RESUMED **[10.30 am]**

COMMISSIONER: Welcome back. We are returning to the subject of security and non-proliferation issues. I welcome Professor Gareth Evans. Professor, thanks very much for joining us this morning. Counsel.

PROFESSOR EVANS: Good morning.

MR JACOBI: Professor Evans has been the chancellor of the ANU since January 2010 and is also an honorary professorial fellow. He was a member of the Australian parliament for 21 years in total and was a cabinet minister for 13 years, holding the offices of Minister for Resources and Energy and Foreign Minister, among others. Professor Evans has held international policy-making roles on a number of advisory bodies to the United Nations, and from 2008 until 2010 he co-chaired the Australian and Japanese sponsored International Commission on Nuclear Non-Proliferation and Disarmament.

Professor Evans is the patron and emeritus convener of the Asian Pacific Leadership Network for Nuclear Non-Proliferation and Disarmament, and until early this year, was also the chair of the International Advisory Board for the Centre for Nuclear Non-Proliferation and Disarmament in Canberra, and the Commission calls Professor the Honourable Gareth Evans.

COMMISSIONER: Professor, what we want to do is to go through each of our terms of reference and understand the international policy implications and complexities of each part of increasing the opportunity in South Australia for nuclear fuel cycling. If I start with a broad question, in a lot of submissions that we have received, there's a close linkage in the minds of the submission preparers between civil nuclear energy and nuclear weapons. In terms of international policy implications, do you see that link? Perhaps you could just expand that to start off with.

PROFESSOR EVANS: Of course there's a potential then, because aspects of the fuel cycle, in particular enrichment or reprocessing, can provide the wherewithal, the fuel, for nuclear weapons, but the international understanding from day one, and the international acceptance since day one, which I think I can honestly say is universal, is that these are in completely separate boxes. You can be a fierce opponent of nuclear weapons, a fierce proponent of nuclear disarmament as well as non-proliferation, you can be someone like me, and at the same time completely supportive of civil nuclear energy uses, subject of course to all the obvious conditions about safeguards, safety and security.

But the whole premise of the post-war world, and the discipline that the post-war world has agreed to submit itself to so far as nuclear non-proliferation with the NPT, the Non-Proliferation Treaty, the whole premise has been that it

is both conceptually and practically possible to keep those two policy dimensions completely separate and quarantine military uses from civilian uses, and I wholly agree with that position and my quite extensive international experience in this respect makes me believe it's a distinction that is absolutely workable.

COMMISSIONER: All right. Can I move, firstly, to the first term of reference, which is expansion of uranium mining? What are the international policy implications of that?

PROFESSOR EVANS: Well, with Australia possessing roughly a third of the world's uranium resources, and with the potential contribution these essentially carbon-free resources can manifestly make to meeting the world's energy needs, I see absolutely no reason why we shouldn't mine and export commensurately, and I see no conceivable international downside in doing so. No negative international reaction is remotely likely to Australia engaging in this part of the fuel cycle.

COMMISSIONER: We recently had evidence in relation to the agreement between Australia and India for the sale of uranium. Do you see any concern in relation to that particular agreement?

PROFESSOR EVANS: There are issues about that bilateral agreement. I'm not one of those who takes the absolutist position that we can't supply either nuclear material or technology to any country not a party to the NPT. I think we have to recognise the whole history of the NPT and do our best to get non-NPT members observing a whole variety of effectively NPT disciplines even if they can't or won't or are not allowed to become parties to the Treaty. So no prima facie objections to negotiating a bilateral agreement, but the detail of that agreement is rather important and my personal belief is that Australia should have insisted on more rigorous conditions in that agreement than we have in fact done.

In particular, there is a concern that the distinction between civilian and military facilities in India is not completely watertight. There is a grey zone potential overlap between the two, and we therefore have to be particularly careful if we want to observe the safeguards principle that no Australian-origin nuclear material should ever end up in a military facility. We have to be very, very clear about the accountancy arrangements or the physical movement arrangements that are going to be attached to every single atom of Australian uranium, and my understanding of the agreement is that we can't be so confident that there are ambiguities and weaknesses.

I would have much preferred that we attach perhaps a condition of the kind that the Americans have done, which is they will only supply uranium fuel to the

Indians on the basis of it being manufactured into fuel rods. We don't have that manufacturing capability ourselves obviously, but we could easily require an Australian uranium to be so incorporated in fuel rods design manufactured in the United States and make that a condition of supply.

Of course there are commercial issues that would no doubt then come into play as to the viability of any such more complex arrangement, but I think in principle, it's the kind of thing we should have been more concerned to insist upon, and I agree in this respect with the evidence that was given by Mr Carlson, the former head of ASNO, the safeguards office, to the joint committee on treaties in the Australian parliament. The concerns that he has regularly articulated in evidence to that body are ones that I share. I'm not saying at the end of the day that these considerations are so dramatic and so alarming that we ought not to go ahead with a treaty, but I think if Australia is to play to the reputation that I hope we have as a good international citizen and derive foreign policy benefit from that, we do have to be very careful about how we enter into these particular arrangements.

And even if the issues are more symbolic than substantive, because, after all, uranium is fungible and any supply to a nuclear weapon state, a nuclear arms state, raises the possibility of diversion of other equivalent material. So you're not necessarily affecting the overall balance by any constraints of the kind I'm proposing, but nonetheless, it is an important principle to articulate and an important principle to apply, and I think we have done less well than we should have and could have in that bilateral agreement.

COMMISSIONER: Thank you for that. It might be a good time now for us to move on to conversion, enrichment and fuel fabrication. In those particular areas, what are the international policy implications about - - -

PROFESSOR EVANS: Well, I don't think there are any international policy implications at all, so far as processing of uranium ore into uranium oxide are concerned, or were we to go down the path of conversion into uranium hexafluoride. There would be commercial, there would be safety issues of course, but not any policy issues at all. If you want to go further along the track and actually engage in enrichment activity, there are very, very real policy issues that here arise. I mean, you have to begin at the beginning and recognise that a non-proliferation treaty does not itself proscribe any state engaging in these activities, something that Iran was very anxious to insist upon its so-called "right to enrich" under the treaty.

But that said, there are very obvious proliferation risks associated with allowing any state to develop its own enrichment capability because of the obvious reality that the technology required to enrich to industrial standards for peaceful energy purposes is exactly the same technology whether it's laser or

centrifuge or whatever, exactly the same technology that's involved in enriching up to weapons grade, and once you get into that game you are in the business of having, as someone once described, bomb starter kits, and a world that is anxious to avoid proliferation ought to be very anxious indeed to involve any further spread of bomb starter kits.

So I think there's no commercial imperative that I can see, that's for others to judge, for Australia to go down the enrichment path. The sort of rule of thumb I have seen on this is it only begins to become commercially viable if you have got something like 20 domestic reactors to service, you know, to supply fuel to. The world is presently over supplied with both conversion and enrichment facilities at the moment. So there's no obvious market for getting into that business.

I'm working, of course, on the assumption that there is no security reason why Australia would want to have the domestic capability, I am working on the assumption which I am sure is well founded that there's no way Australia will go down a nuclear weapons path in the future, we will continue to honour our treaty commitments and take that policy position.

So in the absence of any commercial imperative or any security imperative, there is no good reason at all, I think, for Australia to go down the enrichment path and to actively foreswear going down that path to make it very clear that we're making a policy decision not to do so would be a positive contribution to global policy making, it is very important that many more countries lead with this kind of example.

The United Arab Emirates did win itself quite a few friends, I think, when it made a commitment in the context of announcing its civil nuclear intentions not to go down the path of building enrichment capability and I think we should do the same, and I think there are not only no negative international policy implications, there are real positives involved in doing so.

COMMISSIONER: We have had some evidence about the commitment from the UAE, I am just interested to understand whether you believe those are irrevocable, those commitments.

PROFESSOR EVANS: Well, probably not technically irrevocable, I mean, even treaty commitments, let's face it, are not technically irrevocable. Under the law treaties, you can usually walk away from them, whether it's the right thing to do, whether you will win any friends in the world at large by doing so, but as with any formal legal commitment whether given treaty format or not in the international sphere, it sets a very important constraint on a country's freedom of action to make such a commitment.

Country's reputations do matter in international relations and countries that get a reputation of playing fast and loose with the commitments they make, whether they're given very formal and rock solid legal format or not, are countries that don't do all that well in the wider international community when it comes to achieving other returns they want in terms of trade negotiation, diplomatic negotiations, election to international bodies and so on, reputations do matter and I am sure that would be a consideration for the UAE if it were ever minded to walk away from that.

MR JACOBI: In the course of some evidence we had earlier on, there was a suggestion, I think, at some level that in terms of offering assurance to other countries about the fact that we were committed to a civilian program as opposed to any other program, that in essence not much of a distinction was drawn between countries, and I am just interested to understand your view about in terms of communicating a message such as your peaceful intent, whether that view that really there isn't much difference between countries holds?

PROFESSOR EVANS: I don't accept that view at all. I mean I think there's a universe of different weights with which countries' words are given, there's a universe of different perceptions of the contributions that countries make to global public goods, you know, which are very often policy outcomes that don't deliver an immediate traditional economic interest or security interest return, but nonetheless are of manifestly worldwide interest to have and where cooperative solutions are required.

The way in which countries handle their approach to these transnational issues, which the proliferation of weapons of mass destruction is one such global public good issue, is a very clear sort of criterion for ranking the credibility of countries in wider international discourse. I strongly believe that it matters. Your willingness to take important positions on these issues and, of course, to stick to them and, you know, there's a bit of a disposition to say that it's all a realpolitik universe, the only thing that matters are the very crude, traditional interests we're used to thinking about, but my judgment is that these other things do matter as well.

The way I put it in a lot of writing over the years is that, in fact, every country in the world has not just two national interests of the kind we're familiar with, geopolitical strategic security on the one hand, and economic commercial investment on the other, every country does, in fact, have a third interest, an interest in being and being seen to be a good international citizen. By "good international citizen" I mean a country which is seen to be a cooperative player in the resolution of global public goods problems across a broad spectrum from weapons of mass destruction through to health pandemics and piracy and terrorism and drug and people trafficking and umpteen other issues of that kind

which are a central part in our international discourse.

To be seen to be a good international citizen in that way is not just a matter of boy scout good deeds, it's not just a matter of some sort of moral add-on, there are some really hard-headed reciprocal returns associated with acting in that way. The reputational returns which I have already mentioned, which are important to every country.

There's also straight reciprocity, if I as a country show a willingness to help you as a country deal with your policy problem which requires a cooperative solution, which matters a lot to you, maybe it's piracy for example in the West Indian Ocean, not mattering so much to us, that country, if we're seen to be cooperatively helping the resolution of that kind of problem, that country will be that much more inclined to help us when it comes to our problem, whether it's refugee outflows, unregulated population movements, or whatever. It's just the way the world works. I can't give you chapter and verse for that, I am just speaking from my experiences as foreign minister for eight years - - -

COMMISSIONER: That's very reasonable experience.

PROFESSOR EVANS: As a head of an international crisis group, major NGO working on conflict prevention and resolution for nine years and being very actively involved in international debates of this kind. Reputations matter, positions that you take on these issues matter.

COMMISSIONER: Can I return to the enrichment issue and clearly our terms of reference preclude us from any consideration of nuclear weapons. You have mentioned that that declaration is useful. What other things have you seen in terms of providing confidence to the international community about countries who are contemplating being involved commercially in that particular activity?

PROFESSOR EVANS: It's very important that any country engaged in nuclear energy production, civil production, have complete - or being contemplating getting into that business, very important that such countries have complete confidence in security of supply into the hereafter. There are various ways of giving them that degree of comfort. You can have more watertight commercial agreements, bilateral agreements with supplier countries that, you know, will give a country wanting to be in this business greater confidence than just being a prisoner of the ebb and flow of the market or current events might give, but usually countries want a bit more than that.

There's two ways, I think, of doing just that. One is by creating in additional to whatever other bilateral commercial mechanisms there may be, some kind of international fuel bank on which countries can be sure they will draw. Preferably administered by an international agency like the IEA. Now we have

one, we have got a couple of sort of quasi fuel banks already in existence, but the big one that's coming on stream quite soon is the Kazakhstan one which is being hosted by Kazakhstan but actually operated and controlled by the IAEA, and funded to a significant extent by private sector philanthropy, Warren Buffet, through the nuclear threat initiative.

I think this is an admirable initiative. It may never be drawn on, the reserves that are going to be accumulated in that particular location but it does give an extra source of solace and comfort to countries that will want that supply guarantee. The other general kind of approach is just to let countries go down the path of somehow getting in to the business of fissile material production but doing it on a multinational basis where they are participants, active participants, in some kind of fissile manufacturing operation. There are plenty of big – number of examples of this and the best known one is URENCO in Europe where basically the expertise has been pooled and shared and the facility is run on a completely multinational basis, which means that no single country can basically get away with using its access to that facility to use that material for anything other than its intended civilian purpose.

I think that arrangement has worked pretty well in the past. I would prefer personally to – for the future, to go down the path of internationally supervised fuel banks, rather than the multilateral root because the multilateral root implies at least some degree of engagement in the manufacturing process, even if only as a beneficiary of that. You may agree not to have access to the actual design of the technology involved; the black box answer, so called. On the whole, I would prefer to avoid going down that particular path but one way or the other, I think there is now a lot of willingness internationally to accept the utility and relevance of these kinds of solutions and some of the original anxiety we had from some of the developing world initially, that this was just another way of denying rightful opportunities to third world countries. I think a little bit of that ideological opposition to these sorts of arrangements has evaporated and that is a good thing.

MR JACOBI: Can I just pick up the black box technology aspects and in some earlier evidence we had, it was suggested that the concept of black box in technology was – I think it was described as an exercise in diplomatic physics and I think the idea was that if one could black box the technology, one could then essentially reopen it again later. If humans could lock it up, humans could later break it apart again and I am just interested in your view about the extent to which that might undermine a multinational effort?

PROFESSOR EVANS: Well, what you are talking about with black box technology here, I mean is something I addressed in the 2015 volume of the Nuclear Weapon State of Play report on page 232 to 235 in which what we are talking about here is the transfer of complete turnkey systems of facilities, as I

describe them, without the transfer of the enabling design and manufacturing technology, under conditions that don't permit or enable replication of the facility. So we are talking about a non-technologically capable country getting in to a cooperative enrichment arrangement with someone else, getting the benefit of that technology in a black box context but not being able to use it to sell. Is such an arrangement absolutely water tight? Is it inconceivable that the black box could ever be broken open and the technology could be required? Of course it's not inconceivable. Of course one can envisage circumstances, particularly when the technology we're talking about here is not particularly top secret and is notionally pretty much available to engineers anywhere. But – so don't let's overstate that but it does – the utility of this concept in the multinational arrangements we are talking about, is that it does mean that people can be active, cooperative participants in an enrichment facility without having on their own territory or manifestly full scale access to the technology concerned.

So all that we are talking about here is an additional layer of protections, of constraints, of limitations on the ease with which you can move from having some kind of access to fissile material technology and translate that in to military uses. That is of course, what we are talking about right across the spectrum here, it is a matter of – it is like the old argument why do we talk about trying to ban nuclear weapons completely because you can't uninvent the technology? Why did we even try to absolutely prohibit chemical weapons because the technology is understood and can be recaptured and reinstalled at any given time. Of course that is true but when you multiply the constraints, in those cases, chemical weapons case by formal treaty, or the case we are talking about now, by some sort of legal commitment, combined with a technological arrangement which doesn't give you any kind of easy access to the technology, we are multiplying the constraints. Multiplying the limitations, multiplying the confidence that you can have that this technology won't be misused and I think in the real world that is as much as we can hope for.

MR JACOBI: Perhaps if I can just come - - -

PROFESSOR EVANS: Sorry to be dismissive of it in the way that I think some of your previous witnesses have been, I think is not really particularly persuasive and of course one can be dismissive but one has to appreciate the balances that here involved.

MR JACOBI: Just to come back to enrichment, as I understand your answer earlier, that is that your preference is that simple state enrichment would not be a desirable choice.

PROFESSOR EVANS: Absolutely.

MR JACOBI: But do you have the same concerns about a multinational operation in Australia, or a fuel bank that was based in Australia?

PROFESSOR EVANS: No. The multinational – I mean I am not saying these are less preferred options, certainly the multinational one because it would imply some Australian participation which I don't think is necessary or desirable and I think we ought to limit these things. In terms of a fuel bank established in Australia, well we could volunteer to do that. I'm not sure that there is a particular policy need for another fuel bank, with the Kazakhstan one coming on stream. These are quite expensive to maintain because they do have to be subsidised by someone because almost by definition they are there as an insurance policy, as a guarantee of supply. They are not there as a regular source of deposits and withdrawals with gathering interest along the way. You can't apply a banking model to that as a commercial operation. So I can't see any obvious point in Australia going down that particular path. But in terms of the policy issues and the reputational issues, international policy issues that are involved, there is no obvious constraint on Australia taking on that role were anyone minded to give it to us, or were we minded to take it and pay for it ourselves.

COMMISSIONER: We might move on to energy generation. What are the policy implications considering generating electricity from nuclear power plants? Are there anything?

PROFESSOR EVANS: Well, there are no international, again, policy implications of any remotely negative kind. The world understands that civil nuclear energy is an entirely legitimate activity, atoms for peace, and not inextricably connected at all with the military issue and no downside of that kind. There are obvious safety and security issues which have to be taken in to account of the safeguard issues. Whether we embark upon such a strategy of building our own nuclear power plants, is a matter of combination of environmental policy judgment and (indistinct) judgment. The up-front costs are very substantial. Nuclear power generation – the long-term returns are problematic in the context of other alternative energy sources at the moment. It is a commercial risk. But in policy terms there should be no inhibitions at all; and my own judgement is that we are not going to be well enough advanced for the indefinitely foreseeable future with the kind of storage technology that is needed to enable wind and solar to give you effective base load capacity. And to that extent for base load it is going to have to be a choice in the future between fossil fuels of one kind or another or nuclear.

You have obviously got fossil fuel spectrum, clean coal versus gas versus dirty coal and so on and these are all policy choices that have got to be made and they will be made for different reasons than ones related to international concerns about non-proliferation and the fuel cycle as such. And that is

probably as much as I can usefully say on that subject.

MR JACOBI: In the course of evidence another issue was raised, which was that the adoption of an energy program might pose a problem for a country in convincing other countries that it only had NPP program, that is, it only wants to put in nuclear energy and it didn't in fact have the other facilities.

PROFESSOR EVANS: (indistinct)

MR JACOBI: No, sorry, a nuclear power plant, that is - - -

PROFESSOR EVANS: Yes.

MR JACOBI: That it only had a nuclear power plant, that it didn't in fact have enrichment or reprocessing. Do you think it would be a particular challenge for Australia to convince other countries that if we were to adopt nuclear energy we only had a nuclear energy program?

PROFESSOR EVANS: No, not at all, not at all, I think, because a number of countries have clearly gone down that particular path. Not every country that has a power reactor has an enrichment program. None of the non-weapon states have reprocessing programs except Japan, which is a special case, and the pressures are all on in terms of the non-proliferation regime and the intensity of concern about non-proliferation and for countries not to go down that particular path, and everybody knows what the commercial realities are at the moment, in terms of market over-supply. So no one would find it remotely surprising or implausible for Australia to say, "We're getting into the power business, but we're not getting into any of the lead-up technologies as well."

It's a totally plausible position, and it would be added to, of course, by Australia's general reputation, and again, the extent to which countries can be taken at face value when they make these sort of commitments depends on what kind of general reputation they have across a whole tradition of diplomatic engagement with others, and Australia's reputation is good in this respect, so I see no problems at all with that.

COMMISSIONER: Thank you. The final term of reference for us to consider is waste disposal and storage, and again, we'd like to explore what particular complexities might be involved, from an international perspective, of being engaged and potentially having waste storage and disposal facilities in South Australia, for instance.

PROFESSOR EVANS: Well, for a start, there are no downside international reputation or other policy issues here involved. Storing your own radioactive waste, or storing other people's, for that matter, doesn't really significantly in

any way raise proliferation risks because, among other things, of the difficulty of converting waste into fissile material unless you go down all the other technological paths of reprocessing. As we've already discussed, those issues just don't arise.

There are security issues to the extent that you get into the business of storing more and more radioactive waste, including others, and you have to be very careful indeed about how they're handled, but again, it's easy to exaggerate the security risks associated with radioactive waste because in the context of producing fission, again the problems of converting that waste into anything remotely usable to make a nuclear reactor are immense and there's no real connection there at all. I mean, a terrorist or whoever, or just a routine common, garden burglar, grabbing some of the stuff and trying to put it onto the international market wouldn't find too many buyers, frankly, or too many users.

There is an issue about radioactive waste being used as a component in a so-called "dirty bomb", a radiological bomb, which is a matter of concern. What we're talking about here, of course, is not a fission bomb of the Hiroshima-Nagasaki kind, but simply radioactive material being strapped onto conventional TNT explosives and spreading some degree of radioactive hazard around the area covered by the explosion. You could do a degree of damage in the middle of a city setting off such a dirty bomb, there's no doubt about that, but it's easy to wildly exaggerate the physical damage that's involved; not easy to exaggerate the psychological damage. I mean, you would be talking about very large implications of that kind. People would be very spooked for a very long time by any such explosion taking place.

But it's important to realise that this is a debate that's really going on a completely separate track from anything South Australia or anyone else might want to do about waste disposal. There's already an issue about dirty bomb potential with caesium-137 and other radioactive materials being in pretty widespread industrial and medical use, and anyone really determined to get hold of that material to set off a dirty bomb would have other options than those that we're talking about than some properly secured waste repository.

So that's that side of it. In terms of the positives involved, I mean, my personal view is that it's a complete no-brainer for Australia to go down this path; we should, certainly in relation to our own Australian-origin nuclear material, taking back the waste, including the high-level waste associated with that, and being prepared to store it ourselves, and also, I think, being completely prepared to look at the possibility of doing it for other people's origin material as well on a proper commercial basis. The argument for that is of course economically attractive.

I haven't done the arithmetic. I haven't got the capacity to do it, but on any view, this is a potentially huge worldwide market and it's not presently being supplied by anyone else, although the Finns and Canadians and Swedes are still talking about it and doing a little bit about it, but nothing much is really happening, and if Australia could move ahead of the game and establish such a repository, we would have potentially enormous commercial potential, I think, in doing so.

Also, I think there's a reputational return in going down this particular path, for all the reasons I spelt out before: good international citizenship, cooperative contribution to what is clearly a global, public-good environmental issue, and we would unquestionably stand very tall in the international community were we to pull off an enterprise of this kind. Are we capable of doing it in terms of the physical characteristics of the South Australian landmass? Well, that's again for others to judge. All I know is that Australia is probably the most geologically stable continent on the planet and we should have a pretty high measure of confidence. I would have thought that we could find appropriate places to dig.

Any such repository, might I add - you'll probably ask me how many - I think should be constructed in a way where the process is reversible. I think there's still concern about the very, very long-term leaching of various radioactive materials back into the environment. I think a lot of those concerns are exaggerated, and it's a bit hard not to believe that somehow within the next 20,000 plus years we won't solve the kind of technological problems that are in the way of dealing with plutonium-39's half-life, but I certainly think it's possible to contemplate right now medium or deep, reversible, underground storage solutions for high-level radioactive waste and it's certainly possible to find solutions for that in the Australian geological context.

COMMISSIONER: You gave a key note address to the Bulletin of Atomic Scientists' annual Clock Symposium in Chicago on 16 November this year, and if I just pick up a couple of your lines of thought there, you were talking generally about getting the international community serious about measures to improve nuclear security, and you mentioned that we still needed to do better, that there are gaps. This is on page 3. So this is in the context of security. I'm interested to understand what those gaps are, in your view, and particularly the relevance to the sorts of terms of reference that this Royal Commission has to address.

PROFESSOR EVANS: Yes. Might I say, I was also in that presentation arguing the world should get very much more serious about nuclear disarmament and non-proliferation as well as the issue of nuclear security, but I can perfectly understand why you want to focus on security. No, what I said there is that although there's been a lot of attention given to nuclear security,

that is, the issue of ensuring that rogue non-state actors, or indeed, rogue state actors, don't get hold of either fissile material that could fuel a nuclear weapon or a nuclear weapon itself.

Although there's been a lot of international attention given to this with the successive summits initiated by President Obama in Washington and then Seoul and then the Hague and to be concluded with a final summit in Washington next year, I do think that some of the self congratulation that has been associated with those summits is a little bit overplayed because there are some serious gaps left in the international capability to deal effectively with these security risk issues even though there are some significant international instruments now in place and quite a number of national commitments that have been made.

What are those gaps? Well, we can list them. I think basically the first is that nothing has been done in any of this process to address the 85 per cent of the world's sensitive nuclear material, highly enriched uranium and plutonium, which is under military control as distinct from civilian control and if we are serious about ensuring that none of that is ever diverted to uncomfortable purposes we have got to do something about those stocks.

We can do better in terms of overarching international standards, there are some relevant conventions and protocols but they're fairly limited in scope. Most of the effort so far has gone into establishing national standards, national commitments, rather than overarching international ones, and so far as the national ones are concerned there is - while a lot of those are highly desirable, the commitments that have been made, there's no real provision for accountability in a lot of the international accountability, no follow-up if people don't follow through on those commitments and not much transparency.

Beyond that, my concern is the obvious one that international cooperation in this area has been becoming more rather than less fragile in recent times with the US Russia disagreements and Russia walking away from further participation in the Nunn-Lugar program for some allocation of nuclear material to civilian uses, and the fact that umpteen million American light bulbs are, in fact, interestingly powered by the contents of former Russian bombs, and that kind of classic cooperative program for reducing the risk associated with having this material lying around is on its uppers at the moment and that's very unfortunate.

I think also there's a gap in the sense that the IAEA, International Atomic Energy Agency, who would want to be the primary international control agency or supervising agency, is very under resourced in this respect. So that's the kind of agenda that I have been articulating, as have a number of others in the context of this process.

I wouldn't elevate any of these concerns to the level of sort of show stoppers because I think, you know, in terms of the kind of thing that we might be minded to do here in Australia in developing civilian nuclear energy, I think we're probably at less security risk because of our geography than many other countries in this business, and the kind of commitments and the kind of processes that Australia has in place are pretty rigorous by International standards. So I don't think it's a huge issue for us, but internationally it's certainly something we ought not to be complacent about and not to just tick that box and say that security is now done as a result of that international process.

MR JACOBI: I don't know whether it might be inherent in your last answer, but you also spoke about there being a loss of traction with respect to some non-proliferation strategies, and I am just interested to understand the extent to which they were linked to civilian nuclear fuel cycle activities.

PROFESSOR EVANS: Yes. Well, I mean, the loss of traction I talk about there is in arms control and disarmament arrangements generally, the absence of further movement of the US Russia bilateral negotiations as a follow-on to the START Treaty and so on, but also in terms of non-proliferation, I mean, there are many ways in which one could still strengthen the non-proliferation regime through achieving the general universalisation, for example, with the additional protocol which is a higher level and safeguard standard than the traditional accountancy one, it implies actual detection of activity rather than just keeping track of where atoms are going.

You know, because of the international dynamic that has been in play over the last three years or so, you know, in particular the tension as between Russia and the United States, there has certainly been a falling away of international momentum on the disarmament arms reduction front and that has translated into, as we saw at the NPT review conference earlier this year, it's translated into a sort of cantankerous unwillingness on the part of the non-nuclear weapon states to be more forthcoming in terms of agreeing to stronger non-proliferation measures.

There's no rational basis for that position. If you don't think the weapon states are doing enough on disarmament, that's no obviously rational foundation for saying, you know, we ought to do less on non-proliferation, we should, but psychologically these things matter. Another loss of traction has been in the hope of getting some kind of weapons of mass destruction for a zone in the Middle East and, of course, that has just fallen apart in the context again of Russia US tensions but also tensions on the ground in the Middle East with Israel being even less forthcoming now than it has been in the past about doing to unwind its own nuclear armoury.

COMMISSIONER: I think that concludes the questions we had for nuclear non-proliferation, but whilst you're here, and I note that it was a topic in your keynote address to the Bulletin of Atomic Scientists. I am not asking for a discussion of the economics, but an opinion perhaps of the role that nuclear might play in the issue of climate change as potentially a carbon-free source for energy into the future. You expressed some views at this particular conference on that. It's topical, they're in Paris at the moment discussing that matter.

PROFESSOR EVANS: I can't believe that nuclear won't be an important part of the carbon reduction solution. To take a different view means either wanting to hang your hat on fossil fuel strategies that move away from coal to gas, which are still problematic in carbon terms but, you know, manifestly less problematic than coal, is that the whole answer as I think, you know, some people would want to argue to the big baseload issue. It also means, you know, assuming I guess, that we're simply not through other renewables, in particular wind and solar, going to get to the stage ever of those technologies making a major contribution to baseload supply.

Now, never say never when it comes to matters technological, maybe, you know, we will find some way of dealing with the storage issue here which enables these, you know, technologies to really zoom up the charts in terms of their baseload contribution, but in the absence of any obvious grounds for confidence about that, I have always believed that nuclear has to be part of the solution and I find it frankly, you know, disconcerting that some countries have been so spooked by the Fukushima experience, Europeans in particular, the Germans walking away from it, others stepping back, I find it, you know, difficult to believe that that's a very rational response.

As I said to the Chicago Bulletin meeting, when you look at the things that have gone wrong with simple nuclear energy production at Fukushima, at Chernobyl, at Three Mile Island, there's nothing that we don't know how to fix, there's nothing that shouldn't have been foreseen and fixed anyway, and there's nothing we can't afford to fix in terms of, you know, what went wrong on those occasions, and the notion of being, you know, so spooked by this that you won't even consider, you know, the possible utility of nuclear playing a really quite major role in the larger environmental strategy to me seems a triumph of emotion over reason.

Of course, in any given country context there are going to be economic issues that are going to have to be debated, of course, nuclear is an expensive option, of course nuclear is a very expensive comparative option for Australia because of the availability that we so obviously have, conveniently accessible fossil fuel resources including gas, but I would very much like to see it part of the solution and I think it's time we just grew up a bit and had a very fully

considered reasoned response to each of these issues rather than being driven by vital bodily fluids, emotional considerations that seem to have been so central to the debate for so long.

COMMISSIONER: Professor, I thank you very much for making time in your busy program to come and provide evidence. Very useful, and thank you for the preparation of the evidence as well.

PROFESSOR EVANS: Not at all. I appreciate the opportunity, thank you.

COMMISSIONER: We will adjourn until 12.30.

ADJOURNED **[11.20 am]**