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[11.00 am]

COMMISSIONER: We'll reconvene at 1100. The topic is security and non-proliferation risks, and we welcome Professor Henry Sokolski. Thank you very much, professor, for joining us. Counsel.

MR JACOBI: Undertaking nuclear fuel cycle activities for peaceful purposes carries with it the unique potential for some technologies and materials to be adapted or diverted for non-peaceful means. History has shown that governments and non-state actors have made attempts to adapt technology or divert materials. The Commission's terms of reference require it to consider the extent of the risks associated with the establishment of a range of nuclear facilities. This includes the potential expansion of the mining and milling of uranium or the establishment and operation of facilities to process uranium into nuclear fuel to generate power or to store and dispose of nuclear waste, including spent nuclear fuel. Each of these activities carries some proliferation and security risk.

The concept of proliferation relates to a national government's acquisition of nuclear technologies and materials for the purposes of establishing a new nuclear weapons program. Security is concerned with the protection of materials and technologies. Both of the issues are related. The Commission is concerned to understand which activities present particular proliferation and security sensitivities and how they might be exploited. The Commission will then need to consider the regulatory and other means which are in place to minimise those risks, including international safeguards and physical protection measures and their effectiveness in achieving those objectives.

The Commission will analyse those risks in a South Australian context, that is, by conducting the additional risks created by the potential establishment of

South Australian nuclear facilities or by the export of products from such facilities. In that sense, the Commission's task is narrower than would be the case if it had to review issues of proliferation and security more generally in the context of nuclear facilities located in anywhere in the world.

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As has been explained in the issues paper, the issues of non-proliferation and security fall within the realm of the commonwealth government, and in the case of non-proliferation exclusively. The task for the Commission is not to review the organisations responsible for those matters or their effectiveness, but rather to identify the reasonable range of risks associated with the potential expansion in activities and report on that range. The Commission has already touched on these issues in the evidence of Dr Tom Cochran, and to develop its appreciation of these issues, the Commission will today speak with Professor Henry Sokolski about the extent of those risks, and Dr Robert Floyd, Director General of the Australian Non-Proliferation and Safeguards Office, ASNO, about the international and local regulation and management, and indeed, it will return to this issue in the coming weeks.

Professor Henry Sokolski is the executive director of NPEC, a not-for-profit organisation established in 1994 and based in Washington DC in the United States. NPEC seeks to promote and enhance the understanding of strategic weapons proliferation issues, and Professor Sokolski also serves an adjunct professor at the Institute of Politics in Washington DC. Previously, Professor Sokolski has held positions including deputy for non-proliferation policy in the Pentagon and is a member of the Central Intelligence Agency Senior Advisory Group. Between 2008 and 2010, Professor Sokolski served as a member of the Commission on the Prevention of Weapons of Mass Destruction Proliferation and Terrorism, which was established by the United States congress, and the Commission calls Professor Henry Sokolski.

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COMMISSIONER: Professor, if I might go directly to the risks, you will appreciate the Royal Commission is looking at the opportunity, cost and risk of extending its activities beyond just mining into areas of power generation, of waste and storage, and front-end nuclear activity. For a nation such as Australia, what do you think the non-proliferation risks might be as we expand in those areas of the nuclear fuel cycle?

PROFESSOR SOKOLSKI: I think the key risk in every case, even including mining, turned very heavily on whether or not the activity can be sustained by domestic consumption and finance privately. If those two conditions are met, the risk with regard to exporting to marginal customers with marginal non-proliferation credentials is all but eliminated. The second concern, however, may be independent of that. It is conceivable, although I think the invisible hand of Adam Smith will guide you away from these dangerous, uneconomic activities of reprocessing spent fuel and enriching uranium.

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But if, per chance, you were able to make money through domestic consumption there still would be a second risk, and that second risk would be the example that you would set for your neighbours and the world. That would be a problem as well, because these activities, whether meant to be peaceful or not, bring nations to the brink of bomb making, and really cannot be safeguarded in a fashion that meets the IEA's own criteria for timely detection.

COMMISSIONER: I might pick up that issue of safeguarding in a minute, but based upon what you've just said, do you see a non-proliferation issue with light-water reactor power generation, for instance, if activities were to be constrained to that?

PROFESSOR SOKOLSKI: Yes, I do. The problem with light-water reactors is that despite their peaceful intent by their designers, they can be used to make weapons-grade and weapons-explosive plutonium in large amounts. The United States government in 1987 actually considered seriously buying an incomplete civilian reactor in Washington State to produce weapons plutonium and tritium to put pressure on the Soviet Union. For a number of reasons, including glasnost and détente, we did not follow through on that, but technically it was very attractive. So power reactors are safeguarded by the IEA in recognition of this possibility.

So light-water reactors are not immune. I think if you are looking for an immune activity to proliferation implications it would have to be very small, zero power research reactors that could not produce enough material to make a single bomb in anything less than five to ten years. Those I think you can let spread almost about anywhere, and you can get timely detection of diversion in plenty of time. Once you depart from that, you back into some very tricky propositions.

COMMISSIONER: We are talking about an Australian context here. So what do you see are the difficulties in providing safeguarding for a country such as Australia?

PROFESSOR SOKOLSKI: Well, in the case of Australia, assuming there was no desire to get nuclear weapons, and the memories of past programs were well behind you, you could argue that safeguarding wouldn't be an issue except to the extent that it presented a precedent for other countries. This is why I get back to the first criteria. If you launch into a program that is state supported - that means subsidised, directly or indirectly - and the project depends on that support, you will then enable other countries, including your neighbours, to argue that, well, they too would like to engage in these activities.

Once you engage in a power reactor program in a country that may not have

the intent of keeping the program peaceful into the future, you run into problems. So you have to think ahead of whether or not you have the high economic, if not high moral, ground to be able to say, "We engage in this activity because we don't need to have state support. It actually is financed and supported by domestic financing and consumption." That standard would probably allow you to go ahead and not only have to worry about safeguards, but the example you've set.

COMMISSIONER: We had it put to us that nuclear power generation might be the saviour in terms of climate change. Would you add that to your economic analysis of light-water reactors in terms of accepting their development?

PROFESSOR SOKOLSKI: I think I would not, and I'll tell you why. This is a topic which has been debated very extensively here in the States and as a result, the folks promoting nuclear power and the folks who are against nuclear power have gotten focused on very, very detailed analytical models. The best, or I should say the one used the most, is put out by an auditing firm called McKenzie. This model has been used by Greenpeace analysts and the largest merchant utility utilising nuclear power, Epsilon, and they both use this model and they both agree that it's a good model, and this model tells you that you should do about ten other things first if you're serious about reducing carbon before you buy a new power reactor. That strikes me as very, very interesting and as positive.

More recently, I think you can read an article that was put out by Chris Buckley in the New York Times, and he makes the case that others do, that China must go with nuclear to reduce its carbon footprint. But he repeats the claim by the government of China that at most by 2030 if every one of the reactors they built was built on time, which will be a remarkable achievement, they will only have 10 per cent of their electricity generation supplied by nuclear. The rest will likely be fossil fuels.

I think this tells you how far you can go with nuclear. First, not very and second, there are quicker ways to reduce carbon that are cheaper. Mostly it has to do with management of consumption which is a fancy word or phrase for turning the lights off more regularly and the second thing is doing natural gas substitutions for coal. Those are your quickest, cheapest ways to most dramatically reduce carbon and that is the project probably of the next three decades. That is where you will make your advances. Also grid rationalisation; most people don't realise it but if you look at an outlet, power outlet, and you ask yourself the question of what am I paying for when I pay the bill for what comes out of that outlet? Most people think that they're paying mostly for electrical generation. I think in the United States, usually my students say 70 to 90 per cent of their bill must be related to the generation

of power. Actually two thirds of the cost have nothing to do with generation, has to do with balancing the grid.

5 If you rationalise your grid by making it more efficient, you don't need
anywhere near as much power generation. It's very non-intuitive and that also
will be a major avenue for reducing the amount of electrical generation and
therefore the amount of carbon. The investments of the Chinese demonstrate
this. They are spending more on their grid rationalisation and are interested I
10 think even more in capitalising on liquefied natural gas imports and natural gas
substitution for coal than they are in nuclear, which is not generally well
known.

MR JACOBI: Professor, I was just hoping to pick up, the Commissioner's
question, I think specifically asked as to whether or not you should factor in to
15 the – your economic argument, other benefits? That is, other than the fact that
it might be profitable and benefits such as CO2 abatement, in to your calculus
with respect to that matter? That was – I think his question, irrespective of
whether you might - - -

20 PROFESSOR SOKOLSKI: Well - - -

MR JACOBI: Irrespective of whether or not you might have an argument
about whether those benefits exist or they don't?

25 PROFESSOR SOKOLSKI: Well, I thought I was trying to answer that by
saying the model that merchant – the largest merchant nuclear utility in the
world uses, tells them that the economics do not recommend it until very, very
late in the game. They argued that having used this model that the price of
carbon as a tax, which currently is zero most places in the world would have to
30 rise to somewhere in the neighbourhood of \$160 per tonne, or conversely you
could have a combination. If the price of natural gas for 1,000 BTU they argue
rose to the level above – in the United States of above \$8 per 1,000 BTU and
you had a carbon tax of over \$25, it would then perhaps make sense to build
new power reactors. Those figures, economic figures make it very clear that
35 that is very distant. Our price now is for 1,000 BTU for gas is now around \$2
and we don't have any carbon tax at all. Zero. And I think in Europe it's not
even anything close to seven. So the short answer is, I wouldn't factor that in,
or if I did, it would be very slight because the economics currently don't seem
to sustain that argument. What the economics argue is that you should do
40 many other things before, if you are interested in reducing carbon, and so I
wouldn't give that much weight. In fact there are a numbers through this
model assigned to it and the economics don't look very strong for using
nuclear for carbon abatement.

45 Let me give you one example, just to drive this home. If someone comes to

you and said, I can eliminate all the carbon emissions in the world but here is the catch, I need 200 years and a quadrillion dollars now. And someone comes to you and says in 20 years, I can reduce your carbon emissions by 50 per cent and I don't need you to do anything but follow the economic signals you are
5 current getting by doing gas substitutions, it's pretty clear what you would do. That is the reason why I would not give much weight to that fusion option, economically, for obvious reasons. There is a time value to money investments in carbon reductions and that is what that model, the McKenzie model does. I
10 recommend focussing on that and thinking about the economics of any carbon abatement scheme, whether it's wind, solar, nuclear or anything else.

MR JACOBI: Can I come back to – closer to home and to non-proliferation, and - - -

15 PROFESSOR SOKOLSKI: Yes.

MR JACOBI: - - - I am just interested in picking up on where you see the relative risks associated with proliferation existing, thinking about the entire nuclear fuel cycle? Is it right to say that the greatest risks exist in the area of
20 enrichment and reprocessing?

PROFESSOR SOKOLSKI: Yes. But with one qualification; you can't reprocess without a reactor. If you only – if you didn't have reactors in the world, reprocessing wouldn't be a threat. So you need to have two to tango and I think people get this wrong repeatedly. They think, well all we have to
25 do is prevent the reprocessing. Certainly when I was learning first about this topic back in 1973 and four, there was an optimism that we could somehow prevent the enrichment and the reprocessing clearly. The problem is that increasingly, enrichment is being seen as something that is not to be viewed as
30 dangerous and as normal and reprocessing may get that status fairly soon on the one hand and the on the other hand, we have learned over the last 20 years, that the ability to find covert facilities is very, very wane, we keep getting surprised late in the game about where things might be. When you put all of
35 that together, it really recommends thinking about more of the fuel cycle rather than less and I think what we have learned over the last 40 years is that it's too optimistic to think you only need to worry about what you can see in the way of enrichment and processing.

MR JACOBI: I am just interested in just thinking about the fuel cycle
40 conceptually and that is that if I was to have a nuclear power plant in isolation of enrichment or reprocessing - - -

PROFESSOR SOKOLSKI: Yes.

45 MR JACOBI: - - - and I am just interested to understand your view with

respect to what you consider the proliferation risk is, associated with that?

PROFESSOR SOKOLSKI: Well, clearly if you only had a power reactor and you did not have reprocessing enrichment and you were confident with that,
5 then I think you would be quite safe. It's the lack of confidence in the other propositions that brings the trouble and I must say, we are moving towards a world that is accepting of enrichment and of reprocessing which complicates the problem doubly. Not only now have to worry about covert lines but overt lines. Because once those activities begin, even if they're monitored, they
10 cannot be safeguarded. The reason why is you can inspect but you cannot get timely detection of abrupt or even gradual or incremental diversions from those very large processing facilities.

MR JACOBI: I actually want to come back and just deal with that particular
15 issue in a minute.

PROFESSOR SOKOLSKI: Yes.

MR JACOBI: But I am just interested, if one comes to a country like
20 Australia which is a signatory to the MPT - - -

PROFESSOR SOKOLSKI: Yes.

MR JACOBI: - - - and is involved internationally in non-proliferation efforts,
25 I am just interested to understand what you see is the real proliferation issues, if a country like Australia was to engage in more fuel cycle activities and perhaps if we can start off with nuclear power plants?

PROFESSOR SOKOLSKI: Well again, I think you make a pretty good case
30 that if you could restrict the activity only to a light water reactor, and you could convince the world that you are not engaged in any of the other activities of enrichment or reprocessing, you would have a technical leg up. You would still be setting a precedent if however, you were subsidising that activity because others would then use that as an excuse to go ahead. So you would be
35 in a smarter position if you did not have those things but you wouldn't be totally clear.

MR JACOBI: Do you think that risks change if one then adds enrichment or
40 reprocessing in to that mix?

PROFESSOR SOKOLSKI: Substantially, dramatically. So you go from sort
of okay to really bad and the reason it becomes really bad can be seen, I think most easily by looking at the current situation in East Asia, which is not that distant from you. I have been spending the last year travelling back and forth
45 talking to Chinese, Japanese and Koreans, South Koreans. And the problem

there is once you get in to this activity, in this case reprocessing by the Japanese, they were going to open their facility up really massively large facility for recycling weapons explosive plutonium in March of next year, if you get engaged in that activity, well the Chinese were very interested in following suit. And then the concern was well if the Chinese or the Japanese went ahead, the Koreans would demand that the United States allow South Korea to do the same thing. In all of these countries, when you start engaging in uneconomic dangerous separation of plutonium, the prospects are very, very great that you will be stockpiling literally tens of thousands of bombs worth of plutonium for many years.

Now the idea that countries like Australia would engage in this, would only give further credence to the idea that, well everyone's doing it, why not us? You might even see your neighbours follow suit. I mean it's pick a sensitive possibility. I understand the Indonesians are now interested in possibly buying Russian floating reactors. What else might they be interested in? What might the dynamic be between your country and Indonesia if you engaged in certain other additional activities? One wonders.

MR JACOBI: You have identified, I think so far, some deficiencies that you consider exist in the safeguard system with respect to - - -

PROFESSOR SOKOLSKI: Yes.

MR JACOBI: - - - the ability to detect, and I am just interested to understand what you consider the key deficiencies are in the system that might relate to Australia?

PROFESSOR SOKOLSKI: I think you are never going to be able to keep track of the gases, powders and liquids involved in enrichment in reprocessing and most fuel fabrication and probably uranium feed activity such as hexafluoride plants. So whatever your intent, you will inherit the great tradition that we have learned about in the United States, it's called material unaccounted for and in our case it's several thousand kilograms of material. We don't know where it is. We still don't. So you, if you're lucky, if you get engaged in this activity, will be able to join us in this great tradition of not knowing where literally hundreds of bombs worth of material will be. So there's that; I think you have to be concerned about other people's experience making fuel and their inability to keep track of all of it. Under the best of circumstances, large facilities technically, according to the IEA, you can keep track of everything statistically but one per cent, that sounds pretty good until you look at the size of many of the facilities that would be recommended for commercial size activity and you consider that if you put humans in the loop, the number goes up. It goes up several fold and then the numbers get very large per year.

So even again, under the best of intentions, you create an environment where you are having to argue about where things went and justify why you shouldn't worry. That's not anything that encourages a great example for the rest of the world. And it's just – it's no one's fault, it has nothing to do with motive.

MR JACOBI: Sorry, am I to understand from that, that there are simply inherent deficiencies in the system of accounting in your view?

PROFESSOR SOKOLSKI: I have to admit that my background is that of someone who studied constitutional law in graduate school for many, many years. I do read, however, luckily. There's hope for people like me. You can get in to other topics, so I am not going to propose that I am a physicist, I know my limits but there are certain laws of physics that I'm aware of, or I've heard about and diplomats don't like dealing with these laws. They'd like to have a world that doesn't accord with the laws of physics and so they talk about things as if technical realities can be ignored. You can keep track pretty well of large solid objects, this is commonsense but when you're talking about particles of gas, particulates of powder and liquids, the measurement capabilities of all of the things that we can imagine, are not what they need to be. You are going to lose track statistically of some of the material.

More important, far more important than that gradual diversion problem that I've raised, it's a technical reality, is that when you start dealing with materials that are themselves nuclear explosives, plutonium that's separated and is plutonium. Highly enriched uranium. These items can be directly made in to insertable weapons cores and the amount of time that you can have after detecting a diversion, before it becomes a bomb is too short to allow any political intervention to prevent the bomb from being made. So those two realities are to paraphrase Senator Gore, Vice President Gore, "stubborn and inconvenient truths" that yes, I don't think diplomats fully, fully grasp.

MR JACOBI: Are you of the view that there are unilateral actions that a state might take over and above whatever the safeguards requirements are that are promulgated by the IAEA that could communicate clearly its intention either not to engage in particular activities, or to further demonstrate the fact that it is not seeking to divert material?

PROFESSOR SOKOLSKI: Well, you would have to allow wide area surveillance of the kind that was experienced during the Iraq – after the Iraq war, which is extremely unorthodox for a sovereign state in peacetime to do. But it is an area where the IEA could, this is very woolly headed but this is conceivable, it could be given the authority to do a wide area surveillance search of a country in a much more robust way than it currently does. Now they currently argue that they can get a sense of whether a country has a covert

or undeclared facility by interviewing and discussing and examining open source materials. This is what is the lead up to an additional protocol. But I think in some cases, the agency would be hesitant to use that kind of technique with certain countries for fear that they might make a mistake. The work
5 around would have to be some rather energetic inspections, I suppose and this is well beyond my arena. This is very woolly headed what I am suggesting.

MR JACOBI: What I had in mind was the ability to demonstrate, for example, the material wasn't being diverted by taking steps to demonstrate
10 compliance that were over and above those that had otherwise been contemplated? Do you think - - -

PROFESSOR SOKOLSKI: I think that's what I - I think that's what I was trying to forecast what it might look like. It's a tall order but I think it would
15 have to be something along the lines I mentioned. Unless you have something specific in mind?

MR JACOBI: I was interested to pick up, you spoke about, I think a link between the economics of nuclear fuel cycle activities and proliferation - - -

20 PROFESSOR SOKOLSKI: Yes.

MR JACOBI: - - - risks, and I am just interested to pick up on the two themes. As I understood the first was that if one engaged in non-economic nuclear
25 activities, one would have an incentive, as I understand it, to seek to recoup on one's investment by selling to parties with perhaps questionable proliferation standards. I'm interested to understand the extent to which there's any example that might demonstrate that proposition.

30 PROFESSOR SOKOLSKI: I always like to start at home. People tend to listen to you if you point to yourself, so let's start with the United States. Iran, we trained most of the people who are senior in that program at MIT. We subsidised that and we changed the admission requirements to make it easier for them to come in. Why? Well, we are going to sell something in the order
35 of 20 or more power reactors. It's going to be an enormous market. There were ads celebrating how the shah was going to buy all these reactors and they were all going to be American. We were going to help them actually set up a big reprocessing plant.

40 Now, we put our foot down and said, "Well, maybe we can't do the latter," but it's not well known that towards the end of the shah's rule he met with the president of the United States, Jimmy Carter, and even that was considered perhaps something we would reopen, and I think part of the reason we did that was our desire to support the shah, but part of it was it looked commercially
45 very attractive. He had money, a lot of it. So that's one.

Then there's India. Similar. We were going to do both good for ourselves and good by them and good by the world. Enormous market. All these people needing electricity. So first we went with the Canadians and tried to bootstrap them technically with what was called the Canadian-Indian-US Reactor, CIRUS reactor, and we gave them all the technology and training they needed to operate that plant and to do recycling. All this was under a pledge that it would only be for peaceful purposes. They used that to make their first bomb. They call it a peaceful nuclear explosive.

We also sold them two light-water reactors at TerraCorp. We thought that they would promise not to reprocess that. They said, "No. You misread what we promised. We would like to reprocess it." We have never resolved that. We continue to give them technology, and even reopened the whole question of whether it was okay for a state that had bombs and never signed the pledge under the Nuclear Non-Proliferation Treaty not to, whether or not it would be okay to give them civil assistance. We cut a new deal in 2008 and the materials that we are now selling, which include some uranium, now is making it easier for them to make more bombs, and we did all this because there was a market and because we thought we could capture it. We have failed to capture it yet.

MR JACOBI: Professor, could I interject there? The examples you've identified involve the export of technology, and I'm interested in whether there's a distinction between that and the export of, for example, fuel by a country such as Australia were we to fabricate fuel in Australia to be sent overseas and to be used in power reactors elsewhere, or, for example, for it to offer enrichment services.

PROFESSOR SOKOLSKI: All these activities are scenario dependent, but to use the Indian example, which comes close to home for the Americans, and, I think, for Australians, for obvious reasons; you've just cut a deal to do the exporting as much as we have. The Pakistanis make a very good case that by sending civil material that is under safeguards in India, you are freeing up domestic production of uranium that is not under safeguards to go to make more bombs. This strikes me as a pretty strong argument, not just because the Pakistanis are making it, but because people who are senior officials in the US government, now retired have made this argument, people who focused on nuclear proliferation issues. So, yes, you run the risk in certain cases of actually encouraging certain bomb-making activities even if you sell the material under safeguards.

Now, that isn't true for countries that have all of their facilities under safeguards, but you'll see what happens when you're desperate to capture market share: you go where you can. The United States, I believe Russia,

France, Japan, Korea, have all tried to see if they could make sales to India. Similarly, sales are now being contemplated for Saudi Arabia, a country whose leadership has openly discussed its desire to make nuclear weapons at some point, and have talked about their civil activities as a way to bootstrap themselves into that capacity or option. I could go on, but, yes, there's a connection even there.

MR JACOBI: Can I pick up on the second strand of the argument you made, and that was the relationship between non-economic activities and offering an example to other countries and the extent to which that might be used as providing for a foundation for other countries to engage in such activities. I'm interested to understand the extent to which you consider there have been real world examples of that.

PROFESSOR SOKOLSKI: I think it's pretty clear that India, which is enamoured of breeder reactors - which make regular reactors look like money machines; these things are very, very uneconomical, well beyond anything you could accuse any light-water reactor of being - and their desire to close the fuel cycle got a lot of impetus from the similar activities that could be found earlier on in France, Great Britain, Germany and the US. Now, each one of these countries has turned those projects off, but not before the Indians pointed to them as examples for why they should proceed.

Their breeder reactor, I might add, is unsafeguarded and is almost certain to be used to produce weapons material for their weapons program. They point also to perhaps what Japan originally intended to do. Their program is still on paper, but in practice, it's not operating at all. So, yes, that's one example. I could point to others, if you'd like.

MR JACOBI: Can I pick up on a different topic, which is the relevance of what I might describe as multinationalism or internationalism with respect to fuel facilities. I'm interested in your view as to the likelihood of success of such an approach to be able to provide a relevant arrangement for non-proliferation, particularly for enrichment activities.

PROFESSOR SOKOLSKI: Yes. Well, there are two ways to look at this: one is the hope established, as far back as 1946 under the Acheson-Lilienthal report, which first discussed the idea of having international ownership of all dangerous nuclear activities, as they described them - if the world had actually been arranged under such tight controls as were suggested there, I would venture to say that it would make some sense. The premises of such tight control that all dangerous, large reactors, all mining of uranium, all enrichment, all reprocessing, would be owned and operated by an international authority makes one's head spin. I mean, the likelihood of that happening now is very, very remote. Everything is

nationally owned in those categories. There is nothing internationally owned.

But one can imagine that scenario, and that is the scenario that has been offered up on a voluntary basis. What if we had a voluntary international enrichment effort? Well, perhaps. I am very sceptical though. There is a real world example of a multinational enrichment effort. It was Urenco. What happened there? Well, first, I understand the Israelis went in and managed to take an awful lot of information. They have an enrichment program for their weapons program that's based on the technology they were able to get. And then of course Mr AQ Khan visited and he, in turn, took the technology, gave Pakistan its first batch of uranium for its first bombs and of course he shared the technology in turn with Libya, it looks like Iran and we're still tracking down all the other places it may have gone. What is interesting is to even make these transfers look more attractive, the Pakistani agent in this case, and I think the government had some knowledge of this, I'm trying to be very diplomatic here, sweetened the deal with all sorts of other things, including preliminary bomb designs. So that experiment in multinational control of enrichment did not go very well. The idea that somehow new circumstances would permit you to succeed after that failure just shows the pride of optimism of the human spirit. I am not sure there is something that's happened that would suggest success in the future in a way that would be convincing.

There are people that say oh well, you could black box the technology. This again strikes me as diplomatic physics. It's what – if you don't know very much about the technology, you can imagine it not being accessible to anyone by some series of devices. If you know a lot about the technology, much like I guess cyber competitions, you know how to break the link. That which is devised by humans technically can be seized, broken in to by humans and we've learned this the hard way in the case of Iraq. I don't think that's going to change.

MR JACOBI: I am interested to the extent to which what you have described with respect to URENCO represents a failure of multinationalism in the sense that other countries couldn't be assured of what other countries were doing because no one country had control of it. I am just interested that the examples you have given involve, in essence, the theft of the technology and I am just interested to understand the extent to which multinationalism might though have a role in offering other countries assurances that the host country isn't seeking to use the technology for another purpose?

PROFESSOR SOKOLSKI: I think that raises an interesting theoretical. In the case of Germany and the Dutch and now I guess the Americans and the French, the concern that it might be seized to make bombs is very low. But you know if you had a multinational fuel centre in East Asia or in the Middle East, yes we can see at least this much evidence that there be a worry. My friends who are

South Korean were asked pointedly well why don't you just let the Japanese do your recycling, or why don't you let them do your enrichment? You could do it together, and the rejoinder was why would we want them to do it, we would prefer to do it ourselves. That is a backhanded way of suggesting that they
5 don't feel comfortable doing it in places where there are competitions. They feel like that would only allow the Japanese to have all the benefits of having the facility there, without South Korea having the benefits of being able to compete. And this is not economics we are talking about but it's national security (indistinct) I think you would encounter that kind of fear and loathing
10 in other places where you might want these facilities to work. For the sake of peace, they would work the worst in those locations. You might want to find another Holland, if you want to do this.

MR JACOBI: Yes.
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PROFESSOR SOKOLSKI: Right, and – but even there, it didn't work very well did it.

MR JACOBI: I am just interested to pick up about whether you see that there
20 is any place for multinationalism at all with respect to fuel facilities? Reading the speech that you gave back in – I think 2014, at the IAEA, you did talk about in the end that – and I think it was expressed in this way, that some honesty about the difficulties with safeguards could lead to an agreement that an enrichment facility be organised on such a basis. I am just interested as to
25 whether you think that modern nationalism has any role at all in the process?

PROFESSOR SOKOLSKI: It would if you recognised why you need it. We are in denial about how safeguardable these activities are. We just say, well who can inspect or monitor, you can get timely detection and even the IEA in
30 its more honest moments, will tell you that's not true. It will not meet the timeliest detection goals which have absolute numbers in a time and amounts and they cannot make those goals. So think if you have that first and if you could find a host location, I suppose it would make more sense. You would then have to prevent any additional national facilities and probably wean those
35 facilities that are nationally owned off their national management. That is a pretty tall order. Most people are talking about – when they talk about multinational enrichment is well it's voluntary. We added on top of the existing structure and this somehow adds dramatically to our non-proliferation goals. I think that's not the case.
40

In other words, the suggestion in the paper that Victor Gilinsky and I gave, was you would have to go back to something more like an understanding of things in the Ashes of Lilienthal report in the Beirut plan. That's a pretty tall order. I don't mean to deny its role at all but I just caution that this is not something
45 you can do a la carte.

MR JACOBI: Can I just pick up on why you think that – perhaps what you described as an overlay would not be effective?

5 PROFESSOR SOKOLSKI: The reason why there is so many other sources for these materials. It isn't as though one would go to Kazakhstan for example to get surplus uranium. This is something that they've thrown out. Who would go to whoever supplies it currently at a market price and there is so many other suppliers. Also, it would not be binding that anyone go buy through this
10 particular location. It might not be economically viable as a result. There is a reason why they haven't been created to date; those that have the technology who can make some money enriching fuel are doing so and have captured so much of the market that it's very hard to break in to the market. Right now, moreover there's a 50 per cent surplus of capacity to enrich, over demand and
15 that is likely to continue to grow. To open up an additional facility and just – and to say it's multinational, it's voluntary to come to it, I don't think would necessarily help tamp down the problems associated with enrichment as a proliferation problem, or as a solution I should say.

20 MR JACOBI: I am just interested, perhaps this final question, in terms of – in your experience, has there ever been a case where a country has been able to effectively communicate an assurance that it was not minded to – that is was minded to engage in nuclear activities, perhaps nuclear power plants but to communicate effectively an assurance that it had no interest in developing a
25 weapons programme, or proliferating?

PROFESSOR SOKOLSKI: I think de facto, certain countries have pulled that off, when they're part of an alliance system or an economic system NATO or the European Union but I have not – I would have to really reflect on that to
30 think about has anyone explicitly pulled that off. I can't think of one.

MR JACOBI: Just that there are models where, for example, a country has indicated, and I am thinking about for example the United Arab Emirates, where the explicit policy of the model was, well we want to develop nuclear
35 power but we explicitly disclaim - - -

PROFESSOR SOKOLSKI: Yes.

MR JACOBI: - - - engagement in other activities within the cycle.
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PROFESSOR SOKOLSKI: You pick a case I know something about. That agreement was oral then it became very weak on paper and then it became firmer as a result of complaints made by organisations like my own. Actually, almost exclusively by my organisation, if I can brag a little. However, what we
45 finally got is a very interesting obligation. It says, and this is instructive for

5 this Commission, and I'd like to think it strengthens my argument a bit - in that agreement, if you read it carefully it says that the United Arab Emirates will be free to demand conditions more liberal than these restrictions if the United States offers any such more liberal nuclear cooperation with a Middle Eastern nation.

10 Now, there's been a bit of a kerfuffle recently when the chairman of the House Foreign Affairs Committee publicly stated that he had gotten a phone call and had a conversation with the ambassador from the United Arab Emirates that conveyed the thought that the UAE now felt like it could demand exception to the requirement that it not reprocess or have a heavy-water reactor, because we had a struck deal, after all (indistinct) that allowed them to enrich and therefore, under the terms of the agreement, they should be freed from the obligation. Now, I believe if you contact the embassy, they deny that call ever
15 occurred, but eyebrows go up because it's in the agreement and it may well be that at some point they might feel that they're no longer obliged.

20 So all of these things that are set as precedents, as good as they are, have an undercurrent, and the more you learn about those undercurrents, the more worrisome even these efforts, which are really the best of what American non-proliferation restrictions have to offer, offer.

25 COMMISSIONER: Professor, thank you very much for your evidence today. It's been very useful.

PROFESSOR SOKOLSKI: Okay. Well, thank you very much for letting me speak and answer your questions.

30 COMMISSIONER: We'll adjourn to 1300 when we'll have Dr Robert Floyd from the Australian Safeguards and Non-Proliferation Office.

ADJOURNED

[11.52 am]