindrop is formed. You need a condensation nuclei and there are too many of them, so it cannot form. The moisture is there, but it cannot form rain.

Ms LEY—We went through that. I understand that.

Mr Gingis—What Mr Forrest is referring to is that if you get the normal cloud that precipitates over the ocean, that is what we have found. This has been published in the *Science* journal, that particular satellite image. Have a look on the screen. You can see those clouds coming from the south-west. These clouds, when they are red magenta, have large particles of about 20 or 25 microns. Being a red magenta colour here, we actually measure the size of the particles. When these particles change in the areas that we know are polluted, like Adelaide, like Melbourne and, for instance, that particular satellite image, we are also measuring the effect through the precipitation radar. All these two white horizontal lines in fact are the boundaries of the precipitation radar.

What we have found is that the clouds affected by the well-known sources of air pollution not only change colour here—as you can see, that is approximately where Port Phillip Bay is; that day, Melbourne air pollution was going north—but you can see the brighter colours here and in the north-east. That is area No. 4. What we physically have done—I would like you to appreciate this particular point—is that we have delineated seven boxes on this satellite image. You can see box No. 1, box No. 2, box No. 3, box No. 4, No. 5, box No. 6 and box No. 7. You measure the microphysical structure of those clouds. We also have measured precipitation from these clouds.

To give you an idea, this is a black line going from box No. 1 to box No. 3; that is between A and B. The area south of Port Augusta and Port Pirie. I refer you to the graph above that satellite image between A and B. This is the area between A and B. With Box No. 1, you can see those colours here. These colours here are blue and green. If you look at the scale here, that is rain intensity measured in dBZ. It give you an idea what rain intensity measures, at approximately 30 dBZ, it is approximately 10 millimetres per hour on the ground. You also can see that that is a cross-section of the clouds. That is the clouds themselves. You can see these are the clouds. They are not really big clouds, but there is still rain. They are not polluted. When this cross-section from A to B—this is a grid line here—goes into the area affected in box No. 2, which is downwind from Adelaide air pollution, as that is approximately where Adelaide air pollution ends, you can see it is brighter. That is where those clouds are. There is no precipitation measured from those even larger clouds.

However, with this cross-section going into a relatively clean area—over the Wimmera that particular day—you can see the clouds start raining again. The Murray-Darling Basin is a cross-

section you can see between C and D and the ocean. This is the major catchment. You can see that the Wimmera area does not have huge clouds but they are all raining. That is clear in box 3. As soon as that cross-section—you can see that black line—goes into the area where it has been affected by air pollution from Melbourne, which is approximately here, even the clouds, as far as the colours are concerned, become a little bit orange. Can you see the difference between that colour here and that colour here?

Ms LEY—Is that every season? Is that at a certain time of year?

Mr Gingis—I will answer your question in a minute, if I may. I will explain that. These colours are from a spectrum analysis that has actually been developed by Professor Rosenfeld to measure the size of these particles in the clouds. So you can see here in the unpolluted areas in box No. 3 that these clouds, as little as they are, are all raining. See here? As soon as they cross into polluted areas, in boxes 4 and 5, even in much larger clouds they are completely shut off. Can you see that they shut off? They are affected here in this area, which is a typical area for the Snowy Mountains and the Victorian Alps. They are affected by the air pollution of Melbourne and go north and north-east on that particular day. They are also affected by air pollution over the La Trobe valley power stations, which again go along this way on this particular day. You can also see the gap between Melbourne air pollution and La Trobe valley air pollution, which is 150 kilometres away in west Gippsland. Can you see that? It is a little bit darker.

This area is also polluted, but not nearly as polluted as that coming out of Melbourne and the La Trobe valley. This is a gap here. It is a bit darker. In other words, the particles are much larger. That is why mainly west Gippsland gets more rain. But this precipitation measurement is the best explanation of what is physically happening with these clouds. You can see unpolluted areas have rain. Polluted areas have huge clouds over the critical catchment, but they get nothing.

Mr ADAMS—There are two or three issues. Is your measurement of clouds done physically?

Mr Gingis—Physically by instruments. We have instruments.

Mr ADAMS—Instruments from?

Mr Gingis—From NASA satellites.

Mr ADAMS—From satellites?

Mr Gingis—Yes. We also have compared that by flying into those clouds and measuring them. There are also measurements from the ground. These precipitation radars can be run from the ground. All of this has been a real discovery from 1997. Our measurements are very accurate. We believe that they are sound. I will answer Ms Ley's question. Could you repeat it, please.

Ms LEY—My observation is that, depending on the season, clouds are more or less likely to deliver rain. That may be influenced by factors other than pollution.

Mr Gingis—Let me tell you that it is a very good question. I appreciate the question. It is very critical for you to understand one important issue. With our scientific measurements, through satellites we can observe the clouds on a continental scale. It is not just seeing one cloud coming over Canberra or over Melbourne. We appreciate more than anybody else the origin of this cloud and the kind of cloud it is. More importantly, we can measure through our satellite measurements and aircraft measurement as well as through ground radar measurements the physical structures of those clouds. The advantage of satellite measurement is that we know where that cloud is coming from.

We have found three major groups of clouds affecting the Australian mainland. One is called convective maritime clouds. Those convective maritime clouds we call MC clouds. Traditionally, they come from the ocean. In different parts of the country, they come from different parts of the ocean. In the south-east they come in during the winter and during the spring and autumn, or in the autumn and late spring, the opposite. In early spring they come. They traditionally come from the west and south-west. That is why they are called convective maritime clouds. Those clouds are the main source of rainfall. They are not the cold front itself. They are post frontal clouds. They are very much receptive to the air pollution. We can see them. They change their physical structures very readily. The clouds are mostly affected by air pollution. That is what we have found. The clouds come directly from the south, not from the south-west or the west. They are much colder. If those clouds are colder—they are less than minus 12 degrees c at the bottom of the clouds—they are less susceptible to air pollution. In other words, in Australia, we have found the majority of them are warmer than minus 12 degrees and they are very much affected by air pollution.

There is a second type of cloud that is very much affected by air pollution. One is called convective continental clouds. These convective continental clouds, which you are aware of, are clouds that are formed over the land in afternoon storms. We have found that afternoon storm form over the land traditionally on a hot summer afternoon. When they are formed, they are ingesting huge amounts of not only air pollution, if there is reasonable air pollution, but a huge amount of dust. Dust plays exactly the same role as air pollution. In other words, we can see they are precipitating at least 50 per cent less of their capacity. Sometimes, as you are well aware, these clouds are the major cause of large hail storms. They are the major cause of those dust storms and often have little rain.

The third type of clouds that we still get that are not affected by air pollution, or we have not found huge effects, is those large tropical troughs that come in from the north-west of WA and from the north of Queensland. Those ones we have found are very old clouds. They are formed many thousands of kilometres away in the Indian Ocean. They are very high. If you could see them physically in an aircraft, you would see the aircraft under those clouds. They come in a very large form; in other words, they are very large. They obviously would be small and large. When they come into the south-east, they are very often depleted. They are not precipitating. You can identify visually those clouds because they are normally large. They could produce rain that falls for three days in a row. Traditionally, they are one colour, which is a grey mass. Their rate of precipitation is very steady. If there is one day of precipitation from those particular clouds—they have a rate of precipitation of 30 millimetres per day—and we know that it is a three-day cloud, in other words, it is big enough, we know that we will get 90 millimetres there.

CHAIR—Mr Gingis, I may have to stop you there. I am quite sure the committee would like to ask you questions. I apologise for rushing you, but I know that we are going to lose a few of the committee members because they have commitments after six o'clock.

Mr Gingis—I want to show you one more thing.

CHAIR—If you could do it quickly. I am sorry to rush you.

Mr Gingis—Yes, that is okay. I want to show you what actually happened with our rainfall last winter. I think it is critical for you to appreciate it. I also want to deal with the question concerning what actually is happening and how we know what is happening with south-east Queensland. I want to show you a satellite image. This is where Moreton Bay is. You can see Brisbane in this area. It shows unpolluted clouds in this system coming from the east. You can see the red magenta. You can see that these clouds change their colours immediately and stop precipitating. You can see that? That is what is happening. They change their physical structure. That is where all this area is deprived of rainfall. That is one question.

The other question which is critical for you to see is what happened last winter. I want to show you rain maps which I copied from the Bureau of Meteorology. Those rain maps in fact were taken and then recorded by us during the wettest day of last year, which was the 24 hours on 7 July. These were the south-westerly streams. The clouds were coming along from the south-west towards the north-east. These clouds have hit, firstly, an unpolluted area of western Tasmania. You are from Tasmania, Mr Adams?

Mr ADAMS—That is right, yes.

Mr Gingis—So there was substantial rainfall here. They also hit hard in the areas of Wilsons Promontory and western Gippsland. As soon as those clouds reached the La Trobe Valley power stations, they cut off. They reduce substantially the amount of rainfall in the Victorian Alps. Not only do they reduce substantially the amount of rainfall. The Snowy Mountains are much smaller than the Victorian Alps. The amount of rainfall in the Victorian Alps and the Snowy Mountains is much smaller than in Tasmania, where the clouds are very similar. You can see that in most of central Gippsland and east Gippsland, in particular, a huge track up to 300 kilometres long and maybe in some places 250 kilometres wide, there is no rainfall from those clouds. Those clouds are drifting all the way and producing nothing.

Mr ADAMS—But is there ever any rainfall on the white patch?

Mr Gingis—No.

Mr ADAMS—Never? There has never been any rain? There has to be rainfall there at some time on the white patch.

Mr Gingis—Let me explain, Mr Adams.

Mr ADAMS—Your assertion is that the clouds come in and they never fell on that part of Gippsland where the coal mines are, right?

Mr Gingis—No.

Mr ADAMS—Isn't that the assertion here? It is on that day?

Mr Gingis—On that day. The clouds on that day did not precipitate. I will explain to you. I will answer that. That is true.

Mr ADAMS—There are a lot of variations. There are a lot of reasons why they may not have done that other than your research explanations.

Mr Gingis—Let me explain. First of all, we measured these clouds through the NASA tropical rainfall measuring mission. I will explain that. You will have no questions after I show you the next rain map. We can see these clouds are supposed to precipitate all the way. They did not. That is also a recognised area where the forests have burned. It is not only that the clouds did not rain; there was drought.

In the next one, it is a systematics problem. It is that particular day. I want to show you a satellite image of that wettest week we had last year. That wettest week finished on 7 July. It is the entire week, not just one day. You can see how much rainfall fell on the west coast of Tasmania. You can see how little rain fell on the Victorian Alps and the Snowy Mountains. We were supposed to have more rainfall and snowfalls there. More important is the central parts of Gippsland and east Gippsland, because that is where most of the week there were south-westerly streams. Even the flat areas of south-western Victoria here received more rainfall than elevated areas of the Victorian Alps, because this area is unpolluted.

I will show you something which is closer to your electorate. You can see the south-east corner of Tasmania was deprived of rainfall here. What we have found is the main cause of that is very substantially the air pollution coming out of Hobart. I will answer your question.

Mr ADAMS—Okay. Let me assert to you that that has been the driest part of Tasmania since white settlement. It is not proving anything to me, I am sorry, because there is not other evidence to support that. The west coast of Tasmania is the wettest part. It always gets more rain than anywhere else. I think it would get more rain than those areas of Victoria on average. If you had the scales there, I could look at them and compare.

Mr Gingis—This is the scale, Mr Adams. This is the scale of rainfall.

Mr ADAMS—Yes, I know. I mean average rainfall.

Mr Gingis—I can show you more measurements. What we have found is that in that part of Tasmania there is no reason in that winter week that it should get more rainfall than the tops of the Victorian Alps and the Snowy Mountains, but it did. Let me show you the next one. This is the wettest week. This is the next satellite image and the next rain map in the second wettest week, where Tasmania had again very substantial rainfall. Air pollution from the La Trobe valley power stations stopped precipitation in the Victorian Alps and the Snowy Mountains. It is very substantially stopped.

To answer the question how come this area still gets some rainfall, I want to draw your attention to the next map. This is a typical, different event. You can see that this area now did get rainfall. It was inland.

Mr ADAMS—Another weather pattern.

Mr Gingis—Exactly. It is a different weather pattern. That weather pattern, Mr Adams, is in fact proving our point. That particular weather pattern was coming from the south-east. Let me just show you that when this particular low was coming from the south-east and it was streaming south of Tasmania, you can see the south of Tasmania got its rainfall. The east coast of Tasmania got its rainfall, but Hobart air pollution shut off precipitation inland. We measured that. What happened in south-eastern Victoria here is that because this part of it is not polluted, the rain went inland to the mountains and quite substantially beyond the mountains. However, the La Trobe valley power station pollution, with the flow from here, from the direction south-east, went towards Melbourne. It shut off precipitation not only in west Gippsland, which received little precipitation here, but all around the metropolis. It shut off precipitation, depriving rain to this part. Now this observation is very convincing. These observations are different between these measurements, which is what we are saying, and the Bureau of Meteorology measurements. Yes, indeed, it was a different weather pattern. In other words, they were the same type of maritime convective clouds coming from different directions.

However, the last rain map I want to show you is in fact the entire month of July, which was the wettest month last year. You can see the discrepancy. Even in the unpolluted flat coast of south-western Victoria, in some parts it got more rainfall than elevated parts of the Victorian Alps. You can see how much more rainfall in fact fell in Tasmania's west coast. That is from the Tasmanian Hydro-Electric Corporation.

Mr ADAMS—How long have we been measuring that pattern to fall like that? How far back can we go to look at that?

Mr Gingis—I can show you the site for many, many years.

Mr WINDSOR—What are your critics saying? We are not scientists. If there were a mob of scientists here, how would they shoot you down? What would they say is wrong?

Mr Gingis—That is a problem. We have to appreciate that what we published in the three journals is called scientific facts. They could publish something in three journals which opposes what we have published, but they have not. What they do, unfortunately, the CSIRO and the Bureau of Meteorology, is come along to you and the ministers of all the governments and the public servants and tell them that we are wrong, what our scientists wrote. That is a bad way of going about it. If they disagree with us, they can publish it.

What I have given with the references is, first, the methodology of Professor Rosenfeld, which was published in the most prestigious journal of the American Meteorological Society. That is the methodology. The research we have published in *Geophysical Research Letters* is in a refereed journal. All of that is scientific fact. What we have found in south-eastern Victoria is published in the *Science* journal, a refereed journal. All those satellite images of Victoria that I have showed you are all here and you are welcome to have a look.

Mr WINDSOR—I think we understand that. What is the CSIRO saying about this?

Mr Gingis—What the CSIRO is saying is irrelevant. Let them publish. What they are saying is that our science is flawed. That is a sneaky way of going about it. Unfortunately, the ministers and the departments believe them and not us. They have got not one shred of evidence to produce that our scientists are wrong. But that is what they are saying.

Mr WINDSOR—They are saying similar things in relation to cloud seeding.

Mr Gingis—That is another issue. You see, on attachment No. 5 here in this submission, I have put a recording, a transcript of what was said at a science seminar about one of my presentations that I was invited to give at a shire council. Dr Greg Ayers, just recently, not for scientific research, was promoted to head the atmospheric research division of the CSIRO. His statement was here. The recording was done not by us but by some farmer who was sitting next to him. He produced a transcript to show to you what he is saying.

Mr FORREST—We will have the CSIRO back here on 25 June. We will be asking them questions. Specifically, what do we have to ask them? Why won't they accept that your work is valid science?

Mr Gingis—Because they cannot produce any scientific evidence that could be published. You see, science is not argued on what you said and what I said. Scientific journals are designed. Our science has been published not anywhere but in the most prestigious scientific journals like the *Bulletin of the American Meteorological Society*, like *Nature*, like *Geophysical Research Letters*.

There is a paper Professor Rosenfeld published in the *National Academy of Sciences*. The *Nature* paper is another science paper. We are looking at a top-class scientist. Just to give you an idea, Professor Rosenfeld, for his scientific advancement in measuring clouds, was awarded an equivalent of the Nobel Prize for meteorology, the Verner E. Soumi Award. Verner Soumi was in the American Meteorological Society. That is the equivalent of the Nobel Prize for meteorology. That was for 2001 after he published that *Science* paper and after we discovered all that.

Mr WINDSOR—So why is the CSIRO shooting him down?

Mr Gingis—Well, I did explain that in my submission. After we worked for eight months with the Victorian EPA, I was lucky enough in the Victorian EPA to come across the director of science, a very nice gentleman by the name of Harry Blustein. He ordered one of his lieutenants, Dr Peter McAllister—remember that I mentioned his name—to do that modelling. After we worked with them for free, we did our part and they did their part. They did the modelling of air pollution discharges. At one of the meetings—and I put it in my submission—approximately on 28 February 2000, during other general meetings, we had a discussion with Dr Peter McAllister, who is the Manager of Air Quality Studies. He told me that the man just went white and was upset. I said, 'What's the problem, Pete?' He said to me, 'I just received a phone call from the CSIRO and they told us not to work with you.' I said, 'Why?' He said, 'That is the same question I asked them.' They explained to him that if we get government assistance and government support, be it from the federal government or state government, to do our research and to do cloud seeding work, which is revolutionary all over the world, this gentleman—he did

not want to reveal the name—said that if we got a budget, our budget would be taken from the CSIRO budget. It is as simple as that.

Ms LEY—How is your research funded?

Mr Gingis—Privately funded.

Ms LEY—And the interests that those private people have is what?

Mr Gingis—Well, it is basically Australian Consolidated Management, the firm I represent. It is not funded, unfortunately, by any of the Victorian, New South Wales or Queensland governments. We do all this research ourselves. The CSIRO has very wide connections. In Western Australia, they did not know until we spoke with an organisation called Indian Ocean Climate Initiative. The Indian Ocean Climate Initiative consists of two or three relatively scientifically incompetent departments. I am not sure. It also consists of the Bureau of Meteorology and CSIRO. The science part of it is driven by the Bureau of Meteorology.

Ms LEY—What interests do the private people who fund the AMC have?

Mr Gingis—We are just private people and we are just proud Australians. We just want to know what is happening with our rainfall. There is no specific interest. Without any funding, we determined the cause. We also got very vital solutions, which I want to prove to you. Our interest is to understand the drought scientifically, to publish about this drought and then to offer to potential customers not only the cause but also solutions, how to make these clouds rain.

CHAIR—The time has run away, unfortunately. We really would like to get your answers on record of what the solutions are and why cloud seeding works. That is your submission. Your submission was based on cloud seeding success. We would like to know your solutions and answers to why cloud seeding does work.

Mr Gingis—Thank you, Chairman. The last paper I mentioned published by the CSIRO was by Dr Brian Ryan, where he openly admitted that 40 or 50 years of cloud seeding in Australia under CSIRO management did not work. What he did is publish that in this journal.

CHAIR—When was that published?

Mr Gingis—It was published in 1997. He does not put any new science there. What he does is he just regurgitate on the affairs. It is called ‘Critical review of the Australian experience in cloud seeding’. In other words, they are admitting they cannot do it. Because they cannot do it, they are not allowing anybody else to do it. I actually had a meeting with Dr Brian Ryan and he explained to me, ‘I will stop any cloud seeding cowboys’, as he called it. I said, ‘Well, we’re not cowboys. We are doing proper and honest science. We are publishing.’ Moreover, the reason I could not attend the 7 April presentation in front of this honourable committee was that I had to attend the eighth World Meteorological Organisation conference on weather modification. I was the only Australian delegate presenting papers. I was presenting a paper on behalf of Professor Rosenfeld and found that there were 200 papers from all over the world. There are hundreds of weather modification or cloud seeding projects going around the world. In China alone, and I am

happy to show it to you, there are not three or 30 but 300 projects on harvesting their rainfall. They are harvesting in China. This is a map of Chinese projects. I actually gave a copy—

Mr FORREST—I would like this copy of the proceedings to be part of our evidence.

Mr Gingis—We do have productive, on their level, weather modification projects going in backward countries like Indonesia, Malaysia, Vietnam, South Korea and Thailand. What happened in Thailand eight years ago was that Professor Rosenfeld had an audience with the king of Thailand. From that audience, they established what is called the Royal Rainmaking Institute. There are three concepts there: education, research and operation. It is running. He is supervising.

Mr FORREST—Mr Gingis, we are going to run out of time. You are saying that the rest of the world is doing it and they must know something we do not know here in Australia?

Mr Gingis—Well, we also consider ourselves Australians. We also know these things. Let me tell you that with Professor Rosenfeld's help, for many years here, we have had the best. The problem is that the CSIRO and the Bureau of Meteorology are opposing what we do. They are stopping us. They are not recommending to governments to listen.

Can you imagine somebody like John Thwaites in Victoria? He is obviously a lawyer. He is not scientifically equipped to understand. He goes to the secretary of the department. The secretary of the department is not a cloud physicist, so he has no clue about cloud seeding, about how rain processes work. He goes to the department. Guess what? The department knows nothing as well. The department has to get some references, so they go to the CSIRO. It is a closed circuit. They all have connections in Queensland. We were talking to Minister Robinson. We talk to very nice people. The problem is that they have been advised by their own scientists working for them in the Department of Mining. These scientists are together with the CSIRO. They claim that this Toowoomba based climate centre is the best in the world. We tell them that it is not. They say they know all the answers. We tell them that they do not.

More importantly, who wants to listen? I was not able to get a presentation because of Minister Robinson's advice. We told them, 'Look, we're not saying that you should know everything.' In 2000, I travelled myself to give a presentation. It was on 13 December 2000. On my own account, I went and presented at Indooroopilly. That is where the Department of Natural Resources and Mines office is. The Queensland EPA is refusing to meet with me. I gave a presentation.

Mr WINDSOR—I want to come to the nub of this. If we asked the CSIRO, will they say that your scientific process is flawed?

Mr Gingis—Yes. They are saying it. We have it on the record here.

Mr WINDSOR—Mr Forrest has asked them on a number of occasions about cloud seeding. They are also saying to us that they do not see it as a priority, the CSIRO, with limited funds, so there are other things that are more important.

Mr Gingis—That is unfortunately what they are saying. The problem is that they are publishing papers without much knowledge. Because they cannot do it themselves, they fail. They are saying that they can do it, so nobody else can do it. Moreover, most of these papers, when they published in 1997, referred to work 10, 20, 30 or 40 years ago. That is a difference.

Mr WINDSOR—What are the Bureau of Meteorology saying? Have they made comments on your scientific research?

Mr Gingis—You have to be specific. You have the Bureau of Meteorology Research Centre. Dr Mike Manton is the chief of the BMRC. He is also referred to here in attachment No. 4. What the ABC interviewer is saying is that farmers are concerned that dry spots are getting longer and the rains are getting less frequent. What Mike Manton is saying is that `Yes, it is one of the things.' But he does not know what he is talking about. He is saying, 'We don't know what the patterns are.' So what is he getting research money for? Just to not tell us? So the changes from the decade to decade make it appear as though those things may be changing in a systematic fashion. But in fact, in general, they seem to be up and down. He does not know that. It is his job. That is what he said on the ABC.

Mr FORREST—What has the rest of the world done that we have not done here? What approach have they adopted whereby they have governments prepared to spend hundreds of millions of dollars on this research? What have they done internationally that we have not done here that makes it so badly discredited, what we did wrong in the 1970s?

Mr Gingis—That is a problem. They did it wrong in the 1970s.

Mr FORREST—We have to move on to solutions. We are trying to find a way to coax the CSIRO to change their attitude.

Mr Gingis—What we are offering is the best estimates we have on the Snowy Mountains. I made a proposition to David Kemp through his adviser, Michael Fitzgerald, nine months ago. We propose to have a very small amount of money, $400,000, to run a specific study over the Snowy Mountains to determine many things, including how much rainfall they are losing. It is through satellite measurements. What they know is that they are prepared to trial all over the world. They are prepared to cloud seed. They are prepared to learn by errors. But what have we got? We now have a great ability to do it in Australia on a continental scale and to do it very precisely through the physical measurements and through numerical simulations.

In the Hebrew University they have developed a special model, a cloud physics model. In a nutshell, I can explain to you what we have. We can measure the cloud system when it comes along many hours before it hits the catchment. How will it developed? We can also simulate what cloud seeding material we can apply to these clouds in order to make them of maximum efficiency. We calculate plus or minus 10 per cent how much rainfall they will produce and how much rainfall they will not produce if we do not seed them.

CHAIR—I have to be on duty in another couple of minutes in the House. Unfortunately, we will have to close because the deputy is not here. I will make this our last question.

Mr WINDSOR—What do you want this committee to do for you? Give $400,000 for a scientific experiment in the Snowy Mountains? What do you want us to try and do?

Mr Gingis—I want you, through my presentation and my interview here, to understand the cause of the problem of the drought. The fires are manmade.

Mr WINDSOR—We understand that. What action do you want this committee to take?

Mr Gingis—What I can suggest you can propose to the government to do—and you are in a position to do that—is that we, first of all, have proper research funding. We have to be given a budget to do proper research. With the state of our relationship with the CSIRO, I will not work with the CSIRO. I will work directly with the water authorities and directly with the Snowy Mountains Hydro authority, with the government and not with the local people of the scientific community. If they are not prepared to be honest and understand our credible science, we cannot see that they will progress with us. They closed their eyes, they rejected it, and that is what we want.

Mr FORREST—You want us to investigate a properly set-up research experiment over the Snowy Mountains?

Mr Gingis—Yes.

Mr FORREST—And urge for a commitment to that funding research to be made?

Mr Gingis—Yes. That $400,000 is the proposal we made to David Kemp. It is unique. I tell you what I will do. The World Meteorological Organisation, when we were there, suggested to hundreds of countries to virtually do a three-year randomised study. I have proposed to those countries to do those studies through satellite in one year but give them a report for three years because we have the data in our archives. That report will be very comprehensive, very precise and only for a fraction of the costs. To give you an idea—

Mr FORREST—We have to cut it off there.

CHAIR—We are very fortunate that you have that document there that we can take as further evidence. Your submission has been pretty extensive. We will take the time to make sure that we read it a second time.

Mr Gingis—Did you get this?

CHAIR—You can leave it with us.

Mr Gingis—I left copies of this for you. Please read this; it is important.

CHAIR—I thank you sincerely for the time you have given us this afternoon. It has been very good. Thank you very much. I would like to stop and talk to you for another half an hour. The committee stands adjourned.

Resolved (on motion by **Ms Ley**):

That this committee authorises publication, including publication on the parliamentary database, of the proof transcript of the evidence given before it at public hearing this day.

Committee adjourned at 6.28 p.m.